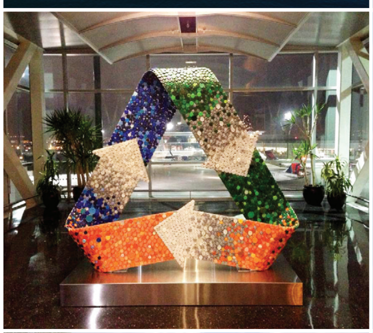
Boston-Logan International Airport

2012 / 2013 EDR

ENVIRONMENTAL DATA REPORT

December 2014

EOEA #3247

SUBMITTED TO

Executive Office of Energy and Environmental Affairs, MEPA Office

SUBMITTED BY

Massachusetts Port Authority

Strategic & Business Planning

PREPARED BY

vhb

IN ASSOCIATION WITH

Harris Miller Miller & Hanson, Inc.
KB Environmental Sciences, Inc.
SH&E, an ICF Company

Boston-Logan International Airport

2012 / 2013 EDR

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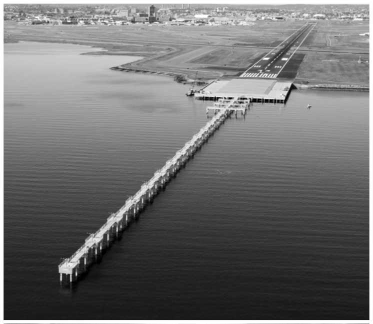

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December 1, 2014

The Honorable Maeve Vallely Bartlett, Secretary
Executive Office of Energy and Environmental Affairs
100 Cambridge Street, Suite 900
Boston, Massachusetts 02114

Re: ***Logan Airport 2012/2013 Environmental Data Report* (*2012/2013 EDR*) - EOEA #3247**

Dear Secretary Bartlett:

On behalf of the Massachusetts Port Authority (Massport), I am pleased to submit for your review, the *Boston-Logan International Airport 2012/2013 Environmental Data Report* (*2012/2013 EDR*). Logan Airport saw an overall increase in passengers and aircraft operations in 2012 and 2013. The trend of increasing activity levels at the Airport marked a continued recovery from the recent recession. Air traffic increases at Logan Airport have been driven primarily by the growth of low-cost carriers (LCCs), including JetBlue Airways and Southwest Airlines, over the past decade. In 2013, passenger levels at Logan Airport reached a new peak, exceeding the previous 2007 historic peak; while aircraft operations at Logan Airport remained well below the historic peak reached in 1998. This *2012/2013 EDR* considers the continuing effects of airlines operating much more efficiently with quieter fleets and flying more passengers per aircraft operation. While these changes continue to yield environmental benefits, as the economy and aviation industry recover, as discussed in the *2011 ESPR*, Massport anticipates increases in activity levels and some increases in environmental effect. As described throughout the *2012/2013 EDR,* Massport remains fully committed to minimizing those effects. The contents of the *2012/2013 EDR* are outlined below.

Content and Structure

The *2012/2013 EDR* responds fully to the Secretary's Certificate on the *Boston-Logan International Airport 2011 Environmental Status and Planning Report* (*ESPR)* and reports on the status of airport operations, environmental conditions, and Massport milestones achieved in 2012 and 2013. The document also provides updates on more recent significant Logan Airport planning activities. The document addresses comments made on the *2011 ESPR* and reports on the 2012 and 2013 conditions for the following environmental categories:

- Highlights for 2012 and 2013 including Logan Airport sustainability initiatives;
- Passenger levels, aircraft operations, aircraft fleets, and cargo volumes;
- Planning, design, and construction activities at Logan Airport including several Airport-wide initiatives such as the Long-Term Parking Management Plan;
- Regional transportation statistics and initiatives;
- Key environmental indicators (Ground Access, Noise Abatement, Air Quality/Emissions Reduction, and Water Quality/Environmental Compliance and Management);
- Mitigation status of Logan Airport projects;
- Secretary's Certificate on the *Boston-Logan International Airport 2011 ESPR* and other comment letters received on the *2011 ESPR*;
- Individual responses to comments received on the *2011 ESPR;*
- Proposed scope for the *2014 EDR;*
- Distribution list; and
- Supporting technical appendices (included in attached CD).

Review Period, Distribution, and Consultation

A 48-day public comment period for the *2012/2013 EDR* will begin on **December 10, 2014**, the publication date of the next Environmental Monitor, and will end on **January 27, 2015**. The distribution list included as Appendix D indicates that all parties on the distribution list will be sent a digital copy of the *2012/2013 EDR* on CD. A smaller number of reviewers will be sent hard copies of the *2012/2013 EDR*. The full *2012/2013 EDR* will also be available on Massport's website (www.massport.com).

A MEPA consultation session on the *2012/2013 EDR* is scheduled for **January 13, 2015 at 4:00 PM**, at the Logan Office Center, One Harborside Drive, East Boston (Logan Airport). Additional copies of the *2012/2013 EDR* may be obtained by contacting Lisa Carisella at (617) 568-3507 or lcarisella@massport.com during the 48-day public comment period.

Future Filings and Timing

Starting in 1997, Massport followed a five-year filing cycle for the *EDRs* and *ESPRs*, with EDRs being filed for each year between the ESPRs. While the last Logan ESPR was filed for calendar year 2011, with approval from the Secretary, this *2012/2013 EDR* was deferred to report on 2012 and 2013 conditions and will be filed on December 1, 2014. As with previous EDRs, the document provides a snapshot of annual conditions and reports on planning studies that form the foundation of our long-range environmental analysis. Reporting on 2012 and 2013 data allowed Massport to analyze trends as the economy continues to rebound from the 2008/2009 economic recession. A summary of 2012 conditions was posted on Massport's website in May 2013. Massport proposes to return to a single EDR format for reporting on calendar year 2014. The *2014 EDR* will be filed in late 2015.

Massport hopes that you and other reviewers of the *2012/2013 EDR* find it informative and complete. We look forward to your review of this document and to close consultation with you and other reviewers in the coming weeks. Please feel free to contact me at (617) 568-3524, if you have any questions.

Very truly yours,

Stewart Dalzell
Deputy Director, Strategic and Business Planning

cc: *2012/2013 EDR* Distribution List (Appendix D in the *2012/2013 EDR*)
Betty Desrosiers, Tom Ennis/Massport

Table of Contents

List of Appendices

List of Tables

List of Figures

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1

Introduction/ Executive Summary

Introduction

Boston-Logan International Airport (Logan Airport or Airport), owned and operated by the Massachusetts Port Authority (Massport), is New England's primary international and domestic airport. This *2012/2013 Environmental Data Report (EDR)* is one in a series of annual environmental review documents submitted to the Massachusetts Environmental Policy Act (MEPA)[1] Office since 1989 to report on the cumulative environmental effects of Logan Airport's operations and activities. Approximately every five years, Massport prepares Environmental Status and Planning Reports (ESPRs), which provide an historical and prospective view of Logan Airport. EDRs, prepared annually in the intervals between ESPRs, provide a review of environmental conditions for the reporting year compared to the previous year. This *2012/2013 EDR* follows the *2011 ESPR* and combines two calendar year EDRs into one document and reports on 2012 and 2013 conditions. Key data from 2012 have been available on Massport's website since May 2013.[2]

The scope for this *2012/2013 EDR* was established by the Secretary of the Executive Office of Energy and Environmental Affairs' (EEA) Certificate dated June 14, 2013, which is included in *Appendix A, MEPA Certificates and Responses to Comments*. This *2012/2013 EDR* updates and compares the data presented in the *2011 ESPR*, and presents activity levels (including aircraft operations and passenger activity) and environmental conditions at Logan Airport for calendar years 2012 and 2013. To enhance the usefulness of this *2012/2013 EDR* as a reference document for reviewers, this report also presents historical data on the environmental conditions at Logan Airport dating back to 1990 in instances where historical information is available. Historical data are included in the technical appendices (CD only).

1 Massachusetts General Laws Chapter 30, Sections 61-62H. MEPA is implemented by regulations published at 301 Code of Massachusetts Regulations (CMR) 11.00 (the "MEPA Regulations").
2 https://www.massport.com/media/238628/2012_Website-Report.pdf

EOEA # 3247

Submitted By

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Logan Airport Environmental Review Process

This *2012/2013 EDR* is part of a two-decade-long, state-level environmental review process that assesses Logan Airport's cumulative environmental impacts. The process provides a context against which individual Airport projects meeting state and federal environmental review thresholds are evaluated on a project-specific basis. The Airport-wide and project-specific environmental review processes are described below.

Historical Context for the Logan Airport EDR/ESPR

In 1979, the Secretary of the Executive Office of Environmental Affairs (EOEA) (now EEA) issued a Certificate requiring Massport to define, evaluate, and disclose, every three years, the impact of long-term growth at the Airport through a Generic Environmental Impact Report (GEIR). The Certificate also required interim Annual Updates to provide data on conditions for the years between the GEIRs. The GEIR evolved into an effective planning tool for Massport and provided projections of environmental conditions so that the cumulative effects of individual projects could be evaluated within a broader context.

EEA eliminated GEIRs following the 1998 revisions to its MEPA Regulations. However, the Secretary's Certificate on the 1997 Annual Update[3] proposed a revised environmental review process for Logan Airport resulting in Massport's preparation of subsequent EDRs/ESPRs. The more comprehensive ESPRs provide a long-range analysis of projected operations and passengers while EDRs are prepared annually to provide review of environmental conditions for the reporting year compared to the previous year. In the last several years, aircraft operations and passenger activity levels and associated environmental effects have remained well below levels previously analyzed for Logan Airport. Thus, the forecasted aviation growth presented in the *2004 ESPR*, the predicate upon which the ESPR schedule was initially established, has not occurred. Accordingly, with the approval of the Secretary, Massport prepared *2009* and *2010 EDRs* in lieu of the *2011 ESPR*. The *2011 ESPR*, filed in early 2013, reported on calendar year 2011 updated passenger activity level and aircraft operations forecasts.

This *2012/2013 EDR* provides a comprehensive, cumulative analysis of the effects of all Logan Airport activities based on actual passenger activity and aircraft operation levels in 2012/2013 and presents environmental management plans for addressing areas of environmental concern. Massport proposes to prepare a *2014 EDR* and a *2015 EDR* to report on activity levels and environmental conditions in those years. The next anticipated

3 Certificate of the Secretary of the Executive Office of Environmental Affairs on the Logan Airport 1997 Annual Update, issued on October 16, 1998.

ESPR will report on calendar year 2016. The *2016 ESPR* will report on updated passenger activity levels and aircraft operations forecasts. Where appropriate, Massport will continue to identify and address any longer-term aviation and environmental trends in either EDRs or ESPRs.

Project-Specific Review

While this Airport-wide review provides the broad planning context for proposed projects and future planning concepts, Airport projects are also subject to a project-specific, public environmental review process when state environmental review thresholds are met. When required, Massport and Airport tenants submit Environmental Notification Forms (ENFs) and Environmental Impact Reports (EIRs) pursuant to MEPA. Similarly, where National Environmental Policy Act (NEPA)[4] environmental review is triggered, projects are reviewed under the Federal Aviation Administration (FAA) environmental review process.

Overview of Logan Airport

Logan Airport is New England's primary domestic and international airport, operating as an origin-destination airport, rather than a connecting hub for major airlines. The Airport plays a key role in the metropolitan Boston and New England passenger and freight transportation networks and is a significant contributor to the regional economy. In 2013, Logan Airport employed approximately 12,000 people. This included approximately 960 Massport airport staff and administration employees in 2013[5]. The Massachusetts Department of Transportation (MassDOT) Aeronautics Division's Statewide Airport Economic Impact Study found that in 2010, Logan Airport supported over 94,000 jobs in Massachusetts and the total economic impact was estimated at approximately $8.9 billion per year. The total economic impact includes on-Airport, visitor-related, construction, and all associated multiplier impacts.[6] In 2012, Logan Airport was the 23rd busiest commercial aviation facility in North America ranked by aircraft operations, and the 20th busiest in North America ranked by number of passengers.[7] In 2013, Logan Airport was the 21st busiest commercial aviation facility in North America ranked by aircraft operations, and remained the 20th busiest in North America ranked by number of passengers.[8]

The Airport boundary encompasses approximately 2,400 acres in East Boston and Winthrop, including 700 acres underwater in Boston Harbor. Logan Airport, shown in Figures 1-1 and 1-2, is one of the most land-constrained airports in the nation, and is surrounded on three sides by Boston Harbor.

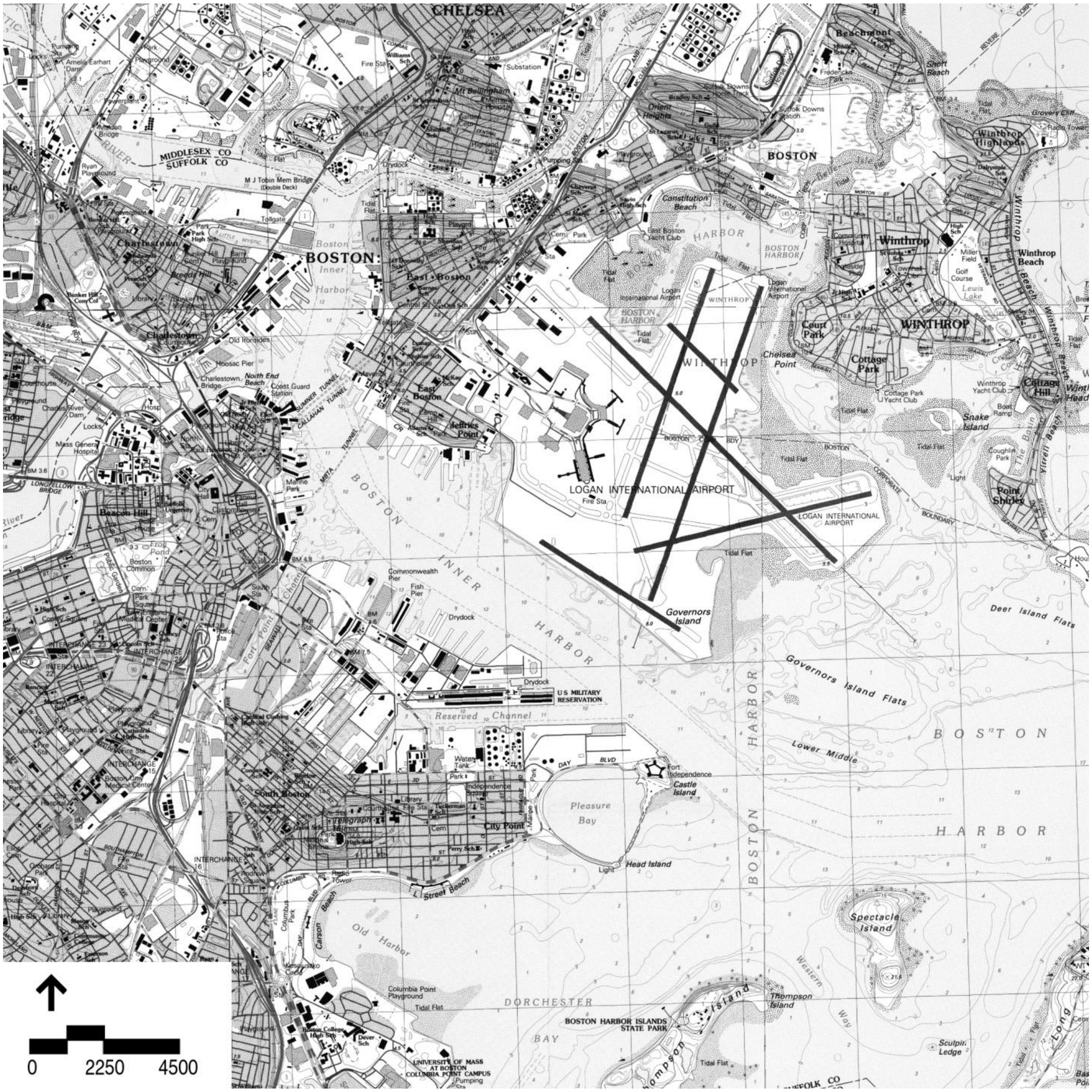
Logan Airport is close to downtown Boston and is accessible by two public transit lines and a well-connected roadway system. The airfield comprises six runways, approximately 15 miles of taxiway, and approximately 240 acres of concrete and asphalt apron. Logan Airport has four passenger terminals (Terminal A, B, C, and E), each with its own ticketing, baggage claim, and ground transportation facilities. Massport continues to evaluate and implement enhancements to Logan Airport's security, operational efficiency, and accessibility to and from the Boston metropolitan area, while carefully monitoring the environmental effects of Logan Airport operations.

4 42 USC Section 4321 et seq. The Federal Aviation Administration implements NEPA through Federal Aviation Administration Order 1050.1E, Environmental Impacts: Policies and Procedures, Federal Aviation Administration, United States Department of Transportation, Effective Date: March 20, 2006.
5 Massport Comprehensive Financial Report, 2015
6 MassDOT Statewide Airport Economic Impact Study, December 20, 2011.
7 ACI-NA Airport Traffic Reports 2012 at http://www.aci-na.org/content/airport-traffic-reports accessed September 2014.
8 Ibid.

Figure 1-1 Aerial View of Logan Airport

Source: Aerial photo, Massport, 2012.

Figure 1-2 Logan Airport and Environs



Source: U.S. Geological Service.

2012/2013 Highlights and Accomplishments

This section provides a brief overview of key events and accomplishments at Logan Airport in 2012 and 2013. Additional information concerning Airport activities is provided in subsequent chapters. Massport's efforts to further sustainability through specific projects and initiatives are highlighted with a sustainability leaf.

Activity Levels

Highlights in aviation activity at Logan Airport in 2012 and 2013 include:

- The total number of air passengers at Logan Airport increased by 1.1 percent to 29.2 million in 2012 and by 3.4 percent to 30.2 million in 2013, compared to 28.9 million in 2011 (see Figure 1-3 and Table 1-1). The 2013 passenger level represents a new record high for Logan Airport.
- The total number of aircraft operations[9] fell from approximately 368,987 in 2011 to 354,869 in 2012, a decrease of 3.8 percent. In 2013, aircraft operations increased by 1.8 percent to 361,339. Despite the increase, aircraft operations at Logan Airport remained well below the 487,996 operations accommodated in 2000 and the historic peak of 507,449 operations reached in 1998. Passenger aircraft operations, which accounted for 91 percent of total aircraft operations, increased by 2.4 percent in 2013 after decreasing by 3.9 percent in 2012, compared to 2011 levels.
- General aviation[10] (GA) operations, which accounted for 7 percent of total operations in 2013, decreased by 0.4 percent in 2012 and by 5.1 percent in 2013. This marked a contraction in GA activity after the rebound that occurred in 2010/2011 following the economic downturn. The 26,682 GA operations in 2013 remain well below the 35,233 GA operations that Logan Airport handled in 2000. GA aircraft cannot be based at Logan Airport; these aircraft can currently be based at Hanscom Field and Worcester Regional Airport.
- Airline efficiency continued to increase as the average number of passengers per aircraft operation increased from 78.3 in 2011 to 82.4 in 2012 and 83.6 in 2013. The average number of passengers per aircraft operation in 2012 and 2013 represented approximately 74 percent of average aircraft seat capacity. At Logan Airport, the increasing number of passengers per flight reflects a shift away from smaller aircraft and rising load factors as airlines have reduced or restricted capacity growth after several airline mergers.
- JetBlue Airways is Logan Airport's largest carrier. JetBlue Airways continued to expand, often backfilling markets dropped by others, at Logan Airport. JetBlue increased its total operations by 15.0 percent in 2013, following growth of 8.1 percent in 2012. In 2013, JetBlue Airways accounted for 24.1 percent of total aircraft operations and 26.8 percent of total air passengers at Logan Airport.

