AIRPORT MASTER PLAN UPDATE

EASTERN SLOPE REGIONAL AIRPORT
Fryeburg, Maine

AIP #3-23-0022-10-2006

August 2008

Final Report

GALE

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AIRPORT MASTER PLAN UPDATE

EASTERN SLOPE
REGIONAL AIRPORT
Fryeburg, Maine

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Final Report – August 2008

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"The preparation of this document was financed in part through a planning grant from the FAA as provided under the Airport Improvement Program of 1982, as amended. The contents of this report reflect the views of the consultant and do not necessarily reflect the official views or policy of the FAA. Acceptance of this report 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 applicable public laws."

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CHAPTER 1: INTRODUCTION

The Eastern Slope Regional Airport Authority (the Authority) commissioned this Airport Master Plan Update (AMPU) to assist it in achieving its goals and objectives for the Eastern Slope Regional Airport (ESRA or the Airport). The Airport is owned by the Town of Fryeburg, Maine and is overseen by the Authority. The AMPU will cover the years 2005 through and including 2025 (the Planning Period).

Membership on the Authority consists of:

Four members from Fryeburg, ME
Two members from Conway, NH
One member from Mt. Washington Valley Chamber of Commerce
One member from Lovell, ME
One member from Denmark, ME
One member from Brownfield, ME
One member from Chatham, NH

"In the late 1950's and early 1960's, Mount Washington Valley businessmen expressed interest in developing a regional airport to provide an alternate form of transportation to the area's recreation facilities. To implement this concept, the Eastern Slope Airport Authority was formed in 1960 to construct and manage the Airport. The Authority selected a site in southern Fryeburg for the location of the Airport due to terrain considerations."[1] Since that time, the Authority has tirelessly pursued improving the Airport as a local and regional transportation resource. To that end, the Authority adopted the following goals and objectives:

GOAL: IMPROVE FINANCIAL SELF-SUFFICIENCY.

Objectives:

- Encourage member towns to financially participate in the ESRA's operating budget
- Construct new aircraft hangars for lease or purchase from the ESAA
- Diversify airport revenue sources to stabilize budgeting efforts
- Make use of private, local, state, and federal funding sources for airport improvements

[1] 1992 Master Plan Update, Eastern Slope Regional Airport, Fryeburg, Maine, prepared by Dufresne-Henry, Inc., May 1993, page 2-1

GOAL: IMPROVE AIRPORT ACCESSIBILITY.

Objectives:
- Improve runway facilities
- Increase visibility of airport to potential new airport users and the community
- Improve aircraft access to airport's leased areas

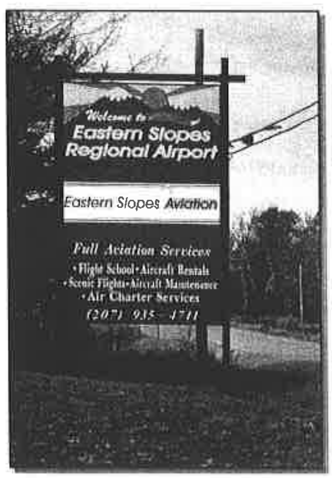
GOAL: IMPROVE AIRPORT AESTHETICS.

Objectives:
- Develop minimum standards for future airport building construction and use
- Add landscaping vegetation near the terminal building and auto parking area

GOAL: ENHANCE AIRPORT SAFETY.

Objective:
- Maintain compliance with FAA standards
- Improve or upgrade runway approaches

Recognizing the Authority's objectives as a sound basis, the primary objective of this study is to produce a plan of action that assists the Authority in reaching its goals and objectives through the identification of the Airport's needs, its compliance status with FAA design standards, and the design of program to fulfill its needs over the next 20 years. Remaining eligible to receive federal funding assistance is key to the Airport's ability to realize its goals. Some key airport improvements were identified for evaluation in this study. They follow (in no particular order of priority):



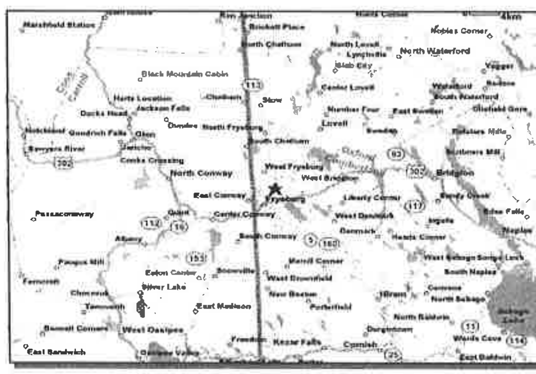
- Construction of a Jet-A fuel system
- Relocation of the Airport terminal building
- Development of additional T-hangars
- Extension of the runway by 800 feet
- Widening of the runway from 75 feet to 100 feet
- Construction of a full-length parallel taxiway
- Installation of visual and radio navigation aids to improve runway approach capabilities
- Construction of additional fixed-based operator (FBO) facilities
- Other related projects

The Federal Aviation Administration (FAA) recommends that airport master plans be updated at least every 5 to 10 years or when significant changes in an airport's environment indicate that an update is appropriate. This report represents such an update to the Airport's most recent Airport Master Plan completed in 1992 (the 1992 Plan).[2] In order to avoid duplication or unnecessary analysis, those areas of the 1992 plan that remain current will not be repeated here but merely cited for reference. This AMPU will cover the planning period from 2005 through and including 2025.

The Airport is eligible to receive federal funding assistance under the FAA's Airport Improvement Program (AIP). All improvements at airports eligible for and intending to apply for AIP funding must be shown on an airport's Airport Layout Plan (ALP). The ALP is a plan set consisting of several sheets that graphically depicts existing conditions and proposed improvements at an airport. It is typical for a Master Plan Report to accompany an ALP. The report documents the analysis and justification for the improvements shown on the ALP. This project will provide the Airport with an updated ALP and an updated Airport Master Plan Report.

1.1 Airport Locus

The Town of Fryeburg is located on the southwest side of Oxford County, Maine. The town is approximately sixty miles northwest of Portland, Maine, fifty miles west of Auburn/Lewiston, Maine, and ten mile east of Conway, New Hampshire. U.S. Route 302 is the major east-west artery serving Fryeburg and State Routes 5 and 113 are secondary north-south highways serving the Fryeburg area.



Regional Location

ESRA Locus

The Airport is located in the southern portion of Fryeburg, off State Route 5, approximately two miles south of the town's central business district. The Airport is within the planning district of the Southern Maine Regional Planning Commission in Sanford, Maine.[3]

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[2] 1992 Master Plan Update, Eastern Slope Regional Airport, Fryeburg, Maine, May 1993, Dufresne-Henry, Inc.
[3] 1992 Master Plan Update, Eastern Slope Regional Airport, Fryeburg, Maine, prepared by Dufresne-Henry, Inc., May 1993, page 2-1

1.2 How to Use This Report

The report was written and organized so that information is presented in a logical, readable format with minimum duplication of information. The graphics contained in the report are formatted as follows:

TABLES: All tables are located in the Chapters and sections to which they apply. At times, cross-references to tables are necessary, but these have been kept to minimum. The tables are identified in numerical sequence starting with the Chapter number so that the third table on Chapter 3 is identified as Table 3-3, etc.

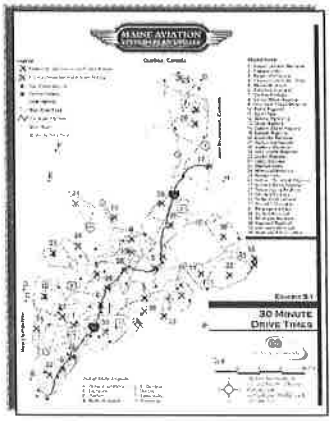
FIGURES: All figures are found in the Chapters and report sections to which they apply and are numbered sequentially starting with the Chapter number so that the second figure in Chapter 5 is identified as Figure 5-2.

SHEETS: Sheets are Airport Layout Plan sheets in their various stages of development. All sheets are located at the end of this report before the appendices. Sheets are developed in stages as the plan is developed, therefore not all plan sheets may be contained in the report until the full draft report has been prepared for final review. Following is a listing of all the sheets that will ultimately be part of the final ALP Update:

Sheet 1 – Airport Layout Plan Cover Sheet
Sheet 2 – Existing Facilities Plan Sheet
Sheet 3 – Airport Layout Plan (ALP) Sheet
Sheet 4 – Pavement History Plan Sheet
Sheet 5 – Terminal Area Plan Sheet
Sheet 6 – Runway Plan & Profile Sheet
Sheet 7 – Imaginary Surfaces Plan Sheet
Sheet 8 – Land Use Plan Sheet

CHAPTER 2: INVENTORY OF AIRPORT FACILITIES

This chapter documents the existing airport facilities to provide the study with a solid basis upon which to analyze future demand, facility needs, and development recommendations. Among other resources, the following documents were used to prepare this chapter:



- *Eastern Slope Regional Airport Master Plan, May 1993*
- *Eastern Slope Regional Airport Layout Plan, July 1993,* January 1997
- *FAA Form 5010-1, Airport Master Record for Eastern Slope Regional Airport,* Last 5010 Inspection November 15, 2002
- *Maine Aviation System Plan Update – Phase 1, 2001-2003*

The Airport is a public use facility that consists of approximately 533 acres. It includes a number of resources that are more fully described in this section.

2.1 Recent Improvements

A small but not insignificant number of improvements to the airport facilities have been accomplished since the 1992 Airport Master Plan (see Figure 2-1). They are:

Table 2-1
Improvements since 1992 Airport Master Plan

Facility	Improvement	Date Constructed or Installed
Runway	500-Foot Extension to Runway 14 end	Resurfaced 1997
	Runway End Identification Lights (REILS)	1995
Fuel Facility	Upgraded to 10,000 gallon underground storage	1994
	Self-serve Pump System Installed	2005
T-hangar	13-Unit Nested	2005
SRE Building	New Equipment Storage and Maintenance Building	2005

2.2 Runway 14-32

The airport has one runway, designated Runway 14-32, oriented in a northwest-southeast direction. Table 2-2 summarizes known information about the runway. For a graphic reference of the runway, refer to Sheet 2 of the ALP.

Table 2-2
Runway Inventory

Component	Runway 14	Runway 32
Length	4,200 feet	
Threshold Displacement	None	None
Width	75 feet	
Surface Type	Asphalt	
Surface Condition	Completely resurfaced in 1997 (Bomaged, graded & paved)	
Shoulder Type	turf	
Shoulder Condition	poor -- sandy material doesn't support turf well	
Weight Bearing Capacity *	30,000 pounds in single-wheel landing gear configuration	
Approach Capabilities	NDB or GPS-B Circling	NDB or GPS-B Circling and GPS Straight-In
Edge Lights	pilot-controlled Medium-Intensity Runway Light System (MIRLS)	
Pavement Markings Available	Numerals	Non-Precision Instrument
Landing Aids	None	Runway End Identification Lights (REILS – 1995) Visual Approach Slope Indicator (VASI)
Wind Coverage *	97.8% with 12 kt crosswinds 99.3% with 15 kt crosswinds	
Effective Gradient *	0.82%	
Runway Safety Areas (RSAs) Available	150'x300' feet (standard)	150'x300' feet (standard)

Source: Gale Associates, Inc.
** 1992 Airport Master Plan*[1]

2.3 Taxiways

The airport has a partial parallel taxiway running from the Runway 32 end to approximately mid-field. This taxiway is named Taxiway "A", and it has two entrance/exit taxiways connecting the parallel taxiway to the Main Apron named Taxiways "B" and "C". Table 2-3 summarizes information about these taxiways. For a graphic reference of the taxiways, refer to Sheet 2 of the ALP.

[1] 1992 Master Plan Update, Eastern Slope Regional Airport, Fryeburg, Maine, prepared by Dufresne-Henry, Inc., May 1993

Table 2-3
Taxiway Inventory

	Taxiway 'A'	Taxiway 'B'	Taxiway 'C'
Type	parallel taxiway	exit/entrance taxiway	exit/entrance taxiway
Use	used to access apron, tie-down areas and hangars	used to leave/enter the runway at midfield	used to leave/enter the runway at the Runway 32 end
Length	2,000± feet	460± feet	280± feet
Width	40± feet	40± feet	40± feet
Surface Type	Asphalt	Asphalt	Asphalt
Surface Condition	Fair Constructed in 1985 (Exceeded Design Life in 2005)	Poor Constructed in 1961 (Exceeded Design Life in 1981)	Good Constructed in 1990
Edge Lights	Pilot-controlled Medium-Intensity Taxiway Edge Lights (MITLS)	Pilot-controlled Medium-Intensity Taxiway Edge Lights (MITLS)	Pilot-controlled Medium-Intensity Taxiway Edge Lights (MITLS)
Pavement Markings	Centerline	Centerline	Centerline

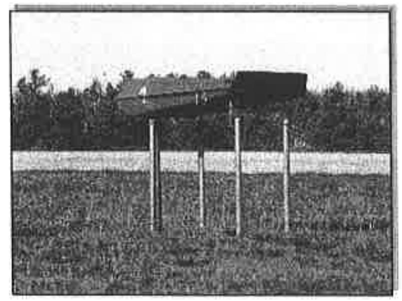
Source: Gale Associates, Inc., and Eastern Slope Airport Authority (ESAA)

2.4 Navigation/Landing Aids

2.4.1 AIRPORT BEACON

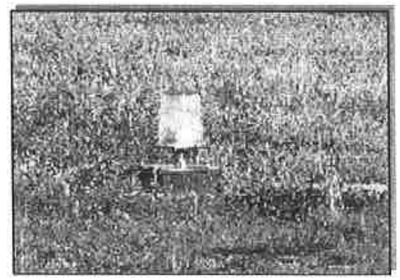
The Airport has a 36-inch rotating beacon on a 60-foot metal tower that was installed in 1983. The rotating beacon is used to indicate to pilots the location of the airport at nighttime or during periods of low visibility. The beacon is standard at civil airports that have runway lighting systems. The beacon emits two beams of light, 180 degrees apart; one light beam is green and the other is white. At airports with no runway lighting, the beacon flashes only white lights. The beacon is located in the terminal area on the east side of the SRE building (facility No. 10), northwest of the terminal building.

2.4.2 VASI



The Airport has a two-box Visual Approach Slope Indicator (VASI) installed in 1983. It is owned and maintained by the ESAA. The VASI is a light system used by pilots on approach to Runway 32 to assist them in maintaining the proper glide slope to the runway.

2.4.3 REILS

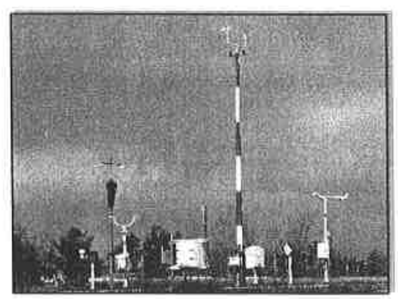


The Airport has a Runway End Identification Light System (REILS) that serves Runway 32. REILS are white flashing strobe lights located at a runway end to assist pilots in identifying the runway end during times of low visibility. The REILS were replaced in 2005 and are owned and maintained by the ESAA.

2.4.4 LIGHTED WINDSOCK

The Airport has two lighted windsocks. One is located near midfield on the terminal side of the runway and the other is located west of the runway and has a segmented circle (re-painted in 2006). These windsocks are used by pilots to determine wind direction and assist in determining the proper runway for landing or take-off.

2.4.5 ASOS



The Airport has an Automated Surface Observing System (ASOS) that provides automated meteorological information to pilots either through the use of a radio or telephone. The ASOS is located to the north of the Main Apron and terminal area. It is owned and maintained by the FAA.

2.4.6 FAN MARKER

The Airport owns and maintains this marker beacon that transmits a radio signal in a vertical "fan" or bone-shaped radiation pattern. Marker beacons provide an indication, by sound and sight that the aircraft is passing over the facility.

2.4.7 NDB

The Airport owns and maintains a Non-Directional Beacon (NDB) located approximately 8 miles from the Airport on the extended runway centerline. The NDB is on property owned by the ESAA. The NDB transmits non-directional radio signals that can be used by pilots equipped with direction finding equipment to determine the bearing to or from the radio beacon.[2]

2.5 Aircraft Parking Facilities

The Airport offers outdoor and indoor aircraft parking facilities.

2.5.1 AIRCRAFT APRONS

The Airport has one paved apron designated as its primary aircraft parking area. The apron is accessed via Taxiways "B" and "C" and is approximately 200 feet wide x 850 feet long and supports approximately 47 single-engine, fixed-wing aircraft. Thirty tie-downs are in a nested arrangement located in the approximate center of the apron and 14 tie-downs are located along the eastern edge of the apron. The apron was constructed in three sections over a period of years. The first section of apron was constructed (200 feet wide by 150 feet long) in 1961 and is shown as section (E) on Sheet 4 of the ALP. The second section was constructed in 1975 (200 feet wide by 210 feet long) and added to section (E). Sheet 4 indicates this second section constructed as section (F). Both of these apron sections have deteriorating pavements that have exceeded their design life and must be replaced. The latest addition to the apron occurred in 1990 with the construction of a 210-foot wide by 500-foot long section shown as section (G) on Sheet 4. Section G is in fair condition and will exceed its design life in 2010. Refer to Sheet 4 of the ALP for a graphic depiction of the apron.

View of Sections E and F of Aprons
(Note Cracking)

2.5.2 AIRCRAFT HANGARS

The airport has several hangars to house aircraft. Table 2-4 summarizes known information about these hangars. Refer to Sheet 2 for a graphic depiction of their locations.

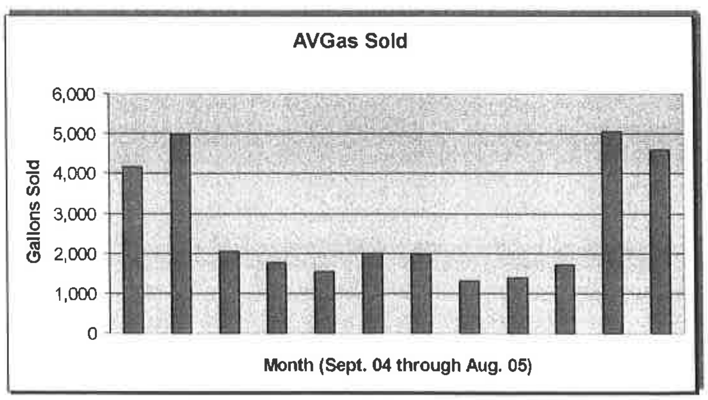
[2] It should be noted that FAA is in the process of transitioning away from the use of NDBs as navigational devices. It is probable that the NDB and its approach procedure will be decommissioned during the planning period.

Table 2-4
Hangar Inventory

	Approx Year Built	Construction Type	Max. Door Opening	Capacity/Use	Owner	Condition
Facility #1	©1960	Wood frame Corregated Metal siding Metal roofing	41 feet	6-Unit T-Hangar Nested configuration	ESAA	Good
Facility #2	Late 1970's	Wood frame Fiberglass siding Metal roofing	50 feet	FBO/Maintenance Hangar	ESAA	Good
Facility #3	1978	Steel & wood frame Metal siding Metal roofing	44 feet	6-Unit T-Hangar Nested configuration	ESAA	Good
Facility #4		Steel & wood frame T111 siding Metal roofing	44 feet	4-Unit T-Hangar	ESAA	Good
Facility #5 Coleman Hangar	1986	Wood frame Metal & T-111 siding Metal roofing	41 feet	6-Unit T-Hangar	Privately-Owned Reversion to ESAA at lease end	Good
Facility #6	1986	Wood frame Metal siding and roofing	40 feet	4-Unit T-Hangar	ESAA	Good
Facility #7	1990	Wood frame, Metal Siding, and roofing	68 feet	Conventional Hangar (2 aircraft)	ESAA	Good
Facility #8	2004-2005	Metal frame, siding, and roofing	40 feet	13-Unit T-Hangar Nested configuration	Condominium	Excellent

Source: Gale Associates, Inc., and ESAA

2.6 Aviation Fuel



The airport has one underground fuel tank built in 1994. The tank is constructed of double-wall steel and has a capacity of 10,000 gallons of 100 low lead (100LL) aviation fuel. The ESAA maintains the pump system which was upgraded in 2005 with self-service terminal. The fuel system is located adjacent to the northwesterly corner of the paved aircraft parking apron. Refer to Sheet 2 for a graphic depiction of the fuel dispensing system's location.

2. 7 Terminal Facilities

The airport is a small, general aviation facility with limited terminal facilities. The terminal area consists of a small terminal building, an automobile parking lot, aviation fueling area, an FBO maintenance hangar, a Snow Removal Equipment (SRE)/storage building, and a mobile home.

2.7.1 TERMINAL BUILDING

The airport has a terminal building located in the northwest quadrant of the airport shown on Sheet 2 as Facility #9. The building has approximately 1,350 square feet of usable area, has an enclosed (four season) porch and an anterior room with several stuffed chairs and coffee tables. The Airport Authority meets in this room to conduct business. The room is adjacent to the FBO[3] office and contains a public telephone, brochures and other information. The building has two lavatories, a small kitchen area, and storage. It was constructed in the early 1980's and is constructed of a wood frame with a corrugated metal roof. The building is undersized for its uses and should either be expanded or replaced with a larger building. The building condition is good and is maintained by the ESAA.

2.7.2 AUTOMOBILE PARKING

The airport has a gravel based parking area for automobiles adjacent to the terminal building. There is no overhead lighting for this parking area; however, an outdoor porch light on the terminal building provides lighting for the lot. The lot has the capacity to accommodate approximately 15 automobiles. Long term parking is available across from the mobile home and has a capacity of approximately 30 vehicles.

Additional automobile parking is allowed for based aircraft owners. These automobiles are normally parked in or adjacent to their hangar.

[3] A fixed-base operator (FBO) is a company or individual who provides services needed to pilots to maintain or repair aircraft, provide flight lessons, sell aviation fuel, provide charter aircraft flight, and/or sell aircraft.

2.8 Other Facilities

2.8.1 AIRPORT FENCING

A 1,000-foot long cable fence section is located on the south side of the Lyman Road surrounding the eastern and southern sides of the automobile parking area. The fence does not currently connect to the terminal building nor is there a gate associated with the fence.

Except for the fence section described above, the Airport perimeter is not fenced.

2.8.2 PILOT AND VISITOR FACILITIES

The Airport terminal building is used as a pilot's lounge. The four season porch, pilot's lounge and restrooms are available 24-hours/day, seven-days/week and contains seating and a telephone for use by pilots and others after business hours.

2.8.3 FIXED BASE OPERATOR (FBO)

The Airport has one FBO, Eastern Slopes Aviation, that leases and manages the fuel sales, tie-downs & long-term parking at the airport. Eastern Slopes also provides aerial tours and sightseeing, offers aircraft major and minor aircraft repair and maintenance services, major airframe and powerplant service, flight lessons, and aircraft rental and charter.

2.8.4 AIRPORT EQUIPMENT

The ESAA has purchased and maintains the following airport maintenance equipment.

Table 2-7
Inventory of Airport Equipment

Year Equipment Purchased	Equipment Make and Model	Funding Sources to Purchase Equipment	Condition
1961	(used) 1954 Walters Snowblower	ESAA	Poor
1977	Unimog Blower (bought used in 1990)	50% MDOT 50% town/airport	Good
1980 (estimated)	John Deer 1450 Tractor Mower	ESAA	Poor
2003	John Deer Loader TC 62H (with blower, plow and loader bucket)	90% FAA 5% MDOT 5% ESAA	Excellent

Source: ESAA

2.8.5 AIRPORT UTILITIES

The airport utilizes electricity for the MIRLs, MITLs, REILS, VASI, Airport Beacon, fuel dispensing facilities, directional signs, windsock, ASOS, SRE Maintenance Building, all hangars, and the terminal building. Single-phase, electrical power is supplied by Central Maine Power Company on a dedicated line via above-ground pole lines across airport property from Porter Road.

Water is supplied to the terminal building, the FBO/Maintenance Hangar, the SRE building and the mobile home by one on-site, artesian well.

No natural gas is supplied to the site. However, the Airport does have propane gas in tanks located adjacent to the terminal building for heat and hot water.

Trash is disposed of by an independent contractor.

2.9 Environmental Resources

Surveys were conducted in 1995 and 2005 on Airport property to identify and assess wetlands and natural communities. The surveys were essentially limited to areas on the Airport that may be impacted by future improvements. The surveys assist planners in determining whether future improvements may or may not affect these resources so that future improvements can be laid out to avoid or at least minimize impacts to them. The surveys indicated the presence of wetlands (labeled "A", "B" and "C") and natural communities on airport property. They are depicted on Sheet 2 of the ALP.

2.9.1 WETLANDS

A summary discussion of the wetland survey results[4] follows:

The Maine Department of Environmental Protection (MDEP) and U.S. Army Corps of Engineers (the Corps) regulate impacts to wetlands identified within the project area. Projects resulting in minor wetland impacts are reviewed jointly by both agencies through the Natural Resources Protection Act (NRPA) Tier review process. In general, projects not located within a wetland, or projects that alter less than 4,300 square feet of wetlands and are not Wetlands of Special Significance, and are exempt from the Tier permitting requirements. Based on Woodlot's review, Wetlands A, B, and C do not meet the definition of a *Wetland of Special Significance.*

However, as the report explains, Wetlands A, B, and C do have some functional value through their contribution to groundwater recharge and discharge, and they provide

[4] *Eastern Slope Regional Airport, Fryeburg, Maine, Wetland and Natural Community Delineation and Assessment Report,* prepared for Gale Associates, Inc., by Woodlot Alternatives, Inc., April 2006

some modest wildlife habitat value. They lack in sediment and toxicant retention due to the soil types and lack of surface water contribution from the runway.

Table 1. Wetland Types on the ESRA Site, Fryeburg, Maine

Wetland ID[1]	*General Wetland Type*	*Class*	*Comments*
A	Palustrine scrub-shrub, broad-leaved deciduous, semi-permanently flooded	PSS1F	Isolated wetland with a mix of small shrubs and graminoids.
B	Palustrine scrub-shrub, broad leaved evergreen, semi-permanently flooded and an open water beaver (*Castor canadensis*) pond	PSS3F and POWK-b	Isolated wetland with a mix of small shrubs and graminoids below a beaver pond with an abundance of downed trees.
C	Palustrine forested, needle-leaved evergreen, saturated seasonally or longer	PFO4B	Seepage wetland of balsam fir (*Abies balsamea*) that connects to a larger more diverse complex of wetlands.

Notes: 1. Refer to *Wetlands Map*.

Note: Table taken from Wetland and Natural Community Delineation and Assessment Report

2.9.2 NATURAL COMMUNITIES

The Airport contains a rare natural community called a Pitch Pine/Scrub Oak (PP/SO) Community as shown on Sheet 2 of the ALP. The Maine Natural Areas Program (MNAP) has designated PP/SO communities as *"S1" – critically imperiled in Maine because of extreme rarity (five or fewer occurrences or very few remaining acres) or because some aspect of its biology makes it especially vulnerable to extirpation from the state.*[5]

The Airport has two areas on Airport property that were identified as a PP/SO community. One area is located on the easterly side of Lyman Road (same side of Lyman Road as the Airport hangars). This area is a long thin strip that runs along Lyman Road to approximately 20 to 25 feet behind the hangar buildings shown as Facilities No. 6, 7 and 8 on Sheet 2 of the ALP. According to Woodlot Alternatives, Inc. (Woodlot) "while this area technically meets the PP/SO community definition, it does not provide the same valuable habitat as the more intact areas." However, it should not be construed that this area does not qualify for protection under federal, state or local regulations.[6]

The "more intact areas" referred to by Woodlot are located on Airport property but on the westerly side of Lyman Road, about 100 feet from the road itself and approximately 300 feet to the south of the mobile home (Facility No. 12 on Sheet 2 of the ALP). According to Woodlot, this area does meet MNAP definition as a PP/SO community.

[5] Wetland and Natural Community Delineation and Assessment Report, Eastern Slope Regional Airport, Fryeburg, Maine, prepared by Woodlot Alternatives, Inc., for Gale Associates, Inc., April 2006, pp.4.
[6] Chapter 6 of this report discusses regulatory requirements for protected natural communities and wetlands.

2.10 Aircraft Inventory

2.10.1 BASED AIRCRAFT

Aircraft inventories represent a "snapshot in time". That is, if an aircraft inventory records that an airport had 20 based aircraft in 2002, the number of aircraft based at the airport during 2002 most likely fluctuated, though not wildly unless unusual circumstances existed. For example, shortly after the September 11th terrorist attacks, it was not unusual that many smaller aircraft moved, some temporarily and some permanently, to smaller airports where security restrictions were less onerous. These aircraft movements caused the based aircraft inventories at the affected airports to fluctuate significantly over and above their historical thresholds. However, these are unusual cases and aircraft inventories at smaller general aviation airports tend to remain stable over time. Table 2-5 lists the historical breakdown of the based aircraft at the Airport.

Table 2-5
Historical Based Aircraft

Reporting Year	Based Aircraft	Source
1989	30	Maine State Aviation System Plan
1991	30	1992 Airport Master Plan Update
2001	27	Maine Aviation Systems Plan-Phase 1
2002	27	Airport Master Record
2005	40	ESAA

Table 2-6 lists the Airport's 2005 based aircraft inventory by aircraft type.

Table 2-6
2005 Based Aircraft Fleet Mix

Single-engine Piston	Twin-engine Piston	Turboprop	Jet	Helicopter	Total
36	3	0	0	1	40
90%	7.5%	0%	0%	2.5%	100%

Source: Gale Associates and ESAA

2.10.2 TRANSIENT AIRCRAFT

At smaller airports it can be safely assumed that its transient aircraft fleet will be a reflection of its home-based aircraft fleet. This is not the case at the Airport. Though many of the Airport's transient aircraft are similar in character and type to the based aircraft - that is, single and twin-engine pistons, the Airport is frequently visited by larger, faster and more sophisticated turboprop and jet aircraft. This is due in large part to the Airport's location in the four season resort area of the White Mountains and Maine lakes regions. According to the ESAA, it is not unusual for the Airport to have six or seven jets parked on the apron and for the Airport to "run-out" of apron space during any season but particularly during the summer and winter (ski season) months. Typically, King Air's, Falcon 900's (visited several times during the summer of 2006), Challengers, Gulfstream IV's, Citations, and Lear jets can be seen arriving and departing from the Airport during all four seasons of the year. Also, a charter company, "Lynnair" flying a Cessna Caravan out of Hanscom Field in Bedford, Massachusetts flies in an out of the Airport 7 or more days per week during the summer months (approximately a 12 week period).

2.10 History of Federally Funded Projects

Table 2-7 provides a history of projects at the Airport that have received federal funding assistance.

Year	Grant Amount	Project Description
1982	$129,241.00	Acquire Land for Development; Install Apron Lighting; Install Miscellaneous NAVAIDS; Install Runway Vertical/Visual Guidance System; Install Weather Reporting Equipment; Remove Obstructions
1983	$131,046.00	Conduct Miscellaneous Study; Extend Runway 14-32; Improve Airport Drainage; Install Runway Lighting
1934	$176,154.00	Construct Taxiway
1990	$229,567.00	Construct Taxiway; Expand Apron; Remove Obstructions
1992	$101,610.00	Conduct Airport Master Plan Study
1994	$124,290.00	Acquire Snow Removal Equipment
1995	$106,342.00	Extend Runway 14
1997	$782,036.00	Construct Taxiway; Extend Runway 14-32; Improve Runway Safety Areas; Remove Obstructions
2004	$292,725.00	Construct Snow Removal Equipment Building
2005	$166,250.00	Update Airport Master Plan Study
2006	$85,500.00	Remove Obstructions
TOTAL	**$2,324,761.00**	

CHAPTER 3: AVIATION FORECASTS

In order to identify airport facility needs during the planning period, it is necessary to project aviation demand levels for various airport components. The purpose of this chapter is to document the aviation demand forecasts during the 20-year planning period of this Study.

3.1 Overview of Aviation Forecasts

Aviation forecasts are based on historic trends or relationships that have been documented by airport management, the funding agencies, or an on-site air traffic control tower. At airports that do not have this information, forecasting methods necessarily rely heavily on realistic assumptions about activity levels likely to be achieved.

Planning airport improvements is a combination of the realization (or near realization) of aviation demand and the ability to fund the project. In other words, funding an improvement project well before a demand exists wastes limited funding resources. This chapter reviews three time periods in which aviation-demand levels may trigger recommended improvements: five-year, 10-year, and 20-year periods.

The following terms are often used in airport forecasts and they are often confused even though their meanings are quite different. For clarification, the meanings of each of these terms are presented below.

Based Aircraft – this term refers to where an airplane makes its home or, in the case of Eastern Slope Regional Airport, an aircraft whose "home" is at the Airport.

Transient Aircraft – this term refers to an airplane whose home is at an airport other than the airport for which the forecast is being produced. In other words, any aircraft that uses Eastern Slope Regional Airport, but whose home base is at another airport is a transient aircraft.

Local Operation – A local operation is one where an aircraft operates within 20 nautical miles of the airport for which the forecast is prepared. A local operation can be performed by either a based or a transient aircraft.

Itinerant Operation – An itinerant operation is one where an aircraft operates at a distance greater than 20 nautical miles of the airport for which the forecast is prepared. Again, an itinerant operation can be performed by either a based or a transient aircraft.

It is important to note that either a based aircraft or a transient aircraft can perform a local operation; the same is true for itinerant operations.

In 2001 the State of Maine produced the Maine Aviation System Plan[1] (MASP) that established system-wide forecast growth rates for based aircraft, the based aircraft fleet mix, and aircraft operations. The methodologies used in the MASP considered the FAA forecasted growth rates[2] as well as the relationship between growth in Maine aviation and county population and employment. The growth rates preferred in the MASP were developed for statewide analysis and therefore must necessarily generalize in their applicability. The FAA forecast was developed for use on the national level, and should also be used with caution at the airport specific level of analysis. Nevertheless, each of these forecasts has value in this forecast and the preferred growth rates from these forecasts will be used where most applicable. Depending upon the aviation element being forecasted, this forecast will apply the most appropriate growth rate to each element. A discussion on the selection of a particular growth rate is included under each aviation element forecasted.

Chapter 2 presented the Airport's 2005 based aircraft inventory. Recent inventories and estimates will necessarily differ from the data used in the MASP principally because the base year used in the MASP was 2001 and it is now five years old. Therefore, recent inventory counts and estimates will be used in this forecast, where appropriate.

3.2 The Based Fleet

The based aircraft fleet consists in large part of relatively small aircraft owned by individuals residing within roughly a 25±-mile radius from the Airport.

The MASP projected that the based aircraft fleet at the Airport was to grow by 11% during the five year period from 2001 to 2006 (from 27 to 30 based aircraft), representing an average annual growth rate of 2.13%. Instead, the Airport's based aircraft fleet grew by 48% over the period (from 27 to 40 based aircraft), representing an average annual growth rate of 8.1%. An 8.1% average annual growth rate is unlikely to be sustained for the planning period by the Airport's based aircraft market area. Particularly when the FAAs forecasted growth rate for single and multi-engine aircraft is expected to be only 0.3% annually.

The MASP preferred average annual growth rate for all general aviation based aircraft in Maine is 1.1%, whereas the FAAs growth rate for the active general aviation fleet is 1.4%. Both of these growth rates differ significantly from the FAAs growth rate for single and multi-engine piston aircraft – 0.3%. The significant differences in these rates are due in large part to the fact that the MASP and FAA growth rates for all general aviation aircraft include aircraft types that are not present in the Airport's based aircraft inventories. These other aircraft types are expected to grow at substantially greater rates than single and multi-engine piston aircraft, which constitute 97.5% of the Airport's based inventory - (growth rates of 2.2% for turboprop and 6.0% for business type jets versus 0.3% for single-engine piston and 0.1% for multi-engine piston). Furthermore, no evidence or indication has been provided that the character of the

[1] Maine Aviation Systems Plan Update Phase 1, prepared for Maine Department of Transportation Office of Passenger Transportation, prepared by Wilbur Smith Associates, 2001/2002

[2] http://www.faa.gov/data_statistics/aviation/aerospace_forecasts/2006-2017/

Airport's market area is expected to change substantially from its current "destination resort" status. It is therefore reasonable to assume that the Airport's base fleet will follow suit and retain its existing character. Because the Airport's variety of based aircraft is limited to the single and multi-engine piston airplanes and piston helicopters, the FAA forecasted growth rate for each aircraft type was applied to the based fleet to derive the Airport's based aircraft forecast: single-engine piston (0.3%); multi-engine piston (0.1%); and piston helicopter (6.7%). Table 3-1 presents this forecast.

Table 3-1
Forecast of Based Aircraft

	2005 (Actual)	2010	2015	2025
Projected based aircraft	40	41	42	45

Source: Gale Associates, Inc.

Table 3-2 presents the based aircraft fleet mix. The mix reflects the Airport's 2005 based aircraft inventory.

Table 3-2
Based Aircraft Fleet Mix

Aircraft Type	Actual 2005	Percent of Fleet
Single-engine piston aircraft	36	90.0%
Multi-engine piston aircraft	3	7.5%
Turboprop aircraft	0	0%
Jet aircraft	0	0%
Helicopters	1	2.5%
Gliders	0	0%
TOTAL	**40**	**100%**

Source: Gale Associates, Inc.

Table 3-3 presents the based aircraft fleet mix forecast. The based aircraft fleet mix forecast combines the results in Tables 3-1 and 3-2 to determine the future mix of based aircraft at the Airport.

Table 3-3
Based Aircraft Fleet Forecast

Aircraft Type	2005 (Actual)	2010	2015	2025
Single-Engine Piston	36	37	37	38
Multi-Engine Piston	3	3	3	3
Turboprop	0	0	0	0
Jet	0	0	0	0
Helicopter	1	1	2	4
Total	40	41	42	45

Source: Gale Associates, Inc.

3.3 The Transient Fleet

At smaller general aviation airports it is often the case that the based aircraft fleet mix is reflective of the total variety of aircraft that use an airfield. However, this is not true in this case. Eastern Slope Regional Airport supports a much broader mix of aircraft than is reflected in its based aircraft fleet. The based aircraft fleet - primarily single and multi-engine piston aircraft and small helicopters - does not reflect the more sophisticated, high performance aircraft that constitute a large part of the Airport's transient fleet. This is most likely due to the Airport being a "destination resort" area airport located in an area highly desired by tourists during all four seasons of the year.

According to the ESAA many visitors to the area arrive and depart on small to medium size turboprops and business jets. In order to substantiate this claim, the ESAA asked transient pilots to record their arrivals. The ESAA provided these records for this study with the caution that only a small minority of pilots actually recorded the needed information. This is not unusual since pilots that fly charter or business aircraft are notoriously protective of their passenger's privacy. Also, it is quite possible that once a pilot recorded the data on the first trip, the pilot did not feel it important to record all subsequent trips. In any case, the collected data was analyzed and each recorded airplane was classified in accordance with FAA airport classification criteria (i.e. by wing span and approach speed).

The records (or surveys) were collected from October 2003 through November 2005, a period of 26 months. Since the flights recorded were all itinerant operations, it is logical to assume that each record entry consisted of at least two operations (one landing to arrive and one takeoff to depart). The records indicate that 1,808 of these operations were recorded during the 26 month period. This represents an average of approximately 70 operations per month or 834 operations annualized (over a 12 month period). According to the data, approximately 276 operations (15%) of the 1,808 operations recorded were performed by the more demanding turboprop and jet aircraft. This appears to be a high proportion of turboprop and jet aircraft operations even though the use of these aircraft has increased disproportionately when compared to single and multi-engine piston aircraft.

The Airport's previous master plan indicated that turboprop and jet aircraft operations comprised only 3% of itinerant operations in 1991. Therefore, it is possible that the most recent survey produced an over-representation of these aircraft operations, probably because the pilots of these aircraft may have been more cooperative in participating in the survey. However, this is speculative and it is not known why the data produced such a high proportion of turboprop and jet operations. The growth in the high performance sector of aviation has been outpacing other sectors for years in general aviation. Therefore, it seems reasonable that the current proportion of high performance aircraft are higher than that reported in the Airport's previous master plan in 1991. In addition, the prospect that this phenomenon will continue and even increase in the future is well supported by aviation forecasts and trends in the general aviation industry. According to the FAA forecasts, general aviation turboprop and jet aircraft operations comprised over 9% of the operations performed by piston, turboprop and jet aircraft between 2000 and 2005. Given this and the destination resort nature of the

Airport, it is not unreasonable to assume that the Airport's transient fleet is comprised of 10% of these high performance aircraft. In addition, the FAA forecast of operations for these types of aircraft are split at 50% turboprop and 50% jet. Therefore, to be consistent with the FAA forecasts, these proportions will be used to determine the character of the Airport's transient fleet.

Table 3-4 contains the transient aircraft fleet mix which assumes that 10% of all transient aircraft are turboprop and jet, and of the 10%, 50% are turboprop and 50% are jet aircraft. It further assumes that the mix of remaining aircraft (non-high performance) is proportionally reflective of the Airport's based aircraft fleet mix.

Table 3-4
Transient Aircraft Fleet Mix

Aircraft Type	Percent of Fleet
Single-engine piston aircraft	81.0%
Multi-engine piston aircraft	6.7%
Turboprop aircraft	5.0%
Jet aircraft	5.0%
Helicopters	2.3%
TOTAL	**100%**

Source: Gale Associates, Inc.

3.4 Aircraft Operations Forecast

For airport planning, the term "aircraft operation" is defined as an arrival to or a departure from an airport. There are two types of operations: local and itinerant.

Local operations are performed by aircraft that: (a) operate in the local traffic pattern or within sight of the airport; (b) are know to be departing for, or arriving from, flight in local practice areas located within a 20-mile radius of the airport; (c) execute simulated instrument approaches or low passes at the airport. Itinerant operations are all aircraft operations other than local operations. Aircraft operations can also be defined in another way, such as air carrier, regional/commuter, air taxi, general aviation, or military.

Aircraft operations at the Airport consist mainly of general aviation (GA) with a small percentage of air taxi and military operations.

The ESAA estimates that approximately 33,000 aircraft operations took place in 2005 with 60% being local operations and 40% being itinerant operations. The ESAA commented that they felt 2005 was a "little slower" than previous years due to fuel prices.

The Airport's 5010 Form Airport Master Record recorded 33,350 aircraft operations in 2002. Of these operations, 330 were air taxi (1%), 19,800 were local operations (59%), 13,200 were itinerant operations (40%), and 20 were military operations (0.06%)[3].

The previous airport master plan forecasted that the Airport would have 27,800 operations in 2001 with 60% of these operations being local and 40% itinerant.

The Maine Aviation Systems Plan (MASP) forecasts recorded 33,350 operations for 2001 (the same as the 5010 Form), and forecasted 36,057 total operations for 2005. This represents an average annual growth rate of 1.97%.

Table 3-5
Reported Annual Aircraft Operations

	2001 Master Plan Projection	2001 (MASP)	2002 (Form 5010)	2005 (ESAA)	2005 (MASP Forecast)
Annual operations	27,800	33,350	33,350	33,000	36,057

A review of Table 3-6 indicates that the growth rate used in the Airport's previous Master Plan forecast most likely presents an under-estimate given the Airport's strong growth in based aircraft since 2001.

The MASP utilized a preferred average annual growth rate of 1.97% for total operations at the Airport, whereas the FAAs forecast used a rate of 1.4% for the total general aviation fleet across the U.S. The MASP growth rate was tailored to the Fryeburg area and although the MASP rate appears slightly aggressive given ESAA estimates, it is possible that the ESAAs estimates are low given that the Airport has no way to actually record its operations. Further, it is beyond the scope of this study to validate the MASP growth rate as it is applied to the Airport. The FAA rate of 1.4% represents an average for the entire United States and it seems logical that such a broad sample is likely not reflective of the "destination resort" uniqueness of the Airport environs, and that such a growth rate would be low given the Airport's environs and circumstances. Therefore, the MASP rate (tailored for the Fryeburg area) appears to be the logical rate to apply in the forecast of airport operations. Therefore a growth rate of 1.97% will be the preferred growth rate used in the forecast for total operations.

Preferred Yearly Growth Rate = 1.97%

The ESAA estimate of annual operations is the most current estimate of activity however, as aforementioned; these estimates may not include all operational activity at the airport. For this reason, the average of the MASP forecasted level for 2005 (36,057 operations) and the ESAA estimate for 2005 (33,000 operations) will be used as the base year in the forecast yielding 35,000[4] total operations.

Total Base Year (2005) Operations = 35,000

[3] % of operations exceed 100% due to rounding.
[4] Rounded to the nearest thousand

Table 3-6 presents the forecast of total operations using the preferred growth rate of 1.97%.

Table 3-6
Forecast of Total Operations

	2005 (base year)	2010	2015	2025
Total Aircraft Operations	35,000	39,000	43,000	52,000

Source: Gale Associates, Inc.

Table 3-7 contains the Airport's Operations Mix Forecast. The operations mix forecast provides a breakdown of the operations forecast by local and itinerant operations and by aircraft type. In developing the forecast, the following assumptions were used:

1. The existing 60% and 40% split between local and itinerant operations reported by several sources will be used.

2. Of the itinerant operations, it is assumed that 30% are conducted by based aircraft and 70% by transient aircraft.

3. Based aircraft operations (both local and itinerant) will be distributed into single-engine piston, multi-engine piston, and helicopters as shown in Table 3-2 (90% single-engine piston, 7.5% multi-engine piston, and 2.5% helicopter).

4. Transient aircraft operations will be distributed as indicated in Table 3-4 (81% single-engine piston, 6.7% multi-engine piston, 5.0% turboprop, 5.0% jet, and 2.3% helicopter).

5. Total annual aircraft operations are taken from Table 3-6.

Table 3-7
Operations Mix Forecast

Aircraft Type	2005 (Base Year)	2010	2015	2025
Local Operations (60% of Total Operations)				
Single-Engine Piston	18,900	21,060	23,220	28,080
Multi-Engine Piston	1,575	1,755	1,935	2,340
Helicopter	525	585	645	780
Total	21,000	23,400	25,800	31,200
Itinerant Operations (40% of Total Operations)				
Single-Engine Piston	11,718	13,057	14,396	17,410
Multi-Engine Piston	972	1,083	1,194	1,444
Turbo Prop	490	546	602	728
Jet	490	546	602	728
Helicopter	330	368	406	491
Total	14,000	15,600	17,200	20,800

Aircraft Type	2005 (Base Year)	2010	2015	2025
Total Operations (100% of Operations)				
Single-Engine Piston	30,618	34,117	37,616	45,490
Multi-Engine Piston	2,547	2,838	3,129	3,784
Turbo Prop	490	546	602	728
Jet	490	546	602	728
Helicopter	855	953	1,051	1,271
Total	**35,000**	**39,000**	**42,000**	**52,000**

Source: Gale Associates, Inc.

3.5 Peak Operations Forecast

Peak levels of activity are important in determining certain selected facility requirements, such as the size of transient aircraft parking aprons. The peak activity levels that assist in making facility improvement recommendations are the peak month, the design day, and the design hour. These are further described below:

Peak Month: The peak month is the calendar month when peak aircraft operations occur. For planning purposes 10% to 15% of total annual operations are assumed to occur in the peak month. Given the destination resort status of the Airport's market area, the peak month will be calculated assuming it represents 15% of total annual operations.

Design Day: The design day is the average day in the peak month. It is normally derived by dividing the peak month operations by the number of days in the peak month. The peak month at the Airport is estimated to be August which has 31 days.

Design Hour: The design hour is the peak hour within the design day. It is assumed that 18% of the Airport's design day operations represent the design hour activity.

Table 3-8
Peak Operations Forecast

	Peak Operations			
Operations	2005 (Base Year)	2010	2015	2025
Total Operations	35,000	39,000	43,000	52,000
Peak Month (15%)	5,250	5,850	6,450	7,800
Design Day	169	189	208	252
Design Hour	30	34	37	45

Source: Gale Associates, Inc.

3.6 Aviation Fuel Flowage Forecast

Currently, the Airport provides only 100LL Aviation Gasoline (AvGas) for sale. The Airport does not provide jet fuel (Jet-A). Whether the Airport should make Jet-A available will be discussed in the next chapter. A forecast for AvGas is provided in

Table 3-9. The forecast for AvGas was computed using the FAA's General Aviation Aircraft Fuel Consumption forecast average annual growth rate for AvGas of 1.9%.

Table 3-9
Fuel Flowage Forecasts

AvGas Fuel Flowage Forecast (gallons)				
	2005 (Actual)	2010	2015	2025
Projected fuel flowage	32,493	35,669	39,222	47,345

Source: Gale Associates, Inc.

3.7 Forecast Summary

Table 3-10 presents a summary of the forecasts.

Table 3-10
Forecast Summary

Aircraft Type	2005 (Base Year)	2010	2015	2025
Based Aircraft				
Single-Engine Piston	36	37	37	38
Multi-Engine Piston	3	3	3	3
Turboprop	0	0	0	0
Jet	0	0	0	0
Helicopter	1	1	2	4
Total	40	41	42	45
Aircraft Operations				
Local	21,000	23,400	25,800	31,200
Itinerant	14,000	15,600	17,200	20,800
Total	35,000	39,000	43,000	52,000
Peak Operations				
Peak Month	5,250	5,850	6,450	7,800
Design Day	169	189	208	252
Design Hour	30	34	37	45
Fuel Flowage (Gallons)				
AvGas	32,493	35,669	39,222	47,345

Source: Gale Associates, Inc.

3.8 Airport Reference Code

The Airport Reference Code (ARC) is a coding system used by the FAA to relate airport design criteria to the operational and physical characteristics of the aircraft intended to operate at an airport.[5] Many of the FAAs dimensional and other standards that apply to airports are based upon the designated ARC. Such things as the runway to taxiway separation, pavement widths, object free areas and other fundamental geometric design parameters are all based upon an airport's ARC. Therefore, it is important that airport plans consider not only the types of airplanes that currently use the airport but also those that are reasonably expected to use it within the 20-year planning period.

The ARC is composed of two parts, separated by a hyphen: a letter that represents aircraft approach speeds (operational characteristic) and a Roman numeral that represents aircraft wingspans (physical characteristic). Table 3-10 presents the ARCs that are possible.

Table 3-10
<u>FAA Aircraft Categories</u>

Wingspans	Approach Speeds				
	A: <91 kts	B: ≥91 kts <121 kts	C: ≥121 kts <141 kts	D: ≥141 kts <166 kts	E: ≥166 kts
I: <49 feet	A-I	B-I	C-I	D-I	E-I
II: ≥ 49 feet, <79 feet	A-II	B-II	C-II	D-II	E-II
III: ≥79 feet, <118 feet	A-III	B-III	C-III	D-III	E-III
IV: ≥118 feet, <171 feet	A-IV	B-IV	C-IV	D-IV	E-IV
V: ≥171 feet	A-IV	B-V	C-V	D-V	E-V

Source: FAA Advisory Circular 150/5300-13, *Airport Design*, including Changes 1 through 8.

The ARC at general aviation airports is based on the operational and physical characteristics of either a single aircraft or a <u>family of aircraft</u> having similar characteristics. Given the aircraft mix at this airport, it is more effective to utilize the family of aircraft concept. To determine the appropriate ARC for the Airport, the most demanding family of aircraft (in terms of their physical and performance characteristics) that fly approximately 500 itinerant operations each year must be identified. Five hundred itinerant operations is the threshold at which the FAA considers a family of aircraft or a single aircraft to be a "regular user" of an airport for planning purposes.

