Rhode Island Airport Corporation

Westerly ALP Update and
Land Use Compatibility Plan

Airport Layout Plan Update and Land Use Compatibility Plan

Westerly State Airport
Westerly, Rhode Island

Prepared for **Rhode Island Airport Corporation**
Federal Aviation Administration

Prepared by *Vanasse Hangen Brustlin, Inc.*
Watertown, Massachusetts

FINAL: April 24, 2009

The preparation of this document was financed in part through a planning grant from the FAA as provided under the Airport Improvement Program. The contents of this report reflect the views of Vanasse Hangen Brustlin, Inc. and do not necessarily reflect the official view 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 public law.

Appendices

Executive Summary

Federal Aviation Administration (FAA) Order 5100.38, Airport Improvement Program Handbook, Grant Assurance 29 requires that the airport sponsor keep the Airport Layout Plan (ALP) up to date at all times.[1] Thirteen years have elapsed since the last ALP Update for Westerly Airport (WST) in Westerly, Rhode Island, and during that time several projects were implemented. The Rhode Island Airport Corporation (RIAC) has contracted Vanasse Hangen Brustlin, Inc. (VHB) to update the 1995 WST ALP to document current conditions and to identify specific ALP elements that require updating.

As part of the ALP Update, RIAC contracted VHB to prepare a Land Use Compatibility Plan to provide the Town of Westerly with information and recommendations to assist in land use planning decisions in the future regarding the influence of Westerly State Airport. The Land Use Compatibility Plan incorporates information regarding runway surfaces and navigable airspace identified during the ALP Update. As defined by the FAA, Federal Aviation Regulation (FAR) Part 77, they must be protected for the safety of air navigation. Existing aircraft noise information (both modeled and collected as part of this land use study) was also included and considered in developing the Land Use Compatibility Plan.

The evaluation of airport facilities indentified both planning and development projects that are recommended at the airport to maintain the airport, preserve existing facilities, and meet anticipated use by aircraft types over the next twenty years. These upgrades are similar to upgrades recommended at other airports comparable to WST.

To protect the airport's approaches easement acquisition, tree removal and obstruction lighting are the highest priority for the FAA and RIAC.

Utilizing FAA noise criteria and land use parameters the evaluation of aircraft noise exposure at WST, indicated that there are no incompatible land uses. Therefore, no corrective land use compatibility measures due to noise are required.

The following provides a summary of the Airport Layout Plan Update and Land Use Compatibility Plan.

1 U.S. Department of Transportation, Federal Aviation Administration, Grant Assurances for Airport Sponsors, March 2005, p. 11.

ES1.1 Airport Layout Plan Update

As part of the ALP Update, the VHB Team has been tasked to:

- Review the 1995 Airport Master Plan Update and ALP Plan Set to identify and resolve any non-standard conditions to the FAA airport design standards FAA Advisory Circular (AC) 150/5300-13, Airport Design;
- Review the 1995 Airport Master Plan Update and ALP Plan Set for consistency with the RI State Guide Plan;
- Update the ALP Plan Set to reflect actual conditions that exist, both on and off the airport, since the last ALP was developed;
- Write an ALP Narrative Report to accompany the updated ALP Plan Set to explain and document any changes in the ALP Plan Set; and
- Identify priority projects for inclusion in RIAC's 5-year Capital Improvement Plan (CIP), as well as identify those projects that are recommended to occur within the 20-year time frame.

ES1.1.1 Airport Inventory Summary

On June 5, 2008 and June 20, 2008 the VHB Team visited WST to review and evaluate the existing airport facilities and to document the condition and location of airfield pavements, buildings, aircraft ramps, runways and taxiways, navigational and visual aids, and airport equipment. This site visit was a general planning overview to familiarize the VHB Team with existing conditions at WST.

Visual inspections of the airport during the site visits in June 2008 indicate that the airport facilities and equipment are good to excellent with the exception of the following:

- Trees and other natural obstructions exist within protective airspace surfaces at the approach ends of all runways and along the south edge of Runway 7-25 and east and west of the approach ends of Runway 14 and 32;
- The pavement on the Main Ramp north of the Landmark Bulk hangar has some rutting and alligator cracking[2] and is deteriorating;
- The pavement on the western portion of Taxiway D has thermal cracking and is deteriorating;[3]
- The soil conditions in the turf Runway Safety Areas (RSAs) for both Runways 7-25 and 14-32 are unstable and eroding;
- The runway paint markings are fading and the edge and centerline markings are yellowing;
- The airport security fence does not enclose the entire airport;
- The airport equipment storage building is not large enough to house the airport's snow removal equipment, which is now stored outdoors; and
- The 1979 Snogo snow plow/blower is in poor condition.

2 U.S. Department of Transportation, Federal Aviation Administration, AC 150/5320-17, Airfield Pavement Surface Evaluation and Rating Manuals, U.S. Government Printing Office, Washington, DC, July 12, 2004, Appendix 1, p. 5 and p. 11.
Rutting is the displacement of material, creating channels in wheel paths and alligator cracking is defined as interconnected cracks forming small pieces ranging in size from about 1" to 6".

3 U.S. Department of Transportation, Federal Aviation Administration, AC 150/5320-17, Airfield Pavement Surface Evaluation and Rating Manuals, U.S. Government Printing Office, Washington, DC, July 12, 2004, Appendix 1, p. 7.
Thermal cracking usually begins as hairline or very narrow cracks; with aging they widen. If not properly sealed and maintained, secondary or multiple cracks develop parallel to the initial crack. The crack edges can further deteriorate by raveling and eroding the adjacent pavement.

In addition to visual inspections, discussions with the Airport Manager and airport users indicate that the airport lacks the following:

- An additional instrument approach. Runway 7 has a non-precision instrument approach;
- A common traffic advisory frequency (CTAF) and pilot controlled lighting frequency dedicated to WST. Currently, WST shares the same frequency with Block Island Airport;
- A pavement maintenance plan; and
- Additional aircraft storage facilities (aircraft hangars and additional tie-downs).

ES1.1.2 Airport Activity Forecast Summary

The *2007 Draft Rhode Island State Airport System Guide Plan (RISASP)*[4] was used as a reference for this ALP Update by the FAA and RIAC.[5] The RISASP forecast projected aviation activity at WST through 2021 using 2001 as the base year. However due to some differences between projections in the RISASP forecast and actual airport activity, it was determined by RIAC that 2007 would replace 2001 as the base year for the purposes of this ALP Update. Airport activity was forecast from 2008 through 2028 for this ALP Update.

Because the average annual FAA growth rates used in the RISASP forecast were similar to more current FAA forecast growth rates, the same growth rates and assumptions used in the RISASP forecast were applied to the actual 2007 airport activity to forecast through 2028 for this ALP Update. The estimates of growth at WST over the next 20 years are outlined in Table ES-1.

Table ES-1 20-Year Airport Activity Growth Estimate at WST

Activity Projections	2007 (Existing)	Estimated Growth		
		2028	Overall Growth Rate (percent)	Average Annual Growth Rate (AAGR) (percent)
Based Aircraft	68	73	7.4	0.36
Annual Aircraft Operations	23,572	28,881	22.5	1.3 (general aviation operations) 0.01 (commercial service operations)
Annual Passenger Enplanements	9,115	13,257	45.4	1.8

Source: Draft Rhode Island State Airport System Plan (RISASP), State Guide Plan Element 640, Chapter 640.03, Projections of Aviation Demand, September 28, 2007.
Notes: See Chapter 2, Airport Layout Plan Update, Section 2.2, *Airport Activity Forecast*, for assumptions.

4 Draft Rhode Island State Airport System Plan, State Guide Plan Element 640, Chapter 640.03, Projections of Aviation Demand, September 28, 2007.
5 The FAA and RIAC confirmed that the forecast from the State System Plan should be used for this ALP Update. Brenda Pope (RIAC), "RE: Westerly Airport Activity," July 22, 2008, email communication.

ES1.1.3 Facility Requirements Summary

During the site visits, the VHB Team compared the 1995 ALP to a 2007 aerial photograph to evaluate any facility differences between the two and to identify projects completed at the airport since the 1995 Master Plan/ALP Update. Discussions with the Airport Manager and both a visual inspection of the airport and comparison of the two graphics indicate that the majority of the planned projects on the 1995 Airport Layout Plan had been completed. Those not completed include:

- Construct three additional aircraft storage hangars;
- Provide additional aircraft storage ramps;
- Acquire easements for obstruction removal and lighting; and
- Install an oil-water separator.

A review of those recommended projects and discussions with the RIAC staff indicate that all of those projects, except installing an oil-water separator, which is no longer necessary, should be considered in this ALP Update.

Based on analysis of: (a) the existing airport facilities during the site visits, (b) discussions with the Airport Manager and tenants, (c) review of airport operations and forecasts, (d) planned projects from the 1995 ALP that were not implemented, and (e) various legislative requirements (Federal Aviation Regulations and State regulations), the following future airside and landside planning and development projects are recommended in this ALP Update (Table ES-2) and depicted in Figure ES-1. The recommendations listed in Table ES-2 identify an unconstrained view of airport needs. The rationale for the proposed development projects listed in Table ES-2 is analyzed in Chapter 2, *Airport Layout Plan Update*, to determine their feasibility and whether they are ultimately recommended on the Airport Layout Plan. Of the proposed planning and development projects listed below, easement acquisition, tree removal and obstruction lighting are the highest priorities for the FAA and RIAC.

Table ES-2 2008 ALP Update Requirements and Proposed Project Recommendations

ALP Update Requirements – Priority Projects
Acquire easements to remove trees and to install obstruction lighting in areas where trees will not be removed. See Appendix A, FAA Airspace Determination Letter dated August 31, 2007.[1]
Remove airport obstructions and install obstruction lighting. See Appendix A, FAA Airspace Determination Letter dated August 31, 2007.[1]
Clear and maintain the obstacle clearance surfaces for the following:[1] 3.6 degree VASI - Runway 7 3.0 degree VASI - Runway 25 4.0 degree PAPI - Runway 14 4.0 degree PAPI - Runway 32
ALP Update Recommendations
Develop a pavement maintenance plan per FAA Grant Assurances
Apply for a new Federal Communications Commission (FCC) license for the Common Traffic Advisory Frequency (CTAF)/pilot controlled lighting
Define Airport Hazard Area for use in land use compatibility planning
Reseed soil/turf in the Runway Safety Area (RSA) for both Runways 7-25 and 14-32
Reconstruct pavement on the Main Ramp (observed in poor condition), north of the Landmark aircraft storage hangar, and Reeves ramp
Relocate utility pole north of the Landmark aircraft storage hangar
Pavement evaluation is necessary to determine need and timing of rehabilitating the following pavements: Runway 14-32 pavement Runway 7-25 pavement Taxiway A pavement Taxiway B pavement Taxiway C pavement Taxiway D pavement (by FBO) Taxiway E pavement Taxiway F pavement Main Ramp pavement
Complete Installation of airport security fencing
Remove VASIs on Runway 7 and 25 and replace with PAPIs
Construct a Snow Removal Equipment (SRE)/Maintenance Equipment building
Acquire additional snow removal equipment
Evaluate a Global Positioning System (GPS) approach to Runway 25 and conduct an FAA Aeronautical Study
Redesign Main Ramp north and west of the Landmark aircraft storage hangar
Construct aircraft storage facilities (tie-downs) for commercial service aircraft parking
Construct aircraft storage facilities (T-hangars) – Private Development
Construct corporate hangars – Private Development

Notes:
1. Notice of Determination Letter from Gail Lattrell (FAA Airport Planner) to Mark Brewer (President and CEO for the Rhode Island Airport Corporation) dated August 31, 2007 RE: Aeronautical Study Number 2007-ANE-97-NRA.

ES1.2 Land Use Compatibility Plan

As part of the ALP Update process, a Land Use Compatibility Plan was prepared to provide the Town of Westerly with an understanding of the noise environment around the airport and thereby assist their efforts when making future land use planning decisions regarding the land surrounding WST. The Land Use Compatibility Plan incorporates information regarding runway surfaces and navigable airspace (defined by FAA's Federal Aviation Regulation, FAR, Part 77) identified during the ALP Update, and existing aircraft noise information (both modeled and collected).

The timing for conducting the Land Use Compatibility Plan was prompted by several related interests. First, the ALP Update described in the first section of this report enabled resources to be combined in conducting both studies in one FAA grant. Second, there was an expressed interest by local officials who were attempting to address concerns identified by airport neighbors. Finally, the December 2004 State Airport System Plan (ASP) included a policy objective to, "*Promote actions that enhance the compatibility of system airports with the human and natural environment.*"[6] Therefore this effort was both timely and in keeping with that ASP objective.

ES1.2.1 Summary of Aircraft Noise Analysis

To conduct the noise and land use assessment the only tools available for a small general aviation airport like Westerly State Airport was the basic guidance established in Federal Aviation Regulation Part 150 and the Federal Aviation Administration Land Use Compatibility Guidelines (Appendix C). Both are accepted industry standards for conducting noise assessments and developing land use recommendations around airports.

The evaluation of aircraft noise exposure at WST consisted of developing Day-Night Average Sound Level (DNL) contours, analysis of noise levels at specific locations surrounding the airport, and noise monitoring at two locations during a typical WST operational day during the peak (summer) season.

Aircraft Noise Contour Modeling

The existing aircraft noise environment at WST was modeled using the FAA's Integrated Noise Model (INM), Version 7.0a. The INM was developed by the FAA specifically for the analysis of aircraft noise levels in the vicinity of airports and is widely used by the civilian aviation community. The evaluation considered three aircraft operational scenarios, including the average annual day, average summer day (peak season), and average peak day of the summer (peak) season (Table ES-3).

6 *Rhode Island State Airport System Plan, State Guide Plan Element 640*, December 2004.

Table ES-3 Daily Aircraft Operations Modeled for each Operational Scenario

Operational Scenario	Average Annual Day (operations)	Average Peak Season (Summer) Day (operations)	Average Peak Day (operations)
Based General Aviation (GA)	15.0	25.4	30.9
Itinerant General Aviation (GA)	35.0	59.4	72.3
New England Airlines	14.6	18.0	20.0
TOTAL	**64.6**	**102.8**	**123.2**

Source: Rhode Island Airport Corporation, 2008; Interviews of airport management and users conducted by VHB in 2008.
Notes: An aircraft arrival or departure is considered one aircraft operation.
General Aviation (GA) refers to all aircraft flights other than military and scheduled airline flights, both private and commercial.
Itinerant aircraft are stored at other airports and use WST as a destination point or refueling stop.

The DNL metric is a 24-hour average noise level with a nighttime (10:00 PM to 7:00 AM) penalty to account for increased annoyance from aircraft noise during this time period and is measured in decibels (dB). The DNL 60 dB, 65 dB, and 70 dB noise contours for each operational scenario are shown in Figure ES-2.

According to FAR Part 150[7], residential land uses are compatible with levels of less than DNL 65 dB for the average annual day operational scenario. The noise contour analysis indicated that no residential land uses exist within the DNL 65 dB contour of the average annual day operational scenario. All aircraft-related noise levels off airport property are within industrial or undeveloped areas and are compatible according to FAR Part 150 Land Use Compatibility Guidelines.

Analysis of Noise Levels at Grid Point Locations

To better understand the noise environment at specific locations, grid point locations of noise sensitive areas and other areas of interest were analyzed using the FAA's INM. The grid point locations are shown in Figure ES-3 and consist of residential, recreational, and other land uses.

In addition to calculating cumulative noise levels using the DNL metric, the following noise levels were calculated at each grid point location for each operational scenario to further examine noise conditions:

- Lmax – the maximum sound level estimated at a location due to aircraft; measures maximum intensity of aircraft noise exposure;
- TA65 – the time (in minutes) above 65 dB, which is the sound level at which outdoor speech disturbance may occur ; and

7 Title 14 Code of Federal Regulations (CFR) Part 150, *Airport Noise Compatibility Planning*, Appendix A, Table 1.

- NA65 – number of aircraft events above 65 dB, which is the sound level at which outdoor speech disturbance may occur.

The findings of the noise analysis at grid point locations are summarized as follows:

- The highest DNL values at the residential land use grid point locations are experienced at the Runway 32 end (R-6, R-9, R-16, and R-10), between the Runways 14 and 25 ends (R-4 and R-3), and along the extended centerline of Runway 14-32 (R-1 and R-2). Values at these locations range from DNL 45 dB to approximately DNL 50 dB in the average annual day operational scenario, which is slightly lower than the typical suburban ambient DNL.

- Although Lmax levels approach or reach 100 dB at some residential locations (R-10, R-16, R-2, and R-1 for example), the frequency of occurrence is low. This is evident in the TA65 levels that are in the range of approximately 4 to 7 minutes (or 0.3 to 0.5 percent of a 24-hour day) at these same locations depending on the operational scenario. Therefore, the maximum noise levels at these locations are reached infrequently and last for a short duration of time.

- The TA65 estimates the time during a day that aircraft operations would have the potential to disturb outdoor speech. The highest potential for outdoor speech disturbance at a residential location is at R-4, with 16 to 25 minutes (1 to 2 percent of a 24-hour day) above 65 dB, depending on the operational scenario. The TA65 in this area is primarily affected by aircraft pre-flight run-up activity at the Runway 25 end, which accommodates the greatest number of aircraft departures.

- The NA65 represents the number, or frequency, of aircraft events above 65 dB (the sound level at which outdoor speech may be disturbed). The NA65 correlates well with TA65. In other words, in areas where the time above 65 dB is higher, then the number of events above 65 dB is higher. The highest number of events at residential locations reaching the noise levels at which outdoor speech could be disturbed is approximately 35 to 78 per day, depending on the operational scenario.

Noise Monitoring

To record noise levels of the specific types of aircraft operating at WST, noise monitoring was performed as part of this study. The noise monitoring program was conducted at two locations from approximately 9:00 AM to 7:00 PM on August 29, 2008 (the Friday of Labor Day Weekend). The noise monitoring equipment was located at two residential sites – a residence on Links Passage (RIAC property) and one in a residential cul-de-sac at Nob Court. These locations are shown in Figure ES-3 (grid point locations R-16 and R-17). The two monitoring locations were selected based on their close proximity to the runways, discussions with RIAC, and input provided by the public during a Public Information Meeting held on August 13, 2008 at the Westerly Town Hall.

Table ES-4 shows the measured Lmax and L90[8] (background) sound levels for the two locations. The time above 65 dB, which is the outdoor noise level that can be expected to cause speech interference (for outdoor communication), is also provided in Table ES-4.

Table ES-4 Measured Existing Sound Levels

Receptor Location	Lmax (dB)	L90 (dB)	Time Above 65 dB (minutes)
Links Passage Site (R-16)	96.9	40.0	12:10
Nob Court Site (R-17)	90.6	38.0	10:04

Source: VHB, 2008.

ES1.2.2 Land Use Compatibility Plan Recommendations

The Land Use Compatibility Plan developed several land use compatibility recommendations for suggested guidance to the Town of Westerly. The Land Use Compatibility Plan included in this report describes a recommended Airport Hazard Area, which is defined in Section 1-3 of the Rhode Island General Laws (R.I.G.L.), which is commonly referred to as Airport Zoning Act, and potential land use compatibility measures that the Town of Westerly could consider enacting to prevent future land use incompatibilities.

The recommended Airport Hazard Area is represented by the Airport Airspace Drawing (FAR Part 77 surfaces) from the ALP Update, depicting zones that are equivalent to the horizontal, conical, approach, and transitional surfaces. The recommended Airport Hazard Area is depicted in Figure ES-4.

According to FAA criteria, the noise analysis showed that there are no incompatible land uses surrounding WST. However, the Town of Westerly may wish to consider land use measures to ensure that the areas around the airport remain compatible. Preventive measures are land use controls that typically amend or update the local zoning ordinance, comprehensive plan, subdivision regulations, or building code. Recommended measures that could be considered by the Town include comprehensive planning (with consideration given to the influence of the airport), re-zoning of approximately 2.2 acres of residentially zoned land that is vacant or used for non-residential uses along Post Road to prevent future perceived land use incompatibilities, the use of zoning overlays (for height restrictions and/or noise compatibility), and a mandatory disclosure ordinance.

8 L90 is the noise level that is exceeded 90 percent of the measurement period, and is considered the ambient or background noise level.

1 Introduction

1.1 Purpose

Westerly Airport (WST) is located in the Town of Westerly, in the southwestern portion of Rhode Island (Figure 1-1). The Rhode Island Airport Corporation (RIAC) is responsible for operating, maintaining, and developing WST, along with five other airports in the State (including T.F. Green Airport in Warwick). Management of WST is contracted to Landmark Aviation (formerly Piedmont Hawthorne). The purpose of the airport is to help meet the aeronautical demands of not only the Washington County, Rhode Island area (including Westerly, Charlestown, Hopkinton, Richmond, Exeter, and parts of South Kingstown), but also southeastern Connecticut.[9]

Federal Aviation Administration (FAA) Order 5100.38, *Airport Improvement Program Handbook*, Grant Assurance 29 requires that the airport sponsor keep the Airport Layout Plan (ALP) up to date at all times. Thirteen years have elapsed since the last ALP Update for WST in Westerly, Rhode Island, and during that time several projects were implemented. RIAC has requested that Vanasse Hangen Brustlin Inc. (VHB) update the 1995 WST ALP to document current conditions and to identify specific ALP elements that require updating.

As part of the ALP Update process, RIAC contracted VHB to prepare a Land Use Compatibility Plan to provide the Town of Westerly with information and recommendations to assist in land use planning decisions in the future regarding the influence of Westerly State Airport. The existing land use surrounding WST is shown in Figure 1-2.

The timing for conducting a Land Use Compatibility Plan was prompted by several related interests. First, the ALP Update planning process enabled resources to be combined in conducting both studies in one FAA grant. Second, there was an expressed interest by local officials who were attempting to address concerns identified by airport neighbors. Finally, the State Airport System Plan completed in December 2004 included a policy that

9 Draft Rhode Island State Airport System Plan, State Guide Plan, September 28, 2007.

stated: "Promote actions that enhance the compatibility of system airports with the human and natural environment."[10]

The Land Use Compatibility Plan incorporates information regarding runway surfaces and navigable airspace identified during the ALP Update. As defined by the FAA, Federal Aviation Regulation (FAR) Part 77, they must be protected for the safety of air navigation. Existing aircraft noise information (both modeled and collected as part of this land use study) is also included and considered in developing the Land Use Compatibility Plan.

Although the WST Land Use Compatibility Plan is not a FAA FAR Part 150[11] Noise Compatibility Program the aircraft noise analysis utilized the same methodology and land use compatibility level thresholds that are incorporated in a Part 150 study. This Land Use Compatibility Plan is intended for use by the Town of Westerly for the above described planning purposes.

1.2 Public Participation

RIAC conducted a public outreach program for the Airport Layout Plan Update and Land Use Compatibility Plan. RIAC conducted two public coordination meetings. The first public meeting was held early in the study (August 13, 2008) to inform the public regarding the preliminary scope of the project and to obtain comments and concerns regarding the airport from local officials, airport users, and community members. A total of 26 local officials, airport users, and community members attended the first meeting. The second public meeting was held at the completion of the Draft ALP and aircraft noise analysis (November 6, 2008). A total of 21 local officials, airport users, and community members attended the second and final meeting, and a representative from the FAA was present to answer the public's questions.

The public meetings were advertised through the following media.

Newspaper

- Westerly Sun
- Providence Journal

Postings

- A meeting notice was posted at the Westerly Town Hall and at the Westerly Police Department.
- Town of Westerly's Website.

10 *Rhode Island State Aviation System Plan Update*, Rhode Island Airport Corporation (RIAC), December 2004, Page 11-1.
11 Title 14 Code of Federal Regulations (CFR) Part 150, *Airport Noise Compatibility Planning*.

Mailings

- A public notice was also mailed and/or emailed to over 80 community members.

1.3 Report Organization

This Report is organized into three chapters and an appendix section:

- The *Executive Summary* provides a summary of the Airport Layout Plan Update and Land Use Compatibility Plan.
- Chapter 1, *Introduction*, provides an overview of the purpose of the Airport Layout Plan Update and Land Use Compatibility Plan and report organization.
- Chapter 2, *Airport Layout Plan Update*, provides the following:
  - Section 2.1, *Airport Inventory*, documents the existing facilities at WST and identifies the projects completed at the airport since the 1995 Master Plan/ALP Update. The inventory provides a snapshot of the airport and airport facilities as of June 2008.
  - Section 2.2, *Airport Activity Forecasts*, contains forecasts of future activity at the airport, which estimates anticipated growth by aircraft types over the next twenty years (2008 – 2028).
  - Section 2.3, *Facility Requirements/ALP Update Recommendations*, uses the data collected during the *Airport Inventory* presented in Section 2.1 and projections of aviation activity presented in Section 2.2, *Airport Activity Forecasts*, as the basis for planning the future facilities needed at WST. Future projects are determined by examining the airport's existing facilities, identifying existing and future airport activity, identifying facility deficiencies, then evaluating whether or not the airport's existing facilities can accommodate existing and future airport demand or whether or not facility deficiencies can be updated/modified. Section 2.3 provides the rationale for the projects proposed at WST.
  - Section 2.4, *Airport Plans*, includes reduced-size copies of the ALP drawing set. The primary facility development projects outlined in the plan is available for review in Drawing 2, Airport Layout Plan. The Airport Layout Plan for WST depicts the recommended airport development projects based on the facility recommendations identified in Section 2.3, *Facility Requirements and ALP Update Recommendations*. The ALP clearly identifies existing and recommended facilities as well as areas reserved for future development projects.
- Chapter 3, *Land Use Compatibility Plan*, includes recommendations for the Town of Westerly to make well informed land use planning decisions in the future. This Land Use Compatibility Plan incorporates information regarding various imaginary surfaces that must be protected for the safety of air navigation such as runway protection surfaces and navigable airspace surfaces identified during the ALP Update.

Existing aircraft noise information (both modeled and collected as part of this study) is also included and considered in the Land Use Compatibility Plan. The purpose of the Land Use Compatibility Plan is to identify potential preventive land use measures to avoid future land use incompatibilities surrounding WST. Chapter 3 provides the following:

- Section 3.1, *Introduction*, provides an overview of the Land Use Compatibility Plan components.

- Section 3.2, *Aircraft Noise Analysis Methodology*, details the how the various noise analyses – noise contour modeling, grid point analysis, and noise monitoring – were performed. Information in this section includes noise model inputs (aircraft operational information for three operational scenarios), grid point locations, and noise monitoring locations.

- Section 3.3, *Aircraft Noise Analysis Results*, describes the noise modeling results (noise contours and grid point analysis) and the noise monitoring results. The noise contour results of the annual average day operational scenario are compared to the FAA's land use compatibility guidelines.

- Section 3.4, *Land Use Compatibility Plan Recommendations*, defines a recommended Airport Hazard Area and describes suggested preventive land use measures for the Town of Westerly's consideration. Also provided is a selected bibliography of Federal, state, and industry material related to airport land use compatibility.

2

Airport Layout Plan Update

2.1 Airport Inventory

Federal Aviation Administration (FAA) Advisory Circular (AC) 150/5070-6B, *Airport Master Plans*, outlines the necessary steps in the development of an Airport Master Plan and Airport Layout Plan Update.[12] The initial step, an airport inventory, is the collection of data pertinent to the airport and the area it serves.

The objective of this inventory task is to document the existing facilities at Westerly Airport (WST), and to explain and document any changes in the Airport Layout Plan (ALP) since the last update. The inventory provides a snapshot of the airport and airport facilities as of June 2008. The inventory provides necessary background information for subsequent analysis and when coupled with the airport activity forecasts, serves as the starting point for future airport planning.

The airport inventory data were obtained through an on-site investigation, which documented existing airport facilities and the condition and location of airfield pavements, buildings, aircraft ramps, runways and taxiways, navigational and visual aids, and airport equipment. The site visit was a general planning overview to familiarize the VHB Team with existing conditions at WST. A detailed engineering effort did not take place during the site visit; the stated condition of airport facilities is based on visual inspections only (and not a detailed engineering effort) and refers to how the facility appeared to the VHB Team during the inspection. Additional facility data were also obtained through discussions with the Airport Manager and airport tenants, review of existing airport operations, and review of specific ALP elements from the 1995 Master Plan/ALP Update[13] that still require implementation.

12 U.S. Department of Transportation, Federal Aviation Administration, Airport Master Plans, AC No. 150/5070-6B, Change 1, U.S. Government Printing Office, Washington, DC, May 1, 2007.
13 Airport Master Plan Update, Westerly State Airport, Hoyle, Tanner, and Associates, November 1995.

This inventory section includes the following:

- Airport Setting
- Existing Airport Facilities
  - Runways and Taxiways
  - Aircraft Storage Areas and Ramps (hangars and aircraft tie-downs)
  - Navigational Aids, Airport Visual Aids, and Airport Marking Aids and Signs
  - Landside Facilities
  - Support Facilities
- Airport Security
- Airport Obstructions
- Projects Completed Since the 1995 Master Plan/ALP Update
  - Aircraft Storage Projects
  - Install Oil-Water Separator Project
  - Easement Acquisition
- Airport Inventory Summary

2.1.1 Airport Setting

WST is one of six airports owned by the state of Rhode Island and operated and maintained by RIAC, which was formed in 1992 as a subsidiary of the Rhode Island Economic Development Corporation. RIAC is responsible for T.F. Green, Block Island, Newport, North Central, Quonset, and Westerly Airports. T.F. Green Airport is the primary commercial service airport in Rhode Island. Newport, North Central, and Quonset serve as general aviation facilities. In addition to serving as general aviation airports, WST and Block Island also serve as commercial service airports.

WST provides regularly scheduled air passenger service to Block Island via New England Airlines. Because of this service, the FAA identified WST as a commercial service airport.[14] Although WST is considered a commercial service airport, approximately 72 percent of the operations[15] are performed by general aviation aircraft. Therefore, the primary role of WST is to serve the general aviation community, which typically uses single and twin engine aircraft and smaller corporate aircraft. WST services the airport users by providing based aircraft with storage facilities (hangars and tie-downs), aviation fuel, and aircraft maintenance and repair services.

Chapter 1, *Introduction*, depicts the location and geographic context of WST (Figure 1-1). WST is located on approximately 300 acres in the Town of Westerly in southwestern Rhode Island and is located less than 2 miles east of the Connecticut state line and less than 2 miles north of Block Island Sound. WST is surrounded by a mix of land uses including: undeveloped land, residential, institutional, commercial, and industrial. Over the

14 U.S. Department of Transportation, Federal Aviation Administration, National Plan of Integrated Airport Systems (NPIAS), U.S. Government Printing Office, Washington, DC, 2007 – 2011, Appendix A: List of NPIAS Airports with 5-Year Forecast Activity and Development Cost, p. A-85.

15 An operation is defined as a takeoff or landing by an aircraft; therefore, the arrival and subsequent departure of one aircraft is counted as two separate operations.

past several years RIAC has purchased various easements and land to protect the airport's runway approaches and other navigable airspace surfaces. In particular, five parcels of land and two easements at the approach end of Runway 32, one easement at the approach end of Runway 7, two parcels of land and three easements at the approach end of Runway 14 were purchased by RIAC between 1999 and 2008.[16] In addition, RIAC has released some of WST land for off-airport commercial development. The release was approved by the FAA on July 1, 1993 according to the Airport's Exhibit 'A' Property Map (Figure 2-1).[17]

2.1.2 Existing Airport Facilities

This chapter describes the status of the airport's existing facilities. These facilities are shown in Figure 2-2.

Runways and Taxiways

As depicted in Figure 2-2, there are two active runways at WST. Runway 7-25 and Runway 14-32. Runway 7-25 is the primary runway and is 4,010 feet in length by 100 feet wide and Runway 14-32 is 3,960 feet in length by 75 feet wide with a 750-foot displaced threshold on the south end (Runway 32) due to ground and tree obstructions. Both runways have full-length parallel taxiways and taxiway stubs to access runways and aprons as depicted in Figure 2-2. Tables 2-1 and 2-2 provide a summary of runway and taxiway data for WST.

In 2006 RIAC completed crack and shoulder repairs to the pavement of Runway 7-25 as well as a full pavement overlay. Based on a visual inspection, the pavement appears to be in excellent condition (Figure 2-3). The pavement on Runway 14-32 was reconstructed in 1999, and visually appears to be in good condition with some minor crack sealing where needed. Visual inspection of the runway safety area (RSA) identified that the RSA soil conditions for both Runways 7-25 and 14-32 is unstable and eroding.

Based on visual inspection, all taxiway pavements appear to be in excellent condition with the exception of Taxiway D (Figure 2-4). Taxiways A, B, and C were rehabilitated in 2004. The eastern portion of Taxiway D was rehabilitated in 1999; however the western portion is approximately 20 years old. Based on a visual inspection the western portion of Taxiway D exhibits age related cracking and is deteriorating. Although taxiway D's pavement is deteriorating, the taxiway is the responsibility of Dooney Aviation and not RIAC's since its sole purpose is to serve this "through-the-fence" operator. Taxiway E and Taxiway F's north section were rehabilitated in 1999. Taxiway F's south section was rehabilitated in 2004.

16 Rhode Island Airport Corporation, Westerly Airport, Westerly RI, Exhibit 'A' Property Map, As revised April 21, 2008.
17 Ibid

Table 2-1 WST Runways – Existing Facilities and Conditions Assessment[5]

	Runway			
	7	**25**	**14**	**32**
Length (feet)	4,010		3,960 (Runway 32: Landing threshold is displaced 750-feet)	
Width (feet)	100		75	
Threshold Elevation (feet) (feet)	51.1	78.3	56.9	81.1
Surface Material and Condition	Asphalt – excellent condition		Asphalt – good condition	
Weight Limitations (pounds) [1]	SW – 30,000/DW – 60,000		SW – 12,500	
Runway Markings	Non-precision – fair condition		Basic – fair condition	
Approach Lights [2]	MALSF – good condition	None	None	
Runway Edge Lighting	Medium Intensity Runway Lights (MIRL) – excellent condition			
Visual Glide Slope Indicators [3]	4-light VASI on right – good condition	2-box VASI on left - good condition	4-light PAPI on left – good condition	4-light PAPI on left – good condition
Runway End Identifier Lights (REILs)	No	Yes – good condition	Yes – good condition	Yes – good condition
Navigational Aids	LOC/DME – good condition [4]	None	None	

Sources: U.S. Department of Transportation, Federal Aviation Administration, FAA Form 5010, Airport Master Record, Westerly State Airport, Effective Date April 10, 2008.
Airport Master Plan Update, Westerly State Airport, November 1995.

Notes:

1. Runway weight data is a realistic estimate of the airport's pavement strength at an average level of airport activity. The acronyms pertain to the landing gear type of an aircraft and are as follows: SW = single wheel and DW = dual wheel.
2. A medium intensity approach lighting system with sequenced flashers (MALSF) is a type of approach lighting system (ALS) that provides pilots with a visual cue to transition from instrument flight to visual flight for landing at an airport. An ALS enhances instrument approach procedures and aids pilots in locating the approach end of a runway.
3. A visual approach slope indicator (VASI) and a precision approach path indicator (PAPI) are similar lighting aids that provide visual approach slope guidance to the runway touchdown area; however, VASI systems are no longer manufactured.
4. A localizer (LOC), which provides lateral approach guidance to a specific airport runway, used especially during times of limited visibility, helps a pilot remain on course or on runway centerline. A distance-measuring-equipment (DME) readout displays distance from the localizer and reduces pilot workload by continuously showing pilots the distance from the airport. A DME transmits a radio signal to aircraft on approach providing distance measuring between the aircraft and the airport.
5. Pavement conditions are estimated based on visual observations by VHB (2008).

Table 2-2 WST Taxiways - Existing Facilities and Conditions Assessment[1]

	Taxiway					
	A	**B**	**C**	**D**	**E**	**F**
Length (feet)	4,010	200	200	400	200	4,710
Width (feet)	35	35	35	35	35	35
Pavement Condition	Excellent			Poor (western portion)	Excellent	
Lighting	MITL[2] – good condition			None	MITL – good condition	

Sources: Airport Master Plan Update, Westerly State Airport, November 1995
Cowley, James. (Airport Manager). Personal interviews. June – July 2008.

Notes:
1. Pavement conditions are estimated based on visual observations by VHB (2008).
2. MITL -- Medium Intensity Taxiway Lights

Aircraft Storage Areas and Ramps

At WST, aircraft storage is available on RIAC and privately owned ramps and hangars. WST has a total of three aircraft ramps and five aircraft hangars: two on-airport aircraft storage ramps and one off-airport, and four on-airport aircraft hangars and one off-airport.

Dooney Aviation is a "through-the-fence" operator located south of Runway 7-25 on privately owned land. Through a lease agreement with RIAC, they are permitted access to the airfield. Dooney Aviation has approximately 28 based aircraft on tie-downs or in its corporate aircraft hangar; however, Dooney has the capacity to accommodate approximately 40 aircraft depending on the aircraft type and size.

Figure 2-5 graphically depicts the location of the on- and off-airport aircraft storage facilities. As of June 2008, there were 68 based aircraft. Table 2-3 provides a summary indicating that currently WST can accommodate approximately 102 aircraft.

Based on a visual inspection, the pavement on the Main Ramp appears to be in excellent condition (Figure 2-3 and Figure 2-6) with the exception of the area north of the Landmark Bulk hangar, which is in poor condition (Figure 2-3 and Figure 2-7); the ramp leased to Reeves Aviation is also in poor condition.

The Landmark Bulk hangar can accommodate approximately 17 aircraft (Table 2-3); however, a utility pole located directly in front of the hangar leaves the east wing of the hangar unusable for approximately five aircraft (Figure 2-7).

Table 2-3 WST Aircraft Storage Areas and Ramps - Existing Facilities and Conditions Assessment

Aircraft Storage	Size (square feet)	Use	Remarks	Storage Capacity
Ramps				
Main	372,000	Transient aircraft storage	Owned and operated by RIAC; Pavement in excellent condition with the exception of the area north of the Landmark Bulk hangar, which is poor	18 6 (air carrier)
Reeves Aviation	10,000	Transient aircraft storage for aircraft maintenance	Owned by RIAC and leased to Reeves Aviation for aircraft storage; Pavement in poor condition	8
Dooney Aviation	87,500	Transient and based aircraft storage	Owned by Dooney Aviation with a “through the fence” operation lease with RIAC to access the airfield; Pavement in good condition	28
Hangars				
Landmark Bulk	14,000	Based aircraft storage	Owned and operated by RIAC; Hangar in good condition	17
5 Individual T-hangars	1,800 (each)	Based aircraft storage	Five privately owned mobile T-hangars on land leased from RIAC; Hangar in good condition	5
Reeves Aviation	6,600	Maintenance aircraft storage	Privately owned hangar on land leased from RIAC; Hangar in good condition	Varies
North American	12,000	Based aircraft storage	Privately owned hangar on land leased from RIAC; Hangar in good condition	8
Dooney Aviation	16,000	Transient and based aircraft storage	Privately owned hangar on privately owned land with a “through the fence” operation lease with RIAC to access the airfield; Hangar in good condition	12
Total Aircraft Storage Capacity				102

Note: Pavement and building conditions are estimated based on visual observations by VHB (2008).

Navigational Aids, Airport Visual Aids, and Airport Marking Aids and Signs

Navigational aids (NAVAID) include electronic and lighting and marking systems used for instrument landings. Figure 2-8 depicts the locations of these aids and a summary is provided below.

Navigational Aids

Navigational aids include:

- Non-precision localizer approach with DME – Runway 7
- Airport rotating beacon

A localizer (LOC) provides lateral guidance to pilots on approach to a specific airport runway; helping pilots remain on course relative to the runway centerline. A distance-measuring-equipment (DME) readout displays distance from the localizer and reduces pilot workload by continuously showing pilots the distance from the airport. A DME transmits a radio signal to aircraft on approach providing distance measuring between the aircraft and the airport. Based on a visual inspection, the LOC/DME at WST appears to be in good condition.

An airport beacon is a visual NAVAID displaying flashes of white and green colored light to indicate the location of the airport. The WST beacon was recently replaced with a newer, more efficient light beacon and appears to be in excellent condition.

Airport Visual Aids

Airport visual aids include:

- Obstruction lights/beacons
- MALSF approach light system – Runway 7
- Runway and taxiway edge lights – all runways and taxiways
- Runway end identifier lights (REIL) - at the approach end of Runways 25, 14 and 32
- Visual approach slope guidance indicators - at the approach end of all runways
- Pilot controlled airport lighting
- Airport landing indicator (segmented circle)

Obstructions are marked and/or lighted to warn pilots of obstructions to navigation such as high terrain, trees, or other structures. Figure 2-8 identifies the location of various obstruction lights in the vicinity of WST, all of which appear to be in good condition based on a visual inspection.

Runway 7 has a medium intensity approach lighting system with sequenced flashers (MALSF). A MALSF approach light system enhances instrument approach procedures and aids pilots in locating the approach end of a runway. The MALSF at WST starts at the landing threshold and extends 1,400 feet into the approach area. Based on a visual inspection, the MALSF at WST appears to be in good condition.

Medium Intensity Runway Lights (MIRL) are located on both Runways 7-25 and 14-32. The edge lights were replaced in 2006 on Runway 7-25 and in 1999 on Runway 14-32 when the runways were rehabilitated. The MIRL for both runways appear to be in good condition based on a visual inspection. With the exception of a portion of Taxiway D (the area outside of airport property boundaries – the western portion of the taxiway - does not have taxiway lighting but does have taxiway reflectors); medium intensity taxiway edge lights (MITL) exist on all taxiways and appear to be in good condition based on a visual inspection. The electrical wiring for all edge lights is directly buried in the ground.

Runway end identifier lights (REIL) provide identification of the approach end of a particular runway. The system consists of a pair of synchronized flashing lights located on each side of the runway threshold. REILs are located at the approach end of Runways 25, 14, and 32 and appear to be in good condition, based on a visual inspection.

Visual approach slope guidance indicators provide visual descent guidance information during the approach to a runway. These lights are visible from 3-5 miles during the day and up to 20 miles or more at night. Visual approach slope indicators (VASIs) are located at the approach end of Runways 7 and 25. Unlike other NAVAIDs at the airport, which are owned, maintained, and operated by the FAA, these VASIs are owned, maintained, and operated by the State. VASIs and PAPIs are similar lighting aids that provide visual approach slope guidance to the runway touchdown area. The VASI located at the approach ends of Runways 7 and 25 are in good condition. Precision approach path indicators (PAPIs) are located at the approach ends of Runways 14 and 32 and based on a visual inspection are in good condition.

The Common Traffic Advisory Frequency (CTAF) is used by pilots for air-to-air communication at non-towered airports to coordinate their arrivals and departures safely, to provide position reports to other pilots, and to acknowledge other aircraft in the airfield traffic pattern. The CTAF frequency is also used during nighttime operations to activate runway, taxiway and navigational aid lighting. Pilot controlled airport lighting provides airborne control of lights by keying the aircraft's microphone while on a specified radio frequency. Control of lighting systems is often available at locations without specified hours for lighting and where there is no control tower. The control is activated by the pilot keying the aircraft microphone. With no control tower, pilots communicate with each other and activate airport lighting at WST on the CTAF frequency, 123.0. This CTAF is the same used at Block Island, located 15 nautical miles southeast of WST. According to the Airport Manager and airport users, communications between Block Island and WST often become congested, especially during the busy summer season. Also, when pilot controlled airport lighting is activated at Block Island, WST's lights are also illuminated and vice-versa.

A segmented circle and windsock are located east of Runway 14-32 and south of Runway 7-25 to identify wind direction and runway pattern (use) information. The segmented circle at WST is in good condition based on a visual inspection.

Airport Marking Aids

Airport pavement markings and signs provide information that is useful to a pilot during takeoff, landing, and taxiing. Airport marking aids include:

- Non-precision runway paint markings on Runway 7-25
- Basic runway paint markings on Runway 14-32
- Centerline markings on all taxiways
- Tie-down and taxiway markings on all ramps
- Lighted signs for both runways and taxiways

Based on a visual inspection during the June 2008 site visits, it was noted that all markings are in fair and somewhat yellowing condition. The standard color for runway markings is white. All taxiways and ramps are marked and based on a visual inspection appear to be in good condition. The standard color for taxiway and ramp markings is yellow. All signs are visible, well maintained, and appear to be in good condition.

Landside Facilities

Landside facilities include a terminal building and automobile parking. See Figure 2-2.

The terminal building was constructed in 2001 after the original facility was destroyed by a fire in 1998. The building is a one-story structure that includes: office and counter space for New England Airlines, office and conference room facilities for the Airport Manager/fixed based operator (FBO), public rest rooms, public waiting room, and a pilot lounge and flight planning area. Based on a visual inspection, the terminal building appears to be in good condition.

The automobile parking facilities include one paved automobile parking lot capable of accommodating 150 cars. Based on a visual inspection, the pavement appears to be in good condition. A grass area located northeast of the paved lot is used during the busy summer season for overflow parking.

Support Facilities

Support facilities include an airport equipment storage building and equipment for snow removal and mowing operations. See Figure 2-2 for location.

The airport currently has the following equipment for snow removal and mowing operations:

- 1979 Snogo Snow Blower
- 1997 Ford Snow Plow
- 1979 John Deere tractor

Discussions with the Airport Manager indicate that the 1979 Snogo snow blower is in poor condition (Figure 2-9) and that the equipment is unreliable.

Based on a visual inspection, the airport equipment storage building, which was built in the 1940s, appears to be in good condition (Figure 2-10); however, it is not large enough to accommodate the airport's snow removal equipment.

2.1.3 Airport Security

Security measures at general aviation airports vary from airport to airport and are dependent on the type of airport activity that occurs at a particular general aviation airport. Typically, airport security fencing, security lighting, and coded access gates are the most common means of securing the airport perimeter. Figure 2-11 identifies the mix of barriers used at WST (coded access gates, fence, and natural barriers) to secure the airport. The security fencing and coded gates exist near sensitive areas such as the terminal area, aircraft storage areas, airport equipment areas, navigational equipment areas, and along busy roads and intersections.

2.1.4 Airport Obstructions

The FAA establishes imaginary surfaces above airports to protect the approach and departures surfaces and other navigable airspace from obstructions. Obstructions are considered to be any manmade objects, objects of natural growth, such as trees or brush, and terrain (ground penetrations). Any obstructions penetrating these imaginary surfaces are assumed to be hazards to air navigation.

In 2001, the FAA issued an Airspace Determination that required RIAC to accomplish an extensive amount of obstruction clearing and lighting, as well as obtain easement rights to accomplish the off airport work. Except for the on-airport obstruction removal, the progress to clear and/or light all the obstructions was limited. In 2006, RIAC initiated a new obstruction survey to update the 2001 obstruction data that penetrated the airport imaginary surfaces. The new survey identified tree obstructions in all the runway approach surfaces and tree and brush obstructions south of Runway 7-25 and east and west of Runway 14-32. The revised 2006 RIAC aeronautical study was submitted to the FAA requesting modifications to the 2001 FAA Airspace Determination. The FAA accepted virtually all the recommendations and issued a new FAA Airspace Determination on August 31, 2007. See Appendix A.[18] The outcome was a revised vegetation clearing and obstruction lighting plan depicted in Figure 2-12. It dramatically reduced the amount of obstructions needed to be removed and/or lighted. As a result, it also reduced the number of easements RIAC needed to obtain.

Table 2-4 identifies the actions RIAC must take per the 2007 FAA Airspace Determination. Easement acquisition, tree removal and obstruction lighting are the highest priority for the FAA and RIAC. These projects are priority projects that the airport sponsor, Rhode Island Airport Corporation (RIAC), is required to complete by August 2009 per the FAA Airspace Determination Letter (August 31, 2007). See Appendix A.

18 Notice of Determination Letter from Gail Lattrell (FAA Airport Planner) to Mark Brewer (President and CEO for the Rhode Island Airport Corporation) dated August 31, 2007 RE: Aeronautical Study Number 2007-ANE-97-NRA.

Table 2-4 FAA Aeronautical Analysis Requirements[1]

2007 FAA Aeronautical Analysis Requirements	Completed (Yes/No)	Date of Completion
Runway 7:		
Clear and maintain the obstacle clearance surface for the 3.6 degree VASI	No	Not completed
Obtain easements on four parcels seven parcels to clear tree obstructions and install two obstruction lights in areas where trees are to remain. This runway will lose Category D approach minima for the runway unless the trees are removed.	No	Not completed
Maintain hazard beacon on water tower on the right side of the approach	Yes	On-going
Runway 25:		
Clear and maintain the obstacle clearance surface for the 3.0 degree VASI	No	Not completed
Obtain easements on two parcels to clear tree obstructions	No	Not completed
Runway 14:		
Clear and maintain the obstacle clearance surface for the 4.0 degree PAPI	No	Not completed
Obtain easements on four parcels to clear tree obstructions and maintain the height of trees on land where existing easements exist	No	Not completed
Runway 32:		
Clear and maintain the obstacle clearance surface for the 4.0 degree PAPI	No	Not completed
Clear trees to the existing displaced threshold and obtain easements on three parcels to clear tree obstructions and install one obstruction light in areas where trees are to remain.	Two of the three easements were obtained and trees cleared.	May 11, 2001
Purchase property within the Runway Protection Zone to control the height of trees.	Property was purchased.	July 2008

Note:
1. Notice of Determination Letter from Gail Lattrell (FAA Airport Planner) to Mark Brewer (President and CEO for the Rhode Island Airport Corporation) dated August 31, 2007 RE: Aeronautical Study Number 2007-ANE-97-NRA.

2.1.5 Projects Completed Since the 1995 Master Plan/ALP Update

Table 2-5 summarizes the airport development recommendations made in the 1995 Airport Master Plan Update and lists the development that has been completed since the update. As indicated in Table 2-5, the majority of the proposed projects were complete. Those projects not completed are further analyzed in Section 2.3, *Facility Requirements/ALP Update Recommendations*, to determine if the project is still warranted for inclusion in this ALP Update.

Aircraft Storage Projects

Five years after completion of the 1995 Airport Master Plan Update, only one of the four T-hangars[19] proposed was constructed. The area north of the T-hangar developed in 2000 was cleared for development of a second T-hangar if needed.

The proposed based and transient aircraft ramp areas (Figure 2-13) were not constructed. The land was purchased for the ramp proposed west of the approach end of Runway 14. However, the area requires a significant amount of fill to bring it up to the runway and taxiway grade and the project could also impact wetlands and most likely require the completion of an environmental assessment. Because of site development costs the project was put on hold. The proposed ramp north of the approach end of Runway 25 and east of the intersection of Runway 14-32 has not been developed.

As of June 2008, demand does not require the development of any of the above facilities.

Install Oil-Water Separator Project

Installation of an oil-water separator (OWS) was recommended in the 1995 Master Plan/ALP Update; however, discussions with RIAC staff indicate that there is no need for an OWS at WST at this time. The 2007 Spill Prevention, Control and Countermeasure Plan prepared by Gresham Smith and Partners do not have an OWS as an outstanding compliance issue; therefore an OWS is no longer necessary.[20]

Acquire Easements

The FAA typically recommends fee simple easement acquisition (absolute ownership of real property) for property that lies within the runway protection zone (RPZ) and other property where tree removal is required.[21] The 1995 Airport Master Plan Update recommended either acquisition of land or easements for the land within the RPZs and the Aeronautical Study recommended easements for tree removal. As indicated in Tables 2-4 and 2-5, both easements and land acquisition for Runway 32 were completed between 1999 and 2008 and the trees were removed. The easements needed within the RPZ at both the Runway 14 and Runway 25 ends are included in the requirements of the 2007 Aeronautical Study but as of June 2008 had not been

19 The name T-hangar derives from the storage unit's construction, which is in the shape of the letter T. This type of hangar is the most common type of storage space for aircraft and is primarily used for private aircraft at General Aviation Airports because they are more economical than a rectangular shaped hangar.

20 Brenda Pope (RIAC), "RE: WST/ALPU," January 20, 2009, email office communication.

21 An RPZ is an imaginary trapezoidal surface that begins 200 feet from and extends beyond the runway end to protect the runway approach. This imaginary surface is established to define land areas underneath aircraft approach paths where development of certain land uses, such as residences and buildings for public assembly are highly undesirable as defined by FAA guidance. The FAA developed guidelines for RPZs and recommends that airport owners own the property under the runway approach and departure areas to at least the limits of the RPZ. This allows the airport to have more control of the area to ensure that it is kept free of structures and any undesirable development. If ownership of the land is impractical, the FAA recommends that airport owners purchase easements to protect against obstructions being created in that area.

acquired. Due to existing development of Westerly Crossing, a retail center with a supermarket, restaurant, and various other retail stores at the approach end of Runway 14, several of the trees of concern have been removed.

Table 2-5 Development/Project Implementation since the 1995 ALP Update

1995 Airport Master Plan Update Recommended Development	Completed (Yes/No)	Date of Completion
Runways (RWY)/ Taxiways (TWY)		
Reconstruct RWY 14-32	Yes	1999
Improve RWY 14 End Safety Area	Yes	2002
Improve RWY 32 End Safety Area	Yes	2002
Reconstruct RWY 7-25 (Crack and Shoulder Repair and Overlay)	Yes	2006
Construct TWY ‘A’ East/ Reconstruct TWY ‘A’ West	Yes	2004
Reconstruct TWY Stub ‘A1’, ‘A2’, ‘A3’, and TWY ‘F’ South	Yes	2004
Reconstruct TWY ‘F’ North	Yes	1999
Reconstruct TWY Stub ‘F1’	Yes	1999
Relocate TWY ‘C’/ TWY ‘D’	Yes	2006
Aircraft Storage		
Construct T-hangar 1	Yes	2000
Construct T-hangars 2, 3, 4	No	-
Construct 27-Space Tie-down Area with Access/Parking	No	-
Construct 36-Space Tie-down Area with Access/Parking	No	-
Remove 14 Tie-downs Inside Runway Visibility Zone	Yes	2004
Facilities/Equipment		
Relocate Electrical Vault	No	-
Purchase Snowplow #1/Snowplow #2	Yes	Unknown
Install Sewer Line to Westerly System for New Terminal	Yes	2001
Install Oil-Water Separator	No	-
Property Acquisition/Easements		
Acquire Runway Protection Zone Easements – RWY 14 End	No	-
Acquire Runway Protection Zone Easements – RWY 32 End	Yes – land acquired	1999, 2001, and 2008
Acquire Runway Protection Zone Easements – RWY 25 End	No	-
Other		
Acquire Land for 36-Space Tie-down Area with Access/Parking	Yes	2000
Construct Auto Parking Area	Yes	2001
Demolish Old and Construct New Terminal Building	Yes	2002/2003

Sources: Airport Master Plan Update, Westerly State Airport, November 1995.
Cowley, James. (Airport Manager). Personal interviews. June – July 2008.
Lattrell, Gail. (FAA). Email correspondence. December 2008.