9 An aircraft operation is defined as one arrival or one departure.
10 General Aviation is defined as all aviation activity other than commercial airline and military operations.

- Legacy air carriers (such as Delta Air Lines, American Airlines/US Airways, and United Airlines) maintained or reduced operations levels, while low-cost carriers (LCCs) increased operations. Legacy carriers continued to reduce domestic operations slightly in 2012 and 2013, eliminating less profitable routes. In contrast, LCC operations have steadily increased. LCCs accounted for 33.5 percent of domestic operations at Logan Airport in 2012 and 35.7 percent in 2013, compared to 32.6 percent in 2011. In 2003, LCCs accounted for 9.0 percent of operations (prior to JetBlue Airways' entry), and just 2.9 percent of operations in 2000.
- Air cargo volumes, including shipments transported in the belly compartments of passenger aircraft, decreased from 562 million pounds in 2011 to 553 million pounds in 2012, a decline of 1.4 percent compared to 2011. Over the same period, all-cargo aircraft operations[11] fell by 16.5 percent to 5,237 million pounds. All-cargo aircraft operations fell at a faster rate than cargo volumes, as all-cargo airlines introduced larger capacity aircraft into service at Logan Airport. In 2013 air cargo volumes increased by 0.8 percent to 558 million pounds and all-cargo operations increased by 3.2 percent to 5,403 million pounds, compared to 2012. Additional information is provided in *Chapter 2, Activity Levels.*

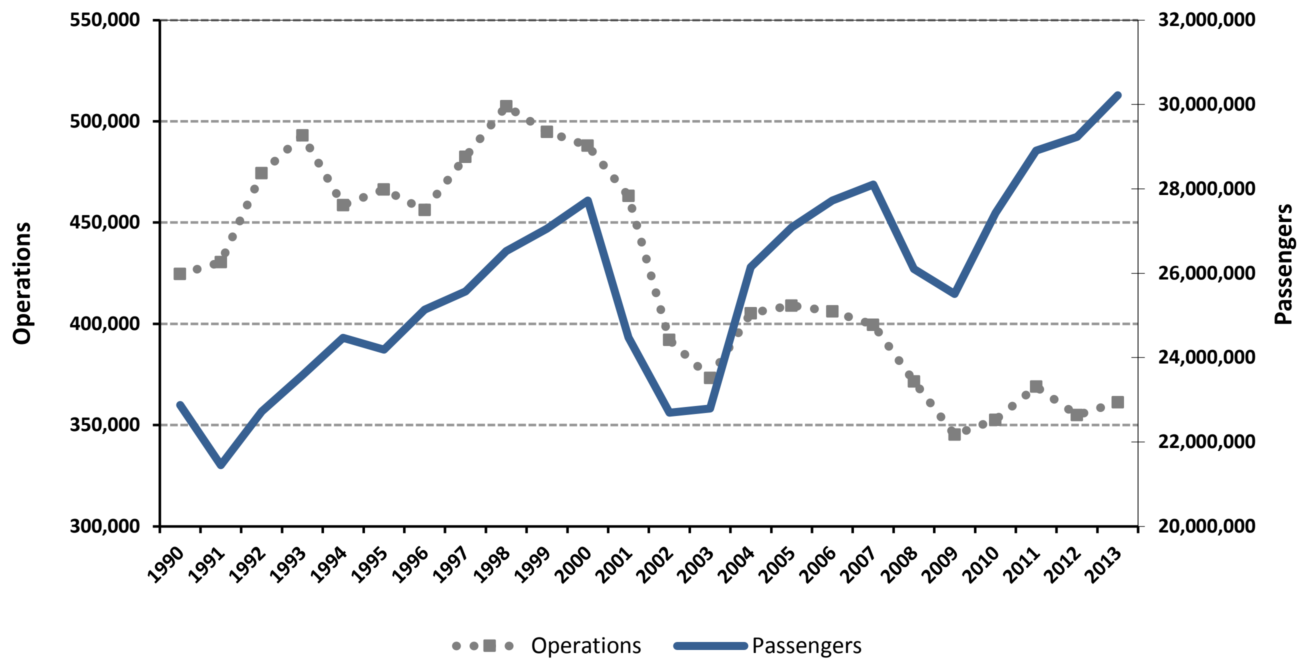
Table 1-1 Air Passengers, Aircraft Operations, and Cargo and Mail Volume, 1990, 2000, and 2009 to 2013

	1990	2000	2009	2010	2011	2012	2013	Percent Change (2011-2012)	Percent Change (2012-2013)	Avg. Annual Growth (2009-2013)
Air Passengers by Market Segment										
Domestic	19,519,247	23,100,645	21,767,086	23,688,471	24,579,780	24,743,008	25,578,080	0.7%	3.4%	4.1%
International	3,358,944	4,513,192	3,696,336	3,681,739	4,215,071	4,383,945	4,546,018	4.0%	3.7%	5.3%
General Aviation	N/A	2,948,542	48,664	58,752	114,416	109,134	94,872	(4.6%)	(13.1%)	18.2%
Total Passengers	22,878,191	27,726,833	25,512,086	27,428,962	28,909,267	29,236,087	30,218,970	1.1%	3.4%	4.3%
Aircraft Operations by Market Segment										
Total Aircraft Operations	424,568	487,996	345,306	352,643	368,987	354,869	361,339	(3.8%)	1.8%	1.1%
Total Passenger Operations	N/A	440,481	326,406	331,687	334,487	321,518	329,254	(3.9%)	2.4%	0.2%
Total GA Operations	24,976	35,233	12,242	14,682	28,230	28,114	26,682	(0.4%)	(5.1%)	21.5%
Total Cargo Operations	N/A	12,282	6,658	6,274	6,270	5,237	5,403	(16.5%)	3.2%	(5.1%)
Cargo and Mail Volume (lbs.)										
Total Volume	753,253,075	1,047,259,667	546,359,548	572,283,608	561,518,356	553,377,736	557,600,528	(1.4%)	0.8%	0.5%

Source: Massport.
N/A Not available

11 An all-cargo aircraft is defined as a dedicated air cargo aircraft that is used exclusively to transport air cargo and not passengers.

Figure 1-3 Historical Passenger and Operations Activity Levels at Logan Airport, 1990-2013



Source: Massport.

Planning

Massport has several on-going planning initiatives for both Massport facilities in general and specifically for Logan Airport. The status of Logan Airport planning projects and efforts in 2012 and 2013 is described below.

Airport Projects

- **Southwest Service Area (SWSA) Redevelopment Program (EEA 14137).** Consolidation of rental car operations and associated shuttle bus service into a single coordinated shuttle bus fleet operation resulted in customer service improvements, reduced vehicle miles traveled (VMT) and associated emission reductions, and stormwater system enhancements. In 2010, construction began on the new Rental Car Center (RCC), and rental car and bus operations began in the centralized facility on September 25, 2013. Work remaining includes constructing quick turnaround areas, a permanent taxi pool, bus, and limousine pools, and the SWSA edge buffer. The status of mitigation efforts for the RCC is provided in *Chapter 9, Project Mitigation Tracking*. The RCC is eligible for Leadership in Energy and Environmental Design (LEED) ® Silver certification.

- **Logan Airport Runway Safety Area (RSA) Improvements Project at Runway Ends 33L and 22R (EEA 14442).** Construction of the Runway 33L RSA improvements commenced in June 2011 and was completed ahead of schedule in November 2012. The Runway 22R RSA improvements are planned to be completed by the end of 2014. The status of mitigation for the RSA projects is provided in *Chapter 9, Mitigation Tracking*. As of this filing, mitigation efforts associated with Runway 33L and Runway 22R safety improvements are underway.

- **Logan Airport Runway 33L Light Pier Replacement Project (EEA 14442).** In January 2012, Massport submitted a Notice of Project Change for the RSA Project (noted above) to include full replacement of the Runway 33L Light Pier, including all sections not already replaced by the Runway 33L RSA Project. All local, state, and federal permits were secured in 2012 and the replacement was completed in November 2012 coinciding with the completion of the Runway 33L RSA project. As part of this project, the Runway 33L Instrument Landing System approach, originally approved in the Airside Improvements Planning Project, was upgraded from Category I to Category III. Reduction in approach minimums on Runway 33L was implemented in 2013 following the completion of the Runway 33L Light Pier replacement and FAA testing of new ILS equipment.
- **Green Bus Depot (EEA 14629).** Design of a bus maintenance facility for Massport's clean fuel fleet buses in the North Service Area (NSA) began in 2009. The Green Bus Depot helps to minimize bus traffic on local neighborhood streets by serving as a central location for bus maintenance on Airport property rather than traveling for service at the off-site bus maintenance location in Chelsea. The Green Bus Depot is used to maintain the expanded clean fuel shuttle bus fleet that replaced Logan Airport's compressed natural gas (CNG) bus fleet and the rental car company diesel shuttle buses. Construction was completed in September 2012 and the facility is now in operation. The Green Bus Depot received LEED Silver certification in 2014.
- **Martin A. Coughlin (East Boston-Chelsea) Bypass Project (EEA 14661).** The Bypass is a limited-access roadway between Logan Airport and the new Chelsea Street Bridge. The Bypass roadway is designed to improve commercial vehicle access to the Airport, as well as reduce congestion on local East Boston streets in the vicinity of Day Square, Eagle Square, and the Neptune Road corridor by directing Airport-related commercial traffic to the new Bypass roadway. Construction was substantially completed in November 2012 when the roadway was opened. The road was named the "Martin A. Coughlin" Bypass Road for the late Martin A. Coughlin, an East Boston resident. The project includes the use of high efficiency light-emitting diode (LED) lighting and incorporates bio-swales for stormwater retention and drainage.
- **Renovations and Improvements at Terminal B.** This project includes renovations to Terminal B, Pier A. By modifying and expanding existing facilities to meet airlines' needs and providing a connection between Piers A and B, the project improves and simplifies the passenger traveling experience. The renovations include new ticket counters, a modified and enlarged passenger checkpoint, reconfigured departure lounges, concessions, new inbound and outbound baggage system, and a new airline club. With initial renovations that began in June 2012, the project came on-line on April 30, 2014.
- **Terminal B Garage Improvement Project.** Terminal B Garage repair and rehabilitation was completed in March 2012. In addition to overall upgrades, sustainable features were also installed, including 32 solar modules (200 kilowatt [kW]) on the top floor, high efficiency LED lighting throughout the garage, and two rainwater harvesting collection tanks to store and later re-use stormwater. The project also included enhanced curbside passenger drop-off and curbside operations.
- **North Service Area Roadway Corridor Project.** The NSA Roadway Corridor extends approximately from the State Police building up to and including Neptune Road. This corridor improvement project was intended to unify the existing roadway with new landscape and urban design elements along this highly visible roadway corridor, providing an important public edge along the corridor. Massport has located the WindWheels Sculpture by William Wainwright to a parcel southwest of Neptune Road. Construction of the NSA Roadway Corridor Project began in 2010 and was completed in the spring of 2012.

- **Greenway Connector Project.** The Greenway Connector is a pedestrian/bicycle path connecting the Bremen Street Park path to the future City of Boston pedestrian/bicycle path that begins at the Greenway Overlook and continues to Constitution Beach. The Greenway and the City of Boston Link provides a continuous pedestrian/bicycle path from Piers Park to Constitution Beach. Construction of the Greenway Connector began in spring 2013 and was completed in July 2014.
- **Hangar Upgrade Projects.** Architectural design commenced in December 2010 for two hangar upgrades in the North Cargo Area. The renovated JetBlue Airways hangar opened in 2012. The American Airlines hangar, formerly occupied by Northwest Airlines, was refurbished in 2013. Planning for demolition of the former American Airlines hangar (Hangar 16) commenced in late 2013.
- **Parking Consolidation Project.** Massport is planning the construction of structured and surface parking spaces that will consolidate 2,050 temporary parking spaces as part of an addition to the West Garage and other surface locations, to be confirmed. The West Garage addition is atop the existing Hilton Hotel parking lot. The project will incorporate sustainable design and resiliency elements. The project will be in full compliance with the Logan Airport Parking Freeze. The consolidation is expected to be completed before 2017.

Planning Inititiaves

- **Strategic Planning**. Massport is conducting a strategic planning initiative that will position the Authority's aviation, maritime, and real estate lines of business, and its administrative support structures and workforce to meet the region's 21st century transportation and economic development challenges. The strategic planning initiative's primary goal is to formulate a vision for Massport as a transportation and economic development engine for the Commonwealth of Massachusetts focusing on the horizon years of 2022 and beyond. The strategic planning effort is expected to be completed in 2014.
- **Resiliency Planning.** At the end of 2013, Massport initiated the Disaster and Infrastructure Resiliency Planning (DIRP) Study for Logan Airport, the Port of Boston, and Massport's waterfront assets in South and East Boston. The DIRP Study includes a hazard analysis, modeling sea-level rise and storm surge, and projections of temperature and precipitation and anticipated increases in extreme weather events. The DIRP Study will make recommendations regarding short-term adaptation strategies to make Massport's facilities more resilient to the likely effects of climate change. The study is nearing completion and a Request for Proposals for implementing recommendations was issued in September 2014.
- **Logan Airport Sustainability Management Plan (SMP).** In 2013, Massport was awarded a grant by the FAA to prepare an SMP for Logan Airport. The Logan Airport SMP planning effort began in May 2013, and is expected to be completed in 2015. The Logan Airport SMP takes a broad view of sustainability including economic vitality, social responsibility, operational efficiency, and natural resource conservation considerations. The Logan Airport SMP is intended to promote and integrate sustainability department-wide, coordinate on-going efforts within and across departments, develop a framework with targets to show progress over time, formulate a list of prioritized initiatives, and engage employees and tenants. A baseline data assessment was completed in winter 2014 to assess current sustainability performance at the Airport. The focus areas of the Logan Airport SMP include energy efficiency/greenhouse gas reduction, water conservation, waste management and recycling, and the well-being of employees and the community.

- **Long-Term Parking Management Plan.** As referenced in the June 14, 2013, Secretary's Certificate on the *2011 ESPR* (*Appendix A, MEPA Certificates and Responses to Comments*), Massport is in the process of developing a long-term parking management plan for Logan Airport. The Long-Term Parking Management Plan lays out a multi-part strategy for efficiently managing parking supply, pricing, and operations – both at Logan Airport and at Massport-controlled off-Airport locations –to maximize transit/shared-ride ground access while minimizing both drive-and-park and pick-up/drop-off modes. Key elements of the plan include:
  - **Managing parking supply** by adding revenue-controlled parking spaces in the terminal area at Logan Airport to bring supply up to the maximum number of spaces allowed under the Parking Freeze. At the same time, Massport is working to increase the supply of Massport-controlled off-Airport parking at Logan Express sites.
  - **Managing Parking Pricing** with a pricing policy designed to discourage air passengers from driving and parking at Logan Airport.
  - **Managing Employee Parking** by continuing to reduce the number of Airport employees commuting by private automobile and parking at the Airport, by providing off-Airport parking both near Logan Airport and at Logan Express sites, as well as by implementing measures to enhance employee commuting options.
  - **Managing Parking Operations** to improve the efficiency of its current system of addressing overflow conditions.

Massport is actively working to manage Airport parking. At the same time Massport is working hard to promote many options to access Logan Airport other than single occupant vehicles. Additional measures are currently under discussion as part of Massport's strategic planning efforts. The Long-Term Parking Management Plan is included in *Appendix G, Ground Access.*

Additional information on planning activities is provided in *Chapter 3, Airport Planning.*

Regional Transportation

Highlights for the regional airports and the status of long-range regional transportation planning efforts in the region which are relevant to Massport's three airports as well as the regional transportation network are provided below.

- The New England region is anchored by Logan Airport and a system of 10 other commercial service, reliever, and GA airports[12] (regional airports). Together, these 11 airports accommodate nearly all of New England's air travel demand. Logan Airport serves a major domestic origin and destination market and acts as the primary international gateway for the region. The region is also served by Amtrak which connects Boston to the New York/Washington DC metropolitan area to the south and Portland, ME to the north.

12 The *New England Regional Airports Air Passenger Service Study* (Federal Aviation Administration, 1995) defined the Bradley International, T.F. Green, Manchester- Boston Regional, Portland International Jetport, Bangor, Burlington, Worcester Regional, and Tweed-New Haven Airports as the region's principal commercial airports, other than Logan Airport, since all of these airports either supported or had previously supported commercial jet passenger services. Subsequently, in 1999, limited commercial passenger service was introduced at Hanscom Field and at Portsmouth International Airport, though neither airport has been able to sustain commercial airline services over the long-term. These 11 airports are included in the *New England Regional Airport System Plan Study*, which was published in 2006.

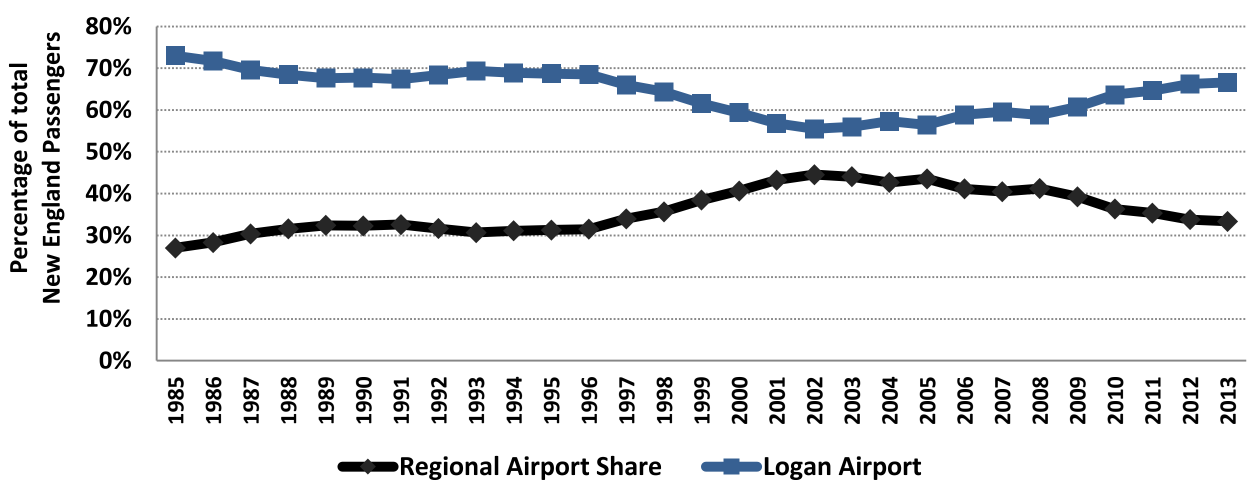
- In 2012, the total number of air passengers utilizing New England's commercial service airports, including Logan Airport, decreased by 1.3 percent from 44.7 million in 2011 to 44.1 million annual air passengers. The decline in the region's passenger traffic largely reflects airline service reductions at many of the regional airports in 2012. Due to a slow and uneven recovery in the economy following the recession in 2008/2009 and sustained high fuel prices, U.S. airlines have continued to face a challenging operating environment. Airlines have attempted to maintain tighter capacity control, which has resulted in ongoing service cuts at various secondary and tertiary airports across the nation. While passenger traffic at Logan Airport increased slightly in 2012, reduced passenger levels at the regional airports resulted in an overall decline for the region. Overall passenger growth in the New England region lagged slightly behind the overall U.S. passenger market, which saw an average increase of 1.1 percent in 2012.[13]
- In 2013, however, overall passenger traffic at New England commercial airports recovered somewhat, increasing 2.8 percent from 44.1 million to 45.4 million passengers. Passenger traffic at the New England airports in 2013 represented the highest passenger traffic level for the region since the economic downturn in 2008. Passenger traffic in the region has yet to return to the prior 2005 to 2007 peak levels, which exceeded 47.0 million. In 2013, total passenger traffic at the regional airports increased 1.6 percent from the previous year, while passenger traffic at Logan Airport increased by 3.4 percent. In comparison, U.S. passenger traffic increased by an average 1.3 percent[14] from the previous year, similarly reaching its highest total since the 2008 downturn. Logan Airport passenger traffic is increasing ahead of both the region and the nation.
- Logan Airport's share of regional passengers has increased since 2011 (Figure 1-4).
  - Of the 44.1 million passengers using New England's commercial service airports in 2012, 66.2 percent of passengers (29.2 million) used Logan Airport compared to 64.7 percent (28.9 million) in 2011. Of the 45.4 million passengers using the region's commercial service airports in 2013, 66.6 percent of air passengers (30.2 million) used Logan Airport.
  - Passenger levels at the regional airports (excluding Logan Airport) decreased by 5.7 percent (0.9 million) in 2012, and then increased by 1.6 percent (0.2 million) in 2013. In comparison, passenger levels at Logan Airport increased by 1.1 percent (0.3 million) in 2012, followed by an increase of 3.4 percent (1.0 million) in 2013. This trend reflects continued service cuts by legacy air carriers and LCCs in the smaller secondary markets, while JetBlue Airways' expansion at Logan Airport has off-set weak growth or reductions by other airlines in the process of consolidating services after a series of airline mergers.
  - Logan Airport's current share of regional passengers exceeds its share in 2005 to 2007, which ranged from 56 to 60 percent. Logan Airport's regional share remains below its historic peak of 73 percent in 1985.[15]

13 Airports Council International, 2012 Worldwide Air Traffic Report.
14 Based on U.S. Department of Transportation, Bureau of Transportation Statistics for scheduled passenger traffic.
15 Based on airport passenger statistics from 1985 to 2013.