As the 2005 Airport inventory of based aircraft indicates, the Airport's based aircraft inventory is composed of small single and twin-engine piston aircraft having wingspans under 49 feet and approach speed less than 121 knots – aircraft in the A-I and B-I categories. These aircraft do not meet the criteria of "most demanding" and will not be used in determining the ARC.

[5] FAA Advisory Circular 150/5300-13, *Airport Design*, includes changes 1-8, page 4.

According to the ESAA and Airport operational staff, the transient aircraft that frequent the Eastern Slope Regional Airport include larger, high performance aircraft. Some of the aircraft observed in 2005 include:

Table 3-11
Jet and Turboprop Aircraft Frequenting Eastern Slope Regional Airport

Aircraft	ARC	Max. Takeoff Weight (pounds)
Turboprop		
Beech King Air C-90	B-II	9,650
Beech King Air B-200 **	B-II	12,500
Beech King Air B-350 **	B-II	15,100
Pilatus PC-6	A-II	4,850
Jet		
Cessna Citation CJ-3 **	B-II	13,870
Cessna Citation I **	B-I	11,850
Cessna Citation II **	B-II	13,300
Cessna Citation III **	B-II	22,000
Dassault Falcon 50 **	B-II	37,480
Dassault Falcon 900	B-II	45,500
Bombardier LearJet 45 **	C-II	21,500
Gates LearJet 25	C-I	15,000
Gates LearJet 35A	D-I	18,300
Canadair Challenger 600	C-II	41,250
Gulfstream G-IV	D-II	71,780

** Aircraft representative of the design family of aircraft

This represents an impressive inventory of business type aircraft that range from the least demanding A-II category to the more demanding C-II, and D-II categories.

The operations forecast in Table 3-7 estimates that there were 490 jet aircraft and 490 turboprop aircraft operating at Eastern Slope Regional Airport in 2005. These estimates increase to 546 jets and 546 turboprops in 2010. Looking at the aircraft listed in Table 3-11, we see that the majority of the jets and turboprops are ARC B-II. It is unlikely that the C and D approach category aircraft reach the 500 operations threshold by themselves. A review of the survey data supports the fact that the majority of the high performance aircraft that visit the Airport are the Beech King Air turboprop group and the Falcon, Citation, and similar jet group. This makes sense in light of the Airport's runway length and approaches.

Based on the forecasts presented above and the operations data collected by the Airport, an ARC of B-II is recommended for the Eastern Slope Regional Airport. The Beech King Air B-200 and B-350 along with the Citation I, II, and III and the Falcon 50 are representative of the family of aircraft that are the most demanding regular users of the Airport (see Table 3-11).

In addition to the ARC, it is important to determine if the design family of aircraft has a maximum takeoff weight at or below 12,500 pounds. This information is necessary to determine certain airspace characteristics at the Airport. Table 3-11 indicates that the large majority of the aircraft in the design family exceed 12,500 pounds at maximum certificated takeoff weight. Because of this, the Airport's runway is NOT a "utility" runway, otherwise termed "other than utility". Therefore, an ARC of B-II (other than utility) is recommended.

The Falcon 50 business jet is recommended as the "critical aircraft" (sometimes called the "design airplane" since it is the most demanding airplane in the family of aircraft that regularly use the Airport.

- **Recommended ARC is B-II (other than utility)**
- **Recommended Critical Aircraft is the Falcon 50 Business Jet**
  (Wing Span = 61.9 Feet, Approach Speed = 113 Knots/hr, GTOW = 37,480#)

CHAPTER 4: FACILITY REQUIREMENTS

This chapter takes the information collected in Chapter 2, Inventory of Airport Facilities, considers the projected demand forecasted for the Airport as developed in Chapter 3, and determines the capacity of the existing facilities to meet the expected future demand levels. This chapter provides an unconstrained analysis of the Airport's facility requirements for the duration of the planning period. FAA Advisory Circular 150/5300-13, *Airport Design*, Federal Aviation Regulation (FAR) Part 77 protected surfaces, and FAA Order 8260.3B, *U.S. Standards for Terminal Instrument Procedures*, will be used to identify airport facilities that need improvement, replacement or expansion. Facility improvements may also be recommended to fill a demand for services, not just to meet design or safety standards.

In the following chapter, the facility requirements identified in this section will be subjected to the constraints of constructability, maintainability, environmental impact, budget limitations, and pilot operating characteristics in order to eliminate or modify needs that may not be realistic or feasible during the planning period. These applied constraints will then help to shape an airport-development program for the Airport.

4.1 Airside Capacity and Requirements

Airside facilities are those features which facilitate the movement of aircraft on the airport. They include runways, taxiways, aprons, navigational aids, and airfield lighting systems. This section will review the capacity and functionality of the Airport's airside facilities and their compliance with FAA standards.

4.1.1 RUNWAY CAPACITY

Airport capacity is typically expressed in terms of the number of aircraft operations that can be conducted within a given period of time. Capacity is most often expressed as annual service volume (ASV) and as hourly capacity (throughput capacity). The capacity of a runway is determined by the runway and taxiway configuration, the ARC of the runway, and the navigation aids available on the airport. The FAA Advisory Circular 150/6050-5, *Airport Capacity and Delay*, utilizes computer models developed by the FAA to evaluate airport capacity and reduce aircraft delay. These models use an airport's ASV to approximate the capacity of the runway, while accounting for differences in runway configuration, fluctuations in aircraft fleet mix, touch and go activity levels, and weather conditions, among other factors. The FAA model for a runway configuration such as that at the Airport, without an Instrument Landing System (ILS) and used almost exclusively by Class A and B aircraft, indicates that the airport has an hourly capacity of between 82 and 97 operations under VFR (Visual Flight Rules) conditions and 20 to 24 under IFR (Instrument Flight Rules) conditions. As discussed in Chapter 3, the Airport typically experiences 30 operations in its design hour, the peak hour within the average day of the peak month. In 2025, the design hour is expected to increase to 45 operations. The runway capacity analysis indicates that the current runway configuration will be sufficient during the planning period with the exception of the possible need for a full-length parallel taxiway.

Finding: The current runway capacity at the Airport will be sufficient for the duration of the planning period.

4.1.2 RUNWAY REQUIREMENTS

Runway dimensional requirements are based upon the projected ARC for the runway during the planning period. The previous chapter identified the most demanding family of aircraft regularly using the airport as having an ARC of B-II (i.e., wingspans 79 feet or less, and approach speeds 121 knots or less). Generalizations about runway length requirements are made based on a family or grouping of similar aircraft. The geometric design (i.e., layout) of a runway in conjunction with taxiways, aprons, approach surfaces, and the like are made based on the ARC design group rather than specific representative aircraft makes or models. These standards will be discussed individually in the following sections. The runway was resurfaced in 1997, and will reach the end of its useful design life in 2017.

Recommendation: A runway rehabilitation project should be planned for the mid to long-term period.

As seen in Table 4-1, the runway centerline to holdline separation, as well as the runway centerline to parallel taxiway centerline separation, does not meet current FAA design criteria. This will be discussed further in *Section 4.1.2.3.*

Table 4-1
Runway Dimensional Requirements

Facility	Design Criteria (B-11)	Existing	Compliance
Runway centerline to holdline	250'	165'	Does not comply
Runway centerline to parallel taxiway centerline	240'	200'	Does not comply
Runway centerline to edge of aircraft parking	250'	575'	Complies
Runway protection zone at both runway ends: Length Inner Width (200' beyond runway end) Outer Width	 1,000' 500' 700'	 1,000' 500' 700'	Complies
Runway pavement width	75'	75'	Complies
Runway shoulder width	10'	10'	Complies
Runway safety area width	150'	150'	Complies
Runway safety area length beyond runway end	300'	300'	Complies
Runway object-free area width	500'	500'	Complies
Runway object-free area length beyond runway end	300'	300'	Complies

Facility	Design Criteria (B-11)	Existing	Compliance
Runway obstacle-free zone width	400'	400'	Complies
Runway obstacle-free zone length beyond runway end	200'	200'	Complies

4.1.1.1 Runway Length Requirements

Major factors that determine the proper runway length requirements for a given aircraft are airport elevation, ambient temperature, and aircraft takeoff weight. An aircraft taking off on a hot day will likely require a longer runway than the same aircraft taking off on a cold winter day, provided the takeoff weights of the aircraft are similar.

The runway length requirements at an airport are determined by the critical design aircraft for the facility. Based on the existing and forecast usage at the time, the 1993 Master Plan recommended the phased extension of the runway to 5,000 feet. The current forecast, presented in *Chapter 3* of this report, determined that the critical design aircraft for the airport is the Dassault Falcon 50, and identified the ARC B-II. An ARC of B-II, other than utility, indicates that planes using the airport regularly are expected to exceed 12,500 pounds maximum take-off weight (MTOW). However, it is unlikely that any aircraft in excess of 60,000 pounds MTOW will use the Airport.

The FAA Runway Length Advisory Circular (AC)[1] provides the procedure for determining the runway length requirements for an airport. Determination of required runway length for airplanes with a MTOW of more than 12,500 pounds and up to and including 60,000 pounds requires certain data, including the airport elevation above mean sea level, mean daily maximum temperature of the hottest month at the Airport, and the critical design aircraft and its useful load. The useful load is determined by considering the difference between the MTOW and the operating empty weight of the aircraft. This information for the Airport is contained in Table 4-2 below.

Table 4-2
Airport Runway Data

Airport Elevation	452'
Mean Daily Maximum Temperature of the Hottest Month	80°F
Effective Runway Gradient	.84%
Critical Design Aircraft	Dassault Falcon 50
Maximum Take-Off Weight	39,700 lbs
Empty Operating Weight	21,800 lbs
Useful Load	17,900 lbs

In determining the appropriate runway length for an airport, one of the factors to be determined is which "percentage of the fleet" category represents the critical design

[1] FAA Advisory Circular 150/5325-4B *Runway Length*, revised 7-1-2005.

aircraft. From the FAA list, the design aircraft at the Airport constitutes "75 percent of the fleet" and the runway length must be sufficient to satisfy the operational requirements for this percentage of the fleet operating at either 60 percent useful load or 90 percent useful load. The useful load factor at an airport is determined on the basis of the haul lengths and service needs of the critical design aircraft. The FAA AC recommends that, in order to sufficiently accommodate 75 percent of the fleet operating at 90 percent useful load, the base runway length be 5,800 feet. This does not include runway length adjustments for the effective runway gradient or wet and slippery runways. An extension of this length is likely to have environmental and other impacts, and the benefit of the additional runway is exceeded by the cost to design, permit and construct the runway. It is recommended that the runway be extended by 800 feet to a total length of 5,000 feet in order to achieve the runway length required as based on the forecast for the Airport.

Recommendation: The runway should be extended to a total length of 5,000 feet in order to achieve the runway length required as based on the forecast for the Airport.

4.1.1.2 Runway Approach Requirements

This section will review the current and preferred runway approach types and will provide an overview of the protected surfaces associated with the new runway approaches.

Existing Approach

Currently, Runway 14 has a visual, circling approach. This means that aircraft approaching the runway under IFR conditions must, at a predetermined decision point, implement a missed approach procedure unless the pilot has the runway in view and has determined that a safe landing is possible. In the case where a pilot has the runway in view and deems it safe to land, the aircraft must then enter the airport's "circling" traffic pattern, circle the airport to assure that conditions are safe, and then make the landing.

Runway 32 has a non-precision, straight-in GPS approach in which the pilot is not required to enter the airport's circling pattern. The aircraft merely continues from the decision point straight in to the runway for the landing. This is considered an upgrade from a circling approach since the straight-in approach is safer, and the elimination of the circling traffic minimizes aircraft noise for residents under the pattern.

Preferred Approach

The Airport has determined that an Approach with Vertical Guidance (APV) would be preferable to the existing non-precision approach to Runway 32. An APV approach is an instrument approach procedure which provides course and vertical path guidance, but does not meet the more stringent standards of a precision approach. This approach type will provide additional guidance to pilots in locating the runway, and will afford a safer approach. Table 4-3 summarizes the requirements for an APV approach procedure.

Table 4-3
APV Approach Requirements

Visibility Minimums	< ¾ statute mile	< 1 statute mile	1 statute mile	> 1 statute mile
Height Above Touchdown	250'	300'	350'	400'
TERPS Paragraph 251	34:1 clear	20:1 clear	20:1 clear, or penetrations lighted for night minimums	
Precision Obstacle Free Zone	Required	Recommended		
Airport Layout Plan	Required			
Minimum Runway Length	4,200' (paved)	3,200' (paved)	(3,200' paved)	
Runway Markings	Non-precision (Precision Recommended)		Non-precision	
Holding Position Signs and Markings	Non-precision (Precision Recommended)		Non-precision	
Runway Edge Lights	HIRL/MIRL		MIRL/LIRL	
Parallel Taxiway	Required		Recommended	
Approach Lights	Required		Recommended	
Runway Design Standards	APV Obstacle Free Zone (OFZ) Required			

In addition to the requirements shown above, the approach must also meet threshold siting requirements and United States Standard for Terminal Instrument Procedures[2] (TERPS) requirements. Establishing new approach procedures can be a complex task. This review is presented merely to allow a preliminary review of whether the concept of upgrading has merit. If an upgrade in approach type is considered in the future, a definitive aeronautical study by FAA of the impacts of the upgrade should be conducted at that time. The feasibility of the Airport meeting the requirements necessary to upgrade to an APV approach will be discussed further in Chapter 5, *Development Alternatives.*

4.1.1.3 Runway Width Requirements

Runway 14-32 currently has a paved width of 75 feet. The standard runway width for a runway with approach minimums less than ¾ of a mile is 100 feet. Prudent planning calls for construction of the runway to this standard.

Recommendation: Expand the runway pavement to 100 feet.

[2] FAA Order 8260.3B, Change 19, *United States Standard for Terminal Instrument Procedures (TERPS)*, 5-12-2002

4.1.1.4 Other Requirements

FAR Part 77 Surfaces

The airspace surrounding public-use airports is governed by regulations found within 14 CFR Part 77. This regulation is known by its more common title as **FAR Part 77** – *Objects Affecting Navigable Airspace* (Part 77). Part 77 was promulgated by the FAA to protect airspace around (sometimes called Imaginary or Protected Surfaces) that must be kept clear of penetrating objects, called "obstructions". By accepting FAA funding, the Airport agrees to make all reasonable efforts to keep its protected Part 77 surfaces clear of obstructions. Part 77 also includes guidance for analysis and marking of penetrating objects in specific cases. Objects are defined by Part 77 as:

> *"any object of natural growth, terrain, or permanent or temporary construction or alteration, including equipment and materials used therein, and apparatus of a permanent or temporary character; and alteration of any permanent or temporary existing structure by a change in its height (including appurtenances), or lateral dimensions, including equipment or materials used therein."*

Part 77 specifies the dimensions of imaginary surfaces for each airport based on the type and size of the aircraft using the facility, the runway surface treatment, as well as the type of navigation and approach aids available to pilots. Five imaginary surfaces are identified and defined under Part 77:

- Primary Surface
- Approach Surface
- Transitional Surface
- Horizontal Surface
- Conical Surface

Figure 4-1 depicts the relationship of these surfaces to a typical runway. Dimensions for each of these surfaces are stipulated in Part 77. Runway 14-32 serves aircraft with a maximum takeoff weight greater than 12,500 pounds. Because of this, the approaches are classified as "other than utility". Runway 14 has only a visual approach, and Runway 32 has visual and a non-precision straight-in instrument approaches. The surfaces at the Airport are defined as follows:

- Primary Surface – A rectangular shaped surface longitudinally centered on the runway centerline at the same elevation of the nearest corresponding point on the runway centerline. The primary surface dimensions vary according to the approach type and the type of runway surface. The primary surface is determined by the most precise approach, either existing or planned, for either end of that runway.

At the Airport, the most precise approach is a non-precision instrument approach with visibility minimums greater than ¾ of a statute mile, which requires a primary surface that is 500 feet wide, and extends 200 feet beyond the runway end.

- Approach Surface – A trapezoidal shaped surface centered on the runway centerline and extending outward and upward from each end of the primary surface at a prescribed slope angle. Approach surface dimensions and slope angle will vary according to the runway approach type. An approach surface is applied to each runway end based upon the type of approach available at that runway end.

  The Runway 14 end has a visual approach which dictates an approach surface which begins at the 500 foot wide primary surface and expands uniformly to an outer width of 1,500 feet. The Runway 14 approach surface extends outward from the runway for 5,000 feet at a slope of 20:1 (twenty feet horizontal for every one foot vertical). The non-precision instrument approach to Runway 32 requires an approach surface with an inner width of 500 feet and an outer width of 3,500 feet. The Runway 32 approach surface extends outward from the runway for 10,000 feet at a slope of 34:1 (thirty-four feet horizontal for every one foot vertical).

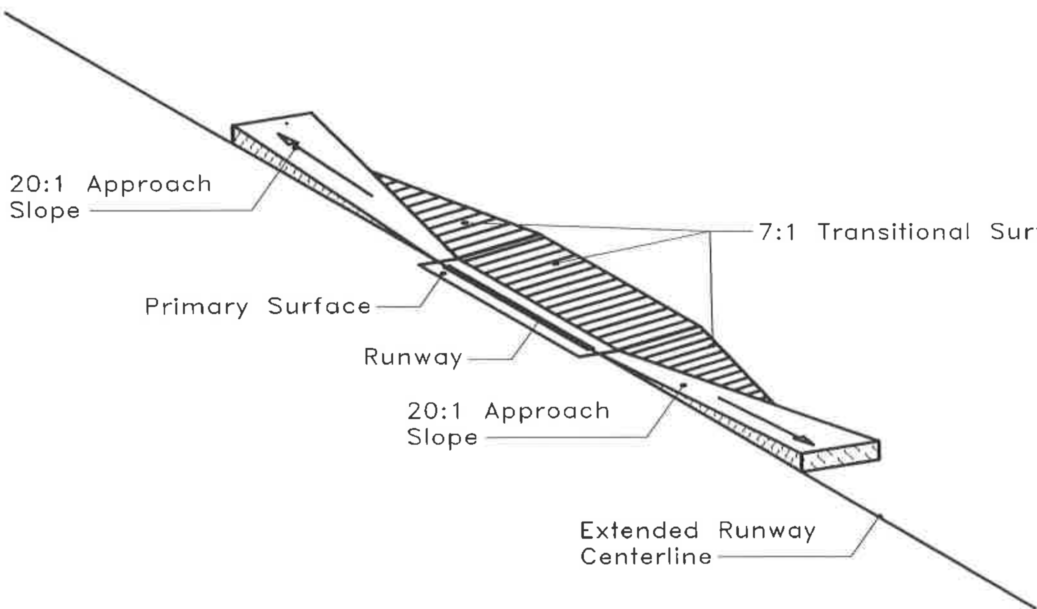


Figure 4-1
Typical Part 77 Protected Surfaces

- Transitional Surface – This surface is an inclined plane running parallel to the runway centerline beginning at the edges of the primary and approach surfaces. It then extends upward and outward from the edges of those surfaces at a slope of 7:1 (seven feet horizontal for every one foot vertical) to the horizontal surface (150' above the airport elevation).

- Horizontal Surface – This surface is an oval shaped, horizontal plane dictated by Part 77 to be 150 feet above the established airport elevation. It is established by swinging arcs from the intersection of the extended runway centerline and primary surface at each end of the runway and then closing each area with tangent lines. In areas where the primary, approach and transitional surfaces may overlap, the surface with the lowest elevation is the controlling surface.

  The radius of the arc for each runway end will be the same value, and is the highest value determined for either end of the runway based upon the approach to that runway end. At the Airport, a 10,000 foot arc is specified at each runway end to establish the horizontal surface.

- Conical Surface – This surface extends upward and outward from the edge of the horizontal surface at a slope of 20:1 (twenty feet horizontal for every one foot vertical) for a horizontal distance of 4,000 feet from the edge of the horizontal surface.

The Part 77 surface dimensions and the compliance status for Runway 14-32 are shown in Table 4-4. The Part 77 surfaces are shown on Sheet 7, *FAR Part 77 Surfaces Plan*. In Table 4-4, compliance means that the surface is unobstructed by penetrating objects, or that penetrating objects are properly lighted. The existing surfaces for the Runway 14 visual approach end are also dictated by the surfaces of the Runway 32 non-precision instrument approach. The most stringent dimensions for the primary and horizontal surfaces are used to determine those surfaces for both runway ends.

Table 4-4
Part 77 Compliance

Protected Surfaces	Runway 14 (Visual Only)		Runway 32 (Non-precision Instrument)	
	Dimensions	Compliance	Dimensions	Compliance
Primary surface width	500' *	Tree Penetrations	500'	Tree Penetrations
Primary surface length beyond runway end	200'		200'	
Approach surface width at inner end	500'	Tree Penetrations	500'	Tree Penetrations
Approach surface width at outer end	1,500'		3,500'	
Approach surface length	5,000'		10,000'	
Approach surface slope	20:1		34:1	
Transitional surface slope	7:1	Tree Penetrations	7:1	Tree Penetrations

Protected Surfaces	Runway 14 (Visual Only)		Runway 32 (Non-precision Instrument)	
	Dimensions	Compliance	Dimensions	Compliance
Horizontal surface radius	10,000' *	Ground and Tree Penetrations	10,000'	Ground and Tree Penetrations
Conical surface slope	20:1	Ground and Tree Penetrations	20:1	Ground and Tree Penetrations
Conical surface distance	4,000'		4,000'	

***The primary surface width and horizontal surface radius are dictated by the most dimensions of the most stringent runway approach on the Airport.**

In 2007 a tree clearing project is planned to remove obstructions to the Part 77 Primary, Approach and Transitional surfaces. This project will remove approximately 28 acres of tree penetrations. Of this, approximately 2 acres consists of selective clearing in wetland areas. Table 4-4 shows these areas as currently not in compliance with Part 77, but the planned tree clearing project will bring each of those areas into compliance.

Should the Runway 32 approach be upgraded to an APV approach, the Part 77 surfaces and tree clearing requirements would remain the same.

Recommendations: Complete the tree clearing as identified in the 2002 Vegetation Management Plan.

Runway Lighting

Runway 14-32 is currently lighted with pilot controlled MIRLs which were installed in 1984. The design life of the MIRLs was theoretically exceeded in 2004 and the lights are eligible for replacement. Currently, the MIRLS are in working condition.

Recommendation: The Airport should plan for the replacement of the existing MIRLs when the runway is reconstructed in the mid-term period.

Runway Safety Areas

A Runway Safety Area (RSA) is a defined surface surrounding the runway end which is suitable for reducing the risk of damage to an aircraft and injury to its occupants in the event of an undershoot, overshoot, or excursion from the runway. A RSA also provides access to fire fighting and rescue equipment during such incidents. The FAA design standards require that the RSA be cleared and graded and have no potentially hazardous surface variations; capable of supporting snow removal equipment, emergency equipment and aircraft; and be free of objects, except those which need to be located in the RSA because of their function (i.e., runway end threshold lights). For a B-II runway with visibility minimums greater than ¾ mile, the RSA width must be 150 feet centered on the runway centerline for the entire length of the runway, and must extend 300 feet beyond each usable runway end.

Finding: All RSAs comply with current FAA standards.

Runway Obstacle Free Zone

The Runway Obstacle Free Zone (ROFZ) is a volume or airspace centered on a runway centerline. The ROFZ extends 200 feet beyond the usable runway end, and, based on the proposed ARC of B-II, is 400 feet wide, centered on the runway centerline. The ROFZ precludes taxiing and parked aircraft and object penetrations, except for frangible visual NAVAIDs which need to be located in the ROFZ because of their functions.

Finding: The ROFZ complies with current FAA standards.

Runway Object Free Area

The Runway Object Free Area (ROFA) is a surface centered on the runway centerline at the same elevation as the runway centerline. The ROFA precludes penetrations by fixed or movable objects except for those objects whose location is fixed by function (i.e., visual NAVAIDs, taxiing aircraft). The ROFA for ARC B-II with approach visibility minimums not lower than ¾ mile is 500 feet wide and extends 300 feet beyond the runway end. FAA standards require the clearing of the ROFA of any above ground objects protruding above the ROFA elevation. Any trees, shrubs or other penetrations to the ROFA must be removed.

Finding: The ROFA complies with current FAA standards.

Runway Protection Zone

Runway Protection Zones (RPZs) underlie the inner approach and departure surfaces for the purpose of protecting people and property on the ground during an aircraft's initial and final phases of flight. The RPZ begins 200 feet beyond the runway end. For a runway with a visual approach and an ARC of B-II, the RPZ extends outward from the runway end for 1,000 feet. At its inner edge, the RPZ is 500 feet wide. At the outer edge of the RPZ, its width is 700 feet. This area is comprised of approximately 14 acres at each runway end.

In order to provide control over the activities and structures in the RPZ, it is recommended by the FAA that sufficient property interests be acquired by an airport for this area. Some of the excluded uses in the RPZ include residences and places of public assembly (i.e., churches, schools, hospitals). Fuel storage facilities also should not be located in the RPZ. The RPZ at the Airport is located entirely over Airport property, and thus inappropriate uses are excluded by the Airport Commission.

Finding: The RPZ lies entirely within Airport property and meets all current FAA standards.

Compliance with Separation Standards

Adequate separation between runways and other airport facilities (i.e., taxiways, aircraft parking aprons, hold lines) is necessary so that Airport operations on the runway are conducted safely and are not hampered by other operations occurring on the Airport. The required separation distances (as presented in Table 4-1) are based on the ARC and approach capabilities of the runway and are always measured from the runway centerline.

Currently, the partial-parallel taxiway does not meet the required separation standards for an ARC B-II runway. The design standard requires a separation of 240 feet, and currently the runway-taxiway separation is 200 feet. Additionally, there is not the required separation between the holdline and the runway centerline.

Recommendation: The runway or taxiway should be relocated in order to provide the required runway to taxiway separation.

4.1.2 TAXIWAY REQUIREMENTS

Taxiways are paved areas over which airplanes move from one part of the Airport to another. One of the more important functions of a taxiway is to provide aircraft access between the airside terminal areas, and the runway. There are three types of taxiways, parallel, exit and access. Taxiways parallel to the runway provide a route for aircraft to reach distant points on the runway without interfering with operations on the runway. Exit taxiways connect to parallel taxiways and provide paths for the aircraft to leave the runway after they have landed. Access taxiways and taxilanes provide paths for aircraft to move among the airside components of the Airport (T-hangars, parking aprons, fueling areas, etc). Good access between the runway and other airside facilities is important in helping to improve the overall operational efficiency of the Airport.

Currently, the Airport has a partial parallel taxiway and two entrance/exit taxiways which provide access to the runway. To improve safety, and enhance airfield movement and efficiency, it is recommended that the partial-parallel taxiway be extended to a full-parallel taxiway. Additionally, in order to improve the approach to include vertical guidance, a parallel taxiway is required for visibility minimums lower than 1 statute mile, and recommended for visibility minimums greater than 1 statute mile.

4.1.2.1 Taxiway Dimensional Requirements

As previously discussed, the Airport has three taxiways- one partial-parallel taxiway, and two exit taxiways. Though the taxiways currently provide adequate runway access, improving the partial parallel taxiway to a full-parallel will improve the efficiency of Airport operations, and will enhance safety. The FAA design standards for taxiways are presented in Table 4-5.

Table 4-5
Taxiway and Taxilane Compliance

Facility	Design Criteria	Compliance
Taxiway centerline to fixed or movable object	65.5'	Complies
Taxilane centerline to fixed or movable object	57.5'	Complies
Taxiway width	35'	Complies
Taxiway edge safety margin	7.5'	Complies
Taxiway shoulder width	10'	Complies
Taxiway safety area width	79'	Complies
Taxiway object-free area width	131'	Complies
Taxilane object-free area width	115'	Complies
Taxiway centerline to runway centerline	240'	Does not comply

Source: FAA AC 150/5300-13, "Airport Design"

The current taxiway does not meet all of the FAA design criteria for a B-II runway.

Recommendation: As recommended previously, in order to meet these criteria and provide proper runway-taxiway separation, the parallel taxiway, and the runway, must be separated by an additional 40 feet.

4.1.2.2 Taxiway Lighting

The Airport's partial-parallel taxiway is lighted with Medium Intensity Taxiway Lights (MITLs). These MITLs were installed in 1985 and exceeded their design life in 2005. The existing MITLs should be replaced in the short term planning period.

Recommendation: The existing MITLs should be replaced when the taxiway is extended or reconstructed.

4.1.3 APRON CAPACITY

Aircraft parking aprons are used to accommodate unhangared, parked aircraft either short or long term. Both based aircraft and transient aircraft are expected to use aircraft parking aprons. In New England, it is typical that the owners of more than 50 percent of the based aircraft will want to have their aircraft hangared, rather than parked on an apron. This helps to protect aircraft from wind, snow, ice and from snow-removal or mowing efforts. Hangaring aircraft has also been recommended by the Transportation Security Administration (TSA) as a method to help prevent aircraft theft and misuse.

The Airport Parking Apron accommodates approximately 47 single-engine, fixed wing aircraft. In 2005, six (6) of the based aircraft at the Airport utilized the parking apron tie-downs. This represents approximately 15 percent of the total based aircraft onsite at the Airport. By the end of the planning period in 2025, the Airport could have 45 based aircraft. Assuming that approximately 15-20 percent of those aircraft will be tied-down on aircraft parking aprons, at the end of the planning period, the Airport will utilize another 6 to 9 *based* aircraft tie-downs for a total of 12 to 15.

Intermittently, transient aircraft will make use of the parking apron. The airport experiences approximately 13,200 itinerant operations annually, approximately 40 percent of the total operations conducted on the Airport. In *Chapter 3,* it was estimated that during the Airport's peak month, 5,250 operations will take place. It was also projected that by 2025, a total of 7,800 operations will take place during the Airport's busiest month. Lacking better information, it is assumed that 40 percent of aircraft operations will be conducted by itinerant aircraft. Using some rules of thumb, the busiest day of the busiest month is approximately 110 percent of the average day, and half of the transient operations will require apron space:

$$\{[(7{,}800 \text{ operations/month} \times 40\% \text{ transient}) / 31 \text{ days/month}] \times 110\%\} \div 2 =$$
$$55 \text{ transient aircraft parking spaces}$$

So that for the busiest day of the busiest month, 55 *transient* aircraft tie-downs will be required, in addition to the 6-9 based aircraft tie-downs previously estimated. This then requires a total of 61-64 total spaces on the parking apron to accommodate demand throughout the planning period. The current parking apron may not have sufficient capacity to meet demand for the length of the planning period.

Due to the increasing volume of jet traffic visiting the Airport, and the expectation that Jet-A fuel will be provided in the future, it is reasonable to expect that the Airport will have several based jets in the near future, in addition to the transient jet fleet already using the Airport. A new parking apron should be planned which can safely accommodate those aircraft. Experience has shown that it is not safe to mix the aircraft on the same apron, and they should be separated.

The existing apron was built in several different phases. The first section (200 feet by 150 feet) was constructed in 1961, and the second section (200 feet by 175 feet) was constructed in 1975. These apron sections have deteriorating pavements that have exceeded their design life and must be replaced. Reconstruction of these sections should be planned for the short term period.

To summarize, the Airport's projected demand requires a total of 61-64 tie-downs for single-engine, fixed wing aircraft. The Airport currently has 47 such tie-downs, so it is anticipated that approximately 14-17 additional spaces will be required during the planning period. In addition, a jet apron should be planned for the long term which can accommodate approximately 5 jet aircraft, with an area identified for additional future development.

Recommendation: A jet apron should be planned to accommodate the projected increase in jet traffic using the Airport in the mid to long term.

The deteriorating sections of the existing aircraft parking apron should be replaced in the short-term and additional aircraft parking should be identified for transient aircraft.

4.1.4 NAVIGATION AND APPROACH AIDS

Aids to navigation provide pilots with information to assist in locating the airport, and to provide horizontal and/or vertical guidance during landing. Additionally, navigational aids permit access to the airport during poor weather conditions. At the Airport, visual guidance is currently provided by runway edge lights (MIRLS), runway end identifier lights (REILS), a rotating airport beacon, a lighted windsock and a lighted segmented circle.

4.1.4.1 Rotating Airport Beacon

A rotating beacon is used to indicate to pilots the location of the Airport at night or in adverse weather conditions. Rotating beacons emit two beams of light 180 degrees apart; one light beam is green and the other is white. The beacon is located in the terminal area on the east side of the SRE building. The Airport's rotating beacon was installed in 1983 and was eligible for replacement in 2003.

Recommendation: The Airport's rotating beacon should be replaced when the MIRLs are replaced as they are both elements of a federally-funded lighting system.

4.1.4.2 Non-Directional Beacon

A Non-Directional Beacon (NDB) is owned and maintained by the Airport Authority and is located 8 miles from the Airport along the extended runway centerline. The NDB transmits non-directional radio signals that can be used by pilots to determine the bearing to or from the beacon. The FAA is currently transitioning away from the use of NDBs as navigational devices. It is likely that the NDB and its approach procedure will be decommissioned during the planning period, therefore, the Airport should plan for alternative facilities to maintain its non-precision approach.

4.1.4.3 Runway End Identifier Lights

Runway End Identifier Lights (REILs) are used to provide pilots with guidance to the runway at night or under unfavorable conditions. REILs are a system of synchronized flashing lights located at the approach end of a runway. They aid in the identification of the runway and runway end. The airport has REILs which serve Runway 32. They were replaced in 2006 and are owned and maintained by the Airport Authority. These REILs should be sufficient for the duration of the planning period.

Finding: The REILs on Runway 32 will not require replacement during the course of the planning period. Runway 14 does not require the installation of REILs.

4.1.4.4 Visual Approach Slope Indicator

A Visual Approach Slope Indicator (VASI) provides pilots with visual approach slope guidance to the runway. The Airport currently has a two-box VASI, used by pilots on the approach to Runway 32, which was installed in 1983. The VASI is owned and maintained by the Airport. The VASI will require replacement as the equipment ages, however, this equipment can no longer be acquired. Therefore, it is recommended that, when the VASI requires replacement, it be replaced with a two-box Precision Approach Path Indicator (PAPI).

Recommendation: Replace the existing VASI with a PAPI in the short-term planning period, or when needed.

4.2 Landside Capacity and Requirements

Those airport facilities not required for the movement of aircraft are considered landside facilities and usually consist of terminal buildings, hangars, and automobile parking.

4.2.1 AIRPORT TERMINAL BUILDING

The existing Terminal Building is approximately 1,350 square feet with an enclosed (four season) porch and an anterior room with several stuffed chairs and coffee tables. The Airport Authority meets in this room to conduct business. The room is adjacent to the FBO[3] office and contains a public telephone, brochures and other information. The building has two lavatories, a small kitchen area, and storage. It was constructed in the early 1980's and is constructed of a wood frame with a corrugated metal roof. The building is undersized for its uses and should either be expanded or replaced with a larger building.

Recommendation: The terminal building should be expanded, or replaced with a larger building to accommodate the administration, meeting, and storage needs of the Airport Authority.

4.2.2 AIRCRAFT HANGARS

Demand for aircraft hangars depends on a number of variables, including airport location, type of aircraft, cost and seasonal variation. Currently, the Airport has hangar capacity for approximately 40 aircraft, all of which are occupied year-round. It has been

[3] A fixed-base operator (FBO) is a company or individual who provides services needed to pilots to maintain or repair aircraft, provide flight lessons, sell aviation fuel, provide charter aircraft flight, and/or sell aircraft.

estimated by the ESAA and the airport FBO that demand does exist for as many as 40 additional hangar spaces.

Recommendation: Areas for future T-hangar development should be identified.

4.2.3 FIXED BASE OPERATOR (FBO) DEVELOPMENT

A proposal has been made to the Authority to develop an aircraft refurbishing operation on the Airport which would require a significant land area for the facility, hangar space, parking apron, and access to the runway. While this particular proposal may not come to fruition, it is prudent to plan for a future large-scale aviation development on the Airport. An area should be identified and preserved for this type of development in the future.

Recommendation: Identify an area for future aviation development with adequate access to the runway, and appropriate space for large-scale development.

4.2.4 AUTOMOBILE PARKING

The Airport can currently accommodate approximately 15 vehicles in a gravel parking area adjacent to the Administration Building. Long-term parking is available near the mobile home and has a capacity for an additional 30 vehicles. Based aircraft owners often park their vehicles in or adjacent to their hangars. As there is no restaurant at the Airport, the automobile parking requirements are limited to the demands of the pilots and their passengers. Occasional Airport Commission meetings, or on-airport events may attract additional visitors and require additional parking.

Finding: The present automobile parking is sufficient to meet the needs of the Airport for the duration of the planning period.

4.2.5 AIRPORT ACCESS ROAD

The Airport is located one mile off of State Routes 5 & 113, on Lyman Drive. A portion of Lyman Drive, approximately 2,200 feet long, serves solely as the access to the Airport. The improvement of this portion of the airport access road may be eligible for AIP funding. The entirety of Lyman Road is currently in fair to poor condition and is deteriorating. The road is in need of reconstruction.

Recommendation: Reconstruct Lyman Drive.

4.3 Support Facility Requirements

Support facilities are those facilities on the Airport which help to ensure efficient operation of the Airport. The Airport has fueling facilities, snow-removal and grass-mowing equipment, security fencing, and other facilities which all must be maintained and upgraded as needed so that day-to-day operations may continue.

4.3.1 AVIATION FUELING FACILITIES

The Airport has one underground fuel tank which was installed in 1994. The tank holds 10,000 gallons of 100 low lead aviation fuel (AvGas). The pump system was upgraded in 2005 with a self-service terminal. In 2005, the Airport sold approximately 32,000 gallons of aviation fuel. In the peak month of 2005, the Airport had aviation fuel sales of approximately 5,000 gallons. Chapter 3, *Aviation Forecasts*, projected that, in 2025, the annual AvGas fuel flowage will be approximately 47,000 gallons. The current underground fuel tank should have sufficient capacity to meet the AvGas demand at the Airport for the duration of the planning period.

Over the past several years, the Airport has experienced an increase in the amount of transient jet traffic using the facility. In 2005, 490 jet aircraft operated at the Airport. This estimate is expected to increase to 600 annually by the year 2015, and over 700 by 2025. The Airport serves a "destination resort" area, visited by tourists during all four seasons, and a large portion of its transient fleet consists of sophisticated, high performance Aircraft, as discussed in Chapter 3. Installation of a Jet-A fuel tank at the Airport will provide a convenience to those jet aircraft which currently visit the Airport, will attract additional aircraft to base at the airport, and will ultimately provide the Airport with an additional source of revenue so that it may continue to be financially self sufficient.

Recommendation: The Airport should pursue the installation of Jet A fuel tanks, either in the form of stationary fuel tanks, or mobile refuelers. This improvement should be planned for the short to mid-term.

4.3.2 AIRFIELD MAINTENANCE EQUIPMENT

As presented in Chapter 2, the Airport currently owns and maintains the following airport maintenance equipment:

Table 4-6
Inventory of Airport Equipment

Year Equipment Purchased	Equipment Make and Model	Funding Sources to Purchase Equipment	Condition
1961	(used) 1954 Walters Snowblower	ESAA	Poor
1990	(used) 1977 Unimog Blower	50% MDOT 50% town/airport	Good
1980 (estimated)	John Deere1450 Tractor Mower	ESAA	Poor
2003	John Deer Loader TC 624 (with blower, plow and loader bucket)	90% FAA 5% MDOT 5% ESAA	Excellent

Source: ESAA

Based upon the information in AC 150/5200-30A, *Airport Winter Safety and Operations*, and AC 150/5220-20, *Airport Snow and Ice Control Equipment*, it is possible to determine the size and type of SRE needed at the Airport during the planning period. The required SRE are determined by the amount of primary areas which must be cleared during a snow event, within the clearance time which is dictated by the annual operations experienced at the Airport. A brief review of the FAA eligibility requirements indicates that the Airport is potentially eligible for the following equipment:

- 1 – Class II (1,500 ton/hr or less) snow blower with carrier vehicle;
- 1 – 12' minimum displacement plows with carrier vehicles;
- 1 – Front-end loader with a 1.5 CY general-purpose bucket and a snow basket;
- 1 – Ramp plow for the front-end loader;
- 1 – Runway Broom with carrier vehicle;
- 1 – Material spreader body.

However, the methods used by the Airport to clear snow will likely not require the purchase of all eligible equipment. The Airport's current SRE need is for a Runway Broom on an agricultural tractor carrier vehicle.

Recommendation: The needs of the Airport should be reevaluated when the Airport's current equipment is eligible for replacement.

4.3.3 SNOW REMOVAL EQUIPMENT STORAGE

In 2005, a new Snow Removal Equipment (SRE) storage building was constructed for the storage of the Airport's mowing equipment and SRE. This facility is approximately 4,000 square feet and provides storage for the Airport's snowblowers, and loader with blower, plow and bucket. The building also provides ample room to conduct equipment maintenance and material storage. This building will not require upgrade during the planning period.

Finding: The newly constructed SRE building will provide sufficient storage for the duration of the planning period.

4.3.4 AIRPORT FENCING

Currently, the fencing at the Airport (as shown on Sheet 2, the Existing Facilities Plan, of the ALP) is minimal and does not restrict access to the Airport's airside facilities. A section of fencing on the north side of Lyman road extends along the parking lot, but does not connect to the Airport Administration Building. Additional fencing should be planned to reduce the likelihood of inadvertent access to the airside facilities of the Airport. For safety and security purposes, gates should be used to restrict access to authorized individuals only.

Recommendation: Install additional fencing to reduce inadvertent access to the airside facilities of the Airport.

4.3.5 AIRPORT SECURITY NEEDS

Security requirements have become very important in planning airport facilities. In *Security Guidelines for General Aviation Airports*, a guidance document produced by the Transportation Security Administration, recommendations for minimum security measures at general aviation airports are provided. The recommendations take into consideration a number of factors, including airport location, number and type of based aircraft, runway length, as well as the number and type of airport operations performed. Point values are assigned to each factor, and, based on the total number of points, minimum security recommendations are provided.

Table 4-7
Airport Security Characteristics Measurement

Security Characteristics	Assessment Rating
26-100 based aircraft	2
Based aircraft over 12,500 lbs	3
Runway length less than 5,000', greater than 2001'	4
Asphalt or concrete runway	1
Flight training	3
Rental aircraft	4
Maintenance, repair and overhaul facilities conducting long term storage of aircraft over 12,500 lbs	4
TOTAL	21

Based on the TSA *Guidelines,* the following minimum security measures are recommended:

- Coordinate with local law enforcement officers to conduct regular patrols of the Airport property;
- Create a security committee to involve Airport stakeholders in developing effective and reasonable security measures;
- Develop transient pilot sign-in/sign-out procedures to identify non-based pilots and aircraft using the facility;
- Install warning signage around the perimeter of the Airport to deter unauthorized access;
- Formalize an airport policy so that all persons entering the airport operations area are verified and all baggage and cargo are known;
- Aircraft should be secured properly, through door locks, ignition locks, hangaring, or other auxiliary locks;
- Formalize an Airport community watch program and train Airport tenants and users to recognize and report suspicious activity;
- Formalize airport security procedures and distribute to all Airport tenants and users;
- Prepare and distribute an emergency contact list.

The Airport has already taken steps to implement a number of these recommendations to improve security. Implementation of these TSA recommended security improvements is not typically AIP-eligible.

Recommendation: Perimeter signage should be installed to deter unauthorized access to the Airport. The Airport should also use fencing and security gates to limit Airport access.

4.4 Summary of Facility Requirements

The following is a list of facility needs identified at the Airport through the twenty year planning period. It is possible that some of the long term needs may not be needed at all should the projected demand for such facilities fail to materialize. Additionally, some of the recommendations below may not be viable once constraints are applied in the following chapter.

Short Term (2006-2011) Improvement Recommendation

- Extend existing runway to a total length of 5,000 feet and expand to a width of 100 feet.
- Extend existing partial-parallel taxiway to a full-parallel taxiway.
- Separate the runway and taxiway by an additional 40 feet to provide the required separation distance.
- Rehabilitate the deteriorating sections of the existing aircraft parking apron.
- Identify areas for future T-hangar development and FBO development.

Mid-Term (2012-2018) Improvement Recommendation

- Partial rehabilitation of the runway pavement.
- Replacement of the existing MIRLs and the Rotating Beacon.
- Replacement of the existing MITLs.
- Install additional fencing for safety and security purposes, and to reduce inadvertent access to airside facilities.
- Install tanks or mobile refuelers for jet fuel.

Long Term (2019-2026) Improvement Recommendation

- Construct a jet apron to accommodate the projected increase in jet traffic using the Airport.
- Construct additional transient aircraft tie-downs.
- Expand or replace the terminal building.
- Reconstruct Lyman Drive.

CHAPTER 5: DEVELOPMENT ALTERNATIVES

This chapter will present and evaluate alternative development concepts to provide the required facility improvements identified in Chapter 4, *Facility Requirements*. Evaluation of airfield concepts is predicated upon providing a safe airport environment, meeting appropriate design standards, and making efficient use of airport assets while considering the affects of cost, construction feasibility and overall environmental impact. The objective of this chapter is to provide a sound foundation for making reasonable development recommendations that have the best potential for implementation.

This chapter evaluates alternatives to address the required improvements identified in Chapter 4. More specifically, concepts are presented to address:

- The need to extend the runway to 5,000 feet long and widen it to 100 feet wide in order to meet the forecasted runway length requirements and design standards;
- The need for a standard runway to taxiway separation to comply with ARC B-II criteria;
- The need to upgrade the Runway 32 approach to a GPS Approach with Vertical Guidance (APV);
- The need for a full-length parallel taxiway to improve runway entry and exit, safety and overall Airport operability;
- The need to locate a jet apron to accommodate the increasing volume of jet traffic visiting the Airport;
- The need to locate new hangars suitable to store small piston engine aircraft, and small turboprop and jet aircraft;
- The need to locate a fueling facility for the storage and dispensing of Jet-A fuel;
- The need to install fencing to reduce inadvertent access to the airside facilities of the Airport; and
- The need to reserve an area for future FBO development.

This list represents the results of the Facility Requirements Analysis and may not include all recommended improvements listed in Section 4.4, *Summary of Facility Requirements*, because it was found that some did not require a review of alternative concepts (e.g., replacement of the MIRLs and Rotating Beacon). The alternative development concepts presented will be based on the proposed upgrade of the Runway 32 approach to an APV approach, as discussed in Chapter 4, *Facility Requirements*. This will help ensure that the Airport does not develop airport facilities in such a way that a future upgrade to an APV approach is not possible.

Upon completion of the alternatives evaluation, a preferred development plan is selected. The preferred development plan includes those development alternatives for each of the above cited needs that are determined to meet the needs of the Airport, strive to minimize adverse non-environmental and environmental impacts and are deemed to be feasible to implement. Sheet 3 of the Airport Layout Plan set (ALP) depicts the preferred development plan and includes other facility improvements (e.g., proposed NAVAIDs) that are recommended for implementation but do not require the study of alternative concepts.

Estimated costs used in this study were developed for purposes of comparing alternatives to one another. All estimated costs are presented as "order of magnitude" or "planning level" costs and are in present day dollars. Since the estimated costs presented were developed to assist in the decision-making process; they should not be construed as estimates for use in the competitive bidding process or in preparation for project design or construction. The cost estimates include estimates for design, permitting, construction, construction oversight, and administrative elements such as project development and coordination costs. In a later chapter, a Schedule of Improvements with cost estimates will be provided that can be used to update the Airport's Capital Improvement Program (CIP).

In evaluating each alternative, the Airport's requirements versus the impacts of each alternative are identified and then briefly discussed. For purposes of ease in evaluation, the Airport's facility needs are grouped as follows: 1) Runway and Taxiway Concepts and 2) Land Side and Support Facility Concepts.

Impacts that are considered in the evaluation include aviation impacts, environmental impacts, and other impacts or considerations.

Aviation Impacts:

- Compliance with required FAA design standards
- Impacts to protected Airport surfaces (FAR Part 77 Surfaces, TERPS Surfaces, AC 150/5300-13 Change 11 (9/30/04) Surfaces)
- Impacts to NAVAIDS (e.g., runway/taxiway lighting systems, PAPI)
- Impacts to other airfield facilities (e.g., fencing)
- Impacts to Airport operations (e.g., fuel efficiency)

Environmental Impacts:

- Impacts to wetlands/wetland buffer zones
- Impacts to rare and endangered species of plants and animals

- Wetland tree clearing impacts
- Total tree clearing impacts
- Impacts to water quality
- Impacts to historical/archeological resources

Other Impacts or Considerations:

- Estimated Project Costs
- Property or easement acquisition requirements
- Environmental review and permitting requirements

The ALP will depict a variety of recommended improvements that will sometimes meet or exceed the environmental review or permit thresholds of local, state, and federal environmental regulations. Once a preferred development concept is chosen, the environmental review and permitting requirements will be provided based upon all of the improvements that make up the preferred development concept, not each improvement component separately.

5.1 Runway and Taxiway Concepts

In Chapter 4, it was determined that the Airport requires a runway extension to 5,000 feet in order to meet the aviation needs of the region as an Economic Development Airport. Additionally, it was determined that in order to increase safety and improve overall runway operability, the existing partial-parallel taxiway should be extended to a full-parallel taxiway. The existing runway to taxiway separation is 200 feet. The *Airport Design* AC requires a separation of 240 feet for an airport with an ARC of B-II. Chapter 4, Facility Requirements, also recommended upgrading the existing non-precision GPS approach to Runway 32 to a GPS Approach with Vertical Guidance (APV) in order to provide pilots with both horizontal and vertical guidance in locating the runway. Alternatives intended to address these deficiencies are presented in this section.

5.1.1 RUNWAY AND TAXIWAY ALTERNATIVE 1 – "NO BUILD"

The "No-Build" Alternative provides a baseline upon which the proposed Runway and Taxiway Alternatives can be examined. Under the "No Build" Alternative, no action is taken to meet the needs of the Airport as described above. Figure 5-1 presents a graphical depiction of this alternative. The objective of this alternative is to evaluate the costs and benefits of maintaining the existing condition and not striving to meet the identified facility needs at the Airport.

Under this alternative, all existing conditions are maintained.

5.1.1.1 Aviation Impacts

Under this alternative, the aviation needs of the Airport are not met:

- The runway remains at its current length and width of 4,200 feet by 75 feet.
- The runway length is not sufficient to satisfy the operational requirements of the design aircraft at the Airport.
- The runway length does not meet the recommended runway length required for the high performance aircraft currently using the Airport, and does not provide the improved safety during crosswind conditions that a 100 foot wide runway would provide.
- The runway to taxiway separation does not meet the 240' separation standard required by FAA.
- The approach to Runway 32 remains a non-precision instrument approach and does not provide the improved safety of an APV approach.
- The taxiway remains a partial parallel taxiway, thus not providing the improved safety and overall operability that a full parallel taxiway provides.