2.1.6 Airport Inventory Summary

During the airport inventory in June 2008 the following airport facilities and equipment were identified as being in need of improvement:

- The pavement on the Main Ramp north of the Landmark Bulk hangar has some rutting and alligator cracking[22] and is deteriorating;
- The pavement on the western portion of Taxiway D has thermal cracking and is deteriorating;[23]
- The soil conditions in the turf Runway Safety Areas (RSAs) for both Runways 7-25 and 14-32 are unstable and eroding;
- The runway paint markings are fading and the edge and centerline markings are yellowing;
- The airport security fence does not enclose the entire airport;
- Trees and other natural obstructions exist within protective airspace surfaces at the approach ends of all runways and along the south edge of Runway 7-25 and east and west of the approach ends of Runway 14 and 32;
- The airport equipment storage building is not large enough to house the airport's snow removal equipment, which is now stored outdoors; and
- The 1979 Snogo snow plow/blower is in poor condition.

In addition to visual inspections, discussions with the Airport Manager and airport users indicate that the airport lacks the following:

- An additional instrument approach. Runway 7 has a non-precision instrument approach;
- A common traffic advisory frequency (CTAF) and pilot controlled lighting frequency dedicated to WST. Currently, WST shares the same frequency with Block Island Airport and each airport should have its own dedicated frequency;
- A pavement maintenance plan; and
- Additional aircraft storage facilities (aircraft hangars and additional tie-downs).

22 U.S. Department of Transportation, Federal Aviation Administration, AC 150/5320-17, Airfield Pavement Surface Evaluation and Rating Manuals, U.S. Government Printing Office, Washington, DC, July 12, 2004, Appendix 1, p. 5 and p. 11.
Rutting is the displacement of material, creating channels in wheelpaths and alligator cracking is defined as interconnected cracks forming small pieces ranging in size from about 1" to 6".

23 U.S. Department of Transportation, Federal Aviation Administration, AC 150/5320-17, Airfield Pavement Surface Evaluation and Rating Manuals, U.S. Government Printing Office, Washington, DC, July 12, 2004, Appendix 1, p. 7.
Thermal cracking usually begins as hairline or very narrow cracks; with aging they widen. If not properly sealed and maintained, secondary or multiple cracks develop parallel to the initial crack. The crack edges can further deteriorate by raveling and eroding the adjacent pavement.

2.2 Airport Activity Forecasts

Forecasts serve as a basis for planning the facilities needed to accommodate demand at an airport. The projections are estimates of future activity based largely on variable factors such as the economy, local population, employment, income levels, the cost of flying, and the number of based aircraft at an airport.

This chapter contains forecasts of future activity at WST, which estimate growth over the next twenty years (2008 – 2028). The aviation activity presented in this chapter will serve as a basis for planning future facility needs which are presented in Section 2.3, *Facility Requirements/ALP Update Recommendations*, of this Report.

2.2.1 Forecast

This ALP Update relied on forecasts of future airport activity based on projections presented in the 2007 Draft Rhode Island State Airport System Plan (RISASP).[24] The RISASP forecasts were accepted as a basis for the ALP Update by the FAA and RIAC.[25] The RISASP forecast projected aviation activity at WST through 2021 using 2001 as the base year. VHB reviewed the forecasts and found them reasonable; however, since the previous forecasts, the VHB Team identified the following three issues:

- The split of transient versus local general aviation operations differed in the RISASP forecast from actual;
- Actual based aircraft in 2007 were much lower than predicted in the RISASP forecast; and
- Actual general aviation operations counted from 2002 through 2007 were much higher than predicted in the RISASP forecast.

For these reasons the forecast used for this ALP Update: (a) modified the forecast split of transient versus local general aviation operations, (b) changed the base year from 2001 to 2007, and (c) forecasted airport activity from 2008 through 2028.
The RISASP forecast identified a 50/50 split in local versus transient operations. However, discussions with the Airport Manager, airport tenants, and local pilots in June 2008 indicated that the split is more like 70 percent transient and 30 percent local. The 2007 airport activity counts, collected during the June 2008 site visit, indicate a 63 percent transient and 37 percent local. Therefore, a 60/40 percent split was used in this ALP Update rather than the split identified in the RISASP forecast. As was the case in the RISASP forecast, the assumed percent split (60/40) will remain unchanged throughout the forecast period for this ALP Update.

Since 2001, RIAC, together with Landmark Aviation Services, outlined appropriate aircraft activity (operations and passenger enplanements) counting procedures for the publicly owned airports in the State. These new procedures, although not an exact science, but rather estimates of aviation activity, provided more reliable activity counts for the State's non-towered facilities.[26] The counting procedures are based on data collected from fueling records, based aircraft movements, transient sign-in logs, and the collection of landing fees, all recorded on a daily basis by the Airport Manager and airport tenants and compiled into a monthly report. The

24 Draft Rhode Island State Airport System Plan, State Guide Plan Element 640, Chapter 640.03, Projections of Aviation Demand, September 28, 2007.
25 The FAA and RIAC agree that the forecast from the State System Plan should be used.
Brenda Pope (RIAC), "RE: Westerly Airport Activity," July 22, 2008, email office communication.
26 WST does not have an operating air traffic control tower with air traffic control personnel available to count airport activity.

practice of collecting airport activity data for WST using these new aircraft activity counting procedures was implemented toward the end of 2001. As a result, based aircraft and general aviation operations data collected after 2001 proved to be significantly different but more accurate than previous estimates. Actual based aircraft in 2007 were much lower than predicted in the RISASP forecast (68 actual versus the 86 projected for 2007 in the RISASP forecast). Actual general aviation operations counted from 2002 through 2007 were much higher than predicted in the RISASP forecast. In 2007, RIAC recorded 16,982 general aviation operations, while the RISASP forecast predicted 6,880 general aviation operations for 2007. Because the RISASP forecast highly overestimated based aircraft and underestimated general aviation activity, adjustments were made for this ALP Update to reflect current aviation activity levels using 2007 as the base year.

Because the average annual FAA growth rates used in the RISASP forecast were similar to more current FAA growth rates, the same growth rates and assumptions used in the RISASP forecast were applied to the actual 2007 airport activity to forecast through 2028 for this ALP Update.

Based Aircraft

The RISASP forecast for based aircraft used projections of U.S. active general aviation aircraft from the *FAA Aerospace Forecasts Fiscal Years 2002-2013*, which projected an average annual growth rate (AAGR) of approximately 0.36 percent for based aircraft from 2001 through 2021. Review of the FAA's more recent aerospace forecasts (*FAA Aerospace Forecasts Fiscal Years 2007-2020*) for the U.S. active general aviation aircraft indicate similar growth rates. Therefore, VHB used the same 0.36 percent AAGR for based aircraft as the RISASP forecast to project based aircraft activity through 2028 with 2007 as the base year (68 aircraft).

According to discussions with the Airport Manger, the aircraft fleet mix has remained fairly consistent since the 1995 Master Plan/ALP Update with single engine aircraft accounting for the majority (85 percent), multi-engine (10 percent), and the remaining 5 percent a mix of jet and other aircraft such as ultra-light aircraft. Based on the RISASP forecast, the fleet mix is anticipated to remain consistent throughout the planning period and therefore, will remain constant throughout this ALP Update.

Aircraft Operations

The RISASP forecast for general aviation operations used the AAGR of general aviation aircraft hours flown, projected by the FAA, to project general aviation operations. According to forecasts in the *FAA Aerospace Forecast FY 2002-2013*, hours flown by general aviation aircraft are projected to increase 1.1 percent per year, on average, over the forecast period. Operations were projected to grow slowly at 0.6 percent per year on average between 2001 and 2006 then over the next 15 years (2006 to 2021) at a higher average annual rate (1.3 percent). Review of the FAA's more recent aerospace forecasts (*FAA Aerospace Forecasts Fiscal Years 2007-2020*) for the general aviation aircraft hours flown identify similar growth rates beyond 2006. Therefore, VHB used the same 1.3 percent AAGR for general aviation aircraft operations as the RISASP forecast to project aircraft operations activity through 2028 for this ALP Update.

The RISASP forecast for commercial service operations applied a market share methodology using the airport's share of commercial service operations in New England, as projected by the FAA in the *Terminal Area Forecasts (TAF)*. Historic information for the airline identified a continued decline in commercial service operations. According to New England Airline records, scheduled commercial service operations fell in the early 1990s and have remained relatively unchanged since 1992. Based on a decreasing share of New England's commercial operations over the last decade, it was projected that this trend will continue. By applying this methodology, the RISASP forecast indicates that the airport's commercial operations would increase at 0.01 percent per year on average over the planning period. The RISASP forecast projected that WST would have 6,590 commercial service operations in 2007, which is similar to the actual 6,126 commercial operations recorded in 2007 by the airport. Review of the FAA's more recent terminal area forecasts (*FAA Terminal Area Forecasts 2007-2025*) identifies slightly lower growth rates. However, using the AAGR from the RISASP forecast to forecast commercial service operations for this ALP Update allows these forecasts to fall within the tolerance established by FAA guidance that specifies airport forecasts to be within 10 percent of the FAA TAF for the first five years and 15 percent for the next 10 years. Therefore, VHB used the same 0.01 percent AAGR for commercial operations as the RISASP forecast to project activity through 2028 for this ALP Update.

Passenger Enplanements

According to the RISASP forecast, discussions with New England Airlines indicate that the carrier does not have any plans to increase its fleet or scheduled operations throughout the forecast period. Based on this information, enplanements at WST are projected to experience minimal growth over that period. Based on historic enplanement trends and discussions with New England Airlines, a decreasing market share of total U.S. enplanements was chosen as the preferred methodology to project WST future enplanements. By applying this methodology, the airport's enplanements are expected to increase at 1.8 percent per year on average over the planning period. An AAGR of 1.8 percent in the RISASP forecast projected that WST would have 10,611 passenger enplanements in 2007, which is close to the actual 9,115 commercial enplanements recorded by the airport. Review of the FAA's more recent terminal area forecasts (*FAA Terminal Area Forecasts 2007-2025*) identifies slightly lower growth rates. However, using the AAGR from the RISASP forecast to predict enplanements for this ALP Update allows these forecasts to fall within the tolerance established by FAA guidance similar to commercial service operations. Therefore, VHB used the same 1.8 percent AAGR for passenger enplanements as the RISASP forecast to project activity through 2028 for this ALP Update.

Airfield Requirements

Federal Aviation Administration AC 150/5300-13, *Airport Design,*[27] outlines the standards and recommendations for airport facility design. The design of runways, taxiways, ramps, and other facilities needs to be maintained and developed according to the characteristics of the most demanding aircraft. The FAA's AC 150/5300-13 has established the Airport Reference Code (ARC) as the method of determining geometric design criteria for airports. ARC is a coding system used by the FAA that is based on two components: aircraft approach speed and wingspan. The aircraft with the most critical approach speed and wingspan and number of annual operations that is expected to use the airport on a regular basis[28] determines

27 U.S. Department of Transportation, Federal Aviation Administration, AC 150/5300-13, Airport Design, U.S. Government Printing Office, Washington, DC, Changes 1 -13, September 1989.
28 The FAA defines a "regular basis" as at least 500 operations per year.

the most demanding aircraft and thus the size and design of runways, taxiways, ramps, safety areas, and other airfield features.

Based on the 1995 Airport Master Plan, and approved by the FAA, an ARC of B-II was established for use in airport facility design for WST.[29] The RISASP also establishes the current and future ARC of B-II for WST.[30] Aircraft classified as ARC B-II include those with approach speeds of 91 knots or more but less than 121 knots, and wingspans of 49 feet or more but less than 79 feet such as the multiengine turboprop Beech Super King Air 200 or the small business jet, the Cessna Citation II. Because the aircraft fleet mix has remained fairly consistent since the 1995 Master Plan/ALP Update and is anticipated to remain consistent throughout the planning period, it is assumed that an ARC of B-II will be used in this ALP Update as well.

29 Airport Master Plan Update, Westerly State Airport, Hoyle, Tanner, and Associates, November 1995, p. 13.
30 Draft Rhode Island State Airport System Plan, State Guide Plan Element 640, Chapter 640.03, Projections of Aviation Demand, *Figure 640-02 (06), General Airport Data*, September 28, 2007, p. 02-08.

2.2.2 Forecast Summary

Table 2-6 depicts the forecasts of future aviation activity at WST through 2028.

Table 2-6 Forecast Aircraft Activity Projections (2008 – 2028)

Description	2007 (Existing)[1]	2013	2018	2023	2028	AAGR (2008-2028)
Based Aircraft						
Single Engine	58	59	60	61	62	0.3%
Multi-Engine	7	7	7	7	7	0.0%
Jet	1	1	1	2	2	3.6%
Other	2	2	2	2	2	0.3%
Total Based Aircraft	**68**	**69**	**71**	**72**	**73**	**0.36%**
Operations						
General Aviation (GA)	16,982	18,350	19,575	20,880	22,273	1.3%
Transient[2]	10,687	11,010	11,745	12,528	13,364	1.1%
Local[2]	6,295	7,340	7,830	8,352	8,909	1.6%
Commercial Aviation	6,590	6,595	6,599	6,604	6,608	0.01%
Total Operations	**23,572**	**24,946**	**26,174**	**27,484**	**28,881**	**0.97%**
Total Enplaned Passengers	**9,115**	**10,145**	**11,091**	**12,126**	**13,257**	**1.8%**

Notes:

1. VHB reviewed the forecasts and found them reasonable; however, due to differences between projections in the RISASP forecast and actual airport activity, 2007 replaced 2001 as the base year to forecast airport activity through 2028 for this ALP Update.
2. The RISASP forecast identified a 50/50 split in local versus transient operations. However, discussions with the Airport Manager, airport tenants, and local pilots in June 2008 indicated that the split is more like 70 percent transient and 30 percent local. The 2007 airport activity counts indicate a 63 percent transient and 37 percent local. Therefore, a 60/40 percent splits will be used in the ALP Update rather than the split identified in the RISASP forecast. As was the case in the RISASP forecast, the assumed 60/40 percent split will remain unchanged throughout the forecast period.

AAGR -- Average Annual Growth Rate

2.3 Facility Requirements/ALP Update Recommendations

Future facility requirements are determined by examining the airport's existing facilities presented in Section 2.1, *Airport Inventory*, and identifying facility deficiencies that may exist based on the projected airport activity presented in Section 2.2, *Airport Activity Forecasts*.

The objective of this task is to identify deficiencies in the airport's existing facilities based on federal design standards and to determine if the airport's existing facilities can accommodate existing and future airport demand based on the airport activity forecast. It is an unconstrained view of airport needs. As a result of the facility requirements analysis, projects are reviewed to determine their feasibility and whether they are ultimately recommended on the Airport Layout Plan.

This section includes analysis of the following:

- Airfield Requirements
  - Pavements
  - Runway Safety Areas
  - Navigational, Visual and Marking Aids and Signs
  - Airport Obstructions
  - Airport Security
- Airport Support Equipment Requirements
- Aircraft Storage Requirements
- Facility Requirements Summary

To determine future facility requirements for airports, two key factors are considered: airport design standards and forecasts of future airport activity. The FAA uses various standards and guidelines for airport design and construction. As indicated in the previous section, a key source used for airport design is the FAA's AC 150/5300-13, *Airport Design*,[31] which outlines the standards and recommendations for the design of various airport facilities such as runways, taxiways, ramps, and safety areas. AC 150/5300-13 also makes reference to other advisory circulars that provide specific recommendations for various airport facilities. The FAA-approved ARC for WST is B-II.[32, 33]

WST facilities currently meet the airfield geometry requirements to accommodate B-II aircraft. However, several of the facilities at WST do not meet other FAA standard criteria. Therefore, future projects are considered in this section to accommodate those standards or to improve the level of safety at the airport.

31 U.S. Department of Transportation, Federal Aviation Administration, AC 150/5300-13, Airport Design, U.S. Government Printing Office, Washington, DC, Changes 1 -13, September 1989.
32 *Airport Master Plan Update, Westerly State Airport*, Hoyle, Tanner, and Associates, November 1995, p. 13.
33 Draft Rhode Island State Airport System Plan, State Guide Plan Element 640, Chapter 640.03, Projections of Aviation Demand, *Figure 640-02 (06), General Airport Data*, September 28, 2007, p. 02-08.

Forecasts of future airport activity also play a major role in determining future facility requirements. Forecasts of future activity levels are the basis for effective decisions in airport planning. Activity projections are used to determine the need for new or expanded facilities. All of the recommendations identified in this section are depicted graphically in Section 2.4, *Airport Plans*.

2.3.1 Airfield Pavements

FAA Grant Assurance 11 requires airport sponsors to implement effective airport pavement maintenance for the useful life of any pavement constructed, reconstructed, or repaired with federal assistance.[34] AC 150/5380-6B, *Guidelines and Procedures for Maintenance of Airport Pavements,*[35] and AC 150/5380-7A, *Airport Pavement Management Program*,[36] provide guidance to develop a pavement maintenance management program. To be in compliance with FAA Grant Assurance 11, such a pavement management program should be considered and implemented at WST.

As indicated in Section 2.1, *Airport Inventory*, between 1999 and 2006, RIAC completed runway, taxiway, and ramp reconstruction or overlays on all pavements with the exception of a portion of the Main Ramp, Reeves Aviation ramp, and the western portion of Taxiway D, which based on a visual inspection, appear to be in poor condition. See Figure 2-3 for existing pavement condition. According to AC 150/5380-6B, *Guidelines and Procedures for Maintenance of Airport Pavements*, airfield pavement may require an overlay or reconstruction when the original pavement has served its design life. The Main Ramp (area located north of the Landmark Bulk hangar only), Reeves Aviation ramp, and the western portion of Taxiway D appear to have reached their useful life and should be reconstructed within this planning period.

Because the design life of pavement varies from airport to airport based on annual use, load bearing capacity, environmental conditions, or original design, the AC does not specify a typical pavement design life; however, most airports complete basic pavement maintenance such as crack sealing or overlays every few years and depending on use, a major rehabilitation may be necessary. Although RIAC completed runway, taxiway, and ramp reconstruction or overlays on all pavements between 1999 and 2006 (with the exception of the Main Ramp north of the Landmark Bulk hangar, Reeves Aviation ramp, and the western portion of Taxiway D), the following pavements will need to be evaluated and included in a pavement management program to determine future pavement maintenance needs within this ALP Update:

- Runway 14-32 pavement
- Runway 7-25 pavement
- Taxiway A pavement
- Taxiway B pavement
- Taxiway C pavement
- Taxiway D pavement
- Taxiway E pavement

34 U.S. Department of Transportation, Federal Aviation Administration, Grant Assurances for Airport Sponsors, March 2005, p. 5.
35 U.S. Department of Transportation, Federal Aviation Administration, AC 150/5380-6B, Guidelines and Procedures for Maintenance of Airport Pavements, U.S. Government Printing Office, Washington, DC, September 28, 2007.
36 U.S. Department of Transportation, Federal Aviation Administration, AC 150/5380-7A, Airport Pavement Management Program, U.S. Government Printing Office, Washington, DC, September, 2006.

- Taxiway F pavement
- Main Ramp

2.3.2 Runway Safety Areas

A runway safety area (RSA) is a graded, rectangular area, centered on the runway centerline, and extended beyond the runway ends and runway edges. The purpose of the RSA is to support, under dry conditions, snow removal and aircraft rescue and firefighting equipment and the occasional passage of aircraft without causing major damage to the aircraft. The RSA must be cleared and graded and have no potentially hazardous ruts, humps, depressions, or other surface variations. RSAs are typically turf surfaces, which normally reduces the possibility of soil erosion. However, the grass seed used in the RSA are not suitable for the sandy soils at WST. A visual inspection indicates that the turf roots are not well anchored in the sandy soil. It has eroded and caused ruts and depressions in the RSA. Reseeding the RSA with a grass mixture that will thrive in sandy soil conditions is recommended within this planning period.

2.3.3 Navigational Aids, Airport Visual Aids, and Airport Marking Aids and Signs

The following improvements should be considered within this ALP Update:

- Commission a GPS approach to Runway 25;
- Remove and replace the VASIs with PAPI systems for Runway 7-25;
- Apply for a new Federal Communication Commission (FCC) license for pilot controlled lighting; and
- Repaint runway paint markings for both Runways 7-25 and 14-32.[37]

Discussions with the Airport Manager, airport tenants, and airport users indicate that the installation of an instrument approach to Runway 25 would enhance operational capabilities for the airport. Currently, only Runway 7 has an instrument approach (a non-precision localizer approach). The evaluation of a global positioning system (GPS) approach is recommended for WST for the following reasons:

- According to wind analysis, observations, and discussions with the Airport Manager, airport tenants, and airport users, Runway 25 is used approximately 50 percent of the time, while Runway 7, with the existing instrument approach, is used approximately 10 percent of the time. With the frequency of use, equipping Runway 25 with an instrument approach would broaden pilot’s instrument approach options.
- A GPS approach to Runway 25 would increase the potential for more arrival operations over vacant land uses northeast of WST.
- A GPS approach to Runway 25 would broaden a pilot’s instrument approach options during inclement weather when an instrument approach is most needed.
- The land at the approach end of Runway 25 is largely undeveloped, versus the approach areas for Runways 14 and 32, which are largely commercial and residential. The approach surfaces for Runway 25 could be more easily protected.

37 The remarking of pavement is not eligible for federal funding under the FAA’s Airport Improvement Program but is only mentioned here as a maintenance item to be considered by RIAC.

The installation of a new approach will also require the completion of an Aeronautical Study to analyze the slope for obstructions for a new non-precision approach. Currently, Runway 25 is a visual approach and requires a clear approach at a slope of 20 feet to 1. A non-precision approach requires a clear approach surface at a slope of 34 feet to 1 foot; therefore, an FAA Aeronautical Study is required to implement a non-precision approach.

According to AC 150/5340-30C, *Design and Installation Detail for Airport Visual Aids*,[38] the FAA recommends the installation of visual approach slope guidance indicators to provide additional guidance for a visual or non-precision approach. Visual approach slope guidance indicators provide visual descent guidance information during the approach to a runway. At WST, the non-precision approach for Runway 7 and the visual approach for Runway 25 are supplemented with visual approach slope indicators (VASIs). However, the VASI systems are being replaced by precision approach path indicator (PAPI) systems due to several shortcomings of the existing VASI system. The PAPI was designed to replace the VASI to provide more stable and accurate tracking to final approach. The PAPI was accepted and certified in 1981 by the International Civil Aviation Organization (ICAO).[39] The VASI system lost its ICAO certification in 1995. Because of the VASI shortcomings and because the VASI is no longer manufactured and replacement parts are difficult to find, replacement of the VASI on Runways 7 and 25 with PAPI systems is recommended within this planning period.

The Common Traffic Advisory Frequency (CTAF) is used by pilots for air-to-air communication at non-towered airports. The CTAF is used by pilots to coordinate their arrivals and departures safely, to provide position reports to other pilots, and to and acknowledge other aircraft in the airfield traffic pattern. Typically, the CTAF frequency is also used during nighttime operations to activate runway, taxiway, and navigational aid lighting. As indicated in Section 2.1, *Airport Inventory*, the CTAF, 123.0, is the same frequency used at both Block Island and Westerly. Discussions with the Airport Manager, airport users, and RIAC staff indicate that two problems exist with the shared frequency. The first problem is considered more of an annoyance and concerns the unnecessary activation of the pilot controlled lighting by Block Island pilots and the second is a safety concern voiced by the pilot community. During nighttime operations when pilot controlled airport lighting is activated at Block Island, WST's lights are also illuminated and vice-versa. Complaints from both the pilot and residential community have been made regarding constant unnecessary illumination of the runway lights from Block Island pilots. The pilot community is concerned about the safety of using the same frequency for two nearby airports. Pilots operating at WST can pick up the communications from pilots operating at Block Island and vice-versa. During the busy summer season, this frequency can become congested. Therefore, the pilot community has suggested applying for a new FCC license for the WST CTAF. For safety purposes and to avoid unnecessary activation of pilot controlled lighting, a new FCC license requesting a new CTAF frequency is recommended within this planning period.

38 U.S. Department of Transportation, Federal Aviation Administration, 150/5340-30C, Design and Installation Detail for Airport Visual Aids, U.S. Government Printing Office, Washington, DC, September 20, 2007, p. 49.
39 ICAO is an international organization formed in 1910 to standardize basic principals governing aviation and aviation safety worldwide.

As indicated in Section 2.1, *Airport Inventory*, a visual inspection during the June 2008 site visits indicated that the runway edge and centerline markings are fading and yellowing. According to AC 150/5340-1J, *Standards for Airport Markings*,[40] paint markings are used to enhance the runway, taxiway, and ramp environment, especially during nighttime operations or during low visibility due to weather. Therefore, the visibility of paint markings is essential. Markings that cannot be seen by pilots or markings that are confusing are useless. For airport projects receiving federal funds under the Airport Grant Assistance program it is mandatory that these guidelines and standards are followed and the markings maintained.[41] Therefore, due to the fading and yellowing condition of the white runway paint, the runway markings should be repainted as often as necessary. Although it is not a capital improvement project listed on the ALP, it is a maintenance item to be accomplished by RIAC in the future.

2.3.4 Airport Obstructions

As indicated in Section 2.1, *Airport Inventory*, RIAC completed an aeronautical study in 2007 to identify obstructions that penetrate the imaginary surfaces for WST. The following surfaces were analyzed in the aeronautical study:

- FAA Advisory Circular 150/5300-13, Airport Design, Appendix 2, Runway End Siting Requirements;
- FAA Order 8260.3, United States Standard for Terminal Instrument Procedures (TERPS); and
- Title 14 Code of Federal Regulations Part 77, *Objects Affecting Navigable Airspace*.

FAA Advisory Circular 150/5300-13, *Airport Design, Appendix 2, Runway End Siting Requirements*, contains guidance on siting thresholds to meet approach obstacle clearance requirements and departure obstacle clearance requirements at airports.[42]

FAA Order 8260.3, *United States Standard for Terminal Instrument Procedures (TERPS),*[43] contains standardized regulations used to design instrument flight procedures and provides guidance relating to required obstacle clearances. TERPS specifies the minimum measure of obstacle clearance required for a particular instrument procedure at an airport and is required for instrument approach and departure procedures.

Federal Regulations Part 77, *Objects Affecting Navigable Airspace*,[44] establishes imaginary surfaces above airports to protect navigable airspace from objects/obstructions. Imaginary surfaces are based on the classification of the runway and the type of existing and future approach available. Logically, the dimensions of the imaginary surfaces for a precision instrument approach runway are larger than those associated with a

40 U.S. Department of Transportation, Federal Aviation Administration, AC 150/5340-1J, Standards for Airport Markings, U.S. Government Printing Office, Washington, DC, April 29, 2005.
41 U.S. Department of Transportation, Federal Aviation Administration, AC 150/5340-1J, Standards for Airport Markings, U.S. Government Printing Office, Washington, DC, April 29, 2005, p. 49.
42 U.S. Department of Transportation, Federal Aviation Administration, Advisory Circular 150/5300-13, Airport Design, U.S. Government Printing Office, Washington, DC, Appendix 2, Runway End Siting Requirements, September 2006, p. 100.
43 U.S. Department of Transportation, Federal Aviation Administration Order 8260.3, United States Standard for Terminal Instrument Procedures (TERPS), U.S. Government Printing Office, Washington, DC, Change 19, May 15, 2002.
44 U.S. Department of Transportation, Federal Aviation Administration, Federal Regulations Part 77, Objects Affecting Navigable Airspace, U.S. Government Printing Office, Washington, DC, March, 1993.

non-precision or visual runway to provide greater safety margins for operations in more degraded ceiling and visibility conditions.

As indicated in Section 2.1, *Airport Inventory,* the FAA issued an Airspace Determination on August 31, 2007. See Appendix A.[45] The determination indentified a vegetation clearing and obstruction lighting plan for WST (Figure 2-12) and required RIAC to take the following action prior to August 2009.

- Runway 7:
  - Clear and maintain the obstacle clearance surface for the 3.6 degree VASI
  - Obtain easements on four parcels seven parcels to clear tree obstructions and install two obstruction lights in areas where trees are to remain. This runway will lose Category D approach minima for the runway unless the trees are removed.
  - Maintain hazard beacon on water tower on the right side of the approach[46]
- Runway 25:
  - Clear and maintain the obstacle clearance surface for the 3.0 degree VASI
  - Obtain easements on two parcels to clear tree obstructions
- Runway 14:
  - Clear and maintain the obstacle clearance surface for the 4.0 degree PAPI
  - Obtain easements on four parcels to clear tree obstructions and maintain the height of trees on land where existing easements exist
- Runway 32:
  - Clear and maintain the obstacle clearance surface for the 4.0 degree PAPI
  - Clear trees to the existing displaced threshold[47] and obtain easements on three parcels to clear tree obstructions and install one obstruction light in areas where trees are to remain.[48] Purchase property within the runway protection zone to control the height of trees.[49]

All FAA funding for the obstruction removal and lighting project has defined this as “high priority” work. The FAA would like to see the work completed in accordance with the deadline provided in its Airspace Determination. Some of the clearing, light installation, and acquisitions have already occurred.[50] The airport should continue to pursue the easements to clear and/or light those areas identified for vegetation obstruction clearing in 2009 (see Section 2.4, Airport Plans, drawing 6 of 7).

In an effort to meet various legislative requirements and to continue to protect navigable airspace, the following surfaces have been considered in defining a recommended Airport Hazard Area so that the Town of

45 Notice of Determination Letter from Gail Lattrell (FAA Airport Planner) to Mark Brewer (President and CEO for the Rhode Island Airport Corporation) dated August 31, 2007 RE: Aeronautical Study Number 2007-ANE-97-NRA.
46 This effort is on-going.
47 Most of the on-airport obstructions were cleared in June 2007. Other on-airport obstruction removal was underway during the June 2008 site visits.
48 Two of the three easements were obtained by RIAC on May 11, 2001 and trees cleared.
49 The property was purchased by RIAC in July 2008.
50 Most of the on-airport obstructions were cleared in June 2007. Other on-airport obstruction removal was underway during the June 2008 site visits. Runway 32: Two of the three easements were obtained in 2001. One other easement is still required and the property was acquired by RIAC in July 2008.

Westerly can develop and adopt Airport Hazard Zoning per the requirements of the Airport Zoning Act. See Section 3.4.2, *Recommended Airport Hazard Area,* of this report for more information:

- Title 14 Code of Federal Regulations Part 77, *Objects Affecting Navigable Airspace*;
- FAA Advisory Circular 150/5300-13, Airport Design, Appendix 2, Runway End Siting Requirements; and
- FAA Order 8260.3, United States Standard for Terminal Instrument Procedures (TERPS).

2.3.5 Airport Security

An Airport Operating Certificate, regulated under Federal Aviation Regulation (FAR) Part 139, is required at airports that:

- Serve scheduled and unscheduled air carrier aircraft with more than 30 seats;
- Serve scheduled air carrier operations in aircraft with more than nine (9) seats but less than 31 seats; and/or
- The FAA Administrator requires the airport to have a certificate.

Airports that hold an operating certificate must provide safeguards to prevent inadvertent entry to the airport by unauthorized persons or vehicles. Airport security fencing is the most common means of securing the airport perimeter.

New England Airlines, the commercial operator at WST, conducts regularly scheduled flights to Block Island in aircraft with less than nine passenger seats. Because these commercial operations are conducted in aircraft with less than nine passenger seats, the FAA does not require WST to hold an Airport Operating Certificate nor does the FAA or Transportation Security Administration (TSA) require the airport to provide security fencing. Although security fencing is not a requirement for WST, both the FAA and TSA do recommend that some sort of barrier be used. The FAA also advises that the nation's airports provide security fencing as public protection in order to prevent possible wildlife hazards and inadvertent entry to the airport movement area (runways and taxiways) by unauthorized persons or vehicles. In addition, increased security awareness is warranted in the wake of the events of September 11, 2001. To improve the security surrounding the airport it is recommended that the security fencing around the airport property be completed within this planning period.

2.3.6 Airport Support Equipment Requirements

As indicated in Section 2.1, *Airport Inventory*, the airport currently has the following equipment to remove snow at the airport:

- 1979 Snogo Snow Blower
- 1997 Ford Snow Plow
- 1979 John Deere tractor

The following projects should be considered:

- The purchase of a new snow plow/blower to replace the 1979 Snogo snow blower; and
- The construction of a new Snow Removal Equipment (SRE)/Maintenance Equipment facility.

Discussions with the Airport Manager indicate that the existing Snowgo snow blower is getting old and unreliable. Therefore, the purchase of a new snow blower should be considered to remove snow from the airport's operating surfaces.

The airport equipment storage garage cannot accommodate any of the snow removal equipment, forcing the airport to store the equipment outdoors. To accommodate the airport's existing snow equipment and any additional equipment purchased, an adequate snow removal equipment storage facility is needed. In AC 150/5220-18A, *Buildings for Storage and Maintenance of Airport Snow and Ice Control Equipment and Materials*,[51] the FAA provides guidelines and standards for airport snow and ice control equipment and materials storage buildings at public-used airports. This AC does not constitute a regulation and in general is not mandatory. However, snow removal equipment is a costly piece of complex equipment and to protect and service this expensive investment, specifically designed maintenance buildings with adequate storage areas are needed. RIAC has a snow removal equipment building earmarked on their current CIP. It is recommended that this facility be constructed to house the existing and any new equipment.

2.3.7 Aircraft Storage Assessment

Table 2-7 identifies the aircraft storage needs for based and transient aircraft based on the methodology used in the 1995 Airport Master Plan Update,[52] which was considered reasonable to forecast future aircraft storage requirements. Although timeframes for storage needs are identified below, demand will dictate the requirement and development of any such facilities.

51 U.S. Department of Transportation, Federal Aviation Administration, AC 150/5220-18A, Buildings for Storage and Maintenance of Airport Snow and Ice Control Equipment and Materials, U.S. Government Printing Office, Washington, DC, September 14, 2007.
52 Airport Master Plan Update, Westerly State Airport, Hoyle, Tanner, and Associates, November 1995, pp. 28 -30.

Table 2-7 WST Aircraft Storage Assessment

	Existing Capacity	2013		2018		2023		2028	
Transient Storage		**Estimated Demand**	**Surplus (Deficit)**	**Estimated Demand**	**Surplus (Deficit)**	**Estimated Demand**	**Surplus (Deficit)**	**Estimated Demand**	**Surplus (Deficit)**
Commercial Service Aircraft Parking	6	9	(3)	10	(4)	10	(4)	11	(5)
Other Transient Parking	18	14	4	15	3	16	2	17	1
Based Aircraft Storage	78	69	9	71	7	72	6	73	5

Source: VHB, 2008.

Table 2-7 indicates that commercial service aircraft parking requirements will be needed between 2008 and 2013. Although a surplus is indicated for other transient aircraft parking, discussions with the Airport Manager indicated that on busy weekends during the summer, the 18 existing aircraft parking spaces are full; therefore, current demand dictates that additional transient aircraft parking is needed.

Additional ramp space to accommodate commercial service aircraft parking requirements and other transient parking could be accomplished by reconfiguring the Main Ramp north and west of the Landmark Bulk hangar and removing the existing utility pole located directly in front of the Landmark Bulk hangar. See Section 2.4, Airport Plans, drawing 4 of 7. Better placement of the buildings in this area and paving some existing grass areas would open up this area, providing additional aircraft parking. The airport equipment storage garage can be demolished and the proposed new facility relocated closer to the Reeves Aviation's hangar. Discussions with one of the hangar tenants indicate that the existing T-hangars could be relocated to the back side of the paved area.[53] Therefore, reconfiguration of the Main Ramp north and west of the Landmark Bulk hangar is recommended to allow for more efficient use of this space and is recommended to take place within this planning period.

Additional based aircraft storage appears to be adequate throughout the planning period; however, land has been cleared north of the North American Hangar for the development of an additional hangar if construction becomes necessary. Also, discussions with the Airport Manager indicate that New England Airlines has shown interest in developing a corporate hangar(s) to store their fleet of aircraft. If additional land is cleared in the same general location of the land already cleared north of the North American Hangar, corporate hangars could be developed. See Section 2.4, *Airport Plans*, drawing 4 of 7.

53 Charles Levandoski (Airport tenant), T-hangar discussion during a public meeting held on November 6, 2008 at Westerly Town Council Chambers.

2.3.8 Facilities Requirements/ALP Update Recommendations Summary

All recommended ALP Update development projects can be accomplished within airport property boundaries. The only recommendations that extend outside of airport property boundaries include easement acquisition and other parcels required to clear and/or light tree obstructions. Table 2-8 summarizes the proposed ALP Update development projects recommended for this ALP Update. The ALP Update development projects that are recommended are consistent with the Rhode Island State Guide Plan[54] recommendations as they pertain to the role of the airport in the system.

54 Rhode Island State Airport System Plan, State Guide Plan Element 640, Draft September 28, 2007.

Table 2-8 2008 ALP Update Requirements and Proposed Project Recommendations

ALP Update Requirements – Priority Projects
Acquire easements to remove trees and to install obstruction lighting in areas where trees will not be removed. See Appendix A, FAA Airspace Determination Letter dated August 31, 2007.[1]
Remove airport obstructions and install obstruction lighting. See Appendix A, FAA Airspace Determination Letter dated August 31, 2007.[1]
Clear and maintain the obstacle clearance surface for the following:[1] 3.6 degree VASI - Runway 7 3.0 degree VASI - Runway 25 4.0 degree PAPI - Runway 14 4.0 degree PAPI - Runway 32
ALP Update Recommendations
Develop a pavement maintenance plan per FAA Grant Assurances
Apply for a new Federal Communications Commission (FCC) license for the Common Traffic Advisory Frequency (CTAF)/pilot controlled lighting
Define Airport Hazard Areas for use in land use compatibility planning
Reseed soil/turf in the Runway Safety Area (RSA) for both Runways 7-25 and 14-32
Reconstruct poor pavement on the Main Ramp, north of the Landmark aircraft storage hangar, and Reeves ramp
Relocate utility pole north of the Landmark aircraft storage hangar
Pavement evaluation is necessary to determine need and timing of rehabilitating the following pavements:
Runway 14-32 pavement
Runway 7-25 pavement
Taxiway A pavement
Taxiway B pavement
Taxiway C pavement
Taxiway D pavement (by FBO)
Taxiway E pavement
Taxiway F pavement
Main Ramp pavement
Complete Installation of airport security fencing
Remove VASIs on Runway 7 and 25 and replace with PAPIs
Construct a Snow Removal Equipment (SRE)/Maintenance Equipment building
Acquire additional snow removal equipment
Analyze and commission a Global Positioning System (GPS) approach to Runway 25 and conduct an FAA Aeronautical Study
Redesign Main Ramp north and west of the Landmark aircraft storage hangar
Construct aircraft storage facilities (tie-downs) for commercial service aircraft parking
Construct aircraft storage facilities (T-hangars) – Private Development
Construct corporate hangars – Private Development

2.4 Airport Plans

The Airport Layout Plan (ALP) is a graphic presentation to scale of both the current airport facilities and the proposed airport development projects. The future development recommended in Section 2.3, *Facility Requirements/ALP Update Recommendations*, was proposed through a combination of the following:

- Airport design requirements outlined in various FAA Advisory Circulars and Orders;
- Development recommendations made in the Rhode Island State Guide Plan for WST;
- Data collected and visual inspection of airport facilities during the site visits in June 2008; and
- Input from the Airport Manager, airport users, and airport tenants.

The ALP drawing set consists of drawings that illustrate additional detail required by the Federal Aviation Administration (FAA) in Advisory Circular (AC) 150/5070-6B, *Airport Master Plans, Appendix F - Airport Layout Plan Drawing Set* and FAA Order 5100.38C, *Airport Improvement Program Handbook*. The key to the entire set of drawings is the ALP. It provides a graphic, albeit conceptual representation of the 20-year development plan (2008 – 2028) for WST. To be eligible for FAA funds the airport development projects must be identified on the FAA-approved ALP.

The ALP drawing set includes the following drawings:

- Cover/Title Sheet — Sheet 0 of 7
- Existing Facilities Plan — Sheet 1 of 7
- Airport Layout Plan — Sheet 2 of 7
- ALP Data Sheet — Sheet 3 of 7
- Terminal Area Plan — Sheet 4 of 7
- Airport Part 77 Surface Drawing — Sheet 5 of 7
- Obstruction Clearing and Lighting Plan — Sheet 6 of 7
- Land Use Plan — Sheet 7 of 7

Each drawing was developed using the FAA's general guidelines in preparing the ALP Drawing Set as outlined in AC 150/5070-6B, *Airport Master Plans, Appendix F - Airport Layout Plan Drawing Set* and FAA Order 5100.38C, *Airport Improvement Program Handbook*. The primary drawing is the ALP, which is the overall development plan for the airport showing both the existing and ultimate facilities. The FAA, RIAC, the Town of Westerly, and other airport tenants refer to the ALP as a guide for future airport development. The following provides a brief description of each drawing.

- **Cover Sheet:** This sheet serves as a cover sheet for the ALP Drawing Set package. The sheet includes airport location and vicinity maps, a list of drawings included in the ALP Drawing Set, and other pertinent information as required by the FAA New England Region's Airports Office.

- **Existing Facilities Plan:** The Existing Facilities Plan identifies existing airport facilities as of June 2008 and includes airport boundaries, pavements, buildings, structures, major tenants/users, and airport design criteria.

- **Airport Layout Plan:** The Airport Layout Plan for WST depicts the recommended airport development program. The ALP clearly identifies existing and proposed facilities as well as areas reserved for future aviation and non-aviation related development. Specific details as required by the FAA are included per AC 150/5070-6B such as the airport reference point, ground contours, runway coordinates, and elevations.

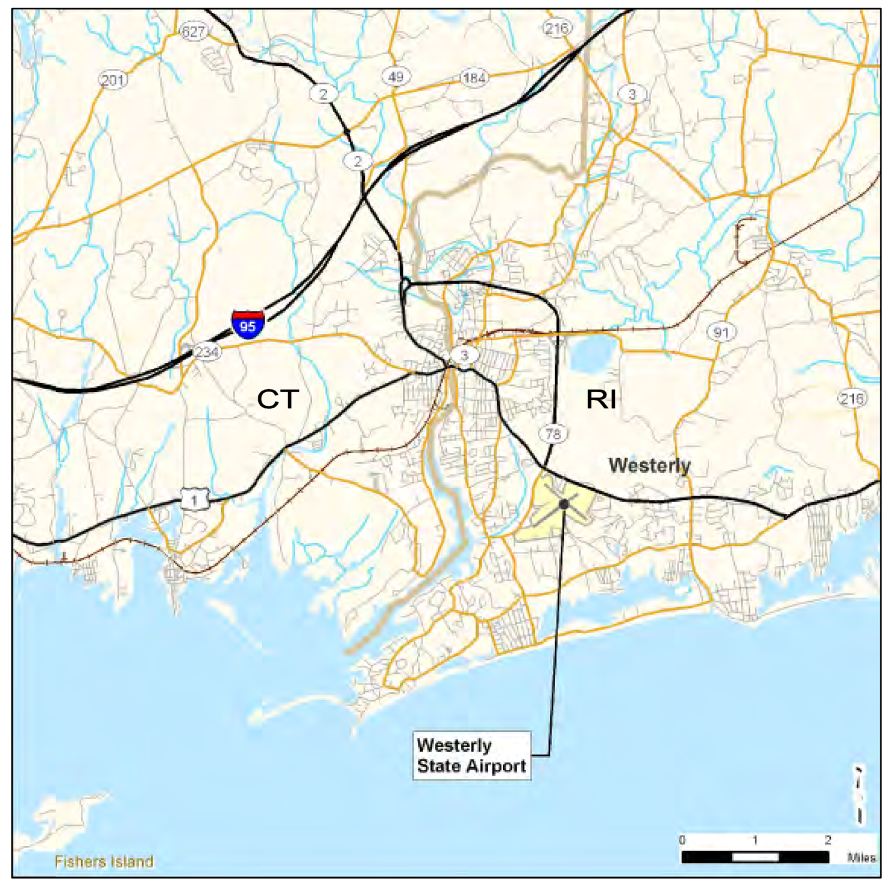
- **ALP Data Sheet:** The data sheet is a tabular presentation of basic airport and runway information, dimensions, and wind data per AC 150/5070-6B that is associated with the Airport Layout Plan (Proposed Facilities Plan).

- **Terminal Area Plan:** The Terminal Area Plan provides a more detailed focus on the aviation service facilities by simply providing an enlargement of the administration/terminal area diagram from the ALP.

- **Airport Part 77 Surface Drawing:** The airspace surfaces (FAR Part 77, *Objects Affecting Navigable Airspace*) for the ultimate development depicted on the ALP are identified in this drawing. The horizontal, conical, approach, and transitional surfaces are depicted together with an isometric sectional view of the airport's airspace.

- **Obstruction Clearing and Lighting Plan:** Based on discussions with RIAC on October 14, 2008, it was determined that this recently approved obstruction clearing and lighting plan for WST (approved by the FAA on August 31, 2007 - FAA Airspace Determination letter [Appendix A of this Report]) would be used in the ALP plan set. The purpose of a plan and profile drawing is to identify obstructions to air navigation. This recently approved obstruction clearing and lighting plan provides that information by identifying obstructions to the FAR Part 77, TERPS, and Threshold Siting Surfaces.

- **Land Use Plan:** This drawing depicts the airport boundary, land uses within the Town of Westerly in the vicinity of the airport, and existing noise contours.



VICINITY MAP

WESTERLY STATE AIRPORT
WESTERLY, RHODE ISLAND

AIRPORT LAYOUT PLAN

LOCATION MAP

RHODE ISLAND
AIRPORT CORPORATION

INDEX TO DRAWINGS

1. EXISTING AIRPORT FACILITIES PLAN
2. AIRPORT LAYOUT PLAN
3. ALP DATA SHEET
4. TERMINAL AREA PLAN
5. AIRPORT PART 77 SURFACE DRAWING
6. VEGETATIVE OBSTRUCTION CLEARING AND LIGHTING PLAN FOR REVISED AERONAUTICAL STUDY REQUEST
7. LAND USE PLAN

APRIL 24, 2009

VHB

Vanasse Hangen Brustlin, Inc.

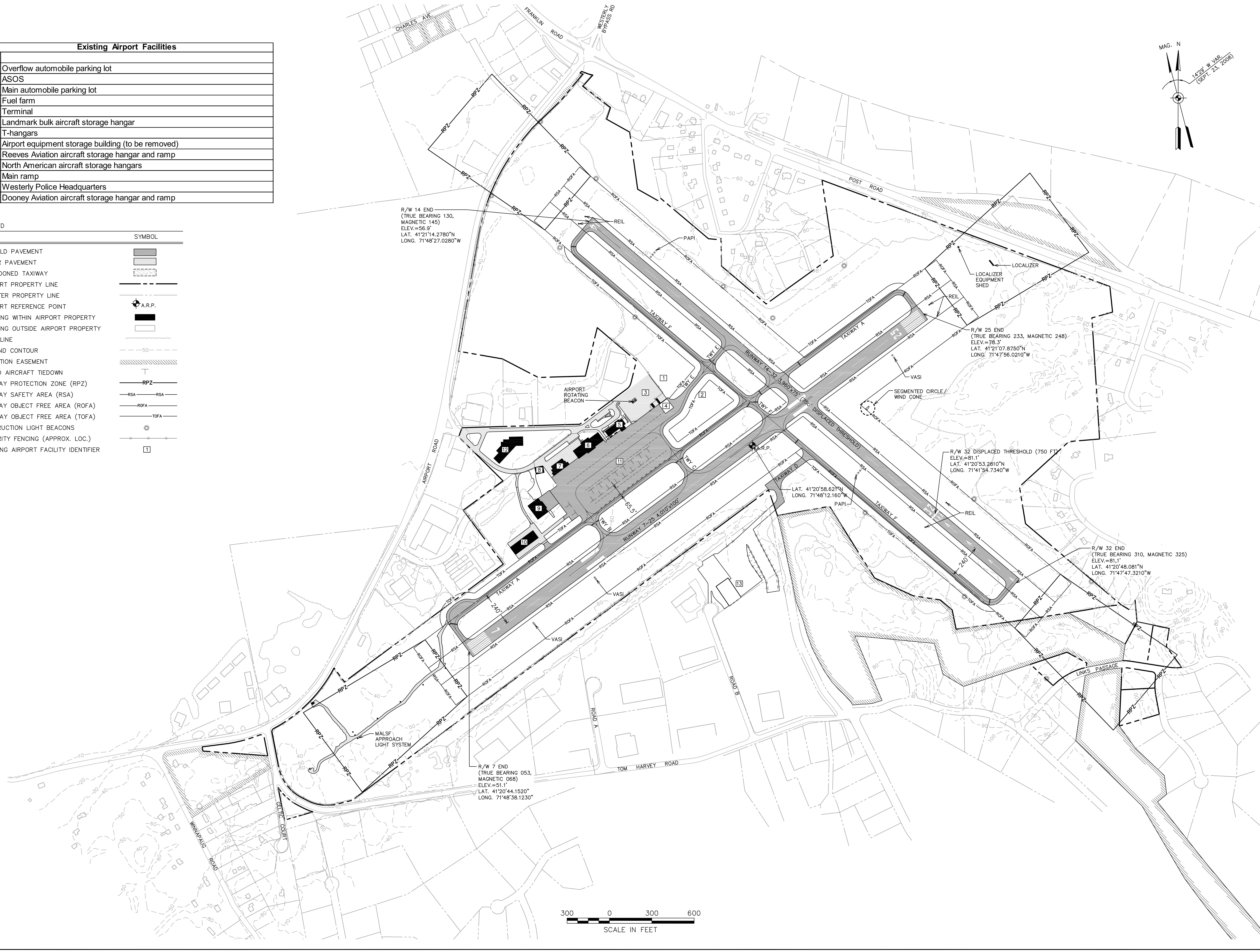
Transportation
Land Development
Environmental Services

101 Walnut Street, P.O. Box 9151
Watertown, Massachusetts 02471
617.924.1770 • FAX 617.924.2286

Existing Airport Facilities	
No.	
1	Overflow automobile parking lot
2	ASOS
3	Main automobile parking lot
4	Fuel farm
5	Terminal
6	Landmark bulk aircraft storage hangar
7	T-hangars
8	Airport equipment storage building (to be removed)
9	Reeves Aviation aircraft storage hangar and ramp
10	North American aircraft storage hangars
11	Main ramp
12	Westerly Police Headquarters
13	Dooney Aviation aircraft storage hangar and ramp

LEGEND

ITEM	SYMBOL
AIRFIELD PAVEMENT	
OTHER PAVEMENT	
ABANDONED TAXIWAY	
AIRPORT PROPERTY LINE	
ABUTTER PROPERTY LINE	
AIRPORT REFERENCE POINT	A.R.P.
BUILDING WITHIN AIRPORT PROPERTY	
BUILDING OUTSIDE AIRPORT PROPERTY	
TREE LINE	
GROUND CONTOUR	50
AVIGATION EASEMENT	
PAVED AIRCRAFT TIEDOWN	
RUNWAY PROTECTION ZONE (RPZ)	RPZ
RUNWAY SAFETY AREA (RSA)	RSA
RUNWAY OBJECT FREE AREA (ROFA)	ROFA
TAXIWAY OBJECT FREE AREA (TOFA)	TOFA
OBSTRUCTION LIGHT BEACONS	
SECURITY FENCING (APPROX. LOC.)	
EXISTING AIRPORT FACILITY IDENTIFIER	1



ENGINEER/ARCHITECT

REV.	DESCRIPTION	DR. BY	CHKD. BY	APPD. BY	DATE

PROJECT NO. 72088.01

FILE NAME 72088-EX-ALP

Vanasse Hangen Brustlin, Inc.

Transportation
Land Development
Environmental Services

101 Walnut Street, P.O. Box 9151
Watertown, Massachusetts 02471
617.924.1770 • FAX 617.924.2286

DES. BY BJS | DR. BY WHH | CHKD. BY BJS

DATE: APRIL 24, 2009

SCALE: AS SHOWN

WESTERLY STATE AIRPORT
WESTERLY, RHODE ISLAND

EXISTING AIRPORT FACILITIES PLAN

DRAWING NO.