- Aircraft operations in the New England region decreased since 2011 levels.
  - Aircraft operations decreased by 3.2 percent in 2012, from 1.09 million operations in 2011 to 1.05 million operations in 2012. Commercial airline operations showed the largest decline in 2012, decreasing by 6.5 percent (40,660 operations), while GA increased slightly by 1.5 percent (6,360 operations) as part of a continued recovery in GA activity since the 2008/2009 economic recession. Military operations decreased by 2.3 percent (820 operations) in 2012.
  - In 2013, total aircraft operations in the region decreased by another 3.6 percent (38,240 operations). Commercial operations held largely steady with a slight 0.3 percent decrease (1,660 operations). However, GA operations declined by 7.9 percent (34,280 operations). Military operations also declined by 6.7 percent (2,300 operations).
  - Aircraft operations have declined significantly since 2000, as part of an ongoing trend of higher load factors, larger aircraft sizes and reduced service levels. Total aircraft operations in the region have declined by over one third, from 1.6 million in 2000 to 1.0 million in 2013.
- Massport continued to participate in state and metropolitan cooperative planning efforts including GreenDOT, the Healthy Transportation Compact,[16,17] and the Boston Metropolitan Planning Organization.
- Massport is participating in the development of the MassDOT's first statewide strategic multi-modal, long-range transportation plan known as *weMove Massachusetts*.[18] The goal of *weMove Massachusetts* is to build action-oriented policies based on stakeholder feedback to implement priorities for the present and future needs of the Massachusetts transportation system.
- MassDOT and the other New England state transportation agencies are collaborating with the FAA on the *New England Regional Airport System Plan – General Aviation* study to provide an understanding of general aviation airports, infrastructure, and capital needs for the New England region.

Additional information is provided in *Chapter 4, Regional Transportation.*

Figure 1-4 Regional Airports' Share of New England Passengers, 1985-2013



Source: Massport and individual airport data reports.

16 Massachusetts Department of Transportation, www.eot.state.ma.us/default.asp?pgid=content/releases/pr060210_GreenDOT&sid=release, June 2, 2010.
17 Massachusetts Department of Transportation, www.massdot.state.ma.us/main/healthytransportationcompact.aspx.
18 Massachusetts Department of Transportation, Office of Transportation Planning. http://www.massdot.state.ma.us/wemove/ (Accessed November 2012).

Ground Access to and from Logan Airport

Key findings for on-Airport transportation include:

- As described earlier, the total number of annual air passengers at Logan Airport increased 1.4 percent to 29.3 million in 2012 and another 3.4 percent to 30.2 million in 2013, compared to 28.9 million in 2011.
- The average daily vehicular traffic on Airport roadways decreased by 0.2 percent from 99,449 in 2011 to 99,281 in 2012, and then increased by 3.5 percent to 102,771 between 2012 and 2013.
- A VISSIM[19] model was used to calculate and analyze VMT on the Airport and roadway system. Based on the VISSIM model results, there was a 0.05-percent decrease in VMT between 2011 to 2012 and a 5.7-percent increase between 2012 to 2013.
- The Parking Freeze limit is currently 21,088, of which 18,415 are dedicated to commercial parking spaces and 2,673 are dedicated to employee parking spaces.Massport continued to be in full compliance with the Logan Airport Parking Freeze[20] throughout 2012 and 2013. Despite an increase in terminal area parking rates on March 1, 2012, daily parking demand more frequently approached the Parking Freeze cap in 2012 and 2013. For further details, please find a copy of the Massachusetts Department of Environmental Protection (MassDEP) filings in *Appendix G, Ground Access*.
- Weekday peak commercial parking demand has increased, placing additional pressure on roadway and parking operations under the Logan Airport Parking Freeze. In 2013, for example, due to high demand on Tuesdays, Wednesdays, and Thursdays, 31,071 cars were diverted to another garage or lot and 37,413 cars were valeted/stacked (when cars are parked in aisles, have their keys taken, and then are re-parked in empty spaces as they become vacant). There were about 39 weeks in which one or more of these measures were put into effect in 2013, an increase over conditions experienced in 2011 and 2012
- Although the peak-day parking activity has increased, the total annual number of vehicles that parked on-Airport (as measured by revenue parking exits) decreased by 3.6 percent from 2,582,453 in 2011 to 2,490,000 in 2012 and another 1.0 percent to 2,466,137 in 2013 due to longer average duration of parking stays. These annual levels of parking activity continue to remain well below historic high levels (in the past 12 years, the highest level was recorded in 2000 at 3,423,118 vehicles that parked at the Airport).

Key findings for ground access activity to and from the Airport include:

- Massachusetts Bay Transportation Authority (MBTA) Silver Line bus boardings at the Airport continued to grow, based on ridership estimates.
- In 2012, Blue Line transit boardings at Airport Station increased about 7 percent over 2011 levels. MBTA ridership on the Blue Line has been increasing steadily over the past several years, and thus, has maintained mode share. In 2013, MBTA Blue Line ridership increased 6 percent over 2012 levels.
- In the summer of 2012, in an effort to boost ridership, Massport initiated a pilot program that allowed passengers to board for free on the Silver Line at Logan Airport. Massport also added customer service staff during peak arrivals periods in the summer and increased public transportation signs and wayfinding. The promising results of this program have demonstrated reduced dwell times at the curbs and faster travel times through the terminal area. Average peak-period dwell times at the terminals have been reduced by 30 seconds in some cases, resulting in travel times through the terminals that are up to two minutes faster. The free Silver Line boardings program is still in effect.

19 PTV America. (2011). Verkehr In Städen Simulationsmodell- VISSIM version 5.40 [computer software]. Portland, OR.
20 310 Code of Massachusetts Regulations 7.30

- In 2012, ridership levels on all types of water transportation to the Airport remained flat in comparison to the previous year. Ridership on the MBTA ferry continues its decreasing trend, while water taxi use has exhibited a slight growth since 2007. In 2013, ridership on private water taxis increased by 3 percent compared to 2012. MBTA water ferry ridership was not available.
- In 2012, air passenger ridership using Logan Express bus service increased 10 percent compared to 2011 levels; employee use of Logan Express increased by 16 percent and non-employee passengers increased nearly 5 percent. In 2013, non-employee passenger ridership increased nearly 8 percent over 2012 levels, and employee passenger activity increased almost 2 percent. With continued growth in each of the past five years, the 2013 total ridership is the highest in the history of Logan Express.
- In September 2013, Massport solicited an operator for a Back Bay express shuttle bus service, which commenced in April 2014. The Back Bay Logan Express, provides improved service to those transit riders impacted by the two-year Government Station closure and increases high occupancy vehicle (HOV) use from the inner Boston area.

In September 2013, Massport instituted a series of curb allocation improvements to enhance curbside usage and reduce congestions. The improvements included sign-posted designated areas for taxi and limousine staging, dedicated shuttle bus areas, and specific locations of active passenger drop-off and pick-up.

Table 1-2 Logan Airport Gateways: Annual Average Daily Traffic, 2009 - 2013

	AADT		AWDT		AWEDT		Annual Air Passengers	
Year	Volume	Percent Change	Volume	Percent Change	Volume	Percent Change	Level of Activity	Percent Change
2009	89,575	(6.9%)	93,670	(6.4%)	78,905	(2.3%)	25,504,845	(2.3%)
2010	94,179	5.1%	98,968	5.7%	82,595	4.7%	27,428,962	7.5%
2011	99,449	5.6%	104,863	6.0%	85,879	4.0%	28,907,938	5.4%
2012	**99,281**	**(0.2%)**	**104, 439**	**(0.4%)**	**86,494**	**0.7%**	**29,235,643**	**1.5%**
2013	**102,771**	**3.5%**	**107,656**	**3.1%**	**90,822**	**5.0%**	**30,218,631**	**3.4%**

Source: Massport
Notes: Numbers in parentheses () represent negative numbers.
AADT Annual average daily traffic.
AWDT Annual average weekday daily traffic.
AWEDT Annual average weekend daily traffic.

Key findings for ground transportation mode shares include:

- Logan Airport continues to rank at the top of U.S. airports with respect to high-occupancy vehicles (HOV)/transit/shared-ride mode share.
- The *2013 Logan Airport Air Passenger Ground-Access Survey* indicates that share of HOV modes to the Airport has returned to 2007 levels at 28 percent HOV mode share. This represents a 2-percent decrease in HOV mode share from the levels reported in the *2010 Air Passenger Ground Access Survey*. HOV modes are defined as transit and shared-ride modes, including MBTA, Logan Express, scheduled bus, and shared-ride vans and limousines; private vehicles, rental cars, and taxicabs are classified as automobile or non-HOV modes, regardless of the number of passengers in a vehicle.
- Many private passenger vehicles arrive at Logan Airport with several occupants. In fact, the 2013 survey indicates that 76 percent of private vehicles carried two or more air passengers and thus frequently function as HOVs.

- A growing concern is private vehicle, taxi, and limousine pick-up/drop-off.

Additional information is provided in *Chapter 5, Ground Access to and from Logan Airport.*

Noise Abatement

In 2012 and 2013, the following changes occurred in the Airport and noise environment:

- As described above, passenger volumes continued to increase, annual aircraft operations decreased from 368,987 in 2011 to 354,869 in 2012 (3.8 percent decrease) with an increase to 361,339 in 2013 (1.8 percent increase) from 2012. Commercial (Passenger and Cargo) operations decreased by 4.1 percent from 340,727 in 2011 to 326,750 in 2012 and increased by 2.7 percent to 335,464 in 2013. This trend represents a reduction in total aircraft operations since 2000 (487,996 operations).
- General Aviation (GA) operations decreased 0.4 percent from 28,230 operations in 2011 to 28,114 operations in 2012. GA operations in 2013 decreased 5.1 percent to 26,682 operations from 2012 levels. GA operations continue to represent only a small percentage (7.9 percent in 2012 and 7.4 percent in 2013) of total operations at Logan Airport. The 26,682 GA operations in 2013 remain well below the 35,233 GA operations that Logan Airport handled in 2000.
- Daily total aircraft operations in 2012 (366 days) averaged approximately 969 operations per day compared to approximately 1,011 operations per day in 2011. Daily operations in 2013 (365 days) averaged approximately 990 operations per day. Since 2000, the number of daily aircraft operations has declined by almost 29 percent (from 1,355 operations per day in 2000 to 990 operations per day in 2013). This trend reflects reductions in the use of small aircraft since 2000, legacy carriers reluctant to expand their routes, and increased efficiencies on the part of airlines.
- In, 2012 there was a significant drop in regional jet (RJ) operations (approximately 30 less flights per day) as airlines switched to using larger aircraft to carry more passengers on routes instead of adding operations, resulting in greater efficiencies and impacts. In 2013, there was a small rise in RJ operations (almost four operations per day) as some carriers expanded flights. RJ operations in 2013 were 21.3 percent higher than the 37,600 RJ operations in 2000.
- An updated version of the FAA Integrated Noise Model (INM) version 7.0d (INMv7.0d) was released in 2013 and was used for the 2013 modeling.
- Compared to 2011, the 2012 Day-Night Average Sound Level (DNL) 65-decibel (dB) contours were slightly larger in East Boston, Revere, South Boston, and Winthrop and smaller over Boston Harbor towards Long Island and south towards Columbia Point. The 2012 contours remained substantially smaller than the 2000 contours. There are several factors that influenced the contour changes, including:
  - Runway 15R-33L, which is the nighttime noise abatement runway, was temporarily closed from June 16, 2012 through October 2, 2012 to allow for the second and final period of construction of the enhanced Runway 33L RSA. There were also partial construction closures of the runway before and after this period. Typically, this runway is used during these periods for head-to-head operations (arrivals to Runway 33L and departures from Runway 15R) at night, which keeps air traffic over Boston Harbor, and away from the community.
  - The 2012 RSA construction closure was a longer period than in 2011, which extended the use of other runways for nighttime operations during 2012. During this period, night operations primarily used Runway 22R and Runway 9 for departures and Runway 4R, 27, and 22L for arrivals.

- Compared to 2012, the 2013 DNL 65 dB contours were slightly larger in East Boston and slightly smaller in Revere, South Boston, and Winthrop. The 2013 contours remained substantially smaller than the 2000 contours. There are several factors that influenced the contour changes, including:
  - Runway use in 2013 was reflective of a typical year (return to pre-construction conditions), with an increased use (compared to 2012) of Runway 15R-33L and Runway 27.
  - The availability of all runway configurations in 2013, resulted in lower levels of arrivals to Runways 22L, 27, and 4R
- Due to the runway closure in 2012, the overall number of people exposed to DNL values greater than 65 dB increased to 4,736 people in 2012 from 3,947 people in 2011 (an increase of 789 people).[21] In 2013 with runway use back to pre-construction patterns, the overall number of people exposed to DNL values greater than 65 dB decreased to 4,307 people in 2013 from 4,736 people in 2012 (a decrease of 429 people). The number of people residing within the DNL 70 dB contour increased from 130 people in 2011 to 200 people in 2012 and returned to 130 people in 2013. These levels are still well below the number of people exposed in the year 2000 when 17,745 people were exposed to DNL noise levels greater than 65 dB and 1,551 people were exposed to DNL levels greater than 70 dB. All of the residences exposed to levels greater than DNL 65 dB in 2012 and 2013 have been eligible to participate in Massport's residential sound insulation program (RSIP).
- Massport reports total annual fleet noise at Logan Airport, as defined in the Logan Airport Noise Rules by a metric referred to as the Cumulative Noise Index (CNI). The CNI is a single number representing the sum of the entire set of single-event noise energy from each operation experienced at Logan Airport over a full year of operation. The CNI is weighted similarly to DNL so that activity occurring at night is penalized by adding an extra 10 dB to each event. This penalty is equivalent to multiplying the number of nighttime events of each aircraft by a factor of 10.
- The 2012 CNI of 152.2 Effective Perceived Noise Decibels (EPNdB)[22] and the 2013 CNI of 152.3 EPNdB remained well below the cap of 156.5 EPNdB established under Massport's Noise Regulations. For comparison, the 2000 CNI was 154.7 EPNdB.
- Massport has an extensive sound insulation program in the areas surrounding Logan Airport. All of the residences exposed to levels greater than DNL 65 dB in 2012 and 2013 have been eligible to participate in Massport's RSIP. Participation in the program is voluntary and all of the homeowners who have chosen to participate in the Massport's RSIP have been sound insulated by Massport.

  An additional 76 residential units received sound insulation treatment in 2013 bringing the program total to 11,409 residential units treated. Massport will continue to seek funding for sound insulation for properties that are eligible and whose owners have chosen to participate.
- The FAA issued a Finding of No Significant Impact/Record of Decision (FONSI/ROD) in June 2013 for the Boston Logan International Airport Runway 33L RNAV Standard Instrument Departure (SID) Final EA. The procedure became available for use by FAA on June 5, 2013 and is included in the 2013 results in this EDR.
- Massport is participating in an FAA aircraft noise study as part of the Airside Improvement Project mitigation. The primary focus of the Boston Logan Airport Noise Study (BLANS) is to determine viable ways to reduce noise from aircraft operations to and from Logan Airport without diminishing airport

21 Population data were derived from the most recent 2010 United States Census.
22 EPNdB is the metric used for Aircraft Noise Certification and forms the basis of the CNI.

safety and efficiency.[23] The RNAV departure portions of Phase 1 of the project, first implemented in 2010, continued to be utilized in 2012 and 2013.

- The Runway 33L departure described above is the last RNAV SID departure procedure to be implemented by the FAA.
- FAA RNAV Standard Terminal Arrival Routes (STARs) were available to aircraft for all of 2013 and have consolidated arrival routes into Logan Airport airspace.
- The visual approach procedure to Runway 33L which was first implemented by FAA in the summer of 2009, continued in 2012 and 2013. The procedure, also an outcome of Phase 1 of BLANS, keeps aircraft offshore avoiding areas of Cohasset and Hull at night in good weather when Visual Flight Rules are in use.

- The 2012 and 2013 Flight Track Monitoring reports in *Appendix H, Noise Abatement* show that 99 percent of shoreline crossings (locations where aircraft which have departed over the water pass back over land) are by aircraft above 6,000 feet, reflecting a slight increase from 2011 which is beneficial to communities under those flight paths.
- The percentage of aircraft following the Runway 27 departure procedure was at 75 percent for 2013, which continued to remain in compliance with the Runway 27 ROD.[24] The FAA determined in early 2012 that no further evaluation of the Runway 27 departure flight corridor is needed.[25] Massport will continue to monitor and publish compliance with the procedure in the annual Flight Track Monitoring Report in this and subsequent EDR/ESPR filings.

Additional information is provided in *Chapter 6, Noise Abatement*.