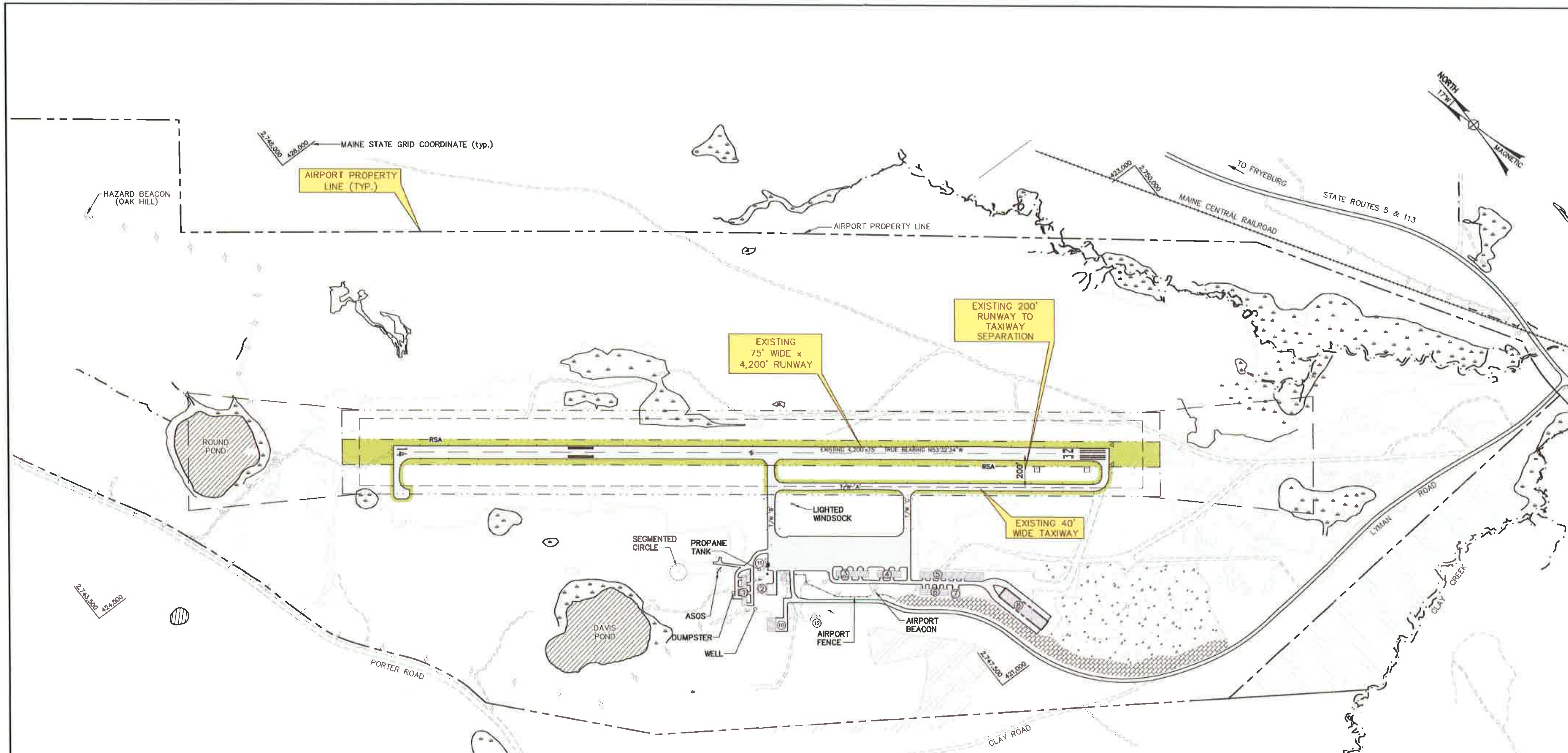
5.1.1.2 Environmental Impacts

Because this alternative does not propose any new construction, there are no environmental impacts expected.

5.1.1.3 Other Considerations

Other impacts to be considered under this alternative include:

- The Airport does not maximize potential revenues.
- There are existing tree penetrations to the FAR Part 77 transitional and approach surfaces which would not be removed under this alternative. A tree clearing project in Spring 2008 will remove some, but not all, of these obstructions to the transitional and approach surfaces.
- There are no capital costs associated with this alternative; however maintenance costs will continue to increase over time as the existing runway and taxiway continue to deteriorate.



LEGEND

- RUNWAY OBJECT FREE AREA (OFA)
- RUNWAY OBSTACLE FREE ZONE (OFZ)
- RUNWAY PROTECTION ZONE (RPZ)
- RUNWAY SAFETY AREA (RSA)
- TREE LINE
- STREAM/ CREEK/ BROOK
- WETLANDS (PREVIOUSLY DELINEATED)
- WETLANDS FLAGGED BY WOODLOT ALTERNATIVES, INC. (SEE NOTE 2)
- EXISTING AVIGATION EASEMENT
- EXISTING PAVEMENT
- TURF SAFETY AREA (RSA / TSA)

AIRPORT FACILITIES

NO.	EXISTING FACILITY
1	SIX UNIT T-HANGAR
2	FBO MAINTENANCE HANGAR
3	SIX UNIT T-HANGAR
4	FOUR UNIT T-HANGAR
5	SIX UNIT T-HANGAR
6	FOUR UNIT T-HANGAR
7	CONVENTIONAL HANGAR
8	13 UNIT T-HANGAR
9	TERMINAL BUILDING
10	SRE MAINTENANCE & STORAGE BUILDING
11	FUEL FARM
12	MOBILE HOME

PITCH PINE/SCRUB OAK COMMUNITIES

- PITCH PINE/SCRUB OAK COMMUNITY INTACT CANOPY; MEETS MAINE NATURAL AREAS PROGRAM DEFINITION
- PITCH PINE/SCRUB OAK COMMUNITY INTACT BUT FRAGMENTED CANOPY; DOES NOT MEET MAINE NATURAL AREAS PROGRAM DEFINITION
- PITCH PINE/SCRUB OAK COMMUNITY HEAVILY IMPACTED; DOES NOT MEET MAINE NATURAL AREAS PROGRAM DEFINITION

NOTES:

1. PITCH PINE/SCRUB OAK COMMUNITY DELINEATION PREPARED BY WOODLOT ALTERNATIVES, INC. ON NOVEMBER 8 AND 10, 2005 AND SURVEYED BY MAINE BOUNDARY CONSULTANTS ON NOVEMBER 18, 2005.
2. WETLAND DELINEATION CONDUCTED BY WOODLOT ALTERNATIVES, INC. ON NOVEMBER 8 AND 10, 2005 AND SURVEYED BY MAINE BOUNDARY CONSULTANTS ON NOVEMBER 18, 2005 FOR WETLANDS DENOTED 'A' OR 'B'. REMAINDER OF WETLAND DELINEATION WAS PREVIOUSLY CONDUCTED BY OTHERS.

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Boston Baltimore Orlando San Francisco

PROJECT: AIRPORT MASTER PLAN UPDATE AIP NO. 3-23-0022-10

OWNER: EASTERN SLOPE REGIONAL AIRPORT FRYEBURG, MAINE

NO.	DATE	DESCRIPTION	BY

PROJECT NO.	775890
CADD FILE	ALT-1
DESIGNED BY	CPL
DRAWN BY	JAT
CHECKED BY	AJD
DATE	JANUARY 2008
DRAWING SCALE	1"=300'

GRAPHIC SCALE
0 150 300 600
SCALE: 1" = 300'

SHEET TITLE

"NO BUILD" ALTERNATIVE

DRAWING NO.

FIG 5-1

5.1.2 RUNWAY AND TAXIWAY ALTERNATIVE #2

The objective of this alternative is to have no wetland disturbances while still attempting to meet the facility needs of the Airport as identified in Chapter 4. Figure 5-2 presents a graphical depiction of this alternative. Under this alternative, the runway is widened to 100 feet, and extended by 100 feet, from 4,200 feet to 4,300 feet in order to extend the runway while still avoiding disturbances of wetlands beyond the Runway 32 end. The taxiway is relocated to provide the standard 240 foot separation from the runway centerline, and is extended to a full parallel taxiway.

5.1.2.1 Aviation Impacts

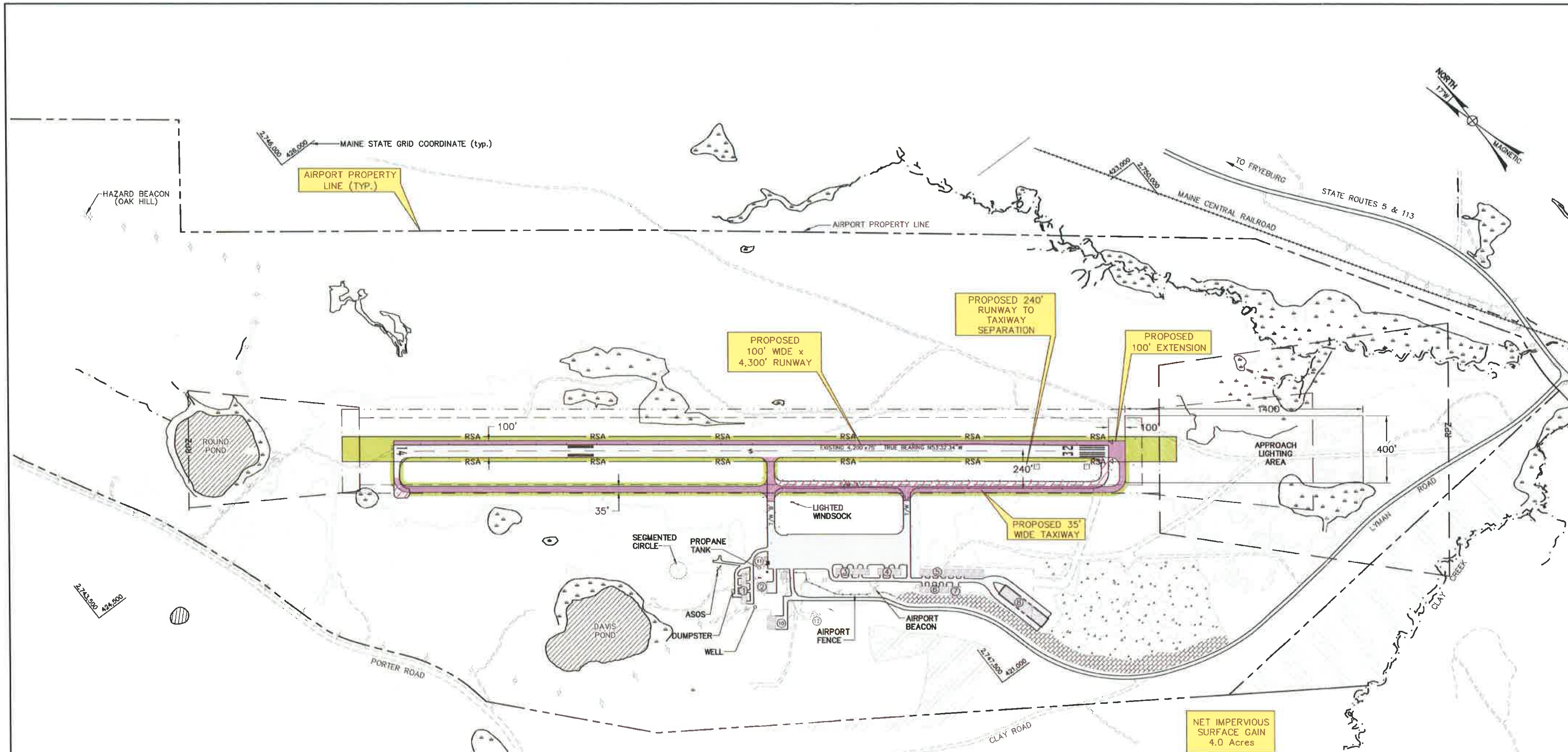
Under this alternative, the following aviation impacts should be considered:

- The runway is extended by 100 feet to a total of 4,300 feet and widened by 25 feet to a width of 100 feet. This is the maximum extension that can be constructed so that the runway has safety areas compliant with current FAA standards, and does not have any wetland disturbances.
- The runway length is not sufficient to satisfy the operational requirements of the design aircraft at the Airport.
- The runway length does not meet the recommended runway length required for the high performance aircraft currently using the Airport.
- Safety during crosswind conditions is enhanced by widening the runway to 100 feet in width.
- The runway extension does not meet the needs of the Airport as identified in Chapter 4, *Facility Requirements.*
- The taxiway is moved 40 feet to the south so that the runway to taxiway separation meets the current FAA standard of 240 feet.
- The taxiway is extended to a full parallel taxiway, which improves safety and operability on the airfield.

5.1.2.2 Environmental Impacts

Under this alternative, there are no disturbances of wetlands; however, the following environmental impacts are expected:

- 4.13 acres of impervious surface is added to the total impervious surface on the Airport.



LEGEND

- RUNWAY OBJECT FREE AREA (OFA)
- RUNWAY OBSTACLE FREE ZONE (OFZ)
- RUNWAY PROTECTION ZONE (RPZ)
- RSA — RUNWAY SAFETY AREA (RSA)
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- WETLANDS FLAGGED BY WOODLOT ALTERNATIVES, INC. (SEE NOTE 2)
- EXISTING AVIGATION EASEMENT
- EXISTING PAVEMENT
- TURF SAFETY AREA (RSA / TSA)
- PROPOSED RUNWAY/TAXIWAY
- PAVEMENT TO BE REMOVED

AIRPORT FACILITIES

NO.	EXISTING FACILITY
①	SIX UNIT T-HANGAR
②	FBO MAINTENANCE HANGAR
③	SIX UNIT T-HANGAR
④	FOUR UNIT T-HANGAR
⑤	SIX UNIT T-HANGAR
⑥	FOUR UNIT T-HANGAR
⑦	CONVENTIONAL HANGAR
⑧	13 UNIT T-HANGAR
⑨	TERMINAL BUILDING
⑩	SRE MAINTENANCE & STORAGE BUILDING
⑪	FUEL FARM
⑫	MOBILE HOME

PITCH PINE/SCRUB OAK COMMUNITIES

- PITCH PINE/SCRUB OAK COMMUNITY INTACT CANOPY; MEETS MAINE NATURAL AREAS PROGRAM DEFINITION
- PITCH PINE/SCRUB OAK COMMUNITY INTACT BUT FRAGMENTED CANOPY; DOES NOT MEET MAINE NATURAL AREAS PROGRAM DEFINITION
- PITCH PINE/SCRUB OAK COMMUNITY HEAVILY IMPACTED; DOES NOT MEET MAINE NATURAL AREAS PROGRAM DEFINITION

NOTES:

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NO.	DATE	DESCRIPTION	BY

PROJECT NO.	775890
CADD FILE	ALT-2
DESIGNED BY	CPL
DRAWN BY	JAT
CHECKED BY	AJD
DATE	JANUARY 2008
DRAWING SCALE	1"=300'

GRAPHIC SCALE
0 150 300 600
SCALE: 1" = 300'

SHEET TITLE
100' RUNWAY EXTENSION

DRAWING NO.
FIG 5-2

- Tree clearing will be required in the approach lighting lane. The approach lighting lane consists of an approximately 13 acre area of land at the Runway 32 end.

- There are no known impacts to rare or endangered plant or animal species.

5.1.2.3 Other Considerations

Under this alternative, other impacts to be considered include:

- The Airport does not maximize potential revenues.

Estimated Cost: The estimated cost of this alternative is approximately $6.1 million for the reconstruction and extension of the runway and taxiway. The breakdown is as follows:

Cost Breakdown	
Facility	**Estimated Cost**
Runway 14-32 100' Extension and Reconstruction (to include compliant safety areas)	$3,800.000
Runway Lighting and NAVAIDS (to include MIRLS, PAPI, REILS, MALSR)	$500,000
Taxiway A Extension and Reconstruction (240' separation)	$1,555,000
Taxiway Lighting	$245,000

5.1.3 RUNWAY AND TAXIWAY ALTERNATIVE #3

Under this alternative, the runway and taxiway are improved to meet the requirements of an APV approach with visibility minimums of ¾ mile or greater. The objectives of this alternative are to:

- Provide a 5,000 foot long by 75 foot wide runway;
- Improve the runway to meet the standard of an APV approach to Runway 32 with visibility minimums of ¾ mile or greater;
- Provide standard runway to taxiway separation of 240 feet;
- Provide standard runway safety areas for the extended runway; and
- Provide a full-length parallel taxiway.

Figure 5-3 presents the dimensional layout of the runway, taxiway and associated safety areas for Runway Alternative #3, APV Approach with ¾ mile or greater visibility minimums. Table 5-1 provides the Airport geometry and dimensions associated with this alternative.

Table 5-1
Proposed Runway Data
¾ mile or Greater APV Approach

Facility	Design Criteria
Runway Length	5,000'
Runway Pavement Width	75'
Runway Safety Area Width	150'
Runway Safety Area Length Beyond Runway End	300'
Runway to Taxiway Separation	240'
Taxiway Safety Area	79'

The FAR Part 77 Protected Surfaces associated with Alternative #3 are presented in Table 5-2.

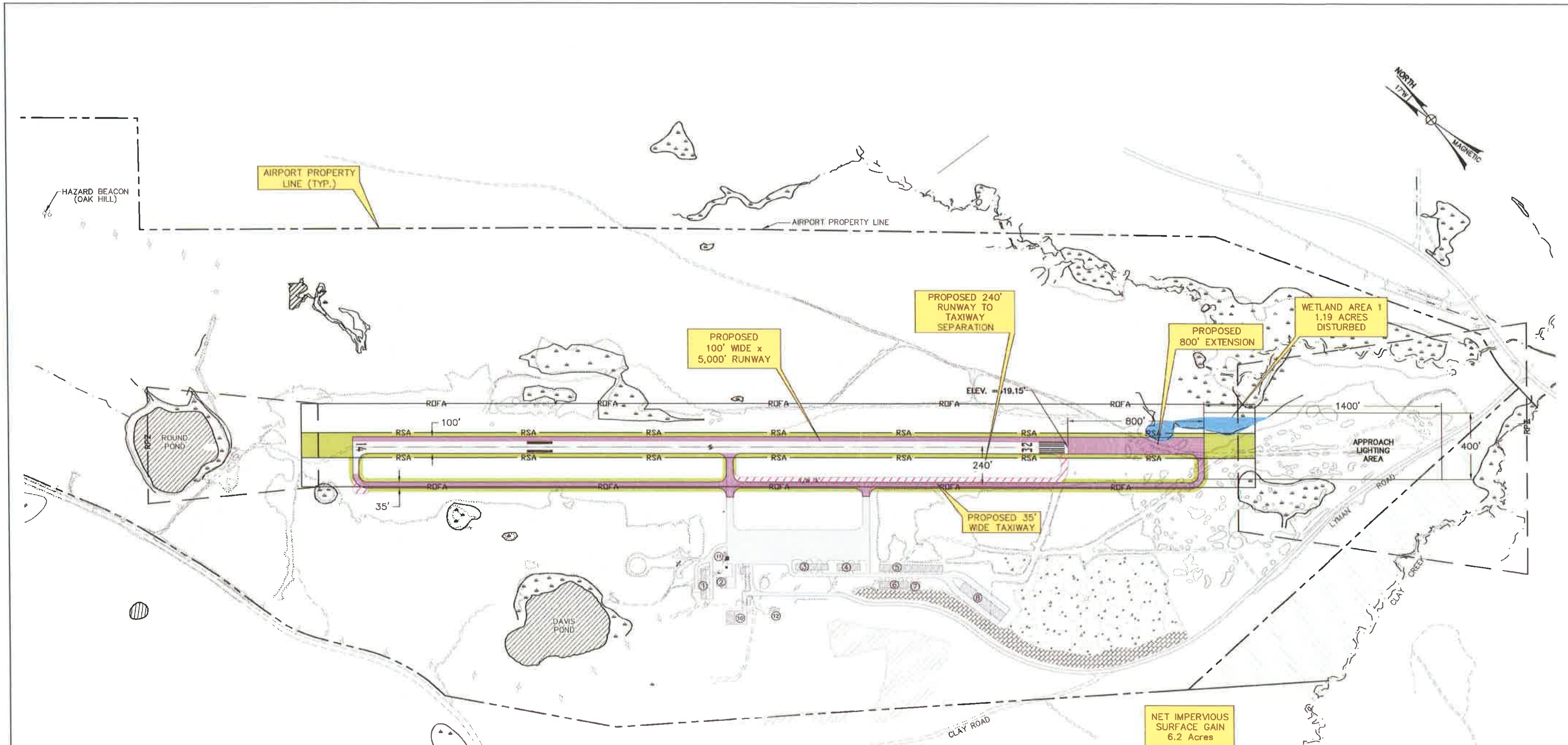
Table 5-2
FAR Part 77 Protected Surfaces
¾ mile or Greater APV Approach

Surface		Dimension
Horizontal Surface		10,000'
Conical Surface		4,000' at 20:1 slope
Primary Surface		500'
Approach Surface	Width at Inner Edge	500'
	Length	10,000' at 34:1 slope
	Width at Outer Edge	3,500'
Transitional Surface		7:1 slope

5.1.3.1 Aviation Impacts

Under this alternative, the following aviation impacts have been identified:

- The runway would be extended to 5,000 feet.
- The runway length is sufficient to satisfy the operational requirements of the design aircraft at the Airport.
- The runway length meets the recommended runway length required for the high performance aircraft currently using the Airport.
- The runway to taxiway separation is improved to meet full runway to taxiway separation standards for an APV approach with visibility minimums of ¾ mile or greater.



LEGEND

- EXISTING AVIGATION EASEMENT
- EXISTING PAVEMENT
- TURF SAFETY AREA (RSA / TSA)
- PROPOSED RUNWAY/TAXIWAY
- PAVEMENT TO BE REMOVED
- WETLAND DISTURBANCE AREAS

AIRPORT FACILITIES

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2	FBO MAINTENANCE HANGAR
3	SIX UNIT T-HANGAR
4	FOUR UNIT T-HANGAR
5	SIX UNIT T-HANGAR
6	FOUR UNIT T-HANGAR
7	CONVENTIONAL HANGAR
8	13 UNIT T-HANGAR
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PROJECT: AIRPORT MASTER PLAN UPDATE AIP NO. 3-23-0022-10

OWNER: EASTERN SLOPE REGIONAL AIRPORT FRYEBURG, MAINE

NO.	DATE	DESCRIPTION	BY

PROJECT NO.	775890
CADD FILE	ALT-5
DESIGNED BY	CPL
DRAWN BY	JAT
CHECKED BY	AJD
DATE	JANUARY 2008
DRAWING SCALE	1"=300'

GRAPHIC SCALE
0 150 300 600
SCALE: 1" = 300'

SHEET TITLE

800' RUNWAY EXTENSION

≥ 3/4 MILE VISIBILITY

DRAWING NO.

FIG 5-3

- The partial-parallel taxiway is extended to a full-parallel taxiway, enhancing safety on the airfield and improving overall operability at the Airport.

- The FAR Part 77 primary surface under this alternative remains at 500 feet.

5.1.3.2 Environmental Impacts

Under this alternative, the following environmental impacts have been identified:

- 1.19 acres of wetlands are expected to be disturbed, due to construction of the runway and required grading of the runway safety area. An August 2007 delineation of this wetland indicated that the wetland is waterfowl and wading bird habitat, meaning that is contains significant wildlife habitat and may be a wetland of special significance as defined by the Maine Natural Resources Protection Act.

- 6.3 additional acres of impervious surface is added to the total impervious area on the Airport.

- Tree clearing will be required in the approach lighting lane. The approach lighting lane consists of an approximately 13 acre area of land at the Runway 32 end.

- There are no known impacts to rare or endangered plant or animal species.

5.1.3.3 Other Considerations

Under this alternative, other considerations include:

- In the future, should the Airport upgrade to an APV approach with minimums less than ¾ mile, runway-taxiway system, runway width, parking aprons, and other on-Airport development would not meet current FAA standards.

- Development of the Airport to the ¾ mile or greater standard at this time may preclude future improvements to the approach.

Estimated Cost: The estimated cost of this alternative is approximately $7 million for the extension and reconstruction of the runway and taxiway. The cost breakdown is as follows:

Cost Breakdown	
Facility	**Estimated Cost**
Runway 14-32 800' Extension and Reconstruction (to include compliant safety areas)	$4,500,000
Runway Lighting and NAVAIDS (to include MIRLS, PAPI, REILS, MALSR)	$600,000
Taxiway A Extension and Reconstruction (240' separation)	$1,545,000
Taxiway Lighting	$245,000
Environmental Mitigation	$110,000

5.1.4 RUNWAY AND TAXIWAY ALTERNATIVE #4

Under this alternative, the runway and taxiway are improved to meet the requirements of an APV approach with visibility minimums less than ¾ mile. The objectives of this alternative are to:

- Provide a 5,000 foot long by 100 foot wide runway;
- Improve the runway to meet the standard of an APV approach to Runway 32 with visibility minimums less than ¾ mile;
- Provide standard runway to taxiway separations of 300 feet;
- Provide standard runway safety areas for the extended runway; and
- Provide a full-length parallel taxiway.

Figure 5-4 presents the dimensional layout of the runway, taxiway and associated safety areas for Runway Alternative #4, APV Approach with <¾ mile visibility minimums. Table 5-3 provides the Airport geometry and dimensions associated with this alternative. The runway will be designed to meet the current design criteria requirements of the FAA.

Table 5-3
Proposed Runway Data
Less than ¾ mile APV Approach

Facility	Design Criteria
Runway Length	5,000'
Runway Pavement Width	100'
Runway Safety Area Width	300'
Runway Safety Area Length Beyond Runway End	600'
Runway to Taxiway Separation	300'
Taxiway Safety Area	79'

The FAR Part 77 Protected Surfaces associated with Alternative #4 are presented in Table 5-4.

Table 5-4
FAR Part 77 Protected Surfaces
Less than ¾ mile APV Approach

Surface		Dimension
Horizontal Surface		10,000'
Conical Surface		4,000' at 20:1 slope
Primary Surface		1,000'
Approach Surface	Width at Inner Edge	1,000'
	Length	10,000' at 34:1 slope
	Width at Outer Edge	4,000'
Transitional Surface		7:1 slope

5.1.4.1 Aviation Impacts

Under this alternative, the following aviation impacts have been identified:

- The runway would be extended to 5,000 feet and widened to 100 feet.
- The runway length is sufficient to satisfy the operational requirements of the design aircraft at the Airport.
- The runway length meets the recommended runway length required for the high performance aircraft currently using the Airport, and enhances safety during crosswind conditions.
- The runway to taxiway separation is improved to meet full runway to taxiway separation standard of 300 feet.
- The partial-parallel taxiway is extended to a full-parallel taxiway, enhancing safety on the airfield and improving overall operability at the Airport.

- The FAR Part 77 primary surface under this alternative is 1,000 feet. Because of this, the area for future development directly adjacent to the runway is restricted.

- A portion of the existing aircraft parking apron will be a penetration to the FAR Part 77 transitional surface and will need to be abandoned.

5.1.4.2 Environmental Impacts

Under this alternative, the following environmental impacts have been identified:

- 2.40 acres of wetlands are expected to be disturbed, due to required grading of the runway and taxiway safety areas.

- Approximately .32 acres of the wetland disturbance, caused by the 300' separation between the runway and taxiway, is potentially a wetland of special significance. In the 1992 Master Plan, the wetland was identified as peat land, which is protected under the Maine Natural Resources Protection Act.

- Approximately 2.03 acres of the wetland disturbance, caused by the runway extension and required grading of the RSAs, is potentially a wetland of special significance. An August 2007 delineation of this wetland indicated that the wetland is waterfowl and wading bird habitat, meaning that is contains significant wildlife habitat and may be a wetland of special significance as defined by the Maine Natural Resources Protection Act.

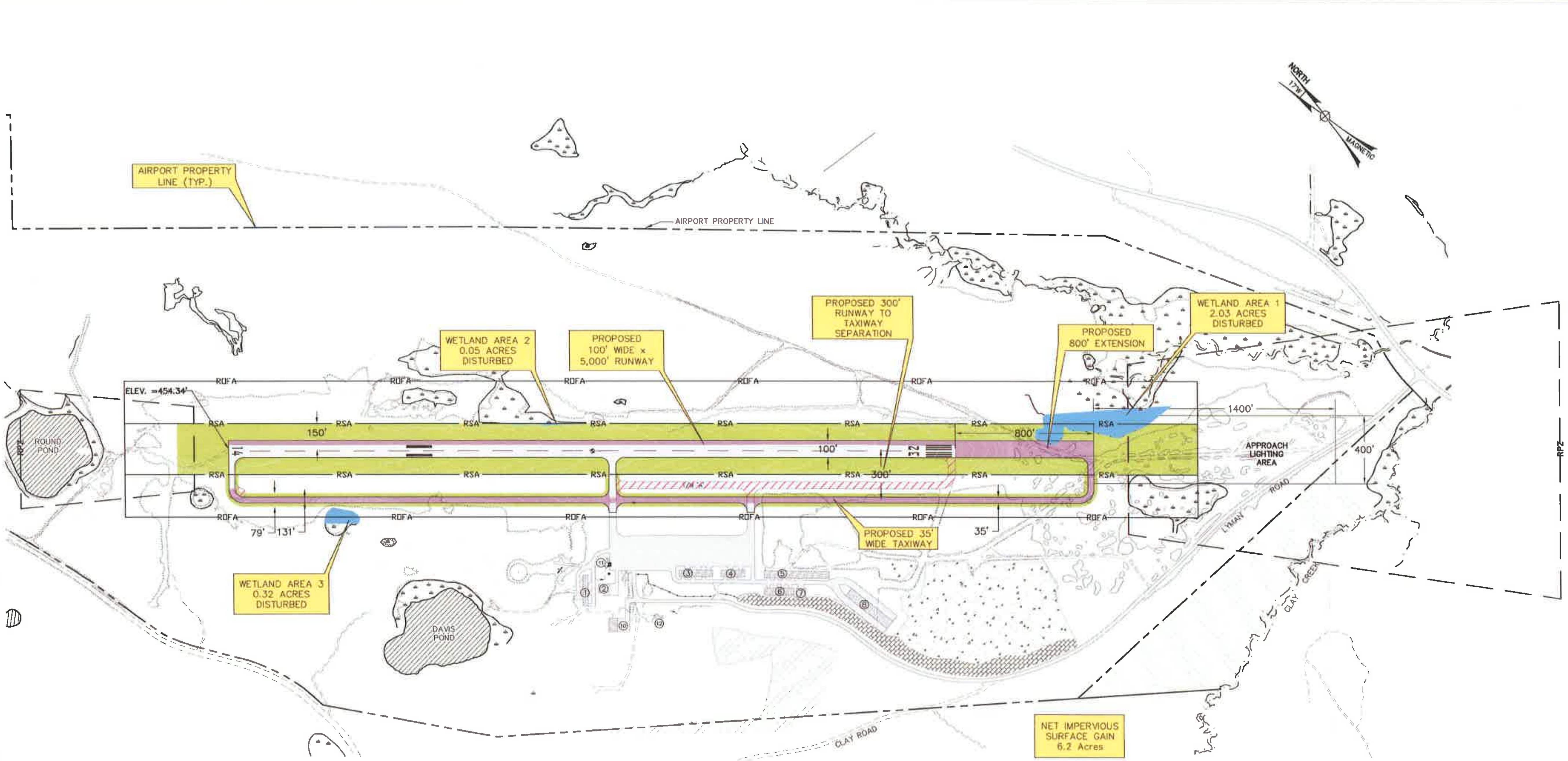
- 6.39 additional acres of impervious surface is added to the total impervious area on the Airport.

- Tree clearing will be required in the approach lighting lane. The approach lighting lane consists of an approximately 13 acre area of land at the Runway 32 end.

- There are no known impacts to rare or endangered plant or animal species.

5.1.4.3 Other Considerations

- Constructing the runway and taxiway to these standards will allow the Airport to implement this improved approach in the future.



LEGEND

- EXISTING AVIGATION EASEMENT
- EXISTING PAVEMENT
- TURF SAFETY AREA (RSA / TSA)
- PROPOSED RUNWAY/TAXIWAY
- PAVEMENT TO BE REMOVED
- WETLAND DISTURBANCE AREAS

AIRPORT FACILITIES

NO.	EXISTING FACILITY
1	SIX UNIT T-HANGAR
2	FBO MAINTENANCE HANGAR
3	SIX UNIT T-HANGAR
4	FOUR UNIT T-HANGAR
5	SIX UNIT T-HANGAR
6	FOUR UNIT T-HANGAR
7	CONVENTIONAL HANGAR
8	13 UNIT T-HANGAR
9	TERMINAL BUILDING
10	SRE MAINTENANCE & STORAGE BUILDING
11	FUEL FARM
12	MOBILE HOME

PITCH PINE/SCRUB OAK COMMUNITIES

- PITCH PINE/SCRUB OAK COMMUNITY INTACT CANOPY; MEETS MAINE NATURAL AREAS PROGRAM DEFINITION
- PITCH PINE/SCRUB OAK COMMUNITY INTACT BUT FRAGMENTED CANOPY; DOES NOT MEET MAINE NATURAL AREAS PROGRAM DEFINITION
- PITCH PINE/SCRUB OAK COMMUNITY HEAVILY IMPACTED; DOES NOT MEET MAINE NATURAL AREAS PROGRAM DEFINITION

NOTES:

1. PITCH PINE/SCRUB OAK COMMUNITY DELINEATION PREPARED BY WOODLOT ALTERNATIVES, INC. ON NOVEMBER 8 AND 10, 2005 AND SURVEYED BY MAINE BOUNDARY CONSULTANTS ON NOVEMBER 18, 2005.
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DRAWN BY	JAT
CHECKED BY	AJD
DATE	JANUARY 2008
DRAWING SCALE	1"=300'

GRAPHIC SCALE
0 150 300 600
SCALE: 1" = 300'

SHEET TITLE

800' RUNWAY EXTENSION

< 3/4 MILE VISIBILITY

DRAWING NO.

FIG 5-4

Estimated Cost: The estimated cost of this alternative is approximately $7.6 million for the extension and reconstruction of the runway and taxiway. The cost breakdown is as follows:

Cost Breakdown	
Facility	**Estimated Cost**
Runway 14-32 800' Extension and Reconstruction (to include compliant safety areas)	$4,900,000
Runway Lighting and NAVAIDS (to include MIRLS, PAPI, REILS, MALSR)	$600,000
Taxiway A Extension and Reconstruction (300' separation)	$1,700,000
Taxiway Lighting	$245,000
Environmental Mitigation	$155,000

5.1.5 RUNWAY AND TAXIWAY ALTERNATIVE SUMMARY

For the purposes of illustration, two additional development alternatives are graphically depicted on the following pages. The first of these Alternatives (Figure 5-5) presents a runway extension of 1,600 feet, to a total length of 5,800 feet, as identified as required in Chapter 4, Facility Requirements. The environmental impacts of this alternative, and the proximity of the runway and taxiway extension to the existing airport access road made this alternative impracticable. The second of these Alternatives (Figure 5-6) presents the required minimum runway extension of 800 feet on the Runway 14 end. This alternative is shown to demonstrate the potential impacts to Round Pond should that alternative be pursued. Because the area surrounding Round Pond has been identified as an important natural resource, it was determined that to extend the runway by 800' in the direction of the pond would not be a practicable alternative.

Alternative 1 (Figure 5-1) is the "No Build" scenario, and is presented here to provide a baseline upon which to compare the other runway alternatives identified.

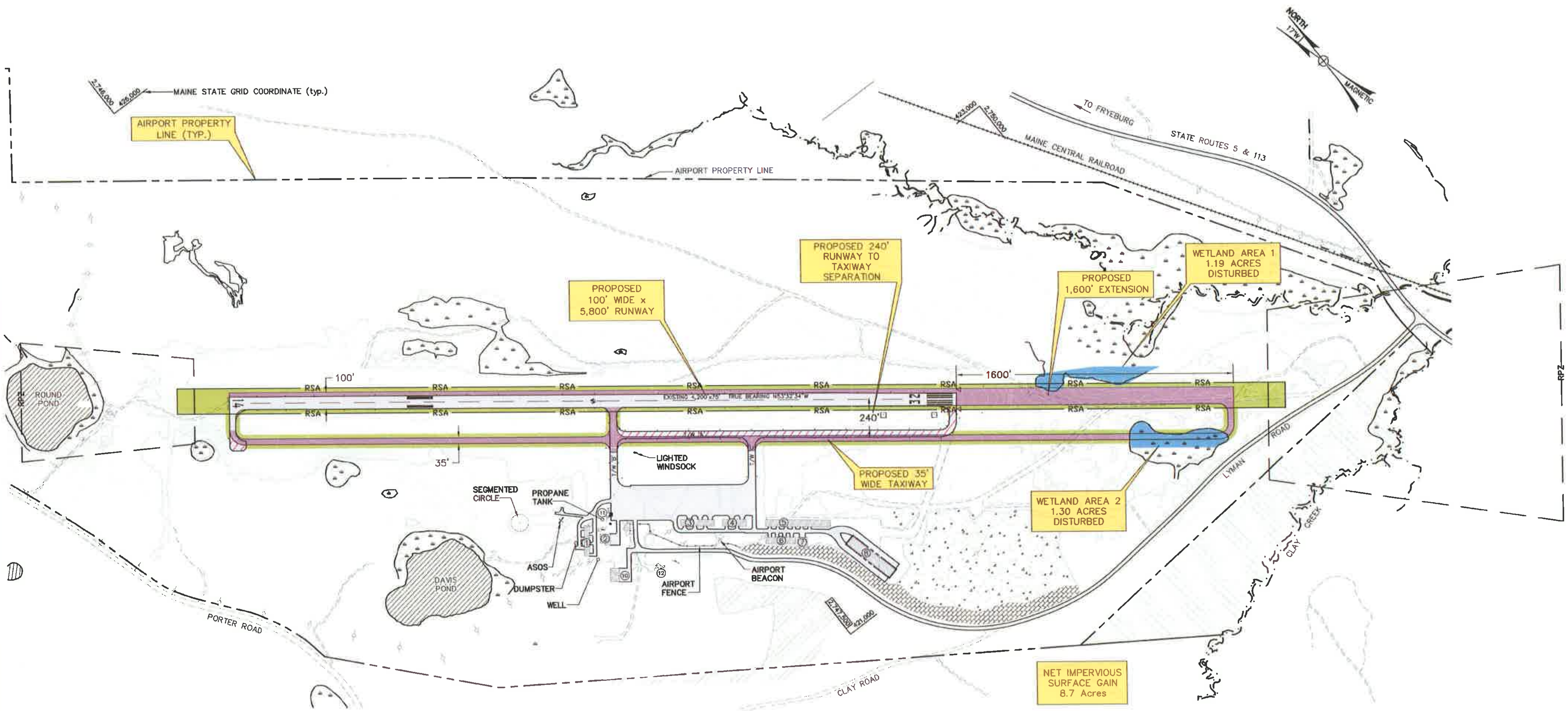
Alternative 2 (Figure 5-2) attempts to meet the needs of the Airport without disturbing wetlands. Under this alternative, the maximum runway extension possible is 100 feet with standard runway safety areas. Taxiway A is relocated to achieve a 240 foot separation from the runway, and is extended to a full parallel. While this alternative successfully avoids wetland disturbances, the runway extension does not meet the needs of the Airport as identified in Chapter 4, and so this is not a reasonable alternative.

Alternative 3 (Figure 5-3) provides an APV approach with visibility minimums of ¾ mile or greater. Under this alternative, the taxiway will be shifted 40 feet to the south to provide a 240 foot separation, and will be extended to a full parallel taxiway. The runway will be extended by 800 feet so that it is a total of 5,000 feet in length. The proposed runway and taxiway improvements will provide the necessary facilities for the Airport to pursue an APV approach with visibility minimums greater than ¾ of a statute mile. This alternative meets the runway and taxiway requirements of the

Airport as identified in Chapter 4, does not eliminate areas for future on-airport development, and has a slightly lower capital cost and wetland disturbance than Alternative 4.

Alternative 4 (Figure 5-4) provides an APV approach with visibility minimums less than ¾ mile. To meet the standard for this approach, the taxiway is relocated to achieve a 300 feet separation from the runway, and is extended to a full parallel. The runway is extended by 800 feet to a total length of 5,000 feet. The FAR Part 77 primary surface is 1,000 feet, centered on the runway centerline, with the transitional surface rising from the edge of the primary surface at a slope of 7:1. This alternative meets the runway and taxiway requirements of the Airport as identified in Chapter 4, but has a marginally higher cost of construction and wetland disturbance than Alternative 3.

It is recommended that the runway and taxiway system be planned to meet the requirements of the APV approach with visibility minimums less than ¾ mile. To construct the system to any other standard would preclude the opportunity to achieve this improved approach in the future. Prudent planning calls for the Airport to construct all of its facilities to meet the requirements of this approach.



LEGEND

- RSA — RUNWAY SAFETY AREA (RSA)
- TREE LINE
- STREAM/ CREEK/ BROOK
- WETLANDS (PREVIOUSLY DELINEATED)
- WETLANDS FLAGGED BY WOODLOT ALTERNATIVES, INC. (SEE NOTE 2)
- EXISTING AVIGATION EASEMENT
- EXISTING PAVEMENT
- TURF SAFETY AREA (RSA / TSA)
- PROPOSED RUNWAY/TAXIWAY
- PAVEMENT TO BE REMOVED
- WETLAND DISTURBANCE AREAS

AIRPORT FACILITIES

NO.	EXISTING FACILITY
1	SIX UNIT T-HANGAR
2	FBO MAINTENANCE HANGAR
3	SIX UNIT T-HANGAR
4	FOUR UNIT T-HANGAR
5	SIX UNIT T-HANGAR
6	FOUR UNIT T-HANGAR
7	CONVENTIONAL HANGAR
8	13 UNIT T-HANGAR
9	TERMINAL BUILDING
10	SRE MAINTENANCE & STORAGE BUILDING
11	FUEL FARM
12	MOBILE HOME

PITCH PINE/SCRUB OAK COMMUNITIES

- PITCH PINE/SCRUB OAK COMMUNITY INTACT CANOPY; MEETS MAINE NATURAL AREAS PROGRAM DEFINITION
- PITCH PINE/SCRUB OAK COMMUNITY INTACT BUT FRAGMENTED CANOPY; DOES NOT MEET MAINE NATURAL AREAS PROGRAM DEFINITION
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FRYEBURG, MAINE

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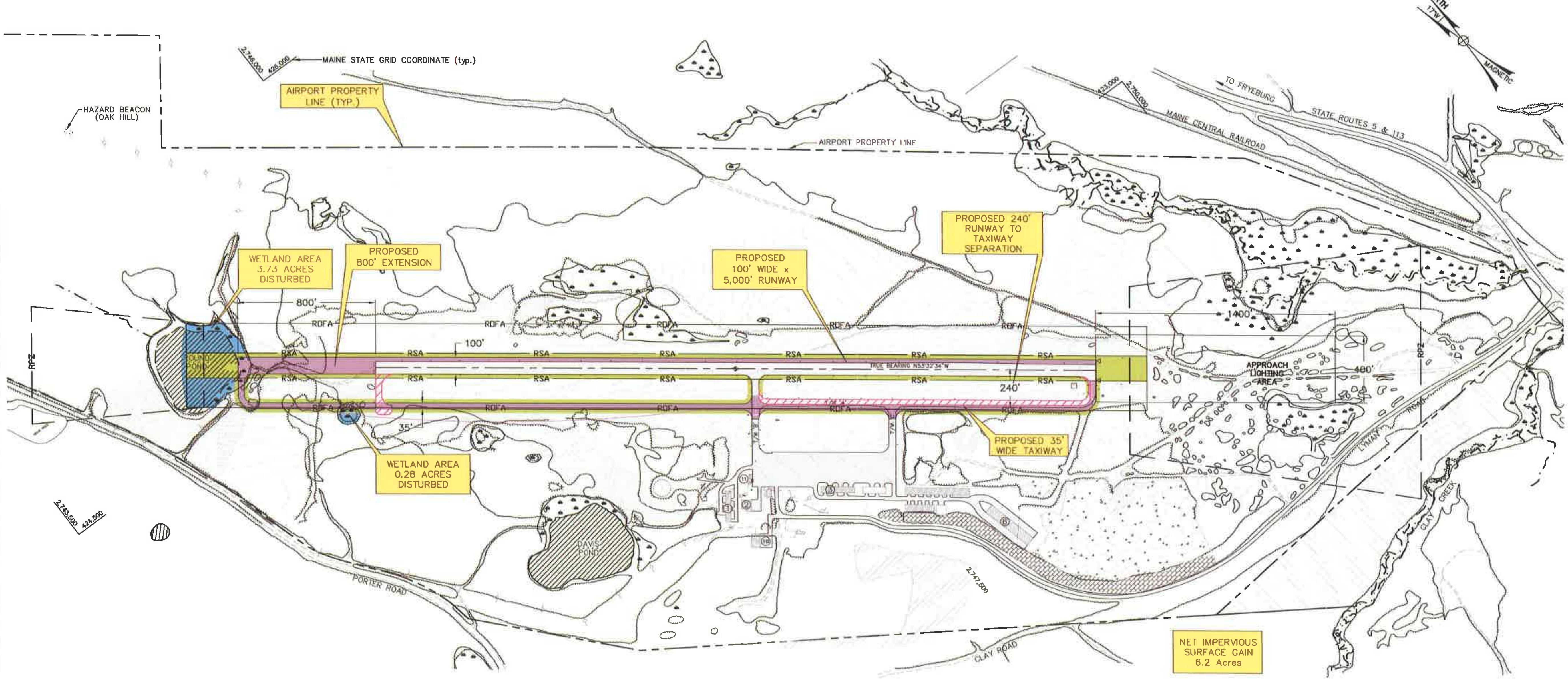
PROJECT NO.	775890
CADD FILE	ALT-3
DESIGNED BY	CPL
DRAWN BY	JAT
CHECKED BY	AJD
DATE	JANUARY 2008
DRAWING SCALE	1"=300'

GRAPHIC SCALE
0 150 300 600
SCALE: 1" = 300'

SHEET TITLE
1,600' RUNWAY EXTENSION

DRAWING NO.
FIG 5-5



LEGEND

- EXISTING AVIGATION EASEMENT
- EXISTING PAVEMENT
- TURF SAFETY AREA (RSA / TSA)
- PROPOSED RUNWAY/TAXIWAY
- PAVEMENT TO BE REMOVED
- WETLAND DISTURBANCE AREAS

AIRPORT FACILITIES

NO.	EXISTING FACILITY
1	SIX UNIT T-HANGAR
2	FBO MAINTENANCE HANGAR
3	SIX UNIT T-HANGAR
4	FOUR UNIT T-HANGAR
5	SIX UNIT T-HANGAR
6	FOUR UNIT T-HANGAR
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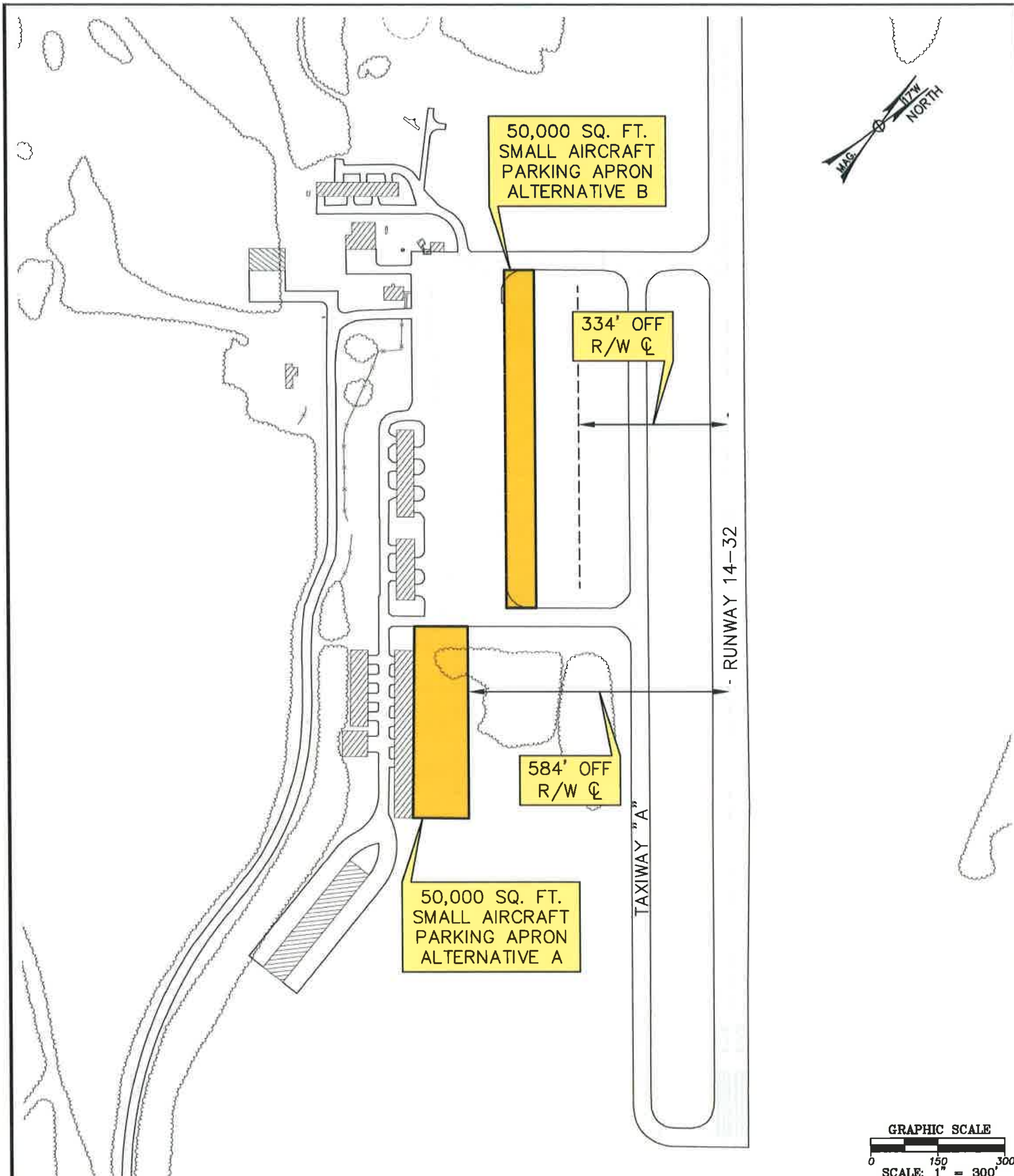
NO.	DATE	DESCRIPTION	BY

PROJECT NO.	775890
CADD FILE	ALT-4
DESIGNED BY	CPL
DRAWN BY	JAT
CHECKED BY	AJD
DATE	JANUARY 2008
DRAWING SCALE	1"=300'

GRAPHIC SCALE
0 150 300 600
SCALE: 1" = 300'

SHEET TITLE: 800' RUNWAY EXTENSION (R/W 14)

DRAWING NO. FIG 5-6



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775890	OKS	CPL	FIGURE-5-5

DATE:	JULY 2007
SCALE:	1" = 300'
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FIG 5-7

in this location will provide parking areas for an additional 15 small aircraft. The cost of this alternative is approximately $400,000.00.

Alternative B is the expansion of the existing parking apron towards the taxiway. The addition of approximately 60,000 square feet of pavement will provide ample space in this location for an additional row of 15 tie-downs with associated taxilanes, and will cost approximately $500,000.00. This alternative encroaches on the FAR Part 77 Transitional Surface associated with the proposed runway, and therefore is not a practicable alternative.

It is recommended that the small aircraft parking expansion be constructed in the area of Alternative A as shown on Figure 5-7.