1

SHEET 1 OF 7

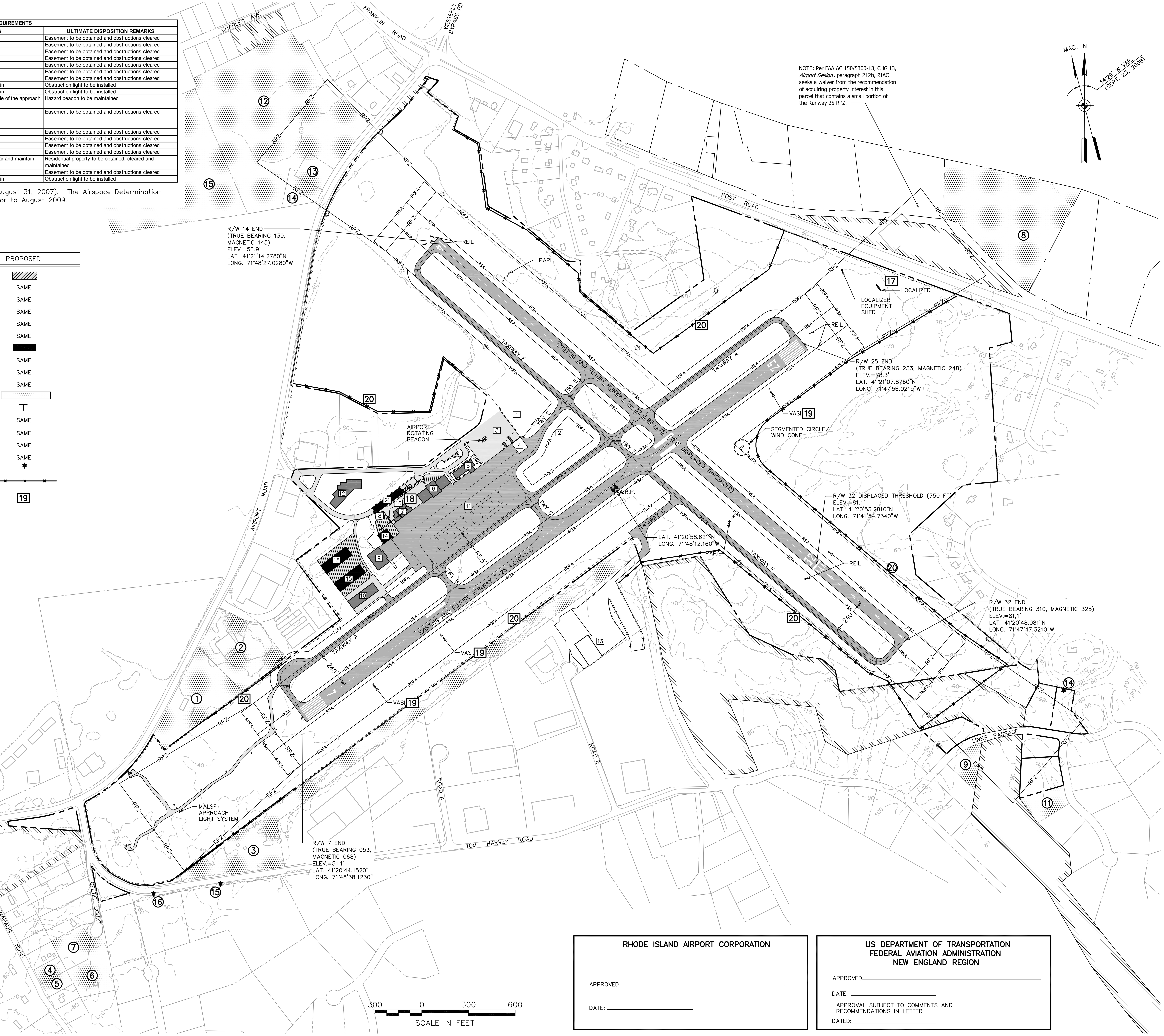
EASEMENT AND OBSTRUCTION CLEARING / LIGHTING REQUIREMENTS				
DESCRIPTION	EXISTING CONDITIONS	KEY	REQUIRED TO MEET STANDARDS	ULTIMATE DISPOSITION REMARKS
Runway 7 approach surfaces	Tree obstructions within Obstacle Clearance Surface (for 3.6 degree VASI)	1	Obtain easement and clear obstructions (trees)	Easement to be obtained and obstructions cleared
		2	Obtain easement and clear obstructions (trees)	Easement to be obtained and obstructions cleared
		3	Obtain easement and clear obstructions (trees)	Easement to be obtained and obstructions cleared
		4	Obtain easement and clear obstructions (trees)	Easement to be obtained and obstructions cleared
		5	Obtain easement and clear obstructions (trees)	Easement to be obtained and obstructions cleared
		6	Obtain easement and clear obstructions (trees)	Easement to be obtained and obstructions cleared
		7	Obtain easement and clear obstructions (trees)	Easement to be obtained and obstructions cleared
		15	Install obstruction light in area where trees are to remain	Obstruction light to be installed
		16	Install obstruction light in area where trees are to remain	Obstruction light to be installed
	Water tower within Transitional Surface	n/a	Maintain hazard beacon on water tower on the right side of the approach	Hazard beacon to be maintained
Runway 25 approach surface	Tree obstructions within Obstacle Clearance Surface (for 3.0 degree VASI)	8	Obtain easement and clear obstructions (trees)	Easement to be obtained and obstructions cleared
Runway 14 approach surface	Tree obstructions within Obstacle Clearance Surface (for 4.0 degree PAPI)	12	Obtain easement and clear obstructions (trees)	Easement to be obtained and obstructions cleared
		13	Obtain easement and clear obstructions (trees)	Easement to be obtained and obstructions cleared
		14	Obtain easement and clear obstructions (trees)	Easement to be obtained and obstructions cleared
		15	Obtain easement and clear obstructions (trees)	Easement to be obtained and obstructions cleared
Runway 32 approach surfaces	Residential property within Runway Protection Zone (RPZ)	9	Obtain fee simple purchase of residential property; clear and maintain property	Residential property to be obtained, cleared and maintained
	Tree obstructions within Threshold Siting Criteria (for 20:1 surface)	11	Obtain easement and clear obstructions (trees)	Easement to be obtained and obstructions cleared
		14	Install obstruction light in area where trees are to remain	Obstruction light to be installed

These non-conforming conditions are based on an FAA Airspace Determination (August 31, 2007). The Airspace Determination requires the airport sponsor (RIAC) to take the actions identified in this table prior to August 2009.

LEGEND

ITEM	EXISTING	PROPOSED
AIRFIELD PAVEMENT		
OTHER PAVEMENT		SAME
ABANDONED TAXIWAY		SAME
AIRPORT PROPERTY LINE		SAME
ABUTTER PROPERTY LINE		SAME
AIRPORT REFERENCE POINT	A.R.P.	SAME
BUILDING WITHIN AIRPORT PROPERTY		
BUILDING OUTSIDE AIRPORT PROPERTY		SAME
TREE LINE		SAME
GROUND CONTOUR	50	SAME
AVIGATION EASEMENT		
PAVED AIRCRAFT TIEDOWN		
RUNWAY PROTECTION ZONE (RPZ)	RPZ	SAME
RUNWAY SAFETY AREA (RSA)	RSA RSA	SAME
RUNWAY OBJECT FREE AREA (ROFA)	ROFA	SAME
TAXIWAY OBJECT FREE AREA (TOFA)	TOFA	SAME
OBSTRUCTION LIGHT BEACONS		
SECURITY FENCING (APPROX. LOC.)		
EXISTING AIRPORT FACILITY IDENTIFIER	1	19

Existing & Proposed Airport Facilities	
No.	
1	Overflow automobile parking lot
2	ASOS
3	Main automobile parking lot
4	Fuel farm
5	Terminal
6	Landmark bulk aircraft storage hangar
7	T-hangars
8	Airport equipment storage building (to be removed)
9	Reeves Aviation aircraft storage hangar and ramp
10	North American aircraft storage hangars
11	Main ramp
12	Westerly Police Headquarters
13	Dooney Aviation aircraft storage hangar and ramp
14	Proposed snow removal and maintenance equipment storage facility
15	Proposed hangars (private development)
16	Proposed tie-downs
17	Proposed evaluation of GPS approach to Runway 25
18	Proposed reconstruction, redesign and pavement addition to the Main Ramp
19	Proposed replacement of VASI systems with PAPI systems for Runway 7-25
20	Proposed security fence installation
21	Proposed relocated T-hangers



RHODE ISLAND AIRPORT CORPORATION
APPROVED ______
DATE: ______

US DEPARTMENT OF TRANSPORTATION FEDERAL AVIATION ADMINISTRATION NEW ENGLAND REGION
APPROVED ______
DATE: ______
APPROVAL SUBJECT TO COMMENTS AND RECOMMENDATIONS IN LETTER
DATED ______

ENGINEER/ARCHITECT

REV.	DESCRIPTION	DR. BY	CHKD. BY	APPD. BY	DATE

PROJECT NO. 72088.01

FILE NAME 72088-PR-ALP

Vanasse Hangen Brustlin, Inc.

Transportation
Land Development
Environmental Services

101 Walnut Street, P.O. Box 9151
Watertown, Massachusetts 02471
617.924.1770 • FAX 617.924.2286

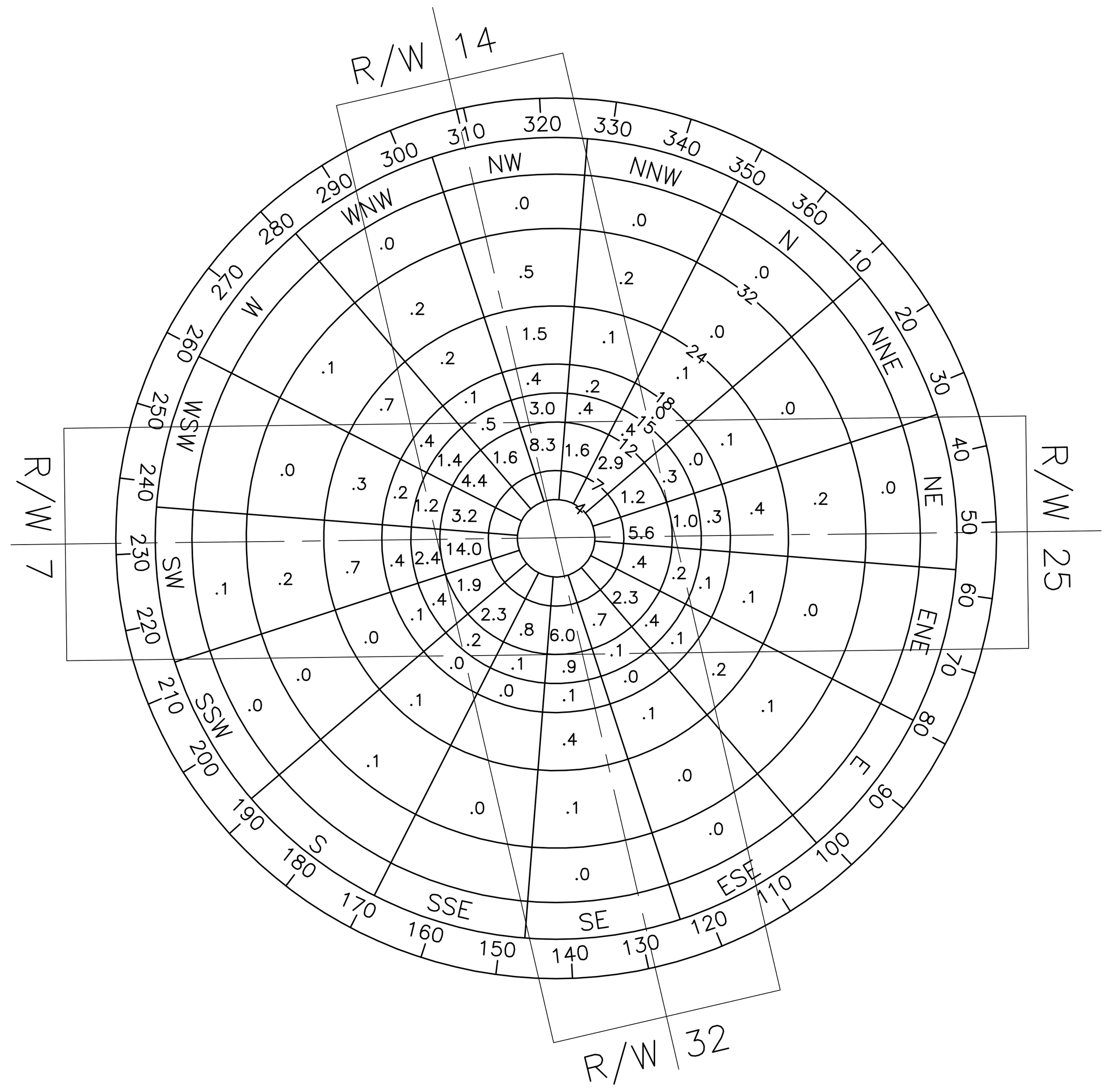
SCALE: AS SHOWN | DATE: APRIL 24, 2009 | DES. BY BJS | DR. BY WHH | CHKD. BY BJS

WESTERLY STATE AIRPORT
WESTERLY, RHODE ISLAND

AIRPORT LAYOUT PLAN

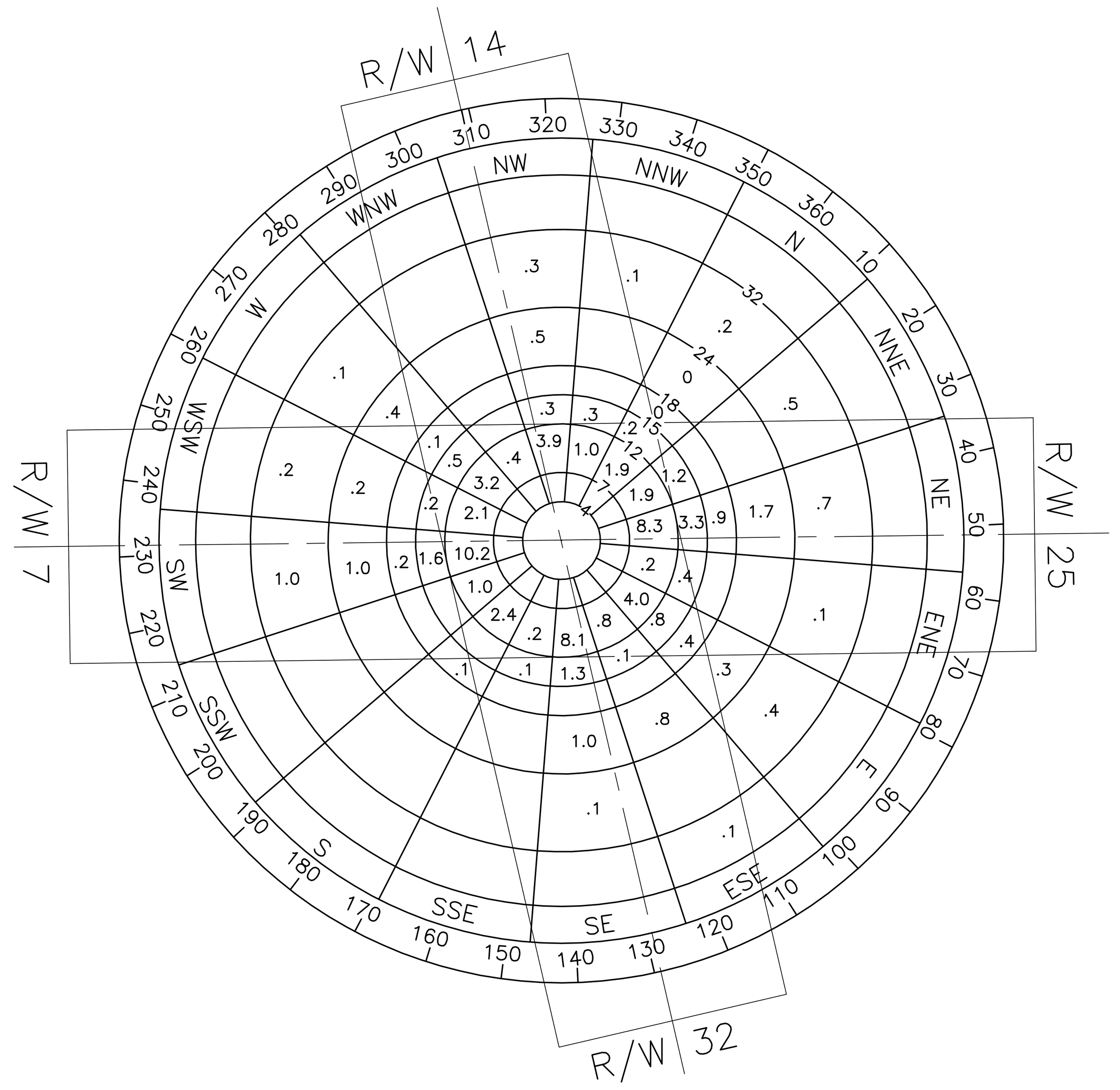
DRAWING NO. 2

SHEET 2 OF 7



ALL WEATHER WIND ROSE

	12 MPH	15 MPH
R/W 7	48.3%	51.9%
R/W 25	61.6%	64.3%
R/W 7–25	88.2%	94.6%
R/W 14	47.3%	49.2%
R/W 32	63.9%	68.0%
R/W 14–32	89.6%	95.6%
R/W 7–25 & R/W 14–32 COMBINED	97.2%	99.4%
CALMS	21.6%	21.6%



I.F.R. WIND ROSE

CEILING <1,000' ≥ 500'
VISIBILITY < 30 MILES ≥ 1.5 MILES

	12 MPH	15 MPH
R/W 7	59.6%	60.0%
R/W 25	60.3%	61.9%
R/W 7–25	91.8%	93.8%
R/W 14 1/	58.5%	61.3%
R/W 32 1/	54.4%	58.1%
R/W 14–32 1/	84.8%	91.3%
R/W 7–25 & R/W 14–32 COMBINED 1/	98.0%	94.1%
CALMS	28.1%	28.1%

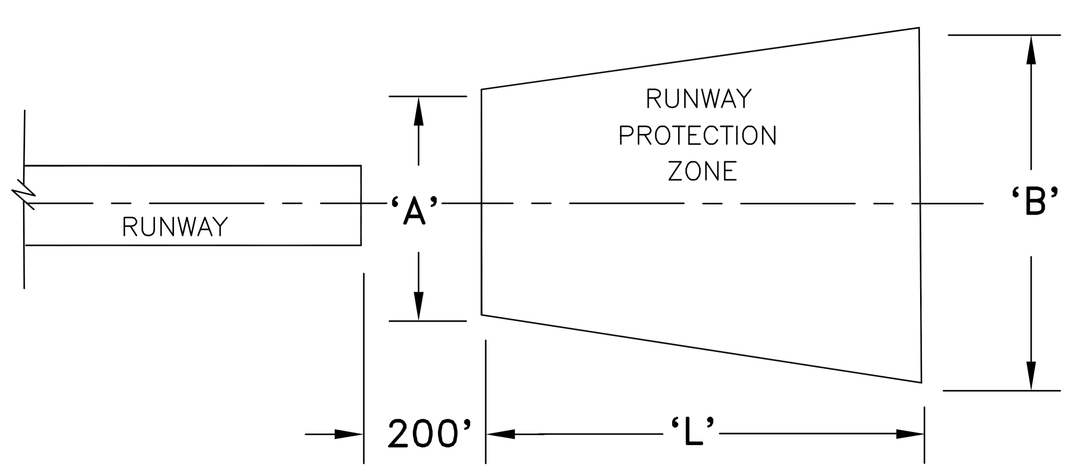
1/ FOR INFORMATION PURPOSES ONLY. THERE ARE NO INSTRUMENT APPROACHES TO RUNWAY ENDS 25, 14 OR 32.

WIND DATA FOR ALL WEATHER AND IFR BASED ON 14,730 ALL WEATHER OBSERVATIONS TAKEN BETWEEN JUNE 1950 AND MAY 1954 AT GROTON–NEW LONDON AIRPORT, NOAA

Airport Data		
Item	Existing	Future
Airport Elevation (U.S.G.S. - M.S.L.)	81.0	Same
Airport Reference Point (ARP)	41° 20' 58.621"N	Same
	71° 48' 12.160"W	Same
Mean Max Temperature (Hottest Month) (1)	75°F	Same
Operational Role (NPIAS) (2)	Commercial Service Non-Primary	Same
Airport Reference Code (ARC)/Design Code for all Runways	B-II	Same
Critical aircraft (approach speed) (3)	Beech Super King Air B200 = 103 knots (B)	Same
Critical aircraft (wingspan) (3)	Beech Super King Air B200 = 54.5 feet (II)	Same
Critical aircraft (runway strength) (3)	Beech Super King Air B200 = 12,500 pounds	Same
Navigational Aids	Localizer Runway 07	Localizer Runway 07 and GPS Runway 25
Combined wind coverage (all weather) (4)	97.20%	Same
Magnetic declination (date) (5)	14° 29' W (9/23/2008)	Same
Distance and direction to the town of Westerly	1.7 miles NW	Same
Land owned in fee (acres)	326 (6)	Same
Avigation easements (acres)	42.85 (6)	59.9
Owner	State of Rhode Island (Rhode Island Airport Corporation)	Same

Notes:
(1) Mean maximum temperature for the hottest month is 75 degrees based on data collected in August 2008.
(2) Based on the 2007-2011 National Plan of Integrated Airport Systems (NPIAS) (September 29, 2006).
(3) Critical aircraft approach speed, wingspan, and runway strength based on: U.S. Department of Transportation, Federal Aviation Administration, Airport Design, AC No. 150/5300-13, Changes 1-13, U.S. Government Printing Office, Washington, DC, June 19, 2008.
(4) Wind data for all weather and IFR based on 14,730 all weather observations taken between June 1950 and May 1954 at Groton New London Airport, NOAA.
(5) Based on estimated value of magnetic declination, NOAA declination calculator: http://www.ngdc.noaa.gov/geomagmodels/struts/calcDeclination
(6) Based on the Exhibit 'A' Property Map completed by the Rhode Island Airport Corporation on August 2005 and revised on April 21, 2008.

Item	Runway Data			
	Runway 7-25		Runway 14-32	
	Existing	Future	Existing	Future
Runway Elevation (Feet M.S.L.)	RWY 7 = 51.1	Same	RWY 14 = 56.9	Same
	RWY 25 = 78.3	Same	RWY 32 = 81.1	Same
Runway End Coordinates				
	RWY 7		RWY 14	
Latitude	41° 20' 44.1520" N	Same	41° 21' 14.2790" N	Same
Longitude	71° 48' 38.1230" W	Same	71° 48' 27.0280" W	Same
	RWY 25		RWY 32	
Latitude	41° 21' 07.8750" N	Same	41° 20' 49.0790" N	Same
Longitude	71° 47' 56.0210" W	Same	71° 47' 47.3100" W	Same
Displaced Threshold Coordinates			RWY 32	
Latitude	N/A	Same	41° 20'53.2810" N	Same
Longitude	N/A	Same	71° 41'54.7340" W	Same
Bearing (True)	RWY 7 = 053	Same	RWY 14 = 130	Same
	RWY 25 = 233	Same	RWY 32 = 310	Same
Length (feet)	4,010	Same	3,960 (with 750 foot displaced threshold)	Same
Width (feet)	100	Same	75	Same
Safety Area (Width/Length in feet)	150/300	Same	150/300	Same
Taxiway Width (feet)	35	Same	35	Same
Pavement Strength (x 1,000 pounds)	Single wheel = 30	Same	Single wheel = 12.5	Same
	Dual wheel = 50	Same		
Pavement Type	Bituminous concrete	Same	Bituminous concrete	Same
Runway Lighting	Medium intensity	Same	Medium intensity	Same
Runway Approach Lighting	RWY 7 = MALSF	Same	None	Same
Runway Marking	non-precision	Same	basic	Same
Effective Gradient (%)	RWY 7 = 0.7	Same	RWY 14 = 0.6	Same
	RWY 25 = 0.7	Same	RWY 32 = 0.6	Same
All Weather Wind Coverage (%) (12MPH)	88.4	Same	89.6	Same
Navigational and Visual Aids	RWY 7 = Localizer	Same	RWY 14 = None	Same
	RWY 25 = None	RWY 25 = GPS	RWY 32 = None	Same
FAR Part 77 Data				
Approach Category	Non-precision	Same	Visual	Same
Approach Type	RWY 7 = non-precision	Same	RWY 14 = visual	Same
	RWY 25 = visual	RWY 25 = non-precision	RWY 32 = visual	Same
Approach Slope (feet)	RWY 7 = 34:1	Same	RWY 14 = 20:1	Same
	RWY 25 = 20:1	RWY 25 = 34:1	RWY 32 = 20:1	Same
Horizontal Surface Height/Radius of Arc (feet)	231/10,000	Same	231/10,000	Same
Conical Surface Slope/Length (feet)	20:1/4,000	Same	20:1/4,000	Same
Primary Surface Width/Length Beyond RWY End (feet)	500/200	Same	500/200	Same



Existing and Future Runway Protection Zone Data								
Runway	Category		L: Length (feet)		A: Inner Width (feet)		B: Outer Width (feet)	
	Existing	Future	Existing	Future	Existing	Future	Existing	Future
7	Non-precision	Same	1,000	Same	500	Same	700	Same
25	Visual	Non-precision	1,000	Same	500	Same	700	Same
14	Visual	Same	1,000	Same	500	Same	700	Same
32	Visual	Same	1,000	Same	500	Same	700	Same

Airport Data	FAR Part 77 Surface Data							
	Runway 7		Runway 25		Runway 14		Runway 32	
	Existing	Future	Existing	Future	Existing	Future	Existing	Future
Category	Non-precision	Same	Visual	Non-precision	Visual	Same	Visual	Same
Approach Type	Non-precision	Same	Visual	Non-precision	Visual	Same	Visual	Same
Visibility Minimums	1 mile	Same	1 mile	Same	1 mile	Same	1 mile	Same
Airport Elevation (feet, MSL)	81							
Airport Imaginary Surfaces								
Horizontal Surface:								
Horizontal Surface Elevation (feet, MSL)	231							
Horizontal Surface Radius	10,000	Same	10,000	Same	5,000	Same	5,000	Same
Conical Surface:								
Horizontal Distance	4,000							
Slope	20:1							
Primary Surface:								
Length beyond runway end	200	Same	200	Same	200	Same	200	Same
Width	500	Same	500	Same	500	Same	500	Same
Approach Surface:								
Horizontal Distance	10,000	Same	5,000	10,000	5,000	Same	5,000	Same
Inner Edge Width	500	Same	500	Same	500	Same	500	Same
Outer Edge Width	3,500	Same	1,500	3,500	1,500	Same	1,500	Same
Slope	34:1	Same	20:1	34:1	20:1	Same	20:1	Same
Transitional Surfaces:	7:1	Same	7:1	Same	7:1	Same	7:1	Same

ENGINEER/ARCHITECT

REV | DESCRIPTION | DR. BY | CHKD. BY | APPD. BY | DATE

PROJECT NO. 72088.01
FILE NAME 72088-DATA

VHB
Vanasse Hangen Brustlin, Inc.
Transportation
Land Development
Environmental Services
101 Walnut Street, P.O. Box 9151
Watertown, Massachusetts 02471
617.924.1770 • FAX 617.924.2286

SCALE: NONE
DATE: APRIL 24, 2009
DES. BY KRS
DR. BY WHH
CHKD. BY BJS

WESTERLY STATE AIRPORT
WESTERLY, RHODE ISLAND

ALP DATA SHEET

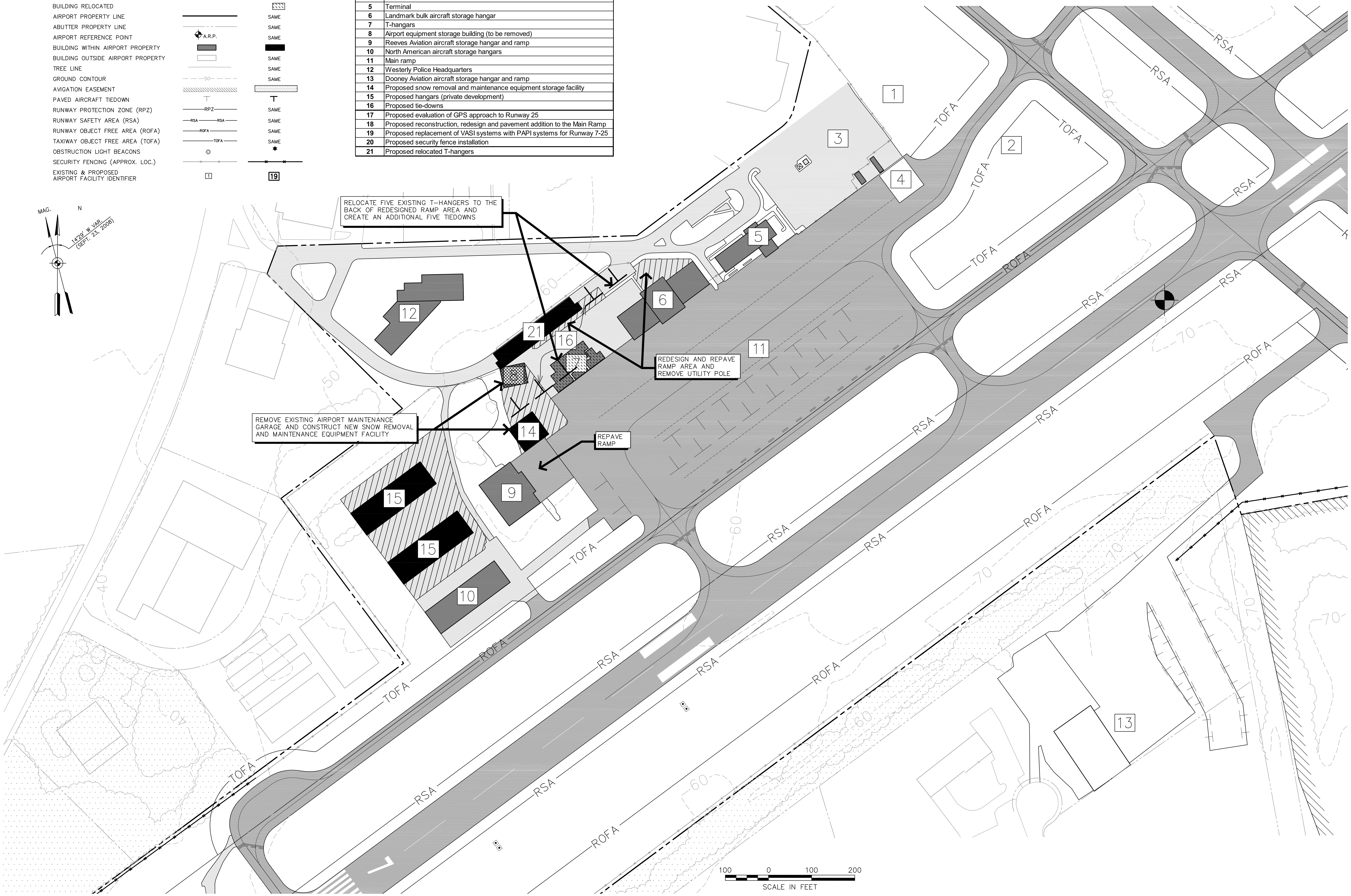
DRAWING NO.
3

LEGEND

ITEM	EXISTING	PROPOSED
AIRFIELD PAVEMENT		
OTHER PAVEMENT		SAME
ABANDONED TAXIWAY		SAME
BUILDING REMOVED		
BUILDING RELOCATED		
AIRPORT PROPERTY LINE		SAME
ABUTTER PROPERTY LINE		SAME
AIRPORT REFERENCE POINT	A.R.P.	SAME
BUILDING WITHIN AIRPORT PROPERTY		
BUILDING OUTSIDE AIRPORT PROPERTY		SAME
TREE LINE		SAME
GROUND CONTOUR	50	SAME
AVIGATION EASEMENT		
PAVED AIRCRAFT TIEDOWN		
RUNWAY PROTECTION ZONE (RPZ)	RPZ	SAME
RUNWAY SAFETY AREA (RSA)	RSA	SAME
RUNWAY OBJECT FREE AREA (ROFA)	ROFA	SAME
TAXIWAY OBJECT FREE AREA (TOFA)	TOFA	SAME
OBSTRUCTION LIGHT BEACONS		
SECURITY FENCING (APPROX. LOC.)		
EXISTING & PROPOSED AIRPORT FACILITY IDENTIFIER	1	19

Existing & Proposed Airport Facilities

No.	
1	Overflow automobile parking lot
2	ASOS
3	Main automobile parking lot
4	Fuel farm
5	Terminal
6	Landmark bulk aircraft storage hangar
7	T-hangars
8	Airport equipment storage building (to be removed)
9	Reeves Aviation aircraft storage hangar and ramp
10	North American aircraft storage hangars
11	Main ramp
12	Westerly Police Headquarters
13	Dooney Aviation aircraft storage hangar and ramp
14	Proposed snow removal and maintenance equipment storage facility
15	Proposed hangars (private development)
16	Proposed tie-downs
17	Proposed evaluation of GPS approach to Runway 25
18	Proposed reconstruction, redesign and pavement addition to the Main Ramp
19	Proposed replacement of VASI systems with PAPI systems for Runway 7-25
20	Proposed security fence installation
21	Proposed relocated T-hangers



ENGINEER/ARCHITECT

REV. | DESCRIPTION | DR. BY | CHKD. BY | APPD. BY | DATE

PROJECT NO. 72088.01
FILE NAME 72088-PR-ALP

Vanasse Hangen Brustlin, Inc.
Transportation
Land Development
Environmental Services
101 Walnut Street, P.O. Box 9151
Watertown, Massachusetts 02471
617.924.1770 • FAX 617.924.2286

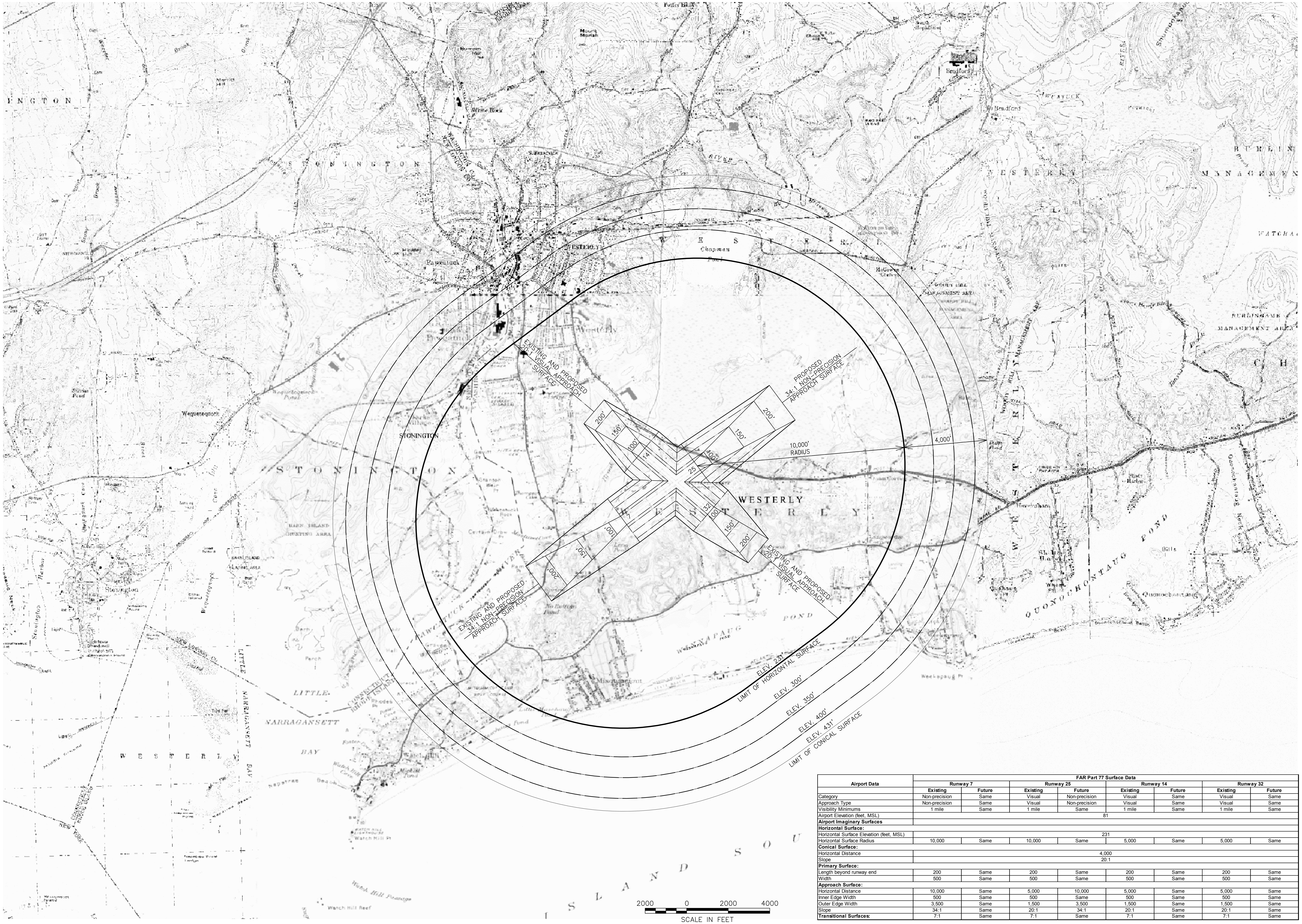
SCALE: AS SHOWN | DATE: APRIL 24, 2009 | DES. BY BJS | DR. BY WHH | CHKD. BY BJS

WESTERLY STATE AIRPORT
WESTERLY, RHODE ISLAND

TERMINAL AREA PLAN

DRAWING NO.
4

SHEET 4 OF 7



Airport Data	FAR Part 77 Surface Data							
	Runway 7		Runway 25		Runway 14		Runway 32	
	Existing	Future	Existing	Future	Existing	Future	Existing	Future
Category	Non-precision	Same	Visual	Non-precision	Visual	Same	Visual	Same
Approach Type	Non-precision	Same	Visual	Non-precision	Visual	Same	Visual	Same
Visibility Minimums	1 mile	Same	1 mile	Same	1 mile	Same	1 mile	Same
Airport Elevation (feet, MSL)	81							
Airport Imaginary Surfaces								
Horizontal Surface:								
Horizontal Surface Elevation (feet, MSL)	231							
Horizontal Surface Radius	10,000	Same	10,000	Same	5,000	Same	5,000	Same
Conical Surface:								
Horizontal Distance	4,000							
Slope	20:1							
Primary Surface:								
Length beyond runway end	200	Same	200	Same	200	Same	200	Same
Width	500	Same	500	Same	500	Same	500	Same
Approach Surface:								
Horizontal Distance	10,000	Same	5,000	10,000	5,000	Same	5,000	Same
Inner Edge Width	500	Same	500	Same	500	Same	500	Same
Outer Edge Width	3,500	Same	1,500	3,500	1,500	Same	1,500	Same
Slope	34:1	Same	20:1	34:1	20:1	Same	20:1	Same
Transitional Surfaces:	7:1	Same	7:1	Same	7:1	Same	7:1	Same

ENGINEER/ARCHITECT

REV.	DESCRIPTION	DR. BY	CHKD. BY	APPD. BY	DATE

PROJECT NO. 72088.01
FILE NAME 72088-AAP

VHB
Vanasse Hangen Brustlin, Inc.
Transportation
Land Development
Environmental Services
101 Walnut Street, P.O. Box 9151
Watertown, Massachusetts 02471
617.924.1770 • FAX 617.924.2286

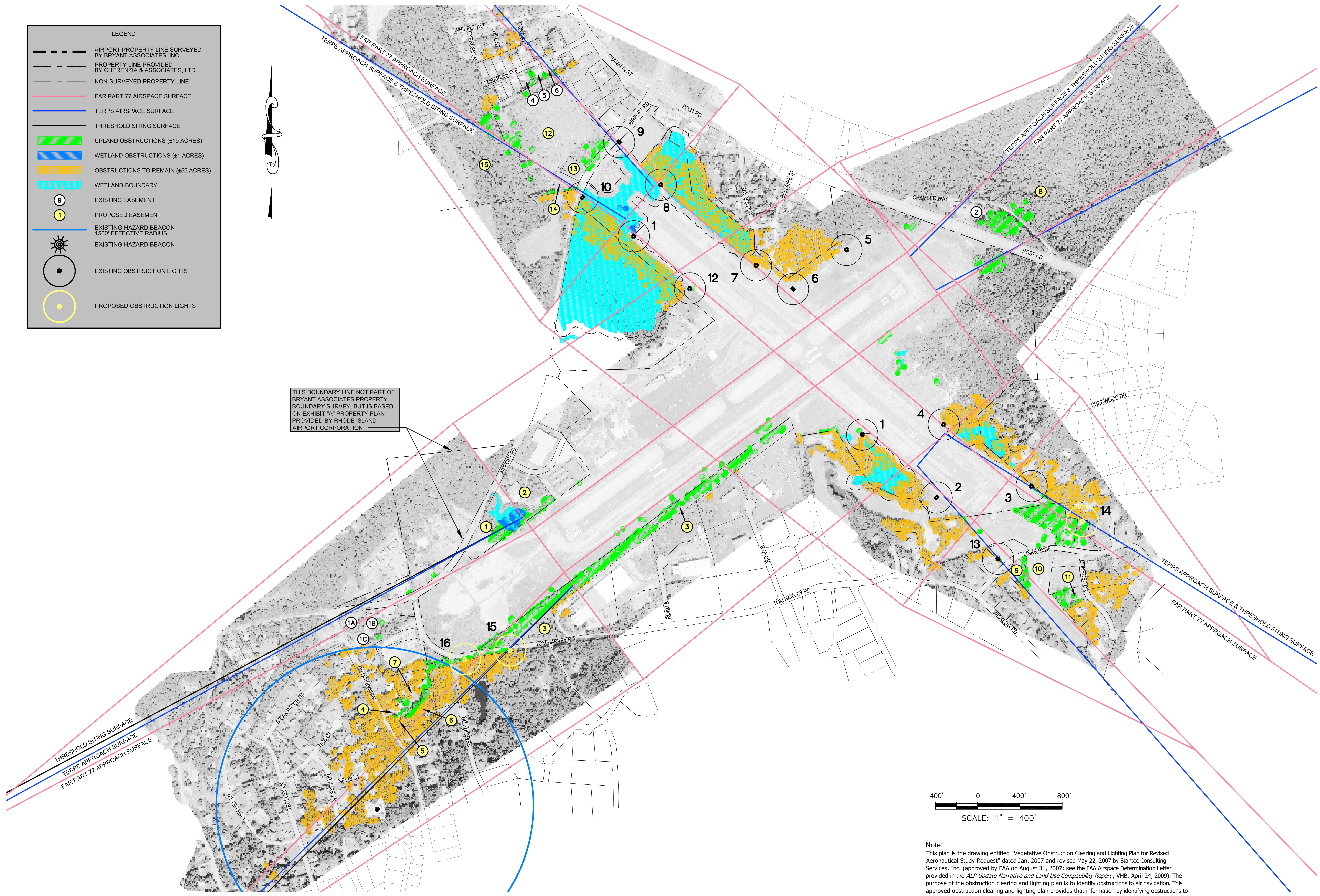
SCALE: AS SHOWN | DATE: APRIL 24, 2009 | DES. BY BJS | DR. BY WHH | CHKD. BY BJS

WESTERLY STATE AIRPORT
WESTERLY, RHODE ISLAND

AIRPORT PART 77 SURFACE DRAWING

DRAWING NO.
5

SHEET 5 OF 7



Note:
This plan is the drawing entitled "Vegetative Obstruction Clearing and Lighting Plan for Revised Aeronautical Study Request" dated Jan. 2007 and revised May 22, 2007 by Stantec Consulting Services, Inc. (approved by FAA on August 31, 2007; see the FAA Airspace Determination Letter provided in the *ALP Update Narrative and Land Use Compatibility Report*, VHB, April 24, 2009). The purpose of the obstruction clearing and lighting plan is to identify obstructions to air navigation. This approved obstruction clearing and lighting plan provides that information by identifying obstructions to the Part 77, TERPS and threshold siting surfaces.

ENGINEER/ARCHITECT

REV.	DESCRIPTION	DR. BY	CHKD. BY	APPD. BY	DATE

PROJECT NO. 72088.01

FILE NAME 72088-ASP

Vanasse Hangen Brustlin, Inc.
Transportation
Land Development
Environmental Services
101 Walnut Street, P.O. Box 9151
Watertown, Massachusetts 02471
617.924.1770 • FAX 617.924.2286

DES. BY BJS | DR. BY WHH | CHKD. BY BJS

SCALE: 1" = 400' | DATE: APRIL 24, 2009

WESTERLY STATE AIRPORT
WESTERLY, RHODE ISLAND

VEGETATIVE OBSTRUCTION CLEARING AND LIGHTING PLAN
FOR REVISED AERONAUTICAL STUDY REQUEST

DRAWING NO.
6

SHEET 6 OF 7

ENGINEER/ARCHITECT

REV. | DESCRIPTION | DR. BY | CHKD. BY | APPD. BY | DATE

PROJECT NO. 72088.01

FILE NAME 72088-LUP

Vanasse Hangen Brustlin, Inc.

Transportation
Land Development
Environmental Services

101 Walnut Street, P.O. Box 9151
Watertown, Massachusetts 02471
617.924.1770 • FAX 617.924.2286

SCALE: AS SHOWN | DATE: APRIL 24, 2009 | DES. BY BJS | DR. BY WHH | CHKD. BY BJS

WESTERLY STATE AIRPORT
WESTERLY, RHODE ISLAND

LAND USE PLAN

DRAWING NO.

7

SHEET 7 OF 7

3
Land Use Compatibility Plan

3.1 Introduction

As part of the ALP Update process, a Land Use Compatibility Plan was prepared to provide the Town of Westerly with information to assist them in making land use planning decisions in the future for locations around WST. The Land Use Compatibility Plan incorporates information regarding runway surfaces and navigable airspace (defined by FAA's Federal Aviation Regulation, FAR, Part 77) identified during the ALP Update, and existing aircraft noise information (both modeled and collected).

The aircraft noise analysis consisted of gathering aircraft operational data and compiling the data for input into the FAA's Integrated Noise Model (INM), noise contour modeling and specific location point analysis in the INM, and noise monitoring. The results and findings of the aircraft noise analysis (along with the findings of the ALP Update) and input from the public gathered during two public information meetings in Westerly were incorporated into the land use compatibility plan.

3.2 Aircraft Noise Analysis Methodology

An introduction to noise, Westerly Airport (WST) aircraft operational data, grid point analysis locations, and the aircraft noise monitoring methodology is presented in this section.

3.2.1 Introduction to Noise

Noise is defined as unwanted or excessive sound. Sound becomes unwanted when it interferes with normal activities such as sleep, work, speech, or recreation. The individual human response to noise is subject to considerable variability because there are many emotional and physical factors that contribute to the differences in reaction to noise. Sound (noise) is described in terms of loudness, frequency, and duration. Loudness is the sound pressure level measured on a logarithmic scale in units of decibels (dB). For community noise impact assessments, sound level frequency characteristics are based upon human hearing, using an A-weighted frequency filter. The A-weighted filter is used because it approximates the way humans hear sound. Table 3-1 presents a list of common outdoor and indoor sound levels. The duration characteristics of sound account for the length of time that a sound is heard. Sound level data can be presented in statistical terms, or metrics, to help describe the noise environment.

The following general relationships exist between noise levels and human perception:[55]

- A 1 or 2 dB increase is not perceptible to the average person.
- A 3 dB increase is just barely perceptible to the average person.
- A 10 dB increase is perceived as a doubling in loudness to the average person.

55 Highway Traffic Noise Analysis and Abatement Policy and Guidance, U.S. Department of Transportation, Federal Highway Administration, Office of Environmental and Planning Noise and Air Quality Branch, June 1995, Table 3, Page 4.

Table 3-1 Common Outdoor and Indoor Sound Levels

Outdoor Sound Levels	Sound Level (dB)*	Indoor Sound Levels
	110	Rock Band at 15 feet
Jet Overflight at 900 feet	105	
	100	Inside New York Subway Train
Gas Lawn Mower at 3 feet	95	
	90	Food Blender at 3 feet
Diesel Truck at 45 feet	85	
Single-Eng. Aircraft Overflight at 300 ft.	80	Garbage Disposal at 3 feet
	75	Shouting at 3 feet
Gas Lawn Mower at 90 feet	70	Vacuum Cleaner at 9 feet
Suburban Commercial Area	65	Normal Speech at 3 feet
	60	
Quiet Urban Area—Daytime	55	Quiet Conversation at 3 feet
	50	Dishwasher Next Room
Quiet Urban Area—Nighttime	45	
	40	Empty Theater or Library
Quiet Suburb—Nighttime	35	
	30	Quiet Bedroom at Night
Quiet Rural Area—Nighttime	25	Empty Concert Hall
Rustling Leaves	20	
	15	Broadcast and Recording Studios
	10	
	5	
Reference Pressure Level	0	Threshold of Hearing

Source: Federal Highway Administration, *Highway Noise Fundamentals*, September 1980.
* dB – decibels.

Information on noise and how it is measured and assessed is provided on the RIAC website[56] and in Appendix B of this report.

56 http://www.pvdairport.com/main.aspx?guid=20936C2E-9997-488E-B7DD-085F23F0D1F9

The aircraft operational data and assumptions described in this section were used to develop cumulative noise contours in the Day-Night Average Sound Level (DNL) metric and noise levels of various metrics at specific grid point locations using the FAA's Integrated Noise Model (INM). The following provides additional information regarding the noise metrics and the FAA's INM.

Noise Metrics

The INM was used to calculate cumulative noise contours for three average aircraft operational scenarios (described further in Section 3.2.2, *Aircraft Operational Data*) using the DNL[57] metric. The DNL metric is the FAA-required and industry accepted method to measure and evaluate cumulative aircraft noise levels in the United States.[58]

The DNL metric represents average daily noise levels that would occur over a 24-hour period; this includes a 10 dB penalty added to noise levels of aircraft operations occurring between the hours of 10:00 PM and 6:59 AM, which is considered nighttime. The 10 dB penalty is applied to account for the increased disturbance that noise intrusions can cause during nighttime hours. Therefore, in terms of disturbance and DNL impacts, this penalty is equivalent to one nighttime operation equaling 10 daytime operations (of the same aircraft). Because the penalty is applied to nighttime (10:00 PM through 6:59 AM) operations in the DNL metric, daytime and nighttime operations by aircraft types are separated in the INM.

DNL contours were generated at levels of 60, 65, and 70 dB. Residential land uses and some public (schools) and recreational (outdoor music shells and amphitheaters) land uses are considered to be incompatible at noise levels of DNL 65 or greater. Most non-aviation commercial and industrial land uses are considered to be incompatible at noise levels of DNL 75 or more. Land use compatibility standards are documented in Title 14 Code of Federal Regulations (CFR) Part 150, *Airport Noise Compatibility Planning*, and are summarized in its Appendix A, Table 1 (Appendix C of this report).

The land use designations identified in Title 14 CFR Part 150, Appendix A, Table 1 do not constitute a federal determination that any use of land is acceptable or unacceptable under federal, state, or local law. The responsibility for determining the acceptable and permissible land uses and the relationship between specific properties and specific noise contours rests with local authorities[59] – in this case, the Town of Westerly.

In addition to producing noise contours in the DNL metric and to better understand the aircraft noise environment, DNL and other noise metrics were calculated at various specific locations (grid points) surrounding WST. The grid point locations are described further in Section 3.2.3, *Grid Point Analysis Locations*. The other noise metrics calculated at each grid point included:

- Lmax – the maximum sound level estimated at a location due to aircraft; measures maximum intensity of aircraft noise exposure;
- TA65 – the time duration (in minutes) above 65 dB per a 24-hour period; and

57 The Day-Night Average Sound Level metric is also represented as Ldn in some sources.
58 The Community Noise Equivalent Level (CNEL) is the official noise metric for aircraft noise analyses in the State of California.
59 Title 14 CFR Part 150, Airport Noise Compatibility Planning, Appendix A, Table 1, Land Use Compatibility with Yearly Day-Night Average Sound Levels.

- NA65 – the frequency, or number, of aircraft events above 65 dB per a 24-hour period.

The maximum sound level, or Lmax, measures only the intensity of the loudest aircraft event. The metric represents the highest reading an observer would note on sound-level measuring equipment when an aircraft passes by. Depictions of Lmax levels during noise monitoring at WST are provided in Appendix E. The Lmax does not account for the event duration (how long the sounds last) or frequency (how many times the event occurs).

The noise level at which outdoor speech may be disturbed, speech interference, was evaluated in this study using TA65 and NA65 to account for the fact that aircraft operational levels increase at WST during the summer months at the same time when residents are outside enjoying warmer climates. Therefore, this study includes the evaluation of noise levels during peak operational periods (see Section 3.2, *Aircraft Noise Analysis Methodology*) in addition to the average annual day conditions, and the use of metrics to determine the potential for outdoor speech interference.

Speech interference is a factor in human annoyance to aircraft noise. Although many factors influence speech interference, this analysis considers that speech would begin to be disturbed (decrease in understanding of speech at more than a relaxed conversational level at a distance of about 1 meter) at noise levels greater than 65 dB. The TA65 provides the duration, or time, that a location would experience noise levels resulting in outdoor speech interference. The NA65 only provides the number of events that would result in outdoor speech interference, without consideration of the duration of the events.

FAA's Integrated Noise Model (INM)

The most recent version of the FAA's INM (Version 7.0a[60]) was used to perform the noise contouring and grid point analysis. The INM was developed by the FAA specifically for the analysis of aircraft noise levels in the vicinity of airports and is typically used by the civilian aviation community in assessing noise at airports served by large commercial jets.

The INM combines aircraft flight profile and noise calculation algorithms[61] with an extensive database of aircraft acoustic and performance information to calculate aircraft noise exposure. The model requires user input in the form of aircraft operations, runways, runway use, flight tracks, flight track use, and other airport operational conditions. The output can be obtained in either tabular or graphic form for a variety of noise metrics. The model is most frequently used to develop maps of cumulative noise levels called noise contours.

The INM is designed to estimate long-term average effects using average annual input conditions. Because the INM is not a detailed acoustics model, differences between predicted and measured values can and do sometimes occur because important local acoustical variables are not averaged, or because complicated

60 FAA's Integrated Noise Model (INM) Version 7.0a was released for use on September 17, 2008.
61 The core calculation modules of INM are based on standards documents produced by the Society of Automotive Engineers (SAE) Aviation Noise Committee (A-21). This internationally represented committee is composed of research institutions, engineering firms, aircraft and engine manufacturers, government regulatory agencies, and end-users of noise modeling tools.

physical phenomena are not explicitly modeled.[62] In addition, the INM does not account for non-aircraft noise events, such as vehicle traffic, landscaping equipment, and other common community noise events.

3.2.2 Aircraft Operational Data

For this aircraft noise analysis, VHB coordinated with RIAC to develop estimated existing aircraft operational data for input into the INM. VHB also gathered information from airport users, such as New England Airlines, general aviation operators, and operators of the two Fixed Base Operators (FBO), Landmark Aviation and Dooney Aviation. Appendix D provides estimated existing operational data used in this noise analysis. The following sections summarize the aircraft operational scenarios, aircraft operations, aircraft fleet mix, day/night distribution, runway utilization, and flight tracks.

Aircraft Operational Scenarios

The southwestern Rhode Island region is a very popular summer destination due to the proximity of the beaches and Block Island. As a result, aircraft operations increase during the summer months. Private general aviation activity generated from both based aircraft and itinerant (transient) aircraft, commercial advertising using banner-towing aircraft, and demand for airline services to Block Island provided by New England Airlines increase during the summer months. Based aircraft are stored at WST and are operated generally by local pilots. Itinerant aircraft are stored at other airports and use WST as a destination point or refueling stop.