Air Quality/Emissions Reduction

Air quality conditions in 2012 and 2013 are described, as follows:

- The air quality modeled results reported in this section are largely a function of aircraft operations, fleet mix characteristics, and airfield taxiing times combined with ground support equipment (GSE) usage, motor vehicle traffic volumes, and stationary source utilization rates. A synopsis of these important model input variables for 2012 and 2013 at Logan Airport includes:
  - Aircraft landing and takeoff operations (LTOs) decreased by approximately 4 percent in 2012 when compared to 2011 (184,494 LTOs in 2011 and 177,439 LTOs in 2012) and taxi times decreased by 5 percent (25.2 minutes in 2011 and 23.9 minutes in 2012). By comparison, aircraft LTOs increased approximately 2 percent in 2013 when compared to 2012 (180,670 LTOs in 2013) and taxi times increased by 5 percent (25.0 minutes in 2013). For comparison, there were 243,998 LTOs in 2000 and taxi times were 27.1 minutes.
  - VMT changed less than 1 percent in 2012 when compared to 2011 (i.e., 167,647 in 2011 and 167,564 in 2012) and increased about 6 percent in 2013 when compared to 2012 (i.e., 177,094 in 2013). For comparison, VMT in 2000 was 178,798.

23 For more information, visit the BLANS website at www.bostonoverflightnoisestudy.com/index.aspx.
24 FAA. Runway 27 Record of Decision. 1996.
25 FAA. Runway 27 Advisory Committee Meeting Notes 01/23/12, published March 5, 2012.

- Natural gas usage by stationary sources (such as boilers, snow melters, and space heaters) decreased by approximately 25 percent in 2012 when compared to 2011 (480 million cubic feet in 2011 and 361 million cubic feet in 2012) and increased by 12 percent in 2013 when compared to 2012 (402 million cubic feet in 2013). Natural gas usage by stationary sources was 284 million cubic feet in 2000. Diesel fuel usage by the snow melters decreased in 2012 when compared to 2011 (218,081 gallons in 2011 and 42,109 gallons in 2012) and increased in 2013 when compared to 2012 (231,130 gallons in 2013).
- GSE fleet mix and time-in-mode data were obtained from a GSE survey conducted at Logan Airport as part of the *2011 ESPR*, and these data were used to model 2012 and 2013 conditions.

Modeled air quality conditions in the 2012 to 2013 time-period for Logan Airport (based on analysis of these data) were:

- Motor vehicle emission factors for the 2012 analysis were obtained from the then most recent version of the United States Environmental Protection Agency's (EPA's) MOBILE model (MOBILE6.2.03) combined with MassDEP-recommended motor vehicle fleet mix data, operating conditions, and other Massachusetts-specific input parameters. Importantly, for the 2013 analysis, the new EPA Motor Vehicle Emission Simulator (MOVES) model was used to estimate motor vehicle emission factors.[26] MOVES2010b is the EPA's latest motor vehicle emissions model and replaces MOBILE as the MassDEP-preferred model. For comparative purposes, both MOBILE and MOVES were used to generate the 2013 motor vehicle emission factors.
- Total volatile organic compound (VOC) emissions in 2012 were 1,080 kilograms per day (kg/day), or approximately 3 percent lower than 2011 levels. By comparison, total VOC emissions in 2013 were 1,138 kg/day, or 5 percent higher than 2012 levels. The decrease in 2012 is primarily due to the corresponding decrease in aircraft LTOs when compared to 2011 and a decrease in aircraft taxi time. Similarly, the increase in 2013 is primarily due to the increase in LTOs when compared to 2012 and an increase in aircraft taxi time. For comparison, total VOC emissions were 1,777 kg/day in 2000.
- Total emissions of oxides of nitrogen (NO_X) in 2012 were 4,099 kg/day, or less than 1 percent higher than 2011 levels. However, total emissions of NO_X in 2013 were 4,020 kg/day, or 2 percent lower than 2012 levels. The increase in 2012 is mostly attributable to the larger number of medium and large regional jets among the GA aircraft category during this time period. Conversely, the decrease in 2013 compared to 2012 is primarily due to the decrease in the number of these aircraft types in the GA aircraft category. For comparison, total NO_X emissions were 5,707 kg/day in 2000.
- Total emissions of carbon monoxide (CO) in 2012 were 6,739 kg/day, or 3 percent lower than 2011 levels. This decrease is mostly attributable to the decrease in GSE and motor vehicle emissions. However, total emissions of CO in 2013 were 7,340 kg/day, or 9 percent higher than 2012 levels. This increase in 2013 compared to 2012 is mostly attributable to the increase in aircraft LTOs and taxi time. For comparison, total CO emissions were 13,111 kg/day in 2000.

26 The U.S. EPA MOVES model is an advancement to the former MOBILE6 model as it contains the most up-to-date emission factors, emission control measures, and other area-specific parameters for motor vehicle fleets nationwide (including the Boston area). For consistency with the Massachusetts State Implementation Plan (SIP), MOVES is also recommended for use by the MassDEP.

- Total emissions of particulate matter $(PM)_{10}/PM_{2.5}$ increased in 2012 by approximately 7 percent to 72 kg/day compared to 2011 levels. This particular increase is unique and is mostly attributable to model changes. Total modeled emissions of $PM_{10}/PM_{2.5}$ again increased in 2013 by approximately 28 percent to 92 kg/day compared to 2012 levels. Notably, this increase is mainly attributable to the new versions of the computer models (i.e., Emissions and Dispersion Modeling System [EDMS] and MassDEP-preferred model –MOVES) used to calculate aircraft and motor vehicle emissions. VMT increased by 5 percent from 2012 to 2013. However, MOBILE6 PM emission factors decreased by the same amount (effectively cancelling each other out). Thus, if MOBILE6 had been used for the 2013 analysis, modeled PM emissions would have decreased by less than 1 percent from 2012 to 2013.
- Importantly, total emissions from all sources associated with Logan Airport in the 2012 to 2013 timeframe are significantly less than they were a decade ago. This continuous downward trend is consistent with Massport's longstanding objective to accommodate the demands of increasing passenger and cargo levels with fewer aircraft while generating less emissions.
- With respect to Massport's Air Quality Initiative (AQI)[27] 1999 benchmark, total NOx emissions in 2012 were 698 tons per year (tpy) lower than the benchmark and in 2013 were 730 tpy lower than the benchmark - which represents an overall decrease of 31 percent in NOx emissions since 1999. For comparison, total NOx emissions in 2000 were 51 tpy lower than the benchmark or a decrease of 2 percent since 1999.
- The year 2013 marks the seventh consecutive year in which Massport has voluntarily prepared a greenhouse gas (GHG) emissions inventory for the EDR/ESPR. The 2012 and 2013 GHG emission inventory was again prepared following methodological guidance by the Transportation Research Board's (TRB) Airport Cooperative Research Program (ACRP).[28] The inventory assigns GHG emissions based on ownership or control (whether it is controlled by Massport, the airlines or other airport tenants, or the general public).
  - Total Logan Airport GHG emissions in 2012 were approximately 3 percent lower than 2011 levels primarily due to the decrease in fuel usage of stationary sources. Total Logan Airport GHG emissions in 2013 were approximately 6 percent higher than 2012 levels primarily due to the increase in usage of passenger ground access vehicles on off-airport roadways. In 2012, Massport-related emissions represented only 10 percent of total GHG emissions at the Airport, tenant-based emissions represented approximately 69 percent, electrical consumption represented 14 percent; and passenger vehicle emissions represented 6 percent. Similarly, in 2013, Massport-related emissions represented only 13 percent of total GHG emissions at the Airport, tenant-based emissions represented approximately 66 percent, electrical consumption represented 10 percent, and passenger vehicle emissions represented 10 percent.

Additional information is provided in *Chapter 7, Air Quality/Emissions Reduction.*

27 Massport developed the AQI as a 15-year voluntary program with the overall goal to maintain NOx emissions associated with Logan Airport at, or below, 1999 levels.
28 Transportation Research Board, Airport Cooperative Research Program, ACRP Report 11, Project 02-06, Guidebook on Preparing Airport Greenhouse Gas Emissions Inventories. See http://onlinepubs.trb.org/onlinepubs/acrp/acrp_rpt_011.pdf for the full report.

Water Quality/Environmental Compliance and Management

Key water quality and compliance findings for 2012 and 2013 are described below:

- In 2012, there were five oil and hazardous material spills that required reporting to MassDEP, two of which involved a storm drainage system.[29] In 2013, there were six spills that required reporting, none of which involved a storm drainage system. Further details on spills can be found in the *Fuel Use and Spills* section of *Chapter 8, Water Quality/Environmental Compliance and Management.*
- In 2012, two outfall samples out of a total of 22 samples at the West Outfall and one sample out of a total of 15 samples at the Maverick Street Outfall, exceeded the regulatory limits of the National Pollutant Discharge Elimination System (NPDES) Permit for the North, West, Northwest, Porter Street, and Maverick Street Outfalls. These exceedances were reported in July and November 2012, respectively, as required. In 2013, one outfall sample out of a total of 21 samples at the North Outfall exceeded the regulatory limits of the NPDES Permit. This exceedance was reported in December, 2013, as required.

Additional information is provided in *Chapter 8, Water Quality/Environmental Compliance.*

Sustainability at Logan Airport

Figure 1-5: EONS Approach to Sustainability

Massport is committed to a robust sustainability program. Sustainability has redefined the values and criteria for measuring organizational success by using a "triple bottom line" approach that considers economic, ecological, and social well-being. Applying this approach to decision-making is a practical way to optimize economic, environmental, and social capital. Massport is taking a broad view of sustainability that builds upon the concept of the triple bottom line, and considers the airport-specific context. Consistent with the Airports Council International - North America's (ACI-NA) definition of Airport Sustainability[30] (Figure 1-5), Massport is focused on a holistic approach to managing Logan Airport to ensure Economic viability, Operational efficiency, Natural resource conservation, and Social responsibility (EONS). Massport has a commitment to implementing environmentally sustainable practices Authority- and Airport-wide, and continues to make progress on a range of initiatives.

Many of the long-term and multifaceted sustainability initiatives undertaken by Massport are described in individual chapters of this *2012/2013 EDR* where appropriate, and are listed in Table 1-4.

State Goals – Leading by Example

The Massachusetts' Governor's Leading by Example – Clean Energy and Efficient Building Program (known as the Leading by Example program) was established in 2007 under Executive Order 484.[31] The program's goals cover many specific measures covering a variety of topics, but there are three key areas which guide

29 State environmental regulations require that oil spills of 10 gallons or more in volume be reported to MassDEP.
30 Airport Council International (ACI). Airport Sustainability: A Holistic Approach to Effective Airport Management. Undated. http://www.aci-na.org/static/entransit/Sustainability%20White%20Paper.pdf. Accessed July 17, 2013.
31 Deval Patrick, Executive Order 484: April 18, 2007.

Massport's sustainability programs: energy intensity, percentage of renewable energy, and GHG reductions. Part of the Leading by Example Executive Order calls for state agencies to procure 15 percent of their electricity from renewable resources by 2012. The Leading by Example program has influenced Massport's own operations including its offices, heating plants, and garages resulting in Massport receiving the Leading by Example award in 2008. As part of the Leading by Example program, all new construction and major renovations over 20,000 square feet by Commonwealth agencies must meet the Massachusetts LEED Plus green building standard established by the Massachusetts Sustainable Design Roundtable. The Massachusetts LEED Plus standard includes:

- Certification by the U.S. Green Building Council (USGBC) LEED program for all new construction and major renovation projects over 20,000 square feet;
- Energy performance 20 percent better than the Massachusetts Energy Code;
- Independent third party commissioning;
- Reduction of outdoor water consumption by 50 percent and indoor water consumption by 20 percent relative to standard baseline projections; and
- Conformance with at least 1 of 4 identified smart growth criteria.

Massport complies with this requirement at all of its facilities.

International Standards Organization (ISO) 14001 standard

The ISO 14001 standard for environmental management systems (EMS) is used to minimize harmful effects on the environment caused by an organization's processes and activities. The goal of Massport's EMS is to achieve continual improvement of an organization's environmental performance. An EMS is different from LEED or the Massport Sustainable Design Standards and Guidelines (SDSG) because its focus is on organizational operations and processes within a building as opposed to the design and materials used to construct buildings. Massport recently expanded its Logan Airport EMS to cover a broader range of activities and buildings. ISO 14001 certification for Logan Airport Facilities II (vehicle maintenance, landscaping, and snow removal) was completed in December 2006 and recertified in December 2009. ISO Certification for Facilities I (Central Heating and Cooling Plant) and Facilities III (Electrical and Structural) was completed in 2011.

Sustainability at Logan Airport

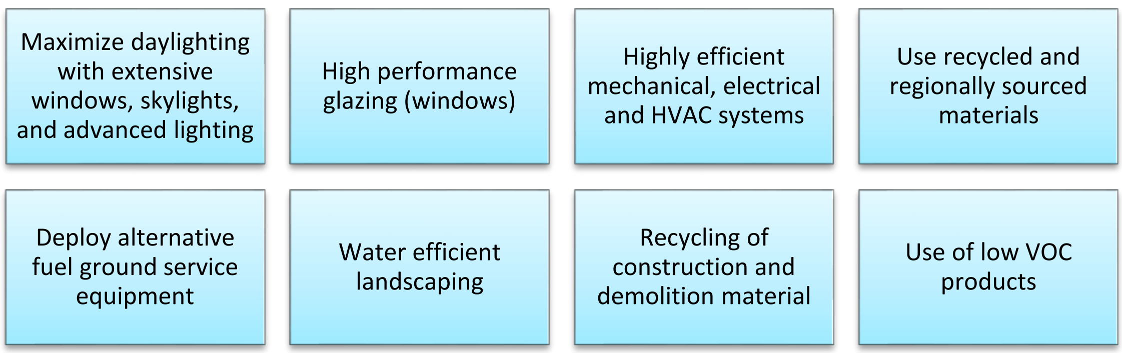
In October 2004, Massport prepared its first Sustainability Plan which presented Massport's long-term and short-term sustainability goals. It also identified the actions necessary to achieve the goals, the staff members responsible for each sustainability goal, and the timeline for achieving the goals. Massport participated in the 2010 Environmental Benchmarking Survey sponsored by ACI-NA to assess solar power, purchase of renewable energy, availability of low emission ground transportation, recycling and environmentally preferred purchasing.

With funding provided by a grant from the FAA, Massport is developing the Logan Airport SMP. The Logan Airport SMP is expected to be completed in 2015. While Massport has many sustainability initiatives across the Airport, this planning effort will provide the necessary framework for Massport to coordinate all the separate initiatives under one comprehensive program. The SMP will provide Massport with a robust framework of sustainability goals, objectives, metrics, and targets, and will also recommend sustainability initiatives that can be implemented to achieve these goals. The status of this planning effort is reported on in *Chapter 3, Airport Planning.*

Sustainability in Planning, Design and Construction
The following section outlines Massport sustainability achievements in the planning, design and construction of projects.

LEED® Green Buildings
The USGBC LEED Green Buildings rating system is the most widely recognized third-party green building certification system in North America. Massport is striving to achieve LEED certification for new and substantial rehabilitation of building projects over 20,000 square feet. For smaller building projects and non-building projects, Massport uses SDSG described in the next section. LEED-certified building elements are featured in Figure 1-6.

Figure 1-6 Common Elements of LEED®-Certified Buildings at Logan Airport



Sustainable Design Standards and Guidelines (SDSG)
In 2009, Massport developed the SDSG for use by architects, engineers, and planners working on capital improvement projects at Massport facilities. The SDSG, revised and reissued in March 2011, provides a sustainable building framework for design and construction of both new construction and rehabilitation projects for both building and non-building projects (for example, pavement projects).

The SDSG applies to a wide range of project-specific criteria, such as site design, project materials, energy management and efficiency, air emissions, water management quality and efficiency, indoor air quality, and occupant comfort. The new standards have been used to guide over $200 million in capital projects Massport-wide between fiscal years 2010 to 2013, including over $30 million for maritime projects.

Certified Green Buildings at Logan Airport
Table 1-3 lists the sustainability features for the green buildings at Logan Airport that have been constructed or are under construction.

The new RCC in the SWSA began construction in 2010 and was completed in 2013. It will meet the Commonwealth of Massachusetts LEED Plus requirements and strive for LEED Silver level certification or better. At least 2.5 percent of the overall electricity needs will be met with solar or wind power, or another form of renewable energy.

The LEED Silver Green Bus Depot shifted bus maintenance operations on-Airport from an off-Airport location. This reduces bus trips and unnecessary emissions on congested neighborhood roadways. Reduced VMT for the bus fleet will have air quality benefits. Further details are available in *Chapter 3, Airport Planning.*

Table 1-3 Green Buildings and Sustainable Features at Logan Airport

Terminal A (LEED Certified) ■ Priority curb locations for high occupancy vehicles (HOV) and bicycles ■ Retrofitting with solar panels on the Terminal A roof ■ Stormwater filtration ■ Reflective roof ■ Water use reduction features ■ Natural daylighting paired with advanced lighting technologies for energy efficiency ■ Use of recycled and regionally sourced materials ■ Measures to enhance indoor air quality ■ Roof-top solar	Completed 2005/2006
Signature Flight Support General Aviation Facility (LEED Certified) ■ Mechanisms to reduce water use ■ Natural day lighting paired with advanced lighting technologies for energy efficiency ■ Window glazing and sunshades to maximize daylight and minimize heat build-up ■ Recycled and regionally sourced materials ■ Measures to enhance indoor air quality	Completed 2007/2008
Green Bus Depot (LEED Silver Certified) ■ Rooftop solar panels ■ Water and energy saving features ■ Vehicle miles traveled (VMT) reduction ■ New shuttle fleet including 50 clean diesel/electric hybrid buses and compressed natural gas (CNG) buses ■ Sustainably grown, harvested, produced, and transported building materials	Completed 2012
Rental Car Center (LEED Silver Eligible) ■ Green building materials ■ Alternative energy sources (such as solar and wind) ■ Bike and pedestrian access and connections ■ Natural day lighting paired with advanced lighting technologies for energy efficiency ■ Use of recycled and regionally sourced materials ■ Enhanced indoor air quality ■ Plug-in stations for electric vehicles and other alternative fuel sources such as E-85 (ethanol) ■ Rental car fleets which include hybrid/alternative fuel/low emitting vehicles ■ Pedestrian connections ■ Bicycle facilities and employee showers/changing ■ Water reclamation for vehicle wash water, and use of stormwater for non-potable uses such as vehicle washing and landscaping irrigation ■ VMT reduction	Completed 2013
Facilities II Building (ISO 14001 certification) ■ Vehicle maintenance, landscaping, and snow removal	Completed 2006; Recertification 2009
Facilities I and III Buildings (ISO 14001 certification) ■ Central Heating and Cooling Plant ■ Electrical and Structural	Completed 2011

Sustainability Programs and Initiatives

A selection of Massport's sustainability programs and initiatives, provided in Table 1-4, are further described in individual chapters of this *2012/2013 EDR*. They are highlighted in each chapter with a sustainability leaf.