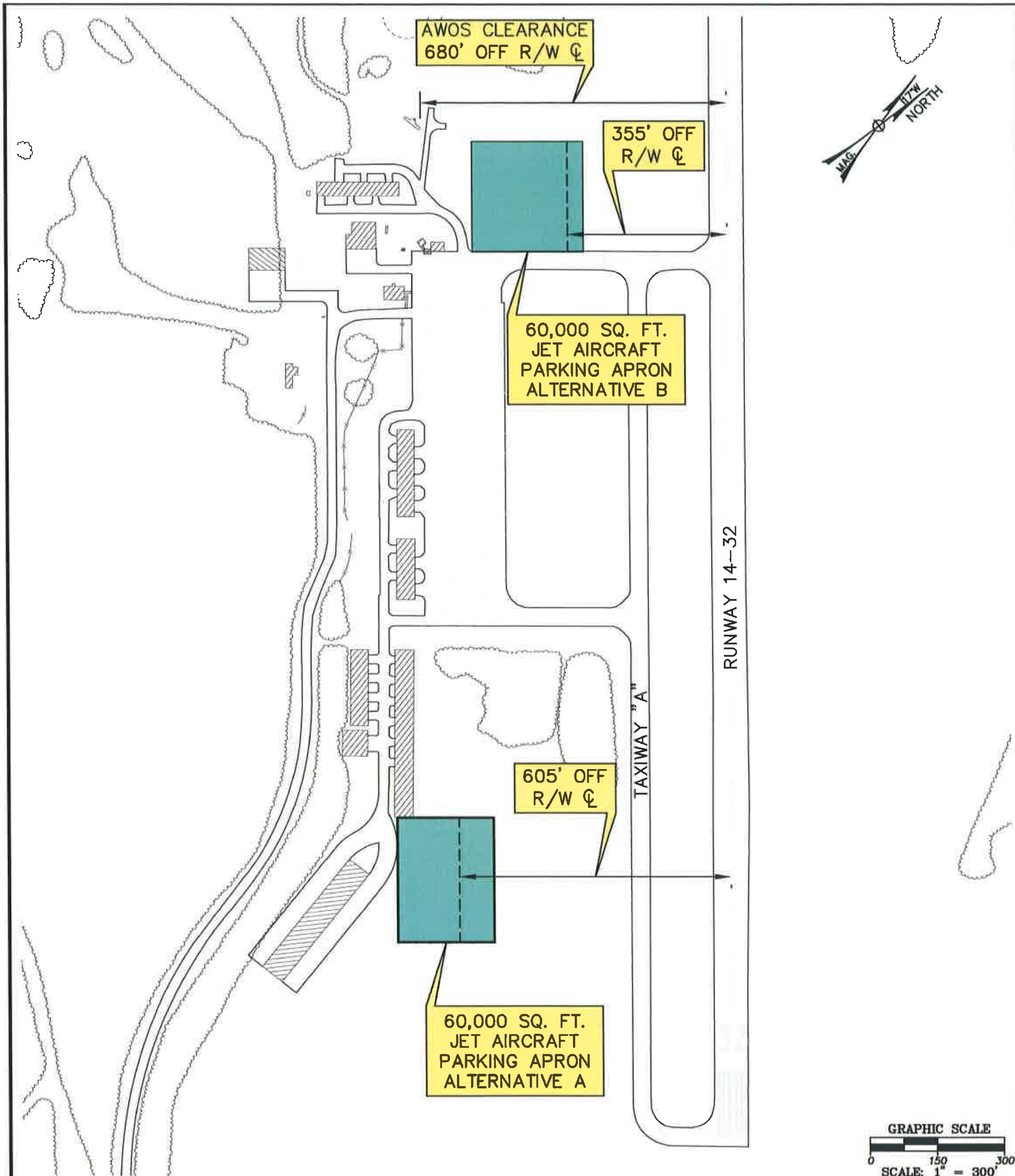
5.2.1.2 Turbojet Aircraft Parking

Currently, the Airport does not have designated parking for turbojet aircraft. During the planning period, the Airport is in need of a new parking apron with 5 parking spaces for turbojet aircraft. The types of jet aircraft currently utilizing the Airport are typically light to medium-sized corporate jets, typically with a wingspan between 49 and 79 feet and approach speeds greater than 91 knots but less than 121 knots.

For safety reasons, it is recommended that jet aircraft not be parked on the same apron with piston aircraft. The jet blast from turbojet aircraft can cause damage to smaller aircraft and creates unsafe conditions on the airfield. A separate jet apron of approximately 60,000 square feet will be sufficient to meet the demand for a small jet parking apron with associated taxilanes. Two potential locations for this apron were evaluated, shown on Figure 5-8.

As discussed in the *Small Aircraft Parking Apron* analysis, the protected surfaces associated with each approach type must be considered in planning areas for future development on the Airport. The preferred approach to the Airport, an APV approach with visibility minimums < ¾ mile, has a 1,000 foot Primary Surface, centered on the runway centerline. Assuming that the jet aircraft intended to use this apron have a tail height of 15 feet, the apron must be set back a minimum of 605 feet off the runway centerline so that aircraft parked on the apron do not obstruct the Transitional Surface. Alternatively, should the Airport pursue an approach with minimums greater than ¾ mile, the required setback for this apron will be 355 feet off the runway centerline. Construction to this lesser standard will preclude future upgrade of the Airport's approach.

Under Alternative A, the jet apron would be constructed beyond the proposed small aircraft apron, toward the Runway 32 end, and would be set back 605 feet off the proposed runway centerline. Though the distance from the apron to the terminal area is a deficiency in this alternative, this location topographically requires less excavation than other potential development alternatives, and this apron alternative meets the



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775890	OKS	CPL	FIGURE-5-6

DATE:	JULY 2007
SCALE:	1" = 300'
REVISION:	

FIG 5-8

setback requirements of the Airport's preferred approach alternative. The cost of constructing this alternative is approximately $500,000.

Under Alternative B, the jet apron will be constructed adjacent to the existing parking apron, to the north toward the Runway 14 end. Though this location requires more extensive excavation, it is in close proximity to the terminal area of the Airport, as well as the existing fueling facilities. The potential to develop this area is limited by the existing facilities, including the FAA owned ASOS equipment and its associated lease area which imposes height restrictions on potential development in close proximity to the equipment. This Alternative is unable to meet the 605 foot setback required for the preferred approach alternative. Construction of the apron to meet the less stringent requirements of the approach with visibility minimums greater than ¾ of a mile is feasible, however, construction to the 355 foot setback standard would preclude future approach improvements. The cost of constructing this alternative is approximately $600,000. The higher cost of this alternative is representative of the additional excavation required at this location.

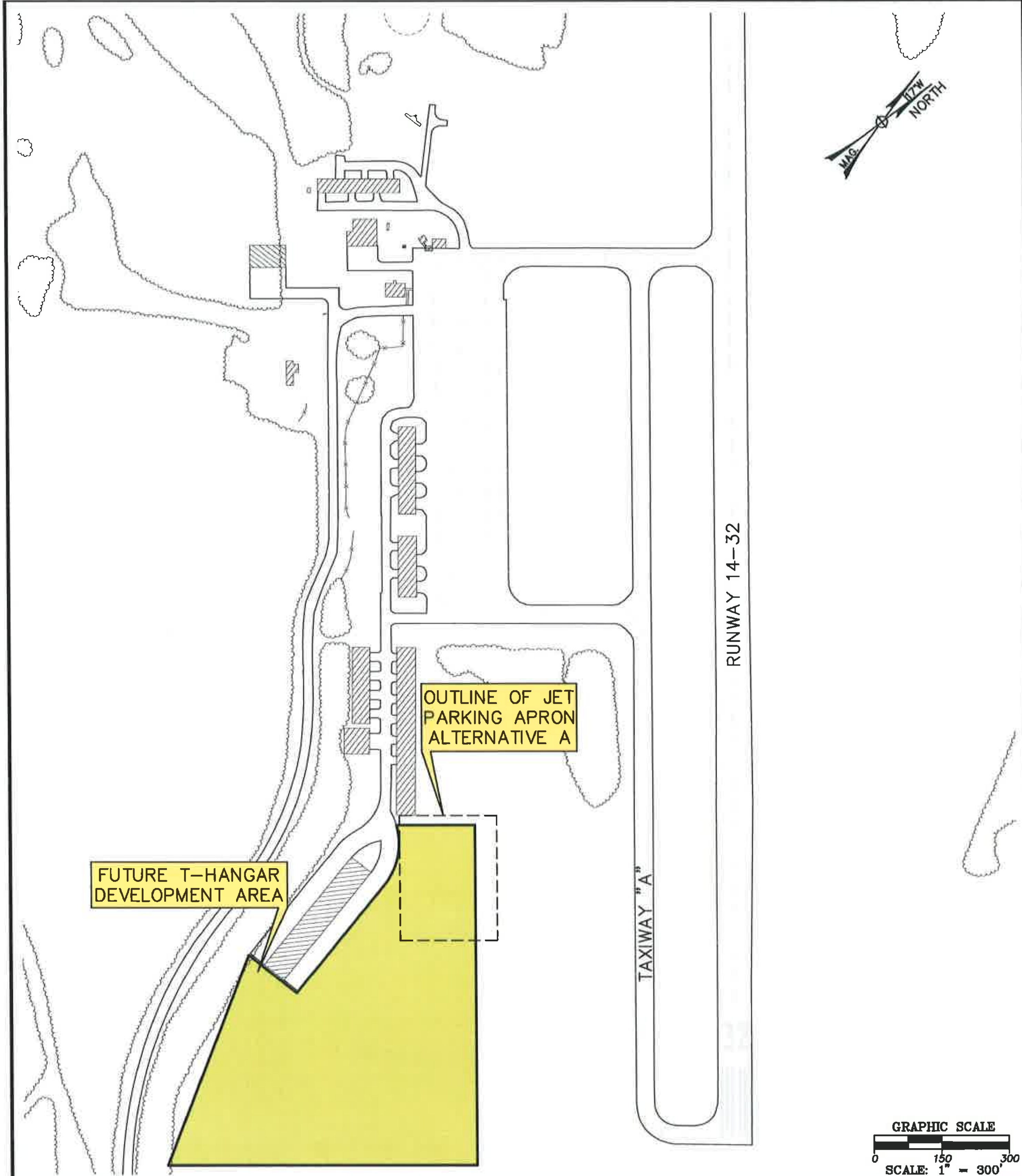
Alternative A is the recommended jet apron alternative. This is because construction of this apron will not foreclose on future opportunities to improve the runway's approach.

5.2.2 FUELING FACILITIES

The existing 10,000 gallon underground storage tank for 100 low lead aviation fuel (AvGas) should have sufficient capacity to meet the AvGas demand at the Airport for the duration of the planning period. With increasing jet traffic utilizing the airport, it will be necessary, in the short to mid-term, to provide Jet-A fuel on the Airport. A stationary tank or a mobile refueler truck with a capacity for 5,000 gallons will be sufficient to meet the demand for Jet-A fuel for the duration of the planning period. In the short term, the Airport may consider leasing a mobile refueler truck for Jet-A fuel during high-traffic months. In the future, the expansion of the existing fuel farm may be warranted. The installation of a 5,000 gallon aboveground storage tank (AST) for the storage of Jet-A fuel is estimated to cost approximately $600,000. At such time that a Jet-A AST is installed, the existing fuel farm should be expanded to properly manage the increase in capacity and to meet the environmental protection requirements of such a facility.

5.2.3 T-HANGAR DEVELOPMENT

It is recommended that an area for future T-hangar development be reserved south of the existing development on the Airport. Currently, T-hangar development has been focused around the mid-field area of the airport, adjacent to the existing parking apron. Expansion has begun to the southwest of the runway, along the access road. It is recommended that future T-hangar construction be located in this same area. Figure 5-9 shows a potential layout for future development of T-hangars in this area.



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775890	OKS	CPL	FIGURE-5-7

DATE:	JULY 2007
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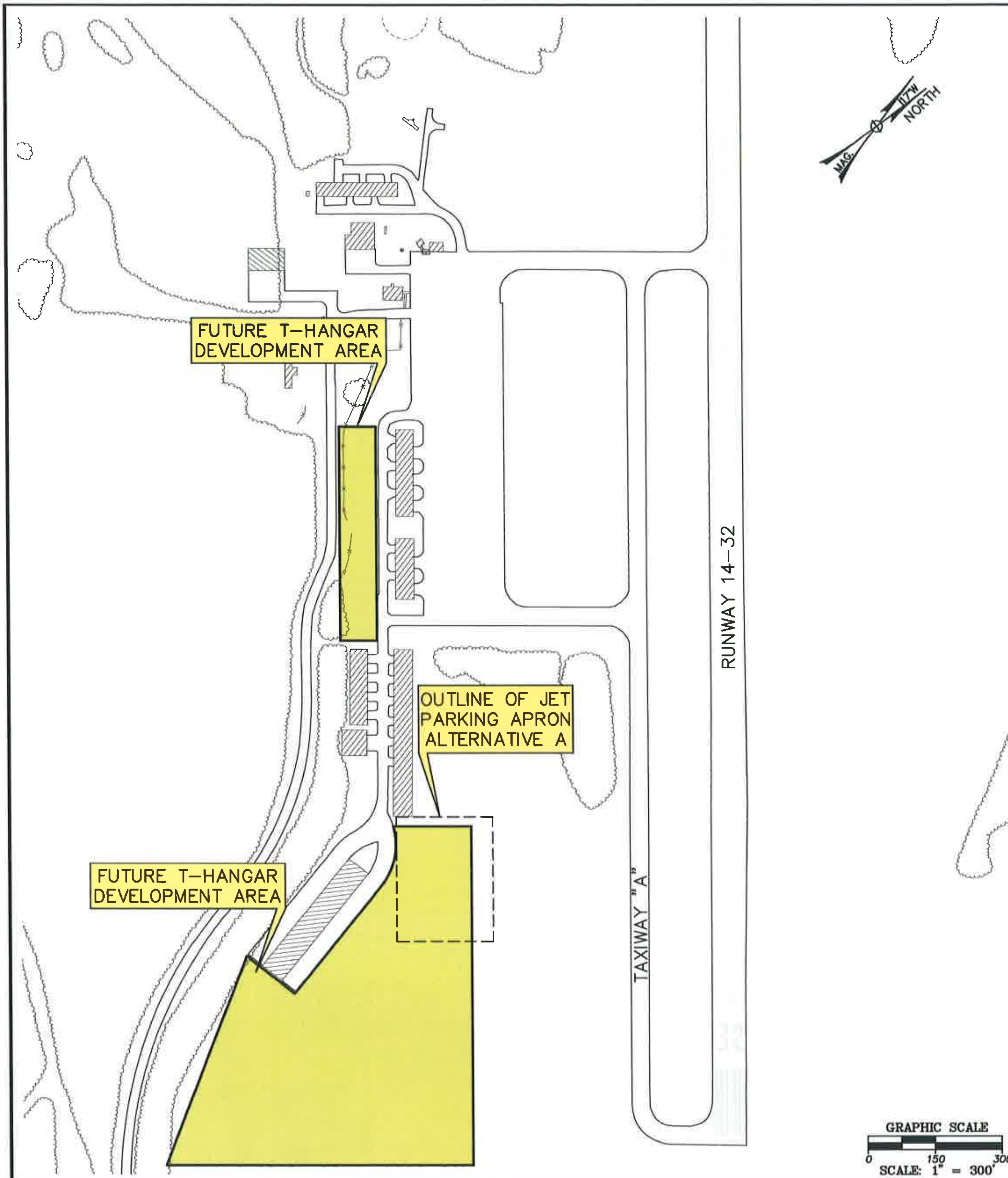
REVISION:	

FIG 5-9

Additionally, it is recommended that areas adjacent to the access road be reserved for additional T-hangar and conventional box hangar development to use the same access taxilanes as the existing ESAA-owned T-hangars as shown in Figure 5-10. These areas should be reserved for future FBO hangar development.

5.2.4 FBO DEVELOPMENT

In the past, a proposal had been made to the Authority to develop an aircraft refurbishing operation on the Airport which would require a significant land area for the facility, hangar space, parking apron, and access to the runway. While that particular proposal did come to fruition, it is prudent to plan for a future large-scale aviation development on the Airport. An area for future FBO and industrial development has been reserved on the westerly side of the airport property as shown in Figure 5-11. In the event that this area is developed for industrial aviation use, access to the runway from the site will require the relocation of the terminal building. A potential site for the relocated terminal building is also shown on Figure 5-11. Relocation of the terminal building provides the required area to construct a taxilane with compliant safety areas from the proposed FBO development site to the runway.



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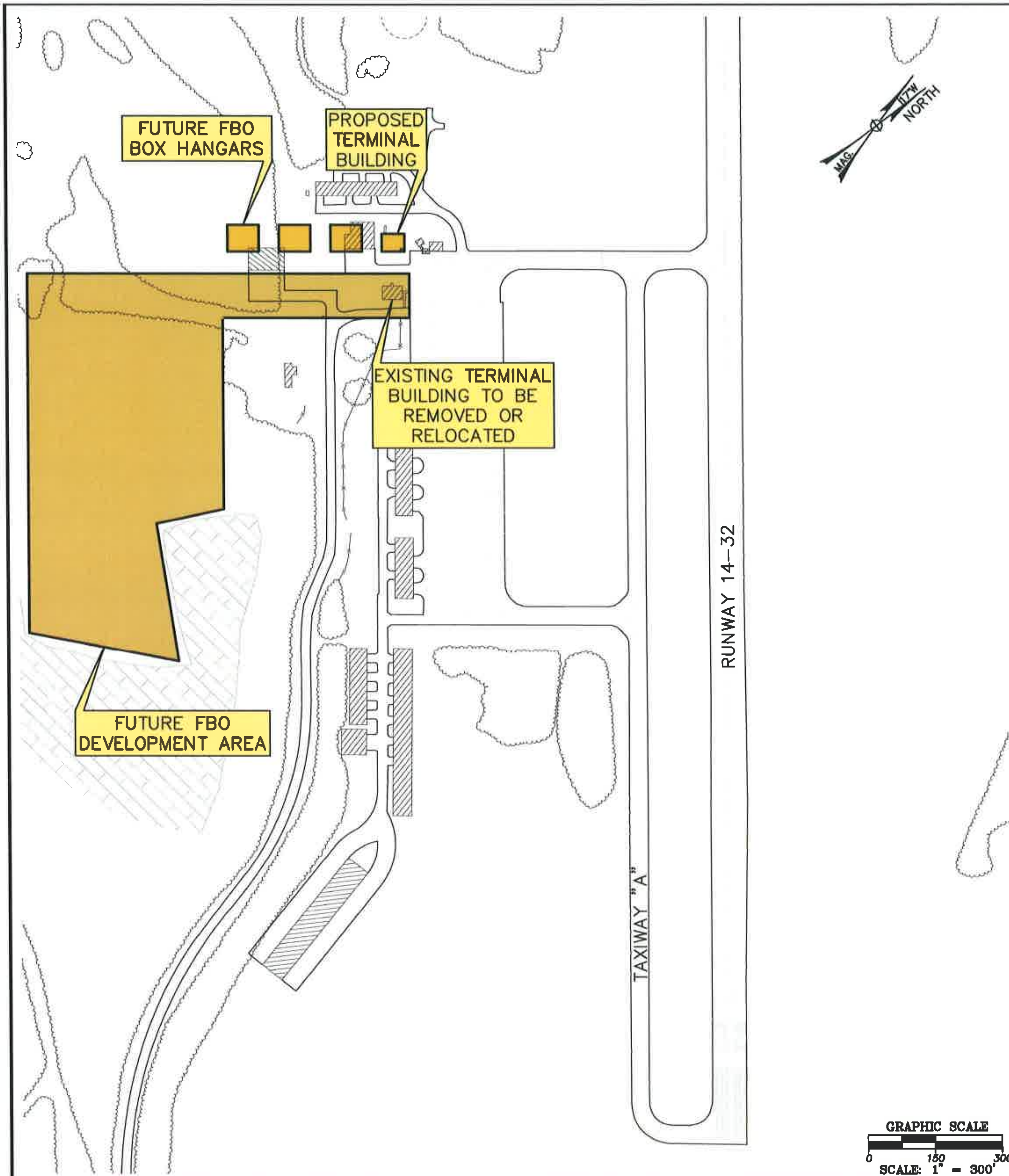
	PROJ. NO:	DRAWN	REVIEWED	CADD FILE	FIG 5–10
	775890	OKS	CPL	FIGURE–5–8	



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AIRPORT MASTER PLAN UPDATE
AIP NO. 3-23-0022-10

EASTERN SLOPE REGIONAL AIRPORT
FRYEBURG, MAINE

PROJ. NO:	DRAWN	REVIEWED	CADD FILE
775890	OKS	CPL	FIGURE-5-9

DATE:	JULY 2007
SCALE:	1" = 300'
REVISION:	

FIG 5-11

CHAPTER 6: SCHEDULE OF IMPROVEMENTS

This chapter presents a recommended Schedule of Improvements (the Schedule) for implementing the improvements shown on the Airport Layout Plan (ALP). The schedule is a first step in the Airport's efforts to develop a coordinated Capital Improvement Plan (CIP) in cooperation with the FAA and Maine DOT. The schedule presented in this Chapter represents the Airport's desired implementation schedule. The final CIP is a state and federal plan published annually once all airport's have submitted their funding requests, therefore the schedule presented here should be viewed as a recommendation.

6.1 Proposed Schedule

The proposed projects are grouped into three project periods identified by federal fiscal year: the short-term (2008-2012), the mid-term (2013-2018) and the long-term (2019-2028).

6.1.1 INFLATIONARY EFFECTS ON COST ESTIMATES

Project costs will likely rise in the future with inflation and other factors. All project costs occurring after 2008 have been adjusted for inflation. The inflation rate used in the adjustment represents a compounded increase of 2.77% per year in cost. The inflation rate used was based upon the average inflation rate that occurred between 2000 and 2007. Future inflation rates may vary, therefore the costs shown in Table 6-1 may need further adjustment. For this purpose, reference is made to the Construction Cost Index (CCI) presented in Engineering News Record, a weekly nationwide civil engineering and construction magazine published by the McGraw-Hill Company. Each month the CCI is revised, reflecting changes in typical labor rates and material costs. By applying future CCI numbers as they become available, the cost estimates can be updated to more accurately reflect likely costs at the time a project is scheduled for implementation.

6.1.2 ENVIRONMENTAL PLANNING / MITIGATION PROJECT COSTS

The costs of environmental planning, review or permitting projects are estimated using assumed scopes of work and from experience with similar types of projects. Actual costs of planning or environmental review and permitting projects are not known with any degree of accuracy until the project scope of work is developed. Developing the scope of work is a process that takes place approximately one year before the actual start of a project in preparation for funding applications. Therefore, the cost of these types of projects may vary greatly from the estimated costs due to changes in the actual scope of the project at the time of implementation.

In addition, costs for environmental mitigation are not known until mitigation plans are presented to regulators and approved. Therefore, projects that contain environmental mitigation components must be assumed so that the costs of these projects can be represented in the Schedule.

6.1.3 PROJECT PHASING

In an effort to better manage funding capabilities or project costs, the Schedule separates some projects into two or more phases, or schedules them apart from other compatible projects that could be grouped together. The grouping of projects should be considered wherever efficiencies or cost savings are potential benefits.

6.1.4 FUNDING BREAKDOWN

Federal airport funding under the FAA Airport Improvement Program currently allows the FAA to reimburse sponsors up to 95% of eligible project costs. Typically, the State and Airport split the remaining project costs, with each paying 2.5%. The prior AIP program reimbursed sponsors up to 90% of the program eligible costs; the remaining 10% was shared between the Airport and the State. The 95% reimbursement program ended with the Federal Fiscal Year 2007 AIP projects. It is assumed that future projects will again be reimbursed at the 90% Federal rate, with the Airport funding a local share of 5% of total project costs, and the Maine DOT funding the remaining 5% for all projects scheduled for implementation starting in FFY 2008.

AIP eligible items generally include environmental planning and permitting, airfield components, land acquisition, aircraft aprons, obstruction removal or lighting, fencing, airport access, etc. Items that are not typically eligible for AIP funding include: hangars, automobile parking lots, and facilities that are for the sole use of private parties. Further, certain electronic and visual navigational aids may be provided entirely by the Airways Facilities and Equipment Division (F&E) of the FAA at no cost to the Airport. Certain recommended improvements are either not currently eligible for Federal funding assistance, or are unlikely to obtain Federal funding. These projects are noted in the Schedule.

Where a project is not eligible for federal funding assistance, the Airport may pursue private funding resources. For example, partnering with an FBO enterprise to construct a terminal building and FBO office is an excellent method for building multi-purpose facilities that meet the needs of the Airport and its tenants, without AIP assistance. The Schedule identifies those projects that may be privately funded, if any.

6.1.5 FORECASTED VS. ACTUAL DEMAND

Although it is the intent of the Schedule to program improvements required to meet forecasted demand through the planning period, it is not recommended that facilities be built unless actual demand for the improvement develops. In all probability, demand will not occur exactly as scheduling indicates, which, in turn, may affect development timetables. Also, any substantial delays in environmental and other review processes may require alterations to the Schedule. In such a case, some of the work items for a given period may have to be postponed.

Because some of the long-term improvements are based on forecasts alone, there is no guarantee that some of these improvements will need to be constructed. Thus, the Airport should continue to monitor demand for Airport facilities as it develops and be prepared to initiate steps to implement long-term recommendations as demand dictates. The Airport should begin the processes of implementing the short-term recommendations as soon as practicable, given funding constraints, as the demand for these projects is in evidence.

Following the Schedule is a description of each project and its eligibility for funding assistance.

Table 6-1
Schedule of Improvements

Fiscal Year	Project Title	Total Project Cost	Funding Breakdown		
			Federal	State	Local
2009	Environmental Assessment	$404,269	$363,842	$20,213	$20,213
2009	Taxiway and Apron Crack Repair	$130,000	$117,000	$6,500	$6,500
2009	Gates and Access Control	$120,000	$108,000	$6,000	$6,000
2010	Design/ Permitting for Parallel Taxiway and Runway Extension	$750,000	$675,000	$37,500	$37,500
2011	Reconstruct and Extend Parallel Taxiway and MITLS; Reconstruct and Extend Runway, replace MIRLS, Rotating Beacon, PAPI	$7,600,000	$6,840,000	$380,000	$380,000
2013	Design and Construct Small Aircraft Parking Apron Expansion	$530,000	$477,000	$26,500	$26,500
2014	Jet A Fuel Tanks	$605,000	--	--	$605,000
2015	Design and Construct Terminal Building Relocation	$350,000	--	--	$350,000
2016	Terminal Area Fencing	$360,000	$324,000	$18,000	$18,000
2017	Design and Construct Jet Apron	$790,000	$711,000	$39,500	$39,500

6.2 Short-Term Project Descriptions

This section provides summary descriptions of the individual projects included in the Airport's short-term Schedule of Improvements (from FY 2008-2012). The following descriptions are for planning purposes only and will require refinement and review.

6.2.1 FY 2009 ENVIRONMENTAL ASSESSMENT

This project, which is currently scheduled on the Airport's CIP for 2009, includes the preparation and filing of an Environmental Assessment (EA) to meet the requirements of the National Environmental Policy Act (NEPA).

An EA must be prepared for a proposed action when the initial review of the action indicates that: 1) it is not categorically excluded from NEPA, 2) it is normally categorically excluded but, in this instance, may involve extraordinary circumstances that may significantly impact the environment, or 3) it is not known normally to require an EIS and is not categorically excluded. The reconstruction and extension of Runway 14-32 from 3,700 feet to 5,00 feet, the extension of the taxiway to a full-parallel taxiway, and the construction of associated runway and taxiway safety areas is not categorically excluded from NEPA, and will require an EA.

If, based on the EA, the FAA determines that the proposed action would not cause a significant environmental effect; the responsible FAA official shall prepare a Finding Of No Significant Impact (FONSI). If, based on the EA, the FAA determines that the proposed action would cause a significant environmental effect, and mitigation would not reduce the effect below applicable significance thresholds, then the FAA shall publish a Notice of Intent (NOI) to prepare an Environmental Impact Statement (EIS) in the *Federal Register* and begin the EIS process. It is anticipated that an EA will be sufficient to demonstrate that the proposed project will not cause a significant environmental effect.

This project is eligible for state and federal funding assistance.

6.2.2 FY 2009 CRACK REPAIR

This project includes repair of pavement cracks at the Airport. This project is the second phase in a FY 2008 Crack Repair project at the Airport. The priority of crack repair will be: runway, taxiways, and then aprons. Cracks that are less than 1 inch in width will be cleaned, dried and sealed with crack sealant. Cracks between 1 and 1 ½ inches in width will be cleaned, dried, filled with sand, and sealed with crack sealant. Larger cracks will have the pavement removed, base material added and compacted, and new bituminous concrete pavement placed.

This project is eligible for state and federal funding assistance.

6.2.3 FY 2009 GATES AND ACCESS CONTROL

This project includes the installation of gates and access control and monitoring system in order to prevent inadvertent access to the Airport. There currently exists a problem with vehicles driving into the aircraft operating area. The gates will be installed so that vehicular access from the existing parking lot is limited to only authorized individuals.

This project is eligible for state and federal funding assistance.

6.2.4 FY 2010 DESIGN AND PERMITTING FOR PARALLEL TAXIWAY AND RUNWAY EXTENSION

This project will include final permitting for the parallel taxiway and runway extension, to possibly include a Section 404 permit from the Army Corps of Engineers for the filling of wetlands. This project also includes the design of the Runway 14-32 extension from the existing 4,200 feet to a total length of 5,000 feet, and the design of the extension of the taxiway to a full-parallel taxiway.

This project is eligible for state and federal funding assistance.

6.2.5 FY 2011 RECONSTRUCT, MARK, SIGN, LIGHT AND EXTEND RUNWAY 14-32 AND RECONSTRUCT, MARK, SIGN, LIGHT, SHIFT AND EXTEND PARALLEL TAXIWAY

This project consists of the reconstruction of Runway 14-32 at a length of 5,000 feet with standard RSAs at each end. Major components of this project include: full depth reconstruction of Runway 14-32 in it's current location; construction of an 800 foot extension to the southwest so that the total runway length is 5,000 feet; marking the runway with non-precision markings, runway centerline markings, and runway end markings; replacing the Medium Intensity Runway Lights (MIRLS); replacing the VASI; and constructing standard Runway Safety Areas at each end.

This project also includes reconstruction and extension of the parallel taxiway. The major components of this project include: full depth reconstruction of the parallel taxiway, shifted to the south by 100 feet in order to provide a 300 foot separation between the runway and parallel taxiway; extending the parallel taxiway to a full-length parallel taxiway; marking the taxiway pavement; and replacing the Medium Intensity Taxiway Lights (MITLS).

This project will also include replacement of the Airport's rotating beacon as part of the complete lighting system improvements.

This project is eligible for state and federal funding assistance.

6.2.6 FY 2013 RECONSTRUCT AND EXPAND MAIN APRON

This project consists of reconstructing the Main Apron (approximately 16,000 square yards) and expanding the apron by approximately 5,500 square yards. The apron will be extended to the south of the existing aircraft parking apron, providing a parking area for an additional 15 small aircraft. Major components of this project will include removal of existing bituminous concrete, grading base materials, installing stormwater drainage structures, paving, installing tie-down hardware, and marking taxilanes and tie-downs.

This project is eligible for state and federal funding assistance.

6.3 Mid-Term Project Descriptions

This section provides summary descriptions of the individual projects included in the Airport's mid-term Schedule of Improvements (from FY 2013-2017). The following descriptions are for planning purposes only and will require refinement and review.

6.3.1 FY 2014 JET-A FUEL TANKS

This project will consist of installing a 5,000 gallon aboveground fuel storage facility adjacent to the existing fuel storage facility on the Airport. The 5,000 gallon AST will be used for the storage of Jet A fuel. Major components in this project include placing a concrete platform for one 5,000 gallon above ground fuel storage tank with one pump, installation of the tank and pumps, and installation of adequate secondary containment to meet all applicable environmental regulations.

Design and construction of revenue-producing facilities, such as fuel storage facilities, are not typically eligible for AIP funding through the FAA. The Airport should consider pursuing alternative funding sources for this project, including agreements with private users and business owners on the Airport.

6.3.2 FY 2015 RELOCATE ADMINISTRATION BUILDING

Future plans for FBO development on the Airport will require removal and relocation of the existing Airport administration building. The existing 1,500 square foot facility provides ample area to serve the needs of the Airport, and it is anticipated that a facility of a similar size and construction will be adequate to meet the future needs of the Airport.

Design and construction of an Airport administration building is not typically eligible for AIP funding through the FAA. The Airport should consider pursuing alternative funding sources for this project, including agreements with the Airport FBO to provide an opportunity for the Airport to meet its administration facility needs in a multi-use facility that also serves as a base of operations for the FBO.

6.3.3 FY 2016 TERMINAL AREA FENCING

This project is proposed to include fencing along a portion of the Airport access road, and in the area of the existing terminal building and parking lot so that access to the airfield is restricted, and inadvertent access to the airfield can be prevented. It is estimated that approximately 1,500 linear feet of fencing will be required. The limits of the fencing will ultimately be determined by the facility layout coordinated with the Airport FBO for the construction of the relocated Administration/FBO facility.

Perimeter and terminal area fencing are typically eligible for AIP funding.

6.4 Long-Term Project Descriptions

This section provides summary descriptions of the individual projects included in the Airport's long-term Schedule of Improvements (from FY 2018-FY2027). The following descriptions are for planning purposes only and will require refinement and review.

6.4.1 FY 2017 CONSTRUCT JET APRON

This project consists of constructing a jet aircraft apron of approximately 6,600 square yards to provide a parking area and associated taxilanes for approximately 5 small jets. This apron will be constructed adjacent and to the north of the existing aircraft parking apron. Major components of this project will include excavation and grading, installing stormwater drainage structures, paving, and marking taxilane centerlines and parking areas.

This project is eligible for state and federal funding assistance.

6.4.2 FY 2018 RECONSTRUCT LYMAN DRIVE

Lyman Drive provides access to the Airport from State Route 5 & 113 and is approximately 1 mile in length. Approximately 2,200 feet of Lyman Drive serves solely to access the Airport and is eligible for state and federal funding assistance. The entirety of Lyman Drive is currently in fair to poor condition and is deteriorating. The road is in need of construction.

This project will reconstruct Lyman Drive. The road is approximately 1 mile long and has a paved width of approximately 20 feet. This project will include excavation, installation of stormwater management devices, installation of base material, paving and restoration of disturbed materials to remain unpaved.

A portion of this project is eligible for state and federal funding assistance.

CHAPTER 7: MULTI-STATE PARTICIPATION

In the late 1950s and early 1960s, Mount Washington Valley businessmen expressed interest in developing a regional airport to provide an alternate form of transportation to the area's recreational facilities. At that time, the existing airport in Conway, NH was deemed to be insufficient to meet the needs of the growing region, and development constraints required that alternative locations for a regional airport be identified.

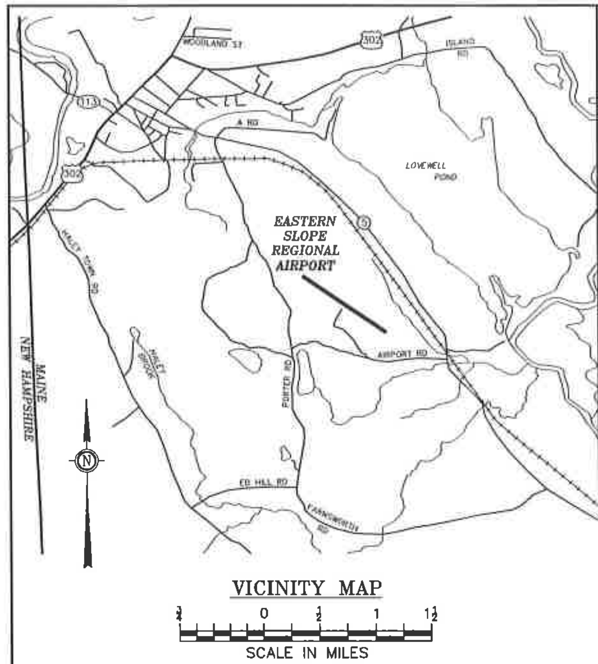
The Eastern Slope Airport Authority was formed in 1960 to construct and manage the proposed Airport. The Authority identified a site in southern Fryeburg, Maine for the location of the Airport due to terrain considerations. The Airport was constructed in 1961 with funding from the states of New Hampshire and Maine as well as the FAA, and opened to the public in 1962. The Airport is currently owned by the Town of Fryeburg, Maine, and is leased to the Authority. The Authority is responsible for the operation and management of the Airport. Membership on the Authority consists of:

- Four members from Fryeburg, ME
- Two members from Conway, NH
- One member from Mt. Washington Valley Chamber of Commerce
- One member each from the towns of Bridgton, Brownfield, Denmark, Hiram, Lovell, Porter, Stow and Sweden, ME
- One member each from the towns of Albany, Bartlett, Chatham, Eaton, Jackson and Madison, NH

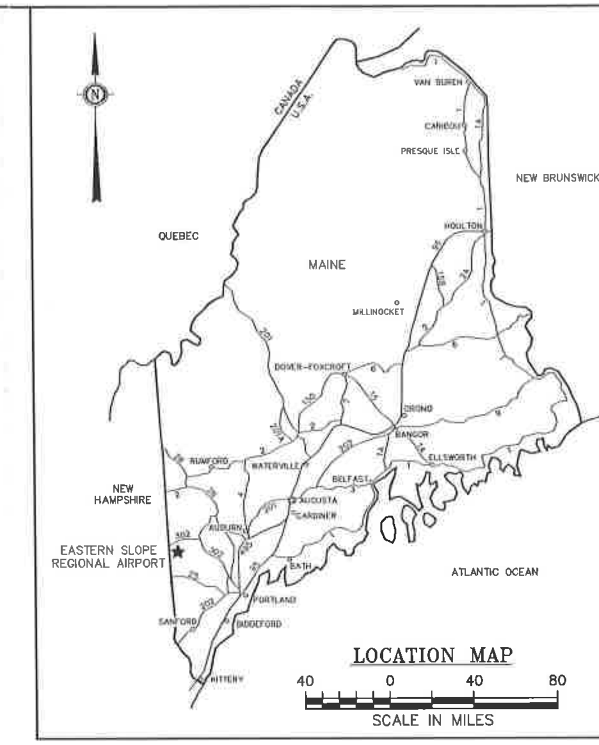
The Airport is a regional facility not only in Authority membership, but also in use of the Airport. Of the 42 based aircraft at the Airport, 22 aircraft owners reside in New Hampshire, and 14 reside in Maine. Transient aircraft use the Airport largely because of its location in the Mount Washington Valley, a popular four-season resort destination. Anecdotal evidence indicates that much of the traffic at the Airport is related to business and tourism in North Conway and the New Hampshire White Mountains.

In order to continue to serve the needs of the region, the Airport and its organization must be restructured so that it is truly regionally owned, operated, governed and supported. This requires legislative support in Maine and New Hampshire, as well as reorganization of the Airport and its Authority. Inclusion in both the Maine and New Hampshire Airport System Plans will provide for improved planning for the future of the Airport in its role as a regional facility. This will allow the Airport to better meet the needs of the region and be supported, in both an advisory and financial capacity, by both states that are served by the Airport.

It is recommended that the Authority study further the feasibility of seeking legislation in both New Hampshire and Maine to access funding from the two states, and concurrence of this concept from the FAA. The feasibility study should include discussion of the issues, and their potential resolution, if any, that surround a reorganization of the Authority, its implications to member communities, and the benefits and costs, if any, of being included in both the Maine and New Hampshire Airport System Plans. The administrative systems needed to seek FAA funding for projects through both states should also be studied.

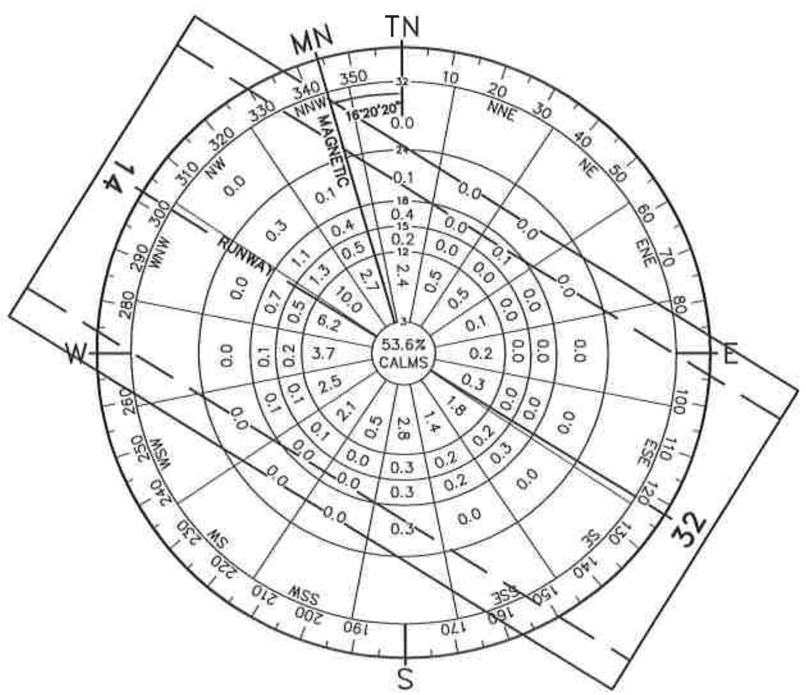


EASTERN SLOPE REGIONAL AIRPORT FRYEBURG, MAINE



AIRPORT MASTER PLAN UPDATE

AIP PROJECT NO. 3-23-0022-10-2005



AUGUST 2008

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3	AIRPORT LAYOUT PLAN
4	PAVEMENT HISTORY PLAN
5	TERMINAL AREA PLAN
6	RUNWAY 14 APPROACH PLAN AND PROFILE
7	RUNWAY 32 APPROACH PLAN AND PROFILE
8	FAR PART 77 SURFACES PLAN

WIND COVERAGE		
	12 MPH	15 MPH
COMBINED	97.8%	99.3%

WIND ROSE NOTES:

SOURCE: NATIONAL CLIMATIC DATA CENTER, ASHEVILLE, NC

STATION: BERLIN, NEW HAMPSHIRE

PERIOD: 1951–1960, JUNE–SEPTEMBER

NUMBER OF OBSERVATIONS: 8,013

MAGNETIC DECLINATION: 16°20'20" WEST (1980)

PREPARED BY

GALE

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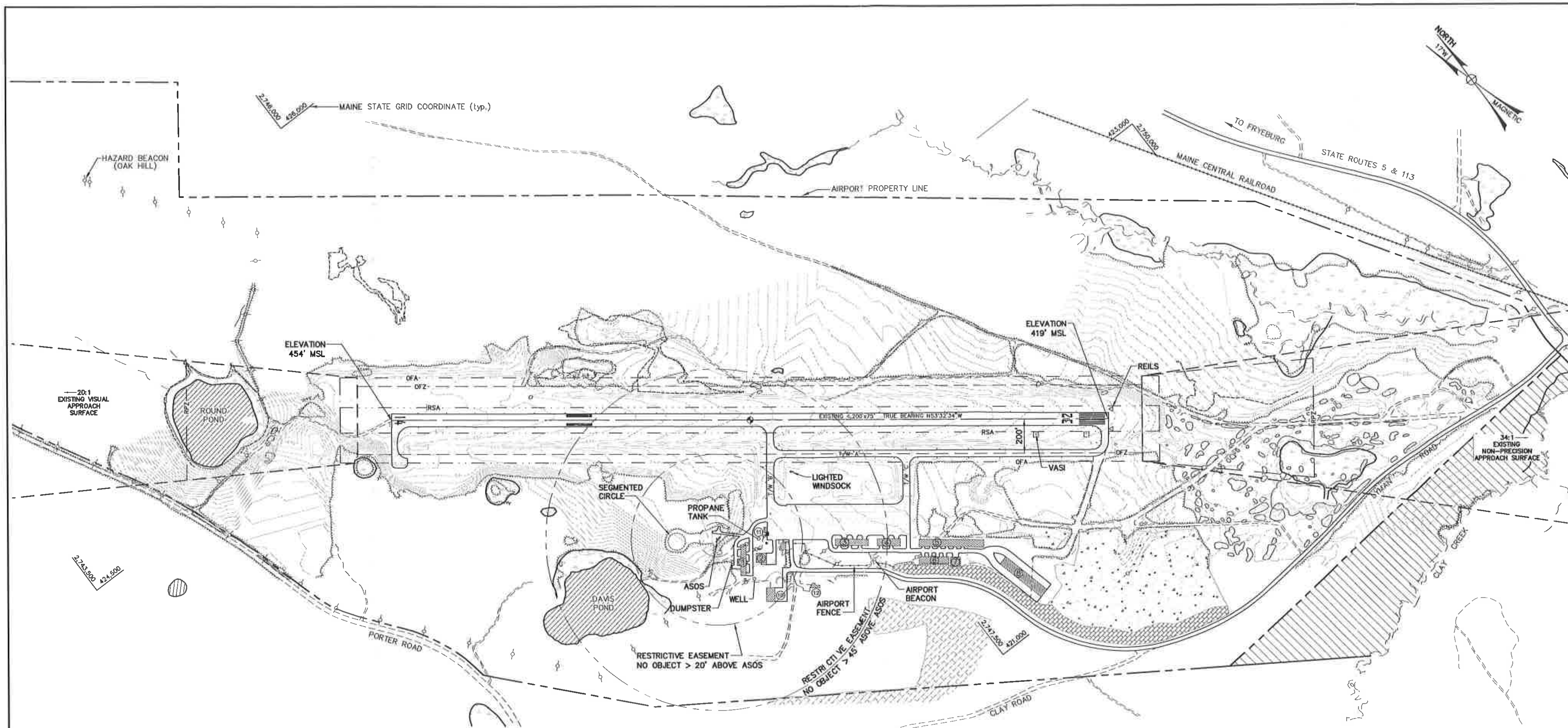
FINAL

SHEET NO.

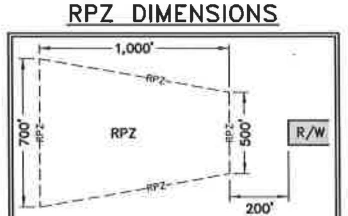
1



RUNWAY PROTECTED ZONES

	EXISTING
RSA WIDTH	150 FEET
RSA LENGTH BEYOND END OF R/W	300 FEET
RSA LENGTH PRIOR TO LANDING THRESHOLD	300 FEET
RUNWAY OBJECT FREE AREA WIDTH	500 FEET
RUNWAY OBJECT FREE AREA LENGTH BEYOND R/W END	300 FEET
RUNWAY OBSTACLE FREE ZONE WIDTH	400 FEET
RUNWAY OBSTACLE FREE ZONE LENGTH BEYOND R/W END	200 FEET

RPZ DIMENSIONS



SAME FOR RUNWAY 14 AND RUNWAY 32

RUNWAY DATA

	EXISTING
RUNWAY LENGTH x WIDTH	4,200' x 75'
% ALL WEATHER WIND COVERAGE*	97.8 % (12 M.P.H.) 99.3 % (15 M.P.H.)
PAVEMENT TYPE & STRENGTH	BITUMINOUS CONCRETE / UNKNOWN
RUNWAY LIGHTING	MIRL
APPROACH SURFACE SLOPE / TYPE	R/W 14 20:1 / VISUAL R/W 32 34:1 / NON-PRECISION
APPROACH VISIBILITY MINIMUMS	R/W 14 ≥ 1-1/4 MILES VISIBILITY ≥ 1,500 FEET CEILING R/W 32 ≥ 1-1/4 MILES VISIBILITY ≥ 1,100 FEET CEILING
FAR PART 77 RUNWAY CLASSIFICATION	OTHER THAN UTILITY
EFFECTIVE GRADIENT	0.84 %
RUNWAY MARKING	R/W 14 VISUAL R/W 32 NON-PRECISION
DESIGN AIRCRAFT	BEECH SUPER KING AIR B200
R/W 14 END COORDINATES	LAT 43°59'40" N LONG 70°57'15" W
R/W 32 END COORDINATES	LAT 43°59'15" N LONG 70°56'29" W

* WIND DATA FROM BERLIN MUNICIPAL AIRPORT FROM 1951-1960 (JUNE-SEPTEMBER).

AIRPORT FACILITIES

NO.	EXISTING FACILITY
1	SIX UNIT T-HANGAR
2	FBO MAINTENANCE HANGAR
3	SIX UNIT T-HANGAR
4	FOUR UNIT T-HANGAR
5	SIX UNIT T-HANGAR
6	FOUR UNIT T-HANGAR
7	CONVENTIONAL HANGAR
8	13 UNIT T-HANGAR
9	TERMINAL BUILDING
10	SRE MAINTENANCE & STORAGE BUILDING
11	FUEL FARM
12	MOBILE HOME

PITCH PINE/SCRUB OAK COMMUNITIES

- PITCH PINE/SCRUB OAK COMMUNITY INTACT CANOPY; MEETS MAINE NATURAL AREAS PROGRAM DEFINITION
- PITCH PINE/SCRUB OAK COMMUNITY INTACT BUT FRAGMENTED CANOPY; DOES NOT MEET MAINE NATURAL AREAS PROGRAM DEFINITION
- PITCH PINE/SCRUB OAK COMMUNITY HEAVILY IMPACTED; DOES NOT MEET MAINE NATURAL AREAS PROGRAM DEFINITION

LEGEND

- LIMIT OF APPROACH SURFACE
- OFA — RUNWAY OBJECT FREE AREA (OFA)
- OFZ — RUNWAY OBSTACLE FREE ZONE (OFZ)
- RPZ — RUNWAY PROTECTION ZONE (RPZ)
- RSA — RUNWAY SAFETY AREA (RSA)
- TREE LINE
- STREAM/ CREEK/ BROOK
- WETLANDS
- EXISTING AVIGATION EASEMENT
- EXISTING AIRPORT REFERENCE POINT
- EXISTING POLE

AIRPORT DATA

	EXISTING
AIRPORT ELEVATION	454.3 FT. MSL
AIRPORT REFERENCE POINT (ARP)	LAT 43°59'28" N LONG 70°56'52" W
NORMAL MAXIMUM TEMPERATURE	82° F
TAXIWAY LIGHTING	MITL
TAXIWAY MARKING	STANDARD
NAVIGATIONAL AND VISUAL AIDS	NDB, ASOS, REILS (32), VASI-2L (32) ROTATING BEACON, WINDSOCK
AIRPORT REFERENCE CODE	B II (OTHER THAN UTILITY)

NOTES:
1. PITCH PINE/SCRUB OAK COMMUNITY DELINEATION PREPARED BY WOODLOT ALTERNATIVES, INC. ON NOVEMBER 8 AND 10, 2005 AND SURVEYED BY MAINE BOUNDARY CONSULTANTS ON NOVEMBER 18, 2005.