Although the average annual day scenario is recognized as the “best representation of the typical long-term average conditions” at an airport and necessary for policy decisions, the FAA notes that, in some cases, it may be useful to “perform supplemental analysis for different times of the year to disclose the effects of the seasonal variation in traffic demand.”[63] Based on knowledge of the airport activity and feedback from the community, RIAC recognized the importance of supplemental operational scenarios for this noise analysis. Therefore, in addition to the average annual day scenario, this noise analysis includes the average day during the peak (summer) season and the average peak day during the peak (summer) season. These operational scenarios are described further in this section.

Average Annual Day Operational Scenario

RIAC estimates that there are currently 23,582 aircraft operations (either a departure or arrival) annually at WST. This estimate was based on observations at the airport and estimates of activity when the airport management office is closed at the airport. The number of average annual day aircraft operations was generated based on the estimated annual number of aircraft operations (23,582) divided by the number of days in a year (365), which equals 64.6 average daily operations.

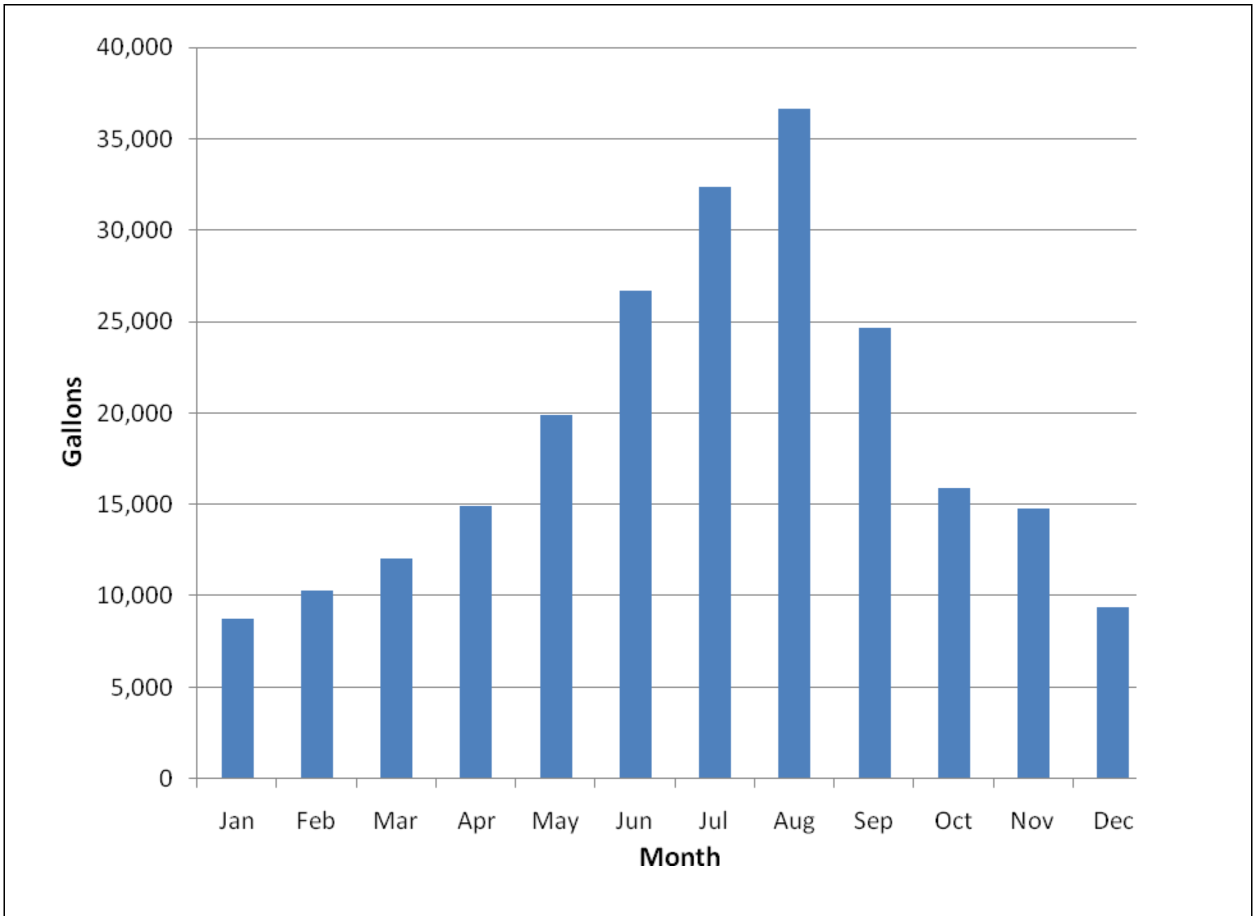
Average Day - Peak Season Operational Scenario

To determine the average peak season (summer) daily operations, records of fuel sales[64] for the year 2007 were evaluated. The amount of fuel sales (in gallons) per month are shown in Figure 3-1. The fuel records indicate that the summer months of June through September accounted for 53 percent of the total fuel sold

62 FAA INM 7.0 User’s Guide, FAA Office of Environment and Energy, April 2007, Page 12.
63 FAA INM 7.0 User’s Guide, FAA Office of Environment and Energy, April 2007, Pages 12-13.
64 Provided by Landmark Aviation and Dooney Aviation at WST.

during the entire year. Assuming the amount of fuel sales are directly related to aircraft operational activity at an airport, approximately 53 percent of the estimated annual operations (12,541 aircraft operations) were assumed to take place during the peak season (122 days), equating to a total of 102.8 average daily aircraft operations during the peak season. The aircraft operational level of the average peak season day would be 59 percent greater than the average annual day.

Figure 3-1 Monthly Fuel Sales (Gallons) in 2007 at WST



Source: Landmark Aviation, 2008; Dooney Aviation, 2008; compiled by VHB, 2008.

Average Peak Day - Peak Season Operational Scenario

The average peak day during the peak season is intended to represent a weekend day during the summer months when visitors are traveling to the area with private aircraft, demand is greater for airline services to Block Island, and aerial advertising (banner-towing) activity is taking place. Because there are no daily records of aircraft activity at WST that could be used to separate weekday from weekend operational activity, this study used the average day from the peak month of activity to represent an average weekend (peak) day during the summer months.

The peak month of fuel sales at WST in 2007 was August, which accounted for 16.2 percent of total annual fuel sales. Assuming the amount of fuel sales are directly related to aircraft operational activity at an airport, approximately 3,820 aircraft operations would have occurred during the peak month. The total estimated aircraft operations (3,820) divided by the number of days in the month (31 days) would yield 123.2 daily operations during the peak month. The aircraft operational level of the average peak day is 91 percent greater than the average annual day, and 20 percent greater than the average peak season day.

Aircraft Operations

The INM requires that the rate of aircraft operations be represented by the average daily operational level. Based on the assumptions regarding the operational scenarios detailed in Section 3.2.2, *Aircraft Operational Data*, aircraft operational data were developed and comprised the following types of aircraft operator categories:

- New England Airlines (scheduled passenger commercial service)
- Based general aviation
- Itinerant general aviation

Based on the schedule of flights provided by New England Airlines during an off-season period and two peak periods during summer season, a total of 14.6, 18.0, and 20.0 average daily operations distributed evenly among arrivals and departures were assigned to the airline for the average annual day, average day peak season, and average peak day peak season operational scenarios, respectively.

The remaining average daily aircraft operations for each scenario were divided among based aircraft and itinerant aircraft. RIAC estimates that 30 percent of aircraft operations are performed by based aircraft and the remaining 70 percent are performed by itinerant aircraft. For the purposes of this noise analysis, all banner-towing aircraft were considered as itinerant aircraft, and all of the estimated 280 banner-towing aircraft operations were assumed to occur during the peak (summer) season.

The distribution of single-engine and multi-engine propeller aircraft, jet aircraft, and helicopters is based on the based aircraft at WST, which is described in greater detail in the following section. A summary of the daily operations by operator and aircraft group for each operational scenario is shown in Table 3-2.

Table 3-2 Aircraft Operations Summary

Operator Group	Aircraft Group	Average Annual Day	Average Day - Peak Season	Average Peak - Day Peak Season
Based General Aviation	Single-engine Propeller	12.7	21.5	26.2
	Multi-engine Propeller	1.4	2.4	3.0
	Jet	0.3	0.5	0.6
	Helicopter	0.6	1.0	1.2
Itinerant	Single-engine Propeller	29.0	48.3	56.5
General Aviation	Multi-engine Propeller	3.3	5.5	6.4
	Jet	0.7	1.1	1.3
	Helicopter	1.3	2.2	2.6
	Banner-towing	0.8	2.3	5.5
New England Airlines		14.6	18.0	20.0
Total Daily Operations		**64.6**	**102.8**	**123.2**

Source: Rhode Island Airport Corporation, 2008; Interviews of airport management and users conducted by VHB in 2008.
Note: An aircraft arrival or departure is considered one aircraft operation.
Totals may not add up due to rounding.
See Appendix C for detailed aircraft operational data by INM aircraft type.

Aircraft Fleet Mix

The Based General Aviation category consists of single-engine and multi-engine propeller aircraft, jet aircraft, and helicopter aircraft. The distribution of the Based General Aviation category aircraft operations to specific INM aircraft types was performed by examining the WST based aircraft list (after removing the New England Airlines aircraft based at WST) and is consistent with the existing fleet mix assumptions detailed in Table 2-6 of Chapter 2. A detailed based aircraft list with INM aircraft types is provided in Appendix D.

The Itinerant General Aviation category consists of similar aircraft types, in addition to banner-towing aircraft. Specific jet, helicopter, and banner-towing itinerant INM aircraft types were determined based on observations made during the noise monitoring task. A list of the predominant itinerant aircraft and corresponding INM aircraft types is provided in Appendix D.

New England Airlines operates a fleet of three Britten-Norman BN-2 Islander aircraft (twin-engine turboprop) and three Piper PA-32 Cherokee 6 aircraft (single-engine piston). The aircraft are used equally; therefore, half of the operations assigned to New England Airlines are performed by the Islander, and the other half of operations are performed by the Cherokee 6.

Day/Night Distribution

Before aircraft operations can be distributed by runway and flight track, the day/night split must be determined (as previously stated, daytime is defined as between 7:00 AM - 9:59 PM, and nighttime is defined as 10:00 PM to 6:59 AM). This is necessary because the DNL noise metric includes a penalty for aircraft movements occurring in the nighttime period.

According to RIAC, approximately 97 percent of general aviation activity occurs during the daytime, while the remaining 3 percent occurs during the nighttime. This estimate is consistent with activity at other non-towered general aviation airports. There are two exceptions to this estimate. First, it was assumed that all banner-towing operations would occur during the day because of the fact that aerial advertising (other than lighter-than-air, or blimp, operations) occur when it is light outside and the advertising can be seen. Also, New England Airlines scheduled operations begin at 7:30 AM and end by 8:30 PM during the summer months. However, during the off-season (non-summer months) in 2008, a small number of flights depart WST before 7:00 AM to ferry building contractors to Block Island. Therefore, 2.9 percent of New England Airlines operations take place during the nighttime period in the average annual day operational scenario. No New England Airlines operations take place during the nighttime period in the other operational scenarios because the ferry flights only take place during the off-season.

As a result of increased banner-towing and New England Airlines operations that occur during the daytime in the peak season operational scenarios, the overall nighttime utilization decreases from 2.95 percent in the average annual day operational scenario to 2.41 percent and 2.38 percent in the average day peak season and average peak day peak season operational scenarios, respectively.

Runway Utilization

Runway utilization accounts for the number, location, and orientation of the active runways, as well as the directions and types of operations that occur on each runway. Runway use depends primarily on wind direction and wind speed. However, it is also a function of factors such as FBO location, taxiing distances, origin/destination, runway length, and runway instrumentation (such as non-precision instrument approaches to assist a pilot during an arrival operation).

Daytime and nighttime runway utilizations, by operation type, were determined based on input from RIAC, pilot interviews, and observations during the noise monitoring task. Tables 3-3 and 3-4 provide a summary of the runway utilization by operator or aircraft group, operation type, and time period. Detailed operational data by runway is provided in Appendix D.

Table 3-3 Runway Utilization Summary - Daytime

	Departures				Arrivals			
Operator/Aircraft Group	**Runway 7**	**Runway 25**	**Runway 14**	**Runway 32**	**Runway 7**	**Runway 25**	**Runway 14**	**Runway 32**
General Aviation*	5%	55%	5%	35%	5%	55%	5%	35%
Jet Aircraft	5%	55%	5%	35%	8%	84%	8%	0%
Banner-towing Aircraft	0%	100%	0%	0%	0%	100%	0%	0%
New England Airlines	15%	30%	15%	15%	15%	30%	15%	15%

Sources: Rhode Island Airport Corporation, 2008; Interviews of airport management and users conducted by VHB in 2008.
Note: See Appendix D for detailed aircraft operational data by runway and INM aircraft type.
* Not including jet and banner-towing aircraft.

Table 3-4 Runway Utilization Summary - Nighttime

	Departures				Arrivals			
Operator/Aircraft Group	**Runway 7**	**Runway 25**	**Runway 14**	**Runway 32**	**Runway 7**	**Runway 25**	**Runway 14**	**Runway 32**
General Aviation*	5%	55%	5%	35%	50%	0%	0%	50%
Jet Aircraft	5%	55%	5%	35%	100%	0%	0%	0%
Banner-towing Aircraft	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
New England Airlines	15%	30%	15%	15%	15%	30%	15%	15%

Source: Rhode Island Airport Corporation, 2008; Interviews of airport management and users conducted by VHB in 2008.
Note: See Appendix D for detailed aircraft operational data by runway and INM aircraft type.
* Not including jet and banner-towing aircraft.
N/A -- Not Applicable; no banner-towing aircraft were modeled during the nighttime period.

Aircraft Flight Tracks

Average aircraft routes, or flight tracks, represent where aircraft fly when departing or arriving at an airport. The development of flight tracks at WST relied on interviews with local pilots and observations during the noise monitoring task because detailed radar data are not available at the airport. Arrival and departure flight tracks were modeled with primary tracks in the center of each general route and secondary, or dispersed, tracks on each side of each primary track to reflect pilot deviation from the primary track. The primary track accommodates the most operations for each track grouping, with a decreasing amount of operations assigned to the dispersed tracks farther from the primary track. The use of flight track dispersion in FAA's INM results in a more accurate estimate of noise exposure for average day scenarios.

Separate tracks were modeled for general aviation aircraft, jet aircraft, New England Airlines, helicopter aircraft, and banner-towing aircraft. The flight tracks are depicted in Appendix D (Figures D-1 through D-9). It is important to note that the flight tracks (both primary and dispersed) are not the only areas where aircraft may fly. Rather, the flight tracks depict average routes used by the majority of aircraft using WST, and are inputs to the INM.

Aircraft Engine Run-Up Operations

Pilots perform a "pre-flight" check of key engine performance indicators prior to each departure. Aircraft pre-flight engine run-up areas are primarily located at each runway end, as shown in Figure 3-2. One additional pre-flight engine run-up area is located along Taxiway F (parallel to Runway 14-32). The airport requests pilots to perform pre-flight checklist run-ups in this location to prevent unwanted noise in the area off Runway 32, the Winnipaug Hills Community. This location is identified on the airfield with a sign beside the taxiway requesting that engine run-ups are performed in the recommended area as opposed to the end of Runway 32.

It was estimated that every departing general aviation and New England Airlines aircraft performs a pre-flight engine run-up (100 percent power for 30 seconds) at the Runways 7, 25, and 14 runway ends prior to departure. It was estimated that all based general aviation and New England Airlines aircraft use the recommended run-up area along Taxiway F because of knowledge of the airfield. Conversely, it was estimated that only half of all itinerant general aviation aircraft would use the recommended run-up area while the other half would use the end of Runway 32.

A summary of the aircraft run-up operations by location is provided in Table 3-5. A detailed listing of run-up operations by aircraft type, location, and time of day is provided in Appendix D.

Table 3-5 Summary of Aircraft Engine Run-up Operations

Operational Scenario	Runway 7 End	Runway 25 End	Runway 14 End	Runway 32 End	Runway 32 Recommended Noise Abatement Location	TOTAL
Average Annual Day	4.1	14.9	2.2	2.8	6.4	30.5
Average Day Peak Season	5.5	24.1	3.3	4.7	10.2	47.9
Average Peak Day Peak Season	6.3	28.3	3.8	5.5	12.1	56.0

Source: Interviews of airport management and users conducted by VHB in 2008.
Note: See Appendix D for detailed aircraft run-up operations data by INM aircraft type.

3.2.3 Grid Point Analysis Locations

The grid point locations analyzed consist of noise sensitive locations and locations of interest surrounding WST. The following types of land uses were investigated within the community surrounding WST:

- Residential uses (e.g., single family dwellings, town houses, apartments);
- Recreational facilities (e.g. parks and golf courses);
- Other land uses (e.g., schools, nursing homes, religious buildings, public buildings); and

- Town of Westerly and RIAC suggested locations (e.g. runway end, industrial area, other residential areas).

It is important to note that the extent of the investigation was confined to the area immediately surrounding WST to ensure that the estimated background, or ambient, noise levels would not greatly exceed predicted aircraft noise levels.

Westerly Airport staff keeps an ongoing record of the aircraft noise complaints received from residents in the surrounding community, including the location and contact information of each caller. Of the noise complaints, properties that were closest on all sides to the airport were selected as potential grid point locations (Figure 3-3). The Town of Westerly and RIAC also suggested particular residential spaces (R-4, R-5, R-8, R-12, and R-15 on Figure 3-3). The two sites that coincide with the noise monitoring locations were derived based on their proximity to the runway ends and public input received at RIAC's first public information meeting, which was held on August 13, 2008. A total of 17 residential locations were identified in the immediate vicinity of WST.

Recreational facilities, including a public park and golf course (P-1 and O-4, respectively, on Figure 3-3), within the immediate vicinity of WST were also selected as grid point locations. No schools, churches, or nursing homes were identified within the immediate vicinity of WST. However, a U.S. Post Office facility (along Tom Harvey Road, beyond the Runway 7 end; O-1 on Figure 3-3), the industrial area adjacent to the airport (O-2 and O-3 on Figure 3-3), and a location off of the Runway 32 end (O-5 on Figure 3-3) were identified as other locations of interest.

3.2.4 Aircraft Noise Monitoring

The purpose of the noise monitoring effort was to provide measured sound levels of aircraft events at two representative residential locations surrounding WST. The noise monitoring captured sound levels associated with typical types of aircraft and operations on one day during the peak summer season. It is also intended to provide the neighbors surrounding the airport with relative sampling of the actual noise measured at the airport versus the calculated data prepared in the report and understanding of other non-airport noise commonly contributing to the noise in the neighborhood.

The noise monitoring program was conducted at two locations from approximately 9:00 AM to 7:00 PM on August 29, 2008 (the Friday of Labor Day Weekend). The existing sound levels were measured using a Type 1 sound analyzer (Larson-Davis model 824). The noise monitor was programmed to collect Lmax and L90 sound level data[65] for every second during the 10-hr period.

The noise monitoring equipment was located at two residential sites – a residence on Links Passage (RIAC property) and one in a cul-de-sac at Nob Court, shown as locations R-16 and R-17, respectively on Figures 3-4 and 3-5. The two monitoring locations were selected based on their close proximity to the runways, discussions with RIAC, and input provided by the public during the first public information meeting held on August 13, 2008 at the Westerly Town Hall. In addition to the equipment, two technicians were present at the sites to record aircraft type and other related information.

Weather readings for the area were collected three times during the monitoring period:

- 9:00 AM (Runways 7 and 32 in use):
  - Temperature = 66.2°F
  - Winds = calm
  - 10 miles visibility
- 11:00 AM (Runways 14 and 25 in use):
  - Temperature = 69.8°F
  - Winds = 3 miles per hour
  - 10 miles visibility
- 6:00 PM (Runway 25 in use):
  - Temperature = 70.1°F
  - Winds = calm
  - 10 miles visibility

Links Passage (RIAC property) Monitoring Site

The Links Passage (RIAC property) monitoring site was located at a residential property recently purchased by RIAC. The site is located approximately 0.2 miles from the physical end of Runway 32 and approximately 0.34 miles from the displaced arrival threshold of Runway 32. Figure 3-4 shows the monitoring site in relation

65 L90 is the A-weighted sound level that is exceeded for 90 percent of a designated time period, and is generally considered to be the background sound level. During a one hour time period, the L90 would be the sound level that was exceeded by other sound levels for 54 minutes (90 percent) of the one hour period.

to the Runway 32 end. The vegetation clearing equipment shown in the background was not used during the monitoring. The monitor began gathering data at 9:00 AM and was shut down at 12:29 PM to download data. The monitor started collecting data again at 12:46 PM and was shut down at 7:07 PM. A total of 9 hours, 51 minutes, and 51 seconds of data was collected at the Links Passage site during the day. Non-aircraft sounds experienced at the site included vehicles (intermittent noise events caused by cars, school bus, trucks, and a motorcycle), landscaping equipment, dogs barking, and golfers (ringing bell indicating foursome of golfers were clear of golfing green).[66]

Figure 3-4 Links Passage (RIAC Property) Monitoring Site

66 Non-aircraft noise events are not accounted for in the FAA's INM.

Nob Court Monitoring Site

The Nob Court monitoring site was located in a residential cul-de-sac southwest of WST. The site is located approximately 0.5 miles from the Runway 7 end. Figure 3-5 shows the monitoring site at the Nob Court cul-de-sac. The monitor began gathering data at 9:20 AM and was shut down at 11:22 AM to download data. The monitor started collecting data again at 11:37 AM and was shut down at 7:00 PM. A total of 9 hours, 25 minutes, and 6 seconds of data was collected at the Nob Court site during the day. Non-aircraft sounds experienced at the site included vehicles (intermittent noise events caused primarily by cars), landscaping equipment, and dogs barking.[67]

Figure 3-5 Nob Court Monitoring Site

67 Non-aircraft noise events are not accounted for in the FAA's INM.

3.3 Aircraft Noise Analysis Results

The aircraft noise analysis at WST consisted of the following:

- Modeling DNL 60 dB, 65 dB, and 70 dB contours for the average annual day, average day peak season, and average peak day peak season operational conditions using FAA's INM;
- Calculating DNL, Lmax, TA65, and NA65 at specific grid point locations surrounding WST using FAA's INM; and
- Gathering noise data of aircraft operations at two locations surrounding WST during a typical peak season day.

The results of each of these components of the aircraft noise analysis are provided in this section.

3.3.1 Aircraft Noise Contour Modeling

The INM was used to generate the DNL 60 dB, 65 dB, and 70 dB contours for the average annual day, average day peak season, and average peak day peak season operational conditions using FAA's INM, Version 7.0a. The DNL contours for each of the operational scenarios are shown in Figures 3-6 through 3-8. The DNL contours are centered along each runway at WST and enlarge at each of the pre-flight engine run-up areas shown previously in Figure 3-2.

The contours for each of the operational scenarios are of similar shape due to the similar input assumptions (fleet mix, runway utilization, flight tracks and utilization). However, the sizes of the contours increase slightly in the peak season operational scenarios due to the greater number of modeled daily operations compared to the average annual day operational scenario.

The on-airport and off-airport DNL contour areas are provided in Table 3-6.

Table 3-6 DNL Contour Area (acres) for Operational Scenarios

Operational Scenario	Contour Band	On-Airport	Off-Airport	Total Area
Average Annual Day	DNL 60 – 65 dB	35.95	0.39	36.34
	DNL 65 – 70 dB	12.57	0.00	12.57
	DNL 70+ dB	4.98	0.00	4.98
	TOTAL	**53.50**	**0.39**	**53.89**
Average Peak Season Day	DNL 60 – 65 dB	40.98	0.41	41.39
	DNL 65 – 70 dB	14.68	0.00	14.68
	DNL 70+ dB	6.29	0.00	6.29
	TOTAL	**61.95**	**0.41**	**62.36**
Average Peak Day Peak Season	DNL 60 – 65 dB	44.97	0.52	45.49
	DNL 65 – 70 dB	16.85	0.01	16.86
	DNL 70+ dB	7.42	0.00	7.42
	TOTAL	**69.24**	**0.53**	**69.77**

Source: VHB, 2008; INM, Version 7.0a.

The DNL 65 dB contour extends slightly off airport property (0.01 acres) in the Average Peak Day Peak Season operational scenario but is considered compatible with the industrial land uses northwest of the Runway 7 end according to the FAR Part 150 Land Use Compatibility Guidelines. According to FAR Part 150, the determination of incompatible land uses is made using the average annual day operational scenario.[68] As shown in Figure 3-6 and Table 3-6, the DNL 65 contour (which is considered the noise threshold of compatibility for residential land uses under FAR Part 150) is completely contained on existing airport property. Therefore, according to the FAR Part 150 Land Use Compatibility Guidelines, there are no incompatible land uses surrounding WST.

3.3.2 Analysis of Noise Levels at Grid Point Locations

Tables 3-7 through 3-9 provide the results of the analysis of noise levels for all grid point locations shown in Figure 3-3 for each operational scenario. For each operational scenario, the DNL, Lmax, TA65 (minutes), and NA65 is provided. The TA65 value in minutes is supplemented in the tables with the percent of time per 24-hour period the TA65 represents. For example, if the TA65 is 5 minutes at a location, then the percent of time per 24-hour period would be 0.35 percent (5 minutes ÷ (60 minutes per hour × 24 hours per day)).

Consistent with the noise contour results described in Section 3.3, *Aircraft Noise Analysis Results*, none of the DNL noise levels at the grid point locations in the average annual day operational scenario (Table 3-7) would indicate that incompatible land uses exist around WST according to the FAR Part 150 Land Use Compatibility guidelines, and all of the analysis results of noise levels at the grid points were common for an airport of this size.

68 14 CFR Part 150, Airport Noise Compatibility Planning, Section A150.103(b)(2).

The highest DNL values at the residential land use grid point locations are experienced at the Runway 32 end (R-6, R-9, R-16, and R-10), between the Runways 14 and 25 ends (R-4 and R-3), and along the extended centerline of Runway 14-32 (R-1 and R-2). Values at these locations range from DNL 45 to approximately DNL 50 in the average annual day operational scenario, which is slightly lower than the typical suburban ambient DNL (see Figure 1 of Appendix C). The primary causes of the DNL values at these general locations are:

- Runway 32 end (R-6, R-9, R-16, and R-10): Departures by aircraft from Runway 32 contribute to over 70 percent of the DNL energy level in this area. To a lesser degree, location R-9 is also affected by aircraft run-up activity at the Runway 32 end (estimated at half of all itinerant general aviation departures from Runway 32).

- Between Runways 14 and 25 ends (R-4 and R-3): Departures from Runway 25 contribute approximately 60 percent of the DNL energy level, while departures from Runway 14 contribute 20 percent, and aircraft run-up activity (primarily from the Runway 25 end) contributes 10 percent. Although not accounted for in the FAA's INM, it is assumed that location R-3 (located less than 100 feet from Post Road, a divided highway) could also be affected by vehicle traffic.

- Along the extended centerline of Runway 14-32 (R-1 and R-2): Departures from Runway 32 contribute over 80 percent, while arrivals to Runway 14 contribute approximately 14 percent to the DNL energy level in this area. Although location R-17 is also along an extended runway centerline (Runway 7-25), DNL values are over 5 dB less because the location is slightly farther from the closest runway endpoint and the elevation of the location is approximately 20 feet lower than at R-1 and R-2 (resulting in greater distances between the aircraft noise source and the receiver at the ground location).

Although Lmax levels approach or reach 100 dB at some residential locations (R-10, R-16, R-2, and R-1 for example), the frequency of occurrence is very low. This is evident in the TA65 levels that are in the range of approximately 4 to 7 minutes (or 0.3 to 0.5 percent of a 24-hour day) at these same locations depending on the operational scenario. Therefore, the maximum noise levels at these locations are reached infrequently and last for a short duration of time.

The TA65 estimates the time during a day that aircraft operations would have the potential to disturb outdoor speech. The highest potential for outdoor speech disturbance at a residential location is at R-4, with 16 to 25 minutes (1 to 2 percent of a 24-hour day) above 65 dB, depending on the operational scenario. The TA65 in this area is primarily affected by aircraft pre-flight run-up activity at the Runway 25 end, which accommodates the greatest number of aircraft departures.

The NA65 represents the number, or frequency, of aircraft events above 65 dB (the sound level at which outdoor speech may be disturbed). The NA65 correlates with TA65. In other words, in areas where the time above 65 dB is higher, then the number of events above 65 dB is higher. The highest number of events at residential locations reaching the noise levels at which outdoor speech could be disturbed is approximately 35 to 78 per day, depending on the operational scenario.

Table 3-7 Noise Levels at Grid Point Locations for the Average Annual Day

Grid Point Location	DNL (dB)	Lmax (dB)	TA65 (minutes)	Percent of TA65 per 24-hr. day	NA65 (# of events)
R-1	45.0	98.5	4.4	0.31%	15.7
R-2	45.7	98.7	4.1	0.28%	15.1
R-3	48.2	85.4	14.4	1.00%	41.4
R-4	48.6	87.1	16.6	1.15%	34.0
R-5	39.7	81.7	6.0	0.42%	17.5
R-6	50.2	88.4	16.8	1.17%	34.9
R-7	34.9	78.3	0.6	0.04%	5.6
R-8	38.5	81.1	4.5	0.31%	16.6
R-9	48.7	98.4	10.8	0.75%	33.2
R-10	44.0	102.4	3.9	0.27%	21.8
R-11	38.7	95.8	2.7	0.19%	13.4
R-12	34.2	79.3	0.6	0.04%	3.9
R-13	39.0	85.0	3.9	0.27%	13.2
R-14	43.2	91.9	4.9	0.34%	16.5
R-15	40.2	97.7	5.3	0.37%	16.5
R-16	44.2	105.1	4.3	0.30%	22.2
R-17	37.2	99.1	1.5	0.10%	8.0
P-1	46.8	95.9	8.5	0.59%	27.6
O-1	48.1	98.6	7.0	0.49%	24.3
O-2	46.3	85.1	13.2	0.92%	30.9
O-3	43.6	83.3	8.3	0.58%	24.6
O-4	35.0	94.8	1.1	0.08%	7.6
O-5	55.3	94.2	17.5	1.22%	34.6

Source: VHB, 2008.
Note: R -- Residence; P -- Park; O -- Other

Table 3-8 Noise Levels at Grid Point Locations for the Average Day/Peak (Summer) Season

Grid Point Location	DNL (dB)	Lmax (dB)	TA65 (minutes)	Percent of TA65 per 24-hr. day	NA65 (# of events)
R-1	45.3	98.9	6.4	0.44%	23.9
R-2	45.9	99.2	6.0	0.42%	23.2
R-3	49.3	85.4	20.6	1.43%	65.4
R-4	49.6	87.1	23.4	1.63%	53.0
R-5	40.6	81.6	8.4	0.58%	26.7
R-6	51.3	87.9	24.5	1.70%	54.7
R-7	35.8	78.3	0.8	0.06%	4.8
R-8	39.3	81.0	5.7	0.40%	23.2
R-9	49.7	98.2	16.1	1.12%	50.4
R-10	44.7	102.6	5.5	0.38%	35.2
R-11	39.5	96.2	3.9	0.27%	16.5
R-12	35.2	79.2	0.6	0.04%	4.6
R-13	40.0	84.8	5.7	0.40%	20.1
R-14	43.4	92.4	7.6	0.53%	26.8
R-15	40.9	97.8	7.2	0.50%	24.2
R-16	45.0	105.6	6.3	0.44%	34.6
R-17	38.1	99.5	2.1	0.15%	12.2
P-1	47.3	95.9	12.2	0.85%	40.5
O-1	47.3	85.1	19.0	1.32%	37.5
O-2	44.1	83.3	11.2	0.78%	48.2
O-3	36.1	95.1	1.4	0.10%	36.9
O-4	56.6	93.7	26.0	1.81%	11.6
O-5	45.3	98.9	6.4	0.00%	54.8

Source: VHB, 2008.
Note: R -- Residence; P -- Park; O -- Other

Table 3-9 Noise Levels at Grid Point Locations for the Average Peak Day/Peak (Summer) Season

Grid Point Location	DNL (dB)	Lmax (dB)	TA65 (minutes)	Percent of TA65 per 24-hr. day	NA65 (# of events)
R-1	46.0	99.1	7.3	0.51%	27.8
R-2	46.6	99.3	7.0	0.49%	27.0
R-3	50.1	85.4	24.5	1.70%	77.8
R-4	50.3	87.1	27.6	1.92%	61.9
R-5	41.3	81.6	9.9	0.69%	32.5
R-6	52.0	87.8	28.5	1.98%	65.8
R-7	36.4	78.2	0.9	0.06%	5.5
R-8	39.9	81.0	6.6	0.46%	27.5
R-9	50.4	98.1	19.1	1.33%	58.8
R-10	45.4	102.6	6.3	0.44%	42.9
R-11	40.2	96.2	4.4	0.31%	19.2
R-12	35.9	79.2	0.8	0.06%	5.2
R-13	40.7	84.7	6.8	0.47%	22.3
R-14	44.1	92.5	9.3	0.65%	32.8
R-15	41.5	97.9	8.6	0.60%	29.7
R-16	45.6	105.7	7.5	0.52%	42.2
R-17	38.7	99.6	2.3	0.16%	14.1
P-1	48.0	95.8	14.4	1.00%	48.3
O-1	49.0	99.0	12.6	0.88%	45.1
O-2	48.1	85.1	22.7	1.58%	58.4
O-3	44.8	83.3	12.2	0.85%	36.4
O-4	36.7	95.1	1.6	0.11%	13.5
O-5	57.2	93.6	30.7	2.13%	65.7

Source: VHB, 2008.
Note: R -- Residence; P -- Park; O -- Other

3.3.3 Aircraft Noise Monitoring

In addition to computer modeling of cumulative, or collective, aircraft operations that occur during average daily conditions at the airport, RIAC undertook an aircraft noise monitoring exercise to capture noise data for specific aircraft events at WST.

Field observations of various types of aircraft were recorded as they were approaching and departing the airport on August 29, 2008. It was also noted whether an aircraft was an overflight. An overflight is when an aircraft was either overflying WST or overflying the monitoring site and, therefore, the observers were unable to associate the aircraft with a type of operation (arrival or departure) occurring at WST.

The noise monitoring equipment gathered one-second data for the equivalent sound level (Leq), Lmax, L90, and L10 (A-weighted sound level that is exceeded for 10 percent of a designated time period). The Links Passage (RIAC property) monitoring site had a clear view of the north side of the airfield and the observer was able to clearly identify the type and location of operations that were taking place on the airfield. The Nob Court monitoring site was at a lower elevation than the airfield and surrounded by trees. The observer did not have a clear view to the airfield.

Noise data for the majority of aircraft types that operate at WST were collected during the exercise, including aircraft of concern that were expressed to RIAC during the first public information meeting. The following activity was captured during the 10-hour monitoring period:

- 96 aircraft operations were recorded
- Of the 96 operations, the noise monitors captured activity by helicopters and jet, multi-engine, and single engine aircraft including the following types of aircraft activity that are of particular interest to the community (as identified through discussions with airport staff and comments received at the first public information meeting):
  - Jet aircraft operation (Cessna Citation) arrival Runway 7 and departure from Runway 25
  - Helicopter operations (Sikorsky S-76C) arrival Runway 32 and departure from Runway 14
  - Banner towing operation (Cessna) looping the airport three times
- The following identifies runway use for the 96 aircraft operations:
  - Runway 7 = 7 operations (7 percent)
  - Runway 25 = 47 operations (49 percent)
  - Runway 14 = 4 operations (4 percent)
  - Runway 32 = 38 operations (40 percent)
- Other noises recorded on the monitors included:
  - Vehicular traffic (cars) with an average decibel level of 53 dB at the Links Passage (RIAC property) site
  - Dogs barking with an average decibel level of 65 dB at the Links Passage (RIAC property) site

- Vehicular traffic (cars) with an average decibel level of 49 dB at the Nob Court site

Table 3-10 shows the measured Lmax and L90 (background) sound levels for the two locations. The time above 65 dB, which is the outdoor noise level that can be expected to cause speech interference (for outdoor communication), is also provided in Table 3-10.

Table 3-10 Measured Existing Sound Levels

Receptor Location	Lmax (dB)	L90 (dB)	Time Above 65 dB (minutes)
Links Passage Site (R-16)	96.9	40.0	12:10
Nob Court Site (R-17)	90.6	38.0	10:04

Source: VHB, 2008.

The maximum noise level (Lmax) of 96.9 dB at the Links Passage site was caused by a multi-engine propeller aircraft (Britten-Norman Islander aircraft) departing Runway 14 in the early afternoon. The measured L90 sound level was 40.0 dB during the monitoring time period. The site experienced noise levels greater than 65 dB for 12 minutes and 10 seconds, or 2.1 percent of the monitoring time period.

The maximum noise level (Lmax) of 90.6 dB at the Nob Court site was caused by a multi-engine propeller aircraft departing Runway 25 in the late afternoon. In general, the monitoring site was slightly quieter than the Links Passage site with an L90 reading of 38.0 dB. The site experienced noise levels greater than 65 dB for a total of 10 minutes and 4 seconds, or 1.8 percent of the monitoring time period.

Figures of noise monitoring data showing maximum noise levels over one-second periods for aircraft operations of interest are provided in Appendix E. Representative data for the following aircraft operations are provided in Tables 3-11 and 3-12.

Table 3-11 Representative Aircraft Operations (Links Passage Monitoring Site)

Aircraft	Operation Type	Observer Notes	Lmax (dB)	TA65
Sikorsky S-76 Helicopter	Arrival to Runway 32	Direct overflight of monitoring site	85.6 dB	32 seconds
Sikorsky S-76 Helicopter	Departure from Runway 14	Direct overflight of monitoring site	79.6 dB	29 seconds
BN-2A-26 Islander	Departure from Runway 7	Parallel to monitoring site	79.1 dB	18 seconds
BN-2A-26 Islander	Arrival to Runway 7	Parallel to monitoring site	66.3 dB	3 seconds
BN-2A-26 Islander	Arrival to Runway 14	Across airfield from monitoring site	63.9 dB	0 seconds
BN-2A-26 Islander	Departure from Runway 14	Direct overflight of monitoring site	96.7 dB	27 seconds
Piper Cherokee 6	Arrival to Runway 25	Parallel to monitoring site	67.9 dB	3 seconds
Cessna 172	Banner drop-off and pick-up along Runway 7	Parallel to monitoring site; repeated circular flight patterns near monitoring site	65.8 dB	3 seconds

Source: VHB, 2008.

Table 3-12 Representative Aircraft Operations (Nob Court Monitoring Site)

Aircraft	Operation Type	Observer Notes	Lmax (dB)	TA65
Cessna (single-engine propeller)	Arrival to Runway 7	Direct overflight of monitoring site	72.4 dB	8 seconds
Cessna (single-engine propeller)	Departure from Runway 25	Direct overflight of monitoring site	78.4 dB	12 seconds
BN-2A-26 Islander	Arrival to Runway 7	Direct overflight of monitoring site	66.8 dB	6 seconds
Piper Seneca	Departure from Runway 25	Direct overflight of monitoring site	85.5 dB	12 seconds
Cessna Citation Jet	Arrival to Runway 7	Direct overflight of monitoring site	82.1 dB	12 seconds
Cessna 172	Banner drop-off and pick-up along Runway 7	Parallel to monitoring site; repeated circular flight patterns near monitoring site	59.4 dB	0 seconds

Source: VHB, 2008.

3.4 Land Use Compatibility Plan

Summary

The purpose of the Land Use Compatibility Plan is to provide the Town of Westerly with an understanding of the noise environment around the airport and thereby assist their efforts when making future land use planning decisions regarding the land surrounding WST.

The timing for conducting the Land Use Compatibility Plan was prompted by several related interests. First, the ALP Update described in the first section of this report enabled resources to be combined in conducting both studies in one FAA grant. Second, there was an expressed interest by local officials who were attempting to address concerns identified by airport neighbors. Finally, the December 2004 State Airport System Plan (ASP) included a policy objective to, "*Promote actions that enhance the compatibility of system airports with the human and natural environment.*"[69] Therefore this effort was both timely and in keeping with that ASP objective.

To conduct the noise and land use assessment the only tools available for a small general aviation airport like Westerly State Airport was the basic guidance established in Federal Aviation Regulation Part 150 and the Federal Aviation Administration Land Use Compatibility Guidelines (Appendix C). Both are accepted industry standards for conducting noise assessments and developing land use recommendations around airports.

As is the case for small general aviation airports, it is not surprising that the noise analysis, conducted according to the aforementioned FAA criteria, showed that no land use incompatibilities exist due to aircraft noise. However, this conclusion is not intended to discount the individual concerns expressed by neighbors regarding disturbances created by specific aircraft activities. Such activities, as a helicopter overflight, banner towing in the summer, ground aircraft engine run-up operations at the end of Runway 32 or occasional jet traffic can create a disturbance as an individual noise event. Evidence the community feedback at the two public information meetings conducted during the study, neighbors expressed dissatisfaction in these areas, as well as the inability to communicate their concerns to management.

What the study conclusion is saying is that; on the whole the airport does create incompatible land use. Notwithstanding that conclusion RIAC will work to document existing and proposed operational and/or management techniques focused on addressing the specific neighborhood concerns referred to above. However, given the circumstances, the study is limited in what it can recommend to address potential preventive land use measures. Section 3.4.1, *Potential Land Use Compatibility Measures* does provide some potential land use compatibility measures for consideration.

Land use compatibility from airspace and protected surfaces obstructions is considered in the development of the recommended Airport Hazard Area in Section 3.4.2, *Recommended Airport Hazard Area*.
Section 3.4.3, *Selected Bibliography of Airport Land Use Compatibility Material*, provides the Town of Westerly references to additional material regarding airport land use compatibility for informational purposes only.

[69] *Rhode Island State Airport System Plan, State Guide Plan Element 640*, December 2004.

3.4.1 Potential Land Use Compatibility Measures

According to FAA's Land Use Compatibility Guidelines residential land us is judged to be incompatible if it is in an area equal to or above the DNL 65 dB noise level for the average annual day scenario. As described in Section 3.3, *Aircraft Noise Analysis Results*, and shown in Figure 3-6 of the report, there are no incompatible land uses surrounding WST according those FAA guidelines. In addition, there is no indication from the analysis performed in this study that there would be land use incompatibilities in the future due to aircraft noise because there is no anticipated change in aircraft fleet mix, and modeling of noise levels with higher aircraft operational scenarios (peak, or summer, season) showed no land use incompatibilities.

The Town of Westerly, Code of Ordinances, §171-7 specifically excludes aircraft from their regulations in Chapter 171 (Noise). However, in the future they may want to consider land use measures to reduce the potential for any perceived land use incompatibilities due to aircraft noise (lower than the FAA standard of DNL 65 dB contour level). Preventive measures are land use controls that typically amend or update the local zoning ordinance, comprehensive plan, subdivision regulations, or building code. This section describes some more common preventive land use measures that the Town of Westerly could consider and their applicability to WST and the community.

Comprehensive Planning

The Town of Westerly is currently revising the 1991 Comprehensive Plan as required by the Rhode Island Comprehensive Planning and Land Use Act (RIGL 45-22.2). The Town should consider the effect of surrounding development on the airport and the airport's effect on the community in the comprehensive plan process. By adopting the Airport Hazard Area (Section 3.4.2, *Recommended Airport Hazard Area*, and Figure 3-9) as an airport overlay zoning district (see the following discussion regarding Zoning Ordinances and Zoning Overlays) in the comprehensive plan update, the Town could protect the airspace surrounding the airport and enhance the provisions of compatible land uses.

Zoning and Zoning Overlays

The noise analysis results (Section 3.3, *Aircraft Noise Analysis Results*) demonstrated that no incompatible land uses exist due to aircraft noise surrounding WST according to FAA land use compatibility guidelines. However, the analysis demonstrated that noise levels were slightly higher in the areas along the extended runway centerlines due to aircraft arriving and departing at low altitudes near each runway end.

The area directly off of the Runway 14 end (northwest of WST) is primarily commercial and other non-residential land uses, and zoned as Highway Commercial, or HC. The areas directly off of the Runway 7 and Runway 32 ends contain residential land uses and zoning and are fully developed. The area off of the Runway 25 end, along the north side of Post Road, is zoned as Medium-Density Residential 30 (MDR-30)[70] but is undeveloped, except for two small areas consisting of non-residential land uses - the Greater Westerly – Pawcatuck, Rhode Island Area Chamber of Commerce and the Blue Star Motor Inn (Figure 3-9). This is the only significant area directly off of the runway ends that is zoned as residential and is undeveloped.

[70] According to the Town of Westerly Zoning Code Chapter 260, the MDR-30 zoning district is "generally intended for single-family neighborhoods adjacent to high-density areas. These zoning districts are designed to conform to existing development patterns rather than encourage major expansions beyond defined neighborhoods."

A total of approximately 2.2 acres of the MDR-30 zoning district could be converted to non-residential zoning – from just west of the Chamber of Commerce building to the Blue Star Motor Inn. Rezoning this area to commercial or industrial would prevent residential development within an area of increased annoyance from aircraft noise, although not incompatibility according to FAA's land use compatibility guidelines.[71]

A zoning overlay is a type of zoning that that applies certain additional requirements (such as height restrictions and/or types of structure) on a specific area while preserving the underlying zoning district(s). Land uses within an overlay zone would need to conform to the underlying zoning as well as the overlay zoning requirements. Many political subdivisions with airports include some form of height overlay zones to prevent structures from being built that would be hazards to air navigation. Noise overlay zones can also be used to limit the types of land uses that are allowed and to specify certain building code requirements (such as sound insulation) without changing the underlying zoning; and/or to require certain disclosures in the development and sale of properties. Some communities around airports use the DNL 60 dB contour (to provide a buffer to FAA's threshold of compatible residential land use) or DNL 65 dB contour of the ultimate airport development to define the limits of a noise overlay zone.

The recommended Airport Hazard Area (Section 3.4.2, *Recommended Airport Hazard Area*,) could be adopted by the Town of Westerly as an airport overlay zoning district to protect the airspace surrounding WST and to ensure compatible land uses. This type of height restriction would not require rezoning of each parcel within the overlay zone, and would satisfy § 1-3-5 of the R.I.G.L. Airport Zoning Act.

Disclosure Ordinance

Disclosure allows a prospective buyer of property to be made aware certain existing conditions, such as aircraft noise levels at the particular location or the proximity of the airport to the particular location. Fair disclosure of this information can be required directly through an ordinance or in the subdivision regulations covering the sale or transfer of the property. A disclosure ordinance does not reduce the noise exposure at a particular location. However, it does ensure that homebuyers are aware of the noise exposure environment and the proximity of the airport, and can include that knowledge in their decision-making process. This usually results in new homeowners that are less likely to be negatively affected by aircraft noise because they were aware of the situation when they purchased their home. Primary concerns of property owners and real estate professionals regarding disclosure ordinances are their potential effects on property values as well as the potential effects on the ability to sell properties.

[71] This area experiences DNL levels below 65 dB for the average annual day condition, which is the threshold for residential land use compatibility. In fact, DNL levels for the average annual day condition range from approximately 40 to 48 dB in this area (see sites R-3 and R-15 in Table 3-7).

The following is a typical disclosure statement that would be used in residential real estate transactions:

> NOTICE OF AIRPORT IN VICINITY: This property is presently located in the vicinity of an airport. For that reason, the property may be subject to some of the annoyances or inconveniences associated with proximity to airport operations (for example: noise, vibration, or odors). Individual sensitivities to those annoyances can vary from person to person. You may wish to consider what airport annoyances, if any, are associated with the property before you complete your purchase and determine whether they are acceptable to you.

The Town of Westerly could consider the implementation of a mandatory disclosure ordinance within the Approach and Transitional Zones identified in the recommended Airport Hazard Area (see Section 3.4.2 and Figure 3-10). These areas include the approach and departure paths closest to each runway end and other areas close to the airport.

Summary of Potential Land Use Compatibility Measures

There are no incompatible land uses surrounding WST due to aircraft noise using the FAA's land use compatibility standards. As such, the Town of Westerly need not undertake any corrective land use measures in the area. However, the Town may want to consider some of the preventive land use measures presented in this section to ensure that future residential encroachment and perceived incompatibilities do not occur. A summary of the preventive land use measures discussed in this section, along with the advantages and disadvantages, presented in Table 3-13.

The following are some specific land use compatibility measures suggested to the Town of Westerly in the areas surrounding the Airport:

- Rezone an area of approximately 2.2 acres off the end of Runway 25. It is currently zoned for residential use and is undeveloped except for the Greater Westerly – Pawcatuck, Rhode Island Area Chamber of Commerce (See Figure 3-9).

- Continue the comprehensive planning process currently underway. Adopt the recommended Airport Hazard Area (Section 3.4.2 and Figure 3-9) as a zoning overlay district to define structure height restrictions in the area surrounding WST.

- Consider a mandatory disclosure program within the Approach and Transitional Zones of the recommended Airport Hazard Area to notify prospective property buyers of the proximity of the airport to the particular location.

Table 3-13 Potential Land Use Compatibility Measures

Preventive Measure	Advantage	Disadvantage
Comprehensive Planning	Low cost and minimal controversy if airport is not in a fully developed area	Not effective when existing incompatible development has encroached on the airport
Zoning and Zoning Overlays	Zoning overlays easy to implement; reduces hazards and incompatible land uses	If land use is incompatible in the underlying zone, this incompatibility will continue
Disclosure Ordinance	Reduces future perceived airport annoyances	May be difficult to enact as mandatory and to enforce

Source: VHB, 2008.

3.4.2 Recommended Airport Hazard Area

Airport Zoning is described in Section 1-3 of the Rhode Island General Laws (commonly referred to as the Airport Zoning Act). The Airport Zoning Act defines an airport hazard as:

> "…any electronic transmission device or structure, which, as determined by the FAA, interferes with radio communication between airport and aircraft approaching or leaving the airport, or any structure or tree or use of land which obstructs the airspace required for the flight of aircraft in landing or taking off at any airport or is otherwise hazardous to the landing or taking off of aircraft."

The Airport Zoning Act (§ 1-3-4) directs RIAC to:

> "…formulate, adopt and revise, when necessary, an airport airspace plan for each publicly owned airport in the state. Each plan shall indicate the circumstances in which structures and trees are or would be airport hazards, the area within which measures for the protection of the airport's navigable airspace, including aerial approaches, should be taken, and what the height limits and other objectives of those measures should be."

As described in Section 2.1.4, *Airport Obstructions*, RIAC completed an aeronautical study in 2007 to identify obstructions that penetrate the imaginary surfaces for WST. The study identified tree obstructions within all approach surfaces at WST and tree and brush obstructions south of Runway 7-25. The outcome of the study was a clearing and obstruction lighting plan depicted in Figure 2-12, which identified removal of or lighting of various airfield obstructions. The FAA approved of the obstruction clearing and lighting plan issuing an Airspace Determination Letter dated August 31, 2007[72] (Appendix A).

72 Notice of Determination Letter from Gail Lattrell (FAA Airport Planner) to Mark Brewer (President and CEO for the Rhode Island Airport Corporation) dated August 31, 2007 RE: Aeronautical Study Number 2007-ANE-97-NRA.

Sheet 5 of the ALP Update drawings – the Airport Airspace Drawing - depicts the airspace surfaces (FAR Part 77, *Objects Affecting Navigable Airspace*) surrounding WST. The horizontal, conical, approach, and transitional surfaces are depicted together with an isometric sectional view of the airport's airspace.

RIAC's Aeronautical Study and the Airport Airspace Drawing included in this ALP Update satisfy § 1-3-4 of the Airport Zoning Act. The Airport Zoning Act (§ 1-3-5) details the zoning powers of political subdivisions within the areas identified in the ALP Update's Airport Airspace Drawing. Specifically, the Airport Zoning Act states the following with respect to local zoning powers:

> (1) In order to prevent the creation or establishment of airport hazards, every political subdivision having an airport hazard area wholly or partly within its territorial limits shall adopt, administer, and enforce, under the police power and in the manner and upon the conditions prescribed, airport zoning regulations for that part of the airport hazard area which is within its territorial limits, which regulations may divide the airport hazard area into zones, and, within those zones, specify the land uses permitted and regulate and restrict the height to which structures and trees may be erected or allowed to grow.
>
> (2) A political subdivision which includes an airport hazard area created by the location of a public airport shall adopt, administer, and enforce zoning ordinances pursuant to this chapter if the existing comprehensive zoning ordinance for the political subdivision does not provide for the land uses permitted, and regulate and restrict the height to which structures may be erected or objects of natural growth may be allowed to grow in, an airport hazard area.
>
> (3) A political subdivision which includes an airport hazard area created by the location of a public airport shall adopt, either in full or by reference, the provisions of part 77 of title 14 of the code of federal regulations, entitled "Objects Affecting Navigable Airspace" hereinafter known as part 77.[73]

Based on the Airport Zoning Act and the airspace studies of WST, it is recommended that the Town of Westerly adopt the Airport Hazard Area depicted in Figure 3-10. The Airport Hazard Area consists of the following FAR Part 77 imaginary surfaces and delineates that no structure shall penetrate the approach zone, transition zone, horizontal zone, and conical zone surfaces. These zones (and the primary surface) are described briefly in this section.

- Primary Surface: The primary surface covers the ground surface for a width of 500 feet centered on each runway and extends 200 feet past each runway end.
- Approach Zones: An approach zone is established for each runway. The type of approach (visual, non-precision instrument, or precision instrument) dictates the dimensions of each approach zone. At WST, the approach zone dimensions take into account non-precision instrument approaches to Runway 7

73 State of Rhode Island General Laws, §1-3-5.

and 25[74] ends and visual approaches to the Runway 14 and 32 ends. The approach zones off the Runway 7 and 25 ends extend for 10,000 feet from the edge of the primary surface with an inner width of 500 feet to an outer width of 3,500 feet at an upward slope of 34:1. The approach zones off the Runway 14 and 32 ends extend 5,000 feet from the edge of the primary surface with an inner width of 500 feet to an outer width of 1,500 feet at an upward slope of 20:1.

- Transition Zones: The transition zones extend from the primary surface and approach zones at an upward slope of 7:1 to the horizontal surface.
- Horizontal zone: The horizontal zone extends outward from the approach zones and transition zones to a maximum radius of 10,000 feet at a constant elevation of 231 feet.
- Conical zone: The conical zone extends from the horizontal surface for a distance of 4,000 feet at an upward slope of 20:1, resulting in a maximum elevation of 431 feet.