Table 1-4 Sustainability Projects and Initiatives Documented in this *2012/2013 EDR*

Sustainability Program or Initiative	Description	Reference in *2012/2013 EDR*
Logan Airport Sustainability Mangement Plan (SMP)	In 2013, Massport was awarded a grant by the Federal Aviation Administration (FAA) to prepare an SMP for Logan Airport. The Logan Airport SMP takes a broad view of sustainability including economic vitality, social responsibility, operational efficiency, and natural resource conservation considerations. The focus areas of the SMP include energy efficiency/greenhouse gas reduction, water conservation, waste management and recycling, and community well-being.	*Chapter 3, Airport Planning*
Greenway Connector Project	The Greenway Connector is a pedestrian/bicycle path connecting the Bremen Street Park path to the future City of Boston pedestrian/bicycle path that begins at the Greenway Overlook and continues to Constitution Beach.	*Chapter 3, Airport Planning*
GreenDOT and Massachusetts Healthy Transportation Compact	Statewide transportation initiatives that balance the needs of all transportation users, improve public health, and reduce the environmental impact of transportation.	*Chapter 4, Regional Transportation*
Logan Transportation Management Association (Logan TMA)	The Logan TMA helps to reduce the number of Airport employees commuting by private automobile, to enhance commuter options, and to reduce traffic and parking demands at Logan Airport.	*Chapter 5, Ground Access to and from Logan Airport*
Pedestrian Facilities and Bicycle Parking	Sidewalks are available along most Airport roadways, overhead pedestrian bridges provide pedestrian connections to all terminals. Bicycle parking is also available at terminals and Rental Car Center.	*Chapter 5, Ground Access to and from Logan Airport*
Logan Express Bus Service	Massport provides frequent, scheduled, express coach bus service to Logan Airport for air passengers and employees from park-and-ride lots in Braintree, Framingham, Woburn, Peabody. A new Back Bay service also commenced in 2014.	*Chapter 5, Ground Access to and from Logan Airport*
Preferred Parking for Alternative Fuel Vehicles	Massport has preferred parking areas in garages, close to terminal entry points for alternative fuel or hybrid vehicles.	*Chapter 5, Ground Access to and from Logan Airport*
Logan Airport Silver Line and Blue Line Rapid Transit Service	Massport supports MBTA rapid transit service which serves all terminals at Logan Airport from South Station and Airport Station.	*Chapter 5, Ground Access to and from Logan Airport*
High occupancy vehicle (HOV) goals	The goal of Massport is to attain a 35.2 percent HOV ground access mode share at the 37.5 million air passenger annual level.	*Chapter 5, Ground Access to and from Logan Airport*
Cell Phone Waiting Lot	The recently expanded Cell Phone Waiting Lot has helped to reduce vehicle emissions by minimizing idling and vehicle miles traveled (VMT).	*Chapter 5, Ground Access to and from Logan Airport*
Logan Air Quality Initiative (AQI)	The AQI is a 15-year voluntary program with the goal of maintaining NOx emissions at, or below, 1999 levels.	*Chapter 7, Air Quality/Emissions Reduction*
Massport Alternative Fuel Vehicle Purchasing Policy	This is a policy to replace conventionally-fueled fleet with alternatively fueled or powered vehicles, when feasible.	*Chapter 7, Air Quality/Emissions Reduction*
Participation in statewide climate change related groups	Massport participates in working groups focused on achieving goals in the Global Warming Solutions Act, as part of the Commonwealth's Climate Change Adaptation Advisory Committee	*Chapter 7, Air Quality/Emissions Reduction*
Single Engine Taxiing	Massport supports the use of single engine taxiing, when it can be done safely and voluntarily at the discretion of the pilot. Single engine taxiing helps to reduce fuel use and emissions.	*Chapter 7, Air Quality/Emissions Reduction*
Energy Planning	Massport's Energy Master Plan is being implemented in phases to reduce Logan Airport's overall energy consumption.	*Chapter 7, Air Quality/Emissions Reduction*

Sustainability Awards

Table 1-5 highlights some of the most recent environmental sustainability-related awards Massport has received. Massport has repeatedly been recognized as an environmental leader by national and international organizations in various industries.

Table 1-5 Selected Sustainability Awards

Year	Awarding Organization	Name of Award	Subject
2013	Construction Management Association of America (CMAA)	Infrastructure Project of the Year (projects less than $100 million)	Received in recognition of the Runway 33L Safety Area improvements (warm mix asphalt).
2012	CMAA	Building Project of the Year – Renovation/Modernization (projects greater than $40 million)	Received in recognition of the Terminal B Parking Garage structural repairs, lighting replacement, and roadway improvements.
2011	CMAA	Building Project of the Year – New Construction (project less than $50 million)	Received in recognition of the Economy Parking Structure and its sustainable features.
2010	CMAA	CMAA Infrastructure Award of the Year	This award was for the rehabilitation of Runway 9-27 with warm mix asphalt. Warm mix asphalt uses less energy to produce and results in fewer greenhouse gas emissions.
2009	American Association of Port Authorities	Comprehensive Environmental Management Award	This was awarded for Massport's Sustainable Design Standards and Guidelines
2008	American Institute of Aeronautics and Astronautics (AIAA), the American Association of Airport Executives (AAAE), and the Airports Consultants Council (ACC)	Jay Hollingsworth Speas Airport Award	The award recognizes the environmental benefits achieved by Terminal A at Boston Logan International Airport, the world's first LEED certified airport terminal.
2008	Commonwealth of Massachusetts	Leading by Example Awards	The Leading by Example Awards recognize outstanding efforts among Commonwealth agencies, public colleges and universities, and municipalities which have established and implemented policies and programs resulting in significant and demonstrable environmental benefits. Massport has voluntarily adopted Leading by Example energy targets.
2008	Airports Council International –North America (ACI-NA)	Environmental Management Award	Logan Airport's Air Quality Program / Emissions Reduction Program
2007	Business travel website Aviation.com.	"Easiest Airport to Get To"	Logan Airport is among the closest airports in the country to the Central Business District of a major city with a five-minute drive or 15-minute rapid transit ride to downtown Boston, reducing emissions associated with accessing the airport, when compared to peer airports.

Organization of the *2012/2013 EDR*

The remainder of this *2012/2013 EDR* includes:

- ***Chapter 2, Activity Levels***, presents aviation activity statistics for Logan Airport in 2012 and 2013 and compares activity levels to the prior year. The specific activity measures discussed include air passengers, aircraft operations, fleet mix, and cargo/mail volumes.
- ***Chapter 3, Airport Planning***, provides an overview of planning, construction, and permitting activities that occurred at Logan Airport in 2012 and 2013. It also describes known future planning, construction, and permitting activities and initiatives.
- ***Chapter 4, Regional Transportation***, describes activity levels at New England's regional airports in 2012 and 2013 and updates recent regional planning activities.
- ***Chapter 5, Ground Access to and from Logan Airport***, reports on transit ridership, roadways, traffic volumes, and parking for 2012 and 2013.
- ***Chapter 6, Noise Abatement***, updates the status of the noise environment at Logan Airport in 2012 and 2013, and describes Massport's efforts to reduce noise levels.
- ***Chapter 7, Air Quality/Emissions Reduction***, provides an overview of Airport-related air quality issues in 2012 and 2013 and efforts to reduce emissions.
- ***Chapter 8, Water Quality/Environmental Compliance and Management***, describes Massport's ongoing environmental management activities including NPDES compliance, stormwater, fuel spills, activities under the Massachusetts Contingency Plan, and tank management.
- ***Chapter 9, Project Mitigation Tracking***, reports on Massport's progress in meeting its MEPA Section 61[32] mitigation commitments for specific Airport projects.

Supporting appendices include:

Appendices

- **MEPA Appendices**: The 2013 Secretary of EEA's Certificate on the *2011 ESPR*, comment letters received on the *2011 ESPR* and responses to those comments, Secretary of EEA's Certificates on the annual reports issued for reporting years 2004 through 2010, a list of reviewers to whom the *2012/2013 EDR* was distributed, and a proposed scope for the *2014 EDR*.

  Appendix A – MEPA Certificates and Responses to Comments
  Appendix B – Comment Letters and Responses
  Appendix C – Proposed Scope for the 2014 EDR
  Appendix D – Distribution List

32 Massachusetts General Law, Chapter 30, Section 61 (M.G.L. c. 30, § 61).

- **Technical Appendices**[33]: These include detailed analytical data and methodological documentation for the various environmental analyses presented in and conducted for this *2012/2013 EDR*.

  Appendix E – Activity Levels
  Appendix F – Regional Transportation
  Appendix G – Ground Access
  Appendix H – Noise Abatement
  Appendix I – Air Quality/Emissions Reduction
  Appendix J – Water Quality/Environmental Compliance and Management
  Appendix K – 2012/2013 Peak Period Pricing Monitoring Report
  Appendix L – Reduced/Single Engine Taxiing at Logan Airport Memoranda

33 Technical appendices are included on the attached CD.

2
Activity Levels

Introduction

This chapter reports on annual activity at Logan Airport in 2012 and 2013, including air passengers, aircraft operations, aircraft fleet mix, and cargo volumes. Passenger activity levels and operations at Logan Airport form the basis for the evaluation of vehicle miles traveled (VMT), noise, and air quality impacts associated with the Airport. In this chapter, current activity levels at the Airport are compared to prior-year levels, and historical passenger and operation trends at Logan Airport dating back to 1990 where historical information is available.

The chapter specifically describes 2012 and 2013 activity levels, changes over the prior year, and historical trends for:

- Air passengers
- Aircraft operations
- Cargo and mail volumes

2012/2013 Activity Levels Highlights

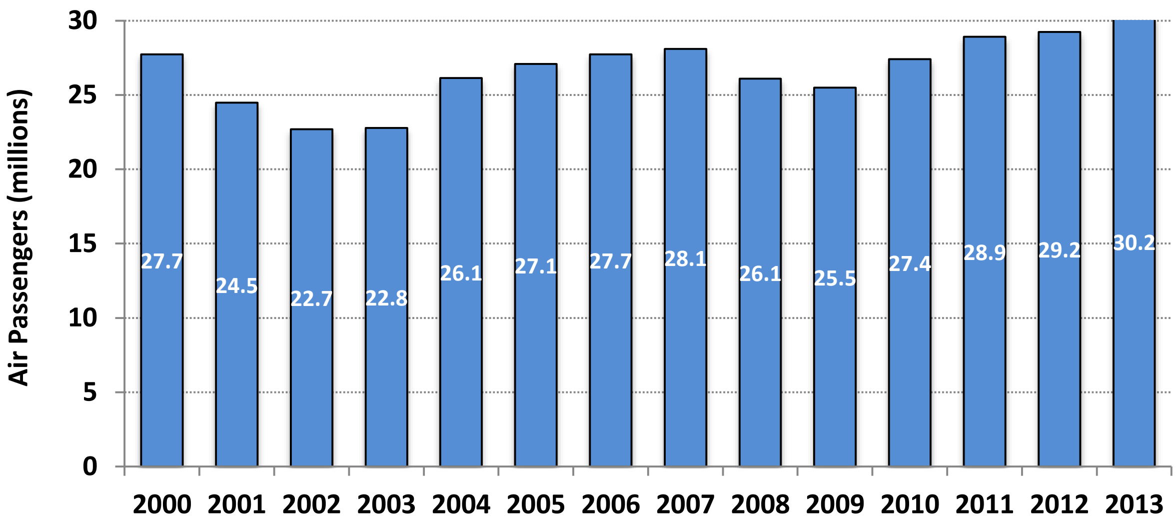
The number of air passengers using Logan Airport grew over the past two years, increasing by 1.1 percent in 2012 compared to 2011 and by 3.4 percent in 2013 compared to 2012 levels. The trend of increasing passenger levels at the Airport reflects continued recovery from the 2008/2009 economic recession; JetBlue Airways' expanding service network; the addition of new international services; and some shift of market share from T.F. Green Airport and Manchester-Boston Regional Airport. The continued growth of JetBlue Airways has contributed the most to overall passenger traffic growth at Logan Airport, offsetting service reductions by recently merged air carriers. Aircraft operations, on the other hand, have decreased slightly since 2011 due to legacy carriers restricting growth in aircraft operations, higher passenger load factors, and the continued move towards larger, more fuel-efficient aircraft.

Notable changes in passenger, operations, and cargo activity at Logan Airport in 2012 and 2013 include:

- The total number of air passengers at Logan Airport increased by 1.1 percent to 29.2 million in 2012 and by 3.4 percent to 30.2 million in 2013, compared to 28.9 million in 2011 (Figures 2-1 and 2-4; Table 2-1). The 2013 passenger level represents a new record high for Logan Airport.
- The total number of aircraft operations[1] fell from approximately 368,987 in 2011 to 354,869 in 2012, a decrease of 3.8 percent. In 2013, aircraft operations increased by 1.8 percent to 361,339. Despite the increase, aircraft operations at Logan Airport remained well below the 487,996 operations accommodated in 2000 and the historic peak of 507,449 operations reached in 1998. Passenger aircraft operations, which accounted for 91 percent of total aircraft operations, increased by 2.4 percent in 2013 after decreasing by 3.9 percent in 2012, compared to 2011 levels.
- General aviation[2] (GA) operations, which accounted for 7 percent of total operations in 2013, decreased by 0.4 percent in 2012 and by 5.1 percent in 2013. This marked a contraction in GA activity after the rebound that occurred in 2010/2011 following the economic downturn. The 26,682 GA operations in 2013 remain well below the 35,233 GA operations that Logan Airport handled in 2000. GA aircraft cannot be based at Logan Airport; these aircraft can currently be based at Hanscom Field and Worcester Regional Airport.
- Airline efficiency continued to increase as the average number of passengers per aircraft operation increased from 78.3 in 2011 to 82.4 in 2012 and 83.6 in 2013. The average number of passengers per aircraft operation in 2012 and 2013 represented approximately 74 percent of average aircraft seat capacity. At Logan Airport, the increasing number of passengers per flight reflects a shift away from smaller aircraft and rising load factors as airlines have reduced or restricted capacity growth after several airline mergers.
- JetBlue Airways is Logan Airport's largest carrier. JetBlue Airways continued to expand, often backfilling markets dropped by others, at Logan Airport. JetBlue increased its total operations by 15.0 percent in 2013, following growth of 8.1 percent in 2012. In 2013, JetBlue Airways accounted for 24.1 percent of total aircraft operations and 26.8 percent of total air passengers at Logan Airport.
- Legacy air carriers (such as Delta Air Lines, American Airlines/US Airways, and United Airlines) maintained or reduced operations levels, while low-cost carriers (LCCs) increased operations. Legacy carriers continued to reduce domestic operations slightly in 2012 and 2013, eliminating less profitable routes. In contrast, LCC operations have steadily increased. LCCs accounted for 33.5 percent of domestic operations at Logan Airport in 2012 and 35.7 percent in 2013, compared to 32.6 percent in 2011. In 2003, LCCs accounted for 9.0 percent of operations (prior to JetBlue Airways' entry), and just 2.9 percent of operations in 2000.
- Air cargo volumes, including shipments transported in the belly compartments of passenger aircraft, decreased from 562 million pounds in 2011 to 553 million pounds in 2012, a decline of 1.4 percent compared to 2011. Over the same period, all-cargo aircraft operations[3] fell by 16.5 percent to 5,237 million pounds. All-cargo aircraft operations fell at a faster rate than cargo volumes, as all-cargo airlines introduced larger capacity aircraft into service at Logan Airport. In 2013 air cargo volumes increased by 0.8 percent to 558 million pounds and all-cargo operations increased by 3.2 percent to 5,403 million pounds compared to 2012.

1 An aircraft operation is defined as one arrival or one departure.
2 General Aviation is defined as all aviation activity other than commercial airline and military operations.
3 An all-cargo aircraft is defined as a dedicated air cargo aircraft that is used exclusively to transport air cargo and not passengers.

Figure 2-1 Passenger Activity Levels at Logan Airport, 2000-2013



Source: Massport
Notes: 2011 Passenger numbers revised to reflect changes in carrier reported figures. Total annual passengers changed from 28,907,938 to 28,909,267.

Air Passenger Levels in 2012 and 2013

The following section provides an overview of air passenger activity levels in 2012 and 2013 for Logan Airport.

Logan Airport Passengers

Air passenger traffic at Logan Airport totaled 29.2 million in 2012, an increase of 1.1 percent over passenger traffic in 2011. In 2013, passenger traffic grew to 30.2 million, an increase of 1.0 million passengers or 3.4 percent between 2012 and 2013. The passenger traffic level in 2013 represents an historic high for Logan Airport, exceeding the previous record of 29.2 million in 2012. Passenger growth at Logan Airport continues to outpace overall U.S. passenger growth. Total scheduled passenger traffic in the U.S. increased by 1.0 percent in 2012 and 1.3 percent in 2013.[4] Factors that contributed to the strong passenger growth at Logan Airport in 2012 and 2013 included:

- Strengthening economic growth and a gradual recovery in air travel demand across the nation;
- JetBlue Airways' continued growth at Logan Airport; and
- The introduction of new international services at Logan Airport.

As shown in Table 2-1, domestic air passengers represent Logan Airport's largest market segment, accounting for 84.6 percent of total passengers in 2013. The domestic passenger market increased slightly by 0.7 percent in 2012 and then grew more strongly by 3.4 percent in 2013. Growth in JetBlue Airways' service network from Logan Airport and modest economic growth were the main contributors to growth in domestic passengers. JetBlue Airways carried 6.6 million domestic passengers at Logan Airport in 2012 and 7.3 million in 2013, compared to 6.2 million in 2011. However, other air carriers at Logan Airport contracted over the past two years after a period of industry consolidation through airline mergers. JetBlue Airways' growth in the domestic market offset losses by other carriers in both 2012 and 2013.

4 Bureau of Transportation Statistics, 2013.

Table 2-1 Air Passengers by Market Segment, 1990, 2000, and 2009-2013

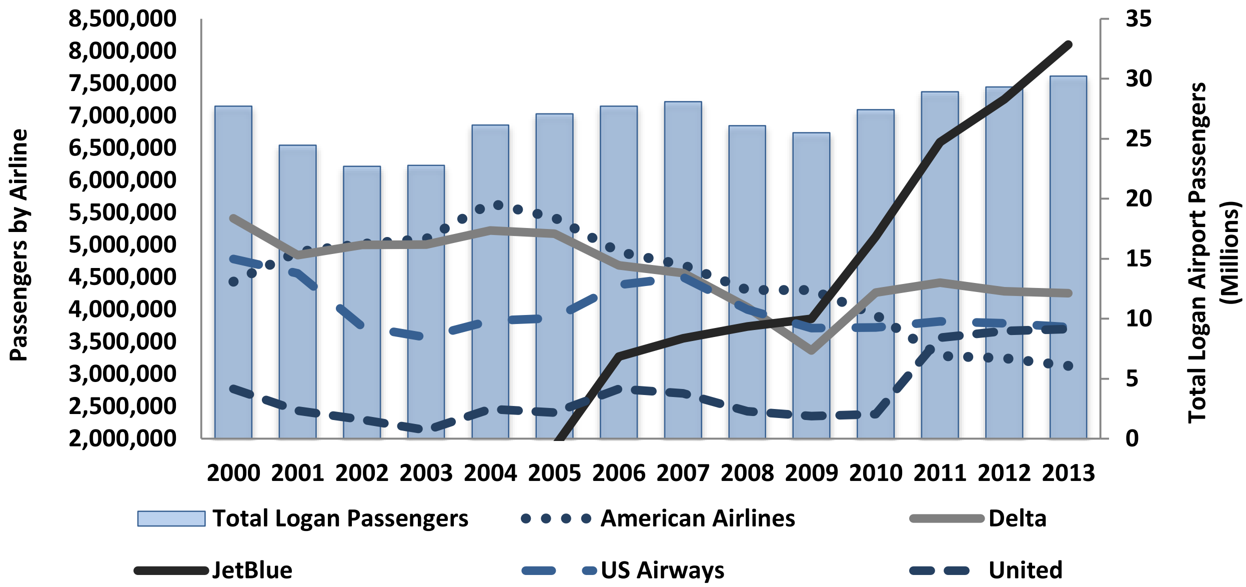
	1990	2000	2009	2010	2011	2012	2013	Percent Change (2011-2012)	Percent Change (2012-2013)	Avg. Annual Growth (2009-2013)
Domestic	**19,519,247**	**23,100,645**	**21,767,086**	**23,688,471**	**24,579,780**	**24,743,008**	**25,578,080**	**0.7%**	**3.4%**	**4.1%**
International	**3,358,944**	**4,513,192**	**3,696,336**	**3,681,739**	**4,215,071**	**4,383,945**	**4,546,018**	**4.0%**	**3.7%**	**5.3%**
Europe/ Middle East	N/A	2,948,542	2,605,825	2,672,635	2,939,226	2,896,002	2,901,529	(1.5%)	0.2%	2.7%
Bermuda/ Caribbean	N/A	693,620	636,719	486,911	700,267	793,953	863,842	13.4%	8.8%	7.9%
Canada	N/A	833,669	453,430	518,088	573,660	614,879	643,987	7.2%	4.7%	9.2%
Asia/Pacific	N/A	37,451	0	0	0	78,484	104,235	New	32.8%	New
Central/South America	N/A	0	362	4,105	1,918	627	32,425	(67.3%)	5,071.5%	207.6%
General Aviation	N/A	**112,996**	**48,664**	**58,752**	**114,416**	**109,134**	**94,872**	**(4.6%)**	**(13.1%)**	**18.2%**
Total Passengers	**22,878,191**	**27,726,833**	**25,512,086**	**27,428,962**	**28,909,267**	**29,236,087**	**30,218,970**	**1.1%**	**3.4%**	**4.3%**

Source: Massport
Notes: Numbers in parenthesis () indicate negative number.
2011 passenger numbers revised to reflect changes in carrier reported figures. Previously reported 2011 total passenger traffic was 28,907,938.
N/A Not available

Figure 2-2 shows the total annual passengers for the five dominant airlines at Logan Airport and highlights the rapid expansion of JetBlue Airways since 2004. Overall, the tremendous LCC growth at Logan Airport over the past decade – particularly the entry of JetBlue Airways in 2004 and its subsequent decision to expand and make Logan Airport one of its focus cities – has exceeded recent consolidation and contraction among other carriers serving Logan Airport.[5] Domestic passenger activity levels have recovered from the recent economic downturn in 2009, when domestic passenger activity levels fell to 21.8 million, reaching a new peak of 25.6 million in 2013.