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PROJECT: AIRPORT MASTER PLAN UPDATE
AIP NO. 3-23-0022-10-2005

OWNER: EASTERN SLOPE REGIONAL AIRPORT
FRYEBURG, MAINE

NO.	DATE	DESCRIPTION	BY

PROJECT NO.	775890
CADD FILE	SHEET 2
DESIGNED BY	CPL
DRAWN BY	JAT
CHECKED BY	AJD
DATE	MARCH 24, 2008
DRAWING SCALE	1"=300'

GRAPHIC SCALE
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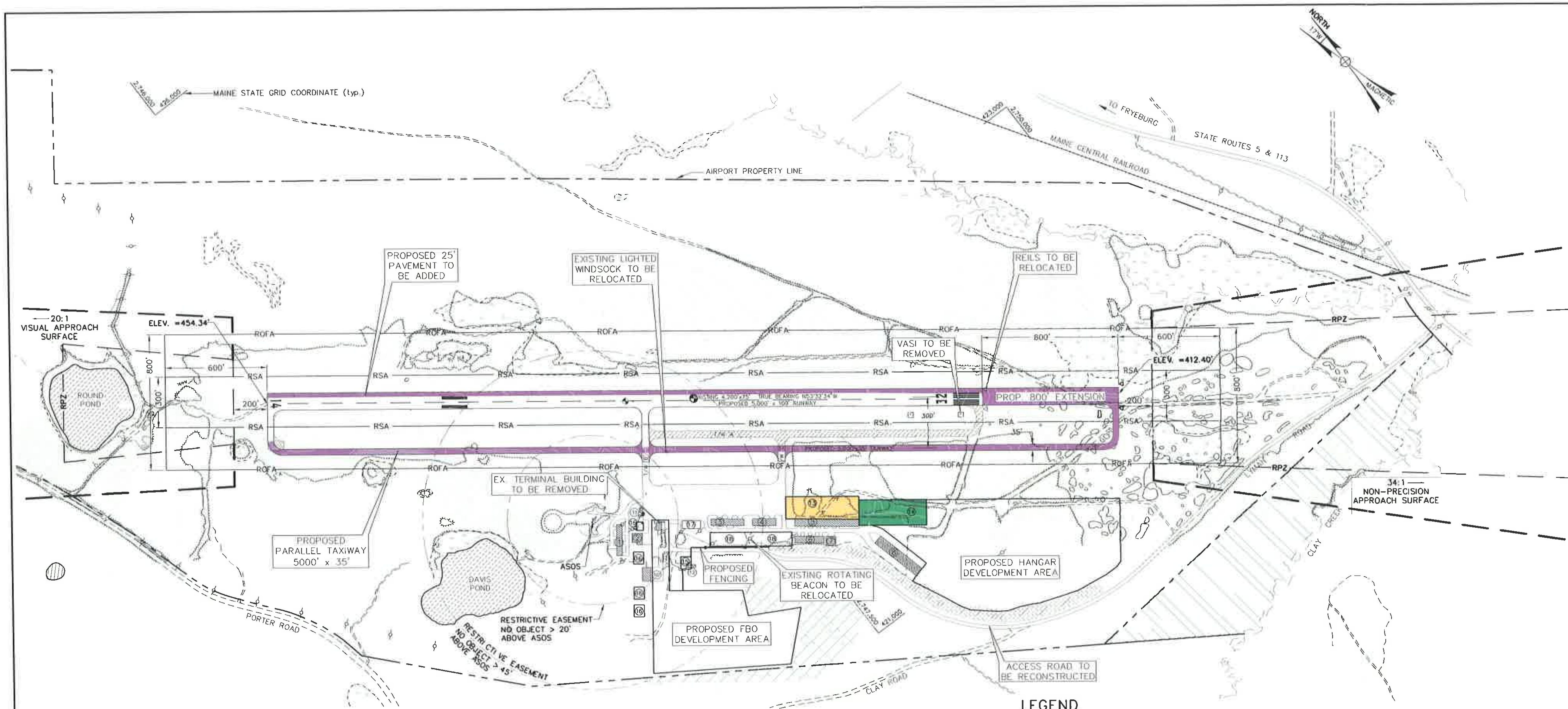
SCALE: 1" = 300'

SHEET TITLE
EXISTING FACILITIES PLAN

DRAWING NO.
SHEET 2



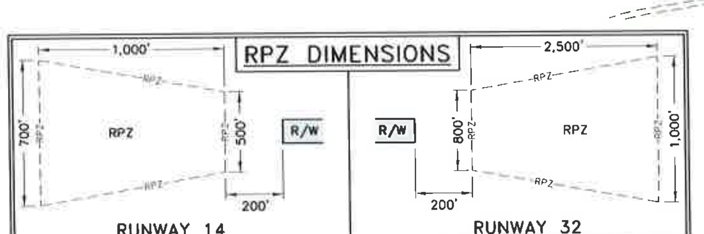
RUNWAY PROTECTED ZONES

	EXISTING	PROPOSED
RSA WIDTH	150 FEET	300 FEET
RSA LENGTH BEYOND END OF R/W	300 FEET	600 FEET
RSA LENGTH PRIOR TO LANDING THRESHOLD	300 FEET	600 FEET
RUNWAY OBJECT FREE AREA WIDTH	500 FEET	800 FEET
RUNWAY OBJECT FREE AREA LENGTH BEYOND R/W END	300 FEET	600 FEET
RUNWAY OBSTACLE FREE ZONE WIDTH	400 FEET	400 FEET
RUNWAY OBSTACLE FREE ZONE LENGTH BEYOND R/W END	200 FEET	200 FEET

AIRPORT BUILDINGS

NO.	EXISTING FACILITY	NO.	EXISTING FACILITY
1	SIX UNIT T-HANGAR	11	FUEL FARM
2	FBO MAINTENANCE HANGAR	12	MOBILE HOME
3	SIX UNIT T-HANGAR		
4	FOUR UNIT T-HANGAR	NO.	PROPOSED FACILITY
5	SIX UNIT T-HANGAR	13	SMALL AIRCRAFT APRON 56,500 sf (12' TAIL HEIGHT)
6	FOUR UNIT T-HANGAR	14	JET AIRCRAFT APRON 60,000 sf (15' TAIL HEIGHT)
7	CONVENTIONAL HANGAR	15	PROPOSED TERMINAL
8	TEN UNIT T-HANGAR	16	FBO HANGARS
9	TERMINAL BUILDING	17	JET A FUEL FACILITY
10	SRE MAINTENANCE & STORAGE BUILDING	18	T-HANGAR DEVELOPMENT AREA

RPZ DIMENSIONS



RUNWAY DATA

	EXISTING	PROPOSED
RUNWAY LENGTH x WIDTH	4,200' x 75'	5,000' x 100'
% ALL WEATHER WIND COVERAGE*	97.8 % (12 M.P.H.) 99.3 % (15 M.P.H.)	97.8 % (12 M.P.H.) 99.3 % (15 M.P.H.)
PAVEMENT TYPE & STRENGTH	BITUMINOUS CONCRETE / UNKNOWN	BITUMINOUS CONCRETE
RUNWAY LIGHTING	MIRL	MIRL
APPROACH SURFACE SLOPE / TYPE	R/W 14 20:1 / VISUAL R/W 32 34:1 / NON-PRECISION	R/W 14 20:1 / VISUAL R/W 32 34:1 / NON-PRECISION
APPROACH VISIBILITY MINIMUMS	R/W 14 ≥ 1-1/4 MILE VISIBILITY ≥ 1,500 FEET CEILING R/W 32 ≥ 1-1/4 MILE VISIBILITY ≥ 1,100 FEET CEILING	R/W 14 ≥ 1-1/4 MILE VISIBILITY ≥ 1,500 FEET CEILING R/W 32 < 3/4 MILE VISIBILITY
FAR PART 77 RUNWAY CLASSIFICATION	OTHER THAN UTILITY	OTHER THAN UTILITY
EFFECTIVE GRADIENT	0.84 %	0.81 %
RUNWAY MARKING	R/W 14 VISUAL R/W 32 NON-PRECISION	R/W 14 VISUAL R/W 32 PRECISION
DESIGN AIRCRAFT	BEECH SUPER KING AIR B200	FALCON 50 BUSINESS JET
R/W 14 END COORDINATES	LAT 43°59'40" N LONG 70°57'15" W	LAT 43°59'41" N LONG 70°57'15" W
R/W 32 END COORDINATES	LAT 43°59'15" N LONG 70°56'29" W	LAT 43°59'11" N LONG 70°56'20" W

* WIND DATA FROM BERLIN MUNICIPAL AIRPORT FROM 1951-1960 (JUNE-SEPTEMBER).

LEGEND

- LIMIT OF APPROACH SURFACE
- ROFA — RUNWAY OBJECT FREE AREA (OFA)
- OFZ — RUNWAY OBSTACLE FREE ZONE (OFZ)
- RPZ — RUNWAY PROTECTION ZONE (RPZ)
- RSA — RUNWAY SAFETY AREA (RSA)
- TREE LINE
- STREAM/ CREEK/ BROOK
- WETLANDS
- EXISTING AVIGATION EASEMENT
- EXISTING AIRPORT REFERENCE POINT
- EXISTING POLE
- PROPOSED AIRPORT REFERENCE POINT (ARP)
- PROPOSED PAPI
- PROPOSED REILS
- PROPOSED RUNWAY/TAXIWAY
- PAVEMENT TO BE REMOVED

PITCH PINE/SCRUB OAK COMMUNITIES

- PITCH PINE/SCRUB OAK COMMUNITY INTACT CANOPY; MEETS MAINE NATURAL AREAS PROGRAM DEFINITION
- PITCH PINE/SCRUB OAK COMMUNITY INTACT BUT FRAGMENTED CANOPY; DOES NOT MEET MAINE NATURAL AREAS PROGRAM DEFINITION

AIRPORT DATA

	EXISTING	PROPOSED
AIRPORT ELEVATION	454.3 FT. MSL	454.3 FT. MSL
AIRPORT REFERENCE POINT (ARP)	LAT 43°59'28" N LONG 70°56'52" W	LAT 43°59'26" N LONG 70°56'48" W
NORMAL MAXIMUM TEMPERATURE	82° F	82° F
TAXIWAY LIGHTING	MITL	MITL
TAXIWAY MARKING	STANDARD	STANDARD
NAVIGATIONAL AND VISUAL AIDS	NDB, ASOS, REILS (32), VASI-2L (32) ROTATING BEACON, WINDSOCK	NDB, ASOS, REILS (32), PAPI (32) ROTATING BEACON, WINDSOCK
AIRPORT REFERENCE CODE	B II (OTHER THAN UTILITY)	B II (OTHER THAN UTILITY)

FEDERAL AVIATION ADMINISTRATION

APPROVED: ______________________
AIRPORT PLANNER

DATE: ______________________

MAINE DEPARTMENT OF TRANSPORTATION

APPROVED: ______________________
DIRECTOR, OFFICE OF PASSENGER TRANSPORTATION

DATE: ______________________

FRYEBURG, MAINE

APPROVED: ______________________
CHAIRMAN, EASTERN SLOPE AIRPORT AUTHORITY

DATE: ______________________

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www.galnc.com

Boston Baltimore Orlando San Francisco

PROJECT: AIRPORT MASTER PLAN UPDATE
AIP NO. 3-23-0022-10-2005

OWNER: EASTERN SLOPE REGIONAL AIRPORT
FRYEBURG, MAINE

NO.	DATE	DESCRIPTION	BY

PROJECT NO.	775890
CADD FILE	SHEET 3
DESIGNED BY	CPL
DRAWN BY	JAT
CHECKED BY	AJD
DATE	MARCH 24, 2008
DRAWING SCALE	1"=300'

GRAPHIC SCALE
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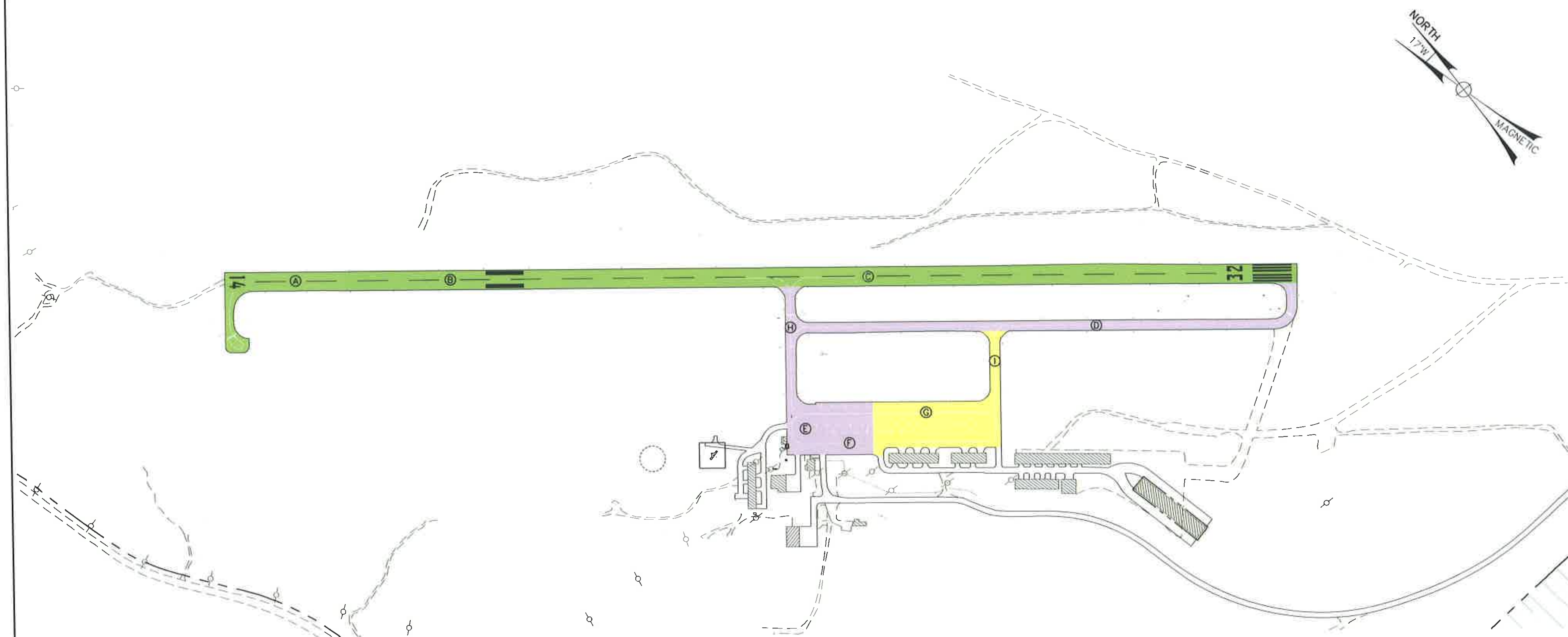
SCALE: 1" = 300'

SHEET TITLE

AIRPORT LAYOUT PLAN

DRAWING NO.

SHEET 3



PAVEMENT HISTORY DATA

(A)	R/W 14 - 32	BITUMINOUS CONCRETE REHABILITATION EXTENDED R/W 14 1996 (500' x 75')
(B)	R/W 14	BITUMINOUS CONCRETE EXTENDED 1985 (700' x 75')
(C)	R/W 14 - 32	ORIGINAL BITUMINOUS CONCRETE 1961 (3,000' x 75')
(D)	PARALLEL TAXIWAY 'A'	ORIGINAL BITUMINOUS CONCRETE 1985 (2,000' x 40')
(E)	APRON	ORIGINAL BITUMINOUS CONCRETE 1961 (200' x 150')
(F)		EXPANDED BITUMINOUS CONCRETE 1975 (200'± x 210')
(G)		EXPANDED BITUMINOUS CONCRETE 1990 (210' x 500')
(H)	STUB TAXIWAY 'B'	ORIGINAL BITUMINOUS CONCRETE 1961 (460'± x 40')
(I)	STUB TAXIWAY 'C'	ORIGINAL BITUMINOUS CONCRETE 1990 (280' x 40')

DESIGN LIFE DATA

- DESIGN LIFE EXPIRED
- DESIGN LIFE EXPIRES 2010
- DESIGN LIFE EXPIRES 2016

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AIP NO. 3-23-0022-10-2005

OWNER: EASTERN SLOPE REGIONAL AIRPORT
FRYEBURG, MAINE

NO	DATE	DESCRIPTION	BY

PROJECT NO	775890
CADD FILE	SHEET 4
DESIGNED BY	CPL
DRAWN BY	JAT
CHECKED BY	AJD
DATE	MARCH 24, 2008
DRAWING SCALE	1"=200'

GRAPHIC SCALE
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SCALE: 1" = 200'

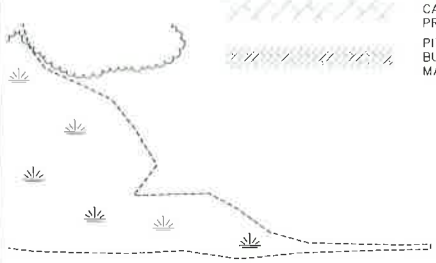
SHEET TITLE

PAVEMENT HISTORY PLAN

DRAWING NO.

SHEET 4

PITCH PINE/SCRUB OAK COMMUNITIES



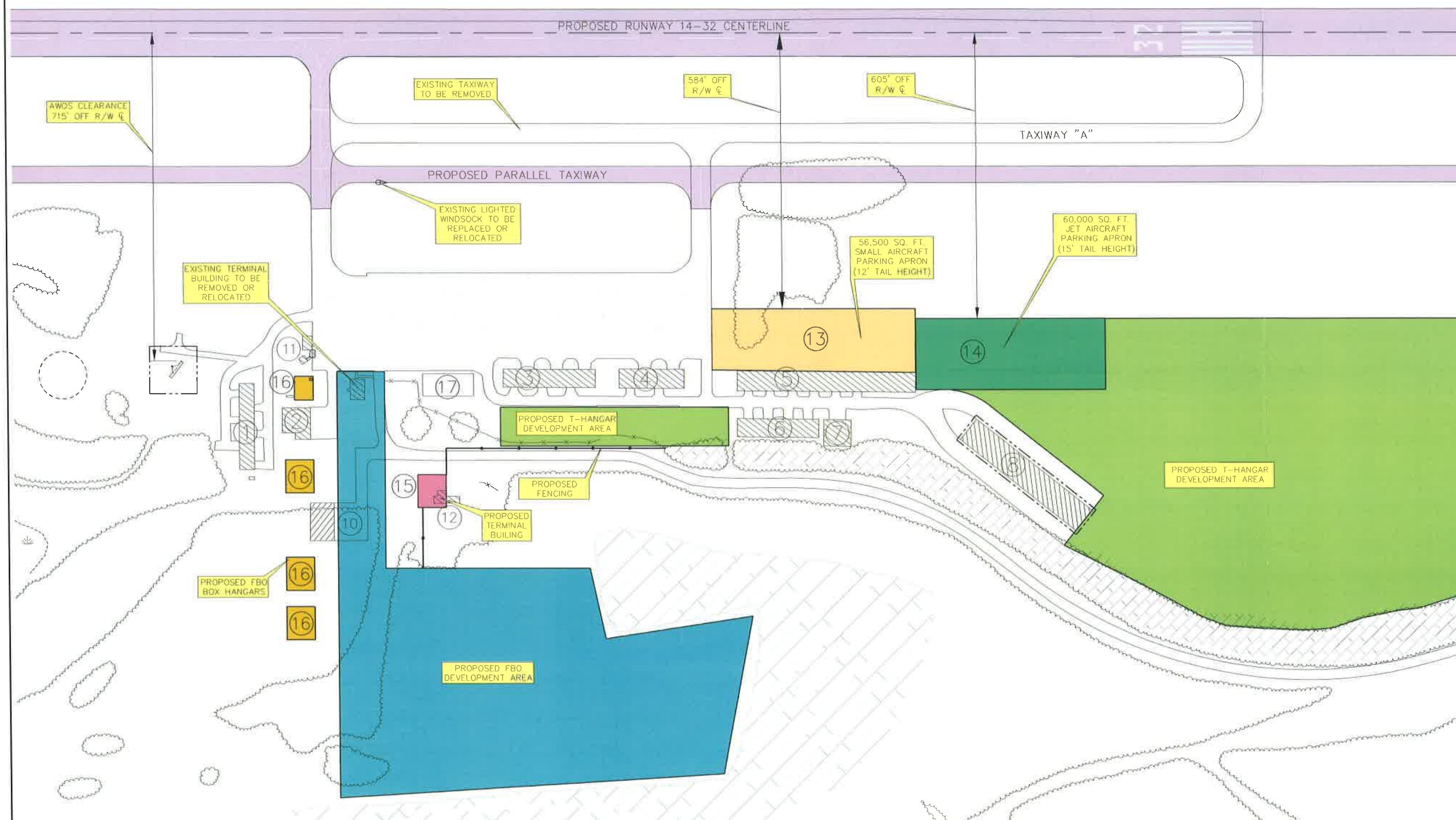
- PITCH PINE/SCRUB OAK COMMUNITY INTACT CANOPY; MEETS MAINE NATURAL AREAS PROGRAM DEFINITION
- PITCH PINE/SCRUB OAK COMMUNITY INTACT BUT FRAGMENTED CANOPY; DOES NOT MEET MAINE NATURAL AREAS PROGRAM DEFINITION

AIRPORT BUILDINGS

NO.	EXISTING FACILITY	NO.	EXISTING FACILITY
1	SIX UNIT T-HANGAR	11	FUEL FARM
2	FBO MAINTENANCE HANGAR	12	MOBILE HOME
3	SIX UNIT T-HANGAR		
4	FOUR UNIT T-HANGAR	NO.	PROPOSED FACILITY
5	SIX UNIT T-HANGAR	13	SMALL AIRCRAFT APRON
6	FOUR UNIT T-HANGAR	14	JET AIRCRAFT APRON
7	CONVENTIONAL HANGAR	15	PROPOSED TERMINAL
8	TEN UNIT T-HANGAR	16	FBO HANGARS
9	TERMINAL BUILDING	17	JET A MOBILE REFUELER PARKING
10	SRE MAINTENANCE & STORAGE BUILDING		

LEGEND

- PROPOSED RUNWAY AND TAXIWAY
- PROPOSED "SMALL AIRCRAFT" APRON
- PROPOSED "JET AIRCRAFT" APRON
- PROPOSED FBO HANGARS
- PROPOSED TERMINAL BUILDING
- FUTURE FBO DEVELOPMENT AREA
- FUTURE T-HANGAR DEVELOPMENT AREA
- PROPOSED FENCING



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OWNER: EASTERN SLOPE REGIONAL AIRPORT FRYEBURG, MAINE

NO.	DATE	DESCRIPTION	BY

PROJECT NO.	775890
CADD FILE	SHEET 5
DESIGNED BY	CPL
DRAWN BY	JAT
CHECKED BY	AJD
DATE	MARCH 24, 2008
DRAWING SCALE	1"=300'

GRAPHIC SCALE
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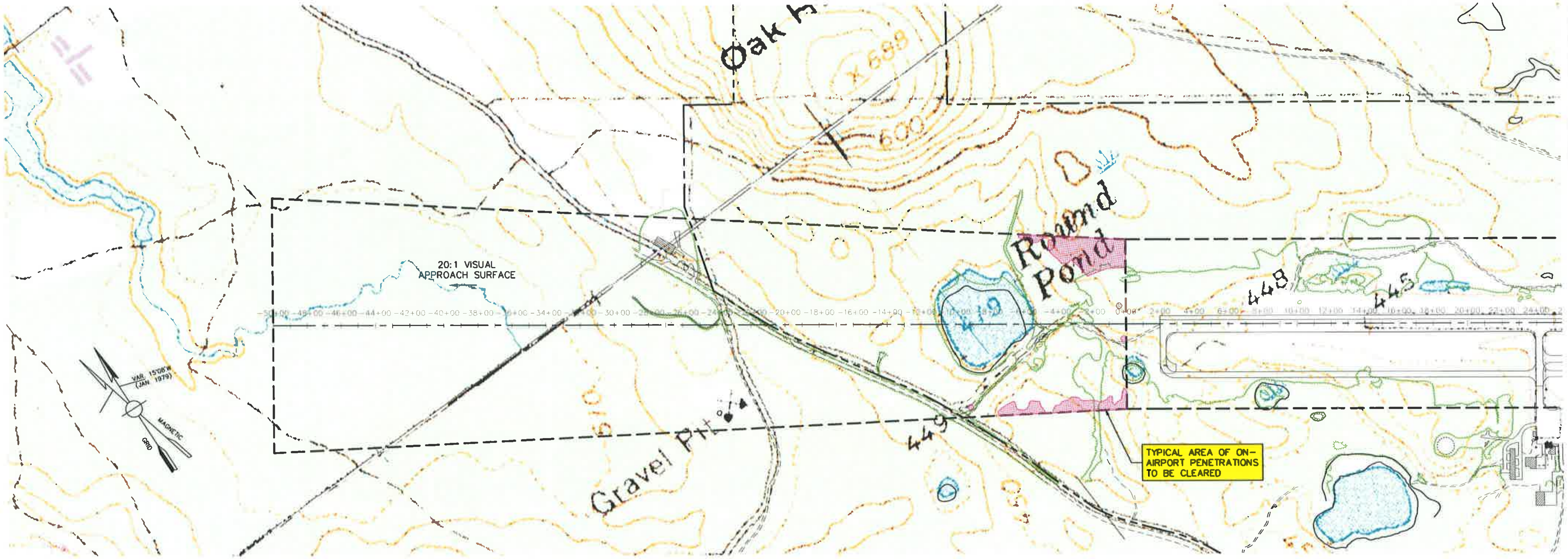
SCALE: 1" = 300'

SHEET TITLE

TERMINAL AREA PLAN

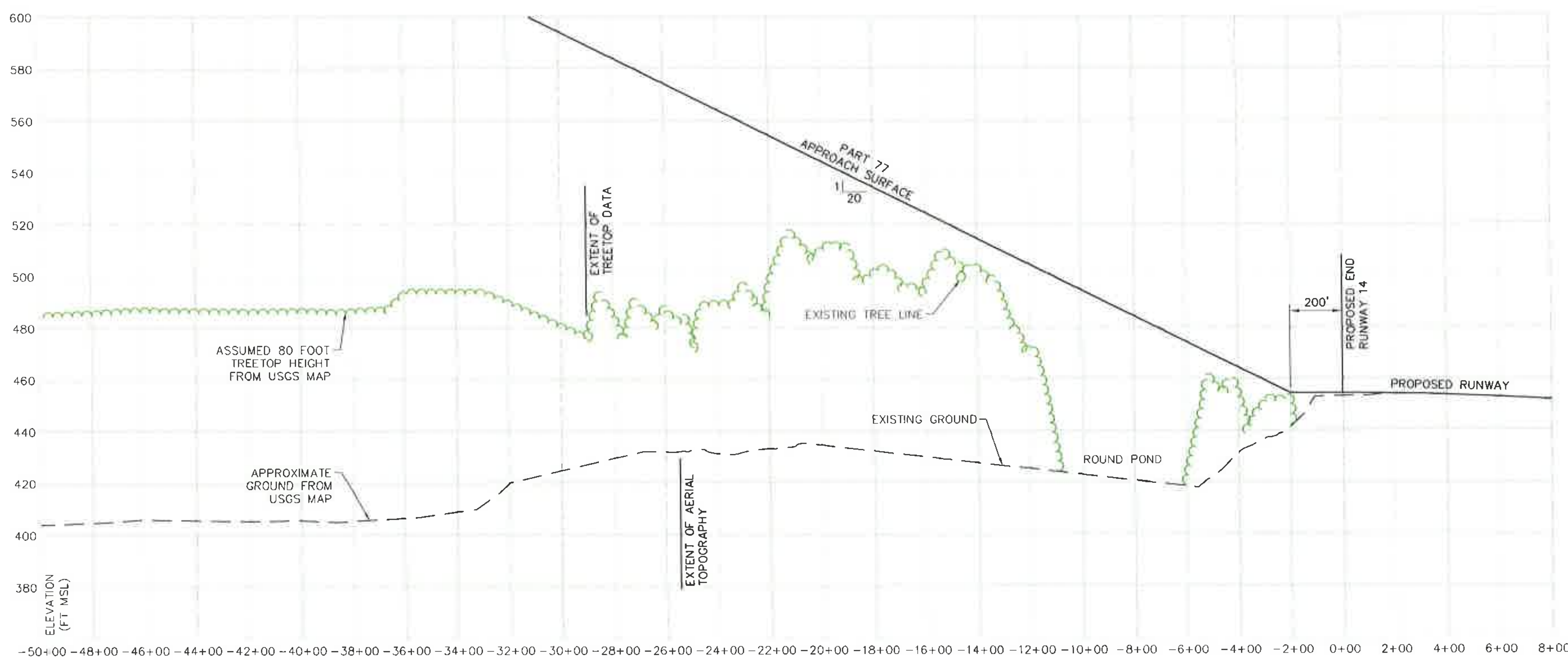
DRAWING NO.

SHEET 5



RUNWAY 14 APPROACH – PLAN VIEW

SCALE: 1" = 300'



RUNWAY 14 APPROACH – PROFILE

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

LEGEND

- EXISTING RAILROAD
- EXISTING AIRPORT PROPERTY LINE
- EXISTING AVIGATION EASEMENT
- PROPOSED RUNWAY CENTERLINE
- PROPOSED APPROACH SURFACE

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PROJECT: AIRPORT MASTER PLAN UPDATE, AIP NO. 3-23-0022-10-2005

OWNER: EASTERN SLOPE REGIONAL AIRPORT, FRYEBURG, MAINE

NO	DATE	DESCRIPTION	BY

PROJECT NO	775890
CADD FILE	SHEET 6
DESIGNED BY	CPL
DRAWN BY	JAT
CHECKED BY	AJD
DATE	MARCH 24, 2008
DRAWING SCALE	1"=300'

GRAPHIC SCALE
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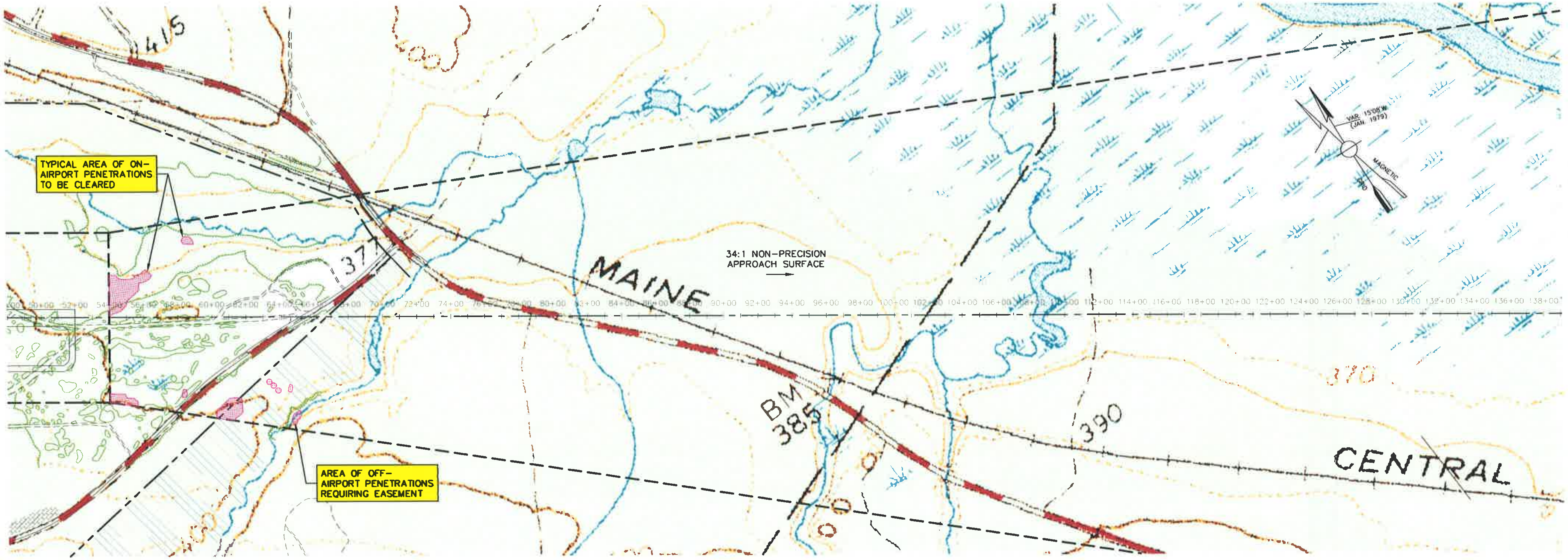
SCALE: 1" = 300'

SHEET TITLE

RUNWAY 14 APPROACH PLAN AND PROFILE

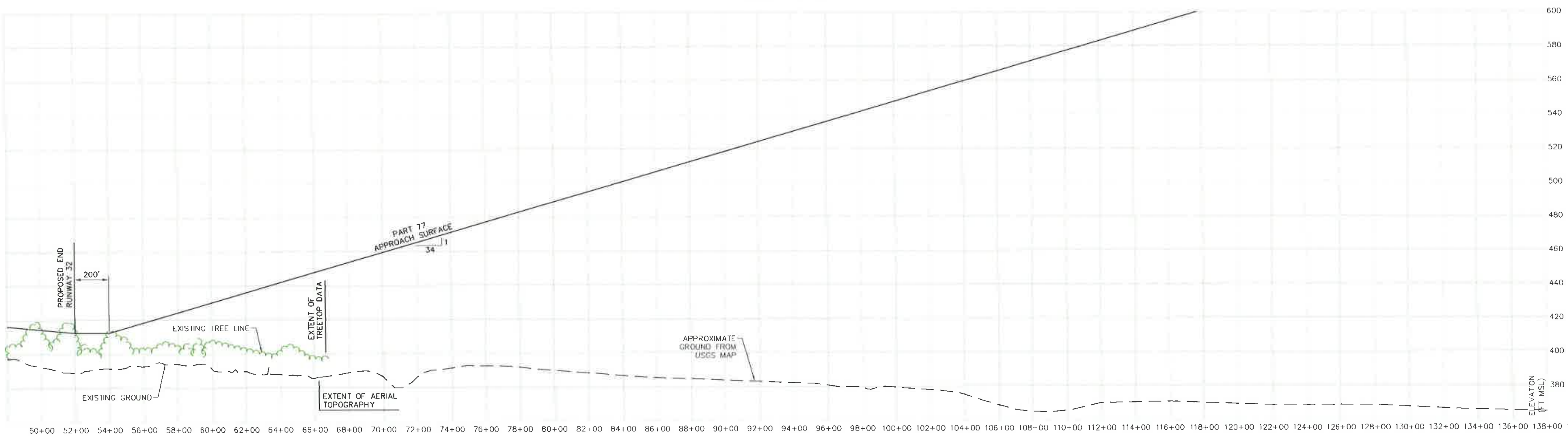
DRAWING NO.

SHEET 6



RUNWAY 32 APPROACH – PLAN VIEW

SCALE: 1" = 300'



RUNWAY 32 APPROACH – PROFILE

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

LEGEND

- EXISTING RAILROAD
- EXISTING AIRPORT PROPERTY LINE
- EXISTING AVIGATION EASEMENT
- PROPOSED RUNWAY CENTERLINE
- PROPOSED APPROACH SURFACE

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PROJECT
AIRPORT MASTER PLAN UPDATE
AIP NO. 3-23-0022-10-2005

OWNER
EASTERN SLOPE REGIONAL AIRPORT
FRYEBURG, MAINE

NO.	DATE	DESCRIPTION	BY

PROJECT NO.	775890
CADD FILE	SHEET 6
DESIGNED BY	CPL
DRAWN BY	JAT
CHECKED BY	AJD
DATE	MARCH 24, 2008
DRAWING SCALE	1"=300'

GRAPHIC SCALE
0 150 300 600
SCALE: 1" = 300'

SHEET TITLE

RUNWAY 32 APPROACH PLAN AND PROFILE

DRAWING NO.

SHEET 7

APPROACH SURFACE STANDARDS

RUNWAY	EXISTING
14	OTHER THAN UTILITY RUNWAY W/ VISUAL APPROACH
32	OTHER THAN UTILITY RUNWAY W/ NON-PRECISION APPROACH
RUNWAY	ULTIMATE
14	OTHER THAN UTILITY RUNWAY W/ VISUAL APPROACH
32	OTHER THAN UTILITY RUNWAY W/ NON-PRECISION APPROACH

HAZARD BEACON SITES

EXISTING		ULTIMATE *	
(1)	STARKS HILL NW OF R/W 14 END	(4)	HILL WNW OF R/W 14 END
(2)	BALD PEAK WSW OF R/W 14 END	(5)	LONG HILL
(3)	OAK HILL N OF R/W 14 END	(6)	FROST MOUNTAIN
		(7)	PEARY MOUNTAIN

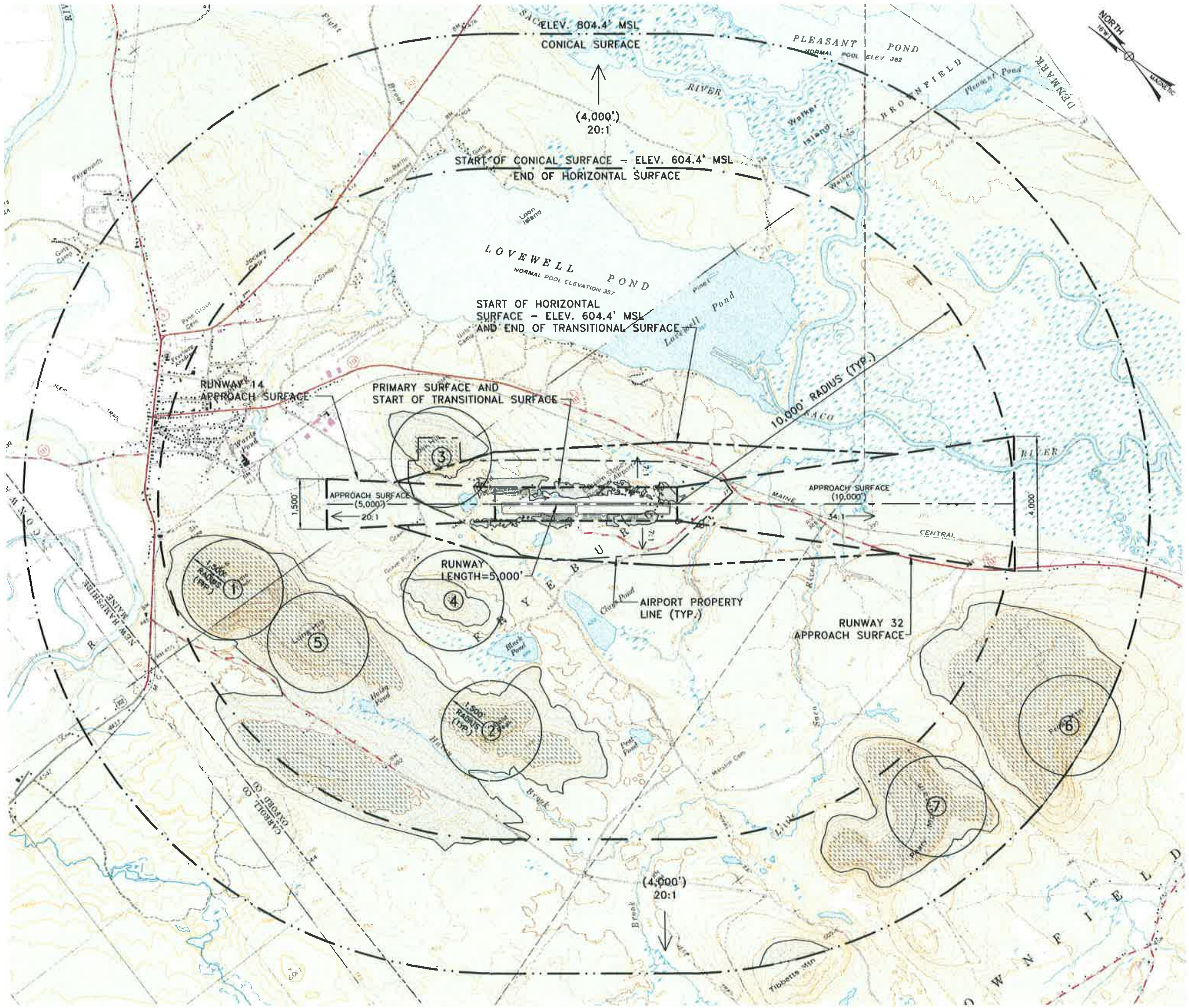
* PENDING CONCURRENCE BY FAA.

LEGEND

- PRIMARY SURFACE
- APPROACH SURFACE
- TRANSITIONAL SURFACE
- HORIZONTAL SURFACE
- CONICAL SURFACE
- APPROACH CENTERLINE
- AIRPORT PROPERTY LINE
- GROUND PENETRATIONS
- TREE PENETRATIONS

NOTE: TREE HEIGHTS IN THE HORIZONTAL AND CONICAL SURFACES WERE ASSUMED AT 80 FEET TALL.

TOPOGRAPHIC SURVEY DATA FROM U.S.G.S. 7 ½ - MINUTE QUADRANGLE MAPS, BROWNFIELD, ME. 1983 AND FRYEBURG, ME. 1989.



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OWNER: EASTERN SLOPE REGIONAL AIRPORT FRYEBURG, MAINE

NO.	DATE	DESCRIPTION	BY

PROJECT NO.	775890
CADD FILE	SHEET 8
DESIGNED BY	CPL
DRAWN BY	JAT
CHECKED BY	AJD
DATE	MARCH 24, 2008
DRAWING SCALE	1"=1,500'

GRAPHIC SCALE
0 750 1,500 3,000
SCALE: 1" = 1,500'

SHEET TITLE

FAR PART 77 SURFACES PLAN

DRAWING NO.

SHEET 8

Appendix A – Terms and Definitions

FAA ACRONYMS

Source: FAA Operational Evolution Plan
http://www.faa.gov/programs/oep/v6/Acronyms/Acronyms%20V6.htm#top

A

AAF	Airway Facilities Service
AAI	FAA Office of Accident Investigation
AAP	Advanced Automation Program
AAR	Airport Acceptance Rate
AAS	Advanced Automation System
AAT	Associate Administrator for Air Traffic
AC	Advisory Circular
ACAA	Air Carrier Association of America
ACDO	Air Carrier District Office
ACEP	Airport Capacity Enhancement Plan
ADAP	Airport Development Aid Program
ADAS	Automated Weather Observing System Data Acquisition System
ADC	Air Defense Command
ADIC	ATS Interfacility Data Communications
ADL	Aeronautical Data Link
ADO	Airline Dispatch Office
ADO	Airport District Office
ADS	Automatic Dependent Surveillance
ADSIM	Airfield Delay Simulation Model
AEE	FAA Office of Environment and Energy
AEEC	Airlines Electronic Engineering Committee
AF	Air Force
AFMS	Automatic Flight Management System
AREA	Automated En Route Air Traffic Control
AFS	Airways Facilities Sector
AFSS	Automated Flight Service Station
AGI	FAA Office of Government and Industry Affairs
AILS	Automatic Instrument Landing System
AIM	Aeronautical Information Manual
AIP	Airport Improvement Program
AIRPAC	Advisor for the Intelligent Resolution of Predicted Aircraft
AIS	Aeronautical Information System
ALPA	Airlines Pilots Association
ALSF	Approach Lighting System With Sequenced Flashing Lights
ALTRV	Altitude Reservation
AMASS	Airport Movement Area Safety System
AMIC	Area Manager in Charge
AMIS	Aircraft Management Information System
AMCC	Air Route Traffic Control Center Maintenance Control Center
AND	Associate Administrator for NAS Development
ANM	Northwest Mountain Region
ANS	NAS Transitions and Implementation

AO	Acronymic Obfuscation
AOA	FAA Office of the Administrator
AOAS	Advanced Oceanic Automation System
AOC	Airline Operational Control Center
AOP	NAS Operations
AOPA	Aircraft Owners and Pilots Association
AOS	Operational Support Service
APM	Approach Path Monitor
ARC	Administrator's Review Committee
ARC	Airlines Reporting Corporation
ARC	Aviation Review Committee
ARINC	Aeronautical Radio Incorporated
ARSR	Air Route Surveillance Radar
ARTCC	Air Route Traffic Control Center
ARTS	Automated Radar Terminal System
ASAS	Aviation Safety Analysis System
ASD	Aircraft Situation Display
ASDE	Airport Surface Detection Equipment
ASOS	Automated Surface Observing System
ASP	Arrival Sequencing Program
ASR	Airport Surveillance Radar
ASR	Airways Facilities Spectrum Policy and Management
ATA	Airline Transport Association
ATC	Air Traffic Control
ATCA	Air Traffic Control Association
ATCAA	ATC Assigned Airspace
ATCRBS	Air Traffic Control Radar Beacon System
ATCSCC	Air Traffic Control Systems Command Center
ATCT	Airport Traffic Control Tower
ATIDS	Airport Surface Target Identification System
ATIS	Automated Terminal Information Service
ATM	Air Traffic Manager
ATMS	Automated Training Management System
ATN	Aeronautical Telecommunications Network
ATO	Air Traffic Operations
ATOMS	Air Traffic Management Operations Management Systems
ATS	Air Traffic Services
AVN	Aviation System Standards
AWOS	Automated Weather Observing System
AWP	Aviation Weather Processor
AWP	Western Pacific Region

B

BFO	Blazing Flash of the Obvious (DOD)
BRITE	Bright Radar Indicator Tower Equipment
BUEC	Backup Emergency Communications

C

CA	Conflict Alert

CAASD	Center for Advanced Aviation System Development
CATTS	Computerized Air Traffic Training System
CAD	Computer Aided Drawing
CAEG	Computer Aided Engineering Graphics
CAMI	Civil Aeronautical Medical Institute
CAP	Civil Air Patrol
CARF	Central Altitude Reservation Function
CASA	Controller Automated Spacing Aid
CBI	Computer Based Instruction
CD	Common Digitizer
CDC	Computer Display Channel
CDM	Collaborative Decision Making
CDS	Central Dispatch System
CDT	Controlled Departure Time
CDTI	Cockpit Display of Traffic
CDV	Compressed Digital Video
CENRAP	Center Radar Arts Presentation
CERAP	Center Radar Approach Control
CFR	Code of Federal Regulations
CHI	Computer Human Interface
CIP	Capital Investment Plan
CNS	Communications, Navigation, and Surveillance
COTR	Contracting Officer's Technical Representative
COTS	Commercial-Off-The-Shelf
CP	Conflict Probe
CPDLC	Controller Pilot Data Link Communications
CRA	Conflict Resolution Advisory
CRDA	Converging Runway Display Aid
CTAS	Center TRACON Automation System
CWP	Central Weather Processor

D

DARC	Direct Access Radar Channel
DARP	Dynamic Aircraft Route Planning
DASI	Direct Altimeter Setting Indicator
DB	Decibel
DBRITE	Digital Bright Radar Indicator Tower Equipment
DCC	Direct Channel Complex
DF	Direction Finder
DGNSS	Differential Global Navigation Satellite System
DGPS	Differential Global Positioning System
DIA	Denver International Airport
DLAP	Data Link Applications Processor
DME	Distance Measuring Equipment
DOD	Department of Defense
DOT	Department of Transportation
DOTS	Dynamic Ocean Track System
DOVE	DSR Oceanic VSCS En Route Implementation Working Group
DSP	Departure Sequencing Program
DSR	Display System Replacement
DSS	Decision Support System

DUATS	Direct User Access Terminal System
DVOR	Doppler Very High Frequency Omni Directional Range
DVRS	Digital Voice Recorder System

E

EARS	En Route Analysis and Reporting System
EARTS	En Route Automated Radar Tracking System
EDC	Early Display Configuration
EDCT	Estimated Departure Control Time
EDI	Electronic Data Interchange
EDMS	Electronic Document Management Systems
EPA	Environmental Protection Agency
ERM	En Route Spacing Program
ESP	Enroute Sequencing Program
ETMS	Enhanced Traffic management Systems
EVCS	Emergency Voice Communications Systems
EVFR	Electronic Visual Flight Rules

F

FAATC	Federal Aviation Administration Technical Center
FAATSAT	Federal Aviation Administration Telecommunications Satellite
FADE	FAA/Airline Data Exchange
FANS	Future Air Navigation System
FARM	Fielded Automation Requirements Management
FAST	Final Approach Spacing Tool
FCC	Federal Communications Commission
FCM	Flight Schedule Monitor
FCT	Federal Contract Tower
FDP/RDP	Flight Data Processing/Radar Data Processing
FIAO	Flight Inspection Area Office
FIR	Flight Information Region
FIS	Flight Information Services
FLIP	Flight Information Publication
FLTCK	Flight Check
FONSI	Finding of No Significant Impact
FMA	Final Monitor Aid
FMS	Flight Management System
FPL	Full Performance Level
FPS	Military Primary Radar
FSDPS	Flight Service Data Processing System
FSM	Flight Schedule Monitor
FTS	Federal Telecommunications System

G

GA	General Aviation
GAO	General Accounting Office

GDE	Ground Delay Enhancements
GDP	Ground Delay Program
GENOT	General Notice
GETS	Government Emergency Telecommunications Service
GLONASS	Global Orbiting Navigational Satellite System
GMCC	General National Airspace System Maintenance Control Center
GNAS	General National Airspace System
GNSS	Global Navigation Satellite System
GOMP	Gulf of Mexico Program
GPS	Global Positioning System
GSA	General Services Administration
GUI	Graphic User Interface
GWDS	Graphic Weather Display System

H

HCS	Host Computer System
HID	Host Interface Display
HID/NAS/LAN	Host Interface Device/National Airspace System/Local Area Network
HUD	Heads Up Display

I

I&I	Impact and Implementation
IAPA	Instrument Approach Procedures Automation
IATA	International Air Transport Association
ICAO	International Civil Aviation Organization
ICSS	Integrated Communications Switching System
IFR	Instrument Flight Rules
ILS	Instrument Landing System
IMC	Instrument Meteorological Conditions
INM	Integrated Noise Model
IOC	Initial Operating Capability
IOT&E	Independent Operational Test and Evaluation
IPT	Integrated Product Team
ISC	Initial System Capability
ITC	In-Trail Climb
ITD	In-Trail Descent
ITWS	Integrated Terminal Weather System
IVT	Interactive Video Teletraining
IWGDS	Interim Weather Graphic-Display System

J

JAI	Joint Acceptance Inspection
JSS	Joint Surveillance System

K

kHz	Kilohertz

L

LAAS	Local Area Augmentation System
LABS	Los Angeles Basin Study
LAGPS	Local Area Global Positioning System
LAN	Local Area Network
LAHSO	Land and Hold Short Operations
LAWRS	Limited Aviation Weather Reporting Service
LCC	Life Cycle Cost
LFME	Local Flow Management Enhancements
LINCS	Leased Interfacility National Airspace System Communications System
LLWAS	Low-Level Windshear Alert System
LOA	Letter of Agreement
LOB	Line Of Business
LOC	Localizer
LOM	Locator Outer Marker
LORAN	Long-Range Navigation
LRR	Long Range Radar

M

M1FC	Model 1 Full Capacity
MALSR	Medium-Intensity Approach Lighting System With Runway Alignment Indicator
MAP	Missed Approach Procedure
MARSA	Military Assumes Responsibility for Separation
MCI	Mode C Intruder
METAR	Aviation Routine Weather Report
mGz	Megahertz
MLS	Microwave Landing System
MNPS	Minimum Navigation Performance Specification
MNS	Mission Needs Statement
MOA	Military Operations Area
MODE C	Altitude Reporting Mode of Secondary Radar
MODE S	Mode Select; Discrete Addressable Secondary Radar System With Data Link
MODEM	Modulator-Demodulator
MOU	Memorandum of Understanding
MSA	Minimum Safe Altitude
MSAW	Minimum Safe Altitude Warning
MTD	Moving Target Detection
MTR	Military Training Route
MWP	Meteorological Weather Processor