As defined in the Airport Zoning Act, the purpose of the Airport Hazard Area is to define an area of zoning control for political subdivisions to restrict the height of structures and objects of natural growth to prevent the creation of an obstruction to flight operations or air navigation. Although the Town of Westerly could restrict the height of structures within the recommended Airport Hazard Area, the FAA would also monitor structure heights within the area through the Form 7460[75] process (Appendix F). This process requires that a Form 7460 be completed and submitted to the FAA whenever tower construction or crane operation occurs in the vicinity of an airport. It is recommended that the Town of Westerly in considering building or development proposals require the proponent to file notification (FAA Form 7460) with the FAA as a condition of approval.

3.4.3 Selected Bibliography of Airport Land Use Compatibility

A selection of valuable materials from the FAA, State of Rhode Island, and the Transportation Research Board (TRB) related to airport land use compatibility are provided in this section that could be used by the Town of Westerly to assist in making land use planning decisions in the future regarding the influence of Westerly State Airport.

FAA Material

The FAA maintains the Airport Noise Compatibility Planning Toolkit as part of the agency's Land Use Planning Initiative. The toolkit is "designed to aid regional offices in assisting state and local officials and interested organizations for airport noise compatibility planning around the nation's airports,"[76] and contains subject matter on the following topics:

74 The proposed future approach to Runway 25 consists of a non-precision GPS approach. The Airport Airspace Drawing (Sheet 5 of the ALP Update) and the Recommended Airport Hazard Area (Figure 4-9) reflect the future approaches to each runway. Only the Runway 25 approach would change in the future.
75 FAA Form 7460-1, Notice of Proposed Construction or Alteration.
76 http://www.faa.gov/about/office_org/headquarters_offices/aep/planning_toolkit/, Accessed December 11, 2008.

- FAA Policies, Regulations, Programs, and Funding Sources
- FAA Guidance Materials
- State and Local Noise Compatibility Programs
- Communication Tools
- Additional Tools

The toolkit may be accessed at the following internet address:

http://www.faa.gov/about/office_org/headquarters_offices/aep/planning_toolkit/

The following FAA Advisory Circular (AC) is provided for guidance regarding the development of zoning ordinances for height restrictions (for example, within the recommended Airport Hazard Area depicted in Figure 3-9):

A Model Zoning Ordinance to Limit Height of Objects around Airports, FAA AC 150/5190-4A, Federal Aviation Administration, December 14, 1987.
http://rgl.faa.gov/Regulatory_and_Guidance_Library/rgAdvisoryCircular.nsf/0/35e1883669b46c6a86256c690074e920/$FILE/150_5190_4a.pdf

State of Rhode Island

The State of Rhode Island offers guidance regarding land use and comprehensive planning, and zoning. The following website addresses and handbooks are provided for the Town of Westerly to consider in developing effective planning measures for the areas surrounding WST:

Rhode Island Statewide Planning Program – Comprehensive Plans.
http://www.planning.ri.gov/comp/default.htm

Handbook on the Local Comprehensive Plan for the Rhode Island Comprehensive Planning and Land Use Regulation Act, Rhode Island Department of Administration, Division of Planning, The State Planning Council, June 1989, Update 2003. http://www.planning.ri.gov/comp/handbook16.pdf

Transportation Research Board (TRB) Material

Legal Research Digest 5: Responsibility for Implementation and Enforcement of Airport Land-Use Zoning Restrictions, Transportation Research Board (TRB), Airport Cooperative Research Program (ACRP), March 2009. http://onlinepubs.trb.org/onlinepubs/acrp/acrp_lrd_005.pdf

Enhancing Airport Land Use Compatibility, Transportation Research Board (TRB), Airport Cooperative Research Program (ACRP) 03-03, *to be released shortly*. http://www.trb.org/TRBNet/ProjectDisplay.asp?ProjectID=137

This page intentionally left blank

Figures

This page intentionally left blank

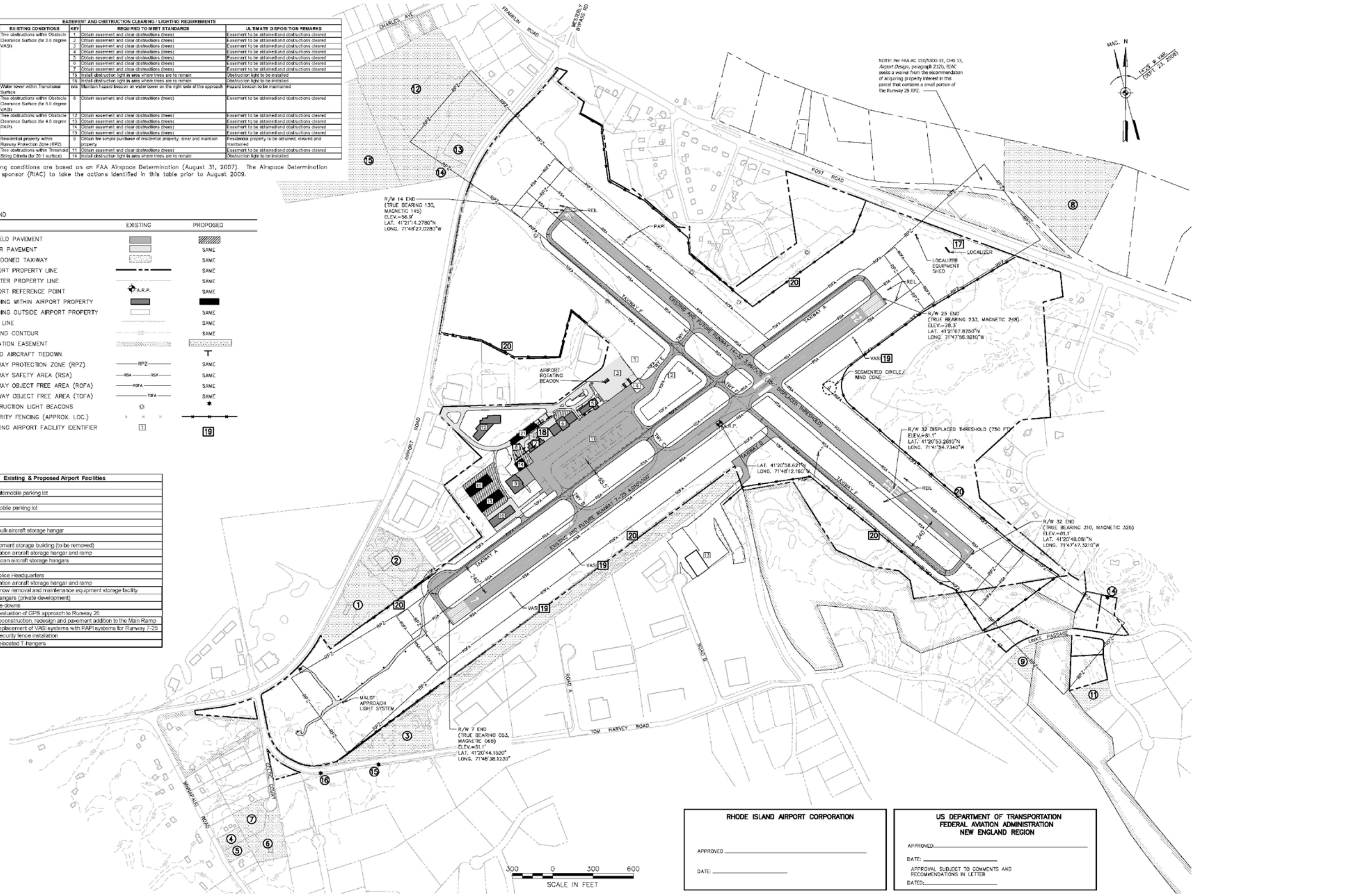
EASEMENT AND OBSTRUCTION CLEARING / LIGHTING REQUIREMENTS				
DESCRIPTION	EXISTING CONDITIONS	KEY	REQUIRED TO MEET STANDARDS	ULTIMATE DISPOSITION REMARKS
Runway 7 approach surfaces	Tree obstructions within Obstacle Clearance Surface (for 3.6 degree VASI)	1	Obtain easement and clear obstructions (trees)	Easement to be obtained and obstructions cleared
		2	Obtain easement and clear obstructions (trees)	Easement to be obtained and obstructions cleared
		3	Obtain easement and clear obstructions (trees)	Easement to be obtained and obstructions cleared
		4	Obtain easement and clear obstructions (trees)	Easement to be obtained and obstructions cleared
		5	Obtain easement and clear obstructions (trees)	Easement to be obtained and obstructions cleared
		6	Obtain easement and clear obstructions (trees)	Easement to be obtained and obstructions cleared
		7	Obtain easement and clear obstructions (trees)	Easement to be obtained and obstructions cleared
		15	Install obstruction light in area where trees are to remain	Obstruction light to be installed
		16	Install obstruction light in area where trees are to remain	Obstruction light to be installed
	Water tower within Transitional Surface	n/a	Maintain hazard beacon on water tower on the right side of the approach	Hazard beacon to be maintained
Runway 25 approach surface	Tree obstructions within Obstacle Clearance Surface (for 3.0 degree VASI)	8	Obtain easement and clear obstructions (trees)	Easement to be obtained and obstructions cleared
Runway 14 approach surface	Tree obstructions within Obstacle Clearance Surface (for 4.0 degree PAPI)	12	Obtain easement and clear obstructions (trees)	Easement to be obtained and obstructions cleared
		13	Obtain easement and clear obstructions (trees)	Easement to be obtained and obstructions cleared
		14	Obtain easement and clear obstructions (trees)	Easement to be obtained and obstructions cleared
		15	Obtain easement and clear obstructions (trees)	Easement to be obtained and obstructions cleared
Runway 32 approach surfaces	Residential property within Runway Protection Zone (RPZ)	9	Obtain fee simple purchase of residential property; clear and maintain property	Residential property to be obtained, cleared and maintained
	Tree obstructions within Threshold Siting Criteria (for 20:1 surface)	11	Obtain easement and clear obstructions (trees)	Easement to be obtained and obstructions cleared
		14	Install obstruction light in area where trees are to remain	Obstruction light to be installed

These non-conforming conditions are based on an FAA Airspace Determination (August 31, 2007). The Airspace Determination requires the airport sponsor (RIAC) to take the actions identified in this table prior to August 2009.

LEGEND

ITEM	EXISTING	PROPOSED
AIRFIELD PAVEMENT		
OTHER PAVEMENT		SAME
ABANDONED TAXIWAY		SAME
AIRPORT PROPERTY LINE		SAME
ABUTTER PROPERTY LINE		SAME
AIRPORT REFERENCE POINT	A.R.P.	SAME
BUILDING WITHIN AIRPORT PROPERTY		
BUILDING OUTSIDE AIRPORT PROPERTY		SAME
TREE LINE		SAME
GROUND CONTOUR		SAME
AVIGATION EASEMENT		
PAVED AIRCRAFT TIEDOWN		
RUNWAY PROTECTION ZONE (RPZ)	RPZ	SAME
RUNWAY SAFETY AREA (RSA)	RSA	SAME
RUNWAY OBJECT FREE AREA (ROFA)	ROFA	SAME
TAXIWAY OBJECT FREE AREA (TOFA)	TOFA	SAME
OBSTRUCTION LIGHT BEACONS		
SECURITY FENCING (APPROX. LOC.)		
EXISTING AIRPORT FACILITY IDENTIFIER	1	19

Existing & Proposed Airport Facilities	
No.	
1	Overflow automobile parking lot
2	ASOS
3	Main automobile parking lot
4	Fuel farm
5	Terminal
6	Landmark bulk aircraft storage hangar
7	T-hangars
8	Airport equipment storage building (to be removed)
9	Reeves Aviation aircraft storage hangar and ramp
10	North American aircraft storage hangars
11	Main ramp
12	Westerly Police Headquarters
13	Dooney Aviation aircraft storage hangar and ramp
14	Proposed snow removal and maintenance equipment storage facility
15	Proposed hangars (private development)
16	Proposed tie-downs
17	Proposed evaluation of GPS approach to Runway 25
18	Proposed reconstruction, redesign and pavement addition to the Main Ramp
19	Proposed replacement of VASI systems with PAPI systems for Runway 7-25
20	Proposed security fence installation
21	Proposed relocated T-hangers



RHODE ISLAND AIRPORT CORPORATION
APPROVED ______
DATE: ______

US DEPARTMENT OF TRANSPORTATION FEDERAL AVIATION ADMINISTRATION NEW ENGLAND REGION
APPROVED ______
DATE: ______
APPROVAL SUBJECT TO COMMENTS AND RECOMMENDATIONS IN LETTER
DATED ______

Source: RIAC, Westerly Airport

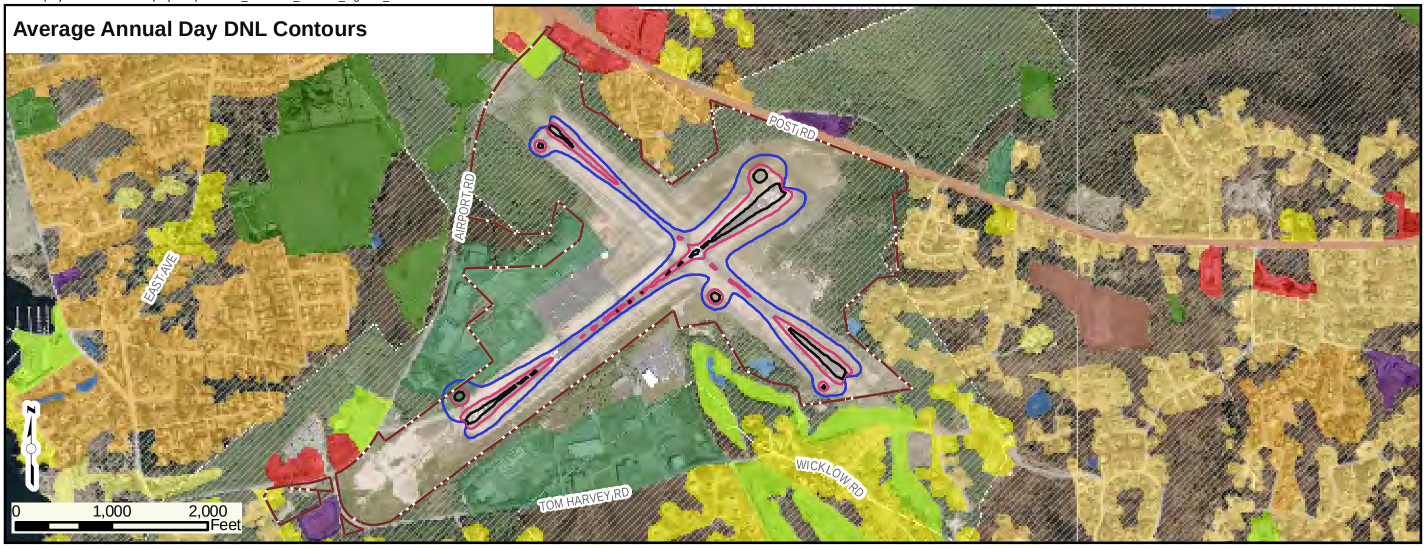
Rhode Island Airport Corporation

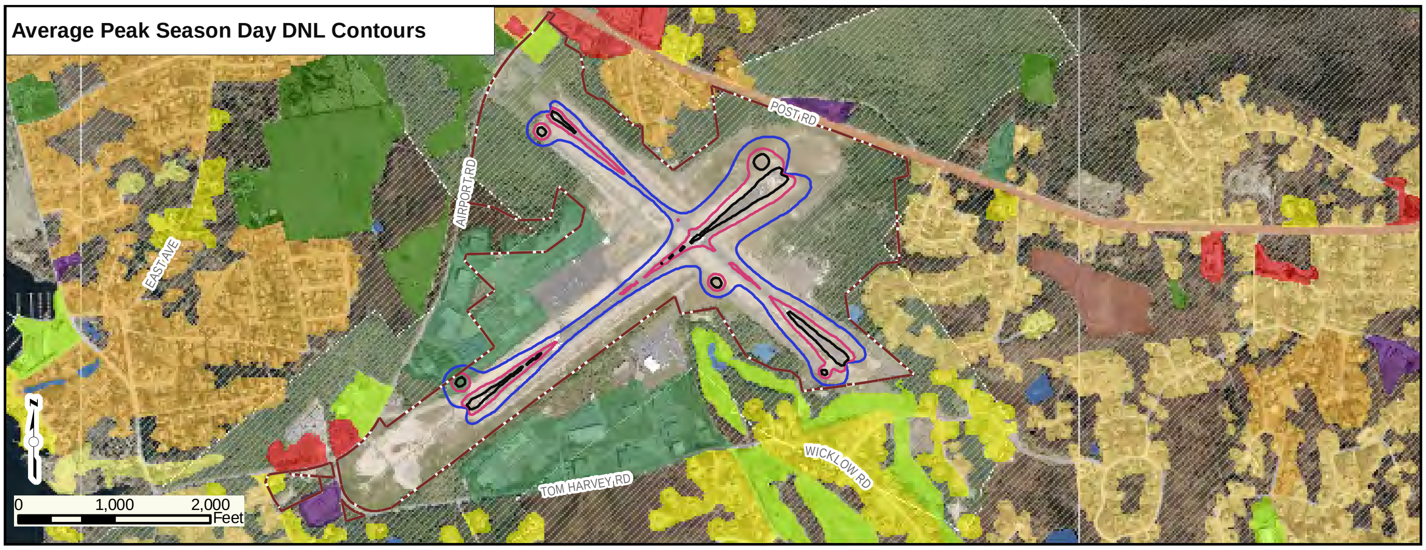
Westerly ALP Update and Land Use Compatibility Plan

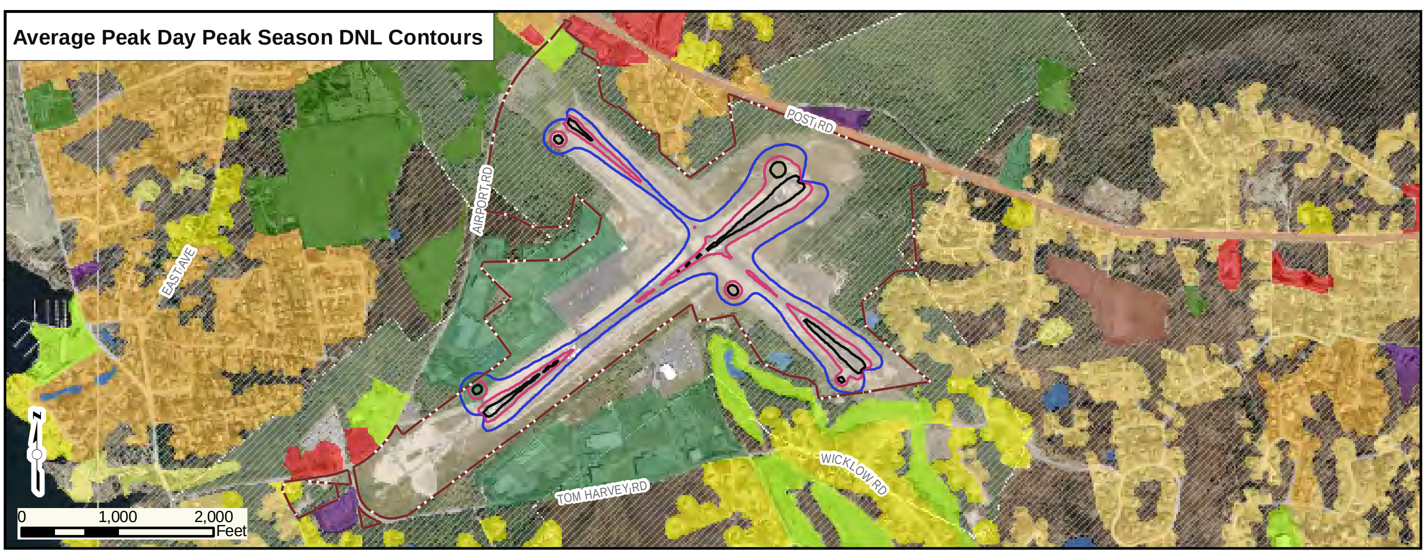
Figure ES-1

Airport Layout - Proposed Facilities Plan

\\ri-data\projects\72088.01\GIS\project\UpdateALP_02\WEST_UALP02_FigES-2_ExDNLContours.mxd







Source: 2007 Aerial (RIAC), 2005 Roadways (RIDOT), 2003-2004 Land Use (RIGIS), Noise Contours (INM)

Legend

- Property Line
- DNL 60dB Contour
- DNL 65dB Contour
- DNL 70dB Contour

Land Use

- Agriculture
- Commercial (sale of products and services)
- Developed Recreation (all recreation)
- Industrial (manufacturing, design, assembly, etc.)
- Institutional (schools, hospitals, churches, etc.)
- High Density Residential (<1/8 acre lots)
- Medium High Density Residential (1/4 to 1/8 acre)
- Medium Density Residential (1 to 1/4 acre lots)
- Medium Low Density Residential (1 to 2 acre lots)
- Low Density Residential (>2 acre lots)
- Mines, Quarries and Gravel Pits
- Roads (divided highways >200' plus related facilities)
- Undeveloped
- Water

Rhode Island Airport Corporation

Westerly ALP Update and Land Use Compatibility Plan

Figure ES-2

Existing Conditions DNL Contours

\\ri-data\projects\72088.01\GIS\project\UpdateALP_02\WEST_UALP02_FigES-3_Noise Analysis Grid Pt Loc.mxd

Legend

- Grid Point Locations
- Property Line

Rhode Island Airport Corporation

Westerly ALP Update and Land Use Compatibility Plan

Figure ES-3

Noise Analysis Grid Point Locations

Note: Locations R-16 and R-17 were also noise monitoring sites.

\\ri-data\projects\72088.01\GIS\project\UpdateALP_02\WEST_UALP02_FigES-4_RecAirportHazZone.mxd

Source: Airport Layout Plan Update, Airport Airspace Drawing, Sheet 5 of 7, December 30, 2008.

Legend

- Westerly Bounds
- FAR Part 77 surfaces outside of the Town of Westerly
- Elevations
- End of Conical Zone (20:1 slope to Elev. 431')
- Horizontal Zone (Elev. 231')
- Horizontal Zone Outside of Westerly (Elev. 231')
- Primary Surface (Elev. 31')
- Approach Zone - Visual (20:1 slope to Elev. 231')
- Approach Zone - Non-precision (34:1 slope to Elev. 231')
- Transitional Zone (7:1 slope to Elev. 231')

Note: All elevations are Above Mean Sea Level (AMSL)

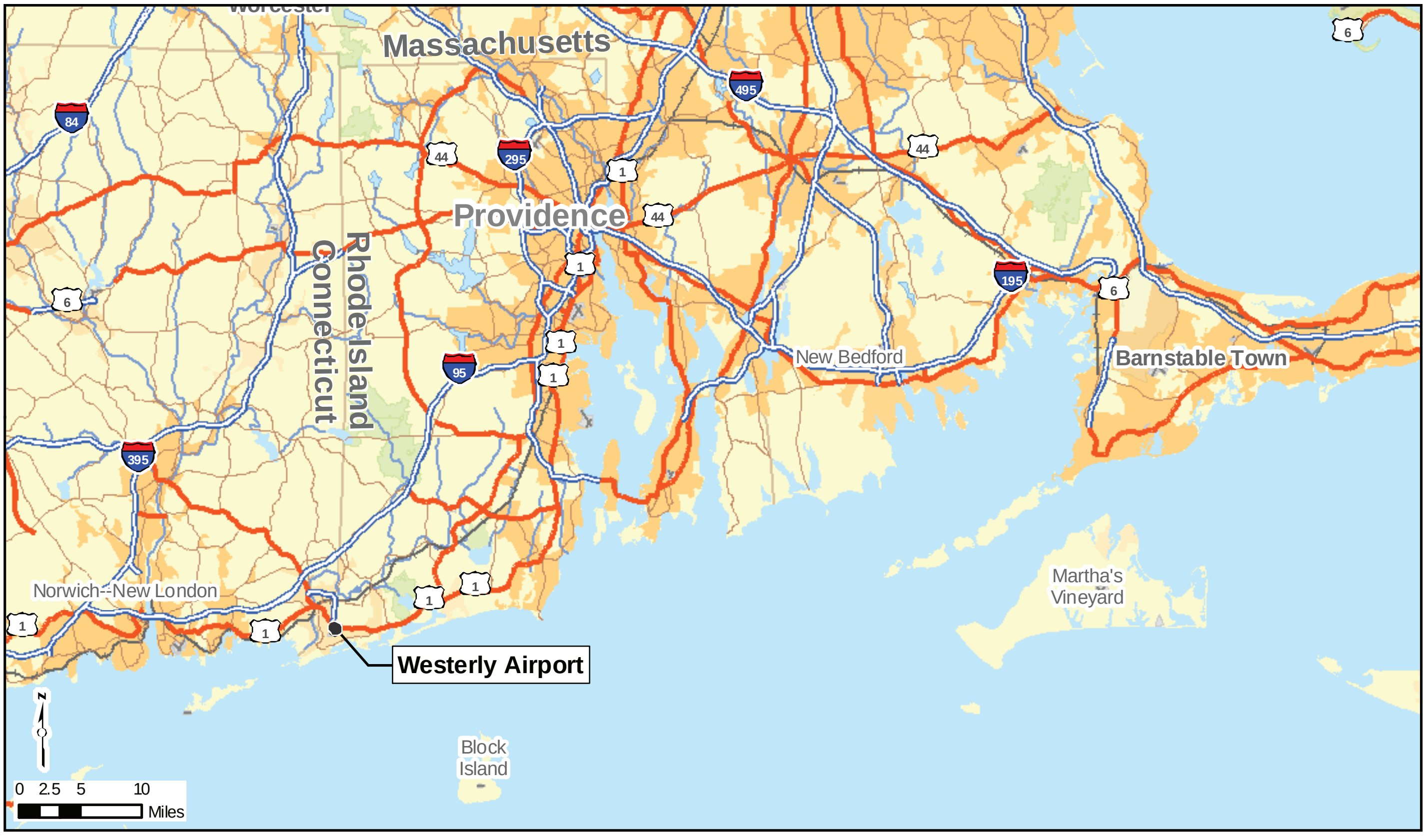
Rhode Island Airport Corporation

Westerly ALP Update and Land Use Compatibility Plan

Figure ES-4

Recommended Airport Hazard Area

\\ri-data\projects\72088.01\GIS\project\UpdateALP_02\WEST_UALP02_Fig1-1_SiteLocation.mxd



Source: Streetmap 9.1

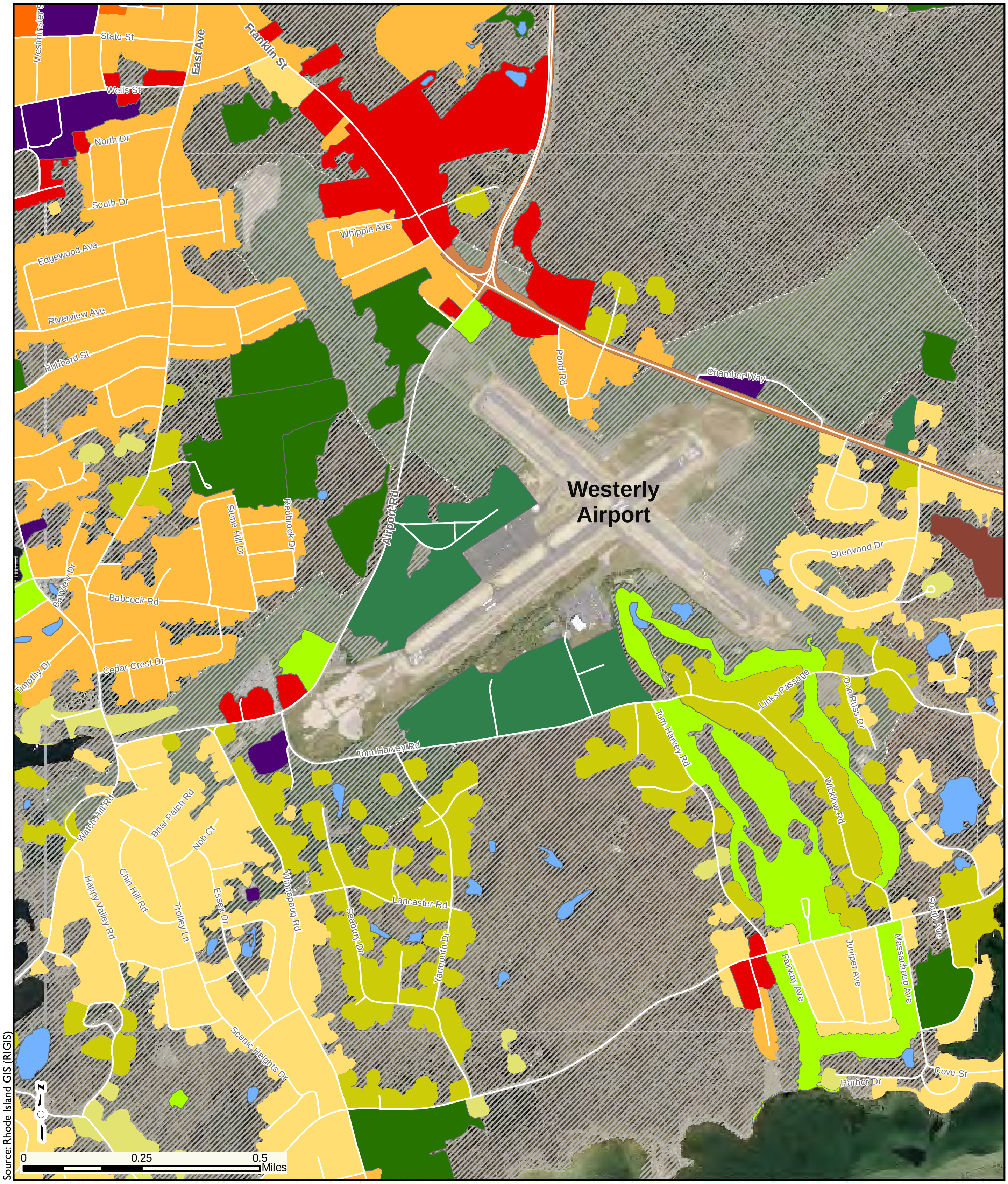
Rhode Island Airport Corporation

Westerly ALP Update and Land Use Compatibility Plan

Figure 1-1

Westerly Airport Location
Washington County
Westerly, Rhode Island

\\ri-data\projects\72088.01\GIS\project\UpdateALP_02\WEST_UALP02_Fig1-2_Surrounding Land Use.mxd



Legend

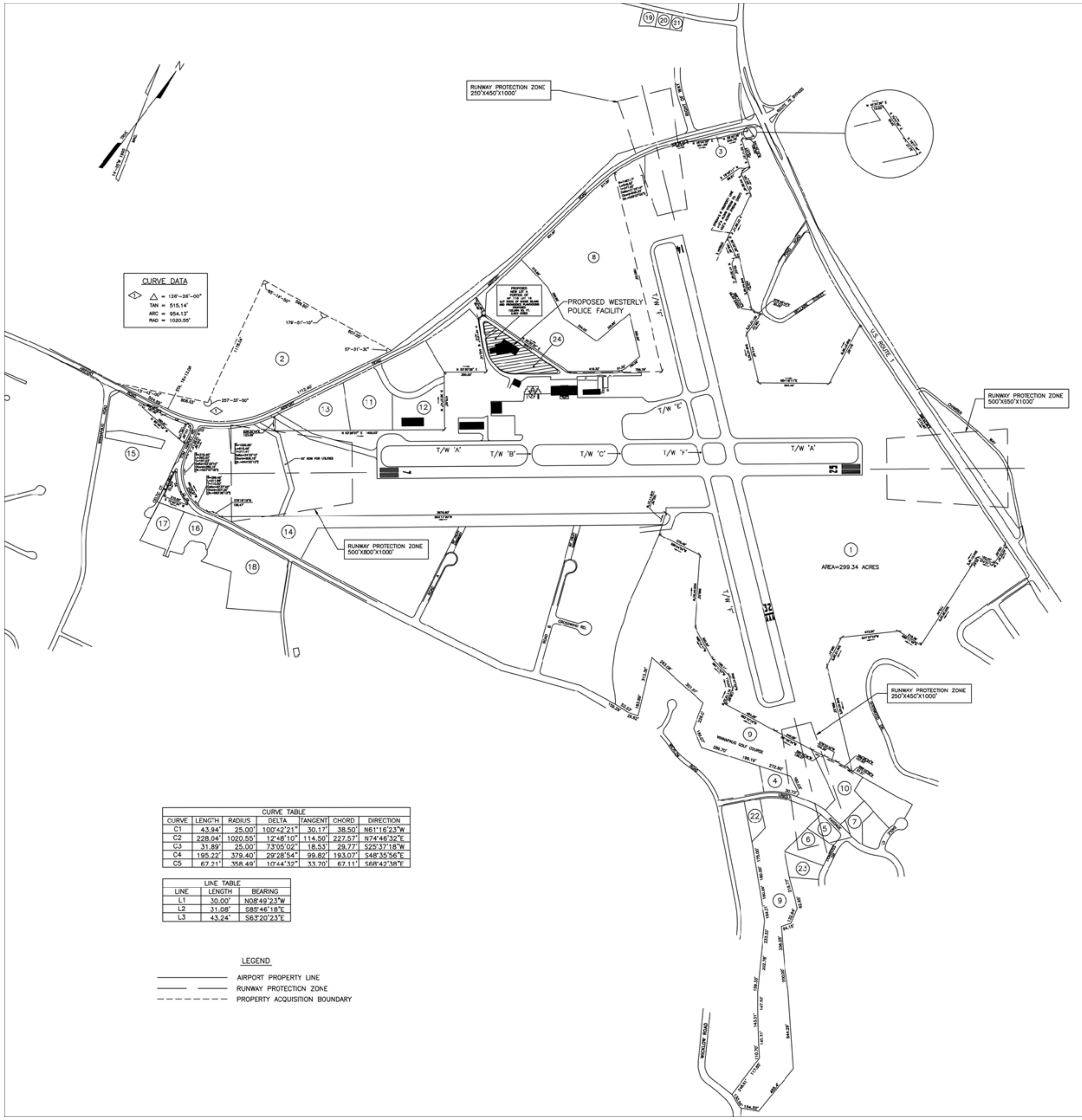
- Agriculture
- Cemeteries
- Commercial (sale of products and services)
- Developed Recreation (all recreation)
- Industrial (manufacturing, design, assembly, etc.)
- Institutional (schools, hospitals, churches, etc.)
- High Density Residential (<1/8 acre lots)
- Medium High Density Residential (1/4 to 1/8 acre)
- Medium Density Residential (1 to 1/4 acre lots)
- Medium Low Density Residential (1 to 2 acre lots)
- Low Density Residential (>2 acre lots)
- Mines, Quarries and Gravel Pits
- Railroads (and associated facilities)
- Roads (divided highways >200' plus related facilities)
- Undeveloped
- Waste Disposal (landfills, junkyards, etc.)
- Water
- Water and Sewage Treatment

Rhode Island Airport Corporation

Westerly ALP Update and Land Use Compatibility Plan

Figure 1-2

Surrounding Land Use



CURVE TABLE						
CURVE	LENGTH	RADIUS	DELTA	TANGENT	CHORD	DIRECTION
C1	43.94'	25.00'	100°42'21"	30.17'	38.50'	N61°16'23"W
C2	228.04'	1020.55'	12°48'10"	114.50'	227.57'	N74°46'32"E
C3	31.89'	25.00'	73°05'02"	18.53'	29.77'	S25°37'18"W
C4	195.22'	379.40'	29°28'54"	99.82'	193.07'	S48°35'56"E
C5	67.21'	358.49'	10°44'32"	33.70'	67.11'	S68°42'38"E

LINE TABLE		
LINE	LENGTH	BEARING
L1	30.00'	N08°49'23"W
L2	31.08'	S85°46'18"E
L3	43.24'	S63°20'23"E

WESTERLY STATE AIRPORT

KEY	MAP GRANTOR	GRANTEE	INST.	DATE OF ACQUISITION	TOWN	REMARKS
1	TOWN OF WESTERLY	STATE OF R.I.		SEE REMARKS	TOWN OF WESTERLY	TOWN TOOK LAND IN 1936 AND CONVEYED IT TO THE STATE IN OCT., 1936. ADDITIONAL GIFT IN 1942 MADE TOTAL OF 419 ACRES. (LEASED TO FEDERAL GOVERNMENT IN 1942 FOR NAVY. RETURNED TO STATE IN LATE SUMMER 1947.) (TOTAL NOW IS 299.34 ACRES.)
2	STATE OF R.I.	TOWN OF WESTERLY	FEE	SEE REMARKS	TOWN OF WESTERLY	STATE OF R.I. HAS RELEASED (PLAT 118, LOT 16) 20.1 ACRES TO THE TOWN OF WESTERLY. APPROVED BY FAA ON JULY 1, 1993.
3	STATE OF R.I.	TOWN OF WESTERLY	N/A	JUNE 8, 1999	TOWN OF WESTERLY	ACQUISITION BY CONDEMNATION AUTHORIZED BY THE STATE PROPERTIES COMMITTEE ON THE 8th DAY OF JUNE, A.D. 1999 FOR HIGHWAY PURPOSES. AREA=11,957 SQ/FT.
4	KENNETH SORENSEN AND BRIAN McCUIN	STATE OF R.I.	FEE	NOVEMBER 09, 1999	TOWN OF WESTERLY	ACQUIRED ASSESSOR'S PLAT 119 LOT 3-T FOR RPZ AND OBSTRUCTION REMOVAL PURPOSES AREA=1.0675 ACRES WITH FAA FUNDS AIP NO. 06
5	JAMES ROMANELLA	STATE OF R.I.	FEE	NOVEMBER 30, 1999	TOWN OF WESTERLY	ACQUIRED ASSESSOR'S PLAT 120 LOT 5-1 FOR RPZ AND OBSTRUCTION REMOVAL PURPOSES AREA=0.7806 ACRES WITH FAA FUNDS AIP NO. 06
6	JAMES ROMANELLA	STATE OF R.I.	FEE	NOVEMBER 30, 1999	TOWN OF WESTERLY	ACQUIRED ASSESSOR'S PLAT 120 LOT 5-2 FOR RPZ AND OBSTRUCTION REMOVAL PURPOSES AREA=1.4842 ACRES WITH FAA FUNDS AIP NO. 06
7	JAMES ROMANELLA	STATE OF R.I.	FEE	NOVEMBER 30, 1999	TOWN OF WESTERLY	ACQUIRED ASSESSOR'S PLAT 120 LOT 5-21 FOR RPZ AND OBSTRUCTION REMOVAL PURPOSES AREA=0.9549 ACRES WITH FAA FUNDS AIP NO. 06
8	INDUSTRIAL FOUND. OF R.I.	STATE OF R.I.	FEE	SEPTEMBER 7, 2000	TOWN OF WESTERLY	ACQUIRED ASSESSOR'S LOT 15 MAP 108 AREA=858,365 SQ/FT
9	GEORGE A. BUCK	STATE OF R.I.	ESMT.	MAY 11, 2001	TOWN OF WESTERLY	ACQUIRED ASSESSOR'S PLAT 130 LOT 4 FOR AVIGATION EASEMENTS GRANT NO. 08 AREA=40.8 ACRES
10	LINDA LAVALLEE	STATE OF R.I.	ESMT.	MAY 11, 2001	TOWN OF WESTERLY	ACQUIRED ASSESSOR'S PLAT 120 LOT 5-22 FOR AVIGATION EASEMENTS GRANT NO. 08 AREA=2.7 ACRES
11	LJUNGBERG, JENS & SUSAN G.	RIAC	ESMT.	PROPOSED	TOWN OF WESTERLY	GRANT ACQUISTION NO. 3-44-0005-15-2005 PLAT NO. 118, LOT NO. 19A, AREA=3.79 ACRES
12	WES TECH ASSOCIATES	RIAC	ESMT.	PROPOSED	TOWN OF WESTERLY	GRANT ACQUISTION NO. 3-44-0005-15-2005 PLAT NO. 118, LOT NO. 19B, AREA=3.51 ACRES
13	SCHONNING, EUNICE-ANNE R.	RIAC	ESMT.	PROPOSED	TOWN OF WESTERLY	GRANT ACQUISTION NO. 3-44-0005-15-2005 PLAT NO. 118, LOT NO. 19, AREA=3.64 ACRES
14	TOWN OF WESTERLY WATER DEPT.	RIAC	ESMT.	PROPOSED	TOWN OF WESTERLY	GRANT ACQUISTION NO. 3-44-0005-15-2005 PLAT NO. 128, LOT NO. 6, AREA=9.67 ACRES
15	BAILEY, DONA L.	RIAC	ESMT.	FEBRUARY 22, 2006	TOWN OF WESTERLY	ACQUIRED ASSESSOR'S PLAT 127, LOT 103 FOR AVIGATION EASEMENTS GRANT NO. 3-44-0005-08 AREA=0.12 ACRES
16	RUTTER, ROBERT C. & PATRICIA H.	RIAC	ESMT.	PROPOSED	TOWN OF WESTERLY	GRANT ACQUISTION NO. 3-44-0005-15-2005 PLAT NO. 128, LOT NO. 103-QQQ, AREA=1.75 ACRES
17	LALLI, NICHOLAS & AGNES	RIAC	ESMT.	PROPOSED	TOWN OF WESTERLY	GRANT ACQUISTION NO. 3-44-0005-15-2005 PLAT NO. 128, LOT NO. 103-RRR, AREA=1.25 ACRES
18	HARMS, DAVID	RIAC	ESMT.	PROPOSED	TOWN OF WESTERLY	GRANT ACQUISTION NO. 3-44-0005-15-2005 PLAT NO. 128, LOT NO. 103-TTT, AREA=6.45 ACRES
19	LAFLEUR, WILLIAM CARL & DAWN M.	RIAC	ESMT.	PROPOSED	TOWN OF WESTERLY	GRANT ACQUISTION NO. 3-44-0005-15-2005 PLAT NO. 98, LOT NO. 15, AREA=0.50 ACRES
20	BERLAM, ROBERT A.	RIAC	ESMT.	PROPOSED	TOWN OF WESTERLY	GRANT ACQUISTION NO. 3-44-0005-15-2005 PLAT NO. 98, LOT NO.14, AREA=0.40 ACRES
21	QUARATELLE, THOMAS J.	RIAC	ESMT.	JUNE 23, 2006	TOWN OF WESTERLY	ACQUIRED ASSESSOR'S PLAT 98, LOT 13 FOR AVIGATION EASEMENTS GRANT NO. 3-44-0005-08 AREA=0.34 ACRES
22	HIGHFILL, ANNA M.	RIAC	ESMT.	PROPOSED	TOWN OF WESTERLY	GRANT ACQUISTION NO. 3-44-0005-15-2005 PLAT NO. 119, LOT NO. 3V, AREA=0.86 ACRES
23	LAWLOR, CHRISTOPHER K. & SALLY	RIAC	ESMT.	PROPOSED	TOWN OF WESTERLY	GRANT ACQUISTION NO. 3-44-0005-15-2005 PLAT NO. 120, LOT NO. 5-3, AREA=0.95 ACRES
24	RIAC	TOWN OF WESTERLY (POLICE DEPT.)	LEASE	2005	TOWN OF WESTERLY	PROPOSED RECLASSIFICATION OF A PORTION OF PARCEL 1 AP 118 LOT 19 (2.823 ACRES) FROM AVIATION TO NON-AVIATION USE.

400 0 400 800 1200
SCALE IN FEET

ALL LAND FOR CURRENT AERONAUTICAL PURPOSES EXCEPT FOR KEY NO. 24

REVISION NUMBER	REVISION DATE	DESCRIPTION
1	6/01/01	REVISED EXHIBIT 'A'-PROPERTY MAP
2	4/28/05	ADDED NOS. 14-26
3	8/9/05	ADDED NO. 27
4	7/25/06	DELETED MAGEE, ZANELLA, AIRPORT PLAZA
5	8/22/06	ADDED PROPOSED WESTERLY POLICE FACILITY

Rhode Island Airport Corporation

WESTERLY AIRPORT

WESTERLY, RHODE ISLAND

SHEET TITLE: EXHIBIT 'A'-PROPERTY MAP

DESIGNED | DRAWN MPS | CHECKED DC | APPROVED 000

PROJECT NO.

DATE: AUGUST 2005 | SHEET 1 OF 1

Source: RIAC, Westerly Airport

Rhode Island Airport Corporation

Westerly ALP Update and Land Use Compatibility Plan

Figure 2-1

Westerly Airport Exhibit A

\\ri-data\projects\72088.01\GIS\project\UpdateALP_02\WEST_UALP02_Fig2-2_ExistingFacilities.mxd

Source: 2007 Aerial (RIAC), 2005 Roadways (RIDOT)

Legend

- Property Line
- ❶ Grass Overflow Parking Lot
- ❷ ASOS
- ❸ Main Auto Parking Lot
- ❹ Fuel Farm
- ❺ Terminal
- ❻ Landmark Bulk Hangar
- ❼ T-Hangars
- ❽ Airport Equipment Storage Building
- ❾ Reeves Aviation
- ❿ North American Hangars
- ⓫ Dooney Aviation Hangar and Ramps

Rhode Island Airport Corporation

Westerly ALP Update and Land Use Compatibility Plan

Figure 2-2

Airport Layout - Existing Facilities
2007 Aerial Photo

\\ri-data\projects\72088.01\GIS\project\UpdateALP_02\WEST_UALP02_Fig2-3_ExistingPavementCondition.mxd

Source: 2007 Aerial (RIAC), 2005 Roadways (RIDOT)

Legend

- Property Line
- New Pavement (Excellent Condition)
- Pavement in Good Condition
- Pavement in Poor Condition

Note:
Pavement conditions estimated based on visual observations by VHB (2008).

Rhode Island Airport Corporation

Westerly ALP Update and Land Use Compatibility Plan

Figure 2-3

Existing Pavement Condition

Source: 2007 Aerial (RIAC), June 2008 Photo (VHB Site Visit)

Legend

Approximate Photo Location and Direction

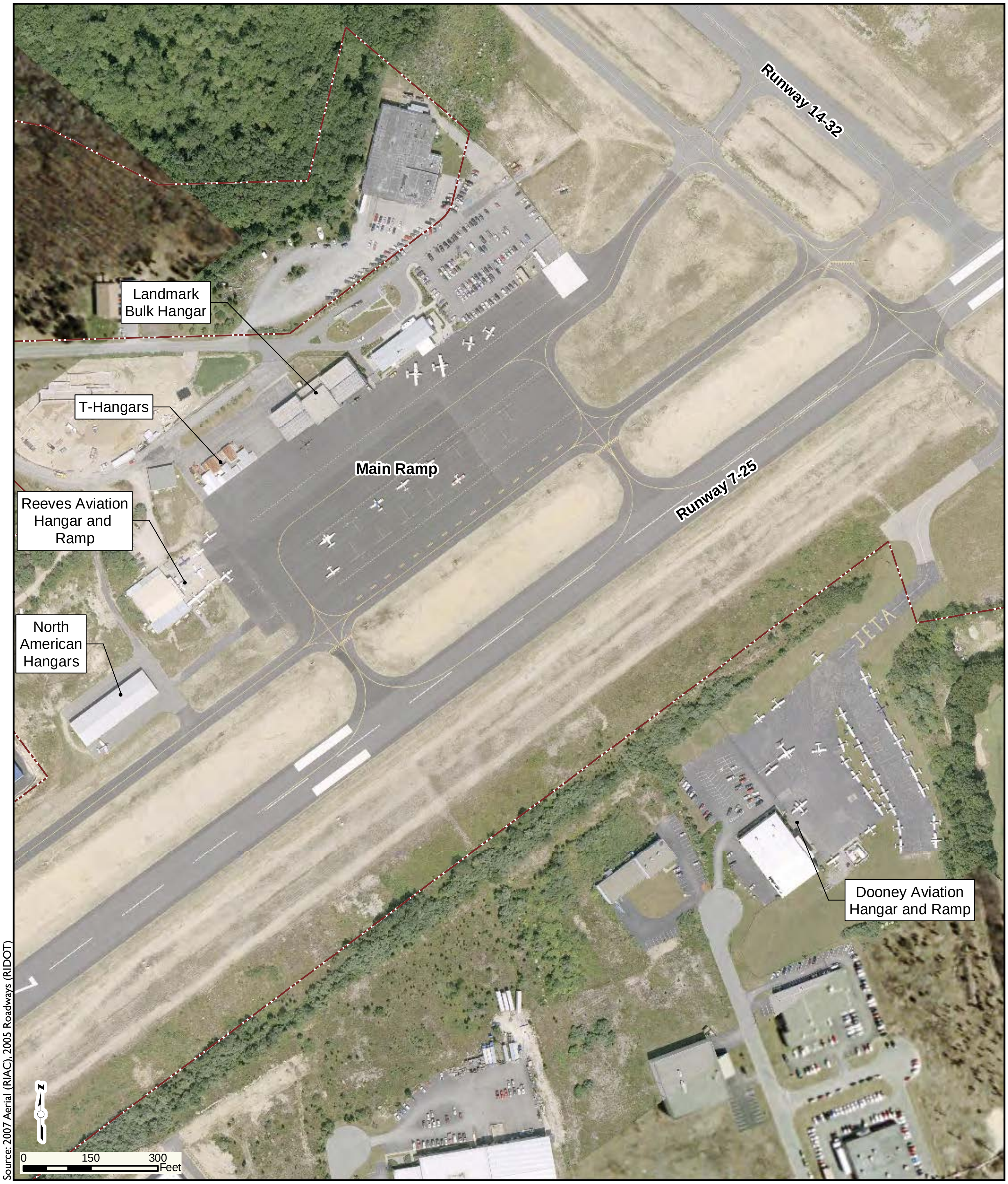
Property Line

Rhode Island Airport Corporation

Westerly ALP Update and Land Use Compatibility Plan

Figure 2-4

Taxiway D - Existing Pavement Condition



Legend

Property Line

Rhode Island Airport Corporation

Westerly ALP Update and Land Use Compatibility Plan

Figure 2-5

Aircraft Storage Areas

\\ri-data\projects\72088.01\GIS\project\UpdateALP_02\WEST_UALP02_Fig2-6_MainRamp_Pavement.mxd

Source: 2007 Aerial (RIAC), June 2008 Photo (VHB Site Visit)

Legend

Approximate Photo Location and Direction

Rhode Island Airport Corporation

Westerly ALP Update and Land Use Compatibility Plan

Figure 2-6

Main Ramp - Existing Pavement Condition

Detail of Poor Pavement Condition

Source: 2007 Aerial (RIAC), June 2008 Photo (VHB Site Visit)

Legend

Approximate Photo Location and Direction

Rhode Island Airport Corporation

Westerly ALP Update and Land Use Compatibility Plan

Figure 2-7

Main Ramp - Utility Pole and Poor Pavement Condition

\\ri-data\projects\72088.01\GIS\project\UpdateALP_02\WEST_UALP02_Fig2-8_Navaids.mxd

Legend

- Property Line
- ASOS
- Airport Rotating Beacon
- Localizer for RW 07 Approach
- MALSF
- PAPI
- REIL
- VASI
- Obstruction Lights
- Runway, Taxiway & Ramp Markings
- Runway & Taxiway Signs

Rhode Island Airport Corporation

Westerly ALP Update and Land Use Compatibility Plan

Figure 2-8

Navigational Aids, Airport Visual Aids, and Airport Marking Aids and Signs

\\ri-data\projects\72088.01\GIS\project\UpdateALP_02\WEST_UALP02_Fig2-9_SnowRemoval.mxd

Source: Photos (VHB Site Visit - June 2008)

Rhode Island Airport Corporation

Westerly ALP Update and Land Use Compatibility Plan

Figure 2-9

Existing Snow Removal Equipment

Source: Photos (VHB Site Visit - June 2008)

Rhode Island Airport Corporation

Westerly ALP Update and Land Use Compatibility Plan

Figure 2-10

Existing Airport Equipment Storage Building

\\ri-data\projects\72088.01\GIS\project\UpdateALP_02\WEST_UALP02_Fig2-11_SecurityFencing.mxd

Source: Photos (VHB Site Visit - June 2008)

Rhode Island Airport Corporation

Westerly ALP Update and Land Use Compatibility Plan

Figure 2-11

Airport Security Fencing - Existing Condition

\\ri-data\projects\72088.01\GIS\project\UpdateALP_02\WEST_UALP02_Fig2-12_Obstructions.mxd

Source: RIAC, Westerly Airport

Vegetative Obstruction Clearing and Lighting Plan for Revised Aeronautical Study Request, Stantec Consulting Services, Inc. Portland ME. 05/22/2007

Rhode Island Airport Corporation

Westerly ALP Update and Land Use Compatibility Plan

Figure 2-12

2007 Vegetation Obstruction Clearing and Lighting Plan

\\ri-data\projects\72088.01\GIS\project\UpdateALP_02\WEST_UALP02_Fig2-13_ProposedRamps.mxd

Legend

Property Line

Proposed Tie Down Ramp Locations

Rhode Island Airport Corporation

Westerly ALP Update and Land Use Compatibility Plan

Figure 2-13

1995 Airport Master Plan Update - Proposed Tie Down Ramp Locations

\\ri-data\projects\72088.01\GIS\project\UpdateALP_02\WEST_UALP02_Fig3-2_EngineRunup.mxd

Legend

- Aircraft Pre-Flight Run-up Areas
- Property Line

Rhode Island Airport Corporation

Westerly ALP Update and Land Use Compatibility Plan

Figure 3-2

Aircraft Pre-Flight Engine Run-up Areas

\\ri-data\projects\72088.01\GIS\project\UpdateALP_02\WEST_UALP02_Fig3-3_Noise Analysis Grid Pt Loc.mxd

Legend

Grid Point Locations

Property Line

Rhode Island Airport Corporation

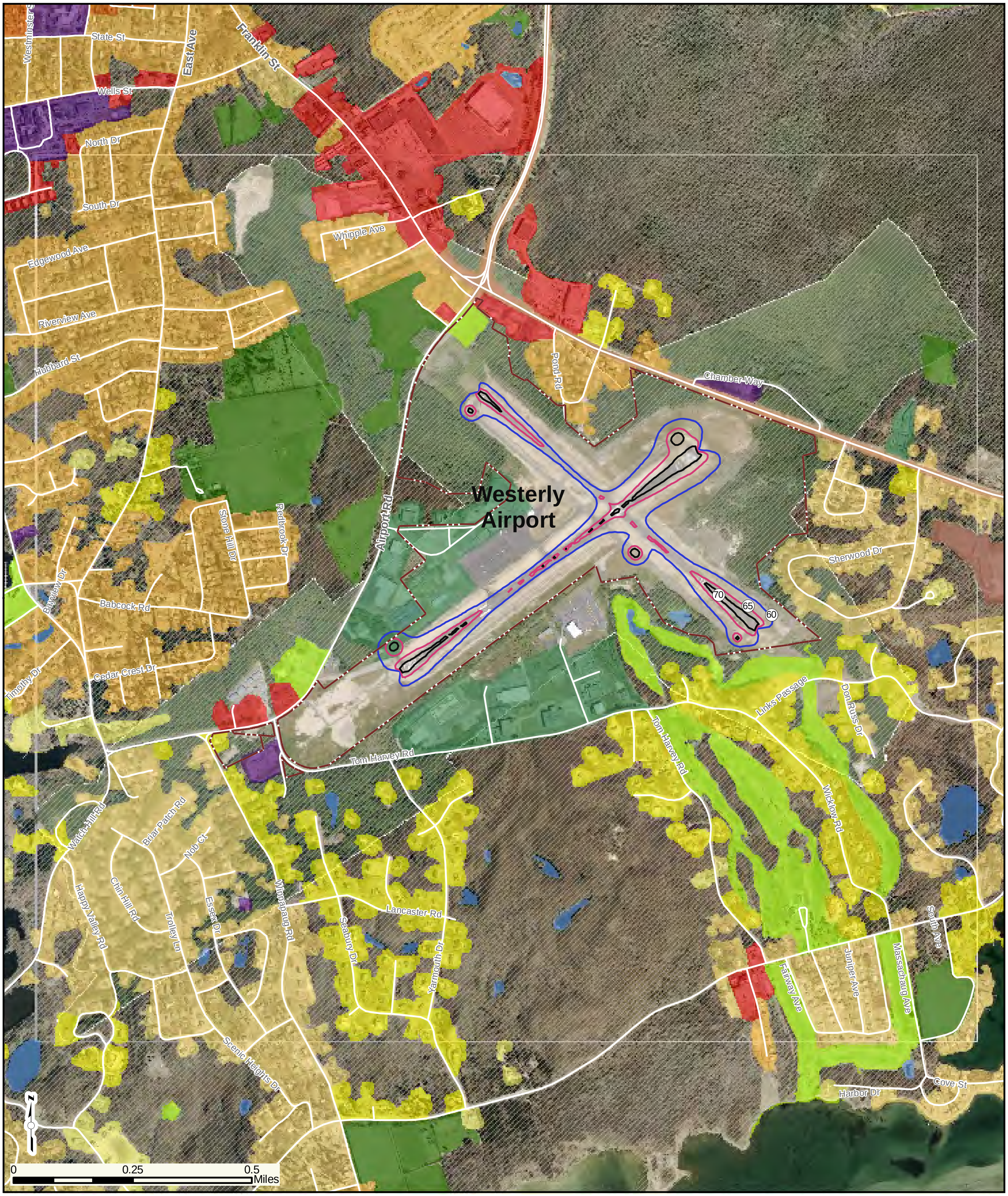
Westerly ALP Update and Land Use Compatibility Plan

Figure 3-3

Noise Analysis Grid Point Locations

Note: Locations R-16 and R-17 were also noise monitoring sites.