5 Delta Air Lines and Northwest Airlines merged in 2009, United Airlines and Continental Airlines merged in 2010 and Southwest Airlines and AirTran Airways merged in 2012, but maintained separate schedules and operating identities through 2013. At Logan Airport, total passengers carried by the consolidated Delta Air Lines decreased 3.0 percent in 2012 and 0.7 percent in 2013. Total Logan Airport passengers carried by the consolidated United Airlines decreased by 1.7 percent in 2012 and increased by 5.6 percent in 2013. Total Logan Airport passengers for the combined Southwest Airlines/AirTran Airways entity decreased by 14.8 percent in 2012 and increased by 2.5 percent in 2013.

Figure 2-2 Annual Passengers at Logan Airport Among Top Five Airlines, 2000-2013



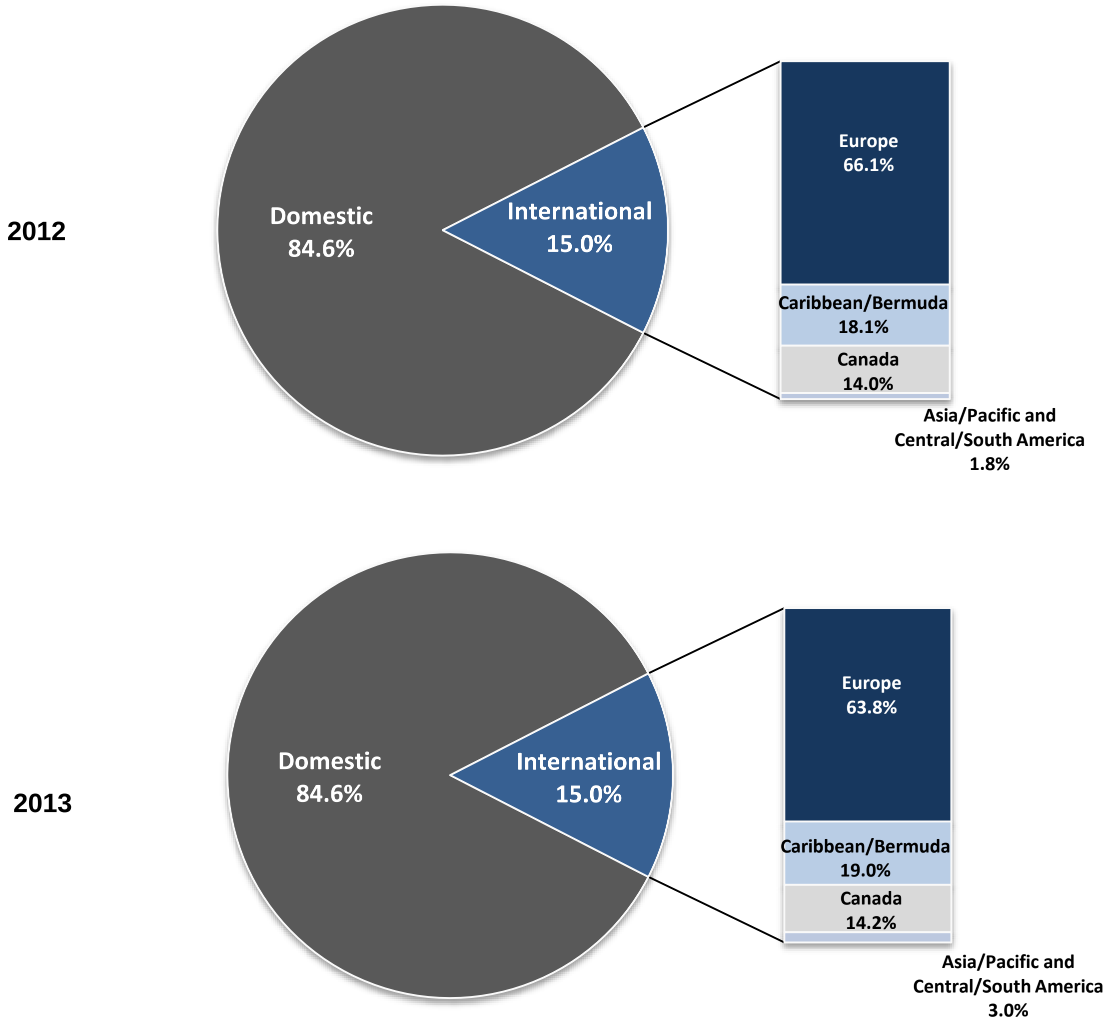
Source: Massport

Notes: United Airlines totals in this chart include Continental Airlines beginning in 2011 (following 2010 merger), Delta Air Lines totals include Northwest Airlines beginning in 2010 (following 2009 merger), and US Airways include America West Airlines beginning in 2005 (following 2005 merger). Totals for American Airlines, Delta Air Lines, United Airlines, and US Airways include Delta Shuttle, US Airways Shuttle, and contract carriers doing business as Delta Connection, United Express, US Airways Express, American Eagle, or American Connection.

Logan Airport also experienced robust growth in international passengers in 2012 and 2013 as airlines introduced new air services. In 2012, total international passengers increased by 4.0 percent over the prior year to 4.4 million, due largely to JetBlue Airways' expanded services to the Caribbean and the introduction of Japan Airlines' nonstop service to Tokyo. The number of international air passengers also increased in 2013, growing by 3.7 percent to 4.5 million, slightly exceeding the previous high level achieved in 2000.

Figure 2-3 shows the distribution of Logan Airport passengers by market segment. International traffic accounted for 15.0 percent of total Logan Airport passengers in both 2012 and 2013. Europe was the dominant international destination market, accounting for 66.1 percent of international traffic in 2012 and 63.8 percent of international traffic in 2013. Passenger traffic to Europe was up 0.2 percent in 2013, compared to a decrease of 1.5 percent between 2011 and 2012. The Bermuda/Caribbean region represented the second largest international market, accounting for 18.1 percent of international passengers in 2012 and 19.0 percent of international passengers in 2013. Traffic to the Bermuda/Caribbean market increased by 8.8 percent in 2013, following a 13.4-percent increase in 2012. The strong growth in the Caribbean market was the result of new JetBlue Airways services. Canada accounted for 14.0 percent of international passengers in 2012 and 14.2 percent of international passengers in 2013. Other international traffic includes limited Asia/Pacific traffic and Central/South America traffic. The Asia/Pacific and Central/South America regions accounted for 2.3 percent and 0.7 percent of total Logan Airport international passengers respectively in 2013.

Figure 2-3 Distribution of Logan Airport Passengers by Market Segment, 2012-2013



Source: Massport
Note: General Aviation accounted for 0.4 percent of Logan Airport passengers in 2012 and 0.3 percent of Logan Airport passengers in 2013.

Aircraft Operation Levels in 2012 and 2013

This section reports on aircraft operations levels for Logan Airport, including passenger aircraft operations, GA operations, all-cargo aircraft operations, and aircraft load factors.

Logan Airport Aircraft Operations

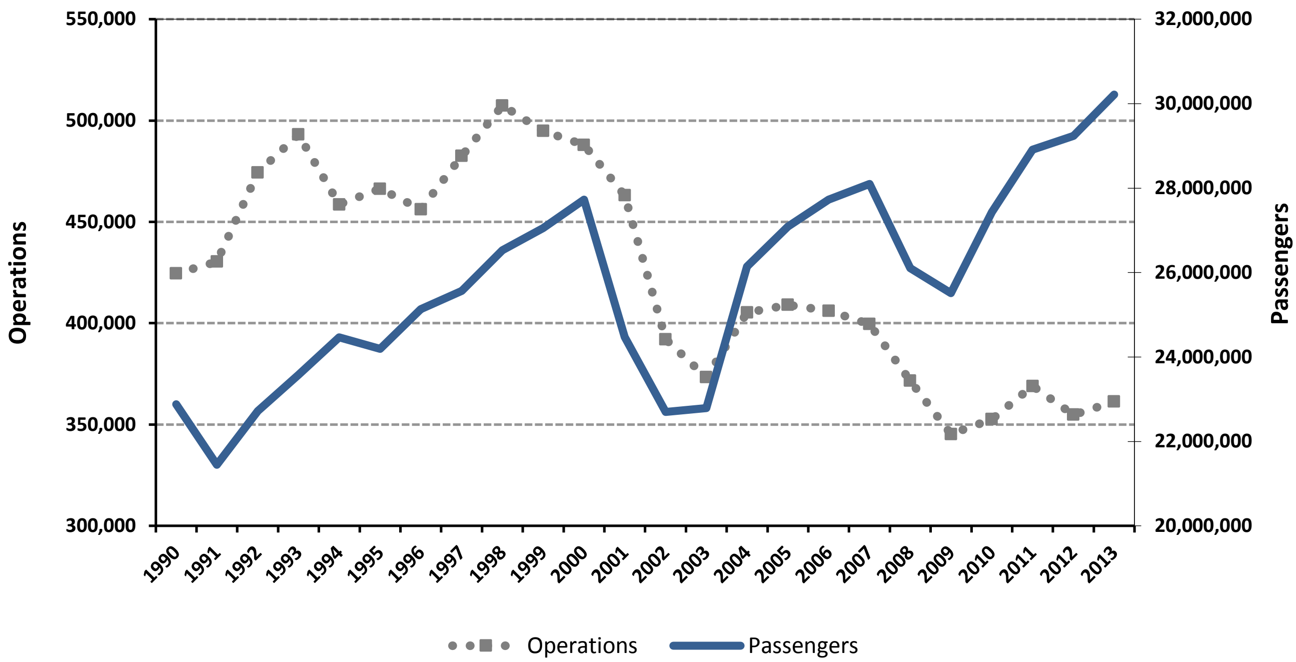
The total number of aircraft operations at Logan Airport (including passenger, GA, and all-cargo) fell by 3.8 percent from 368,987 in 2011 to 354,869 in 2012 (Table 2-2). The decline in aircraft operations in 2012 was primarily attributed to reduced activity brought about by airline consolidations and the cessation of American Eagle services at Logan Airport at the end of 2011. In 2013, aircraft operations increased by 1.8 percent to 361,339 as JetBlue Airways' service expansion offset the effects of further airline industry consolidation at Logan Airport. Overall, aircraft operations have increased at a slower rate than passengers, as a result of continuing increases in passenger load factors (the percentage of seats occupied by paying passengers) and the substitution of larger capacity aircraft for smaller capacity aircraft. Figure 2-4 depicts passengers and operations data since 1990, and shows how passenger levels have grown at Logan Airport while overall aircraft operations have decreased to levels well below the 425,000 operations handled in 1990. From 1990 to 2013, Logan Airport passengers increased by 32.1 percent, while aircraft operations decreased by 14.9 percent.

Table 2-2 Logan Airport Aircraft Operations, 1990, 2000 and 2009-2013

Category	1990	2000	2009	2010	2011	2012	2013	Percent change (2011-2012)	Percent change (2012-2013)	Avg. Annual Growth (2009-2013)
Total Aircraft Operations	**424,568**	**487,996**	**345,306**	**352,643**	**368,987**	**354,869**	**361,339**	**(3.8%)**	**1.8%**	**1.1%**
Operations by Type and Aircraft Class										
Passenger Operations										
Passenger Jet	N/A	254,968	205,341	214,307	223,083	225,166	233,072	0.9%	3.5%	3.2%
Passenger Regional Jet	N/A	37,600	70,198	66,498	61,704	46,753	47,875	(24.2%)	2.4%	(9.1%)
Passenger Non-Jet	N/A	147,913	50,867	50,882	49,700	49,599	48,307	(0.2%)	(2.6%)	(1.3%)
Total	**N/A**	**440,481**	**326,406**	**331,687**	**334,487**	**321,518**	**329,254**	**(3.9%)**	**2.4%**	**0.2%**
General Aviation Operations										
General Aviation Jet Operations	N/A	20,595	8,988	11,430	21,129	21,042	21,237	(0.4%)	0.9%	24.0%
General Aviation Non-Jet Operations	N/A	14,638	3,254	3,252	7,101	7,072	5,445	(0.4%)	(23.0%)	13.7%
Total	**24,976**	**35,233**	**12,242**	**14,682**	**28,230**	**28,114**	**26,682**	**(0.4%)**	**(5.1%)**	**21.5%**
Cargo Operations										
Cargo Jet	N/A	11,788	5,431	5,332	5,053	4,220	4,647	(16.5%)	10.1%	(3.8%)
Cargo Non-Jet	N/A	494	1,227	942	1,217	1,017	756	(16.5%)	(25.6%)	(11.4%)
Total	**N/A**	**12,282**	**6,658**	**6,274**	**6,270**	**5,237**	**5,403**	**(16.5%)**	**3.2%**	**(5.1%)**

Source: Massport
Notes: Jet includes the Embraer E-190, which is a regional jet configured with 88-100 seats, but is similar in size to some traditional narrow-body jets.
Numbers in parenthesis () indicate negative number.
N/A Not available

Figure 2-4 Logan Airport Historical Air Passengers and Aircraft Operations, 1990-2013



Source: Massport

Passenger Operations

The majority of aircraft operations conducted at Logan Airport are for passenger service. Passenger aircraft operations represented 91.1 percent of Logan Airport's total aircraft operations in 2013. Logan Airport accommodated 321,518 passenger aircraft operations in 2012, a decrease of 3.9 percent from 2011. In 2013, passenger aircraft operations grew by 2.4 percent to 329,254, compared to 2012.

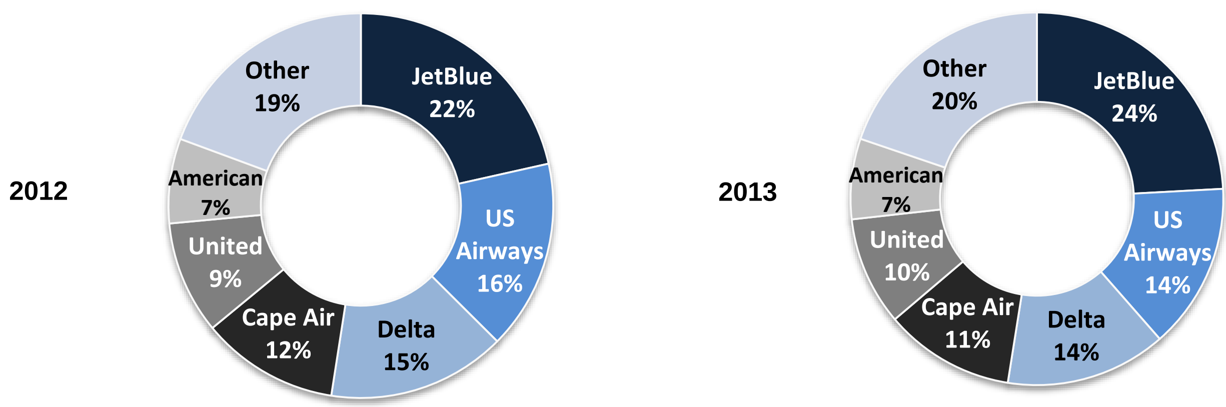
The dominant carriers at Logan Airport based on the number of aircraft operations in 2013 are shown in Figure 2-5. JetBlue Airways, US Airways, Delta Air Lines, Cape Air, United Airlines, and American Airlines were the top carriers at Logan Airport in both 2012 and 2013 based on the number of aircraft operations.[6] In 2012, JetBlue Airways accounted for 69,112 operations, US Airways accounted for 51,335 operations, and Delta Air Lines ranked third with 48,227 operations. In 2013, JetBlue Airways grew to 79,512 operations, US Airways decreased to 47,411 operations, and Delta Air Lines decreased to 45,945 operations. Cape Air, United Airlines, and American Airlines ranked fourth, fifth, and sixth, respectively, with 23,000 to 37,000 operations each in both 2012 and 2013.

6 Airline rank is based on total number of operations for carrier "families," including activity for all regional airlines partners and subsidiaries.

Passenger regional jet (RJ) operations (jet aircraft with fewer than 100 seats) fell substantially by 24.4 percent in 2012, while jet and non-jet passenger operations remained relatively stable.[7] In 2013, jet and RJ operations increased over the prior year by 3.5 percent and 2.4 percent, respectively. RJ operations declined annually from 2006 to 2012, as airlines eliminated unprofitable services to small and medium size markets and consolidated services after a period of airline mergers. The decreases in RJ operations reflected the retirements of smaller RJs with 30 to 50 seats, which are not cost-effective in the current high fuel price environment. The growth in RJs at Logan Airport that occurred in 2013 reflects the airlines' increasing use of larger RJs with 60 to 90 seats, which accounted for 60.7 percent of domestic RJ operations in 2013.

Passenger operations in non-jet aircraft (turboprop or piston aircraft) declined by 0.2 percent in 2012 and by 2.6 percent in 2013. The change in the aircraft mix of passenger flights at Logan Airport since 2000 is shown in Figure 2-6. RJs accounted for 15 percent of total passenger operations in 2013, compared to 31 percent at the peak level in 2005. Similarly, non-jets have declined from a high of 34 percent in 2000 to 15 percent in 2013.