N

NADIN	National Airspace Data Interchange Network
NAILS	National Airspace Integrated Logistics Support
NAPRS	National Airspace Performance Reporting System
NAR	National Airspace Review
NARACS	National Radio Communications System
NAS	National Airspace System
NASDAC	National Aviation Safety Data Analysis Center
NATCA	National Air Traffic Controllers Association
NATS	National Air Traffic Service
NAVAIDS	Navigational Aids
NBAA	National Business Aircraft Association
NBCAP	National Beacon Code Allocation Plan
NCP	NAS Change Proposal
NEXRAD	Next-Generation Weather Radar
NFP	NIMS Premier Facility
NICS	National Airspace System Interfacility Communications System
NIMS	NAS Infrastructure Management System
NIST	National Institute of Standards and Technologies
NM	Nautical Mile
NMCC	National Maintenance Control Center
NOAA	National Oceanic and Atmospheric Administration
NOM	NAS Operations Manager
NOREP	National Oceanic Review and Enhancement Program
NOTAM	Notice to Airmen
NPIAS	National Plan for Integrated Airport Systems
NPM	NAS Program Manager/Management
NPR	National Performance Review
NPRM	Notice of Proposed Rule Making
NRP	National Route Program
NTSB	National Transportation Safety Board
NWS	National Weather Service

O

OAMP	Off-Line Aircraft Management Program
OAP	Oceanic Automation Program
OAS	Oceanic Automation System
OASIS	Operational and Supportability Implementation System
OATS	Office Automation Technology Services
OCA	Oceanic Control Area
OCC	Operations Control Center
ODALS	Omnidirectional Approach Lighting Systems
ODAPS	Oceanic Display and Planning System
ODL	Oceanic Data Link
OE/AAA	Obstruction Evaluation/Airport Airspace Analysis
OMB	Office of Management and Budget

OMEGA	Very Low Radio Navigation System
OPI	Office of Primary Interest
OPSNET	Operations Network
ORD	Operational Readiness Demonstration
OS	Operating System
OS	Operational Shakedown & Cutover
OSRWG	Oceanic Separation Reduction Working Group
OSDS	Oceanic System Development and Support
OSHA	Occupational Safety and Health Administration
OT&E	Operational Test and Evaluation
OTPS	Oceanic Traffic Planning System

P

PAMRI	Peripheral Adapter Module Replacement Item
PAPI	Precision Approach Path Indicator
PAR	Precision Approach Radar
PASS	Professional Airway Systems Specialists
PATS	Precision Approach Tracking System
PCS	Power Conditioning System
PDC	Pre-Departure Clearance
PFAST	Passive Final Approach Spacing Tool
PIP	Program Implementation Plan
PIREP	Pilot Weather Report
PM	Preventive Maintenance
POC	Point Of Contact
PRM	Precision Runway Monitor
PSL	Projected Service Life
PTR	Program Technical/Trouble Report
PVD	Plan View Display
PWI	Proximity Warning Indicator
P2R2	Preferred Route Reduction Program

Q

QA	Quality Assurance

R

R& D	Research and Development
R,E&D	Research, Engineering and Development
RAPCON	Radar Approach Control
RAT	Risk Assessment Team
RCAG	Remote Communications Air/Ground
RCE	Radio Control Equipment
RCF	Remote Communications Facility
RCO	Remote Communications Outlet
REGIS	Regional Information System
REIL	Runway End Identification Lights
RFI	Radio Frequency Interference
RFI	Return on Future Investment

RIAP	Runway Incursion Action Plan
RIAT	Runway Incursion Action Team
RIP	Runway Incursion Program
RML	Radar Microwave Link
RMM	Remote Maintenance Monitoring
RMMS	Remote Maintenance Monitoring Systems
RNAV	Area Navigation
RNP-10	Required Navigation Performance
RPV	Remotely Piloted Vehicle
RSL	Runway Status Light
RTCA	Radio Technical Commission for Aeronautics
RTE	RTE
RTR	Remote Transmitter/Receiver
RTS	Return to Service
RVR	Runway Visual Range
RVSM	Reduced Vertical Separation Minima
RX	Receiver

S

SAMS	Special Use Airspace Management System
SAR	Search and Rescue
SAWRS	Supplemental Aviation Weather Reporting Service
SCAT	Southern California Area TRACON (Metroplex)
SECRA	Secondary Radar
SETA	System Engineering and Technical Assistance
SID	Standard Instrument Departure
SIAP	Standard Instrument Flight Procedures
SIGMET	Significant Meteorological Information
SIMMOD	Airspace and Airport Simulation Model
SPIFR	Single Pilot IFR
SMA	Surface Monitor Aid
SMA	Surface Movement Advisor
SMMC	System Maintenance Monitor Console
SMGCS	Surface Movement Guidance and Control System
SOC	Service Operations Center
SOP	Standard Operating Practice
SPA	Society for the Prevention of Acronyms
SSC	System Support Center
SST	System Shakedown Testing
STAR	Standard Terminal Arrival Route
STARS	Standard Terminal Area Radar System
STARS	Standard Terminal Automation Replacement System
STMP	Special Traffic Management Program
STOL	Short Take - Off and Landing
STT	Staffing to Traffic
STVS	Small Tower Voice Switch
SUA	Special Use Airspace
SUPCOM	Supervisors Committee (AAT AND AAF)
SUPS	Suspected Unapproved Parts System
SVFR	Special Visual Flight Rules
SWAP	Severe Weather Avoidance Procedure/Program

T

TAC	Tactical Air Command (USAF)
TACAN	Tactical Air Navigation
TATCA	Terminal Air Traffic Control Automation
TCAP	Traffic Count Automation Program
TCAS	Traffic Alert and Collision Avoidance System
TCCC	Tower Control Computer Complex
TCVR	Transceiver
TDLS	Tower Data-Link Services
TDWR	Terminal Doppler Weather Radar
TERP	Terminal Instrument Procedures
TFM	Traffic Flow Management
TFR	Temporary Flight Restriction
TMA	Traffic Management Advisor
TMI	Traffic Management Initiatives
TMS	Traffic Management System
TMU	Traffic Management Unit
TOC	Technical Operations Center
TP	Telecommunication Processor
TRACON	Terminal Radar Approach Control
TSSC	Terminal Support Services Contract
TSARTS	Terminal Stand-Alone Radar Training System
TVSR	Terminal Voice Switch Replacement
TWIP	Terminal Weather Information for Pilots
TX	Transmitter

U

UBA	User Benefits Applications
UBI	User Benefits Infrastructure
UHF	Ultra High Frequency
UPR	User Preferred Route
UPS	Uninterruptable Power Supply
UPT	User Preferred Trajectory
URET	User Request Evaluation Tool
USAF	United States Air Force
USCG	United States Coast Guard
USNS	United States Notices to Airmen System
UTC	Coordinated Universal Time (ZULU)

V

VASI	Visual Approach Slope Indicator
VDL	Very High Frequency Data Link
VEARS	VSCS Emergency Access Radio System
VFR	Visual Flight Rules
VHF	Very High Frequency
VMC	Visual Meteorological Conditions
VOR	Very High Frequency Omnidirectional Range
VOR/DME	Very High Frequency Omnidirectional Range

	Colocated with Distance Measuring Equipment
VORTAC	Very High Frequency Omnidirectional Range Colocated Tactical Air Navigation
VRRP	Voice Recorder Replacement Program
VSCS	Voice Switching Communications System
VTOL	Vertical Take-Off and Landing

W

WAAS	Wide Area Augmentation System
WADGPS	Wide Area Differential Global Positioning System
WAN	Wide Area Network
WARP	Weather and Radar Processor
WMSCR	Weather Message Switching Center Replacement
WRS	Wide Area Augmentation System Reference Station
WSR	Weather Surveillance Radar
WX	Weather

Z

ZAB	Albuquerque ARTCC
ZAN	Anchorage ARTCC
ZAU	Chicago ARTCC
ZBW	Boston ARTCC
ZDC	Washington ARTCC
ZDV	Denver ARTCC
ZFW	Fort Worth ARTCC
ZHU	Houston ARTCC
ZID	Indianapolis ARTCC
ZJX	Jacksonville ARTCC
ZKC	Kansas City ARTCC
ZLA	Los Angeles ARTCC
ZLC	Salt Lake City ARTCC
ZMA	Miami ARTCC
ZME	Memphis ARTCC
ZMP	Minneapolis ARTCC
ZNY	New York ARTCC
ZOA	Oakland ARTCC
ZOB	Cleveland ARTCC
ZSE	Seattle ARTCC
ZTL	Atlanta ARTCC

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SUBCHAPTER A—DEFINITIONS
PART 1—DEFINITIONS AND ABBREVIATIONS

Sec.
1.1 General definitions.
1.2 Abbreviations and symbols.
1.3 Rules of construction.

AUTHORITY: 49 U.S.C. 106(g), 40113, 44701.

§ 1.1 General definitions.

As used in Subchapters A through K

of this chapter, unless the context requires otherwise:

Administrator means the Federal Aviation Administrator or any person to whom he has delegated his authority in the matter concerned.

Aerodynamic coefficients means nondimensional coefficients for aerodynamic forces and moments.

Air carrier means a person who undertakes directly by lease, or other arrangement, to engage in air transportation.

Air commerce means interstate, overseas, or foreign air commerce or the transportation of mail by aircraft or any operation or navigation of aircraft within the limits of any Federal airway or any operation or navigation of aircraft which directly affects, or which may endanger safety in, interstate, overseas, or foreign air commerce.

Aircraft means a device that is used or intended to be used for flight in the air.

Aircraft engine means an engine that is used or intended to be used for propelling aircraft. It includes turbosuperchargers, appurtenances, and accessories necessary for its functioning, but does not include propellers.

Airframe means the fuselage, booms, nacelles, cowlings, fairings, airfoil surfaces (including rotors but excluding propellers and rotating airfoils of engines), and landing gear of an aircraft and their accessories and controls.

Airplane means an engine-driven fixed-wing aircraft heavier than air, that is supported in flight by the dynamic reaction of the air against its wings.

Airport means an area of land or water that is used or intended to be used for the landing and takeoff of aircraft, and includes its buildings and facilities, if any.

Airship means an engine-driven lighter-than-air aircraft that can be steered.

Air traffic means aircraft operating in the air or on an airport surface, exclusive of loading ramps and parking areas.

Air traffic clearance means an authorization by air traffic control, for the purpose of preventing collision between known aircraft, for an aircraft to proceed under specified traffic conditions within controlled airspace.

Air traffic control means a service operated by appropriate authority to promote the safe, orderly, and expeditious flow of air traffic.

Air transportation means interstate, overseas, or foreign air transportation or the transportation of mail by aircraft.

Alert Area. An alert area is established to inform pilots of a specific area wherein a high volume of pilot training or an unusual type of aeronautical activity is conducted.

Alternate airport means an airport at which an aircraft may land if a landing at the intended airport becomes inadvisable.

Altitude engine means a reciprocating aircraft engine having a rated takeoff power that is producible from sea level to an established higher altitude.

Appliance means any instrument, mechanism, equipment, part, apparatus, appurtenance, or accessory, including communications equipment, that is used or intended to be used in operating or controlling an aircraft in flight, is installed in or attached to the aircraft, and is not part of an airframe, engine, or propeller.

Approved, unless used with reference to another person, means approved by the Administrator.

Area navigation (RNAV) means a method of navigation that permits aircraft operations on any desired course within the coverage of station-referenced navigation signals or within the limits of self-contained system capability.

Area navigation low route means an area navigation route within the airspace extending upward from 1,200 feet above the surface of the earth to, but not including, 18,000 feet MSL.

Area navigation high route means an area navigation route within the airspace extending upward from, and including, 18,000 feet MSL to flight level 450.

Armed Forces means the Army, Navy, Air Force, Marine Corps, and Coast Guard, including their regular and reserve components and members serving without component status.

Autorotation means a rotorcraft flight condition in which the lifting rotor is driven entirely by action of the air when the rotorcraft is in motion.

Auxiliary rotor means a rotor that serves either to counteract the effect of the main rotor torque on a rotorcraft or to maneuver the rotorcraft about one or more of its three principal axes.

Balloon means a lighter-than-air aircraft that is not engine driven, and that sustains flight through the use of either gas buoyancy or an airborne heater.

Brake horsepower means the power delivered at the propeller shaft (main drive or main output) of an aircraft engine.

Calibrated airspeed means the indicated airspeed of an aircraft, corrected for position and instrument error. Calibrated airspeed is equal to true airspeed in standard atmosphere at sea level.

Canard means the forward wing of a canard configuration and may be a fixed, movable, or variable geometry surface, with or without control surfaces.

Canard configuration means a configuration in which the span of the forward wing is substantially less than that of the main wing.

Category:

(1) As used with respect to the certification, ratings, privileges, and limitations of airmen, means a broad classification

of aircraft. Examples include: airplane; rotorcraft; glider; and lighter-than-air; and

(2) As used with respect to the certification of aircraft, means a grouping of aircraft based upon intended use or operating limitations. Examples include: transport, normal, utility, acrobatic, limited, restricted, and provisional.

Category A, with respect to transport category rotorcraft, means multiengine rotorcraft designed with engine and system isolation features specified in Part 29 and utilizing scheduled takeoff and landing operations under a critical engine failure concept which assures adequate designated surface area and adequate performance capability for continued safe flight in the event of engine failure.

Category B, with respect to transport category rotorcraft, means single-engine or multiengine rotorcraft which do not fully meet all Category A standards. Category B rotorcraft have no guaranteed stay-up ability in the event of engine failure and unscheduled landing is assumed.

Category II operations, with respect to the operation of aircraft, means a straight-in ILS approach to the runway of an airport under a Category II ILS instrument approach procedure issued by the Administrator or other appropriate authority.

Category III operations, with respect to the operation of aircraft, means an ILS approach to, and landing on, the runway of an airport using a Category III ILS instrument approach procedure issued by the Administrator or other appropriate authority.

Category IIIa operations, an ILS approach and landing with no decision height (DH), or a DH below 100 feet (30 meters), and controlling runway visual range not less than 700 feet (200 meters).

Category IIIb operations, an ILS approach and landing with no DH, or with a DH below 50 feet (15 meters), and controlling runway visual range less than 700 feet (200 meters), but not less than 150 feet (50 meters).

Category IIIc operations, an ILS approach and landing with no DH and no runway visual range limitation.

Ceiling means the height above the earth's surface of the lowest layer of clouds or obscuring phenomena that is reported as ''broken'', ''overcast'', or ''obscuration'', and not classified as ''thin'' or ''partial''.

Civil aircraft means aircraft other than public aircraft.

(1) As used with respect to the certification, ratings, privileges, and limitations of airmen, means a classification of aircraft within a category having similar operating characteristics. Examples include: single engine; multiengine; land; water; gyroplane; helicopter; airship; and free balloon; and

(2) As used with respect to the certification of aircraft, means a broad grouping of aircraft having similar characteristics of propulsion, flight, or landing. Examples include: airplane; rotorcraft; glider; balloon; landplane; and seaplane.

Clearway means:

(1) For turbine engine powered airplanes certificated after August 29, 1959, an area beyond the runway, not less than 500 feet wide, centrally located about the extended centerline of the runway, and under the control of the airport authorities. The clearway is expressed in terms of a clearway plane, extending from the end of the runway with an upward slope not exceeding 1.25 percent, above which no object nor any terrain protrudes. However, threshold lights may protrude above the plane if their height above the end of the runway is 26 inches or less and if they are located to each side of the runway.

(2) For turbine engine powered airplanes certificated after September 30, 1958, but before August 30, 1959, an area beyond the takeoff runway extending no less than 300 feet on either side of the extended centerline of the runway, at an elevation no higher than the elevation of the end of the runway, clear of all fixed obstacles, and under the control of the airport authorities.

Climbout speed, with respect to rotorcraft, means a referenced airspeed which results in a flight path clear of the height-velocity envelope during initial climbout.

Commercial operator means a person who, for compensation or hire, engages in the carriage by aircraft in air commerce of persons or property, other than as an air carrier or foreign air carrier or under the authority of Part 375 of this title. Where it is doubtful that an operation is for ''compensation or hire'', the test applied is whether the carriage by air is merely incidental to the person's other business or is, in itself, a major enterprise for profit.

Controlled airspace means an airspace of defined dimensions within which air traffic control service is provided to IFR flights and to VFR flights in accordance with the airspace classification.

NOTE: Controlled airspace is a generic term that covers Class A, Class B, Class C, Class D, and Class E airspace.

Controlled Firing Area. A controlled firing area is established to contain activities, which if not conducted in a controlled environment, would be hazardous to nonparticipating aircraft.

Crewmember means a person assigned to perform duty in an aircraft during flight time.

Critical altitude means the maximum

altitude at which, in standard atmosphere, it is possible to maintain, at a specified rotational speed, a specified power or a specified manifold pressure. Unless otherwise stated, the critical altitude is the maximum altitude at which it is possible to maintain, at the maximum continuous rotational speed, one of the following:

(1) The maximum continuous power, in the case of engines for which this power rating is the same at sea level and at the rated altitude.

(2) The maximum continuous rated manifold pressure, in the case of engines, the maximum continuous power of which is governed by a constant manifold pressure.

Critical engine means the engine whose failure would most adversely affect the performance or handling qualities of an aircraft.

Decision height, with respect to the operation of aircraft, means the height at which a decision must be made, during an ILS or PAR instrument approach, to either continue the approach or to execute a missed approach.

Equivalent airspeed means the calibrated airspeed of an aircraft corrected for adiabatic compressible flow for the particular altitude. Equivalent airspeed is equal to calibrated airspeed in standard atmosphere at sea level.

Extended over-water operation means—

(1) With respect to aircraft other than helicopters, an operation over water at a horizontal distance of more than 50 nautical miles from the nearest shoreline; and

(2) With respect to helicopters, an operation over water at a horizontal distance of more than 50 nautical miles from the nearest shoreline and more than 50 nautical miles from an offshore heliport structure.

External load means a load that is carried, or extends, outside of the aircraft fuselage.

External-load attaching means means the structural components used to attach an external load to an aircraft, including external-load containers, the backup structure at the attachment points, and any quick-release device used to jettison the external load.

Final takeoff speed means the speed of the airplane that exists at the end of the takeoff path in the en route configuration with one engine inoperative.

Fireproof—

(1) With respect to materials and parts used to confine fire in a designated fire zone, means the capacity to withstand at least as well as steel in dimensions appropriate for the purpose for which they are used, the heat produced when there is a severe fire of extended duration in that zone; and

(2) With respect to other materials and parts, means the capacity to withstand the heat associated with fire at least as well as steel in dimensions appropriate for the purpose for which they are used.

Fire resistant—

(1) With respect to sheet or structural members means the capacity to withstand the heat associated with fire at least as well as aluminum alloy in dimensions appropriate for the purpose for which they are used; and

(2) With respect to fluid-carrying lines, fluid system parts, wiring, air ducts, fittings, and powerplant controls, means the capacity to perform the intended functions under the heat and other conditions likely to occur when there is a fire at the place concerned.

Flame resistant means not susceptible to combustion to the point of propagating a flame, beyond safe limits, after the ignition source is removed.

Flammable, with respect to a fluid or gas, means susceptible to igniting readily or to exploding.

Flap extended speed means the highest speed permissible with wing flaps in a prescribed extended position.

Flash resistant means not susceptible to burning violently when ignited.

Flightcrew member means a pilot, flight engineer, or flight navigator assigned to duty in an aircraft during flight time.

Flight level means a level of constant atmospheric pressure related to a reference datum of 29.92 inches of mercury. Each is stated in three digits that represent hundreds of feet. For example, flight level 250 represents a barometric altimeter indication of 25,000 feet; flight level 255, an indication of 25,500 feet.

Flight plan means specified information, relating to the intended flight of an aircraft, that is filed orally or in writing with air traffic control.

Flight time means:

(1) Pilot time that commences when an aircraft moves under its own power for the purpose of flight and ends when the aircraft comes to rest after landing; or

(2) For a glider without self-launch capability, pilot time that commences when the glider is towed for the purpose of flight and ends when the glider comes to rest after landing.

Flight visibility means the average forward horizontal distance, from the cockpit of an aircraft in flight, at which prominent unlighted objects may be seen and identified by day and prominent lighted objects may be seen and identified by night.

Foreign air carrier means any person other than a citizen of the United States, who undertakes directly, by lease or other arrangement, to engage in air transportation.

Foreign air commerce means the carriage by aircraft of persons or property for compensation or hire, or the carriage of mail by aircraft, or the operation or navigation of aircraft in the conduct or furtherance of a business or vocation, in commerce between a place in the United States and any place outside thereof; whether such commerce moves wholly by aircraft or partly by aircraft and partly by other forms of transportation.

Foreign air transportation means the carriage by aircraft of persons or property as a common carrier for compensation or hire, or the carriage of mail by aircraft, in commerce between a place in the United States and any place outside of the United States, whether that commerce moves wholly by aircraft or partly by aircraft and partly by other forms of transportation.

Forward wing means a forward lifting surface of a canard configuration or tandem-wing configuration airplane. The surface may be a fixed, movable, or variable geometry surface, with or without control surfaces.

Glider means a heavier-than-air aircraft, that is supported in flight by the dynamic reaction of the air against its lifting surfaces and whose free flight does not depend principally on an engine.

Ground visibility means prevailing horizontal visibility near the earth's surface as reported by the United States National Weather Service or an accredited observer.

Go-around power or thrust setting means the maximum allowable inflight power or thrust setting identified in the performance data.

Gyrodyne means a rotorcraft whose rotors are normally engine-driven for takeoff, hovering, and landing, and for forward flight through part of its speed range, and whose means of propulsion, consisting usually of conventional propellers, is independent of the rotor system.

Gyroplane means a rotorcraft whose rotors are not engine-driven, except for initial starting, but are made to rotate by action of the air when the rotorcraft is moving; and whose means of propulsion, consisting usually of conventional propellers, is independent of the rotor system.

Helicopter means a rotorcraft that, for its horizontal motion, depends principally on its engine-driven rotors.

Heliport means an area of land, water, or structure used or intended to be used for the landing and takeoff of helicopters.

Idle thrust means the jet thrust obtained with the engine power control level set at the stop for the least thrust position at which it can be placed.

IFR conditions means weather conditions below the minimum for flight under visual flight rules.

IFR over-the-top, with respect to the operation of aircraft, means the operation of an aircraft over-the-top on an IFR flight plan when cleared by air traffic control to maintain ''VFR conditions'' or ''VFR conditions on top''.

Indicated airspeed means the speed of an aircraft as shown on its pitot static airspeed indicator calibrated to reflect standard atmosphere adiabatic compressible flow at sea level uncorrected for airspeed system errors.

Instrument means a device using an internal mechanism to show visually or aurally the attitude, altitude, or operation of an aircraft or aircraft part. It includes electronic devices for automatically controlling an aircraft in flight.

Interstate air commerce means the carriage by aircraft of persons or property for compensation or hire, or the carriage of mail by aircraft, or the operation or navigation of aircraft in the conduct or furtherance of a business or vocation, in commerce between a place in any State of the United States, or the District of Columbia, and a place in any other State of the United States, or the District of Columbia; or between places in the same State of the United States through the airspace over any place outside thereof; or between places in the same territory or possession of the United States, or the District of Columbia.

Interstate air transportation means the carriage by aircraft of persons or property as a common carrier for compensation or hire, or the carriage of mail by aircraft in commerce:

(1) Between a place in a State or the District of Columbia and another place in another State or the District of Columbia;

(2) Between places in the same State through the airspace over any place outside that State; or

(3) Between places in the same possession of the United States;

Whether that commerce moves wholly by aircraft of partly by aircraft and partly by other forms of transportation.

Intrastate air transportation means the carriage of persons or property as a common carrier for compensation or hire, by turbojet-powered aircraft capable of carrying thirty or more persons, wholly within the same State of the United States.

Kite means a framework, covered with paper, cloth, metal, or other material, intended to be flown at the end of a rope or cable, and having as its only support the force of the wind moving past its surfaces.

Landing gear extended speed means the maximum speed at which an aircraft can be safely flown with the landing gear extended.

Landing gear operating speed means the maximum speed at which the landing gear can be safely extended or retracted.
Large aircraft means aircraft of more than 12,500 pounds, maximum certificated takeoff weight.
Lighter-than-air aircraft means aircraft that can rise and remain suspended by using contained gas weighing less than the air that is displaced by the gas.
Load factor means the ratio of a specified load to the total weight of the aircraft. The specified load is expressed in terms of any of the following: aerodynamic forces, inertia forces, or ground or water reactions.
Long-range communication system (LRCS). A system that uses satellite relay, data link, high frequency, or another approved communication system which extends beyond line of sight.
Long-range navigation system (LRNS). An electronic navigation unit that is approved for use under instrument flight rules as a primary means of navigation, and has at least one source of navigational input, such as inertial navigation system, global positioning system, Omega/very low frequency, or Loran C.
Mach number means the ratio of true airspeed to the speed of sound.
Main rotor means the rotor that supplies the principal lift to a rotorcraft.
Maintenance means inspection, overhaul, repair, preservation, and the replacement of parts, but excludes preventive maintenance.
Major alteration means an alteration not listed in the aircraft, aircraft engine, or propeller specifications—
(1) That might appreciably affect weight, balance, structural strength, performance, powerplant operation, flight characteristics, or other qualities affecting airworthiness; or
(2) That is not done according to accepted practices or cannot be done by elementary operations.
Major repair means a repair:
(1) That, if improperly done, might appreciably affect weight, balance, structural strength, performance, powerplant operation, flight characteristics, or other qualities affecting airworthiness; or
(2) That is not done according to accepted practices or cannot be done by elementary operations.
Manifold pressure means absolute pressure as measured at the appropriate point in the induction system and usually expressed in inches of mercury.
Maximum speed for stability characteristics, V_{FC}/M_{FC} means a speed that may not be less than a speed midway between maximum operating limit speed (V_{MO}/M_{MO}) and demonstrated flight diving speed (V_{DF}/M_{DF}), except that, for altitudes where the Mach number is the limiting factor, M_{FC} need not exceed the Mach number at which effective speed warning occurs.
Medical certificate means acceptable evidence of physical fitness on a form prescribed by the Administrator.
Military operations area. A military operations area (MOA) is airspace established outside Class A airspace to separate or segregate certain nonhazardous military activities from IFR Traffic and to identify for VFR traffic where theses activities are conducted.
V_A means design maneuvering speed.
V_B means design speed for maximum gust intensity.
V_C means design cruising speed.
V_D means design diving speed.
V_{DF}/M_{DF} means demonstrated flight diving speed.
V_{EF} means the speed at which the critical engine is assumed to fail during takeoff.
V_F means design flap speed.
V_{FC}/M_{FC} means maximum speed for stability characteristics.
V_{FE} means maximum flap extended speed.
V_H means maximum speed in level flight with maximum continuous power.
V_{LE} means maximum landing gear extended speed.
V_{LO} means maximum landing gear operating speed.
V_{LOF} means lift-off speed.
V_{MC} means minimum control speed with the critical engine inoperative.
V_{MO}/M_{MO} means maximum operating limit speed.
V_{MU} means minimum unstick speed.
V_{NE} means never-exceed speed.
V_{NO} means maximum structural cruising speed.
V_R means rotation speed.
V_S means the stalling speed or the minimum steady flight speed at which the airplane is controllable.
Minimum descent altitude means the lowest altitude, expressed in feet above mean sea level, to which descent is authorized on final approach or during circle-to-land maneuvering in execution of a standard instrument approach procedure, where no electronic glide slope is provided.
Minor alteration means an alteration other than a major alteration.
Minor repair means a repair other than a major repair.
Navigable airspace means airspace at and above the minimum flight altitudes prescribed by or under this chapter, including airspace needed for safe takeoff and landing.
Night means the time between the end of evening civil twilight and the beginning of morning civil twilight, as published in the American Air Almanac,

converted to local time.
Nonprecision approach procedure means a standard instrument approach procedure in which no electronic glide slope is provided.
Operate, with respect to aircraft, means use, cause to use or authorize to use aircraft, for the purpose (except as provided in § 91.13 of this chapter) of air navigation including the piloting of aircraft, with or without the right of legal control (as owner, lessee, or otherwise).
Operational control, with respect to a flight, means the exercise of authority over initiating, conducting or terminating a flight.
Overseas air commerce means the carriage by aircraft of persons or property for compensation or hire, or the carriage of mail by aircraft, or the operation or navigation of aircraft in the conduct or furtherance of a business or vocation, in commerce between a place in any State of the United States, or the District of Columbia, and any place in a territory or possession of the United States; or between a place in a territory or possession of the United States, and a place in any other territory or possession of the United States.
Overseas air transportation means the carriage by aircraft of persons or property as a common carrier for compensation or hire, or the carriage of mail by aircraft, in commerce:
(1) Between a place in a State or the District of Columbia and a place in a possession of the United States; or
(2) Between a place in a possession of the United States and a place in another possession of the United States;
whether that commerce moves wholly by aircraft or partly by aircraft and partly by other forms of transportation.
Over-the-top means above the layer of clouds or other obscuring phenomena forming the ceiling.
Parachute means a device used or intended to be used to retard the fall of a body or object through the air.
Person means an individual, firm, partnership, corporation, company, association, joint-stock association, or governmental entity. It includes a trustee, receiver, assignee, or similar representative of any of them.
Pilotage means navigation by visual reference to landmarks.
Pilot in command means the person who:
(1) Has final authority and responsibility for the operation and safety of the flight;
(2) Has been designated as pilot in command before or during the flight; and
(3) Holds the appropriate category, class, and type rating, if appropriate, for the conduct of the flight.
Pitch setting means the propeller blade setting as determined by the blade angle measured in a manner, and at a radius, specified by the instruction manual for the propeller.
Positive control means control of all air traffic, within designated airspace, by air traffic control.
Powered-lift means a heavier-than-air aircraft capable of vertical takeoff, vertical landing, and low speed flight that depends principally on enginedriven lift devices or engine thrust for lift during these flight regimes and on nonrotating airfoil(s) for lift during horizontal flight.
Precision approach procedure means a standard instrument approach procedure in which an electronic glide slope is provided, such as ILS and PAR.
Preventive maintenance means simple or minor preservation operations and the replacement of small standard parts not involving complex assembly operations.
Prohibited area. A prohibited area is airspace designated under part 73 within which no person may operate an aircraft without the permission of the using agency.
Propeller means a device for propelling an aircraft that has blades on an engine-driven shaft and that, when rotated, produces by its action on the air, a thrust approximately perpendicular to its plane of rotation. It includes control components normally supplied by its manufacturer, but does not include main and auxiliary rotors or rotating airfoils of engines.
Public aircraft means an aircraft used only for the United States Government, or owned and operated (except for commercial purposes), or exclusively leased for at least 90 continuous days, by a government (except the United States Government), including a State, the District of Columbia, or a territory or possession of the United States, or political subdivision of that government; but does not include a government-owned aircraft transporting property for commercial purposes, or transporting passengers other than transporting (for other than commercial purposes) crewmembers or other persons aboard the aircraft whose presence is required to perform, or is associated with the performance of, a governmental function such as firefighting, search and rescue, law enforcement, aeronautical research, or biological or geological resource management; or transporting (for other than commercial purposes) persons aboard the aircraft if the aircraft is operated by the Armed Forces or an intelligence agency of the United States.
An aircraft described in the preceding sentence shall, notwithstanding any limitation relating to use of the aircraft

for commercial purposes, be considered to be a public aircraft for the purposes of this Chapter without regard to whether the aircraft is operated by a unit of government on behalf of another unit of government, pursuant to a cost reimbursement agreement between such units of government, if the unit of government on whose behalf the operation is conducted certifies to the Administrator of the Federal Aviation Administration that the operation was necessary to respond to a significant and imminent threat to life or property (including natural resources) and that no service by a private operator was reasonably available to meet the threat.

Rated 30-second OEI power, with respect to rotorcraft turbine engines, means the approved brake horsepower developed under static conditions at specified altitudes and temperatures within the operating limitations established for the engine under part 33 of this chapter, for continued one-flight operation after the failure of one engine in multiengine rotorcraft, limited to three periods of use no longer than 30 seconds each in any one flight, and followed by mandatory inspection and prescribed maintenance action.

Rated 2-minute OEI power, with respect to rotorcraft turbine engines, means the approved brake horsepower developed under static conditions at specified altitudes and temperatures within the operating limitations established for the engine under part 33 of this chapter, for continued one-flight operation after the failure of one engine in multiengine rotorcraft, limited to three periods of use no longer than 2 minutes each in any one flight, and followed by mandatory inspection and prescribed maintenance action.

Rated continuous OEI power, with respect to rotorcraft turbine engines, means the approved brake horsepower developed under static conditions at specified altitudes and temperatures within the operating limitations established for the engine under Part 33 of this chapter, and limited in use to the time required to complete the flight after the failure of one engine of a multiengine rotorcraft.

Rated maximum continuous augmented thrust, with respect to turbojet engine type certification, means the approved jet thrust that is developed statically or in flight, in standard atmosphere at a specified altitude, with fluid injection or with the burning of fuel in a separate combustion chamber, within the engine operating limitations established under Part 33 of this chapter, and approved for unrestricted periods of use.

Rated maximum continuous power, with respect to reciprocating, turbopropeller, and turboshaft engines, means the approved brake horsepower that is developed statically or in flight, in standard atmosphere at a specified altitude, within the engine operating limitations established under Part 33, and approved for unrestricted periods of use.

Rated maximum continuous thrust, with respect to turbojet engine type certification, means the approved jet thrust that is developed statically or in flight, in standard atmosphere at a specified altitude, without fluid injection and without the burning of fuel in a separate combustion chamber, within the engine operating limitations established under Part 33 of this chapter, and approved for unrestricted periods of use.

Rated takeoff augmented thrust, with respect to turbojet engine type certification, means the approved jet thrust that is developed statically under standard sea level conditions, with fluid injection or with the burning of fuel in a separate combustion chamber, within the engine operating limitations established under Part 33 of this chapter, and limited in use to periods of not over 5 minutes for takeoff operation.

Rated takeoff power, with respect to reciprocating, turbopropeller, and turboshaft engine type certification, means the approved brake horsepower that is developed statically under standard sea level conditions, within the engine operating limitations established under Part 33, and limited in use to periods of not over 5 minutes for takeoff operation.

Rated takeoff thrust, with respect to turbojet engine type certification, means the approved jet thrust that is developed statically under standard sea level conditions, without fluid injection and without the burning of fuel in a separate combustion chamber, within the engine operating limitations established under Part 33 of this chapter, and limited in use to periods of not over 5 minutes for takeoff operation.

Rated 30-minute OEI power, with respect to rotorcraft turbine engines, means the approved brake horsepower developed under static conditions at specified altitudes and temperatures within the operating limitations established for the engine under Part 33 of this chapter, and limited in use to a period of not more than 30 minutes after the failure of one engine of a multiengine rotorcraft.

Rated 2½-minute OEI power, with respect to rotorcraft turbine engines, means the approved brake horsepower developed under static conditions at specified altitudes and temperatures within the operating limitations established for the engine under Part 33 of this chapter, and limited in use to a period of not more than 2$_{12}$ minutes after the failure of one engine of a multiengine rotorcraft.

Rating means a statement that, as a part of a certificate, sets forth special conditions, privileges, or limitations.

Reference landing speed means the speed of the airplane, in a specified landing configuration, at the point where it descends through the 50 foot height in the determination of the landing distance.

Reporting point means a geographical location in relation to which the position of an aircraft is reported.

Restricted area. A restricted area is airspace designated under Part 73 within which the flight of aircraft, while not wholly prohibited, is subject to restriction.

RNAV way point (W/P) means a predetermined geographical position used for route or instrument approach definition or progress reporting purposes that is defined relative to a VORTAC station position.

Rocket means an aircraft propelled by ejected expanding gases generated in the engine from self-contained propellants and not dependent on the intake of outside substances. It includes any part which becomes separated during the operation.

Rotorcraft means a heavier-than-air aircraft that depends principally for its support in flight on the lift generated by one or more rotors.

Rotorcraft-load combination means the combination of a rotorcraft and an external-load, including the external-load attaching means. Rotorcraft-load combinations are designated as Class A, Class B, Class C, and Class D, as follows:

(1) *Class A rotorcraft-load combination* means one in which the external load cannot move freely, cannot be jettisoned, and does not extend below the landing gear.

(2) *Class B rotorcraft-load combination* means one in which the external load is jettisonable and is lifted free of land or water during the rotorcraft operation.

(3) *Class C rotorcraft-load combination* means one in which the external load is jettisonable and remains in contact with land or water during the rotorcraft operation.

(4) *Class D rotorcraft-load combination* means one in which the external-load is other than a Class A, B, or C and has been specifically approved by the Administrator for that operation.

Route segment means a part of a route. Each end of that part is identified by:

(1) A continental or insular geographical location; or

(2) A point at which a definite radio fix can be established.

Sea level engine means a reciprocating aircraft engine having a rated takeoff power that is producible only at sea level.

Second in command means a pilot who is designated to be second in command of an aircraft during flight time.

Show, unless the context otherwise requires, means to show to the satisfaction of the Administrator.

Small aircraft means aircraft of 12,500 pounds or less, maximum certificated takeoff weight.

Special VFR conditions mean meteorological conditions that are less than those required for basic VFR flight in controlled airspace and in which some aircraft are permitted flight under visual flight rules.

Special VFR operations means aircraft operating in accordance with clearances within controlled airspace in meteorological conditions less than the basic VFR weather minima. Such operations must be requested by the pilot and approved by ATC.

Standard atmosphere means the atmosphere defined in U.S. Standard Atmosphere, 1962 (Geopotential altitude tables).

Stopway means an area beyond the takeoff runway, no less wide than the runway and centered upon the extended centerline of the runway, able to support the airplane during an aborted takeoff, without causing structural damage to the airplane, and designated by the airport authorities for use in decelerating the airplane during an aborted takeoff.

Takeoff power:

(1) With respect to reciprocating engines, means the brake horsepower that is developed under standard sea level conditions, and under the maximum conditions of crankshaft rotational speed and engine manifold pressure approved for the normal takeoff, and limited in continuous use to the period of time shown in the approved engine specification; and

(2) With respect to turbine engines, means the brake horsepower that is developed under static conditions at a specified altitude and atmospheric temperature, and under the maximum conditions of rotor shaft rotational speed and gas temperature approved for the normal takeoff, and limited in continuous use to the period of time shown in the approved engine specification.

Takeoff safety speed means a referenced airspeed obtained after lift-off at which the required one-engine-inoperative climb performance can be achieved.

Takeoff thrust, with respect to turbine engines, means the jet thrust that is developed under static conditions at a specific altitude and atmospheric temperature under the maximum conditions of rotorshaft rotational speed and gas temperature approved for the normal takeoff, and limited in continuous use to the period of time shown in the approved engine specification.

Tandem wing configuration means a configuration having two wings of similar span, mounted in tandem.

TCAS I means a TCAS that utilizes interrogations of, and replies from, airborne radar beacon transponders and provides traffic advisories to the pilot.

TCAS II means a TCAS that utilizes interrogations of, and replies from airborne radar beacon transponders and provides traffic advisories and resolution advisories in the vertical plane.

TCAS III means a TCAS that utilizes interrogation of, and replies from, airborne radar beacon transponders and provides traffic advisories and resolution advisories in the vertical and horizontal planes to the pilot.

Time in service, with respect to maintenance time records, means the time from the moment an aircraft leaves the surface of the earth until it touches it at the next point of landing.

True airspeed means the airspeed of an aircraft relative to undisturbed air. True airspeed is equal to equivalent airspeed multiplied by $(r0/r)_{12}$.

Traffic pattern means the traffic flow that is prescribed for aircraft landing at, taxiing on, or taking off from, an airport.

Type:

(1) As used with respect to the certification, ratings, privileges, and limitations of airmen, means a specific make and basic model of aircraft, including modifications thereto that do not change its handling or flight characteristics. Examples include: DC–7, 1049, and F–27; and

(2) As used with respect to the certification of aircraft, means those aircraft which are similar in design. Examples include: DC–7 and DC–7C; 1049G and 1049H; and F–27 and F–27F.

(3) As used with respect to the certification of aircraft engines means those engines which are similar in design. For example, JT8D and JT8D–7 are engines of the same type, and JT9D–3A and JT9D–7 are engines of the same type.

United States, in a geographical sense, means (1) the States, the District of Columbia, Puerto Rico, and the possessions, including the territorial waters, and (2) the airspace of those areas.

United States air carrier means a citizen of the United States who undertakes directly by lease, or other arrangement, to engage in air transportation.

VFR over-the-top, with respect to the operation of aircraft, means the operation of an aircraft over-the-top under VFR when it is not being operated on an IFR flight plan.

Warning area. A warning area is airspace of defined dimensions, extending from 3 nautical miles outward from the coast of the United States, that contains activity that may be hazardous to nonparticipating aircraft. The purpose of such warning areas is to warn nonparticipating pilots of the potential danger. A warning area may be located over domestic or international waters or both.

Winglet or tip fin means an out-ofplane surface extending from a lifting surface. The surface may or may not have control surfaces.

[Doc. No. 1150, 27 FR 4588, May 15, 1962]

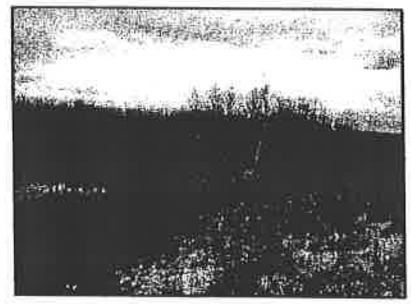
EDITORIAL NOTE: For FEDERAL REGISTER citations affecting § 1.1, see the List of CFR Sections Affected, which appears in the Finding Aids section of the printed volume and on GPO Access.

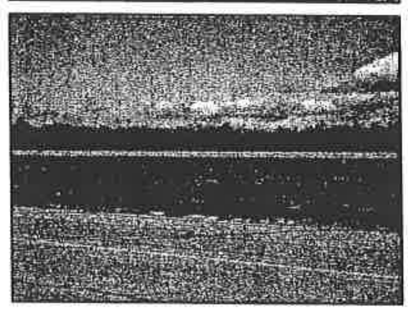
Appendix B – Environmental Inventory

Eastern Slope Regional Airport
Fryeburg, Maine

Wetland and Natural Community Delineation and Assessment Report

April 2006





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WAI PN 104215.02

WETLAND DELINEATION PROJECT SUMMARY

Project:	Eastern Slope Regional Airport (ESRA)
Woodlot Project Number:	104215.02
Woodlot Project Manager:	Steven K. Pelletier[1]
Client:	Gale Associates, Inc.
Town-Project Location:	Fryeburg
County/State:	Oxford County, Maine
Dates of Delineation Review:	November 8 and 10, 2005
Flagging Color(s):	Pink
Delineators:	Georgia W. Hall and Mark W. Christopher
Method of Delineation:	1987 U.S. Army Corps of Engineers (Corps) Wetland Delineation Manual (Corps 1987)
Method of Classification:	U.S. Fish & Wildlife Service Classification System (Cowardin *et. al* 1979)
Method of Mapping:	Flagged boundaries were located with a Global Positioning System Trimble® Pro-XR receiver.

1.0 INTRODUCTION

In 1995, Woodlot conducted separate wetland and Pitch Pine-Scrub Oak (PP/SO) community delineations in potential development areas of the ESRA site in Fryeburg, Maine. The delineations were conducted as part of early planning efforts for the expansion of various components of the airport. In 2005, Gale Associates, Inc., contracted Woodlot to review and update this information.

On November 8 and 10, 2005, Woodlot delineated wetlands regulated by the Maine Department of Environmental Protection (MDEP) and the Corps on potential development areas of the ESRA site (Appendix A, Figure 1). Potential development projects include construction of a Fixed Based Operator facility, a Jet-A fuel tank location, and a new parallel taxiway; expansion of a hanger; tree removal; and construction of an 800-foot runway extension. For the purposes of this report, the location of two individual wetlands previously delineated by Woodlot within the proposed tree removal areas were confirmed and re-surveyed. A third wetland located beyond the area of the proposed runway extension was also identified. However, due to its location beyond the project area, it was given only a cursory review during the 2005 site visit. In addition, Woodlot evaluated these three wetlands for their ability to perform 13 functions and values as outlined in the *Highway Methodology Workbook Supplement: Wetland Functions and Values, A Descriptive Approach* (Corps 1999).

Woodlot also completed a delineation and assessment of a rare PP/SO community. The natural resources assessment was restricted to the potential development areas as identified by Gale Associates, Inc.

The following information is included in this report:

- A *Site Location Map* (Appendix A);
- A summary of wetlands found on-site (Table 1);
- A *Wetlands Map* showing the location of on-site wetlands (Appendix A);
- Individual wetland descriptions (refer to the *Wetlands Map* for the location of numbered wetlands);

[1] The Project Manager is available to answer questions concerning this report and can be reached at (207) 729-1199.

- Information regarding applicable state, federal, and local wetland regulations and permitting requirements;
- Representative site photographs (Appendix B);
- Wetland delineation data forms (Appendix C);
- Wetland Functions and Values Assessment Forms (Appendix D);
- A PP/SO community description (Appendix E);
- Natural Resources Protection Act (NRPA) vernal pool definitions (Appendix F);
- Agency correspondence (Appendix G); and
- A rare plant fact sheet (Appendix H).

2.0 METHODS

Methods used to delineate wetlands and the PP/SO community and to characterize and evaluate wetland functions and values on the ESRA site are described below.

2.1 Wetland Delineation

Wetlands within the ESRA expansion areas were delineated in accordance with the Corps Wetland Delineation Manual (Corps 1987). This methodology requires the assessment of: (1) the presence of hydric soils; (2) a predominance of hydrophytic vegetation; and (3) discernable wetland hydrology. Each parameter must be present to meet Corps wetland criteria. Hydric soil determinations were based on test pits excavated in the field and comparison of soil profiles to those identified in the *Field Indicators for Identifying Hydric Soils in New England* (NEHSTC 2004). Representative wetland photographs are presented in Appendix B. Wetland delineation plots were completed, and data forms are presented in Appendix C. Woodlot flagged wetland boundaries and prepared a sketch map. The sketch map was submitted to the project surveyor contracted by Gale Associates, Inc., who located the delineation area.

2.1.1 *Wetland Characterization*

Wetland characterizations are based on the *Classification of Wetlands and Deepwater Habitats of the United States* (Cowardin *et al.* 1979), which classifies wetlands by landscape position, dominant vegetation types, and seasonal hydrology. Additional wetland characterization data, including commonly occurring plant species, forest stand age, and levels of disturbance, were also collected. The *Classification of Ecosystems and Natural Communities Key* (MNAP 2004) and *Natural Landscapes of Maine* (Gawler and Cutko 2004) are further referenced to better describe existing natural community types within the project area.

2.1.2 *Wetland Functions and Values Assessment*

Wetland functions and values assessments are based on the *Highway Methodology Workbook Supplement: Wetland Functions and Values, A Descriptive Approach* (Corps 1999). This method bases function and value determinations on the presence or absence of specific criteria for each of 13 wetland functions and values defined below. Only information regarding those functions and values determined to be occurring in the project area are included in this report. Completed functions and values assessment forms are presented in Appendix D.

Functions and values assessed for this report include:

° **Groundwater Interchange (Recharge/Discharge)**
This function considers the potential for the project area wetlands to serve as groundwater recharge and/or discharge areas. It refers to the fundamental interaction between wetlands and aquifers, regardless of the size or importance of either.

° **Floodflow Alteration (Storage and Desynchronization)**
This function considers the effectiveness of the wetlands in reducing flood damage by attenuating floodwaters for prolonged periods following precipitation and snow melt events.

° **Fish and Shellfish Habitat**
This function considers the effectiveness of seasonally or permanently flooded areas within the subject wetlands for their ability to provide fish and shellfish habitat.

° **Sediment/Toxicant Retention**
This function reduces or prevents degradation of water quality. It relates to the effectiveness of the wetland as a trap for sediments, toxicants, or pathogens.

° **Nutrient Removal/Retention/Transformation**
This wetland function relates to the effectiveness of the wetland to prevent adverse effects of excess nutrients entering aquifers or surface waters such as ponds, lakes, streams, rivers, or estuaries.

° **Production Export (Nutrient)**
This function relates to the effectiveness of the wetland to produce food or usable products for humans or other living organisms.

° **Sediment/Shoreline Stabilization**
This function considers the effectiveness of a wetland to stabilize stream banks and shorelines against erosion.

° **Wildlife Habitat**
This function considers the effectiveness of the wetland to provide habitat for various types and populations of animals typically associated with wetlands and the wetland edge. Both resident and/or migrating species must be considered.

° **Recreation (Consumptive and Non-Consumptive)**
This value considers the suitability of the wetland and associated watercourses to provide recreational opportunities such as hiking, canoeing, boating, fishing, hunting, and other active or passive recreational activities.

° **Educational/Scientific Value**
This value considers the effectiveness of the wetland as a site for an "outdoor classroom" or as a location for scientific study or research.

° **Uniqueness/Heritage**
This value relates to the effectiveness of the wetland or its associated water bodies to provide certain special values such as archaeological sites, unusual aesthetic quality, historical events, or unique plants, animals, or geologic features.

° **Visual Quality/Aesthetics**
This value relates to the visual and aesthetic qualities of the wetland.

° **Endangered Species Habitat**
This value considers the suitability of the wetland to support threatened or endangered species.

2.2 Pitch Pine/Scrub Oak Community Delineation

A complete description of the PP/SO community is provided in Appendix E. Community delineations were conducted in accordance with the methods, definitions, and corresponding rare communities map provided by the Maine Natural Areas Program (MNAP). MNAP describes this community as a woodland type with a very open to nearly closed canopy of 25-75 percent areal coverage. A dense scrub oak (*Quercus ilicifolia*) layer occurs primarily within canopy openings with a subordinate layer of heath and blueberry shrubs. Soils within this community are sandy, xeric to dry-mesic with flat to undulating micro-topography. MNAP rates the PP/SO community as S1 [i.e., critically imperiled in Maine because of extreme rarity (5 or fewer occurrences or very few remaining acres) or because some aspect of its biology makes it especially vulnerable to extirpation from the state (MNAP 2004; Gawler and Cutko 2004)]. The ranking system rates natural communities from the rarest to the most common on a scale of S1 (rare) to S5 (common). This community is also globally rare and rated G2 [i.e., imperiled throughout its global range because of rarity (6-20 occurrences or very few remaining acres) or because of other factors making it vulnerable to further decline (MNAP 2004)].

During the 1995 assessment of the ESRA site, Woodlot identified PP/SO areas within and adjacent to the proposed development areas (Woodlot 1995). Woodlot reviewed these areas again in November 2005 to determine if PP/SO community characteristics are still present and to delineate any such areas that meet the MNAP definition of a PP/SO community. A meander survey and visual assessment of vegetation composition and structure were conducted. Those areas with an intact pitch pine (*Pinus rigida*) canopy and an understory of scrub oak with minimal evidence of past disturbance were delineated as a PP/SO community, flagged, photographed, and documented. Those areas with no intact pitch pine canopy, minimal scrub oak, and recent evidence of disturbance were not identified as PP/SO communities; however, since these areas displayed some PP/SO characteristics, they were still delineated. Sketch maps of these areas were prepared and submitted to the project surveyor contracted by Gale Associates, Inc.