\\ri-data\projects\72088.01\GIS\project\UpdateALP_02\WEST_UALP02_Fig3-6_AnnualDayDNL.mxd



Source: 2007 Aerial (RIAC), 2005 Roadways (RIDOT), 2003-2004 Land Use (RIGIS), Noise Contours (INM)

Legend

- Property Line
- DNL 60dB Contour
- DNL 65dB Contour
- DNL 70dB Contour

Land Use

- Agriculture
- Commercial (sale of products and services)
- Developed Recreation (all recreation)
- Industrial (manufacturing, design, assembly, etc.)
- Institutional (schools, hospitals, churches, etc.)
- High Density Residential (<1/8 acre lots)
- Medium High Density Residential (1/4 to 1/8 acre)
- Medium Density Residential (1 to 1/4 acre lots)
- Medium Low Density Residential (1 to 2 acre lots)
- Low Density Residential (>2 acre lots)
- Mines, Quarries and Gravel Pits
- Roads (divided highways >200' plus related facilities)
- Undeveloped
- Water

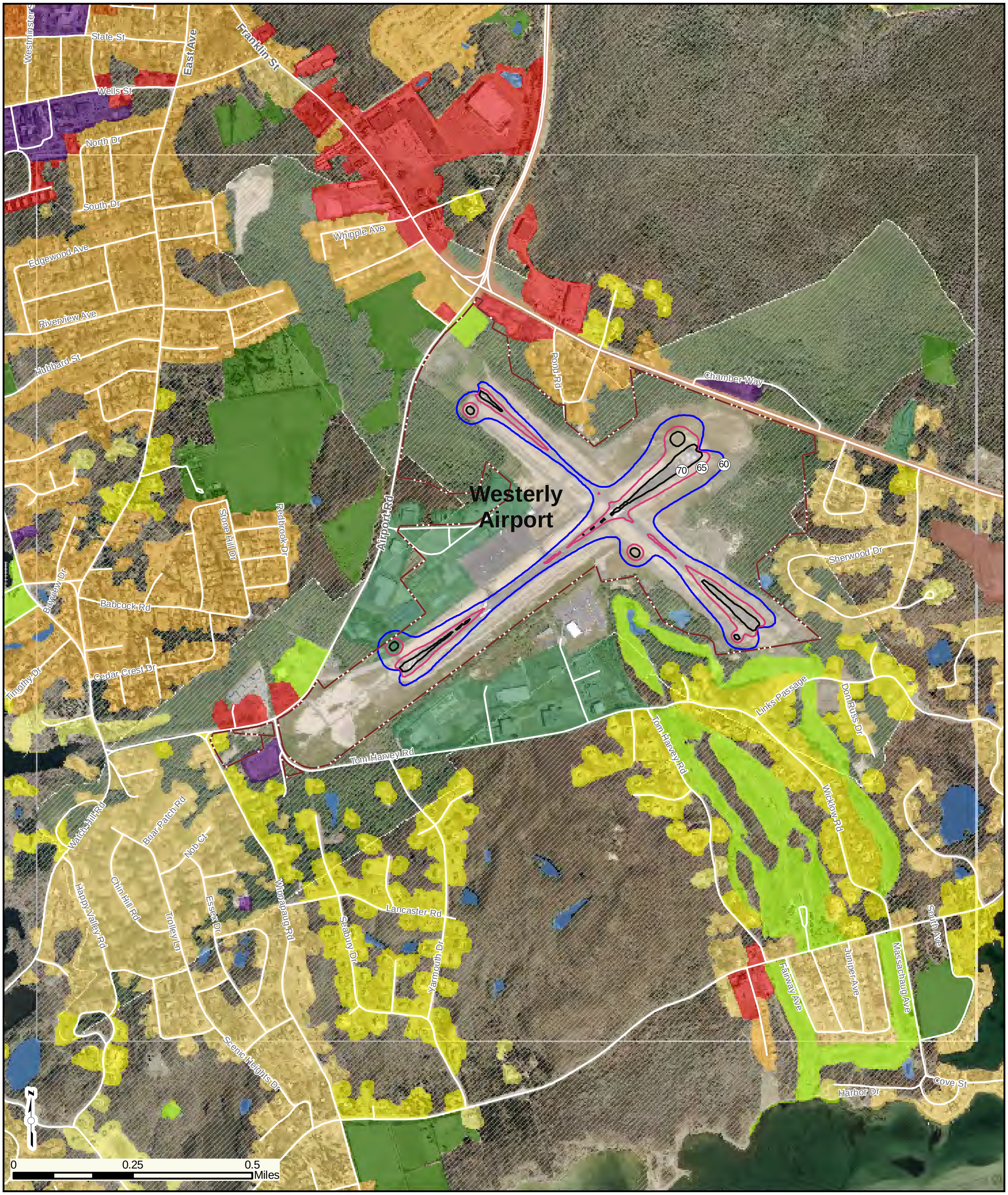
Rhode Island Airport Corporation

Westerly ALP Update and Land Use Compatibility Plan

Figure 3-6

Average Annual Day DNL Contours

\\ri-data\projects\72088.01\GIS\project\UpdateALP_02\WEST_UALP02_Fig3-7_AveragePeakSeasonDayDNL.mxd



Source: 2007 Aerial (RIAC), 2005 Roadways (RIDOT), 2003-2004 Land Use (RIGIS), Noise Contours (INM)

Legend

- Property Line
- DNL 60dB Contour
- DNL 65dB Contour
- DNL 70dB Contour

Land Use

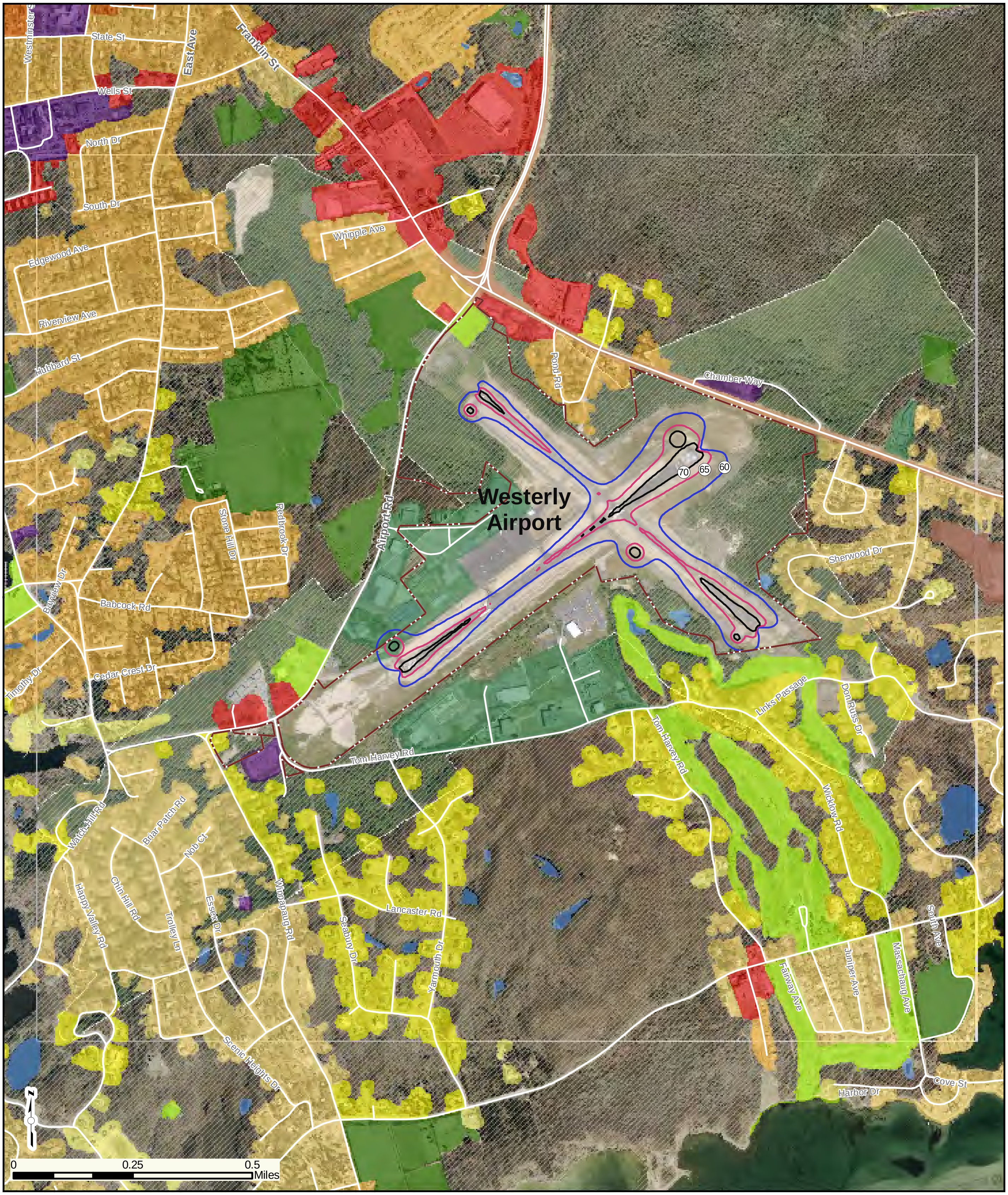
- Agriculture
- Commercial (sale of products and services)
- Developed Recreation (all recreation)
- Industrial (manufacturing, design, assembly, etc.)
- Institutional (schools, hospitals, churches, etc.)
- High Density Residential (<1/8 acre lots)
- Medium High Density Residential (1/4 to 1/8 acre)
- Medium Density Residential (1 to 1/4 acre lots)
- Medium Low Density Residential (1 to 2 acre lots)
- Low Density Residential (>2 acre lots)
- Mines, Quarries and Gravel Pits
- Roads (divided highways >200' plus related facilities)
- Undeveloped
- Water

Rhode Island Airport Corporation

Westerly ALP Update and Land Use Compatibility Plan

Figure 3-7

Average Peak Season Day DNL Contours



Source: 2007 Aerial (RIAC), 2005 Roadways (RIDOT), 2003-2004 Land Use (RIGIS), Noise Contours (INM)

Legend

- Property Line
- DNL 60dB Contour
- DNL 65dB Contour
- DNL 70dB Contour

Land Use

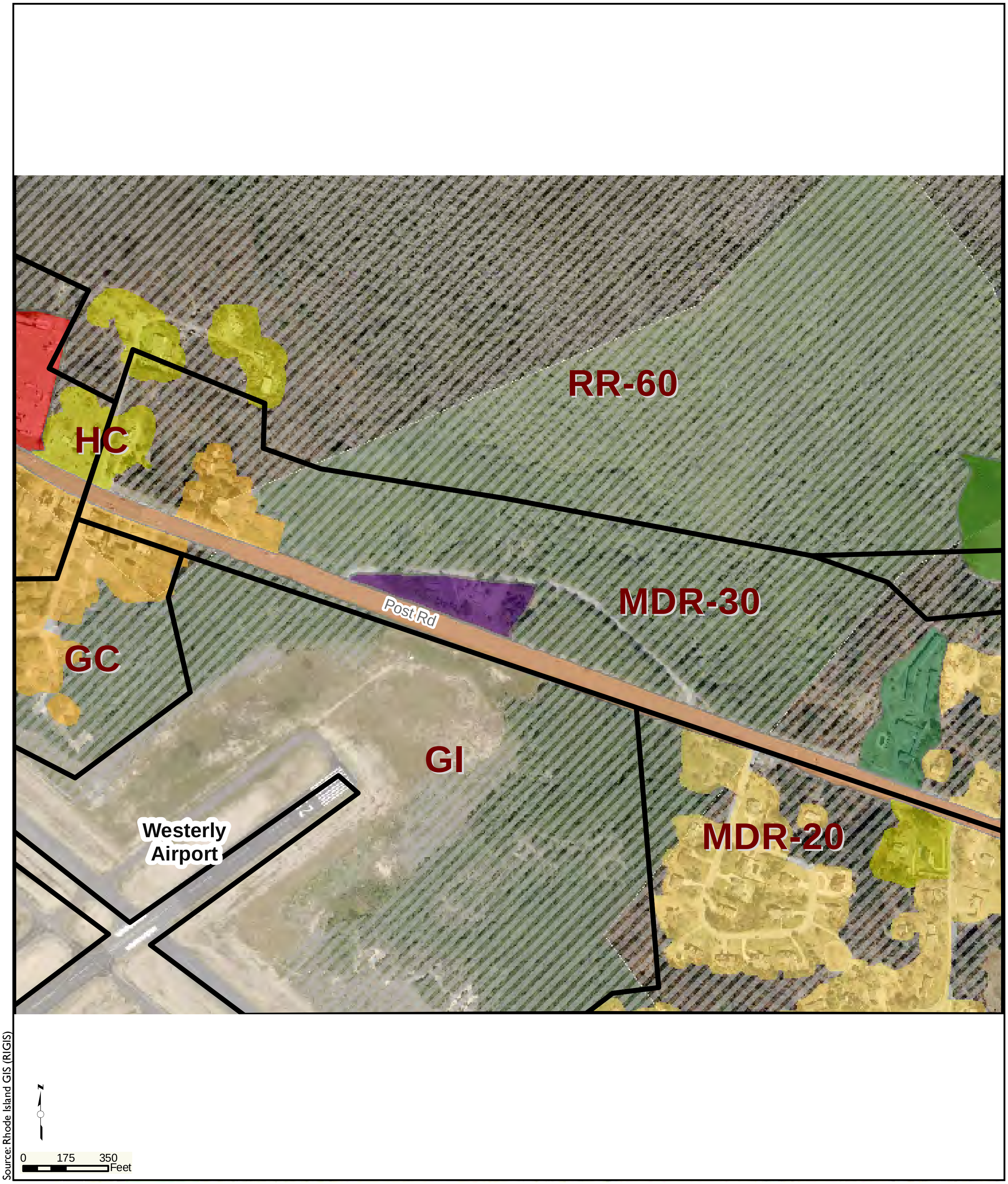
- Agriculture
- Commercial (sale of products and services)
- Developed Recreation (all recreation)
- Industrial (manufacturing, design, assembly, etc.)
- Institutional (schools, hospitals, churches, etc.)
- High Density Residential (<1/8 acre lots)
- Medium High Density Residential (1/4 to 1/8 acre)
- Medium Density Residential (1 to 1/4 acre lots)
- Medium Low Density Residential (1 to 2 acre lots)
- Low Density Residential (>2 acre lots)
- Mines, Quarries and Gravel Pits
- Roads (divided highways >200' plus related facilites)
- Undeveloped
- Water

Rhode Island Airport Corporation
Westerly ALP Update and Land Use Compatibility Plan

Figure 3-8

Average Peak Day Peak Season DNL Contours

\\ri-data\projects\72088.01\GIS\project\UpdateALP_02\WEST_UALP02_Fig1-2_Surrounding Land Use.mxd



Legend

Land Use
- Agriculture
- Commercial
- Developed Recreation
- Industrial
- Institutional
- Medium High Density Residential
- Medium Density Residential
- Medium Low Density Residential
- Low Density Residential
- Roads
- Undeveloped
- Water

Zoning

MDR-30 Medium Density Residential 30
MDR-20 Medium Density Residential 20
GI General Industrial
GC General Commercial
HC Highway Commerical
RR-60 Rural Residential 60

Rhode Island Airport Corporation

Westerly ALP Update and Land Use Compatibility Plan

Figure 3-9

Zoning and Land Use Northeast of WST

\\ri-data\projects\72088.01\GIS\project\UpdateALP_02\WEST_UALP02_Fig3-9_RecAirportHazZone.mxd

Source: Airport Layout Plan Update, Airport Airspace Drawing, Sheet 5 of 7, December 30, 2008.

Legend

- Westerly Bounds
- FAR Part 77 surfaces outside of the Town of Westerly
- Elevations
- End of Conical Zone (20:1 slope to Elev. 431')
- Horizontal Zone (Elev. 231')
- Horizontal Zone Outside of Westerly (Elev. 231')
- Primary Surface (Elev. 31')
- Approach Zone - Visual (20:1 slope to Elev. 231')
- Approach Zone - Non-precision (34:1 slope to Elev. 231')
- Transitional Zone (7:1 slope to Elev. 231')

Note: All elevations are Above Mean Sea Level (AMSL)

Rhode Island Airport Corporation

Westerly ALP Update and Land Use Compatibility Plan

Figure 3-10

Recommended Airport Hazard Area

Appendices

This page intentionally left blank

Contents

This page intentionally left blank

Appendix A – Airspace Determination Letter

This page intentionally left blank

Revision to include eligibility determination
SL

U.S. Department
of Transportation

**Federal Aviation
Administration**

Issue Date: August 31, 2007

Mr. Mark Brewer, A.A.E.
President and CEO
Rhode Island Airport Corporation
2000 Post Road
Warwick, RI 02886-1533

**Aeronautical Study Number
2007-ANE-97-NRA**

***************************Notice of Determination***************************

In response to a June 5, 2007, request from the Rhode Island Airport Corporation, the Federal Aviation Administration has concluded an aeronautical study concerning approach surfaces for four runways ends at the Westerly Airport.

We concur with the proposed actions to remove and mitigate obstructions to the runway surfaces at Westerly as noted in your request for an Aeronautical Study, dated June 5, 2007 with the following stipulations:

Runway 7 – Clear and maintain the obstacle clearance surface for the 3.6 degree VASI. The runway will lose Category D approach minima for the runway. In order to insure the OCS remains free of obstructions, four easements must be obtained and cleared. Maintain hazard beacon on water tower, right side on approach.

Runway 25 – Clear and maintain the obstacle clearance surface for the 3.0 degree VASI. Obtain one easement from the Rhode Island Department of Transportation to protect for the 20:1 surface and another easement for an undeveloped parcel to obtain the rights to clear and protect the VASI OCS surface.

Runway 14 – Maintain the OCS for the 4 degree PAPI. Obtain, clear and maintain four additional easements: 12, 13, 14, and 15. Remove the obstructions and maintain surfaces on existing easements on parcels 4, 5 and 6.

Brenda Pope
Michael Mini
Jim Warcup
Peter Frazier

RECEIVED
SEP 13 2007
RIAC
EXECUTIVE DEPARTMENT

Runway 32-Clear to the existing displaced threshold. Obtain three additional easements to clear and maintain the 20:1 surface for Threshhold Siting Criteria. Clear and protect the OCS to a 4 degree PAPI. Obtain, clear and maintain fee simple purchase of the residential property in the Runway Protection Zone.

We endorse the expenditure of Federal Airport Improvement Program funds for the Rhode Island Airport Corporation to accomplish the off airport clearing.

The determination has been with respect to the safe and efficient use of airspace by aircraft and with respect to the safety of persons and property on the ground. In making this determination, the FAA has considered matters such as effects on existing airspace structure and projected programs of the FAA; the effects that existing or proposed man-made objects (on file with FAA) and known natural objects within the affected area would have on the proposal.

This determination in no way preempts or waives any ordinances, laws or regulations of any other governmental body or agency. This determination in not meant to imply the clearing or runway threshold relocation has been found to be environmentally acceptable in accordance with existing national environmental policies and objectives.

If you have any questions concerning this determination, please contact our office. This determination is valid for 24 months from the date of this letter.

Sincerely,

Gail Lattrell
Airport Planner

Appendix B - Aircraft Noise Frequently Asked Questions (FAQs)[77]

77 Source: RIAC (Website: http://www.pvdairport.com/main.aspx?guid=20936C2E-9997-488E-B7DD-085F23F0D1F9).

This page intentionally left blank

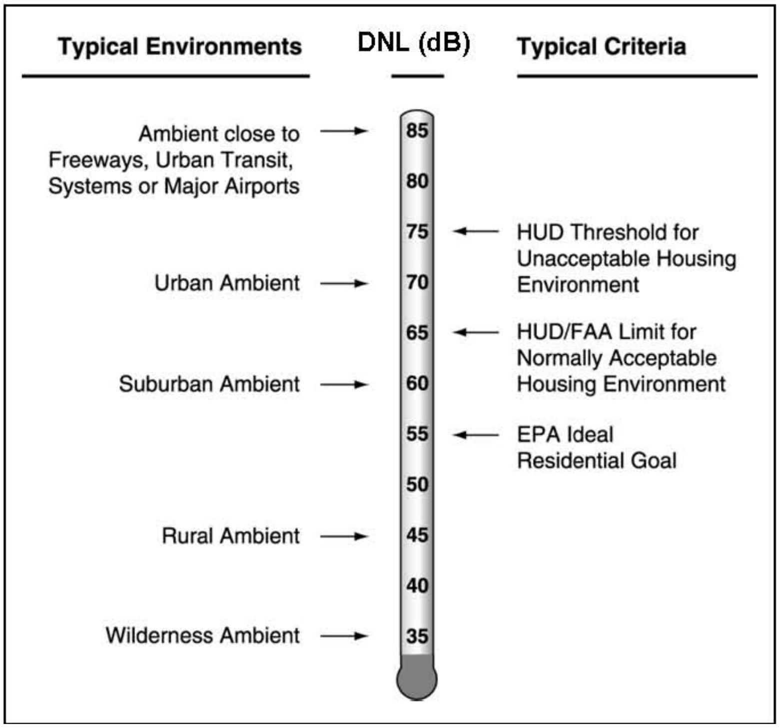
1. How does FAA assess overall aircraft noise exposure?

The Federal Aviation Administration (FAA) requires the use of the Day-Night Average Sound Level (DNL, also referred to as L_{dn}) as the primary metric for aircraft noise exposure.[78] Despite its name, DNL is not a typical average, but instead is a cumulative measure of all noise exposure during a 24-hour period. Because DNL measures total noise exposure, every noise event that occurs during a 24-hour period, whether it is a loud event or a quieter event, increases the DNL value. To reflect the added intrusiveness of noise between the nighttime hours of 10 PM and 7 AM, DNL counts each nighttime noise event as if it occurred 10 times. FAA noise evaluations typically average daily DNL values over a one-year period to account for daily or seasonal fluctuations in aircraft operations, runway use, and weather conditions.

Figure B-1 shows a range of typical DNL values for various outdoor environments along with federal goals and criteria. The ambient sound levels indicated on the figure's left side represent approximate background sound levels in different settings. These ambient levels may include natural sounds such as wind blowing in trees and also human-caused sounds such as distant or local traffic, lawn mowers, air conditioners, etc. depending upon the location. FAA considers all land uses to be compatible with aircraft noise at annual-average exposure levels below DNL 65 dB.

78 FAA Order 1050.1E, Change 1, "Environmental Impacts: Policies and Procedures," March 20, 2006, p. A-63.

Figure B-1 Typical DNL Values and Goals/Criteria for Outdoor Environments



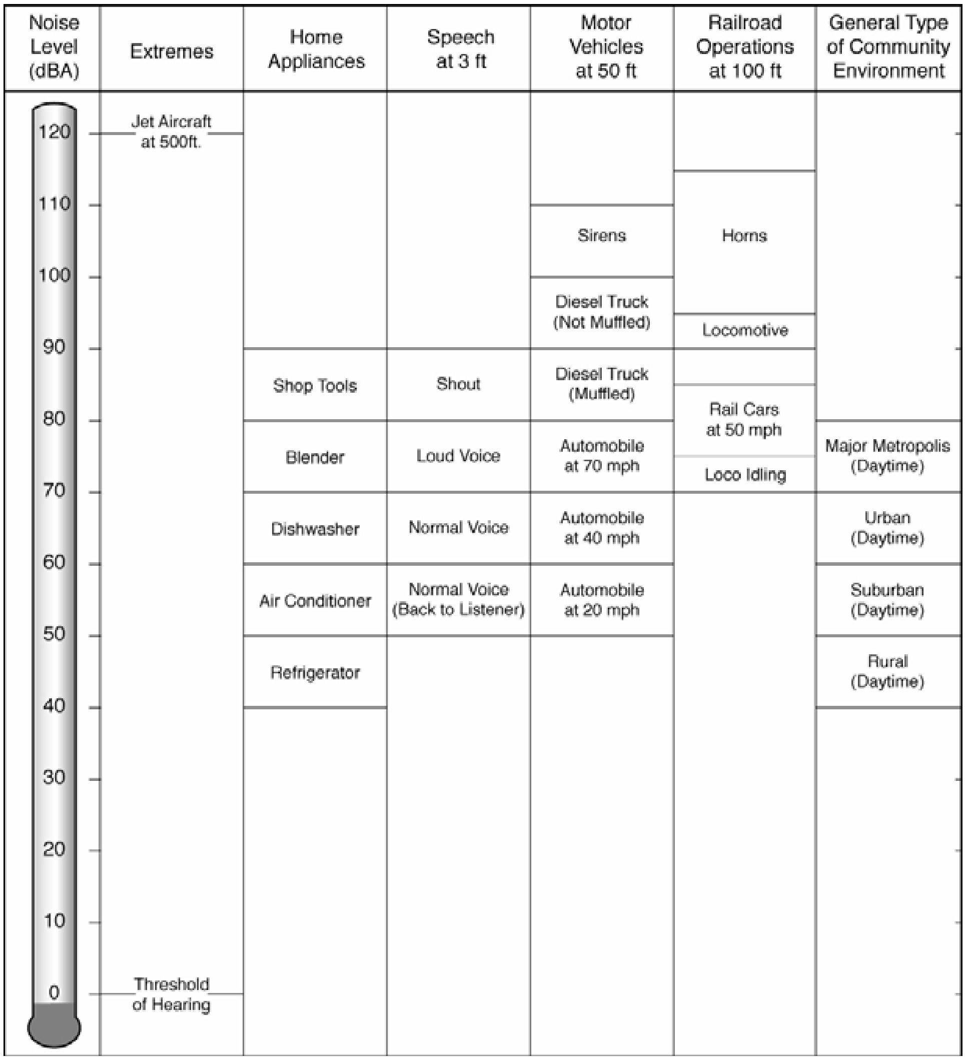
2. How does FAA assess noise caused by a single aircraft event?

In some cases, noise metrics other than DNL are helpful "to describe aircraft noise impacts for specific noise-sensitive locations and to assist in the public's understanding of the noise impact."[79] These supplemental metrics include descriptors that provide information on single events such as an individual aircraft departure or a pre-flight run-up.

The maximum sound level (Lmax) of a particular noise event is one example of a supplemental metric. Although Lmax is easy to understand and helps predict certain noise effects such as speech interference, it does not account for a noise event's duration. Figure B-2 provides examples of common Lmax values. It is important to note that these Lmax values should not be compared directly with the DNL values shown in Figure B-1.

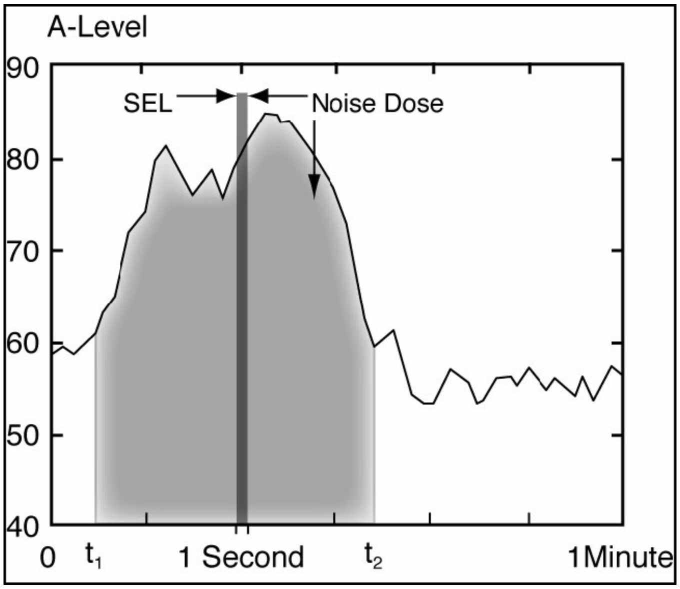
79 Ibid. p. A-64.

Figure B-2 Typical Maximum Sound Levels (Lmax, dB)



Another common supplemental metric, the Sound Exposure Level (SEL), accounts for both the loudness and the duration of a single event. Because it is a cumulative measure, a higher SEL can result from a louder event, a longer event, or from some combination of the two. The shaded area in Figure B-3 represents the noise "dose" associated with a single event such as an aircraft departure. The SEL value for the single event (represented by the vertical bar) is proportional to the area of the noise dose.

Figure B-3 Sound Exposure Level (SEL)



3. How do aircraft ground operations contribute to overall noise exposure near airports?

Aircraft ground operations may include aircraft idling, taxiing, pre-flight run-ups of propeller aircraft, and start-of-takeoff roll. Typically, however, noise from airborne flight operations (i.e. aircraft departures and arrivals) dominates overall noise exposure near airports. Although aircraft ground operations sometimes are audible near airports, generally they are quieter than airborne aircraft when heard in community locations.

Ground operations noise often is reduced by interaction with the ground ("ground effects") and shielding provided by terrain and other obstructions. Because these factors are less likely to reduce noise levels from airborne departures or arrivals, the louder flight operations dominate noise exposure and ground operations noise seldom makes a significant contribution to DNL.

4. What are the potential effects of aircraft ground operations noise?

Even when making only a minor contribution to overall noise exposure (measured in DNL), aircraft ground operations noise still has the potential to cause speech interference, sleep disturbance, and community annoyance in nearby residential areas. Sound levels sufficient to cause speech interference may make conversation difficult or interfere with use of the telephone or with listening to television or radio. Sufficiently high sound levels also may cause sleep disturbance, especially during warmer months when windows are more likely to be open. Sound levels that are not loud enough to cause speech interference or sleep disturbance still may cause community annoyance, especially during events of unpredictable or indefinite duration such as aircraft idling or pre-flight run-ups. For these reasons, supplemental metrics such as Lmax and SEL can be useful in describing and understanding ground operations noise.

5. Do areas of trees and other vegetation near airports reduce aircraft noise?

Trees and vegetation around airports are more likely to affect sound levels caused by aircraft when they are on the ground than when they are in the air. When airborne aircraft are sufficiently high above the ground that trees do not break the line of sight from the listener, the trees provide no noise reduction. When trees do break the line of sight from the listener to an aircraft on the ground, a relatively broad area of dense vegetation is required to provide a noticeable reduction in sound level.

Although the FAA does not provide specific guidance on noise reduction provided by trees and other vegetation, the Federal Highway Administration (FHWA) attributes approximately one to three decibels of noise reduction for every 100 feet of vegetation[80] that is "sufficiently dense to completely block the view along the sound propagation path."[81] To provide this level of noise reduction, such vegetation zones must consist of "long, wide regions of heavy . . . woods and undergrowth, not just individual trees or several rows of trees."[82] When considering changes in sound levels two useful rules of thumb are: (1) most individuals perceive a six to 10 decibel change to be either about a doubling or a halving of loudness, and (2) changes of less than about three decibels are not easily detected outside of a laboratory.

6. What are other possible effects of trees and other vegetation near airports?

Even when not providing measurable noise reduction, vegetation can influence a listener's perception of the noise environment in other ways. Trees can provide a visual buffer and thereby eliminate a visual reminder of one's proximity to an airport or other noise source. Trees scatter the very high frequency sounds that can convey "mechanical harshness," and also may provide a type of forest reverberation further reducing harshness and the impulsive nature of some noise sources. "In addition, wind motion through leaves produces a pleasant sound, which can partially mask more annoying sounds."[83] Although these effects do not reduce the overall noise level, they may affect the listener's perception of the noise environment and thereby decrease annoyance. Oftentimes "even when measurements show no significant [noise reduction] from intervening trees, many people believe strongly that such trees do quiet their environment."[84]

7. What changes may residents near an airport notice due to vegetation removal?

Because cumulative noise exposure (measured in DNL) near airports typically is dominated by airborne departures and arrivals, vegetation removal at an airport is unlikely to have a significant effect on cumulative noise exposure in nearby communities.

80 FHWA Traffic Noise Model® Version 1.0 Technical Manual, Report No. FHWA-PD-96-101, February 1998, Table 12 "Attenuation through dense foliage," p. 99. Estimate based on range of 0.03 dB/meter at 125 Hz to 0.09 dB/meter at 4 kHz.
81 FHWA Traffic Noise Model® User Guide, Report No. FHWA-PD-96-009, January 1998, p. 126.
82 Ibid.
83 Anderson, Grant S. and Ulrich J. Kurze, "Outdoor Sound Propagation," as presented in Chapter 5 of Noise and Vibration Control Engineering, Principles and Applications, p. 134, edited by Leo L. Beranek and Istan L. Ver, 1992.
84 Ibid.

In some areas, however, such as near the approach ends to runways, sufficient areas of dense vegetation will be cleared that residents may notice increased sound levels during particular types of aircraft ground operations. For example, clearing 100 feet or more of trees and dense undergrowth may allow community sound levels during certain events to increase by three decibels or more. If resulting single-event sound levels are sufficiently high, residents may notice increased occurrences of speech interference for brief periods during some events, especially when outside.

Even without a measurable increase in sound levels, residents may notice a change in the character of the sound environment due to reduction in scattering of high-frequency sound, reduction in “forest reverberation,” and decrease in masking noise caused by rustling leaves. In addition, residents are more likely to be generally aware of airport operations in locations where the airport formerly was hidden from view and has become visible due to vegetation removal.

Appendix C - Title 14 CFR Part 150, Airport Noise Compatibility Planning, Appendix A, Table 1

This page intentionally left blank

Table C-1—Land Use Compatibility* With Yearly Day-Night Average Sound Levels

Land use	Yearly day-night average sound level (L_{dn}) in decibels					
	Below 65	65–70	70–75	75–80	80–85	Over 85
Residential						
Residential, other than mobile homes and transient lodgings	Y	N(1)	N(1)	N	N	N
Mobile home parks	Y	N	N	N	N	N
Transient lodgings	Y	N(1)	N(1)	N(1)	N	N
Public Use						
Schools	Y	N(1)	N(1)	N	N	N
Hospitals and nursing homes	Y	25	30	N	N	N
Churches, auditoriums, and concert halls	Y	25	30	N	N	N
Governmental services	Y	Y	25	30	N	N
Transportation	Y	Y	Y(2)	Y(3)	Y(4)	Y(4)
Parking	Y	Y	Y(2)	Y(3)	Y(4)	N
Commercial Use						
Offices, business and professional	Y	Y	25	30	N	N
Wholesale and retail—building materials, hardware and farm equipment	Y	Y	Y(2)	Y(3)	Y(4)	N
Retail trade—general	Y	Y	25	30	N	N
Utilities	Y	Y	Y(2)	Y(3)	Y(4)	N
Communication	Y	Y	25	30	N	N
Manufacturing and Production						
Manufacturing, general	Y	Y	Y(2)	Y(3)	Y(4)	N
Photographic and optical	Y	Y	25	30	N	N
Agriculture (except livestock) and forestry	Y	Y(6)	Y(7)	Y(8)	Y(8)	Y(8)
Livestock farming and breeding	Y	Y(6)	Y(7)	N	N	N
Mining and fishing, resource production and extraction	Y	Y	Y	Y	Y	Y
Recreational						
Outdoor sports arenas and spectator sports	Y	Y(5)	Y(5)	N	N	N
Outdoor music shells, amphitheaters	Y	N	N	N	N	N
Nature exhibits and zoos	Y	Y	N	N	N	N
Amusements, parks, resorts and camps	Y	Y	Y	N	N	N
Golf courses, riding stables and water recreation	Y	Y	25	30	N	N

Numbers in parentheses refer to notes.

*The designations contained in this table do not constitute a federal determination that any use of land covered by the program is acceptable or unacceptable under federal, state, or local law. The responsibility for determining the acceptable and permissible land uses and the relationship between specific properties and specific noise contours rests with the local authorities. FAA determinations under Part 150 are not intended to substitute federally determined land uses for those determined to be appropriate by local authorities in response to locally determined needs and values in achieving noise compatible land uses.

Key to Table 1

SLUCM=Standard Land Use Coding Manual.

Y (Yes)=Land Use and related structures compatible without restrictions.

N (No)=Land Use and related structures are not compatible and should be prohibited.

NLR=Noise Level Reduction (outdoor to indoor) to be achieved through incorporation of noise attenuation into the design and construction of the structure.

25, 30, or 35=Land use and related structures generally compatible; measures to achieve NLR of 25, 30, or 35 dB must be incorporated into design and construction of structure.

Notes for Table 1

(1) Where the community determines that residential or school uses must be allowed, measures to achieve outdoor to indoor Noise Level Reduction (NLR) of at least 25 dB and 30 dB should be incorporated into building codes and be considered in individual approvals. Normal residential construction can be expected to provide a NLR of 20 dB, thus, the reduction requirements are often stated as 5, 10 or 15 dB over standard construction and normally assume mechanical ventilation and closed windows year round. However, the use of NLR criteria will not eliminate outdoor noise problems.

(2) Measures to achieve NLR 25 dB must be incorporated into the design and construction of portions of these buildings where the public is received, office areas, noise sensitive areas or where the normal noise level is low.

(3) Measures to achieve NLR of 30 dB must be incorporated into the design and construction of portions of these buildings where the public is received, office areas, noise sensitive areas or where the normal noise level is low.

(4) Measures to achieve NLR 35 dB must be incorporated into the design and construction of portions of these buildings where the public is received, office areas, noise sensitive areas or where the normal level is low.

(5) Land use compatible provided special sound reinforcement systems are installed.

(6) Residential buildings require an NLR of 25.

(7) Residential buildings require an NLR of 30.

(8) Residential buildings not permitted.

This page intentionally left blank

Appendix D - Aircraft Operational Data

This page intentionally left blank

This appendix contains detailed aircraft operational data and flight track depictions. The aircraft operational data and flight track information were used in the development of Integrated Noise Model (INM) inputs.

The following aircraft operational data tables are provided in this appendix:

The following aircraft flight track depictions are provided in this appendix:

This page intentionally left blank

Table D-1
Summary of Based Aircraft and INM Aircraft Types

INM Aircraft ID	AIRCRAFT TYPE	Fixed-wing Propeller Single-Eng.	Fixed-wing Propeller Multi-Eng.	Fixed-wing Jet	Helicopter	
GASEPF	COZY	X				
GASEPV	PA-25-235 PAWNEE	X				
GASEPF	Avenger V EXPERIMENTAL	X				
GASEPV	Mooney 201LM/205 (M20J)	X				
CNA172	Cessna 150M	X				
GASEPF	AERONCA 11AC	X				
GASEPV	PA-28R-201	X				
GASEPF	PA-28-180	X				
CNA172	C-172P	X				
GASEPF	PA-28-140	X				
GASEPV	PA-25 PAWNEE	X				
GASEPV	T-6G	X				
CNA206	C-182RG	X				
GASEPF	STINSON 108-3	X				
GASEPV	PA-25-235	X				
GASEPV	AT-6A	X				
GASEPV	PA-24-180	X				
CNA172	Cessna 172H	X				
GASEPV	PA-24-250	X				
GASEPV	PA-32 CHEROKEE 6	X				
CNA172	C-172K	X				
GASEPF	ERCOUPE 415-C	X				
CNA206	C-182Q	X				
GASEPF	MAULE M-7-235B	X				
GASEPF	COZY MARK 4	X				
GASEPF	Cherokee 140	X				
GASEPF	Cherokee 180	X				
PA28	Cherokee Warrior	X				
PA28	Cherokee Warrior	X				
GASEPV	Cherokee Six	X				
GASEPV	Piper Arrow	X				
GASEPV	Bonanza A-36	X				
GASEPF	Beechcraft Sundowner	X				
GASEPV	Piper Comanche	X				
CNA172	Cessna 150	X				
CNA172	Cessna 172	X				
CNA172	Cessna 172	X				
CNA172	Cessna 172	X				
CNA172	Cessna 172	X				
CNA172	Cessna 172	X				
GASEPF	Long EZ	X				
CNA206	Cessna 206	X				
GASEPF	Citabria	X				
GASEPV	Pilatus	X				
GASEPF	Pitts S1	X				
CNA441	BEECH B100		X			
BEC58P	PA-31-350		X			
PA30	PA-30		X			
BEC58P	Piper Seneca		X			
CNA441	Cessna Conquest		X			
CNA500	Cessna Citation 1**			X		
R22	Robinson R-22				X	
SA341G	Aerospatiale Alouette				X	**TOTAL**
	General Aviation	45	5	1	2	53
	New England Airlines	3	3	0	0	6
	Total	**48**	**8**	**1**	**2**	**59**

Source: VHB, 2008.

Table D-2
Summary of Based Aircraft INM Fleet Mix

Aircraft Group	INM Aircraft ID	Number of Aircraft	Percent of Fleet Mix	Number of Local Operations		
				Average Annual Day	Average Day Peak Season	Peak Day Peak Season
Fixed-wing Single-Engine	CNA172	10	19.2%	2.8867	4.892	5.9553
	CNA206	3	5.8%	0.866	1.4676	1.7866
	GASEPF	15	28.8%	4.3301	7.338	8.933
	GASEPV	14	26.9%	4.0414	6.8488	8.3375
	PA28	2	3.8%	0.5773	0.9784	1.1911
	Total	**44**	**84.6%**	**12.7016**	**21.5249**	**26.2034**
Fixed-wing Multi-Engine	BEC58P	2	3.8%	0.5773	0.9784	1.1911
	CNA441	2	3.8%	0.5773	0.9784	1.1911
	PA30	1	1.9%	0.2887	0.4892	0.5955
	Total	**5**	**9.6%**	**1.4434**	**2.446**	**2.9777**
Fixed-wing Jet	CNA500	1	1.9%	0.2887	0.4892	0.5955
	Total	**1**	**1.9%**	**0.2887**	**0.4892**	**0.5955**
Helicopter	R22	1	1.9%	0.2887	0.4892	0.5955
	SA341G	1	1.9%	0.2887	0.4892	0.5955
	Total	**2**	**3.8%**	**0.5773**	**0.9784**	**1.1911**

Source: VHB, 2008.

Table D-3
Summary of Itinerant (Transient) Aircraft INM Fleet Mix

Aircraft Group	INM Aircraft ID	Percent of Fleet Mix	Number of Transient Operations: Average Annual Day	Average Day Peak Season	Peak Day Peak Season
Fixed-wing Single-Engine	CNA172	19.2%	6.5875	10.9734	12.84
	CNA206	5.8%	1.9762	3.292	3.852
	GASEPF	28.8%	9.8812	16.46	19.26
	GASEPV	26.9%	9.2224	15.3627	17.976
	PA28	3.8%	1.3175	2.1947	2.568
	Total	**84.6%**	**28.9848**	**48.2828**	**56.4959**
Fixed-wing Multi-Engine	BEC58P	3.8%	1.3175	2.1947	2.568
	CNA441	3.8%	1.3175	2.1947	2.568
	PA30	1.9%	0.6587	1.0973	1.284
	Total	**9.6%**	**3.2937**	**5.4867**	**6.42**
Fixed-wing Jet	CNA55B	1.9%	0.6587	1.0973	1.284
	Total	**1.9%**	**0.6587**	**1.0973**	**1.284**
Helicopter	S76	3.8%	1.3175	2.1947	2.568
	Total	**3.8%**	**1.3175**	**2.1947**	**2.568**
GRAND TOTAL		**100%**	**34.2548**	**57.0615**	**66.7679**

Aircraft Group	INM Aircraft ID	Percent of Fleet Mix	Number of Transient Operations: Average Annual Day	Average Day Peak Season	Peak Day Peak Season
Fixed-wing Single-Engine: Banner-Towing Aircraft	GASEPF	28.6%	0.2192	0.6557	1.5686
	GASEPV	57.1%	0.4383	1.3115	3.1373
	CNA172	14.3%	0.1096	0.3279	0.7843
	Total	**100.0%**	**0.7671**	**2.2951**	**5.4902**
GRAND TOTAL		**100%**	**0.7671**	**2.2951**	**5.4902**

Piper PA-18 Super Cub = GASEPF
Piper PA-25 Pawnee = GASEPV
Single-engine Cessna = CNA172
Maule = M7235C

Note:

According to Interviews with RIAC, Airport Management, and other airport users, the transient aircraft fleet mix is similar to the based aircraft fleet mix. However, two adjustments were made based on the interviews and observations made during the noise monitoring exercise. First, the jet aircraft represents the Cessna Citation Bravo (INM Aircraft ID CNA55B) based on interviews with the FBOs, representing fractional ownership operations. Second, the transient helicopter is modeled as the Sikorsky S76, a corporate executive transport aircraft.

Source: VHB, 2008.

Table D-4
Average Annual Day Aircraft Operations by INM Aircraft Type

Operator Group	Aircraft Group	INM Aircraft ID	Departures								Departure Totals			Arrivals								Arrival Totals			TOTALS		
			Runway 7		Runway 25		Runway 14		Runway 32					Runway 7		Runway 25		Runway 14		Runway 32							GRAND
			Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	TOTAL	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	TOTAL	DAY	NIGHT	TOTAL
Based Aircraft	Fixed-wing Single-Engine	CNA172	0.0700	0.0022	0.7700	0.0238	0.0700	0.0022	0.4900	0.0152	1.4000	0.0434	**1.4434**	0.0700	0.0217	0.7700	0.0000	0.0700	0.0000	0.4900	0.0217	1.4000	0.0434	**1.4434**	2.8000	0.0868	**2.8868**
		CNA206	0.0210	0.0006	0.2310	0.0071	0.0210	0.0006	0.1470	0.0045	0.4200	0.0128	**0.4328**	0.0210	0.0065	0.2310	0.0000	0.0210	0.0000	0.1470	0.0065	0.4200	0.0130	**0.4330**	0.8400	0.0258	**0.8658**
		GASEPF	0.1050	0.0032	1.1551	0.0357	0.1050	0.0032	0.7350	0.0227	2.1001	0.0648	**2.1649**	0.1050	0.0325	1.1551	0.0000	0.1050	0.0000	0.7350	0.0325	2.1001	0.0650	**2.1651**	4.2002	0.1298	**4.3300**
		GASEPV	0.0980	0.0030	1.0780	0.0333	0.0980	0.0030	0.6860	0.0212	1.9600	0.0605	**2.0205**	0.0980	0.0303	1.0780	0.0000	0.0980	0.0000	0.6860	0.0303	1.9600	0.0606	**2.0206**	3.9200	0.1211	**4.0411**
		PA28	0.0140	0.0004	0.1540	0.0048	0.0140	0.0004	0.0980	0.0030	0.2800	0.0086	**0.2886**	0.0140	0.0043	0.1540	0.0000	0.0140	0.0000	0.0980	0.0043	0.2800	0.0086	**0.2886**	0.5600	0.0172	**0.5772**
	Fixed-wing Multi-Engine	BEC58P	0.0140	0.0004	0.1540	0.0048	0.0140	0.0004	0.0980	0.0030	0.2800	0.0086	**0.2886**	0.0140	0.0043	0.1540	0.0000	0.0140	0.0000	0.0980	0.0043	0.2800	0.0086	**0.2886**	0.5600	0.0172	**0.5772**
		CNA441	0.0140	0.0004	0.1540	0.0048	0.0140	0.0004	0.0980	0.0030	0.2800	0.0086	**0.2886**	0.0140	0.0043	0.1540	0.0000	0.0140	0.0000	0.0980	0.0043	0.2800	0.0086	**0.2886**	0.5600	0.0172	**0.5772**
		PA30	0.0070	0.0002	0.0770	0.0024	0.0070	0.0002	0.0490	0.0015	0.1400	0.0043	**0.1443**	0.0070	0.0022	0.0770	0.0000	0.0070	0.0000	0.0490	0.0022	0.1400	0.0044	**0.1444**	0.2800	0.0087	**0.2887**
	Fixed-wing Jet	CNA500	0.0070	0.0002	0.0770	0.0024	0.0070	0.0002	0.0490	0.0015	0.1400	0.0043	**0.1443**	0.0112	0.0043	0.1176	0.0000	0.0112	0.0000	0.0000	0.0000	0.1400	0.0043	**0.1443**	0.2800	0.0086	**0.2886**
	Helicopter	R22	0.0070	0.0002	0.0770	0.0024	0.0070	0.0002	0.0490	0.0015	0.1400	0.0043	**0.1443**	0.0070	0.0022	0.0770	0.0000	0.0070	0.0000	0.0490	0.0022	0.1400	0.0044	**0.1444**	0.2800	0.0087	**0.2887**
		SA341G	0.0070	0.0002	0.0770	0.0024	0.0070	0.0002	0.0490	0.0015	0.1400	0.0043	**0.1443**	0.0070	0.0022	0.0770	0.0000	0.0070	0.0000	0.0490	0.0022	0.1400	0.0044	**0.1444**	0.2800	0.0087	**0.2887**
	Based Aircraft TOTAL		**0.3640**	**0.0110**	**4.0041**	**0.1239**	**0.3640**	**0.0110**	**2.5480**	**0.0786**	**7.2801**	**0.2245**	**7.5046**	**0.3682**	**0.1148**	**4.0447**	**0.0000**	**0.3682**	**0.0000**	**2.4990**	**0.1105**	**7.2801**	**0.2253**	**7.5054**	**14.5602**	**0.4498**	**15.0100**
Itinerant (Transient) Aircraft	Fixed-wing Single-Engine	CNA172	0.1597	0.0049	1.7572	0.0543	0.1597	0.0049	1.1182	0.0346	3.1948	0.0987	**3.2935**	0.1597	0.0494	1.7572	0.0000	0.1597	0.0000	1.1182	0.0494	3.1948	0.0988	**3.2936**	6.3896	0.1975	**6.5871**
		CNA206	0.0479	0.0015	0.5272	0.0163	0.0479	0.0015	0.3355	0.0104	0.9585	0.0297	**0.9882**	0.0479	0.0148	0.5272	0.0000	0.0479	0.0000	0.3355	0.0148	0.9585	0.0296	**0.9881**	1.9170	0.0593	**1.9763**
		GASEPF	0.2396	0.0074	2.6358	0.0815	0.2396	0.0074	1.6773	0.0519	4.7923	0.1482	**4.9405**	0.2396	0.0741	2.6358	0.0000	0.2396	0.0000	1.6773	0.0741	4.7923	0.1482	**4.9405**	9.5846	0.2964	**9.8810**
		GASEPV	0.2236	0.0069	2.4601	0.0761	0.2236	0.0069	1.5655	0.0484	4.4728	0.1383	**4.6111**	0.2236	0.0692	2.4601	0.0000	0.2236	0.0000	1.5655	0.0692	4.4728	0.1384	**4.6112**	8.9456	0.2767	**9.2223**
		PA28	0.0319	0.0010	0.3514	0.0109	0.0319	0.0010	0.2236	0.0069	0.6388	0.0198	**0.6586**	0.0319	0.0099	0.3514	0.0000	0.0319	0.0000	0.2236	0.0099	0.6388	0.0198	**0.6586**	1.2776	0.0396	**1.3172**
	Fixed-wing Multi-Engine	BEC58P	0.0319	0.0010	0.3514	0.0109	0.0319	0.0010	0.2236	0.0069	0.6388	0.0198	**0.6586**	0.0319	0.0099	0.3514	0.0000	0.0319	0.0000	0.2236	0.0099	0.6388	0.0198	**0.6586**	1.2776	0.0396	**1.3172**
		CNA441	0.0319	0.0010	0.3514	0.0109	0.0319	0.0010	0.2236	0.0069	0.6388	0.0198	**0.6586**	0.0319	0.0099	0.3514	0.0000	0.0319	0.0000	0.2236	0.0099	0.6388	0.0198	**0.6586**	1.2776	0.0396	**1.3172**
		PA30	0.0160	0.0005	0.1757	0.0054	0.0160	0.0005	0.1118	0.0035	0.3195	0.0099	**0.3294**	0.0160	0.0049	0.1757	0.0000	0.0160	0.0000	0.1118	0.0049	0.3195	0.0098	**0.3293**	0.6390	0.0197	**0.6587**
	Fixed-wing Jet	CNA55B	0.0160	0.0005	0.1757	0.0054	0.0160	0.0005	0.1118	0.0035	0.3195	0.0099	**0.3294**	0.0256	0.0099	0.2684	0.0000	0.0256	0.0000	0.0000	0.0000	0.3196	0.0099	**0.3295**	0.6391	0.0198	**0.6589**
	Helicopter	S76	0.0319	0.0010	0.3514	0.0109	0.0319	0.0010	0.2236	0.0069	0.6388	0.0198	**0.6586**	0.0319	0.0099	0.3514	0.0000	0.0319	0.0000	0.2236	0.0099	0.6388	0.0198	**0.6586**	1.2776	0.0396	**1.3172**
	Fixed-wing Single-Engine: Banner-Towing Aircraft	GASEPF	0.0000	0.0000	0.1096	0.0000	0.0000	0.0000	0.0000	0.0000	0.1096	0.0000	**0.1096**	0.0000	0.0000	0.1096	0.0000	0.0000	0.0000	0.0000	0.0000	0.1096	0.0000	**0.1096**	0.2192	0.0000	**0.2192**
		GASEPV	0.0000	0.0000	0.2192	0.0000	0.0000	0.0000	0.0000	0.0000	0.2192	0.0000	**0.2192**	0.0000	0.0000	0.2192	0.0000	0.0000	0.0000	0.0000	0.0000	0.2192	0.0000	**0.2192**	0.4384	0.0000	**0.4384**
		CNA172	0.0000	0.0000	0.0548	0.0000	0.0000	0.0000	0.0000	0.0000	0.0548	0.0000	**0.0548**	0.0000	0.0000	0.0548	0.0000	0.0000	0.0000	0.0000	0.0000	0.0548	0.0000	**0.0548**	0.1096	0.0000	**0.1096**
	Itin. (Transient) Aircraft TOTAL		**0.8304**	**0.0257**	**9.5209**	**0.2826**	**0.8304**	**0.0257**	**5.8145**	**0.1799**	**16.9962**	**0.5139**	**17.5101**	**0.8400**	**0.2619**	**9.6136**	**0.0000**	**0.8400**	**0.0000**	**5.7027**	**0.2520**	**16.9963**	**0.5139**	**17.5102**	**33.9925**	**1.0278**	**35.0203**
New England Airlines		GASEPV	1.4147	0.0429	1.0610	0.0321	0.5305	0.0161	0.5305	0.0161	3.5367	0.1072	**3.6438**	1.4147	0.0429	1.0610	0.0321	0.5305	0.0161	0.5305	0.0161	3.5367	0.1072	**3.6438**	7.0734	0.2143	**7.2877**
		BEC58P	1.4147	0.0429	1.0610	0.0321	0.5305	0.0161	0.5305	0.0161	3.5367	0.1072	**3.6438**	1.4147	0.0429	1.0610	0.0321	0.5305	0.0161	0.5305	0.0161	3.5367	0.1072	**3.6438**	7.0734	0.2143	**7.2877**
	New England Airlines TOTAL		**2.8293**	**0.0857**	**2.1220**	**0.0643**	**1.0610**	**0.0321**	**1.0610**	**0.0321**	**7.0734**	**0.2143**	**7.2877**	**2.8293**	**0.0857**	**2.1220**	**0.0643**	**1.0610**	**0.0321**	**1.0610**	**0.0321**	**7.0734**	**0.2143**	**7.2877**	**14.1467**	**0.4286**	**14.5753**
	GRAND TOTAL		**4.0237**	**0.1224**	**15.6470**	**0.4708**	**2.2554**	**0.0688**	**9.4235**	**0.2906**	**31.3497**	**0.9527**	**32.3024**	**4.0375**	**0.4624**	**15.7803**	**0.0643**	**2.2692**	**0.0321**	**9.2627**	**0.3946**	**31.3498**	**0.9535**	**32.3033**	**62.6994**	**1.9062**	**64.6056**

Source: VHB, 2008.