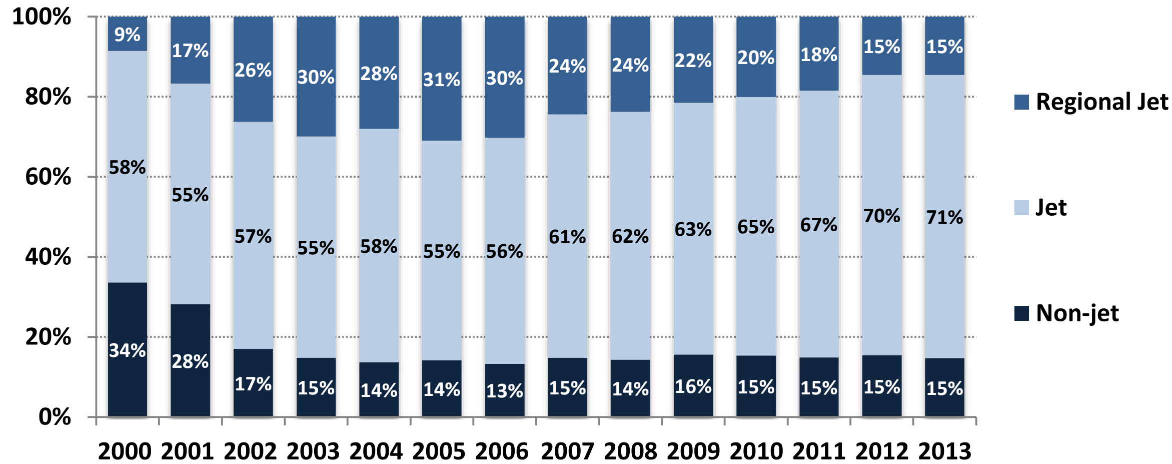
Figure 2-5 Dominant Passenger Carriers at Logan Airport by Aircraft Operations, 2012-2013



Notes: Totals for American Airlines, Delta Air Lines, United Airlines, and US Airways include all regional affiliates and contract carriers.
"Other" category includes all other carriers that have a smaller portion of aircraft operations at Logan Airport. This category includes but is not limited to Southwest Airlines, AirTran Airways, Air Canada, Porter Airlines, British Airways, and Lufthansa, which provide year-round and seasonal service to Logan Airport.

7 In this report, the term regional jet refers to small jet aircraft with fewer than 90 seats. The Embraer-190, operated by JetBlue Airways and US Airways at Logan Airport, carries up to 100 and 99 passengers respectively, and is considered a jet.

Figure 2-6 Passenger Aircraft Operations at Logan Airport by Aircraft Type, 2000-2013



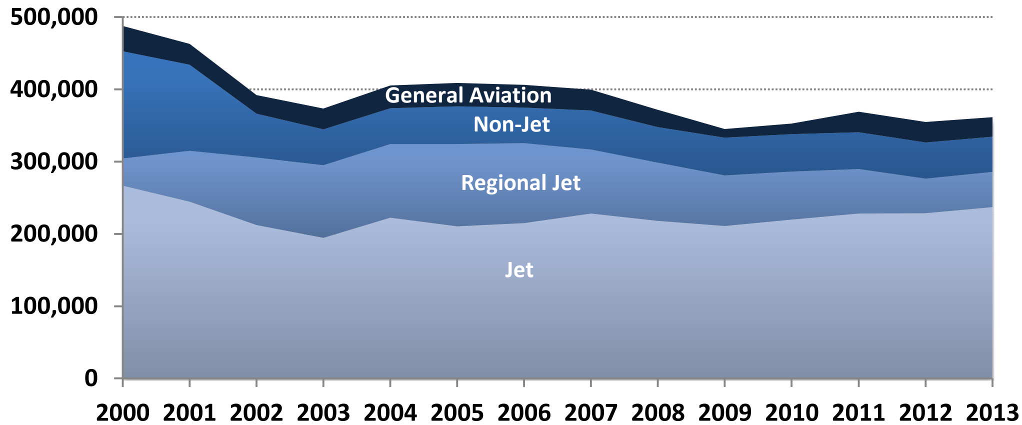
Source: Massport
Notes: Aircraft mix in 2013 is 70.8 percent regional jet, 14.5 percent jet, and 14.7 percent non-jet.
Totals may not sum to 100 due to rounding.

General Aviation Operations

GA is defined as all aviation activity other than commercial airline and military operations. It encompasses a variety of aviation activities at Logan Airport including corporate/business aviation, private business jet charters, law-enforcement, and emergency medical/air ambulance services at Logan Airport. GA operations are conducted with a diverse group of private and business aviation aircraft ranging from single-engine piston driven aircraft to high-performance, long-range jets. In 2010 and 2011, GA activity at Logan Airport showed a recovery from the steep decline during the 2008/2009 economic recession. However, GA operations declined in 2012 and 2013 by 0.4 percent and 5.4 percent, respectively, as a result of economic uncertainty and sluggish economic growth. GA operations totaled 26,682 operations in 2013, down from 28,114 operations in 2012 and 28,230 in 2011.

In 2013, GA operations accounted for 7.4 percent of aircraft activity at Logan Airport (26,682 operations). In comparison, Hanscom Field accommodated approximately 153,640 GA operations in 2013, including 26,915 business jet operations. GA operations represented 99.6 percent of Hanscom Field's aircraft activity. Hanscom Field remains the primary GA airport for the Greater Boston region, accommodating close to six times the number of GA operations than at Logan Airport. Figures 2-6 and 2-7 depict changes in Logan Airport aircraft operations by category since 2000.

Figure 2-7 Aircraft Operations at Logan Airport by Aircraft Class, 2000-2013



Source: Massport
Notes: Jet, regional jet, and non-jet operations are associated with commercial passenger and all-cargo airlines.
General Aviation operations also include jet and non-jet aircraft, but are associated with private charter and corporate use.

All-Cargo Operations

Operations by cargo-dedicated aircraft increased by 3.2 percent in 2013 after a 16.5-percent reduction in 2012. Changes in all cargo aircraft operations reflect changes in demand, which is strongly linked to economic activity, and changes in the aircraft fleets of cargo airlines, which are moving to larger capacity aircraft. The all-cargo segment represents less than 2 percent of aircraft activity at Logan Airport, or 5,403 operations in 2013.

Passengers Per Aircraft and Load Factors

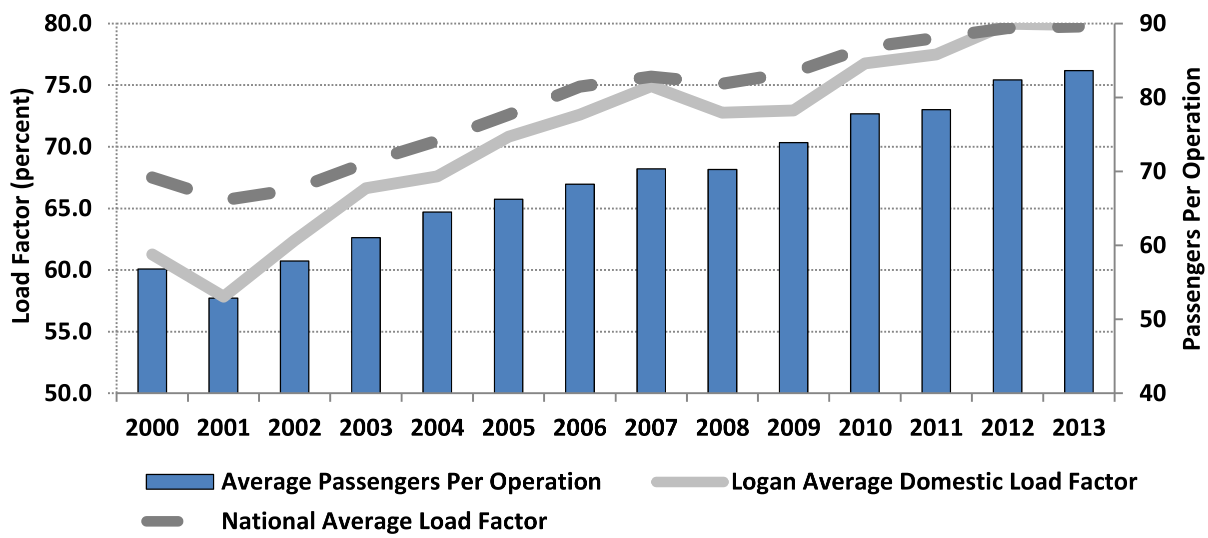
The average number of passengers per aircraft operation increased in 2012 and 2013, continuing the trend seen over the past decade. An increase in the average number of passengers per aircraft operation indicates an increase in the average aircraft seating capacity and/or an increase in the percentage of aircraft seats occupied by passengers (i.e., load factor). In 2013, Logan Airport operations accommodated an average of 83.6 passengers per flight compared to 82.4 in 2012 and 78.3 in 2011 (Table 2-3). The average number of passengers per flight has risen by 13.2 percent since 2009, when the average number of passengers per flight was 73.9. At Logan Airport the increasing number of passengers per flight reflects a shift away from smaller aircraft and rising load factors as airlines have retired many of the small RJs, introduced larger capacity, new generation narrow-body jets, and restricted capacity growth. In 2012, Logan Airport's average domestic load factor increased to 80.0 percent from 77.5 percent in 2011. Logan Airport's average load factor was releatively unchanged in 2013 at 79.9 percent. The national average domestic load factor has also been increasing, rising to 79.8 percent in 2013 from 78.8 percent in 2011.[8] Changes in passengers per operation and load factor are shown in Figure 2-8.

8 U.S. Department of Transportation, T100 Database.

Table 2-3	Air Passengers and Aircraft Operations, 2009-2013							
Year	Air Passengers	Percent Change from Previous Year	Aircraft Operations	Percent Change	Average Number of Passengers per Operation	Net Change from Previous Year	Logan Airport Average Domestic Load Factor	Net Change from Previous Year
2009	25,512,086	(2.3%)	345,306	(7.1%)	73.9	3.6	73.0%	0.2
2010	27,428,962	7.5%	352,643	2.1%	77.8	3.9	76.8%	3.8
2011	28,909,267	5.4%	368,987	4.6%	78.3	0.6	77.5%	0.7
2012	29,235,643	1.1%	354,869	(3.8%)	82.4	4.0	80.0%	2.5
2013	30,218,631	3.4%	361,339	1.8%	83.6	1.2	79.9%	(0.1)

Sources: Massport; U.S. Department of Transportation, T100 Database
Notes: Numbers in parenthesis () indicate negative number.
2011 passenger numbers revised to reflect changes in carrier reported figures. Previously reported 2011 total passenger traffic was 28,907,938.

Figure 2-8 Passengers per Aircraft Operation and Load Factor, 2000-2013



Source: Massport

Airline Passenger Service in 2012 and 2013

Airlines can adjust service at an airport or on a specific route in two ways: changing the number of flights operated, or changing the size of the aircraft. Changes in flight frequency and changes in aircraft size both affect the number of seats available to passengers, also known as seat capacity. Airline services are therefore typically discussed in terms of seat capacity as well as the number of flight departures.[9] This section examines changes in airline departures and seat capacity at Logan Airport in 2012 and 2013 and provides an overview of new and discontinued routes.

9 A departure is an aircraft take-off at an airport. While aircraft operations include both departures and arrivals, airline services are typically described in terms of departures, as the number of scheduled departures generally equals the number of scheduled arrivals. Changes in departures translate to changes in overall operations.

Service Developments at Logan Airport

In 2012, 29 airlines provided scheduled passenger service from Logan Airport to 106 non-stop destinations and in 2013, 29 airlines provided scheduled passenger service to 107 non-stop destinations. The major changes in Logan Airport's scheduled passenger services in 2012 and 2013 are described below. The average non-stop stage length (the average length of non-stop flights) of scheduled domestic flights from Logan Airport increased slightly in 2012 and 2013 to 889 and 899 miles respectively from 751 miles in 2011. The average non-stop stage length of scheduled international flights increased from 1,699 miles in 2011 to 1,714 miles in 2012 and 1,768 miles in 2013.

Changes in Domestic Passenger Service

As shown in Table 2-4, the total number of scheduled domestic flights at Logan Airport decreased by 4.6 percent in 2012, with decreases in all categories. Legacy carrier flights fell as airline industry consolidation continued and reductions in LCC flights resulted from a merger between Southwest Airlines and AirTran Airways and the elimination of redundant services at Logan Airport. Regional commuter flights were down by 10.9 percent in 2012 due primarily to the discontinuation of American Eagle services at the end of 2011.

In 2013, scheduled domestic flights increased by 2.8 percent. Growth by LCCs, mainly JetBlue Airways, offset legacy airline reductions, which continued as carriers adjusted their networks following several major mergers. Total domestic LCC operations grew by 9.5 percent in 2013, increasing to 104,014 from 95,002 operations in 2012. LCCs accounted for 35.7 percent of Logan Airport's total scheduled domestic operations in 2013. JetBlue Airways, the dominant LCC at Logan Airport, continued to expand, increasing its domestic operations by 16.1 percent from 63,210 operations in 2012 to 73,374 operations in 2013. Domestic regional/commuter flights remained relatively flat, increasing by just 0.2 percent in 2013.

Table 2-4 Domestic Air Passenger Operations by Airline Category, 2009-2013

Category	2009	2010	2011	2012	2013	Percent change 2011-2012	Percent change 2012-2013	Avg. Annual Growth (2009-2013)
Total Jet Operations	**184,181**	**203,081**	**207,369**	**203,376**	**211,176**	**(1.9%)**	**3.8%**	**3.5%**
Legacy Carriers	124,147	117,877	111,761	108,374	107,162	(3.0%)	(1.1%)	(3.6%)
Low-Cost Carriers	60,034	85,204	95,608	95,002	104,014	(0.6%)	9.5%	14.7%
Regional/Commuter	107,615	94,535	89,586	79,790	79,922	(10.9%)	0.2%	(7.2%)
Total Scheduled Domestic	**291,796**	**297,616**	**296,955**	**283,166**	**291,098**	**(4.6%)**	**2.8%**	**(0.1%)**

Source: Massport

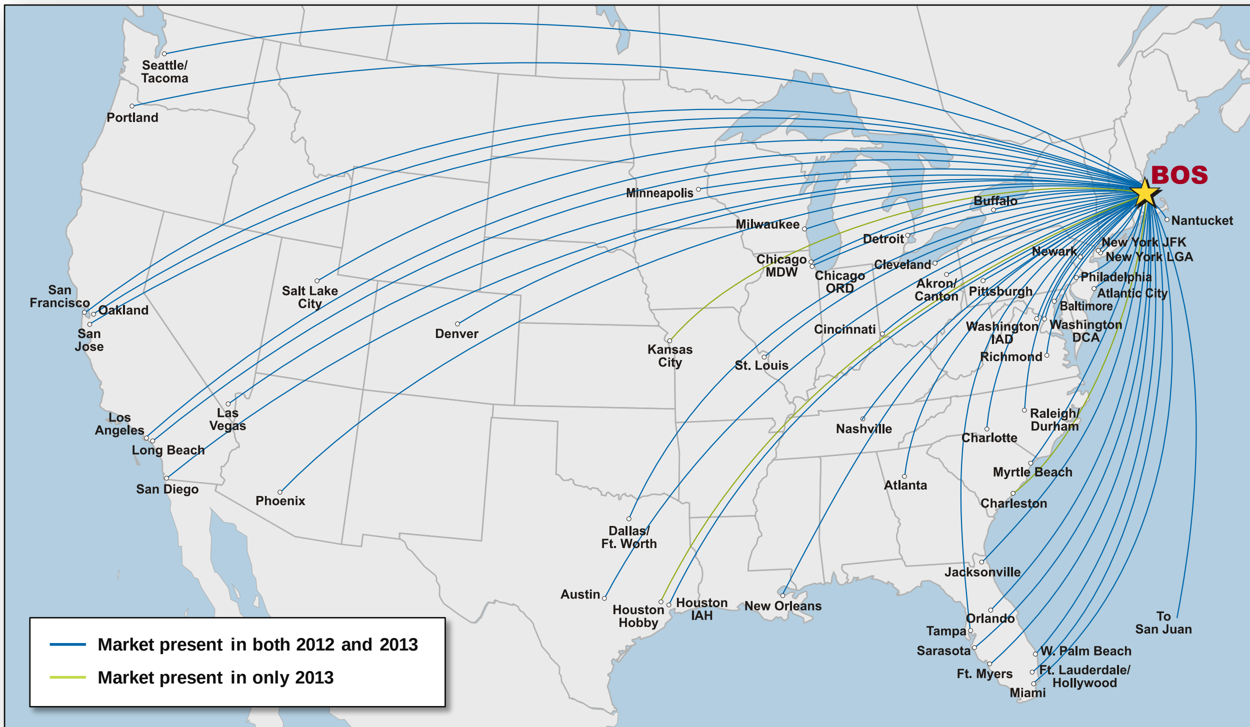
Notes: LCCs serving Logan Airport in 2013 included AirTran Airways, Frontier, JetBlue Airways, Southwest Airlines, Spirit Airlines, Sun Country Airlines, and Virgin America.
Numbers in parenthesis () indicate negative number.

Service changes at Logan Airport in 2012 and 2013 reflect JetBlue Airways' service expansion at Logan Airport, service reductions by merged carriers in the process of rationalizing their service networks, and the introduction of new long-haul international services. Highlights of key airline service changes are summarized below.

- JetBlue Airways added several new markets to its Logan Airport network as it progressed towards its goal of operating 150 daily departures by 2015. In 2012, JetBlue Airways introduced new nonstop services to Dallas-Fort Worth and Nantucket (seasonal service). New JetBlue Airways markets in 2013 included Charleston, SC, Houston Hobby, and Philadelphia.
- American Airlines increased service frequency to New York JFK from three daily narrow-body jet departures in 2012 to four daily in 2013.
- Delta Air Lines discontinued nonstop services from Logan Airport to Washington National Airport and Pittsburgh in 2012 and eliminated service to Kansas City in 2013. New markets added in 2013 included Charleston, SC, Los Angeles (seasonal), and Myrtle Beach (seasonal). In 2012, Delta Air Lines also down-gauged capacity in the New York LaGuardia Shuttle market by replacing all Airbus 319 narrow-body jets (124 seats) with smaller capacity Embraer 175 RJs (76 seats).
- Frontier Airlines withdrew entirely from the Logan Airport market in 2012, discontinuing nonstop services to Milwaukee and Kansas City.
- US Airways eliminated non-jet services to Albany, Bar Harbor, ME, Plattsburgh, NY, and Presque Isle, ME in 2012.
- PenAir began regional non-jet services to Bar Harbor, ME, Plattsburgh, NY, and Presque Isle, ME in 2012. These services replaced services formerly provided by US Airways under the U.S. Department of Transportation's Essential Air Service program, which subsidizes service to eligible small, rural communities. In 2013, PenAir added non-jet service to Islip, NY.
- Spirit Airlines added seasonal services to Dallas-Fort Worth and Ft. Myers in 2012. However, in 2013 Spirit reduced seasonal flights to Atlantic City, Chicago O'Hare, and Dallas-Fort Worth.
- Southwest Airlines continued the integration of AirTran Airways into its route network after completing a merger in May 2011. At Logan Airport in 2012, the combined entity operated flights under both the AirTran Airways and Southwest Airlines brands. Significant changes at Logan Airport included the discontinuation of services to Newport News, Philadelphia, and Phoenix in 2012 and to Sarasota/Bradenton (seasonal) in 2013. The carrier also reduced service frequency in the Baltimore market to eliminate redundant flights. Southwest Airlines also reduced service frequency in the Orlando market. In 2013, Southwest Airlines introduced new services to Houston Hobby and Kansas City.
- United Airlines made multiple adjustments to service frequencies and aircraft in individual markets, often on a seasonal basis, as it continued to adjust its network after merging with Continental Airlines in 2010. Notable changes included a reduction in peak season service to Washington Dulles from seven daily flights (including flights operated by its regional carrier partners) in 2011 to five daily flights in 2013. Service to San Francisco was increased from six daily departures during the 2011 summer peak to eight daily departures during the 2013 peak season.
- Virgin America increased summer season services to Los Angeles from two daily flights in 2011 to three in 2012 and similarly increased service frequency from two to four daily flights in the San Francisco market. In 2013, Virgin America maintained the same peak season services to Los Angeles and San Francisco but adjusted off-peak services downward.