3.0 GENERAL SITE DESCRIPTION

The ESRA site is located on a well-drained, sandy plateau at the southeastern base of the White Mountains. Topography is flat and slightly higher in elevation than the surrounding areas. The nearly xeric upland communities are interspersed with shallow ericaceous wetlands, streams, and glacial outwash ponds. The airport currently has one runway and a "half" taxiway, numerous maintenance and administration buildings, open parking areas, and hangers.

3.1 Upland Communities Description

3.1.1 *Pitch Pine Scrub-Oak Community*

Surveys by Woodlot in 1995 identified four PP/SO stands within the recently proposed development areas. Woodlot also identified other PP/SO areas located beyond the current scope of development and planning; however, these areas were not delineated. Other upland areas did not met the definition based on the lack of intact pitch pine canopies and the occurrence of significant amounts of gray birch (*Betula populifolia*), quaking aspen (*Populus tremuloides*), and white pine (*Pinus strobus*) (Woodlot 1995).

The most intact PP/SO communities (Stands 1 and 2) in the current project area are ranked S1 (i.e., critically imperiled) by MNAP. They are characterized as having 75–80 percent pitch pine in the upper canopy and approximately 75 percent scrub oak in the sub-stratum. Individual pitch pine trees in the stand are fairly uniform in diameter and height (Appendix B, Photos 1 and 2). Sheep laurel (*Kalmia angustifolia*) and bracken fern (*Pteridium aquilinum*) are dominant in the herbaceous layer. Other less abundant species observed include gray birch, common lowbush blueberry (*Vaccinium angustifolium*), woodland sedge (*Carex lucorum*), and roughed-leaved ricegrass (*Orzopsis asperifolia*). A relic and fragmented stand of intact pitch pine (Photo 3) occurs between the airport entrance road and the new hangers (Appendix A, Figure 2). While this area technically meets the PP/SO community definition, it does not provide the same valuable habitat as the more intact areas.

3.1.2 *Cutover Areas*

Areas of former PP/SO communities have been heavily and repeatedly cleared as part of general maintenance along the runway and taxiway. In these areas, pitch pine trees are generally scattered and range in size from saplings to small canopy trees with diameters less than five inches and heights under twenty feet. Scrub oak trees are generally sparse. Other evidence of disturbance includes soil mounds, excavated areas, slash and sawdust piles, and stumps. These areas are not considered PP/SO communities.

The cutover areas also contain large amounts of gray birch with scattered scrub oak, white pine, red oak (*Quercus rubra*), and quaking aspen trees (Photo 4). Sheep laurel, swamp dewberry (*Rubus hispidus*), and bracken fern are common in the understory. Sweetfern (*Comptonia peregrina*), little bluestem (*Schizachyrium scoparium*), and large mats of woodland sedge are common in open areas. Other observed species include roughed-leaved ricegrass, wintergreen (*Gaultheria procumbens*), wolf-claw clubmoss (*Lycopodium clavatum*), Hickey's clubmoss (*Lycopodium hickeyi*), northern running pine (*Diphasiastrum complanatum*), starved panic grass (*Panicum depauratum*), vagabond (*Bulbostylis capillaris*), and reindeer moss (*Cladonia rangifera*) and British soldier (*C. cristatella*) lichens.

Uplands north of the runway are regenerating and characterized by pole and shrub-sized gray birch, scrub oak, eastern white pine (*Pinus strobus*), pitch pine, and quaking aspen. Other species present in the shrub and herbaceous stratum include sheep laurel, bracken fern, lowbush blueberry, little bluestem, sweetfern, and winterberry (Photo 5).

3.2 Individual Wetland Descriptions

Following are wetland descriptions per the U.S. Fish and Wildlife Service classification system (Cowardin *et al.* 1979). Wetlands A and B occur within the areas designated for tree clearing and maintenance. Wetland delineation data forms are provided in Appendix C for Wetlands A and B. Wetland C is adjacent to the proposed runway extension. Its location is based on a previous delineation completed by Woodlot in 1995.

Table 1. Wetland Types on the ESRA Site, Fryeburg, Maine

Wetland ID[1]	*General Wetland Type*	*Class*	*Comments*
A	Palustrine scrub-shrub, broad-leaved deciduous, semi-permanently flooded	PSS1F	Isolated wetland with a mix of small shrubs and graminoids.
B	Palustrine scrub-shrub, broad leaved evergreen, semi-permanently flooded and an open water beaver (*Castor canadensis*) pond	PSS3F and POWK-b	Isolated wetland with a mix of small shrubs and graminoids below a beaver pond with an abundance of downed trees.
C	Palustrine forested, needle-leaved evergreen, saturated seasonally or longer	PFO4B	Seepage wetland of balsam fir (*Abies balsamea*) that connects to a larger more diverse complex of wetlands.

Notes: 1. Refer to *Wetlands Map*.

3.2.1 *Wetland A*

Wetland A is a palustrine, scrub-shrub, broad-leaved deciduous wetland (PSS1F) that is semipermanently inundated (Photo 6). Wetland A most closely resembles a variation of the Mixed Graminoid-Shrub Marsh per the MNAP natural communities descriptions (MNAP 2004; Gawler and Cutko 2004). As a common wetland community type, it is rated S5 (i.e., demonstrably secure in Maine). This community typically occurs on mineral soils that are flooded early in the growing season and remain saturated or occasionally flooded throughout the spring season. Soils are acidic with a pH typically in the 5.0–6.0 range. The mixed Graminoid-Shrub Marsh Community is described as a heterogeneous type in which herbs and shrubs occur in various assemblages and proportions. Many examples of this community are transitional to other wetland types.

The shrub layer of Wetland A is dominated by gray birch. Other shrub species include witherod (*Viburnum nudum*), meadowsweet (*Spiraea alba*), and quaking aspen. Sheep laurel, pointed broom sedge (*Carex scoparia*), wool-grass (*Scirpus cyperinus*), and swamp dewberry dominate the herbaceous layer. Other low growing shrubs observed include rhodora (*Rhodendron canadensis*), black chokeberry (*Photinia melanocarpa*), and steeple bush (*Spiraea tomentosa*). Haircap moss (*Polytrichum commune*) is also common along the fringe with moss (*Sphagnum* spp.) occurring in wetter portions.

Wetland A contains some pit and mound micro-topography with subtle undulations approximately six inches deep and standing water in the lower areas. Soils are hydric sands with a very dark, mucky-mineral A (7.5YR 2/0) horizon underlain with a brown, depleted B horizon (7.5YR 4/2) with 10 to 15 percent redoximorphic features within 10 inches of the mineral soil surface. Portions of this wetland exhibited characteristics commonly associated with vernal pools (e.g., ponding water of sufficient depth to support breeding amphibians, absence of predatory fish, and vegetation suitable for egg mass attachment). Refer to Appendix F for NRPA vernal pool definitions. A spring site visit would be required to determine if these pools are being utilized by breeding amphibians.

3.2.2 *Wetland B*

Wetland B is a palustrine scrub-shrub, broad-leaved evergreen wetland (PSS3F) that is semipermanently inundated. It also includes a palustrine, open water wetland that is artificially flooded by beaver activity (POWK-b). Wetland B most closely resembles a variation of the Mixed Graminoid-Shrub Marsh (MNAP 2004) with a sparse shrub component. It has been influenced by past and ongoing human activities (e.g., construction of the airport runway and logging), as well as by the aforementioned beaver activity. Wetland B is dominated by leatherleaf (*Chamaedaphne calyculata*), wool-grass, and rattlesnake mannagrass (*Glyceria canadensis*) in the low shrub and herbaceous layers. A variety of shrubs occur in scattered locations including maleberry (*Lyonia ligustrina*), meadowsweet, scrub oak, white pine, gray birch, quaking aspen, and pitch pine. At the time of the November 2005 delineation, areas of ponded and flooded fine sands were too wet to obtain a soil profile. The beaver pond is primarily open water with a quantity of downed medium to small diameter trees. A thin border of shrub wetlands occurs along the entire pond perimeter. Vegetation includes gray birch, speckled alder (*Alnus incana*), red maple, maleberry, witch-hazel (*Hamamelis virginiana*), cinnamon fern (*Osmunda cinnamomea*), and sensitive fern (*Onoclea sensibilis*). Scrub-shrub and beaver pond conditions are presented in Photos 7 and 8, respectively.

3.2.3 *Wetland C*

Wetland C occurs adjacent to the runway expansion area. It may be impacted either directly or indirectly by side-slopes from the fill, although this is unclear from the site plan. This wetland is a palustrine, forested wetland of needle-leaved evergreen trees with saturated soils (PFO4B). It contains subtle pit and mound micro-topography and connects to emergent, scrub-shrub, and stream-associated wetlands. The overstory is primarily balsam fir with scattered occurrences of eastern white pine and eastern hemlock (*Tsuga canadensis*). The understory is sparsely vegetated with only a minimal presence of cinnamon fern and sensitive fern. Hydrology is generated by seepage from the adjacent uplands and is characterized by seasonally saturated soils.

4.0 WETLAND FUNCTIONS AND VALUES ASSESSMENT

Following is a summary of the wetland functions and values associated with Wetlands A, B, and C. Functions and values assessment forms for each wetland are presented in Appendix D.

4.1 Wetlands A and B

Wetlands A and B are scrub-shrub wetlands that appear to be semi-permanently inundated. Both wetlands possibly recharge groundwater into the aquifer, as each is underlain by sandy soils. Groundwater from the adjacent uplands likely discharges into the wetland and is the primary source of hydrology. It is probable that other wetlands in this region provide groundwater functions and therefore contribute to the overall recharge of the local aquifer.

Both wetlands have some potential to retain toxicants that may come from sources on the runway. This function is likely very minor, as only a small amount of surface water runoff enters the wetlands from the runway, which is separated from the wetlands by a 100-foot wide grass strip. Water that drains from the runway likely percolates through the sandy soils. The sandy soils should then filter or bind some toxicants. Wetland B has a small drainage swale that receives surface water from the runway and may provide some sediment and toxicant retention.

Both wetlands provide some production export or food chain values. The wetlands provide habitat for a variety of invertebrates and vertebrates, with vegetation and water serving as the basis of the food chain. Decaying vegetation contributes to some nutrient cycling and further contributes to the productivity of the wetland. Each wetland provides habitat for local species such as white-tailed deer (*Odocoileus virginianus*), snowshoe hare (*Lepus americanus*), and coyote (*Canis latrans*). Migratory songbirds such as American robin (*Turdus migratorius*), cedar waxwing (*Bombycilla cedrorum*), and woodcock (*Scolopax minor*) also inhabit these wetlands.

4.2 Wetland C

The hydrologic regime of Wetland C functions from the discharge of groundwater and from surface water runoff from adjacent uplands into the wetland. Groundwater may then recharge into the local aquifer. The wetland provides some modest contribution to the local wildlife food chain indirectly through vegetation growth and decomposition and directly as habitat for a diversity of species. However, its dense canopy limits these functions by preventing the growth of a mid-canopy and understory. The wetland floor is heavily shaded and not particularly productive. Wetland C is larger and more diverse than Wetlands A and B and contains an open water pond created by beaver activity. As such, it provides habitat for a larger variety of wildlife, including waterfowl such as wood ducks (*Aix sponsa*).

4.3 Functions and Values Summary

The three wetlands found along the proposed expansion areas likely contribute groundwater recharge and discharge functions. These functions are dependent upon the sandy, nearly xeric soils found within the adjacent uplands and sandy soils found in the wetlands. The hydrologic regimes of these wetlands function from discharge of seepage water from the uplands. Food chain functions are modest, but habitat is provided for local wildlife and migratory birds. Sediment and toxicant retention functions are limited due to the permeability of the upland soils and the lack of surface water runoff from the runway into the wetlands.

5.0 REGULATORY INFORMATION

5.1 State and Federal Regulations

The MDEP and the Corps regulate impacts to wetlands identified within the project area. Projects resulting in minor wetland impacts are reviewed jointly by both agencies through the NRPA Tier review process. In general, projects not located within a wetland, or projects that alter less than 4,300 square feet of wetlands and are not *Wetlands of Special Significance*, are exempt from the Tier permitting requirements. Typically, projects with cumulative impacts to wetlands between 4,300 and 15,000 square feet are eligible for review under the Tier 1 review process. The Tier 2 review process applies to alterations that affect between 15,000 and 43,560 square feet (i.e., 1 acre). Cumulative project impacts that exceed 1 acre and/or impacts to *Wetlands of Special Significance* typically require a Tier 3 review process. Based on Woodlot's review, Wetlands A, B, and C do not meet the definition of a *Wetland of Special Significance*. However, if it is determined that the pools within Wetland A are significant vernal pools, they may be considered Significant Wildlife Habitat under the NRPA, requiring buffer protection. Woodlot therefore recommends a spring site visit to determine if the pools within Wetland A are vernal pools.

Full identification of *Wetlands of Special Significance* involves contacting natural resources agencies such as the Maine Department of Inland Fisheries and Wildlife (MDIFW), the Maine Historic Preservation Commission (MHPC), and MNAP to determine if there are significant wildlife habitats and/or rare botanical features within the project area. The MDIFW wildlife biologist indicated that several Species of Special Concern occur within the PP/SO community, including the twilight moth (*Xylena thoracica*) and the pine barrens zanclognatha moth (*Zanclognatha martha*). The MDIFW fisheries biologist stated that there are no known threatened or endangered fish or fishery habitat within the project area.

MNAP identified two occurrences of the rare PP/SO community within the general project area and two occurrences of the state-listed S1 (i.e., critically imperiled) Three-way Sedge-Goldenrod Outwash Plain Pondshore (SGOPP) community. Portions of the PP/SO community fall within the proposed construction footprint, but the SGOPP community is located beyond the footprint; therefore, potential impacts appear to be minimal. Narrow-leaved goldenrod (*Euthamia caroliniana*), ranked S2 (i.e., imperiled) by MNAP, characterizes the SGOPP community. These communities have not been surveyed for over ten years, and Woodlot recommends that a late summer survey be conducted to determine if narrow-leaved goldenrod still occurs in the area.

Finally, MHPC stated that the project area is generally sensitive for prehistoric archaeological sites and therefore requested completion of their Historic Building/Structure Survey form (see Appendix G). Archaeological testing at the western end of the runway is complete. However, the rest of the ESRA site is still considered sensitive for the presence of prehistoric archaeological sites.

5.2 Local Regulations

Wetlands A and B do not meet the Town of Fryeburg (Town) definition of a freshwater wetland and do not fall within the Town Natural Resource Protection Zone (NRPZ). Wetland C connects to an unnamed stream, and a portion of the wetland falls within the NRPZ associated with that stream. Filling for the runway extension and/or clearing of trees may impact areas within the NRPZ. Contact should be made with the Town planning office regarding potential impacts to these areas. Furthermore, Wetland C may meet the Town wetland definition, meaning the area contains ten or more contiguous acres.

6.0 LITERATURE CITED

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U.S. Army Corps of Engineers. 1987. *U.S. Army Corps of Engineers Wetlands Delineation Manual.* Environmental Laboratory, Department of the Army. Waterways Experiment Station. U.S. Army Corps of Engineers. Technical Report Y-87-1. January 1987.

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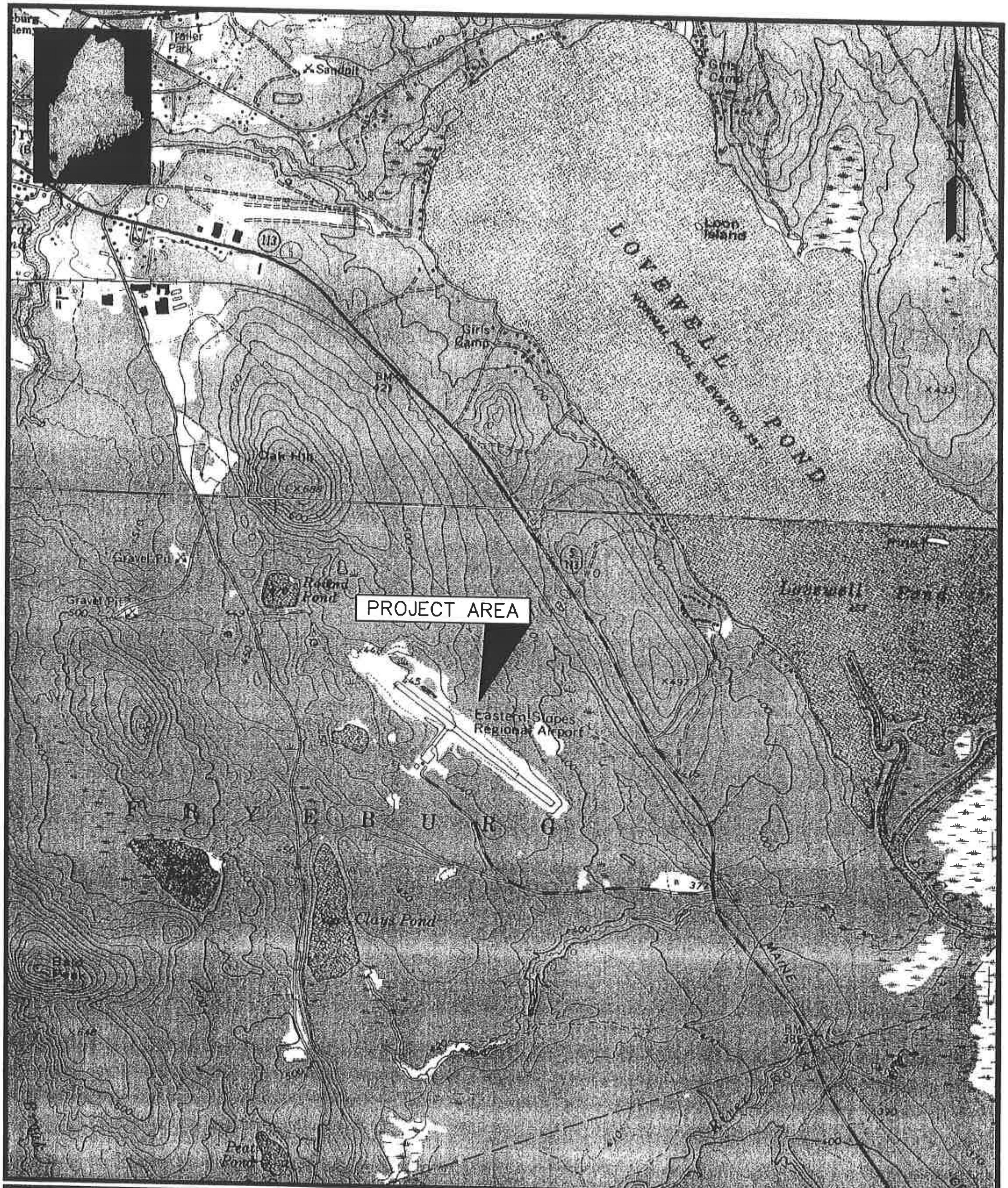
Woodlot Alternatives, Inc. 1995. Wetland and Natural Community Delineations at Eastern Slope Regional Airport, Fryeburg, Maine.

Appendix A
Figures



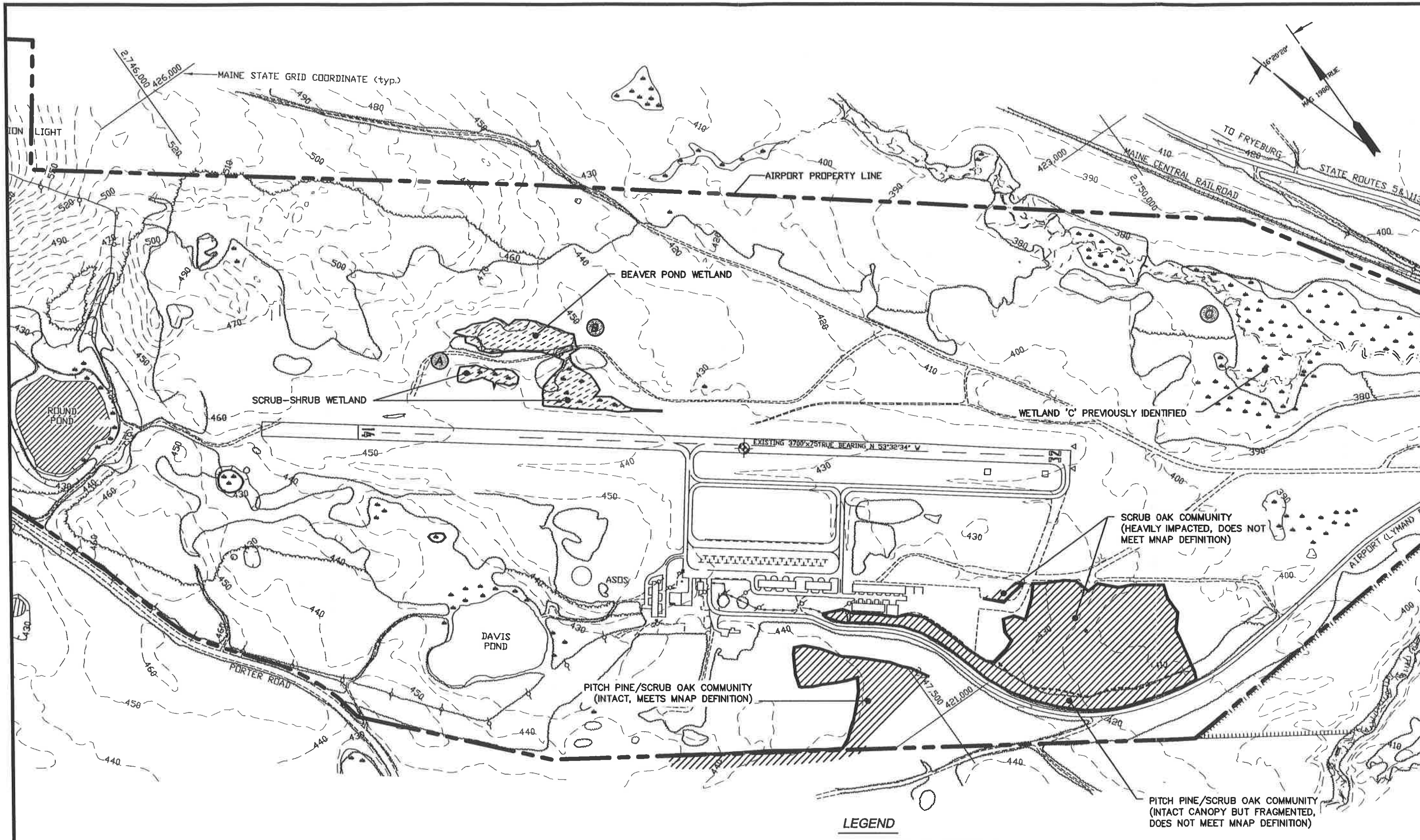
PREPARED BY:

WOODLOT ALTERNATIVES, INC.
ENVIRONMENTAL CONSULTANTS

DATE:	January 2006
SCALE:	1" = 2000'
JOB NO. 104215	
FILE: 104215-F001-location.dwg	

Figure 1 - Location Map
Eastern Slope Airport
Fryeburg, Maine

REV.



LEGEND

- WETLAND IDENTIFIED BY WOODLOT ALTERNATIVES (2005)
- PITCH PINE/SCRUB OAK COMMUNITY
- WETLANDS
- WETLAND DESIGNATOR PER WETLAND REPORT

0 — 500'

1" = 500'

NOTES:

1. WETLAND BOUNDARIES DELINEATED IN ACCORDANCE WITH CORPS 1987 WETLAND DELINEATION METHODOLOGY, IDENTIFIED BY WOODLOT AND SURVEYED BY OTHERS.
2. BASE MAP INFORMATION PROVIDED BY GALE ASSOCIATES, INC.

SHEET TITLE:	Natural Community Map
SCALE:	1"=500'
DATE:	January 2006
PROJECT:	Eastern Slope Airport
ADDRESS:	Fryeburg, Maine
PREPARED BY:	WOODLOT ALTERNATIVES, INC. ENVIRONMENTAL CONSULTANTS 104215-0000-nat_comm.dwg
PROJ. NO.	104215
FIGURE NO.	2

NO. | REVISIONS | DATE

Appendix B
Representative Site Photos

Photo 1. Typical view of the PP/SO community. November 2005.
Photo by Woodlot Alternatives, Inc.

Photo 2. Typical view of the canopy in the PP/SO community. November 2005.
Photo by Woodlot Alternatives, Inc.

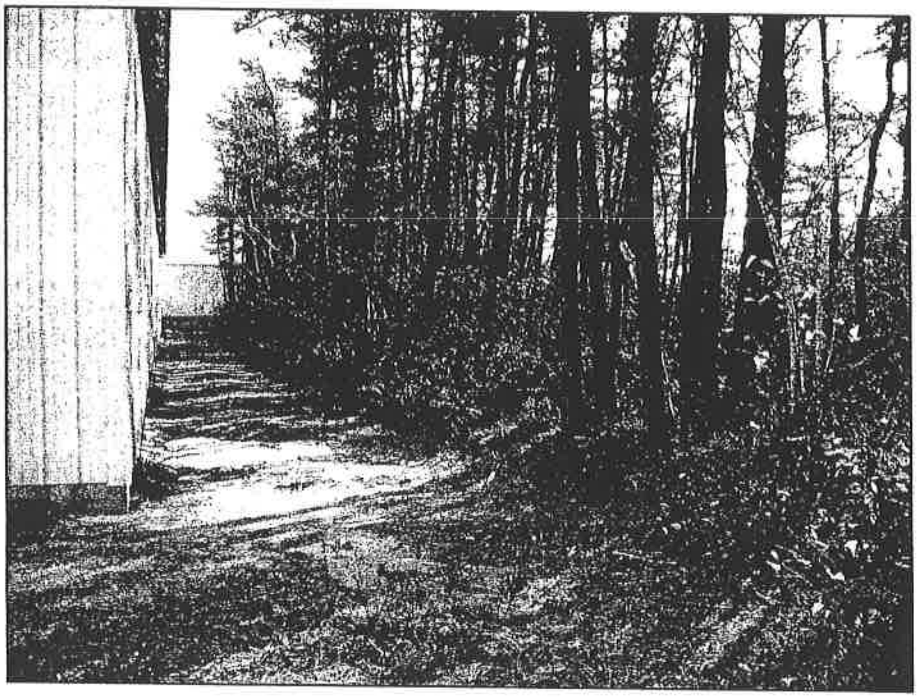


Photo 3: PP/SO relic community along the entrance road. November 2005.
Photo by Woodlot Alternatives, Inc.

Photo 4. An example of the cutover areas. November 2005.
Photo by Woodlot Alternatives, Inc.

Photo 5. Typical upland area along the north side of the runway. November 2005.
Photo by Woodlot Alternatives, Inc.

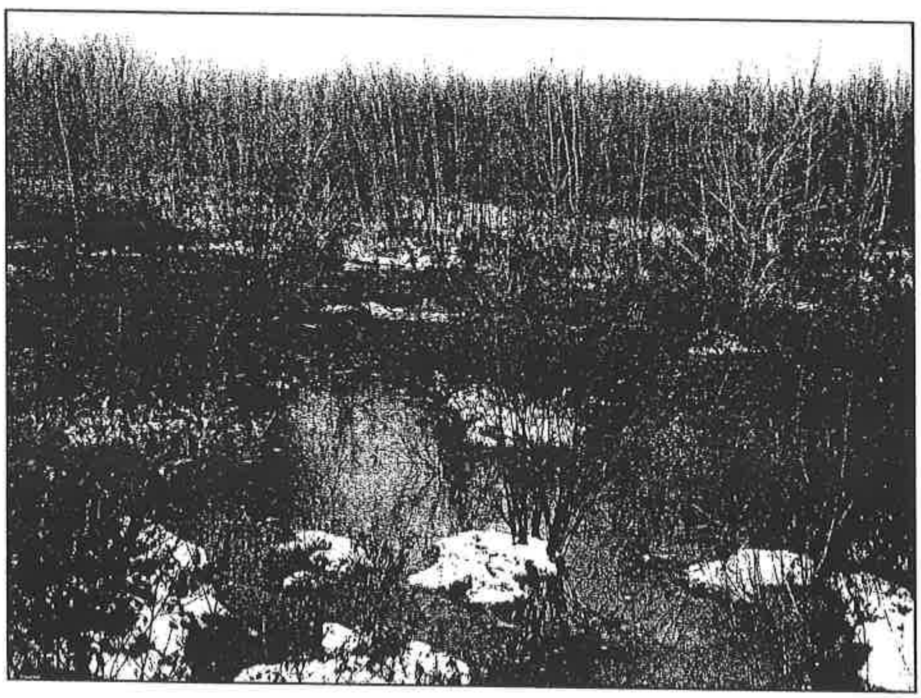


Photo 6. View of Wetland A. November 2005.
Photo by Woodlot Alternatives, Inc.

Photo 7. View of Wetland B. November 2005.
Photo by Woodlot Alternatives, Inc.

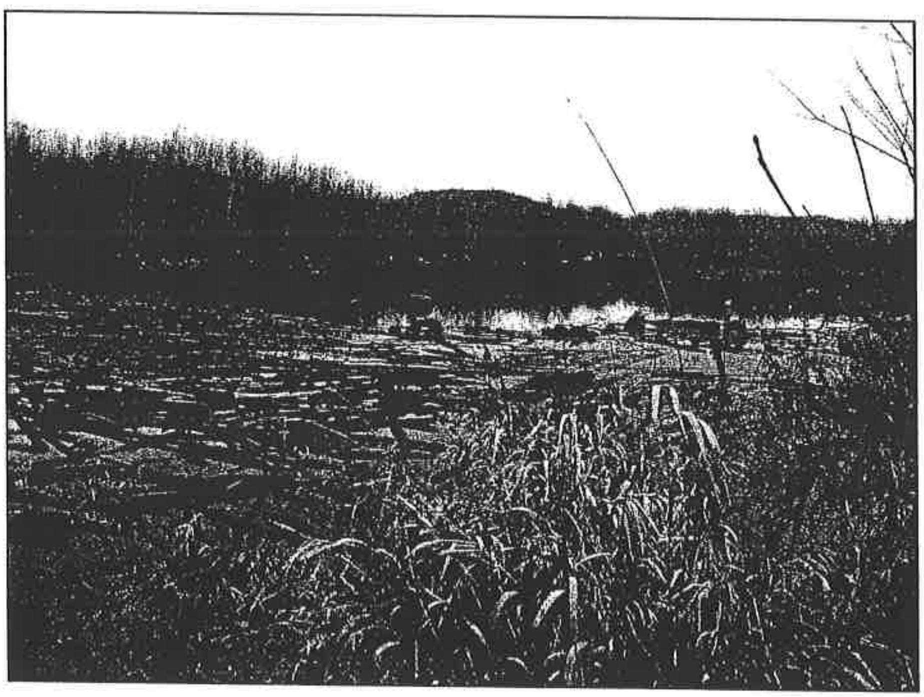


Photo 8. View of Wetland C. November 2005.
Photo by Woodlot Alternatives, Inc.

Appendix C
Wetland Delineation Data Forms

Project Title: Eastern Slope / Fryeburg, Maine **Transcect Number:** MA **Plot Number:** 1 V

Delineators: **Date:** 10 November 2005

VEGETATION	Stratum and Species (dominants only)	Dominance Ratio	Percent Dominance	NWI Status
Pole:				
	Betula populifolia	5/7	71%	FAC
	Populus tremuloides	2	28%	NI
Shrub:				
	Spiraea alba v. latifolia	15	39%	FAC+
	Viburnum nudum var. cassinoides	20/38	53%	FACW
	Quercus ilicifolia	2		
	Spiraea tomentosa	1		
Herb:	Kalmia angustifolia	20/47		FAC
	Carex scoparia	20/47		FACW
	Scirpus cyperinus	2		
	Photinia melanocarpa	5		

Note 1: Use asterisk * to indicate plants with adaptations to wetland hydrology.
Plants recorded with asterisks should be considered as "other hydrophytes" in the tally below.

Note 2: Species with NA or NI status are reported, but are calculated in the tally below.

____ OBL 2 FACW 3 FAC ____ OTHER HYDROPHYTES ____ FAC- ____ FACU ____ UPL

Hydrophytes Subtotal: 5 Non-hydrophytes Subtotal: 0

100 x Subtotal Hydrophytes / Subtotal Hydrophytes + Subtotal Non-Hydrophytes = 100% = Percent Hydrophytes

Describe Vegetation Disturbance:

HYDROLOGY
1. Hydrology is often the most difficult feature to observe.
2. Interpretation must consider the validity of the observation in light of the season, recent weather conditions, watershed alterations, etc.
3. Interpretation of hydrology may require repeated observations over more than one season.

- ☐ RECORDED DATA
  - Stream, lake, or tidal gage Identification: ____
  - Aerial photography Identification: ____
  - Other Identification: ____
- ☐ NO RECORDED DATA
- ☐ OBSERVATIONS:
  - Depth to Free Water: ____
  - Depth to Saturation (including capillary fringe): ____
  - Altered Hydrology (explain) ____

☐ Inundated ☐ Saturated in upper 12" ☐ Water Marks ☐ Drift Lines ☐ Sediment Deposits

☐ Drainage Patterns within Wetland ☐ OTHER (explain):

WOODLOT ALTERNATIVES, INC.
ENVIRONMENTAL CONSULTANTS

SOIL **Sketch Landscape Position** near Flag MA-24

pit + mound

Depth	Horizon	Matrix Color	Redoximorphic Features Color, Abundance, Size & Contrast	USDA Texture and nodules, concretions, masses, pore linings, restrictive layers, root distribution, soil water, etc.
0-5	A	7.5YR 2/0		mucky mineral soil
5-8"	B	7.5YR 4/2		Coarse SANDS
			7.5YR 5/2 } 10-15%/	
			7.5YR 6/2 } med/D	
			Occassional decayed wood	

HYDRIC SOIL INDICATOR(S) 6" of water in pits

REFERENCE:

NTCHS V-3

OPTIONAL SOIL DATA:

TAXONOMIC SUBGROUP:
SOIL DRAINAGE CLASS:
DEPTH TO ACTIVE WATER TABLE:
NTCHS HYDRIC SOIL CRITERION: VI. Depleted MAtrix within 10"

CONCLUSIONS

	YES	NO
Greater than 50% Hydrophytes?	☑	☐
Hydric Soils Criterion Met?	☑	☐
Wetland Hydrology Met?	☑	☐

IS THIS DATAPOINT WITHIN A WETLAND?

YES ☑ NO ☐

REMARKS:

PROJECT TITLE: Eastern Slope TRANSECT: MA PLOT: 1 V

WOODLOT ALTERNATIVES, INC.
ENVIRONMENTAL CONSULTANTS

Project Title: Eastern slope / Fryeburg, ME **Transect Number:** MA **Plot Number:** 2 V

Delineators: Mark Christopher + Georgia Hall **Date:** 10 November 2005

VEGETATION	Stratum and Species (dominants only)	Dominance Ratio	Percent Dominance	NWI Status
Pole:				
	Betula populifolia	30/32	94%	FAC
	Populus tremuloides	2		
Shrub	*Quercus ilicifolia	35/35	100%	UPL (Not listed)
Herb:				
	Kalmia angustifolia	30/74	41%	FAC
	Gaultheria procumbens	25/74	34%	FACU
	Q. ilicifolia	15/74	20%	UPL
	Vaccinium angustifolium	4		
* Flora of Maine describes habitat of Q. ilicifolia as Rocky or Sandy Soil				

Note 1: Use asterisk * to indicate plants with adaptations to wetland hydrology. Plants recorded with asterisks should be considered as "other hydrophytes" in the tally below.

Note 2: Species with NA or NI status are reported, but are calculated in the tally below.

OBL	FACW	FAC	OTHER HYDROPHYTES	FAC-	FACU	UPL
___	___	2	___	___	1	2

Hydrophytes Subtotal: 2 Non-hydrophytes Subtotal: 3

$\frac{100 \times \text{Subtotal Hydrophytes}}{\text{Subtotal Hydrophytes + Subtotal Non-Hydrophytes}}$ = 3/5 60% = Percent Hydrophytes

Describe Vegetation Disturbance:

HYDROLOGY

1. Hydrology is often the most difficult feature to observe.
2. Interpretation must consider the validity of the observation in light of the season, recent weather conditions, watershed alterations, etc.
3. Interpretation of hydrology may require repeated observations over more than one season.

- ☐ RECORDED DATA
  - Stream, lake, or tidal gage Identification: ______
  - Aerial photography Identification: ______
  - Other Identification: ______
- ☐ NO RECORDED DATA
- ☐ OBSERVATIONS:
  - Depth to Free Water: ______
  - Depth to Saturation (including capillary fringe): ______
  - Altered Hydrology (explain) ______

☐ Inundated ☐ Saturated in upper 12" ☐ Water Marks ☐ Drift Lines ☐ Sediment Deposits

☐ Drainage Patterns within Wetland ☐ OTHER (explain):

WOODLOT ALTERNATIVES, INC.
ENVIRONMENTAL CONSULTANTS

SOIL **Sketch Landscape Position**

Depth	Horizon	Matrix Color	Redoximorphic Features Color, Abundance, Size & Contrast	USDA Texture and nodules, concretions, masses, pore linings, restrictive layers, root distribution, soil water, etc.
0-4"	A	7.5yR 2/0		mucky mineral
4-14"	B_1	7.5yR 4/4		fine SAND
14-18"	B_2	10yR 5/6		fine SAND

HYDRIC SOIL INDICATOR(S)

REFERENCE:

NTCHS V-3 B horizon Not depleted

OPTIONAL SOIL DATA:

TAXONOMIC SUBGROUP:
SOIL DRAINAGE CLASS:
DEPTH TO ACTIVE WATER TABLE:
NTCHS HYDRIC SOIL CRITERION: NONE

CONCLUSIONS

	YES	NO
Greater than 50% Hydrophytes?	☐	☑
Hydric Soils Criterion Met?	☐	☑
Wetland Hydrology Met?	☐	☑

IS THIS DATAPOINT WITHIN A WETLAND?

YES	NO
☐	☑

REMARKS:
No drainage pattern observed

PROJECT TITLE: Eastern Slope / Fryeburg, ME

TRANSECT: MA

PLOT: 2 V

WOODLOT ALTERNATIVES, INC.
ENVIRONMENTAL CONSULTANTS

Project Title: Eastern Slope Airport, Fryeburg, Maine **Transect Number:** MB **Plot Number:** 1 ✓

Delineators: Mark Christopher + Georgia Hall **Date:** 10 November 2005

VEGETATION Stratum and Species (dominants only)	Dominance Ratio	Percent Dominance	NWI Status
Shrub Stratum:			
Quercus ilicifolia	1		
Betula populifolia	2/12	17%	FAC
Pinus strobus	2/12	17%	FACU
Pinus rigida	2/12	17%	FACU
Spirea alba v. latifolia	2/12	17%	FAC+
Lyonia Ligustrina	5/12	42%	FACW
Herb stratum:			
Chamaedaphne Calyculata	85/85	100%	OBL
Open water 5% of Plot			
Note: Chamaedaphne is a low growing wetland shrub			

Note 1: Use asterisk * to indicate plants with adaptations to wetland hydrology.
Plants recorded with asterisks should be considered as "other hydrophytes" in the tally below.
Note 2: Species with NA or NI status are reported, but are calculated in the tally below.

1 OBL 1 FACW 2 FAC ___ OTHER HYDROPHYTES ___ FAC- 2 FACU ___ UPL

Hydrophytes Subtotal: ___ Non-hydrophytes Subtotal: ___

100 x Subtotal Hydrophytes / (Subtotal Hydrophytes + Subtotal Non-Hydrophytes) = 4/6 67% Percent Hydrophytes

Describe Vegetation Disturbance:

HYDROLOGY
1. Hydrology is often the most difficult feature to observe.
2. Interpretation must consider the validity of the observation in light of the season, recent weather conditions, watershed alterations, etc.
3. Interpretation of hydrology may require repeated observations over more than one season.

☐ RECORDED DATA
Stream, lake, or tidal gage Identification: ___
Aerial photography Identification: ___
Other Identification: ___
☐ NO RECORDED DATA
☐ OBSERVATIONS:
Depth to Free Water: ___
Depth to Saturation (including capillary fringe): ___
Altered Hydrology (explain) ___

☑ Inundated ☐ Saturated in upper 12" ☐ Water Marks ☐ Drift Lines ☐ Sediment Deposits

☐ Drainage Patterns within Wetland ☐ OTHER (explain):

SOIL **Sketch Landscape Position**

Depth	Horizon	Matrix Color	Redoximorphic Features Color, Abundance, Size & Contrast	USDA Texture and nodules, concretions, masses, pore linings, restrictive layers, root distribution, soil water, etc.

HYDRIC SOIL INDICATOR(S)
I. Ponded Soils

REFERENCE:
NTCHS Version 3

OPTIONAL SOIL DATA:

TAXONOMIC SUBGROUP:
SOIL DRAINAGE CLASS:
DEPTH TO ACTIVE WATER TABLE:
NTCHS HYDRIC SOIL CRITERION: I.

CONCLUSIONS

	YES	NO
Greater than 50% Hydrophytes?	☑	☐
Hydric Soils Criterion Met?	☑	☐
Wetland Hydrology Met?	☑	☐

IS THIS DATAPOINT WITHIN A WETLAND?

YES	NO
☑	☐

REMARKS: Soil Type: SANDS
Too wet to hold on auger

PROJECT TITLE: Eastern Slope Airport / Fryeburg, ME

TRANSECT: MB

PLOT: 1 W

Project Title: Eastern Slope Airport / Fryeburg Maine **Transect Number:** MB **Plot Number:** 2 U

Delineators: Mark Christopher / Georgia Hall **Date:** 10 November 2005

VEGETATION	Stratum and Species (dominants only)	Dominance Ratio	Percent Dominance	NWI Status
Herb Stratum				
*Comptonia peregrina		30/90	33%	U (Not list.)
Schizachyrium (Andropogon) Scoparius		25/90	28%	FACU
Rubus hisidus		25/90	28%	FACW
Solidago puberula		5		
Solidago rugosa		5		
Note: *Flora of Maine describe habitat for Comptonia as dry, sandy or gravelly, open areas				

Note 1: Use asterisk * to indicate plants with adaptations to wetland hydrology. Plants recorded with asterisks should be considered as "other hydrophytes" in the tally below.

Note 2: Species with NA or NI status are reported, but are calculated in the tally below.

___ OBL 1 FACW ___ FAC ___ OTHER HYDROPHYTES
Hydrophytes Subtotal: ___

___ FAC- 2 FACU 1 UPL
Non-hydrophytes Subtotal: ___

$\frac{100 \times \text{Subtotal Hydrophytes}}{\text{Subtotal Hydrophytes + Subtotal Non-Hydrophytes}}$ = ~~2/3~~ 67% = Percent Hydrophytes

Describe Vegetation Disturbance:

HYDROLOGY

1. Hydrology is often the most difficult feature to observe.
2. Interpretation must consider the validity of the observation in light of the season, recent weather conditions, watershed alterations, etc.
3. Interpretation of hydrology may require repeated observations over more than one season.

☐ RECORDED DATA
Stream, lake, or tidal gage Identification: ___
Aerial photography Identification: ___
Other Identification: ___

☐ NO RECORDED DATA

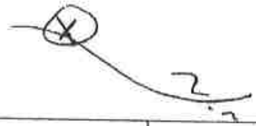
☐ OBSERVATIONS:
Depth to Free Water: ___
Depth to Saturation (including capillary fringe): ___
Altered Hydrology (explain) ___

☐ Inundated ☐ Saturated in upper 12" ☐ Water Marks ☐ Drift Lines ☐ Sediment Deposits

☐ Drainage Patterns within Wetland ☐ OTHER (explain):

WOODLOT ALTERNATIVES, INC.
ENVIRONMENTAL CONSULTANTS

SOIL **Sketch Landscape Position**



Depth	Horizon	Matrix Color	Redoximorphic Features Color, Abundance, Size & Contrast	USDA Texture and nodules, concretions, masses, pore linings, restrictive layers, root distribution, soil water, etc.
0-3"	A	7.5YR 3/2		Loamy Sand
3-12"	B_1	7.5YR 3/4	5YR 4/6 10% /med/D	Coarse + fine Sand +
12-14"	B_2	10YR 4/4	10 YR 2/2 (old organics)	Coarse + fine Sands

HYDRIC SOIL INDICATOR(S)

REFERENCE:

NTCHS Version 3

OPTIONAL SOIL DATA:

TAXONOMIC SUBGROUP:
SOIL DRAINAGE CLASS:
DEPTH TO ACTIVE WATER TABLE:
NTCHS HYDRIC SOIL CRITERION:

CONCLUSIONS

	YES	NO
Greater than 50% Hydrophytes?	☐	☑
Hydric Soils Criterion Met?	☐	☑
Wetland Hydrology Met?	☐	☑

IS THIS DATAPOINT WITHIN A WETLAND?

YES	NO
☐	☑

REMARKS: Disturbed Soils - Sample Taken at Base of fill

PROJECT TITLE: Eastern Slope / Fryeburg Airport

TRANSECT: MB

PLOT:

WOODLOT ALTERNATIVES, INC.
ENVIRONMENTAL CONSULTANTS

Appendix D
Wetland Functions and Values Assessment Forms

Wetland Function – Value Evaluation Form

Wetland Description: Small isolated forested wetland (PSS1F) also classified per MNAP as a graminoid-shrub marsh. The wetland is dominated by witherod (*Viburnum nudum*), meadowsweet (*Spiraea alba* var. *latifolia*), sheep laurel (*Kalmia angustifolia*), and pointed broom sedge (*Carex scoparia*) with scattered occurrences of gray birch (*Betula populifolia*), quaking aspen (*Populus tremuloides*), and bulrush (*Scirpus hattorianus*). The wetland appears to be semi-permanently to seasonally inundated. A review of aerial photography from the mid-1990's and early 2000's shows the area as flooded. The soils are mineral with a shallow mucky mineral surface. The wetland exists along the edge of the runway and possibly receives drainage from the runway and shoulder areas.	File number: 104215.02 Wetland identifier: Wetland A Latitude: Longitude: Preparer(s): Mark Christopher Date: November 2005

Function/Value	Capability Y	Capability N	Summary	Principal Yes/No
Groundwater Recharge/Discharge	X		Wetland is located over sandy soils, and adjacent uplands may discharge groundwater into the wetland as the primary source of hydrology. The prolonged flooding regime may enhance groundwater recharge functions by recharging water to the local aquifer.	Yes
Floodwater Alteration		X	Wetland is small and not associated with a watercourse. Associated development is well above potential flooding levels.	No
Fish and Shellfish Habitat		X	No streams or ponds associated with this wetland.	No
Sediment/Toxicant Retention	X		The wetland probably receives some surface water runoff from the runway, which could contain some sediments or toxicants.	No
Nutrient Removal		X	Wetland is small, isolated, and probably not a nutrient rich community. Outside sources of nutrients are likely unavailable.	No
Production Export	X		Wildlife food sources grow in wetland and evidence of wildlife use was observed. Herbaceous vegetation, leaves, and other debris likely decompose and contribute to a local food chain.	No
Sediment/Shoreline Stabilization		X	Wetland is not associated with a watercourse.	No
Wildlife Habitat	X		This wetland may provide some vernal pool type habitat. Other wildlife use observed included white-tailed deer (*Odocoileus virginianus*) and snowshoe hare (*Lepus americanus*). This wetland can provide good habitat for nesting and migrating songbirds.	No
Recreation		X	Recreation is limited due to its proximity to the runway. Public access is also restricted.	No
Education/Scientific Value		X	The restricted access and relatively remote location limit any of these values.	No
Uniqueness/Heritage		X	The wetland is not a rare community.	No
Visual Quality/Aesthetics		X	The wetland is not very visible from any public viewing areas.	No
ES Endangered Species Habitat		X	No endangered or threatened species were observed in this wetland.	No
Other				

Notes:

* Attach list of considerations.

Wetland Function – Value Evaluation Form

Wetland Description: Medium sized isolated forested (PSS3F) and open water (POWK-b) wetlands also classified per MNAP as a graminoid-shrub marsh.	File number: 104215.02	
The lower wetland closest to the runway is dominated by leatherleaf (*Chamaedaphne calyculata*) with a small open water area. The wetland receives	Wetland identifier: Wetland B	
drainage from the runway and adjacent grassy shoulder. The upper portion of this system was impounded by a small tote road and beaver (*Castor*	Latitude:	Longitude:
canadensis) activity. The wetland as a narrow fringe of red maple (*Acer rubrum*), gray birch (*Betula populifolia*), but this is a small component of the	Preparer(s): Mark Christopher	
wetland.	Date: November 2005	

Function/Value	Capability Y	Capability N	Summary	Principal Yes/No
Groundwater Recharge/Discharge	X		Wetland is located over sandy soils and likely receives and discharges some groundwater. Wetland may function to recharge water to the local aquifer from adjacent uplands.	Yes
Floodwater Alteration		X	The wetland is not associated with any watercourse and all adjacent development is well above possible flood levels.	No
Fish and Shellfish Habitat		X	No streams are associated with either wetland community. The potential for fish and shellfish is low.	No
Sediment/Toxicant Retention	X		The lower portion receives some surface water runoff from the runway which could be a source of sediments/toxicants.	No
Nutrient Removal		X	Neither of the wetland communities are nutrient rich communities and outside sources of nutrients are limited. The wetland system does not have an inlet or outlet to receive an aquatic nutrient source and subsequently discharge cleaner water.	No
Production Export	X		Wildlife food sources grow in wetland and evidence of wildlife use was observed. Beavers have cut a large number of trees reducing the woody vegetation, but encouraging some herbaceous, sapling, and shrub vegetation. Herbaceous and other vegetation and debris decomposes contributing to a local food chain. This wetland is not associated with a watercourse, which limits its food chain contribution.	No
Sediment/Shoreline Stabilization		X	Wetland is not associated with a watercourse.	No
Wildlife Habitat	X		This wetland may provide some vernal pool type habitat. Other wildlife use observed included, beaver, white-tailed deer and snowshoe hare. This wetland can provide good habitat for nesting and migrating songbirds and waterfowl such as wood ducks (*Aix sponsa*).	Yes
Recreation		X	Recreation is limited due to its proximity to the runway. Public access is also restricted.	No
Education/Scientific Value		X	The restricted access and relatively remote location restrict any of these values.	No
Uniqueness/Heritage		X	The wetland not a rare community.	No
Visual Quality/Aesthetics		X	The wetland is not very visible from any public viewing areas.	No
ES Endangered Species Habitat		X	No endangered or threatened species were observed in this wetland.	No
Other				

Notes:

* Attach list of considerations.