Table D-5
Average Day Peak Season Aircraft Operations by INM Aircraft Type

			Departures								Departure Totals			Arrivals								Arrival Totals			TOTALS		
			Runway 7		Runway 25		Runway 14		Runway 32					Runway 7		Runway 25		Runway 14		Runway 32							
Operator Group	Aircraft Group	INM Aircraft ID	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	TOTAL	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	TOTAL	DAY	NIGHT	GRAND TOTAL
Based Aircraft	Fixed-wing Single-Engine	CNA172	0.1186	0.0037	1.3049	0.0404	0.1186	0.0037	0.8304	0.0257	2.3725	0.0735	**2.4460**	0.1186	0.0367	1.3049	0.0000	0.1186	0.0000	0.8304	0.0367	2.3725	0.0734	**2.4459**	4.7450	0.1469	**4.8919**
		CNA206	0.0356	0.0011	0.3915	0.0121	0.0356	0.0011	0.2491	0.0077	0.7118	0.0220	**0.7338**	0.0356	0.0110	0.3915	0.0000	0.0356	0.0000	0.2491	0.0110	0.7118	0.0220	**0.7338**	1.4236	0.0440	**1.4676**
		GASEPF	0.1779	0.0055	1.9574	0.0605	0.1779	0.0055	1.2456	0.0385	3.5588	0.1100	**3.6688**	0.1779	0.0550	1.9574	0.0000	0.1779	0.0000	1.2456	0.0550	3.5588	0.1100	**3.6688**	7.1176	0.2200	**7.3376**
		GASEPV	0.1661	0.0051	1.8269	0.0565	0.1661	0.0051	1.1626	0.0360	3.3217	0.1027	**3.4244**	0.1661	0.0514	1.8269	0.0000	0.1661	0.0000	1.1626	0.0514	3.3217	0.1028	**3.4245**	6.6434	0.2055	**6.8489**
		PA28	0.0237	0.0007	0.2610	0.0081	0.0237	0.0007	0.1661	0.0051	0.4745	0.0146	**0.4891**	0.0237	0.0073	0.2610	0.0000	0.0237	0.0000	0.1661	0.0073	0.4745	0.0146	**0.4891**	0.9490	0.0292	**0.9782**
	Fixed-wing Multi-Engine	BEC58P	0.0237	0.0007	0.2610	0.0081	0.0237	0.0007	0.1661	0.0051	0.4745	0.0146	**0.4891**	0.0237	0.0073	0.2610	0.0000	0.0237	0.0000	0.1661	0.0073	0.4745	0.0146	**0.4891**	0.9490	0.0292	**0.9782**
		CNA441	0.0237	0.0007	0.2610	0.0081	0.0237	0.0007	0.1661	0.0051	0.4745	0.0146	**0.4891**	0.0237	0.0073	0.2610	0.0000	0.0237	0.0000	0.1661	0.0073	0.4745	0.0146	**0.4891**	0.9490	0.0292	**0.9782**
		PA30	0.0119	0.0004	0.1305	0.0040	0.0119	0.0004	0.0830	0.0026	0.2373	0.0074	**0.2447**	0.0119	0.0037	0.1305	0.0000	0.0119	0.0000	0.0830	0.0037	0.2373	0.0074	**0.2447**	0.4746	0.0148	**0.4894**
	Fixed-wing Jet	CNA500	0.0119	0.0004	0.1305	0.0040	0.0119	0.0004	0.0830	0.0026	0.2373	0.0074	**0.2447**	0.0190	0.0073	0.1993	0.0000	0.0190	0.0000	0.0000	0.0000	0.2373	0.0073	**0.2446**	0.4746	0.0147	**0.4893**
	Helicopter	R22	0.0119	0.0004	0.1305	0.0040	0.0119	0.0004	0.0830	0.0026	0.2373	0.0074	**0.2447**	0.0119	0.0037	0.1305	0.0000	0.0119	0.0000	0.0830	0.0037	0.2373	0.0074	**0.2447**	0.4746	0.0148	**0.4894**
		SA341G	0.0119	0.0004	0.1305	0.0040	0.0119	0.0004	0.0830	0.0026	0.2373	0.0074	**0.2447**	0.0119	0.0037	0.1305	0.0000	0.0119	0.0000	0.0830	0.0037	0.2373	0.0074	**0.2447**	0.4746	0.0148	**0.4894**
	Based Aircraft TOTAL		**0.6169**	**0.0191**	**6.7857**	**0.2098**	**0.6169**	**0.0191**	**4.3180**	**0.1336**	**12.3375**	**0.3816**	**12.7191**	**0.6240**	**0.1944**	**6.8545**	**0.0000**	**0.6240**	**0.0000**	**4.2350**	**0.1871**	**12.3375**	**0.3815**	**12.7190**	**24.6750**	**0.7631**	**25.4381**
Itinerant (Transient) Aircraft	Fixed-wing Single-Engine	CNA172	0.2661	0.0082	2.9272	0.0905	0.2661	0.0082	1.8627	0.0576	5.3221	0.1645	**5.4866**	0.2661	0.0823	2.9272	0.0000	0.2661	0.0000	1.8627	0.0823	5.3221	0.1646	**5.4867**	10.6442	0.3291	**10.9733**
		CNA206	0.0798	0.0025	0.8781	0.0272	0.0798	0.0025	0.5588	0.0173	1.5965	0.0495	**1.6460**	0.0798	0.0247	0.8781	0.0000	0.0798	0.0000	0.5588	0.0247	1.5965	0.0494	**1.6459**	3.1930	0.0989	**3.2919**
		GASEPF	0.3992	0.0123	4.3907	0.1358	0.3992	0.0123	2.7941	0.0864	7.9832	0.2468	**8.2300**	0.3992	0.1235	4.3907	0.0000	0.3992	0.0000	2.7941	0.1235	7.9832	0.2470	**8.2302**	15.9664	0.4938	**16.4602**
		GASEPV	0.3725	0.0115	4.0980	0.1267	0.3725	0.0115	2.6078	0.0807	7.4508	0.2304	**7.6812**	0.3725	0.1152	4.0980	0.0000	0.3725	0.0000	2.6078	0.1152	7.4508	0.2304	**7.6812**	14.9016	0.4608	**15.3624**
		PA28	0.0532	0.0016	0.5854	0.0181	0.0532	0.0016	0.3726	0.0115	1.0644	0.0328	**1.0972**	0.0532	0.0165	0.5854	0.0000	0.0532	0.0000	0.3726	0.0165	1.0644	0.0330	**1.0974**	2.1288	0.0658	**2.1946**
	Fixed-wing Multi-Engine	BEC58P	0.0532	0.0016	0.5854	0.0181	0.0532	0.0016	0.3726	0.0115	1.0644	0.0328	**1.0972**	0.0532	0.0165	0.5854	0.0000	0.0532	0.0000	0.3726	0.0165	1.0644	0.0330	**1.0974**	2.1288	0.0658	**2.1946**
		CNA441	0.0532	0.0016	0.5854	0.0181	0.0532	0.0016	0.3726	0.0115	1.0644	0.0328	**1.0972**	0.0532	0.0165	0.5854	0.0000	0.0532	0.0000	0.3726	0.0165	1.0644	0.0330	**1.0974**	2.1288	0.0658	**2.1946**
		PA30	0.0266	0.0008	0.2927	0.0091	0.0266	0.0008	0.1863	0.0058	0.5322	0.0165	**0.5487**	0.0266	0.0082	0.2927	0.0000	0.0266	0.0000	0.1863	0.0082	0.5322	0.0164	**0.5486**	1.0644	0.0329	**1.0973**
	Fixed-wing Jet	CNA55B	0.0266	0.0008	0.2927	0.0091	0.0266	0.0008	0.1863	0.0058	0.5322	0.0165	**0.5487**	0.0426	0.0165	0.4470	0.0000	0.0426	0.0000	0.0000	0.0000	0.5322	0.0165	**0.5487**	1.0644	0.0330	**1.0974**
	Helicopter	S76	0.0532	0.0016	0.5854	0.0181	0.0532	0.0016	0.3726	0.0115	1.0644	0.0328	**1.0972**	0.0532	0.0165	0.5854	0.0000	0.0532	0.0000	0.3726	0.0165	1.0644	0.0330	**1.0974**	2.1288	0.0658	**2.1946**
	Fixed-wing Single-Engine: Banner-Towing Aircraft	GASEPF	0.0000	0.0000	0.3279	0.0000	0.0000	0.0000	0.0000	0.0000	0.3279	0.0000	**0.3279**	0.0000	0.0000	0.3279	0.0000	0.0000	0.0000	0.0000	0.0000	0.3279	0.0000	**0.3279**	0.6558	0.0000	**0.6558**
		GASEPV	0.0000	0.0000	0.6558	0.0000	0.0000	0.0000	0.0000	0.0000	0.6558	0.0000	**0.6558**	0.0000	0.0000	0.6558	0.0000	0.0000	0.0000	0.0000	0.0000	0.6558	0.0000	**0.6558**	1.3116	0.0000	**1.3116**
		CNA172	0.0000	0.0000	0.1640	0.0000	0.0000	0.0000	0.0000	0.0000	0.1640	0.0000	**0.1640**	0.0000	0.0000	0.1640	0.0000	0.0000	0.0000	0.0000	0.0000	0.1640	0.0000	**0.1640**	0.3280	0.0000	**0.3280**
	Itin. (Transient) Aircraft TOTAL		**1.3836**	**0.0425**	**16.3687**	**0.4708**	**1.3836**	**0.0425**	**9.6864**	**0.2996**	**28.8223**	**0.8554**	**29.6777**	**1.3996**	**0.4364**	**16.5230**	**0.0000**	**1.3996**	**0.0000**	**9.5001**	**0.4199**	**28.8223**	**0.8563**	**29.6786**	**57.6446**	**1.7117**	**59.3563**
New England Airlines		GASEPV	1.8000	0.0000	1.3500	0.0000	0.6750	0.0000	0.6750	0.0000	4.5000	0.0000	**4.5000**	1.8000	0.0000	1.3500	0.0000	0.6750	0.0000	0.6750	0.0000	4.5000	0.0000	**4.5000**	9.0000	0.0000	**9.0000**
		BEC58P	1.8000	0.0000	1.3500	0.0000	0.6750	0.0000	0.6750	0.0000	4.5000	0.0000	**4.5000**	1.8000	0.0000	1.3500	0.0000	0.6750	0.0000	0.6750	0.0000	4.5000	0.0000	**4.5000**	9.0000	0.0000	**9.0000**
	New England Airlines TOTAL		**3.6000**	**0.0000**	**2.7000**	**0.0000**	**1.3500**	**0.0000**	**1.3500**	**0.0000**	**9.0000**	**0.0000**	**9.0000**	**3.6000**	**0.0000**	**2.7000**	**0.0000**	**1.3500**	**0.0000**	**1.3500**	**0.0000**	**9.0000**	**0.0000**	**9.0000**	**18.0000**	**0.0000**	**18.0000**
	GRAND TOTAL		**5.6005**	**0.0616**	**25.8544**	**0.6806**	**3.3505**	**0.0616**	**15.3544**	**0.4332**	**50.1598**	**1.2370**	**51.3968**	**5.6236**	**0.6308**	**26.0775**	**0.0000**	**3.3736**	**0.0000**	**15.0851**	**0.6070**	**50.1598**	**1.2378**	**51.3976**	**100.3196**	**2.4748**	**102.7944**

Source: VHB, 2008.

Table D-6
Average Peak Day Peak Season Aircraft Operations by INM Aircraft Type

Operator Group	Aircraft Group	INM Aircraft ID	Departures								Departure Totals			Arrivals								Arrival Totals			TOTALS		
			Runway 7		Runway 25		Runway 14		Runway 32					Runway 7		Runway 25		Runway 14		Runway 32							GRAND
			Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	TOTAL	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	TOTAL	DAY	NIGHT	TOTAL
Based Aircraft	Fixed-wing Single-Engine	CNA172	0.1444	0.0045	1.5886	0.0491	0.1444	0.0045	1.0109	0.0313	2.8883	0.0894	**2.9777**	0.1444	0.0447	1.5886	0.0000	0.1444	0.0000	1.0109	0.0447	2.8883	0.0894	**2.9777**	5.7766	0.1788	**5.9554**
		CNA206	0.0433	0.0013	0.4766	0.0147	0.0433	0.0013	0.3033	0.0094	0.8665	0.0267	**0.8932**	0.0433	0.0134	0.4766	0.0000	0.0433	0.0000	0.3033	0.0134	0.8665	0.0268	**0.8933**	1.7330	0.0535	**1.7865**
		GASEPF	0.2166	0.0067	2.3829	0.0737	0.2166	0.0067	1.5164	0.0469	4.3325	0.1340	**4.4665**	0.2166	0.0670	2.3829	0.0000	0.2166	0.0000	1.5164	0.0670	4.3325	0.1340	**4.4665**	8.6650	0.2680	**8.9330**
		GASEPV	0.2022	0.0063	2.2240	0.0688	0.2022	0.0063	1.4153	0.0438	4.0437	0.1252	**4.1689**	0.2022	0.0625	2.2240	0.0000	0.2022	0.0000	1.4153	0.0625	4.0437	0.1250	**4.1687**	8.0874	0.2502	**8.3376**
		PA28	0.0289	0.0009	0.3177	0.0098	0.0289	0.0009	0.2022	0.0063	0.5777	0.0179	**0.5956**	0.0289	0.0089	0.3177	0.0000	0.0289	0.0000	0.2022	0.0089	0.5777	0.0178	**0.5955**	1.1554	0.0357	**1.1911**
	Fixed-wing Multi-Engine	BEC58P	0.0289	0.0009	0.3177	0.0098	0.0289	0.0009	0.2022	0.0063	0.5777	0.0179	**0.5956**	0.0289	0.0089	0.3177	0.0000	0.0289	0.0000	0.2022	0.0089	0.5777	0.0178	**0.5955**	1.1554	0.0357	**1.1911**
		CNA441	0.0289	0.0009	0.3177	0.0098	0.0289	0.0009	0.2022	0.0063	0.5777	0.0179	**0.5956**	0.0289	0.0089	0.3177	0.0000	0.0289	0.0000	0.2022	0.0089	0.5777	0.0178	**0.5955**	1.1554	0.0357	**1.1911**
		PA30	0.0144	0.0004	0.1588	0.0049	0.0144	0.0004	0.1011	0.0031	0.2887	0.0088	**0.2975**	0.0144	0.0045	0.1588	0.0000	0.0144	0.0000	0.1011	0.0045	0.2887	0.0090	**0.2977**	0.5774	0.0178	**0.5952**
	Fixed-wing Jet	CNA500	0.0144	0.0004	0.1588	0.0049	0.0144	0.0004	0.1011	0.0031	0.2887	0.0088	**0.2975**	0.0231	0.0089	0.2426	0.0000	0.0231	0.0000	0.0000	0.0000	0.2888	0.0089	**0.2977**	0.5775	0.0177	**0.5952**
	Helicopter	R22	0.0144	0.0004	0.1588	0.0049	0.0144	0.0004	0.1011	0.0031	0.2887	0.0088	**0.2975**	0.0144	0.0045	0.1588	0.0000	0.0144	0.0000	0.1011	0.0045	0.2887	0.0090	**0.2977**	0.5774	0.0178	**0.5952**
		SA341G	0.0144	0.0004	0.1588	0.0049	0.0144	0.0004	0.1011	0.0031	0.2887	0.0088	**0.2975**	0.0144	0.0045	0.1588	0.0000	0.0144	0.0000	0.1011	0.0045	0.2887	0.0090	**0.2977**	0.5774	0.0178	**0.5952**
	Based Aircraft TOTAL		**0.7508**	**0.0231**	**8.2604**	**0.2553**	**0.7508**	**0.0231**	**5.2569**	**0.1627**	**15.0189**	**0.4642**	**15.4831**	**0.7595**	**0.2367**	**8.3442**	**0.0000**	**0.7595**	**0.0000**	**5.1558**	**0.2278**	**15.0190**	**0.4645**	**15.4835**	**30.0379**	**0.9287**	**30.9666**
Itinerant (Transient) Aircraft	Fixed-wing Single-Engine	CNA172	0.3114	0.0096	3.4251	0.1059	0.3114	0.0096	2.1796	0.0674	6.2275	0.1925	**6.4200**	0.3114	0.0963	3.4251	0.0000	0.3114	0.0000	2.1796	0.0963	6.2275	0.1926	**6.4201**	12.4550	0.3851	**12.8401**
		CNA206	0.0934	0.0029	1.0275	0.0318	0.0934	0.0029	0.6539	0.0202	1.8682	0.0578	**1.9260**	0.0934	0.0289	1.0275	0.0000	0.0934	0.0000	0.6539	0.0289	1.8682	0.0578	**1.9260**	3.7364	0.1156	**3.8520**
		GASEPF	0.4671	0.0144	5.1376	0.1589	0.4671	0.0144	3.2694	0.1011	9.3412	0.2888	**9.6300**	0.4671	0.1445	5.1376	0.0000	0.4671	0.0000	3.2694	0.1445	9.3412	0.2890	**9.6302**	18.6824	0.5778	**19.2602**
		GASEPV	0.4359	0.0135	4.7951	0.1483	0.4359	0.0135	3.0514	0.0944	8.7183	0.2697	**8.9880**	0.4359	0.1348	4.7951	0.0000	0.4359	0.0000	3.0514	0.1348	8.7183	0.2696	**8.9879**	17.4366	0.5393	**17.9759**
		PA28	0.0623	0.0019	0.6850	0.0212	0.0623	0.0019	0.4359	0.0135	1.2455	0.0385	**1.2840**	0.0623	0.0193	0.6850	0.0000	0.0623	0.0000	0.4359	0.0193	1.2455	0.0386	**1.2841**	2.4910	0.0771	**2.5681**
	Fixed-wing Multi-Engine	BEC58P	0.0623	0.0019	0.6850	0.0212	0.0623	0.0019	0.4359	0.0135	1.2455	0.0385	**1.2840**	0.0623	0.0193	0.6850	0.0000	0.0623	0.0000	0.4359	0.0193	1.2455	0.0386	**1.2841**	2.4910	0.0771	**2.5681**
		CNA441	0.0623	0.0019	0.6850	0.0212	0.0623	0.0019	0.4359	0.0135	1.2455	0.0385	**1.2840**	0.0623	0.0193	0.6850	0.0000	0.0623	0.0000	0.4359	0.0193	1.2455	0.0386	**1.2841**	2.4910	0.0771	**2.5681**
		PA30	0.0311	0.0010	0.3425	0.0106	0.0311	0.0010	0.2180	0.0067	0.6227	0.0193	**0.6420**	0.0311	0.0096	0.3425	0.0000	0.0311	0.0000	0.2180	0.0096	0.6227	0.0192	**0.6419**	1.2454	0.0385	**1.2839**
	Fixed-wing Jet	CNA55B	0.0311	0.0010	0.3425	0.0106	0.0311	0.0010	0.2180	0.0067	0.6227	0.0193	**0.6420**	0.0498	0.0193	0.5231	0.0000	0.0498	0.0000	0.0000	0.0000	0.6227	0.0193	**0.6420**	1.2454	0.0386	**1.2840**
	Helicopter	S76	0.0623	0.0019	0.6850	0.0212	0.0623	0.0019	0.4359	0.0135	1.2455	0.0385	**1.2840**	0.0623	0.0193	0.6850	0.0000	0.0623	0.0000	0.4359	0.0193	1.2455	0.0386	**1.2841**	2.4910	0.0771	**2.5681**
	Fixed-wing Single-Engine: Banner-Towing Aircraft	GASEPF	0.0000	0.0000	0.7843	0.0000	0.0000	0.0000	0.0000	0.0000	0.7843	0.0000	**0.7843**	0.0000	0.0000	0.7843	0.0000	0.0000	0.0000	0.0000	0.0000	0.7843	0.0000	**0.7843**	1.5686	0.0000	**1.5686**
		GASEPV	0.0000	0.0000	1.5687	0.0000	0.0000	0.0000	0.0000	0.0000	1.5687	0.0000	**1.5687**	0.0000	0.0000	1.5687	0.0000	0.0000	0.0000	0.0000	0.0000	1.5687	0.0000	**1.5687**	3.1374	0.0000	**3.1374**
		CNA172	0.0000	0.0000	0.3922	0.0000	0.0000	0.0000	0.0000	0.0000	0.3922	0.0000	**0.3922**	0.0000	0.0000	0.3922	0.0000	0.0000	0.0000	0.0000	0.0000	0.3922	0.0000	**0.3922**	0.7844	0.0000	**0.7844**
	Itin. (Transient) Aircraft TOTAL		**1.6192**	**0.0500**	**20.5555**	**0.5509**	**1.6192**	**0.0500**	**11.3339**	**0.3505**	**35.1278**	**1.0014**	**36.1292**	**1.6379**	**0.5106**	**20.7361**	**0.0000**	**1.6379**	**0.0000**	**11.1159**	**0.4913**	**35.1278**	**1.0019**	**36.1297**	**70.2556**	**2.0033**	**72.2589**
New England Airlines		GASEPV	2.0000	0.0000	1.5000	0.0000	0.7500	0.0000	0.7500	0.0000	5.0000	0.0000	**5.0000**	2.0000	0.0000	1.5000	0.0000	0.7500	0.0000	0.7500	0.0000	5.0000	0.0000	**5.0000**	10.0000	0.0000	**10.0000**
		BEC58P	2.0000	0.0000	1.5000	0.0000	0.7500	0.0000	0.7500	0.0000	5.0000	0.0000	**5.0000**	2.0000	0.0000	1.5000	0.0000	0.7500	0.0000	0.7500	0.0000	5.0000	0.0000	**5.0000**	10.0000	0.0000	**10.0000**
	New England Airlines TOTAL		**4.0000**	**0.0000**	**3.0000**	**0.0000**	**1.5000**	**0.0000**	**1.5000**	**0.0000**	**10.0000**	**0.0000**	**10.0000**	**4.0000**	**0.0000**	**3.0000**	**0.0000**	**1.5000**	**0.0000**	**1.5000**	**0.0000**	**10.0000**	**0.0000**	**10.0000**	**20.0000**	**0.0000**	**20.0000**
	GRAND TOTAL		**6.3700**	**0.0731**	**31.8159**	**0.8062**	**3.8700**	**0.0731**	**18.0908**	**0.5132**	**60.1467**	**1.4656**	**61.6123**	**6.3974**	**0.7473**	**32.0803**	**0.0000**	**3.8974**	**0.0000**	**17.7717**	**0.7191**	**60.1468**	**1.4664**	**61.6132**	**120.2935**	**2.9320**	**123.2255**

Source: VHB, 2008.

Table D-7
Aircraft Engine (Pre-Flight) Run-up Operations

Aircraft	Average Annual Day											
	RWY7END		RWY25END		RWY14END		RWY32END		RWY32NA		Total	
	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night
GASEPF	1.0107	0.0311	11.1198	0.3438	1.0107	0.0311	2.4601	0.0761	4.6161	0.1427	20.2173	0.6248
BEC58P	1.5295	0.0464	2.3245	0.0713	0.6453	0.0196	0.2795	0.0087	1.0550	0.0322	5.8338	0.1782
GASEPV	1.4147	0.0429	1.0610	0.0321	0.5305	0.0161	0.0000	0.0000	0.5305	0.0161	3.5367	0.1072
Total	**3.9548**	**0.1203**	**14.5053**	**0.4473**	**2.1865**	**0.0667**	**2.7396**	**0.0848**	**6.2016**	**0.1910**	**29.5878**	**0.9101**

Aircraft	Average Day Peak Season											
	RWY7END		RWY25END		RWY14END		RWY32END		RWY32NA		Total	
	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night
GASEPF	1.6927	0.0522	18.6211	0.5759	1.6927	0.0522	4.0980	0.1268	7.7518	0.2398	33.8563	1.0468
BEC58P	1.9923	0.0058	3.4660	0.0655	0.8673	0.0058	0.4658	0.0144	1.5560	0.0272	8.3473	0.1187
GASEPV	1.8000	0.0000	1.3500	0.0000	0.6750	0.0000	0.0000	0.0000	0.6750	0.0000	4.5000	0.0000
Total	**5.4850**	**0.0580**	**23.4371**	**0.6414**	**3.2350**	**0.0580**	**4.5638**	**0.1412**	**9.9828**	**0.2670**	**46.7036**	**1.1655**

Aircraft	Average Peak Day Peak Season											
	RWY7END		RWY25END		RWY14END		RWY32END		RWY32NA		Total	
	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night
GASEPF	2.0055	0.0620	22.0601	0.6822	2.0055	0.0620	4.7951	0.1483	9.2432	0.2860	40.1094	1.2405
BEC58P	2.2279	0.0070	4.0067	0.0775	0.9779	0.0070	0.5449	0.0169	1.8004	0.0326	9.5578	0.1409
GASEPV	2.0000	0.0000	1.5000	0.0000	0.7500	0.0000	0.0000	0.0000	0.7500	0.0000	5.0000	0.0000
Total	**6.2334**	**0.0690**	**27.5668**	**0.7597**	**3.7334**	**0.0690**	**5.3400**	**0.1652**	**11.7936**	**0.3186**	**54.6672**	**1.3814**

Notes:

Run-up Location	Aircraft Heading (Degrees; True)	
RWY7END	233	
RWY25END	53	
RWY14END	310	
RWY32END	130	(50% of Itinerant departure ops; 0% of Based departure ops)
RWYNA	130	(50% of Itinerant departure ops; 100% of Based departure ops)

Source: VHB, 2008.

\\ri-data\projects\72088.01\GIS\project\UpdateALP_02\WEST_UALP02_FigD-1_GenAvi_Dep.mxd

Legend

Primary Flight Tracks

Dispersed Flight Tracks

Property Line

Rhode Island Airport Corporation

Westerly ALP Update and Land Use Compatibility Plan

Figure D-1

General Aviation (Non-Jet) Departure Flight Tracks

\\ri-data\projects\72088.01\GIS\project\UpdateALP_02\WEST_UALP02_FigD-2_GenAvi_Arr.mxd

Source: 2007 Aerial (RIAC), 2005 Roadways (RIDOT), Noise Contours (INM)

Legend

- Primary Flight Tracks
- Dispersed Flight Tracks
- Property Line

Rhode Island Airport Corporation

Westerly ALP Update and Land Use Compatibility Plan

Figure D-2

General Aviation (Non-Jet) Arrival Flight Tracks

\\ri-data\projects\72088.01\GIS\project\UpdateALP_02\WEST_UALP02_FigD-3_JetFlightTracks_Dep.mxd

Source: 2007 Aerial (RIAC), 2005 Roadways (RIDOT), Noise Contours (INM)

Legend

- Primary Flight Tracks
- Dispersed Flight Tracks
- Property Line

Rhode Island Airport Corporation

Westerly ALP Update and Land Use Compatibility Plan

Figure D-3

Jet Departure Flight Tracks

\\ri-data\projects\72088.01\GIS\project\UpdateALP_02\WEST_UALP02_FigD-4_JetFlightTracks_Arr.mxd

Legend

Primary Flight Tracks

Dispersed Flight Tracks

Property Line

Rhode Island Airport Corporation

Westerly ALP Update and Land Use Compatibility Plan

Figure D-4

Jet Arrival Flight Tracks

\\ri-data\projects\72088.01\GIS\project\UpdateALP_02\WEST_UALP02_FigD-5_NEAirFlightTracks_Dep.mxd

Legend

- Primary Flight Tracks
- Dispersed Flight Tracks
- Property Line

Rhode Island Airport Corporation

Westerly ALP Update and Land Use Compatibility Plan

Figure D-5

New England Airlines Departure Flight Tracks

\\ri-data\projects\72088.01\GIS\project\UpdateALP_02\WEST_UALP02_FigD-6_NEAirFlightTracks_Arr.mxd

Source: 2007 Aerial (RIAC), 2005 Roadways (RIDOT), Noise Contours (INM)

Legend

Primary Flight Tracks

Dispersed Flight Tracks

Property Line

Rhode Island Airport Corporation

Westerly ALP Update and Land Use Compatibility Plan

Figure D-6

New England Airlines Arrival Flight Tracks

\\ri-data\projects\72088.01\GIS\project\UpdateALP_02\WEST_UALP02_FigD-7_HeliFlightTracks_Dep.mxd

Legend

Primary Flight Tracks

Dispersed Flight Tracks

Property Line

Rhode Island Airport Corporation

Westerly ALP Update and Land Use Compatibility Plan

Figure D-7

Helicopter Departure Flight Tracks

\\ri-data\projects\72088.01\GIS\project\UpdateALP_02\WEST_UALP02_FigD-8_HeliFlightTracks_Arr.mxd

Source: 2007 Aerial (RIAC), 2005 Roadways (RIDOT), Noise Contours (INM)

Legend

- Primary Flight Tracks
- Dispersed Flight Tracks
- Property Line

Rhode Island Airport Corporation

Westerly ALP Update and Land Use Compatibility Plan

Figure D-8

Helicopter Arrival Flight Tracks

\\ri-data\projects\72088.01\GIS\project\UpdateALP_02\WEST_UALP02_FigD-9_Banner Towing Tracks.mxd

Legend

- Primary Arrival Flight Tracks
- Primary Departure Flight Tracks
- Dispersed Arrival Flight Tracks
- Dispersed Departure Flight Tracks
- Property Line

Rhode Island Airport Corporation

Westerly ALP Update and Land Use Compatibility Plan

Figure D-9

Banner-towing Aircraft Flight Tracks

Appendix E - Aircraft Noise Monitoring Data

This page intentionally left blank

This appendix presents graphical depictions of the noise data gathered at two locations in the vicinity of Westerly State Airport (WST) on August 29, 2008. The data shown depict sound levels associated with representative aircraft operations at WST during an average peak season (summer) day. These data are described further in Section 3.2.4, *Aircraft Noise Monitoring*, of the Report.

Noise data gathered from the Links Passage (RIAC property) location are shown in the following figures:

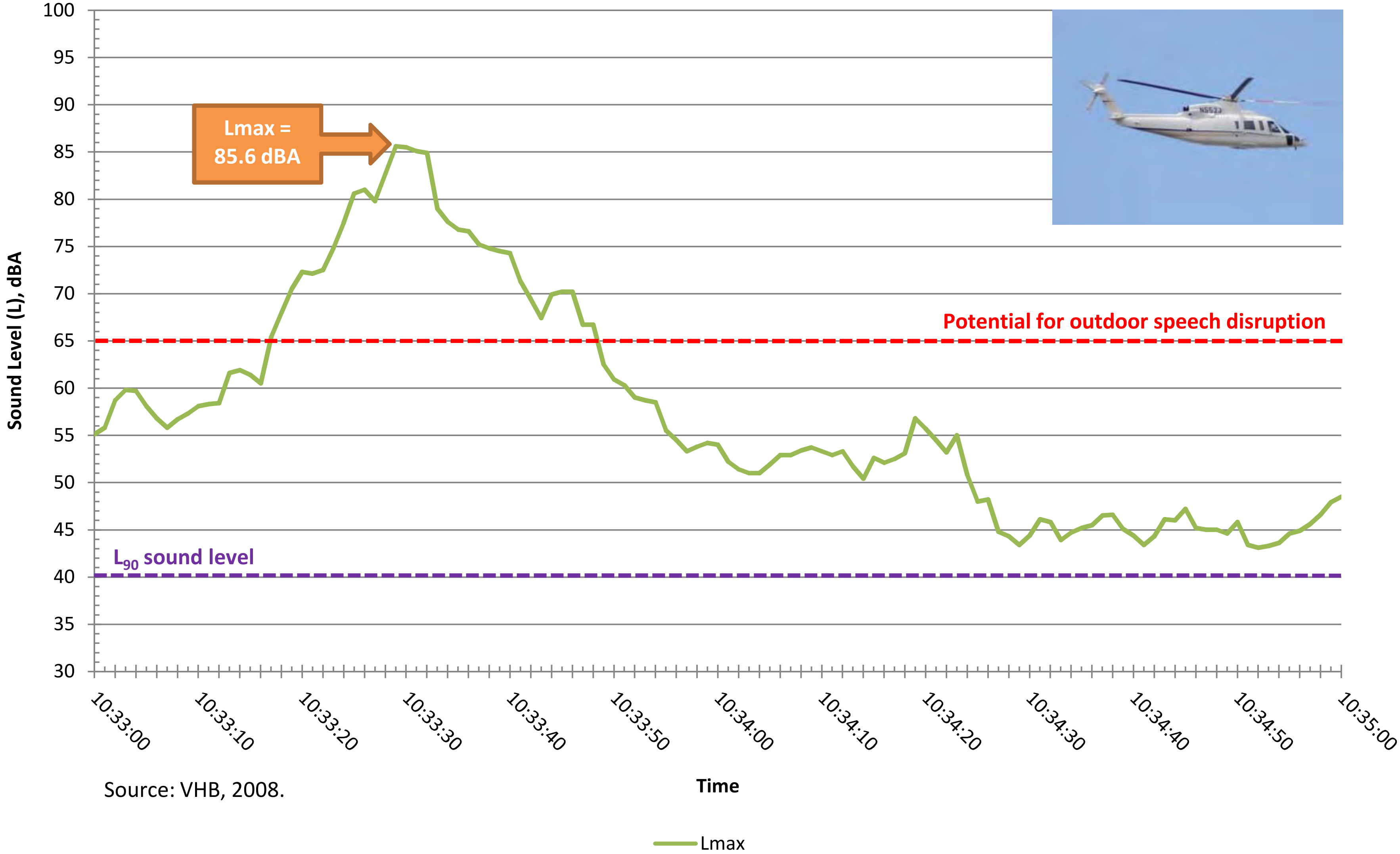
- Figure E-1 Sound Level (L) of Sikorsky S-76C Helicopter Arriving to Runway 32
- Figure E-2 Sound Level (L) of Sikorsky S-76C Helicopter Departing from Runway 14
- Figure E-3 Sound Level (L) of BN-2A-26 Islander Departing from Runway 7
- Figure E-4 Sound Level (L) of BN-2A-26 Islander Arriving to Runway 7
- Figure E-5 Sound Level (L) of BN-2A-26 Islander Arriving to Runway 14
- Figure E-6 Sound Level (L) of BN-2A-26 Islander Departing from Runway 14
- Figure E-7 Sound Level (L) of Piper Cherokee 6 Arriving to Runway 25
- Figure E-8 Sound Level (L) of Citabria Bellanca 7GCBC Towing Banner

Noise data gathered from the Nob Court location are shown in the following figures:

- Figure E-9 Sound Level (L) of Single-Engine Cessna Arriving to Runway 7
- Figure E-10 Sound Level (L) of Single-Engine Cessna Departing from Runway 25
- Figure E-11 Sound Level (L) of BN-2A-26 Islander Arriving to Runway 7
- Figure E-12 Sound Level (L) of Piper Seneca Departing from Runway 25
- Figure E-13 Sound Level (L) of Cessna Citation Jet Arriving to Runway 7
- Figure E-14 Sound Level (L) of Cessna Citation Jet Departing from Runway 25
- Figure E-15 Sound Level (L) of Citabria Bellanca 7GCBC Towing Banner

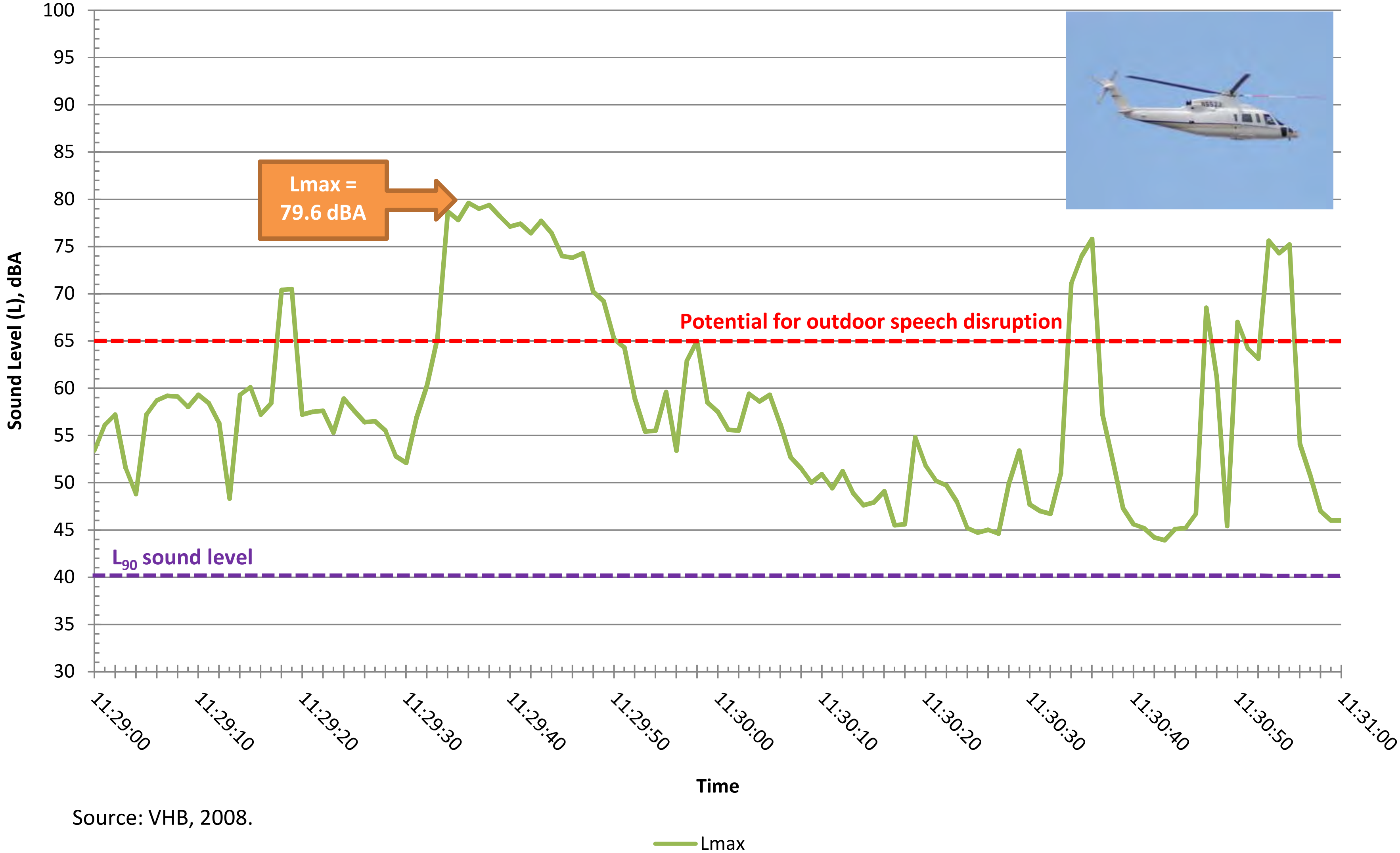
This page intentionally left blank

Figure E-1
Sound Level (L) of Sikorsky S-76C Helicopter Arriving to Runway 32
Links Passage (RIAC Property) Monitoring Location



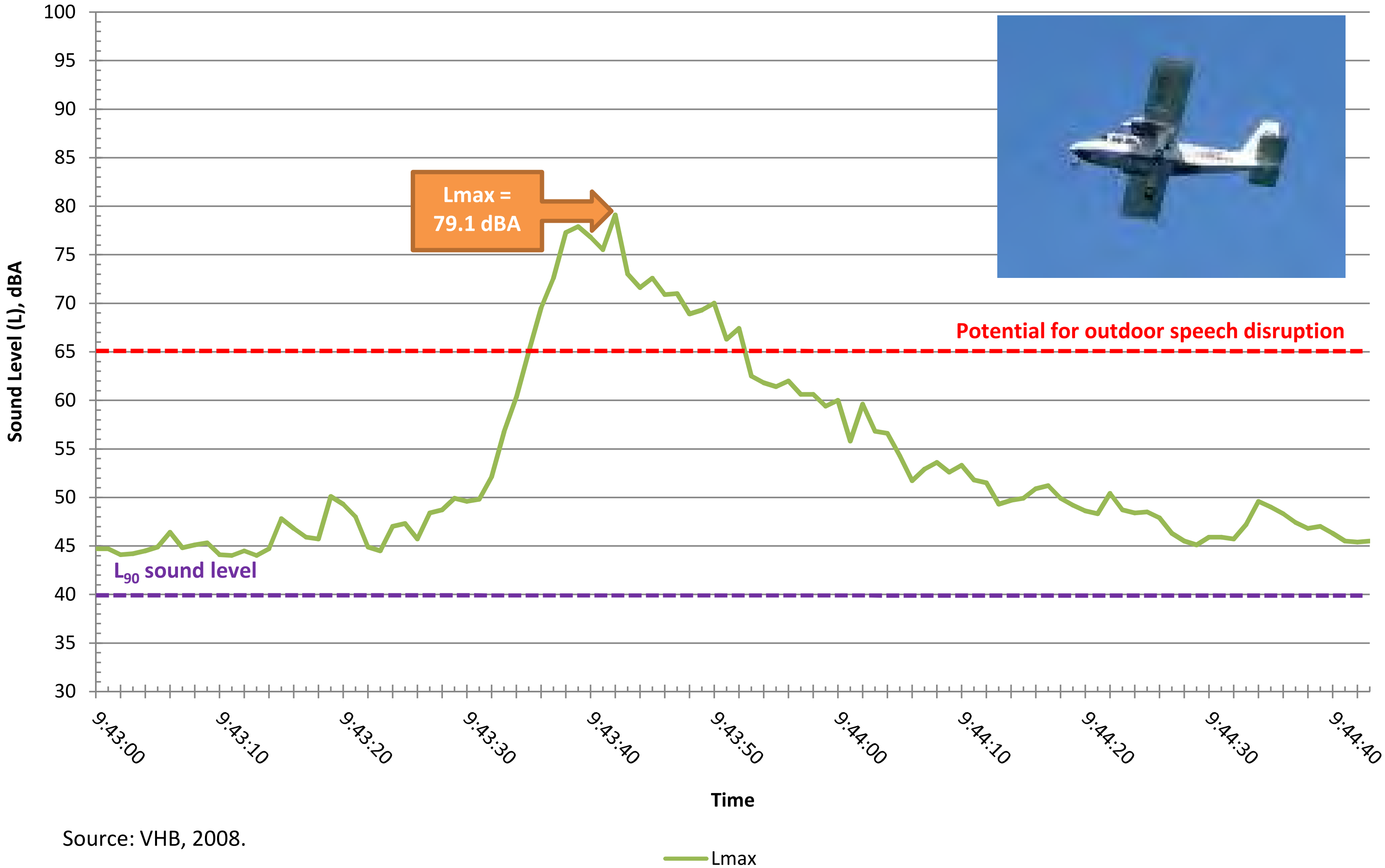
Source: VHB, 2008.

Figure E-2
Sound Level (L) of Sikorsky S-76C Helicopter Departing from Runway 14
Links Passage (RIAC Property) Monitoring Location



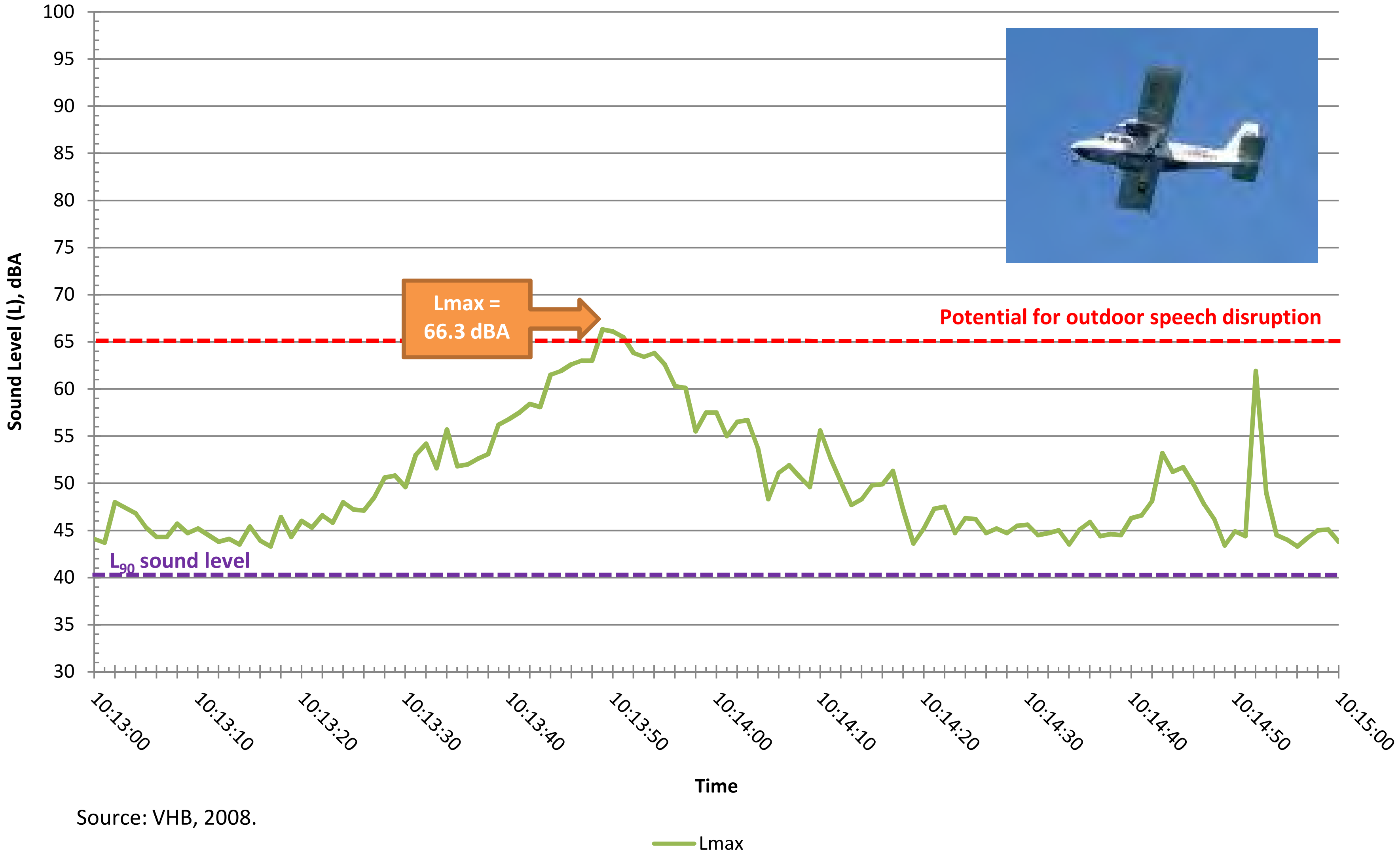
Source: VHB, 2008.

Figure E-3
Sound Level (L) of BN-2A-26 Islander Departing from Runway 7
Links Passage (RIAC Property) Monitoring Location



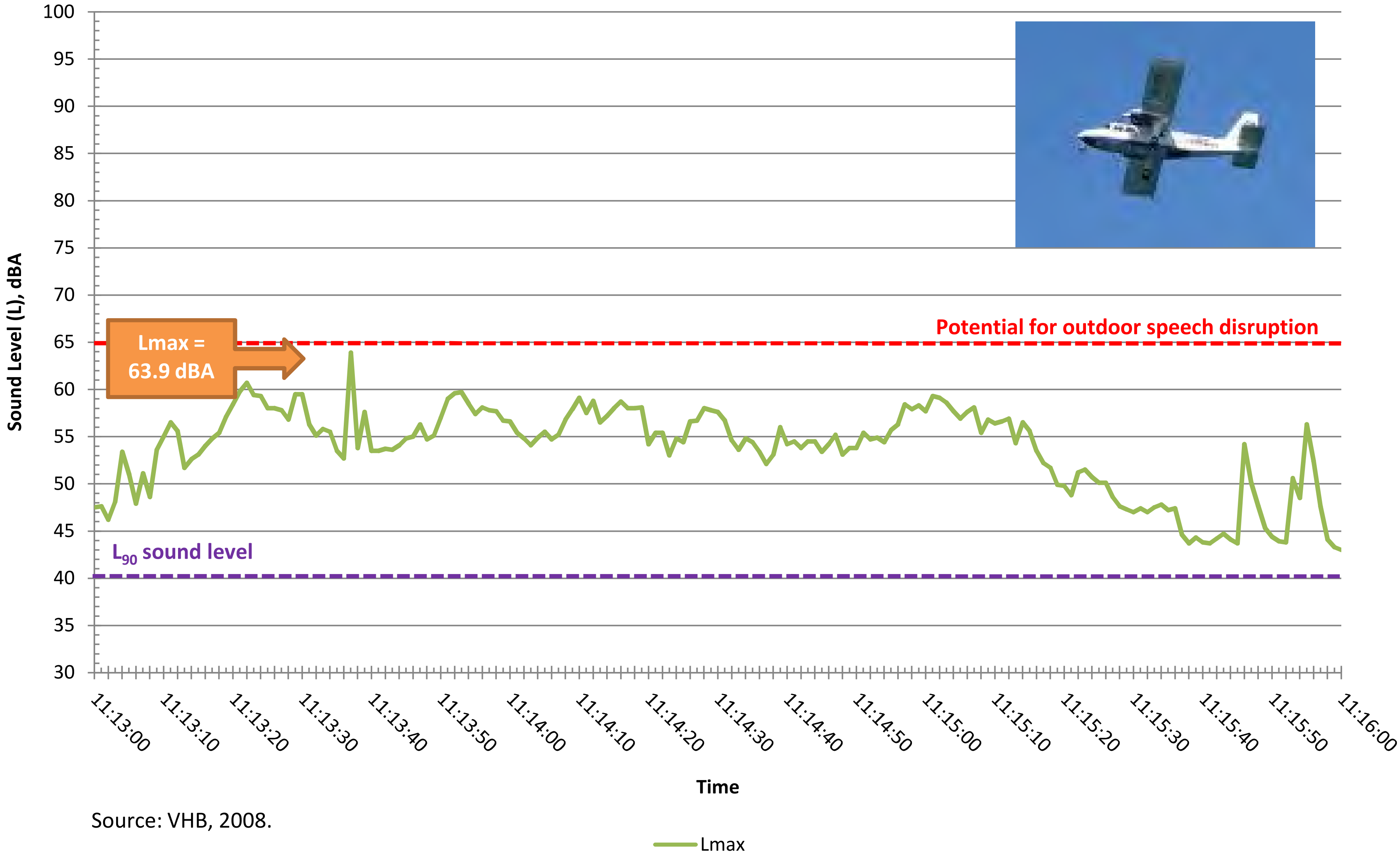
Source: VHB, 2008.