Wetland Function – Value Evaluation Form

Wetland Description: Forested wetland (PFO4B) dominated by balsam fir and scattered occurrences of eastern hemlock and pine. Soils are saturated from seepage from the adjacent sandy upland ridge. The wetland connects to a shrub and emergent wetland system and stream. Overall this wetland complex is diverse and of high functions and values. This seepage wetland being at the higher elevation probably does not provide habitat for wetland dependent wildlife.	File number: 104215.02 Wetland identifier: Wetland C Latitude: Longitude: Preparer(s): Mark Christopher Date: November 2005

Function/Value	Capability Y	Capability N	Summary	Principal Yes/No
Groundwater Recharge/Discharge	X		Wetland is located adjacent to an upland sandy ridge and water seeps down where it discharges through the wetland.	Yes
Floodwater Alteration		X	Wetland does not appear to inundate and does not receive floodwaters from the stream system. Nearby development is not threatened by flooding.	No
Fish and Shellfish Habitat		X	No streams or ponds as part of this wetland.	No
Sediment/Toxicant Retention		X	The wetland does not receive any surface water runoff from the uplands to receive water that maybe laden with sediments or toxicants.	No
Nutrient Removal		X	The wetland does not receive nutrient laden water from adjacent or upstream areas.	No
Production Export	X		Wildlife food sources grow in wetland and evidence of wildlife use was observed. Herbaceous vegetation density, however, is sparse.	No
Sediment/Shoreline Stabilization		X	Wetland is not part of a watercourse.	No
Wildlife Habitat	X		The wetland is part of a larger and diverse wetland system and as such provides good wildlife habitat. Wildlife food sources are located in the wetland.	No
Recreation		X	Recreation is limited due to its proximity to the runway. Public access is also restricted.	No
Education/Scientific Value		X	The restricted access and relatively remote location restrict any of these values.	No
Uniqueness/Heritage		X	The wetland not a rare community.	No
Visual Quality/Aesthetics		X	The wetland is not very visible from any public viewing areas.	No
ES Endangered Species Habitat		X	No endangered or threatened species were observed in this wetland.	No
Other				

Notes:

* Attach list of considerations.

Appendix E
Pitch-Pine Scrub Oak Community Description

Pitch Pine - Scrub Oak Barren

WCUB | STATE RARITY RANK: S1 | PITCH PINE - SCRUB OAK BARREN

Community Description

This woodland type ranges from very open to nearly closed canopy (25%-75% closure) in which pitch pine is dominant (>50% RD). Red maple is frequent but rarely abundant in the canopy. In openings among the trees, a dense shrub/sapling layer of scrub oak is typical. Gray birch may be a prominent feature of the shrub layer, and shrubs are locally dense. A low layer of heath shrubs dominated by lowbush or velvet-leaf blueberry is usually present. Bracken fern and woodland sedge are characteristic herbs. Bryoids are virtually absent. Pitch pine-scrub oak barrens vegetation is typically very patchy, with some areas clearly pitch pine dominated and others areas extensive thickets of scrub oak. Non-forested openings with blueberry and lichens may occur within the barrens.

Sites occur on nutrient-poor soils of glacial outwash plains or moraines south of 44 degrees N latitude. Topography is flat to undulating. The xeric to dry-mesic, sandy soils are acidic (pH usually <5.0) and have little organic matter. Fire is an important factor in maintaining this community, and most sites have a history of periodic fires.

Diagnostics

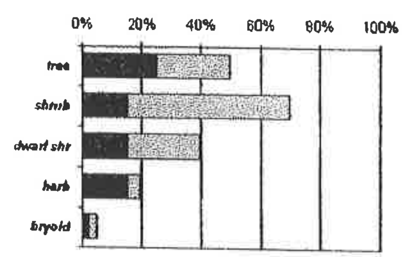
These are pitch pine-dominated, partially forested areas which develop on sands or glacial outwash deposits, not on stabilized coastal dunes. Scrub oak is common and locally dominant in the shrub layer.

Similar Types

Pitch Pine Woodlands can be floristically similar but occur on bedrock, not on deep sandy soils. Pitch Pine Dune Woodlands occur on stabilized sand dunes along the coast. They also lack a well-developed heath shrub layer. Pitch Pine - Heath Barrens share many species but lack the scrub oak layer (scrub oak may be present but only at low cover). Pitch Pine Bogs are wetlands, with at least a shallow peat substrate.

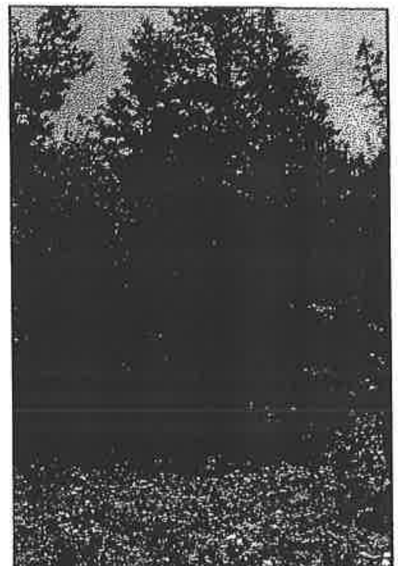
CHARACTERISTIC SPECIES	
CANOPY:	
Pitch pine	(F,C)
Gray birch	(F)
Red maple	(C)
SAPLING/SHRUB:	
Scrub oak	(F,C)
Pitch pine	(F)
Sweetfern	(F)
Gray birch	(F)
Shadbush	(F)
Wild raisin	(F)
DWARF SHRUB:	
Lowbush blueberry	(F,C)
Sheep laurel	(F)
Velvet-leaf blueberry	(F)
HERB:	
Bracken fern	(F,C)
Wintergreen	(F,C)
Woodland sedge	(F)
Mayflower	(F)
Canada mayflower	(F)
Sharp-pointed ricegrass	(F)
Starflower	(F)
BRYOID:	
Large hair-cap moss	(F)

VEGETATION STRUCTURE
(TOTAL COVER BY STRATUM)



61 PITCH PINE BOG
WCS4, p 158

62 PITCH PINE DUNE WOODLAND
WCU10, p 120



63 PITCH PINE - HEATH BARREN
WCU9, p 118

64 PITCH PINE - SCRUB OAK BARREN
WCU8, p 116

Three-way Sedge - Goldenrod Outwash Plain Pondshore

HFF1 | STATE RARITY RANK: S1 | OUTWASH PLAIN PONDSHORE

Community Description

This community consists of concentric zones of different herbs around a central pond. A band of shrubs (highbush blueberry, maleberry, buttonbush, leatherleaf) is typical at the upland/pondshore edge. Moving pondward, the next zone is dominated by narrow-leaved goldenrod and three-way sedge, with patches of flat-sedge and brown-fruited rush; in a narrow band at the top of this zone, golden pert and meadow beauty are characteristic and may form dense patches. The next zone, exposed less frequently and for a shorter time, is dominated by pipewort and spikerush species. There is no well-developed bryoid layer.

This community forms a band around the perimeter of shallow, sandy-bottomed ponds in outwash plains. It occurs on shores that are inundated for part of the growing season and exposed for part of the growing season, although actual exposure varies from year to year. The substrate is sandy, occasionally mucky, and usually saturated to the surface or nearly so.

Diagnostics

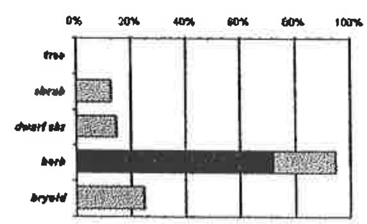
Three-way sedge and usually narrow-leaved goldenrod are dominant in a sandy pondshore setting, with evidence of water level changes through the season. Golden pert and meadow beauty are indicator species.

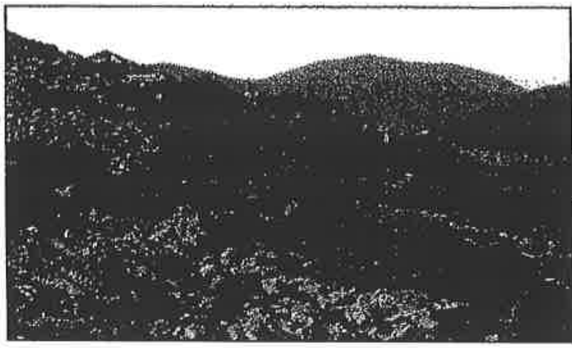
Similar Types

Mixed Graminoid - Shrub Marshes can also occur on temporarily flooded mineral soils and can share some dominants such as three-way sedge, but lack the concentric zonation of outwash plain pondshores and typically intermingle shrubs and herbs rather than segregating them into zones. Lakeshore Beaches (Provisional) may have some similar species but lack zonation; however, that type is as yet not well defined.

CHARACTERISTIC SPECIES	
HERB:	
Pipewort	(F,C)
Narrow-leaved goldenrod	(F,C)
Golden pert	(F,C)
Brown-fruited rush	(F,C)
Toothed flat-sedge	(F,C)
Canada rush	(F)
Fly-away grass	(F)
Yellow loosestrife	(F)
Three-way sedge	(F)
Bur-reed	(C)
Bluejoint	(C)
Robbin's spikerush	(C)
BRYOID:	
Sphagnum mosses	(F)

VEGETATION STRUCTURE
(TOTAL COVER BY STRATUM)

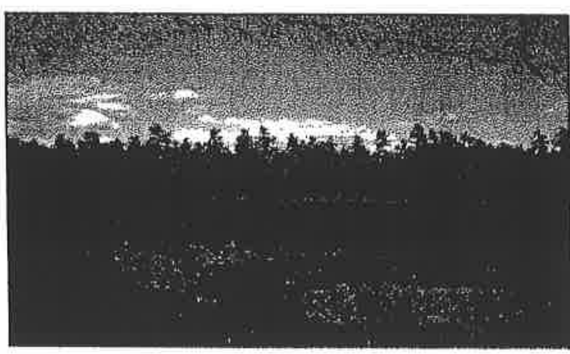




87 SUBALPINE HEATH KRUMMHOLZ
DEU1, p 176

88 SWEETGALE MIXED SHRUB FEN
SDS1, p 204

89 THREE-TOOTHED CINQUEFOIL - BLUEBERRY LOW SUMMIT BALD
HFU2, p 188



90 THREE-WAY SEDGE - GOLDENROD OUTWASH PLAIN PONDSHORE
HFF1, p 222

Appendix F
NRPA Vernal Pool Definitions

Natural Resources Protection Act
Vernal Pool Definitions

Regulatory reference: NRPA, 38 M.R.S.A. § 480-A and the Site Location of Development Law, 38 M.R.S.A. § 375 (15). Effective September 1, 2007.

A **vernal pool**, also referred to as a seasonal forest pool, is a natural, temporary to semi-permanent body of water occurring in a shallow depression that typically fills during the spring or fall and may dry during the summer. Vernal pools have no permanent inlet and no viable populations of predatory fish. A vernal pool may provide the primary breeding habitat for wood frogs (*Rana sylvatica*), spotted salamanders (*Ambystoma maculatum*), blue-spotted salamanders (*Ambystoma laterale*), and fairy shrimp (*Eubranchipus* sp.), as well as valuable habitat for other plants and wildlife including several rare, threatened, and endangered species. A vernal pool intentionally created for the purposes of compensatory mitigation is included in this definition.

Note: The term vernal (vernal = spring) pool has typically been used to discuss the types of pools described in Section 9. However, because some pools are wet in both spring and fall, and others are never dry, they have also been referred to as "seasonal forest pools." Vernal pool is still a common term and will continue to be used in this section.

Significant vernal pools are significant wildlife habitats that consist of a vernal pool depression and envelope, and a portion of the critical terrestrial habitat measuring 250 feet around a significant vernal pool from the spring high water mark. An activity that takes place in, on, over, or adjacent to a significant vernal pool habitat must meet the standards of this chapter.

1. Rarity – A pool in which a qualified individual has documented use in any given year by state-listed endangered or threatened species that commonly require a vernal pool to complete a critical portion of their life history is a significant vernal pool.

2. Abundance – The following species abundance levels, documented in any given year, are indicators of a significant vernal pool.

Species	Abundance Criteria
Blue-spotted salamanders	Presence of 10 or more egg masses
Fairy shrimp	Presence in any life stage
Spotted salamanders	Presence of 20 or more egg masses
Wood frogs	Presence of 40 or more egg masses

Appendix G
Agency Response Letters

Maine Department of Inland
Fisheries and Wildlife
358 Shaker Road
Gray, Maine 04039

Telephone: 207-657-2345 ext. 113
Fax: 207-657-2980
Email: brian.lewis @state.me.us

John Elias Baldacci, Governor

Roland Martin, Commissioner

December 19, 2005

Amy Bai
30 Park Drive
Topsham, Maine 04086

RE: Land around Eastern Slopes Regional Airport, Fryburg

Dear Amy Bai,

I have reviewed your request for fishery resource information, and there are no known threatened/endangered fish species or habitat in the vicinity of the proposed project. There are also no known fisheries resources within the proposed project area. Our regional riparian buffer policy is outlined below.

Stream systems are vulnerable to environmental impacts associated with increased development and encroachment. If present, this project should be sensitive to these resource issues by including provisions for riparian buffers and minimizing any other potential stream impacts. Our regional buffer policy requests 100 foot undisturbed buffers along both sides of any stream or stream-associated wetlands. Buffers should be measured from the upland wetland edge of stream-associated wetlands, and if the natural vegetation has been previously altered then restoration may be warranted. This buffer requirement improves erosion/sedimentation problems; reduces thermal impacts; maintains water quality; supplies leaf litter and woody debris for the system; and provides valuable wildlife habitat. Protection of these important riparian functions insures that the overall health of the stream habitat is maintained.

Stream crossings, if applicable, must include provisions for adequate fish passage, and any in-stream work needs to be done between the first of July and the first of October. Project design should minimize the number of stream crossings. If you have any additional questions or concerns then feel free to contact us.

Sincerely,

Brian Lewis
Fishery Specialist
MDIFW

John E. Baldacci
Governor

Roland D. Martin
Commissioner

DEPARTMENT OF INLAND FISHERIES AND WILDLIFE

Wildlife Division – Region A
358 Shaker Rd.
Gray, ME 04039
Phone: (207) – 657-2345 x 109
Fax: (207) – 657-2980
Scott.Lindsay@maine.gov

January 12, 2006

Amy Bai
Woodlot Alternatives
30 Park Drive
Topsham, ME 04086

Dear Amy,

You contacted this office requesting information on any known wildlife habitats occurring in the vicinity of the Eastern Slopes Regional Airport in the Town of Fryeburg.

Review of the habitat data indicates there are several species of concern associated with a scrub oak – pitch pine barren west of the airport. Of the several species of concern are two species listed as Threatened on the Maine Endangered Species Act; the Twilight Moth and the Pine Barrens Zanclognatha. I have included a map showing the occurrences of these species. Once there is more information available on the nature of the development proposed at this site, we can address management needs of these species at this site.

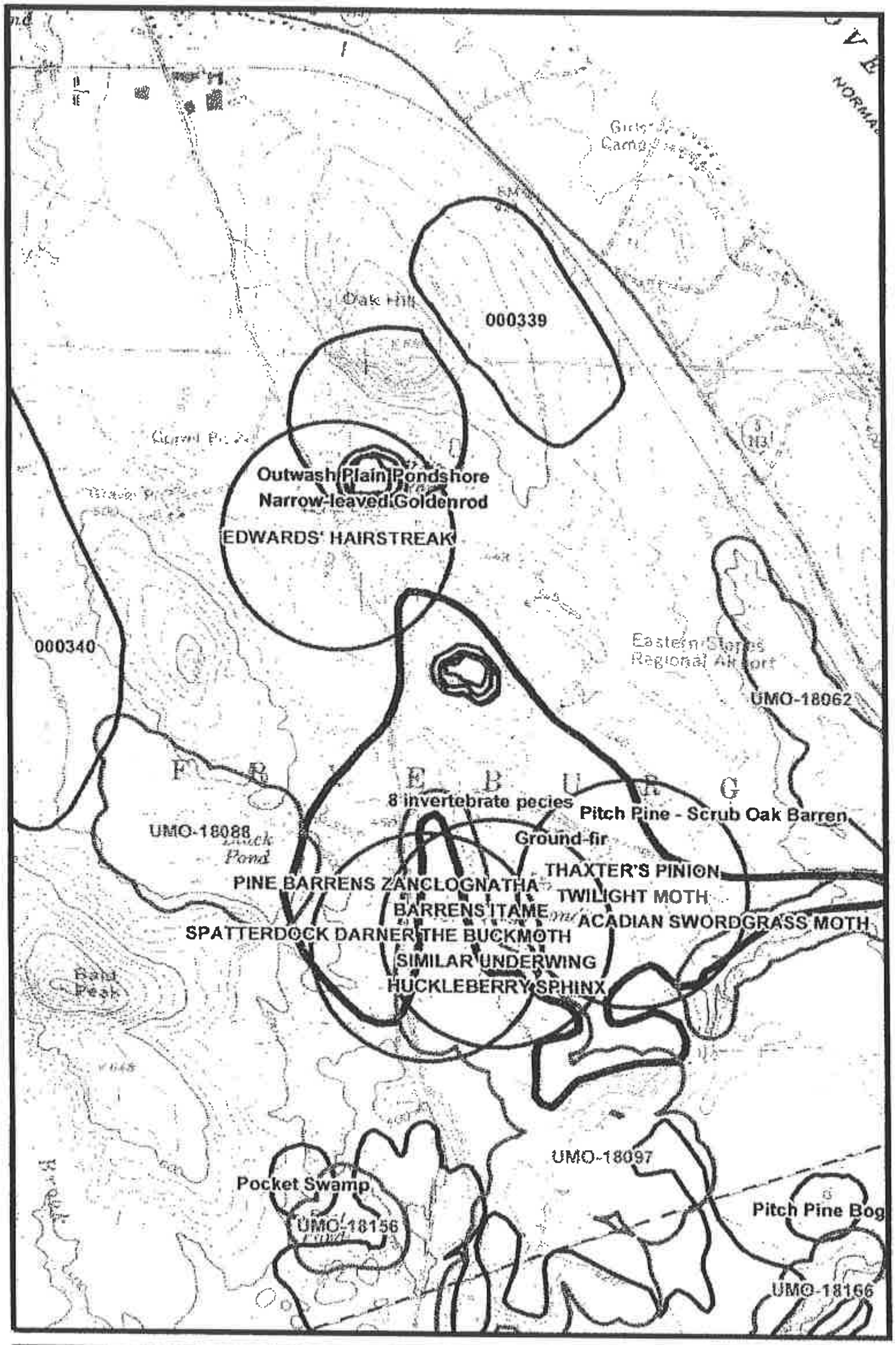
There are no other wildlife habitat issues at this site.

Sincerely

Scott Lindsay

Scott Lindsay
Asst. Regional Wildlife Biologist

Search for Wildlife Observations & Habitat



- Bald Eagle Nest Site
- Piping Plover / Least Tern Nesting, Feeding, & Brood-rearing Area
- Roseate Tern Nesting Area
- Deer Winter Area
- Inland Waterfowl / Wading Bird Habitat
- Coastal Waterfowl / Wading Bird Habitat
- Seabird Nesting Island
- Shorebird Area
- Biological Conservation Database Rare Species or Habitat Observation
- Rare Plant
- Rare / Exemplary Natural Community
- Township Boundary
- County

Eastern Slopes Regional, Fryeburg

0 0.2 0.4 0.6 0.8 Miles

1:23,271

UTM Projection, Zone 19N, NAD83

RR1, 358 Shaker Road
Gray, ME 04039
Voice: (207) 657-2345
Fax: (207) 657-2980
January 12, 2006

MAINE HISTORIC PRESERVATION COMMISSION
55 CAPITOL STREET
65 STATE HOUSE STATION
AUGUSTA, MAINE
04333

JOHN ELIAS BALDACCI
GOVERNOR

December 19, 2005

EARLE G. SHETTLEWORTH, JR.
DIRECTOR

Amy Bai, Administrative Assistant
Woodlot Alternatives, Inc.
30 Park Drive
Topsham, ME 04086

Project: MHPC #3087-05 - proposed development; Eastern Slopes Regional Airport
Town: Fryeburg, ME

Dear Ms. Bai:

In response to your recent request, I have reviewed the information received November 28, 2005 to initiate consultation on the above referenced project pursuant to Section 106 of the National Historic Preservation Act of 1966, as amended.

Based on the location and scope of work, I have concluded that the area submitted for review is generally sensitive for prehistoric archaeological sites. Archaeological survey at the northwest end of the main runway prior to an expansion project approximately 20 years identified prehistoric site 11.4, which was subsequently removed after an archaeological investigation. Archaeological testing of portions of the western end of the runway is complete. However, the rest of the airport area is sensitive for the presence of prehistoric archaeological sites.

Additionally, none of the buildings in the review area have been assessed for National Register eligibility. In order to complete such an assessment, the Commission will need photos and dates of construction of any buildings that are within the review area. All photos should be keyed to a 7.5' U.S.G.S. topographic quad map and submitted on the enclosed *Maine Historic Preservation Commission Historic Building/Structure Survey Form* with lines 3-5 filled out. If no buildings exist, please indicate this in writing.

Once this information is received, we will forward a response regarding the results of our evaluation. Please contact Mike Johnson of my staff if we can be of further assistance in this matter.

Sincerely,

Earle G. Shettleworth, Jr.
State Historic Preservation Officer

enc:

SURVEY MAP NO. _____

SURVEY MAP NAME ____________

MHPC USE ONLY

INVENTORY NO.

MAINE HISTORIC PRESERVATION COMMISSION
Historic Building/Structure Survey Form

1. PROPERTY NAME (HISTORIC): ____________
2. PROPERTY NAME (OTHER): ____________
3. STREET ADDRESS: ____________
4. TOWN: ____________ 5. COUNTY: ____________
6. DATE RECORDED: ____________ 7. SURVEYOR: ____________
8. OWNER NAME: ____________ ADDRESS: ____________
9. PRIMARY USE (PRESENT):

___ SINGLE FAMILY
___ MULTI-FAMILY
___ INDUSTRY
___ TRANSPORTATION
___ RECREATION/CULTURE
OTHER ____________
___ AGRICULTURE
___ GOVERNMENTAL
___ RELIGIOUS
___ DEFENSE
___ UNKNOWN
___ COMMERCIAL/TRADE
___ EDUCATION
___ HOTEL
___ SUMMER COTTAGE/CAMP
___ FUNERARY
___ HEALTH CARE
___ LANDSCAPE
___ SOCIAL

10. CONDITION: ___ GOOD ___ FAIR ___ POOR ___ DESTROYED, DATE __/__/__

ARCHITECTURAL DATA

11. PRIMARY STYLISTIC CATEGORY:

___ COLONIAL
___ FEDERAL
___ GREEK REVIVAL
___ GOTHIC REVIVAL
___ ITALIANATE
___ SECOND EMPIRE
___ STICK STYLE
___ QUEEN ANNE
___ SHINGLE STYLE
___ R. ROMANESQUE
___ ROMANESQUE
___ HIGH VIC. GOTHIC
___ NEO-CLASSICAL REV.
___ RENAISSANCE REV.
___ 19*TH*/20*TH* C. REVIVAL
___ ARTS & CRAFTS
___ BUNGALOW
OTHER ____________
___ FOUR SQUARE
___ ART DECO
___ INTERNATIONAL
___ RANCH
___ VERNACULAR

12. OTHER STYLISTIC CATEGORY:

___ COLONIAL
___ FEDERAL
___ GREEK REVIVAL
___ GOTHIC REVIVAL
___ ITALIANATE
___ SECOND EMPIRE
___ STICK STYLE
___ QUEEN ANNE
___ SHINGLE STYLE
___ R. ROMANESQUE
___ ROMANESQUE
___ HIGH VIC. GOTHIC
___ NEO-CLASSICAL REV.
___ RENAISSANCE REV.
___ 19*TH*/20*TH* C. REVIVAL
___ ARTS & CRAFTS
___ BUNGALOW
OTHER ____________
___ FOUR SQUARE
___ ART DECO
___ INTERNATIONAL
___ RANCH
___ VERNACULAR

13. HEIGHT:

___ 1 STORY
___ 5 STORY
___ 1 1/2 STORY
___ OVER 5 (___)
___ 2 STORY
___ 2 1/2 STORY
___ 3 STORY
___ 4 STORY

14. PRIMARY FACADE WIDTH (MAIN BLOCK; USE GROUND FLOOR):

___ 1 BAY ___ 2 BAY ___ 3 BAY ___ 4 BAY ___ 5 BAY ___ MORE THAN 5 (___)

15. APPENDAGES:

___ SIDE ELL
___ DORMERS
___ REAR ELL
___ PORCH
___ FRONT
___ TOWER
___ ADDED STORIES
___ CUPOLA
___ SHED
___ BAY WINDOW

PHOTOGRAPH:

16. PORCH:
___ ATTACHED ___ ENGAGED ___ ONE STORY ___ MORE THAN ONE STORY
___ FULL WIDTH ___ WRAPAROUND ___ SLEEPING PORCH ___ SECONDARY PORCH

17. PLAN:
___ HALL AND PARLOR ___ 1/2 CAPE ___ CENTRAL HALL ___ SIDE HALL
___ BACK HALL ___ IRREGULAR OTHER ______

18. PRIMARY STRUCTURAL SYSTEM:
___ TIMBER FRAME ___ BRACED FRAME ___ BRICK ___ STONE ___ BALLOON FRAME
___ CONCRETE ___ STEEL ___ LOG ___ PLANK WALL ___ PLATFORM FRAME
___ FRAME CONSTRUCTION - TYPE UNKNOWN OTHER ______

19. CHIMNEY PLACEMENT:
___ I INTERIOR ___ INTERIOR FRONT/REAR ___ CENTER ___ INTERIOR END ___ EXTERIOR
OTHER ______

20. ROOF CONFIGURATION:
___ GABLE SIDE ___ GABLE FRONT ___ HIP ___ MANSARD ___ FLAT
___ GAMBREL ___ PARAPET GABLE ___ SHED ___ CROSS ___ GABLE
___ COMPOUND OTHER ______

21. ROOF MATERIAL: WOOD ___ METAL ___ TILE ___ SLATE ___ ASPHALT ___ ASBESTOS ___

22. EXTERIOR WALL MATERIALS:
___ CLAPBOARD ___ BRICK ___ FLUSH SHEATHING ___ WOOD SHINGLE ___ STONE
___ LOG ___ PRESSED METAL ___ CONCRETE ___ STUCCO ___ ASPHALT
___ GRANITE ___ ASBESTOS ___ TERRA COTTA ___ BOARD AND BATTEN ___ ALUMINUM/VINYL
OTHER ______

23. FOUNDATION MATERIAL:
___ FIELDSTONE ___ BRICK ___ WOOD ___ CONCRETE ___ GRANITE ___ ORNAMENTAL CONC. BLOCK
OTHER ______

24. OUTBUILDINGS/FEATURES:
___ CARRIAGE HOUSE ___ FENCE OR WALL ___ CEMETERY ___ BARN (CONNECTED)
___ BARN (DETACHED) ___ FORMAL GARDEN ___ LANDSCAPE/PLANT MAT. ___ ARCHAEOLOGICAL SITE
___ GARAGE OTHER ______

HISTORICAL DATA

25. DOCUMENTED DATE OF CONSTRUCTION: ______ 26. ESTIMATED DATE OF CONSTRUCTION: ______

27. DATE MAJOR ADDITIONS/ALTERATIONS: ______

28. ARCHITECT: ______ 29. CONTRACTOR: ______

30. ORIGINAL OWNER: ______

31. SUBSEQUENT SIGNIFICANT OWNER: ______ DATES: ______

32. CULTURAL/ETHNIC AFFILIATION:
___ ENGLISH ___ FRENCH ACADIAN ___ NATIVE AMERICAN ___ SCOTTISH ___ FRENCH CANADIAN
___ EAST EUROPEAN ___ IRISH OTHER ______

33. HISTORIC CONTEXT(S):
___ COMMERCE ___ INDUSTRY ___ TRANSPORTATION ___ AGRICULTURE ___ MILITARY
___ RELIGION ___ CIVIC AFFAIRS ___ RECREATION ___ HABITATION ___ EDUCATION
___ ART, LIT, SCIENCE ___ SOCIAL

34. COMMENTS/SOURCES: ______

35. HISTORICAL DRAWINGS EXIST: ___ YES ___ NO LOCATION: ______

ENVIRONMENTAL DATA

36. SITE INTEGRITY: ___ ORIGINAL ___ MOVED DATE MOVED ______
37. SETTING: ___ RURAL/UNDISTURBED ___ RURAL/BUILT UP ___ SMALL TOWN ___ URBAN ___ SUBURBAN
38. QUADRANGLE MAP USED: ______ QUADRANGLE #: ______
39. UTM NORTHING: ______ 40. UTM EASTING: ______
41. FACADE DIRECTION (CIRCLE ONE): N S E W NE NW SE SW

MHPC USE ONLY

DATE ENTERED IN INVENTORY: ______ PHOTO FILE #: ______
NR STATUS: L ___ HD ___ E ___ NE ___ ND ___ REVIEWER ______
DATA SOURCE: ___ HPF ___ CLG ___ R&C ___ STAFF ___ STATE SURVEY OTHER ______ LEVEL OF SURVEY: __R __I
ASSOCIATED INVENTORY NUMBERS: ______

STATE OF MAINE
DEPARTMENT OF CONSERVATION
157 HOSPITAL STREET
93 STATE HOUSE STATION
AUGUSTA, MAINE 04333-0093

JOHN ELIAS BALDACCI
GOVERNOR

PATRICK K. MCGOWAN
COMMISSIONER

December 22, 2005

Amy Bai
Administrative Assistant
Woodlot Alternatives, Inc.
30 Park Drive
Topsham, ME 04086

Re: Rare and exemplary botanical features, Eastern Slopes Regional Airport, Fryeburg.

Dear Ms. Bai:

I have searched the Natural Areas Program's digital, manual and map files in response to your request of November 22, 2005 for information on the presence of rare or unique botanical features documented from the vicinity of the project site in the Town of Fryeburg, Maine. Rare and unique botanical features include the habitat of rare, threatened or endangered plant species and unique or exemplary natural communities. Our review involves examining maps, manual and computerized records, other sources of information such as scientific articles or published references, and the personal knowledge of staff or cooperating experts.

Our official response covers only botanical features. For authoritative information and official response for zoological features you must make a similar request to Steve Timpano, Environmental Coordinator, Maine Department of Inland Fisheries and Wildlife, 284 State Street, Augusta, Maine 04333.

According to our information, the Eastern Slopes Regional Airport is within the Upper Saco River Focus Area. The area surrounding the airport includes a suite of significant natural features (see table below and enclosed maps, natural community and plant fact sheets and focus area fact sheet).

The table below provides information on the significant natural features in terms of global rank, state rank and element occurrence rank (see attached explanation of ranks). The element occurrence rank is a system used to rank the overall quality (i.e. condition, landscape context and size) of a natural community or rare plant occurrence. A unique identifying number is included with the table because there are multiple communities that are similar in type but located in different areas around the airport. This unique identifier is included on the attached maps so each community is clearly distinguished.

MAINE NATURAL AREAS PROGRAM
MOLLY DOCHERTY, DIRECTOR

PRINTED ON RECYCLED PAPER

PHONE: (207) 287-8044
FAX: (207) 287-8040
TTY: (207) 287-2213

Identifying number (see map)	Common Name	Global rank	State rank	Element Occurrence rank
1	Pitch Pine – Scrub Oak Barren	G2	S1	A- Excellent
2	Three-way Sedge-Goldenrod Outwash Plain Pondshore	G2G3	S1	AB- Excellent or Good
3	Narrow-leaved Goldenrod	G5T5	S2	Not rated
4	Pitch Pine - Scrub Oak Barren	G2	S1	B- Good
5	Three-way Sedge-Goldenrod Outwash Plain Pondshore	G2G3	S1	B- Good
6	Narrow-leaved Goldenrod	G5T5	S2	AB- Excellent or Good

When any development plans are drawn up, the Maine Natural Areas Program would like the opportunity to comment on them. If you would like more information on this natural community, or would like to schedule a field visit to this area, please contact MNAP ecologist Don Cameron at 287-8041.

If someone is hired to conduct a field survey of the project area, please refer to the enclosed supplemental information regarding rare and exemplary botanical features documented to occur in the vicinity of the project site. The list may include information on features known to occur historically in the area as well as recently field-verified information. While historic records have not been documented in several years, they may persist in the area if suitable habitat exists. The enclosed list identifies features with potential to occur in the area, and it should be considered if you choose to conduct field surveys.

This finding is available and appropriate for preparation and review of environmental assessments, but it is not a substitute for on-site surveys. Comprehensive field surveys do not exist for all areas in Maine, and in the absence of a specific field investigation, the Maine Natural Areas Program cannot provide a definitive statement on the presence or absence of unusual natural features at this site.

The Natural Areas Program is continuously working to achieve a more comprehensive database of exemplary natural features in Maine. We would appreciate the contribution of any information obtained should you decide to do field work. The Natural Areas Program welcomes coordination with individuals or organizations proposing environmental alteration, or conducting environmental assessments. If, however, data provided by the Natural Areas Program are to be published in any form, the Program should be informed at the outset and credited as the source.

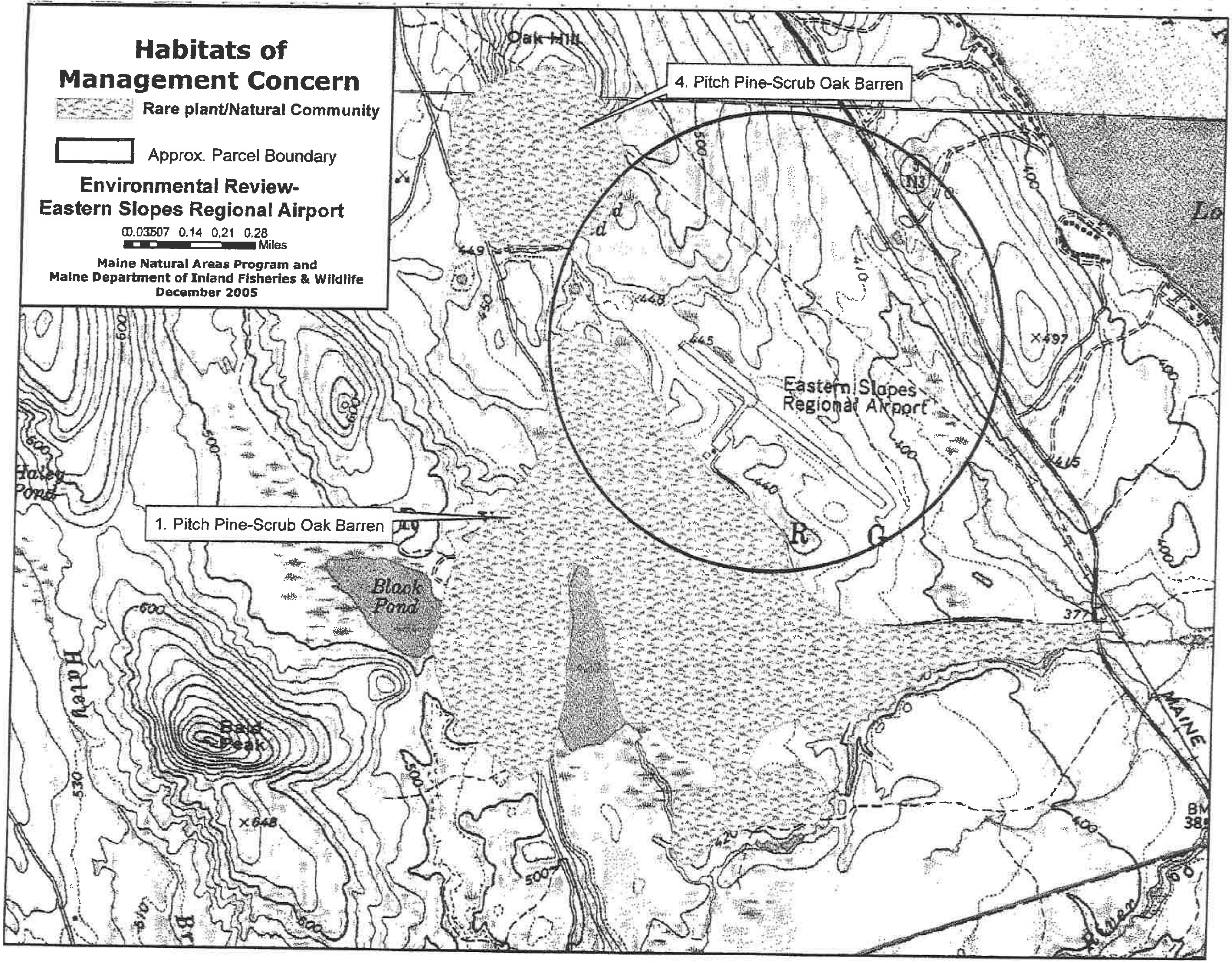
The Natural Areas Program has instituted a fee structure of $75.00 an hour to recover the actual cost of processing your request for information. You will receive an invoice for $75.00 for our services.

Thank you for using the Natural Areas Program in the environmental review process. Please do not hesitate to contact me if you have further questions about the Natural Areas Program or about rare or unique botanical features on this site.

Sincerely,

Raquel D. Ross
Information Manager
93 State House Station
Augusta, ME 04333-0093
207-287-8046
raquel.ross@maine.gov

Enclosures


Habitats of Management Concern
Rare plant/Natural Community
Approx. Parcel Boundary
Environmental Review-
Eastern Slopes Regional Airport
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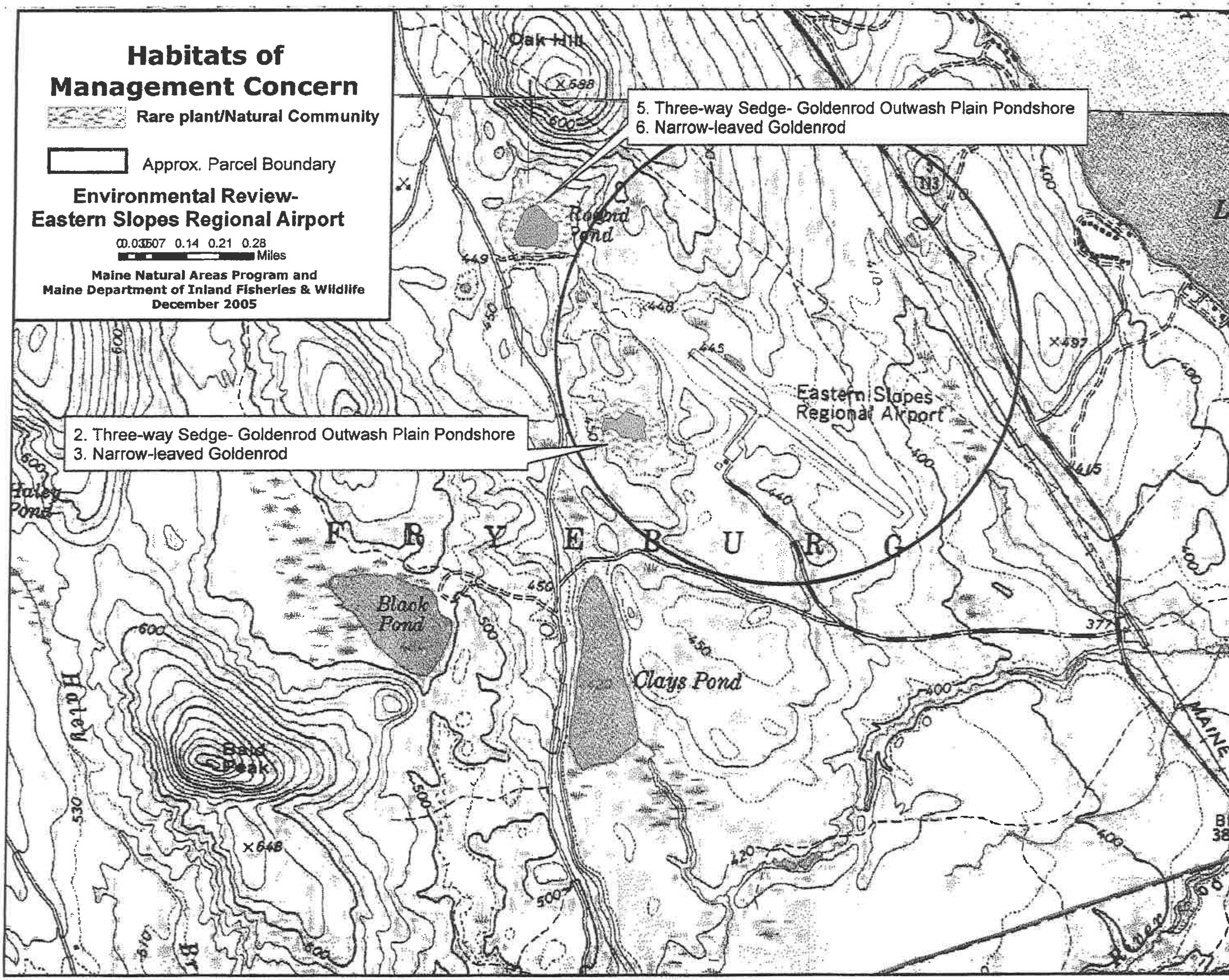
Miles
Maine Natural Areas Program and
Maine Department of Inland Fisheries & Wildlife
December 2005
Oak Hill
4. Pitch Pine-Scrub Oak Barren
Eastern Slopes
Regional Airport
1. Pitch Pine-Scrub Oak Barren
Black Pond
Bald Peak
Haley Pond
MAINE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December 2005
5. Three-way Sedge- Goldenrod Outwash Plain Pondshore
6. Narrow-leaved Goldenrod
2. Three-way Sedge- Goldenrod Outwash Plain Pondshore
3. Narrow-leaved Goldenrod
Oak Hill
Round Pond
Eastern Slopes Regional Airport
F R Y E B U R G
Black Pond
Clays Pond
Bald Peak
MAINE

Rare or Exemplary Botanical Features in the Project Vicinity

Documented within a four mile radius of the Eastern Slopes Regional Airport, Fryeburg.

Scientific Name Common Name	Last Seen	State Rarity	Global Rarity	State Legal Status	Federal Legal Status	Habitat Description
Adlumia fungosa Allegheny Vine		S1	G4	T		Wet or recently burned woods, rocky wooded slopes.
Asplenium platyneuron Ebony Spleenwort		S2	G5	SC		Rich partly forested slopes, rocky ledges, and dry, circumneutral outcrops.
Aureolaria pedicularia Fern-leaved False Foxglove		S3	G5	SC		Dry deciduous woods and clearings.
Calystegia spithamaea Upright Bindweed		S2	G4G5	T		Sandy or rocky open soil, thin woods.
Diphasiastrum x sabinifolium Ground-fir		S2?	GNA	E		Woods, thickets, and clearings.
Eragrostis capillaris Tiny Love-grass		SH	G5	E		Dry sandy or rocky soils.
Euthamia tenuifolia Narrow-leaved Goldenrod		S2	G5T5	T		Outwash plain pondshores, in moist sand, usually below seasonal high-water level.
Fimbristylis autumnalis Fall Fimbry		S2	G5	T		Sandy or peaty shores and low ground.

Rare or Exemplary Botanical Features in the Project Vicinity

Documented within a four mile radius of the Eastern Slopes Regional Airport, Fryeburg.

Scientific Name Common Name	Last Seen	State Rarity	Global Rarity	State Legal Status	Federal Legal Status	Habitat Description
Hemlock - hardwood pocket swamp Pocket Swamp		S2	G5			Relatively small swamps in catch basins or sloping saddles among low hills of the coastal plain of extreme southern Maine. Hemlock and red maple are characteristic; Nyssa occassional. Peat accumulation minimal.
Hudsonia river beach Riverwash Sand Barren		S1	G1			Gravel barrens along beaches and back-beach areas of the Saco River where periodic flooding and xeric soils occur. Paronychia argyrocoma and Hudsonia characteristic.
Ironwood - oak - ash woodland Oak - Ash Woodland		S3	G3G5			Partly forested to sparsely vegetated slopes and low ridges, with thin soils over loose circumneutral bedrock or talus. Can grade to almost closed canopy on lower slopes.
Lipocarpha micrantha Dwarf Bulrush		S1	G4	T		Sandy borders of ponds and streams.
Oak - pine forest Oak - Pine Forest		S4	G5			Red oak - white pine forests of sandy soils or rocky slopes in central and southern Maine. Soils are moderately to very xeric.
Ophioglossum pusillum Adder's Tongue Fern		S1?	G5	SC		Acid swales, wet thickets, shores, damp, sterile pastures
Paronychia argyrocoma Silverling		S1	G4	T		Bare granitic slopes, mountain tops, or sandy river banks.
Pitch pine - scrub oak barren Pitch Pine - Scrub Oak Barren		S1	G2			Patchy, partly-open forests and shrublands on well-drained sandy soils of glacial outwash plains or moraines. Fire dependent.

Rare or Exemplary Botanical Features in the Project Vicinity

Documented within a four mile radius of the Eastern Slopes Regional Airport, Fryeburg.

Scientific Name Common Name	Last Seen	State Rarity	Global Rarity	State Legal Status	Federal Legal Status	Habitat Description
Pitch pine bog Pitch Pine Bog		S2	G3G5			Characteristic of southern Maine south along the coastal plain, these are partly or sparsely forested peatlands with pitch pine the typical tree. Typical bog conditions predominate otherwise, with acidic conditions.
Pitch pine woodland Pitch Pine Woodland		S3	G2			Open forest of Pinus rigida (with lesser amounts of other conifers and/or oak) on ledges or rock outcrops; elevations up to 300 meters. Soils are nutrient-poor and excessively well-drained. Heath shrubs are common in the understory. Mostly coastal.
Polygonum douglasii Douglas' Knotweed		S2	G5	T		Rocky slopes and dry soil.
Red oak - northern hardwoods - white pine forest Oak - Northern Hardwoods Forest		S4	GNR			Found on middle to lower slopes, usually not highly exposed, and on moderately well-drained loamy and stony soils.
Scirpus longii Long's Bulrush		S2	G2	T		Meadows, swamps, and fresh marshes.
Silver maple floodplain forest Silver Maple Floodplain Forest		S3	GNR			Forests of floodplains of larger streams and river. Silver maple dominant. Soils alluvial and mineral. Soil surface may be dry during much of growing season. Variants: berms along the river.
Sweetgale mixed shrub fen Sweetgale Fen		S4	G4G5			Moderate height (~1m) often dense shrubs on the borders of water bodies or peatlands, in sphagnum peat or muck. Usually bordered by open water.
Three-way sedge - goldenrod outwash plain pondshore Outwash Plain Pondshore		S1	G2G3			Herb-dominated communities on the sandy shores of shallow ponds in outwash plains of southern Maine. Water levels may drop considerably or fluctuate during the growing season, but substrates generally remain moist due to groundwater recharge.

Rare or Exemplary Botanical Features in the Project Vicinity

Documented within a four mile radius of the Eastern Slopes Regional Airport, Fryeburg.

Scientific Name Common Name	Last Seen	State Rarity	Global Rarity	State Legal Status	Federal Legal Status	Habitat Description
Unpatterned fen ecosystem Unpatterned Fen Ecosystem		S4	GNR			Peatlands fed by water carrying nutrients from adjacent uplands. Vegetation (with a large component of sedges, grasses, low shrubs, and sphagnum) is different and often more diverse than in bogs, though patches of heath shrub dominated bog communities ma
Vitis aestivalis Summer Grape		S1	G5T4T5	E		Dry woods and thickets.
White oak - red oak forest White Oak - Red Oak Forest		S3	GNR			Deciduous to mixed forests dominated by red oak and white oak. White pine is occasional. Low heath shrubs and woodland sedge are characteristic flora of the forest floor.
Woodsia obtusa Blunt-lobed Woodsia		S1	G5	T		Rocky woods and ledges or dry wooded slopes.
Woodwardia areolata Netted Chain-fern		SH	G5	PE		Acid peat, boggy woods, swamps.

Appendix H
Rare Plant Fact Sheet

Maine Department of Conservation
Natural Areas Program

Euthamia caroliniana (L.) Greene *ex* Porter & Britt.

Narrow-leaved Goldenrod

Habitat: Outwash plain pondshores, in moist sand, usually below seasonal high-water level. [Open wetland, not coastal nor rivershore (non-forested, wetland)]

Range: Coastal, from Nova Scotia south to Virginia.

Phenology: Flowers August - October.

Family: Asteraceae

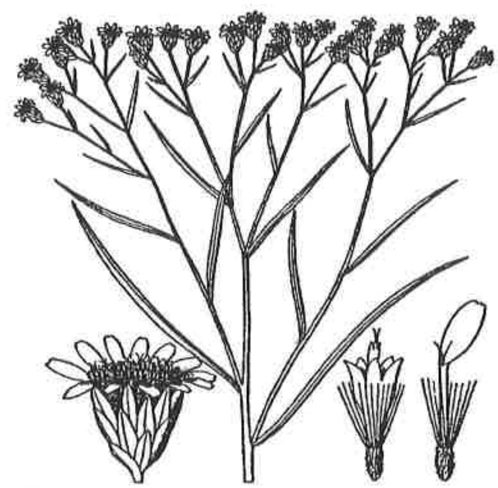


Illustration from Britton & Brown's Illustrated Flora of the Northern United States and Canada, 2nd ed.

Aids to Identification: This goldenrod bears flat-topped flower clusters and grows to 0.3-1 m. The flat-topped inflorescence have flowering heads have 17-21 flowers, of which 10-16 are ray flowers. The leaves are very thin, only 2-3 mm wide, with one central nerve and usually a pair of weak lateral nerves. A similar but very common goldenrod species, *E. graminifolia*, can be distinguished by its 3-nerved leaves with additional faint lateral nerves, and capitula with 20-35 flowers (of which 15-25 are ray flowers).

Ecological characteristics: Where the habitat is intact and of good quality, *Euthamia caroliniana* may be the dominant herb.

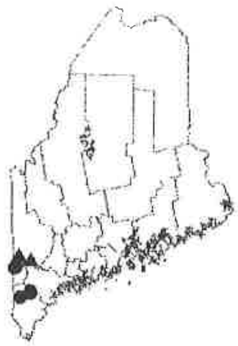
Synonyms: Formerly known as *Euthamia tenuifolia* and *Solidago tenuifolia*.

Rarity of *Euthamia caroliniana*

State Rank:	S2	Imperiled in Maine because of rarity or vulnerability to further decline.
New England Rank:	None	
Global Rank:	G5	Species demonstrably widespread, abundant, and secure globally.

Status of *Euthamia caroliniana*

Federal Status:	None	No Federal Status.
State Status:	Threatened	
Proposed State Status:	Threatened	Rare and, with further decline, could become endangered; or federally listed as Threatened. Listing criteria met:



▲ Historical (before 1982)
● Recent (1982 - present)

Known Distribution in Maine:

This rare plant has been documented from a total of 6 town(s) in the following county(ies): Cumberland, Oxford, York.

Dates of documented observations are: 1918, 1925, 1992 (5), 1996, 2002

Reason(s) for rarity:
At northern limit of range.

Conservation considerations:
Heavy all-terrain vehicle use of the sandy habitats where this occurs has degraded the habitat in some locations and continued use will be detrimental to the plant populations.

The information in this fact sheet was downloaded from the Natural Areas Program's Biological and Conservation Database on 12 MAY 2004. We are grateful to our Botanical Advisory Group for additional information on particular species, and in particular, to Arthur Haines for his assistance with identifying characteristics and taxonomic questions. Nomenclature follows Haines and Vining's *Flora of Maine* (V.F. Thomas Press, 1998); where older works refer to a plant by another name, it is given under "Synonyms". The Natural Areas Program, within the Department of Conservation, maintains the most comprehensive source of information on Maine's rare or endangered plants and rare or exemplary natural communities, and is a member of the Association for Biodiversity Information.

If you know of locations for this plant or would like more information on this species,
please contact the Natural Areas Program
State House Station 93, Augusta, Maine 04333; telephone (207) 287-8044.

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