Figure E-4
Sound Level (L) of BN-2A-26 Islander Arriving to Runway 7
Links Passage (RIAC Property) Monitoring Location



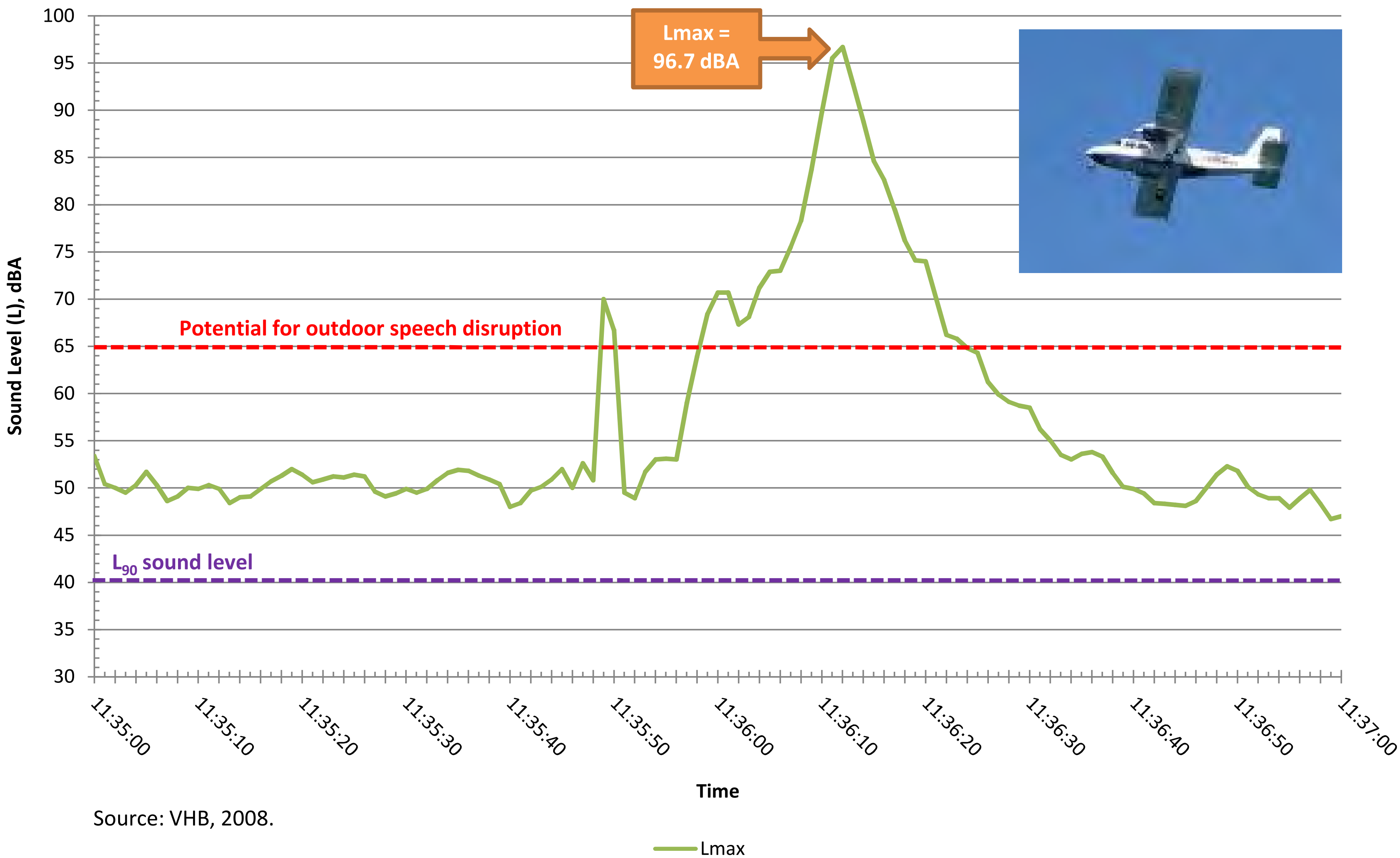
Source: VHB, 2008.

Figure E-5
Sound Level (L) of BN-2A-26 Islander Arriving to Runway 14 Links Passage (RIAC Property) Monitoring Location



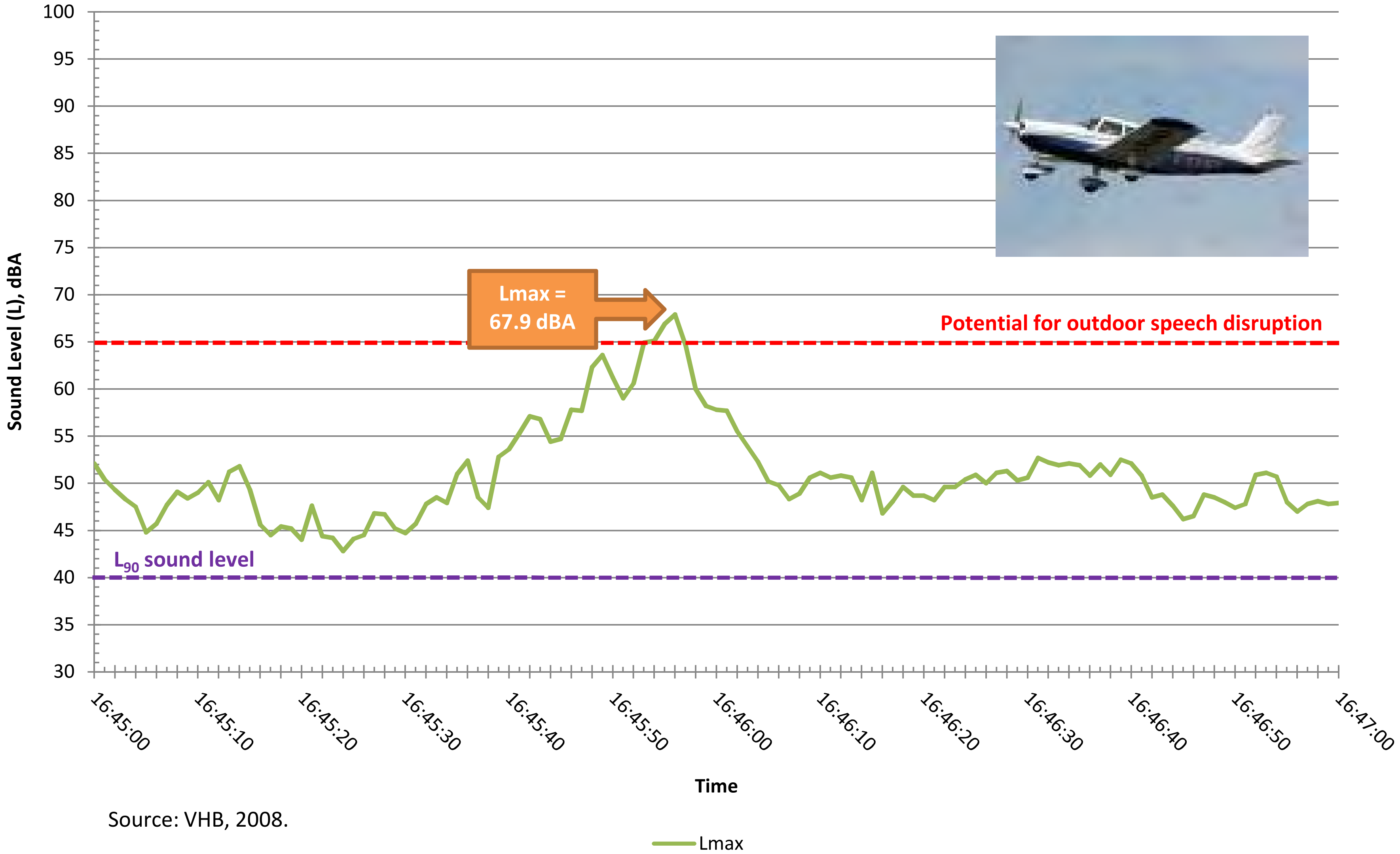
Source: VHB, 2008.

Figure E-6
Sound Level (L) of BN-2A-26 Islander Departing from Runway 14
Links Passage (RIAC Property) Monitoring Location



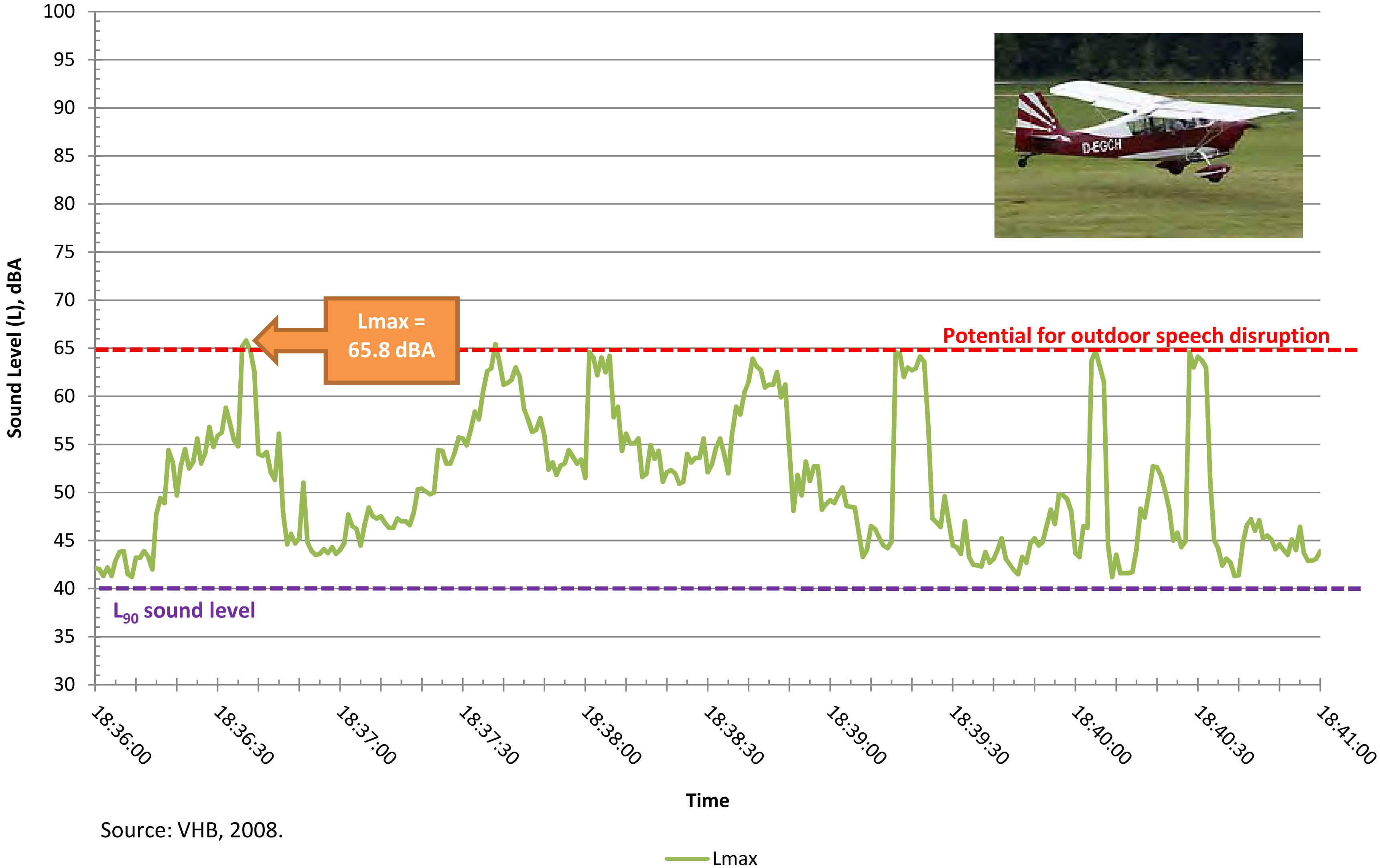
Source: VHB, 2008.

Figure E-7
Sound Level (L) of Piper Cherokee 6 Arriving to Runway 25
Links Passage (RIAC Property) Monitoring Location



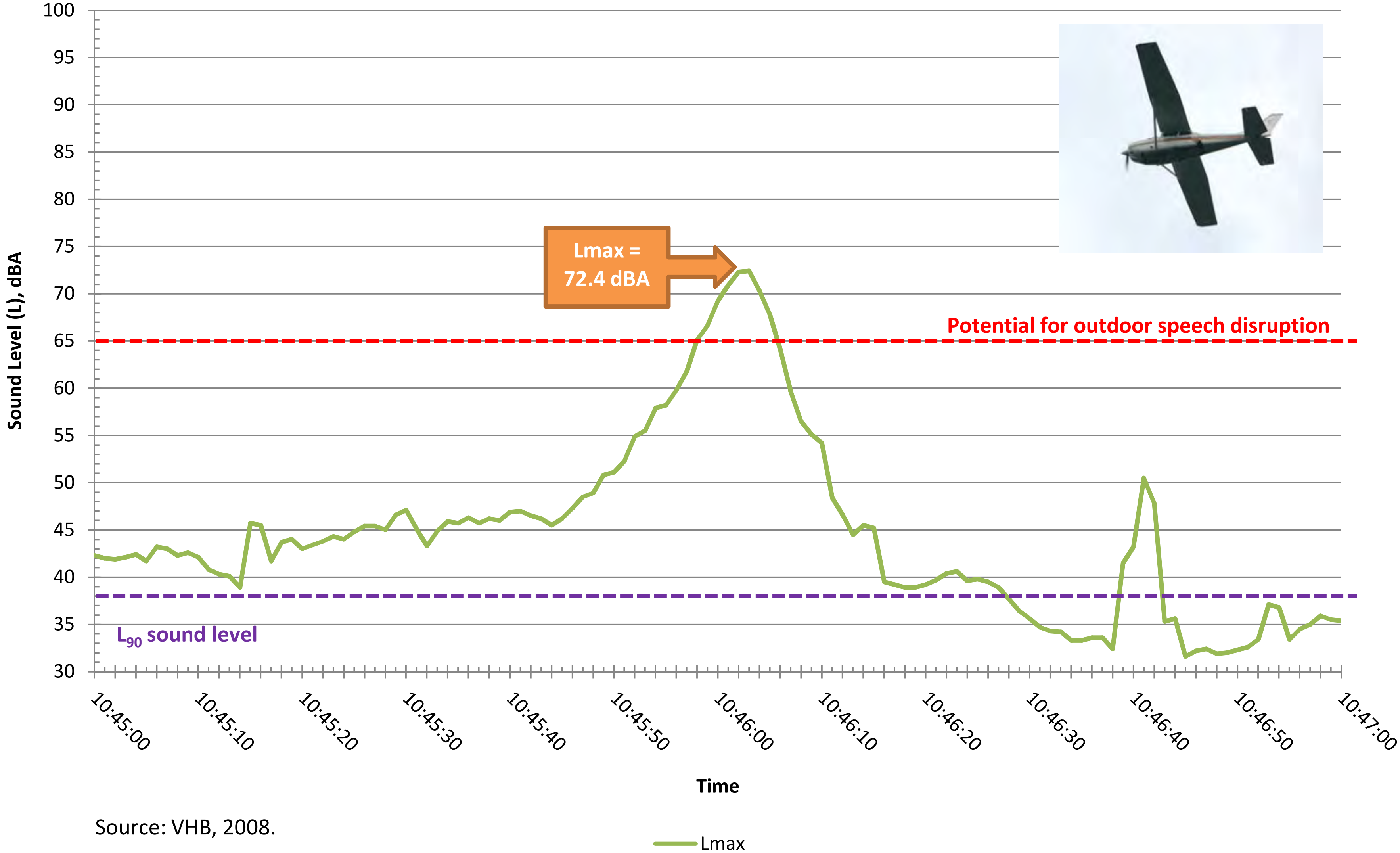
Source: VHB, 2008.

Figure E-8
Sound Level (L) of Citabria Bellanca 7GCBC Towing Banner
Links Passage (RIAC Property) Monitoring Location



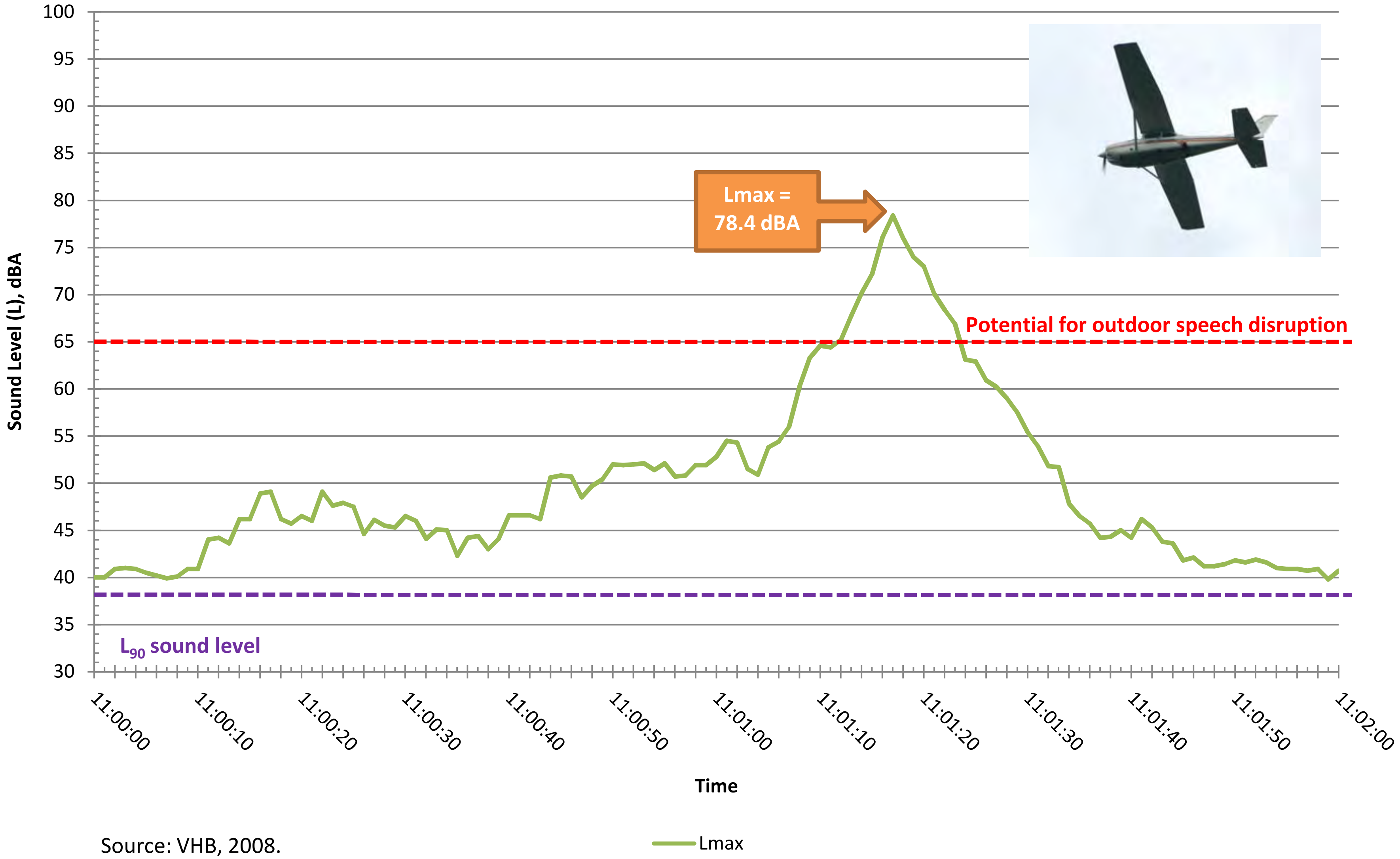
Source: VHB, 2008.

Figure E-9
Sound Level (L) of Single Engine Cessna Arriving to Runway 7
Nob Court Monitoring Location



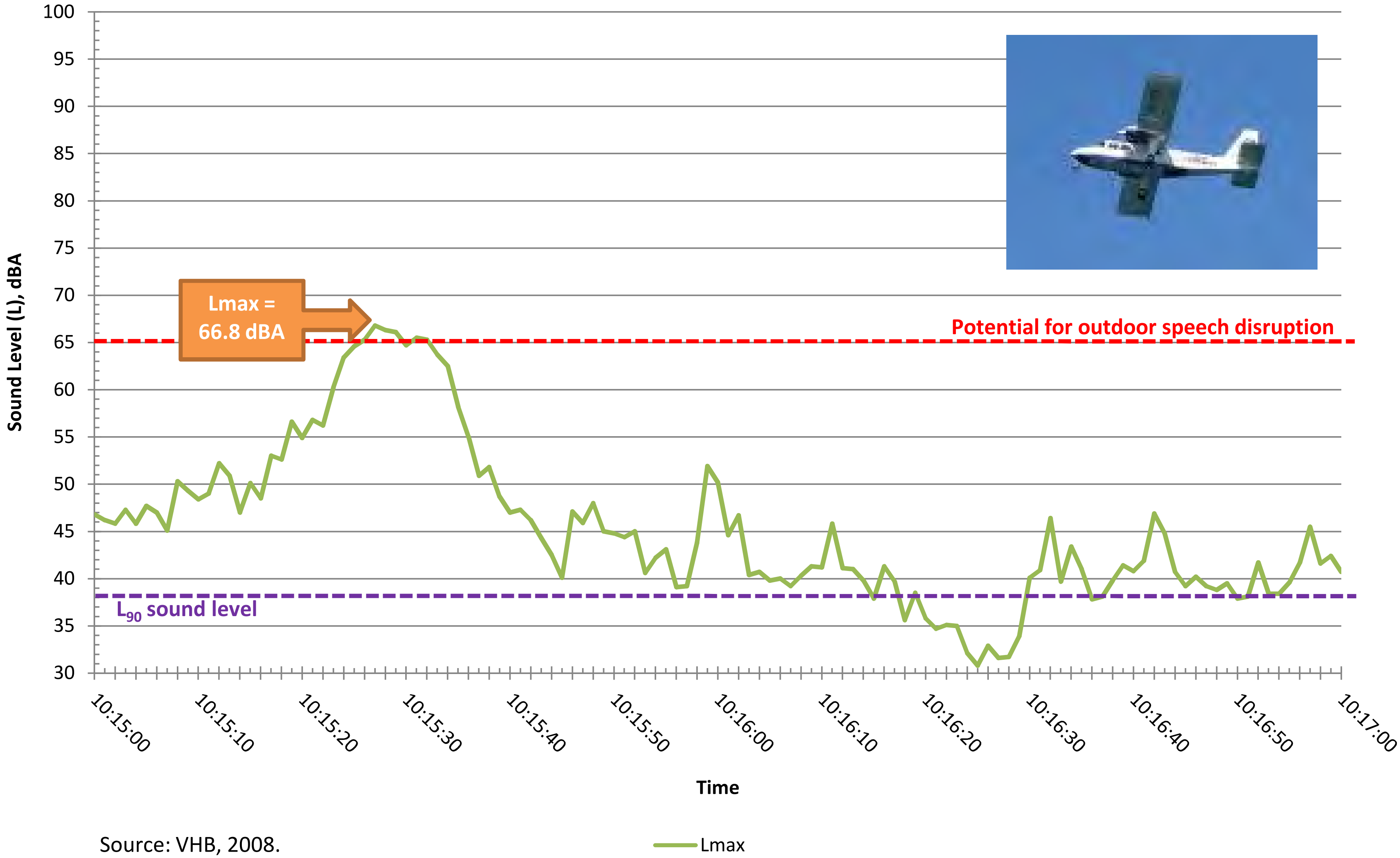
Source: VHB, 2008.

Figure E-10
Sound Level (L) of Single Engine Cessna Departing from Runway 25
Nob Court Monitoring Location



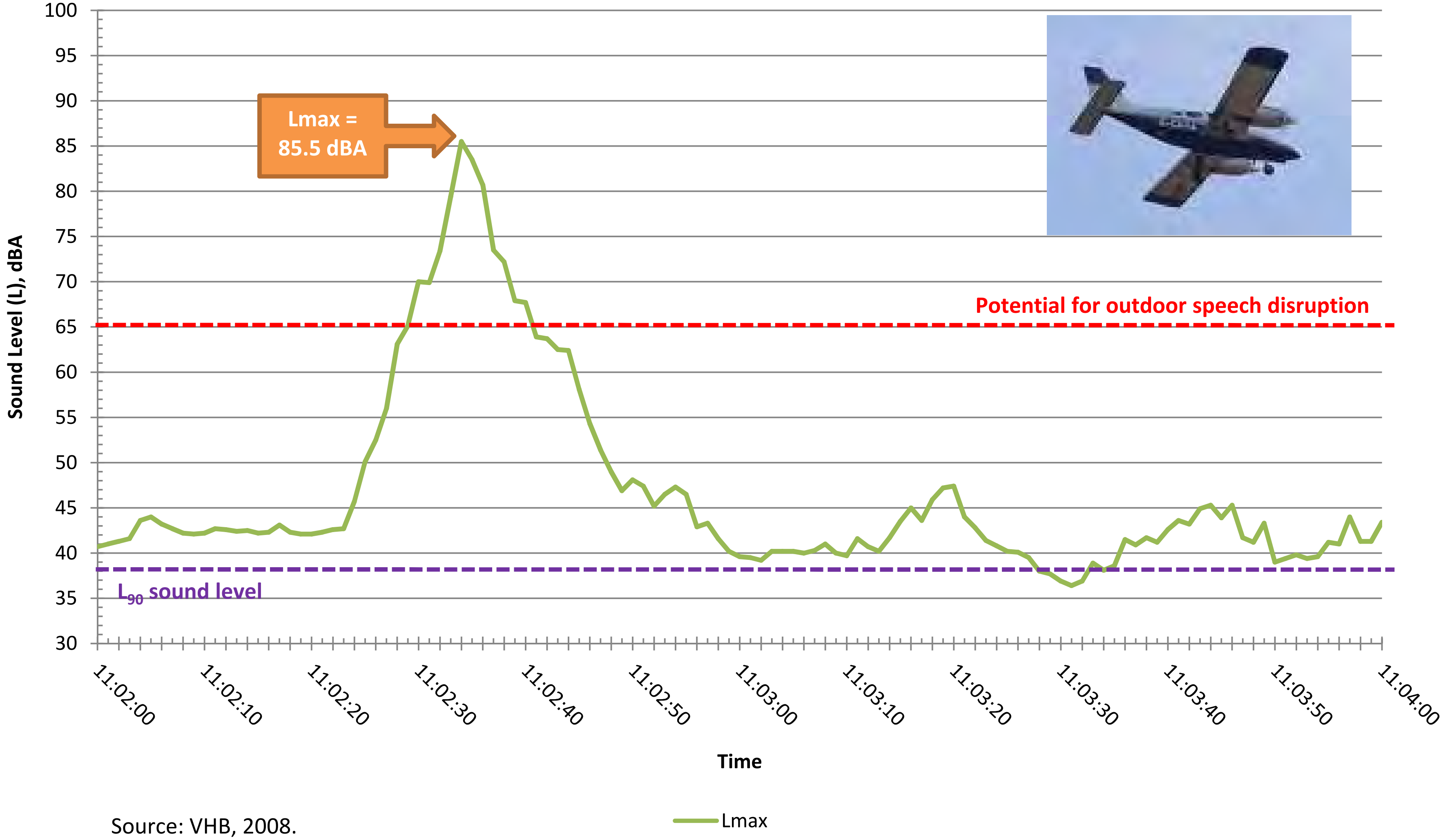
Source: VHB, 2008.

Figure E-11
Sound Level (L) of BN-2A-26 Islander Arriving to Runway 7
Nob Court Monitoring Location



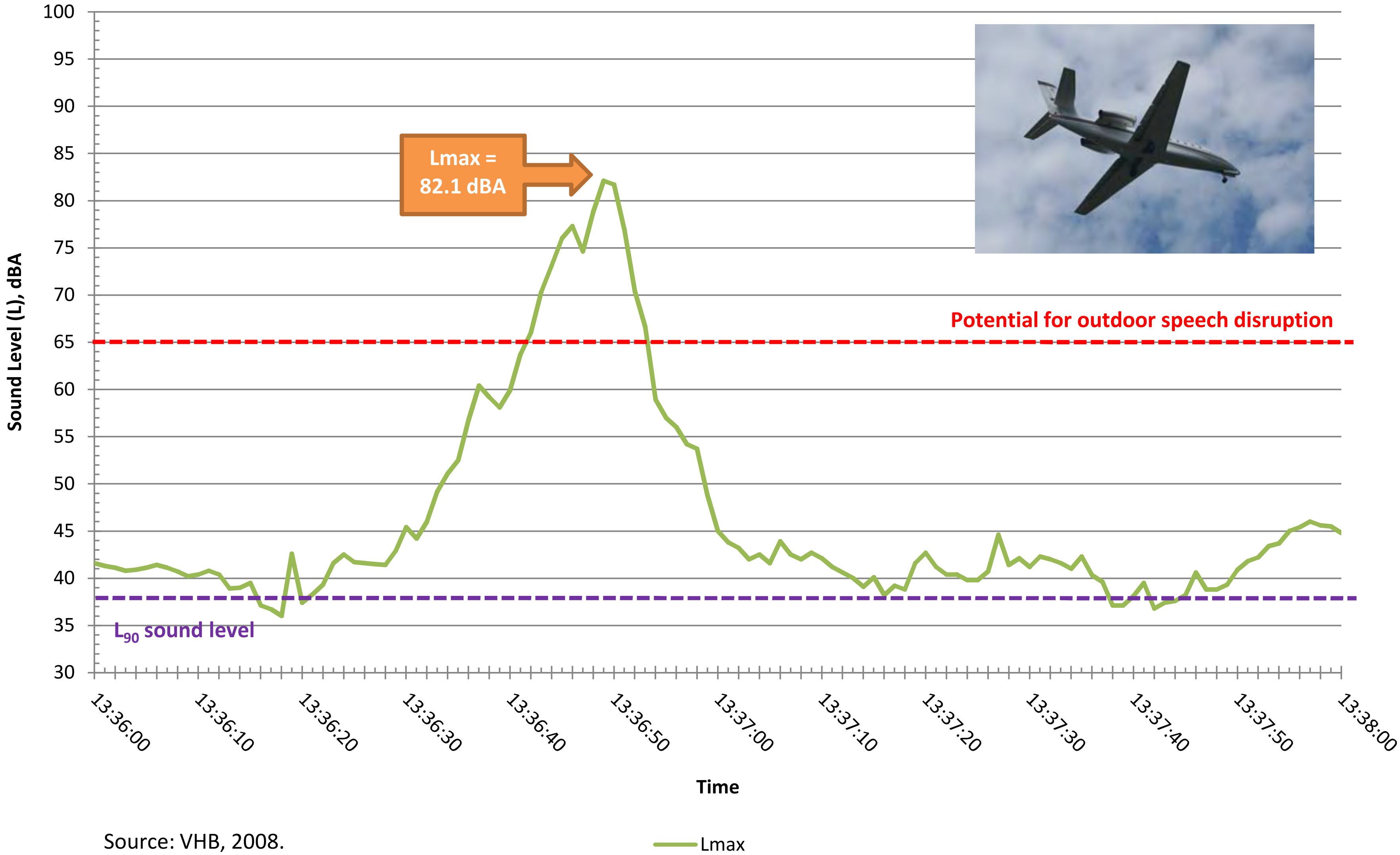
Source: VHB, 2008.

Figure E-12
Sound Level (L) of Piper Seneca Departing from Runway 25
Nob Court Monitoring Location



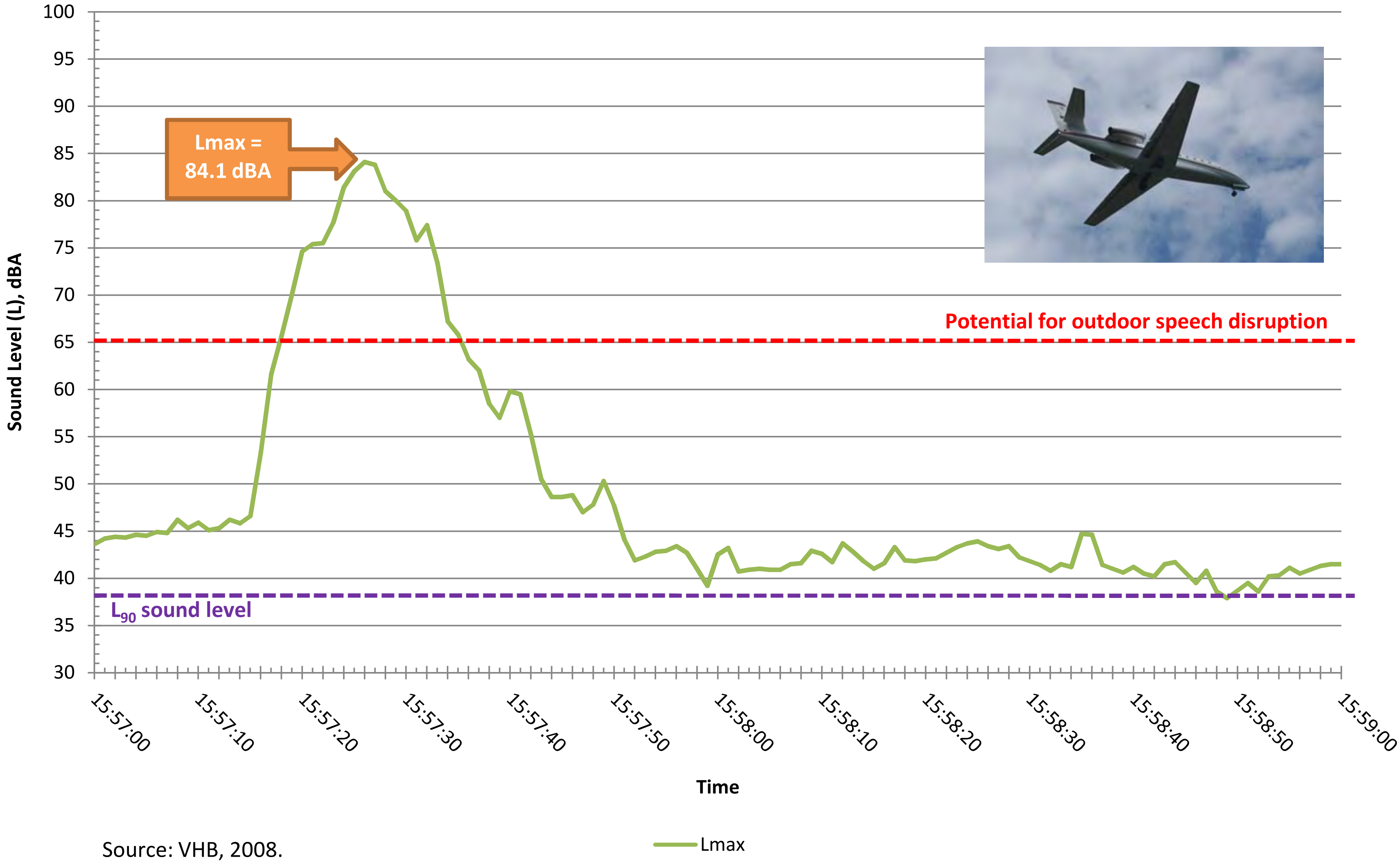
Source: VHB, 2008.

Figure E-13
Sound Level (L) of Cessna Citation Jet Arriving to Runway 7
Nob Court Monitoring Location



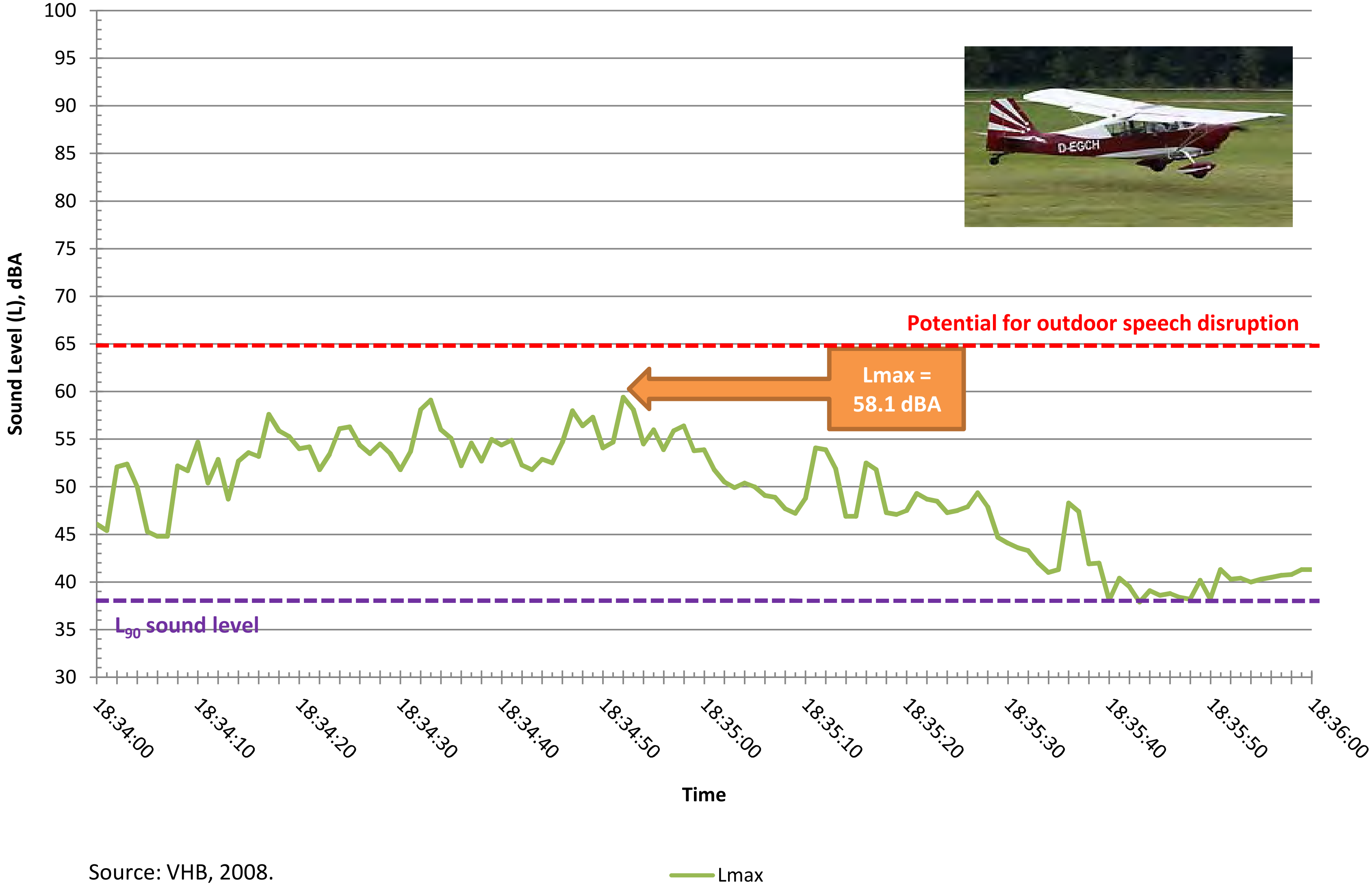
Source: VHB, 2008.

Figure E-14
Sound Level (L) of Cessna Citation Jet Departing from Runway 25
Nob Court Monitoring Location



Source: VHB, 2008.

Figure E-15
Sound Level (L) of Citabria Bellanca 7GCBC Towing Banner
Nob Court Monitoring Location



Source: VHB, 2008.

Appendix F - FAA Form 7460-1, Notice of Proposed Construction or Alteration

This page intentionally left blank

NOTICE OF PROPOSED CONSTRUCTION OR ALTERATION

§77.13 Construction or alteration requiring notice.

(a) Except as provided in §77.15, each sponsor who proposes any of the following construction or alteration shall notify the Administrator in the form and manner prescribed in §77.17:

(1) Any construction or alteration of more than 200 feet in height above the ground level at its site.

(2) Any construction or alteration of greater height than an imaginary surface extending outward and upward at one of the following slopes:

(i) 100 to 1 for a horizontal distance of 20,000 feet from the nearest point of the nearest runway of each airport specified in paragraph (a) (5) of this section with at least one runway more than 3,200 feet in actual length, excluding heliports.

(ii) 50 to 1 for a horizontal distance of 10,000 feet from the nearest point of the nearest runway of each airport specified in paragraph (a) (5) of this section with its longest runway no more than 3,200 feet in actual length, excluding heliports.

(iii) 25 to 1 for a horizontal distance of 5,000 feet from the nearest point of the nearest landing and takeoff area of each heliport specified in paragraph (a) (5) of this section.

(3) Any highway, railroad, or other traverse way for mobile objects, of a height which, if adjusted upward 17 feet for an Interstate Highway that is part of the National System of Military and Interstate Highways where overcrossings are designed for a minimum of 17 feet vertical distance, 15 feet for any other public roadway, 10 feet or the height of the highest mobile object that would normally traverse the road, whichever is greater, for a private road, 23 feet for a railroad, and for a waterway or any other traverse way not previously mentioned, an amount equal to the height of the highest mobile object that would normally traverse it, would exceed a standard of paragraph (a) (1) or (2) of this section.

(4) When requested by the FAA, any construction or alteration that would be in an instrument approach area (defined in the FAA standards governing instrument approach procedures) and available information indicates it might exceed a standard of Subpart C of this part.

(5) Any construction or alteration on any of the following airports (including heliports):

(i) An airport that is available for public use and is listed in the Airport Directory of the current Airman's Information Manual or in either the Alaska or Pacific Airman's Guide and Chart Supplement.

(ii) An airport under construction, that is the subject of a notice or proposal on file with the Federal Aviation Administration, and except for military airports, it is clearly indicated that that airport will be available for public use.

(iii) An airport that is operated by an armed force of the United States.

(b) Each sponsor who proposes construction or alteration that is the subject of a notice under paragraph (a) of this section and is advised by an FAA regional office that a supplemental notice is required shall submit that notice on a prescribed form to be received by the FAA regional office at least 48 hours before the start of construction or alteration.

(c) Each sponsor who undertakes construction or alteration that is the subject of a notice under paragraph (a) of this section shall, within 5 days after that construction or alteration reaches its greatest height, submit a supplemental notice on a prescribed form to the FAA regional office having jurisdiction over the region involved, if —

(1) The construction or alteration is more than 200 feet above the surface level of its site; or

(2) An FAA regional office advises him that submission of the form is required.

§77.15 Construction or alteration not requiring notice.

No person is required to notify the Administrator for any of the following construction or alteration:

(a) Any object that would be shielded by existing structures of a permanent and substantial character or by natural terrain or topographic features of equal or greater height, and would be located in the congested area of a city, town, or settlement where it is evident beyond all reasonable doubt that the structure so shielded will not adversely affect safety in air navigation.

(b) Any antenna structure of 20 feet or less in height except one that would increase the height of another antenna structure.

(c) Any air navigation facility, airport visual approach or landing aid, aircraft arresting device, or meteorological device, of a type approved by the Administrator, or an appropriate military service on military airports, the location and height of which is fixed by its functional purpose.

(d) Any construction or alteration for which notice is required by any other FAA regulation.

§77.17 Form and time of notice.

(a) Each person who is required to notify the Administrator under §77.13 (a) shall send one executed form set of FAA Form 7460-1, Notice of Proposed Construction or Alteration, to the Manager, Air Traffic Division, FAA Regional Office having jurisdiction over the area within which the construction or alteration will be located. Copies of FAA Form 7460-1 may be obtained from the headquarters of the Federal Aviation Administration and the regional offices.

(b) The notice required under §77.13 (a) (1) through (4) must be submitted at least 30 days before the earlier of the following dates —

(1) The date the proposed construction or alteration is to begin.

(2) The date an application for a construction permit is to be filed.

However, a notice relating to proposed construction or alteration that is subject to the licensing requirements of the Federal Communications Act may be sent to the FAA at the same time the application for construction is filed with the Federal Communications Commission, or at any time before that filing.

(c) A proposed structure or an alteration to an existing structure that exceeds 2,000 feet in height above the ground will be presumed to be a hazard to air navigation and to result in an inefficient utilization of airspace and the applicant has the burden of overcoming that presumption. Each notice submitted under the pertinent provisions of this part 77 proposing a structure in excess of 2,000 feet above ground, or an alteration that will make an existing structure exceed that height, must contain a detailed showing, directed to meeting this burden. Only in exceptional cases, where the FAA concludes that a clear and compelling showing has been made that it would not result in an inefficient utilization of the airspace and would not result in a hazard to air navigation, will a determination of no hazard be issued.

(d) In the case of an emergency involving essential public services, public health, or public safety that requires immediate construction or alteration, the 30 day requirement in paragraph (b) of this section does not apply and the notice may be sent by telephone, telegraph, or other expeditious means, with an executed FAA Form 7460-1 submitted within five (5) days thereafter. Outside normal business hours, emergency notices by telephone or telegraph may be submitted to the nearest FAA Flight Service Station.

(e) Each person who is required to notify the Administrator by paragraph (b) or (c) of §77.13, or both, shall send an executed copy of FAA Form 7460-2, Notice of Actual Construction or Alteration, to the Manager, Air Traffic Division, FAA Regional Office having jurisdiction over the area involved.

Announcement

Charting the Next Century of Flight — Federal Aviation Administration

Please send all future FAA form 7460-1 notices to the FAA's new...

EXPRESS PROCESSING CENTER

Federal Aviation Administration
Southwest Regional Office
Air Traffic Airspace Branch, ASW-520
2601 Meachan Blvd.
Fort Worth, TX 76137-4298
Phone: (817) 838-1990

Visit the FAA's new Obstruction Evaluation web site at http://oeaaa.faa.gov

INSTRUCTIONS FOR COMPLETING FAA FORM 7460-1
PLEASE TYPE or PRINT
ITEM #1. Please include the name, address, and phone number of a personal contact point as well as the company name.
ITEM #2. Please include the name, address, and phone number of a personal contact point as well as the company name.
ITEM #3. New Construction would be a structure that has not yet been built.
Alteration is a change to an existing structure such as the addition of a side mounted antenna, a change to the marking and lighting, a change to power and/or frequency, or a change to the height. The nature of the alternation shall be included in **ITEM #21** "Complete Description of Proposal". Existing would be a correction to the latitude and/or longitude, a correction to the height, or if filing on an existing structure which has never been studied by the FAA. The reason for the notice shall be included in **ITEM #21** "Complete Description of Proposal".
ITEM #4. If Permanent, so indicate. If Temporary, such as a crane or drilling derrick, enter the estimated length of time the temporary structure will be up.
ITEM #5. Enter the date that construction is expected to start and the date that construction should be completed.
ITEM #6. Please indicate the type of structure. **DO NOT LEAVE BLANK.**
ITEM #7. In the event that obstruction marking and lighting is required, please indicate type desired. If no preference, check "other' and indicate "no preference'. **DO NOT LEAVE BLANK.** *NOTE: High intensity lighting shall be used only for structures over 500'AGL.* In the absence of high intensity lighting for structures over 500' AGL, marking is also required.
ITEM #8. If this is an existing tower that has been registered with the FCC, enter the FCC Antenna Structure Registration number here.
ITEM #9. and **#10.** Latitude and longitude must be geographic coordinates, accurate to within the nearest second or to the nearest hundredth of a second if known. Latitude and longitude derived solely from **a hand-held GPS instrument is acceptable.** This data, when plotted, should match the site depiction submitted under **ITEM #20.**
ITEM #11. NAD 83 is preferred; however, latitude/longitude may be submitted in NAD 27. Also, in some geographic areas where NAD 27 and NAD 83 are not available other datums may be used. It is important to know which datum is used. **DO NOT LEAVE BLANK.**
ITEM #12. Enter the name of the nearest city/state to the site. If the structure is or will be in a city, enter the name of that city/state.
ITEM#13. Enter the full name of the nearest public-use (not private-use) airport (or heliport) or military airport (or heliport) to the site.
ITEM #14. Enter the distance **from** the airport or heliport listed in **#13 to the structure.**
ITEM #15. Enter the direction **from** the airport or heliport listed in **#13 to the structure.**
ITEM #16. Enter the site elevation above mean sea level and expressed in **whole feet** rounded to the nearest foot (e.g. 17' 3" rounds to 17', 17'6" rounds to 18'). This data should match the ground contour elevations for site depiction submitted under **ITEM #20.**
ITEM #17. Enter the total structure height **above ground level** in **whole feet** rounded to the **next highest foot** (e.g. 17'3" rounds to 18'). **The total structure height shall include anything mounted on top of the structure, such as antennas, obstruction lights, lightning rods, etc.**
ITEM #18. Enter the overall height above mean sea level and expressed in **whole feet.** This will be the total of **ITEM #16 + ITEM #17.**
ITEM #19. If an FAA aeronautical study was previously conducted, enter the previous study number.
ITEM #20. Enter the relationship of the structure to roads, airports, prominent terrain, existing structures, etc. Attach an 8-1/2" X 11" non-reduced copy of the appropriate 7.5 minute U.S. Geological Survey (USGS) Quadrangle Map MARKED WITH A PRECISE INDICATION OF THE SITE LOCATION. To obtain maps, Contact USGS at 1-888-275-8747 or via Internet at http://store.usgs.gov/. If available, attach a copy of a documented site survey with the surveyor's certification stating the amount of vertical and horizontal accuracy in feet.
ITEM #21.
- For transmitting stations, include maximum effective radiated power (ERP) and all frequencies.
- For antennas, include the type of antenna and center of radiation *(Attach the antenna pattern, if available).*
- For microwave, include azimuth relative to true north.
- For overhead wires or transmission lines, include size and configuration of wires and their supporting structures *(Attach depiction).*
- For **each** pole/support, include coordinates, site elevation, and structure height above ground level or water.
- For buildings, include site orientation, coordinates of **each** corner, dimensions, and construction materials,
- For alterations, explain the alteration thoroughly,
- For existing structures, thoroughly explain the reason for notifying the FAA *(e.g. corrections, no record of previous study, etc.).*

Filing this information with the FAA does not relieve the sponsor of this construction or alteration from complying with any other federal state or local rules or regulations. If you are not sure what other rules or regulations apply to your proposal, contact local/state aviation and zoning authorities.

Paperwork Reduction Work Act Statement: This information is collected to evaluate the effect of proposed construction or alteration on air navigation and is not confidential. Providing this information is mandatory for anyone proposing construction or alteration that meets or exceeds the criteria contained in 14 CFR , part 77. We estimate that the burden **of** this collection is an average 19 minutes per response. An agency may not conduct or sponsor, and a person is not required to respond to a collection of information unless R displays a currently valid OMB control number. The OMB control number for this collection is 2120-0001.

Please Type or Print on This Form Form Approved OMB No. 2120-0001

U.S. Department of Transportation
Federal Aviation Administration

Failure To Provide All Requested Information May Delay Processing of Your Notice

Notice of Proposed Construction or Alteration

FOR FAA USE ONLY
Aeronautical Study Number
- - -

1. Sponsor *(person, company, etc. proposing this action) :*
Attn. of: ______
Name: ______
Address: ______
______
City: ______ State: ______ Zip: ______
Telephone: ______ Fax: ______
E-mail Address: ______

2. Sponsor's Representative *(if other than #1) :*
Attn. of: ______
Name: ______
Address: ______
______
City: ______ State: ______ Zip: ______
Telephone: ______ Fax: ______
E-mail Address: ______

3. Notice of: ☐ New Construction ☐ Alteration ☐ Existing

4. Duration: ☐ Permanent ☐ Temporary (months, days)

5. Work Schedule: Beginning ______ End ______

6. Type: ☐ Antenna Tower ☐ Crane ☐ Building ☐ Power Line ☐ Landfill ☐ Water Tank ☐ Other ______

7. Marking/Painting and/or Lighting Preferred:
☐ Red Lights and Paint ☐ Dual - Red and Medium Intensity White
☐ White - Medium Intensity ☐ Dual - Red and High Intensity White
☐ White - High Intensity ☐ Other ______

8. FCC Antenna Structure Registration Number *(if applicable):*
______

9. Latitude: ______ ° ______ ' ______ . ______ "

10. Longitude: ______ ° ______ ' ______ . ______ "

11. Datum: ☐ NAD 83 ☐ NAD 27 ☐ Other ______

12. Nearest: City: ______ State: ______

13. Nearest Public-use (not private-use) or Military Airport or Heliport:
______

14. Distance from #13. to Structure: ______

15. Direction from #13. to Structure: ______

16. Site Elevation *(AMSL):* ______ **ft.**

17. Total Structure Height *(AGL):* ______ **ft.**

18. Overall height (#16. + #17.) *(AMSL):* ______ **ft.**

19. Previous FAA Aeronautical Study Number (if applicable):
______ - OE

20. Description of Location: (Attach a USGS 7.5 minute Quadrangle Map with the precise site marked and any certified survey.)

21. Complete Description of Proposal:

Frequency/Power (kW)	

Notice is required by 14 Code of Federal Regulations, part 77 pursuant to 49 U.S.C., Section 44718. Persons who knowingly and willingly violate the notice requirements of part 77 are subject to a civil penalty of $1,000 per day until the notice is received, pursuant to 49 U.S.C., section 46301 (a).

I hereby certify that all of the above statements made by me are true, complete, and correct to the best of my knowledge. In addition, I agree to mark and/or light the structure in accordance with established marking and lighting standards as necessary.

Date	Typed or Printed name and Title of Person Filing Notice	Signature