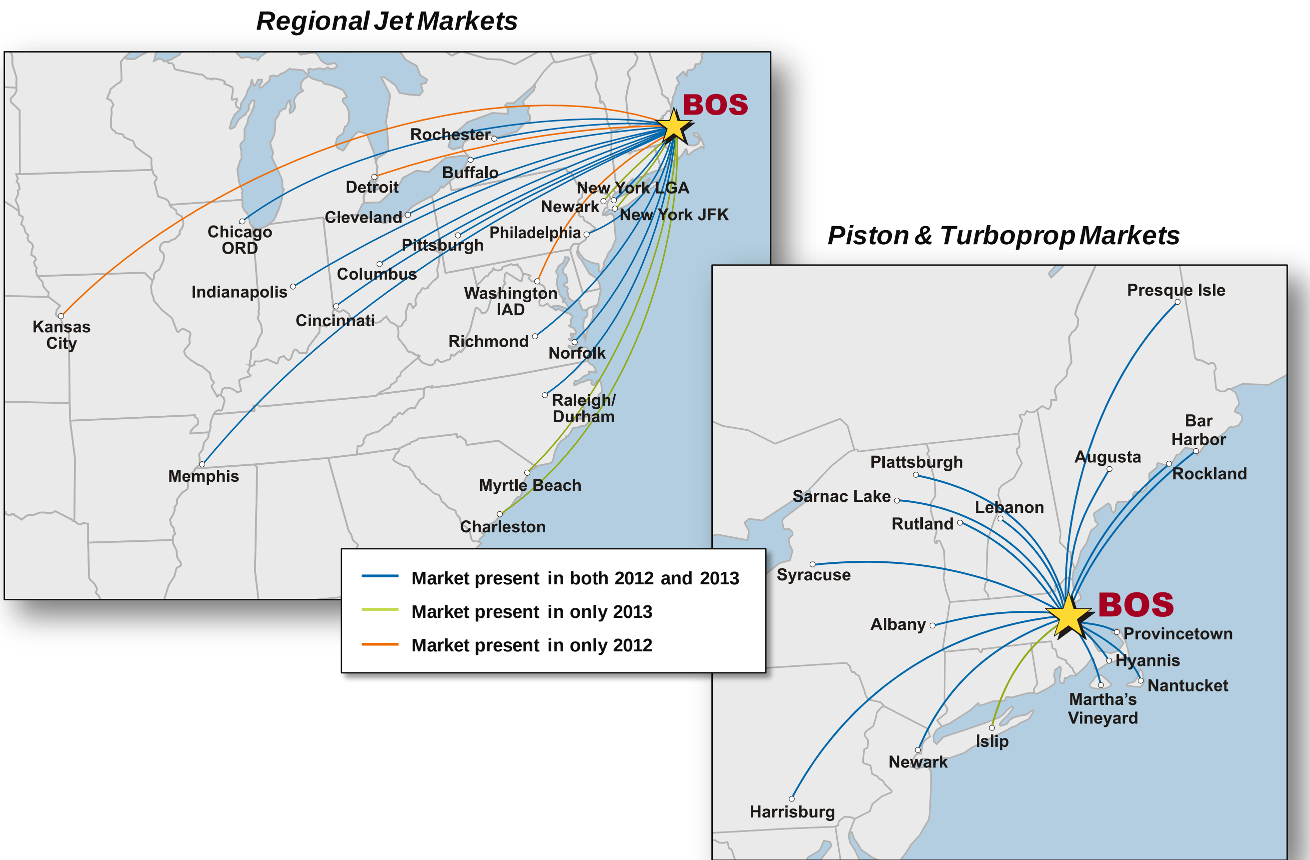
A complete listing of all changes in scheduled departures by domestic destination is in *Appendix E, Activity Levels*. Logan Airport's scheduled domestic large jet and domestic regional services in 2013 are illustrated in Figure 2-9 and Figure 2-10.

Figure 2-9 Domestic Non-stop Large Jet Markets Served from Logan Airport, August 2012 and 2013



Source: Official Airline Guide

Figure 2-10 Domestic Passenger Non-stop Regional Markets Served from Logan Airport, August 2012 and 2013



Source: Official Airline Guide
Note: Figure shows continued service to smaller, remote New England airports beyond the 10 regional airports described in *Chapter 4, Regional Transportation*.

Changes in International Passenger Service

Total scheduled international passenger operations at Logan Airport increased by 2.1 percent in 2012 followed by a slight 0.6-percent reduction in 2013. There were approximately 38,000 annual international passenger operations at Logan Airport in 2012 and 2013, as summarized in Table 2-5 (for details on the changes in operations by carrier, see *Appendix E, Activity Levels*). The Canadian market, Logan Airport's largest international destination region in terms of aircraft operations, increased by 3.1 percent in 2012 and then decreased by 3.9 percent the following year. Passenger operations to the Europe/Middle East market decreased 6.0 percent in 2012 and 2.6 percent in 2013. Nevertheless, the Europe/Middle East market remains the second largest international market in terms of operations and the largest in passengers. Operations to the Bermuda/Caribbean market increased significantly by 11.5 percent in 2012 and again by 4.1 percent in 2013. Logan Airport's scheduled international air service markets are shown in Figure 2-11.

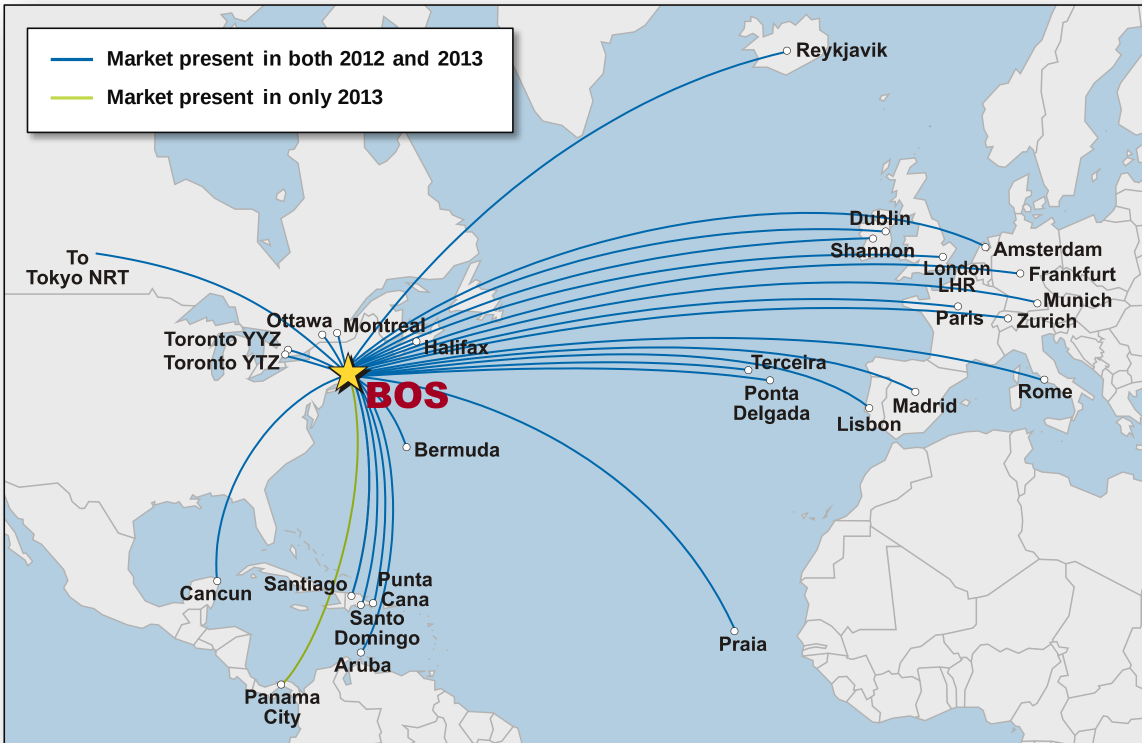
Table 2-5 International Passenger Operations by Market Segment, 2009-2013								
Category	2009	2010	2011	2012	2013	Percent change 2011-2012	Percent change 2012-2013	Avg. Annual Growth (2009-2013)
Canada	14,815	16,399	16,290	16,787	16,125	3.1%	(3.9%)	2.1%
Europe/Middle East	12,960	12,750	14,782	13,890	13,530	(6.0%)	(2.6%)	1.1%
Bermuda/Caribbean[1]	6,103	4,116	6,054	6,752	7,031	11.5%	4.1%	3.6%
Asia	0	0	0	474	646	n/a	36.3%	n/a
Central/South America	0	0	0	0	347	n/a	n/a	n/a
Total Scheduled International	**33,878**	**33,265**	**37,126**	**37,903**	**37,679**	**2.1%**	**(0.6%)**	**2.7%**

Source: Massport
Notes: Numbers in parenthesis () indicate negative number.
1 Includes Puerto Rico and U.S. Virgin Islands.

New and expanded international passenger service at Logan Airport in 2012 and 2013 included the following:

- In 2012, JetBlue Airways expanded its service offering to the Caribbean adding new nonstop seasonal service to Grand Cayman (Cayman Islands) and increasing service frequencies to Providenciales (Turks and Caicos Islands), Punta Cana (Dominican Republic), St. Maarten, Santiago (Dominican Republic), and Santo Domingo (Dominican Republic). JetBlue Airways did not add any new Caribbean destinations from Boston in 2013.
- Japan Airlines initiated new, nonstop service to Tokyo Narita in April 2012. The service, operated with the Boeing 787 Dreamliner, is Logan Airport's first nonstop service to Asia and the first U.S. airport to receive regularly scheduled service with Boeing 787 Dreamliner aircraft.
- Aer Lingus added peak summer season frequencies to the Dublin and Shannon markets in 2012 and 2013.
- Air Canada reduced nonstop service to Montreal from seven daily flights in 2012 to six daily flights in 2013.
- In 2012, American Airlines eliminated its seasonal services to Santo Domingo and withdrew services from the Toronto market. American Airlines also discontinued three daily departures to London Heathrow in 2013.
- British Airways, a Oneworld alliance partner with American Airlines, increased nonstop services to London Heathrow from three daily flights in 2012 to four daily in 2013.
- Copa Airlines introduced new nonstop service to its Panama City connecting hub in July 2013.
- Delta Air Lines discontinued its summer season services to Paris Charles De Gaulle in 2012, but reinstated the service for the summer 2013 season.
- Iceland Express discontinued seasonal services to Reykjavik in 2012.
- Icelandair increased its peak season services to Reykjavik from 14 weekly flights in 2012 to 18 weekly flights in 2013.
- Porter Airlines increased its service to Toronto from five daily departures during the 2012 summer season to seven daily peak season departures in 2013.

Figure 2-11 International Non-stop Markets Served from Logan Airport, August 2012 and 2013



Source: Official Airline Guide Market Files

Cargo Activity Levels in 2012 and 2013

In 2012, Logan Airport ranked 23rd among U.S. airports in total cargo volume.[10] In 2013, Logan Airport ranked 21st among U.S. airports.[11] Air cargo is carried in the belly compartments of passenger aircraft or by dedicated all-cargo carriers, such as FedEx, UPS, and DHL, in all-cargo aircraft. The express/small package segment dominates Logan Airport cargo activity, accounting for 60.0 percent of the total non-mail cargo volume. Table 2-6 shows all-cargo aircraft operations and cargo volumes at Logan Airport for 1990, 2000, and 2009 to 2013.

In 2012, the number of all-cargo aircraft operations at Logan Airport decreased by 16.5 percent while total cargo volume, including mail, only fell slightly by 1.4 percent (Table 2-6). Operations fell at a faster rate as cargo airlines introduced larger capacity aircraft into their fleets and retired older, smaller capacity models. In 2013, the number of all-cargo operations at Logan Airport increased by 3.2 percent and total cargo volume grew by 0.8 percent. From 2009 to 2013, all-cargo operations at Logan Airport declined by approximately 5.1 percent per year, while cargo volume increased slightly by approximately 0.5 percent per year. A number of factors are responsible for the decline in cargo shipments (including freight, express and non-express mail

10 Airports Council International, 2012 World Airport Traffic Report. http://www.aci-na.org/content/airport-traffic-reports accessed September 2014.
11 Airports Council International, 2013 World Airport Traffic Report. http://www.aci-na.org/content/airport-traffic-reports accessed September 2014.

and packages) at Logan Airport, as well as nationally. Cargo carriers, particularly the integrators that provide door-to-door delivery services, have significantly increased their use of trucks to move cargo in shorter haul markets because it is more cost-effective than air transport. In addition, the widespread acceptance and use of the internet and e-mail has greatly reduced mail volumes overall.

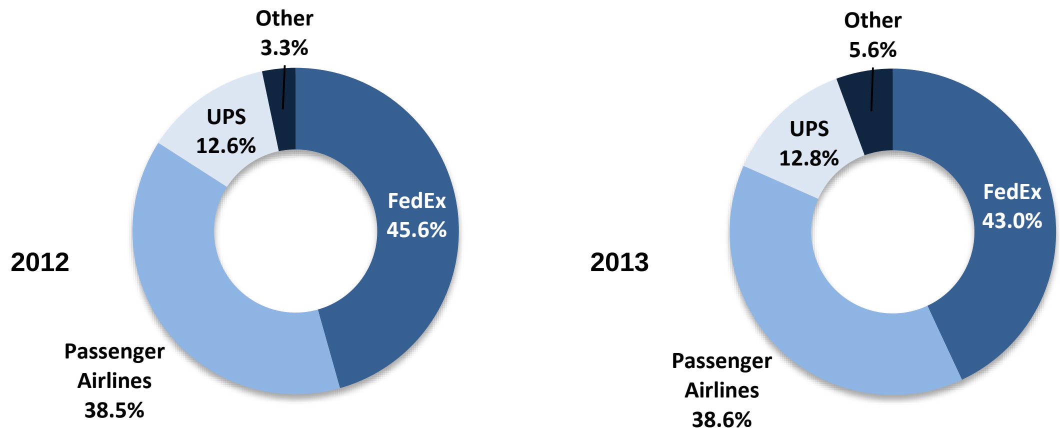
FedEx was the largest air carrier in terms of air cargo volume at Logan Airport in 2012 and 2013. FedEx carried 45.6 percent of the total cargo volume through Logan Airport in 2012 and 43.0 percent of the Airport's total cargo volume in 2013. UPS was the next largest cargo operator and accounted for 12.8 percent of Logan Airport's cargo volume in 2012 and 12.6 percent of the Airport's cargo volume in 2013. Combined, the all-cargo carriers at the Airport carried a total of 337 million pounds and 343 million pounds of air cargo in 2012 and 2013 respectively. Passenger airlines carried 38.5 percent, or 210 million pounds, of Logan Airport's cargo as belly cargo in 2012 and 38.6 percent, or 215 million pounds, of the Airport's cargo as belly cargo in 2013. These numbers are presented in Figure 2-12.

Table 2-6 Cargo and Mail Operations and Volume, 2009-2013

	1990	2000	2009	2010	2011	2012	2013	Percent change (2011-2012)	Percent change (2012-2013)	Avg. Annual Growth (2009-2013)
All-Cargo Aircraft Operations	N/A	N/A	6,658	6,274	6,270	5,237	5,403	(16.5%)	3.2%	(5.1%)
Volume (lbs.)										
Express/Small Packages	N/A	484,490,143	326,475,030	339,485,424	332,896,322	327,234,464	334,315,119	(1.7%)	2.2%	0.6%
Freight	N/A	367,857,011	191,082,152	206,893,979	204,055,228	204,596,956	203,877,671	0.3%	(0.4%)	1.6%
Mail	119,818,113	194,902,513	28,802,366	25,904,205	24,566,806	21,546,316	19,407,316	(12.3%)	(9.9%)	(9.4%)
Total	**753,253,075**	**1,047,259,667**	**546,359,548**	**572,283,608**	**561,518,356**	**553,377,736**	**557,600,528**	**(1.4%)**	**0.8%**	**0.5%**

Source: Massport
Note: Numbers in parenthesis () indicate negative number.
N/A Not available

Figure 2-12 Cargo Carriers – Share of Logan Airport Cargo Volume, 2012-2013



Note: Passenger planes carry cargo as belly cargo (in the belly of planes).

3

Airport Planning

Introduction

This chapter describes the status of projects underway or completed at Logan Airport in 2012 and 2013 and provides an update through the filing of this report. Specific topics include terminal area projects, service area projects, buffer/open space projects, Airport parking projects, airside area projects, high occupancy vehicle (HOV) improvements, and Airport-wide projects.

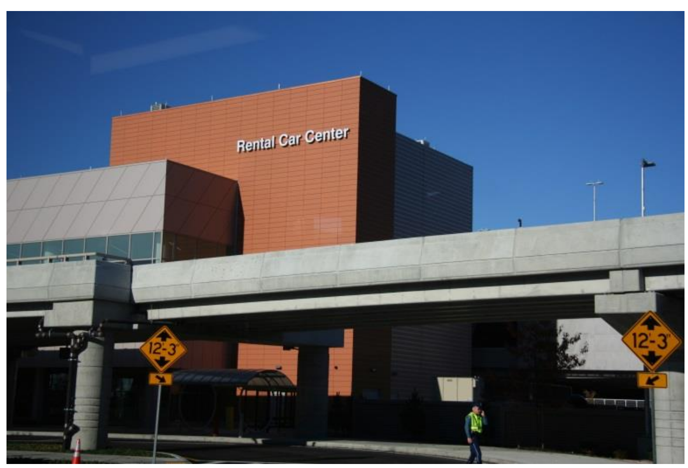
As discussed in *Chapter 1, Introduction/Executive Summary* of this *2012/2013 Environmental Data Report (EDR)*, any proposed project that triggers a threshold under the Massachusetts Environmental Policy Act (MEPA) or the National Environmental Policy Act (NEPA) will undergo the appropriate project-specific state and/or federal environmental review.

2012/2013 Planning Highlights

Recent progress on planning initiatives and individual projects at Logan Airport during 2012 and 2013 are described below.

Airport Projects

- **Southwest Service Area (SWSA) Redevelopment Program (EEA 14137).** Consolidation of rental car operations and associated shuttle bus service into a single coordinated shuttle bus fleet operation resulted in customer service improvements, reduced vehicle miles traveled (VMT) and associated emission reductions, and stormwater system enhancements. In 2010, construction began on the new Rental Car Center (RCC), and rental car and bus operations began in the centralized facility on September 25, 2013.



Rental Car Center
Source: Massport

Work remaining includes constructing quick turnaround areas, a permanent taxi pool, bus, and limousine pools, and the SWSA edge buffer. The status of mitigation efforts for the RCC is provided in *Chapter 9, Project Mitigation Tracking*. The RCC is eligible for Leadership in Energy and Environmental Design (LEED) ® Silver certification.

- **Logan Airport Runway Safety Area (RSA) Improvements Project at Runway Ends 33L and 22R (EEA 14442).** Construction of the Runway 33L RSA improvements commenced in June 2011 and was completed ahead of schedule in November 2012. The Runway 22R RSA improvements are planned to be completed by the end of 2014. The status of mitigation for the RSA projects is provided in *Chapter 9, Project Mitigation Tracking*. As of this filing, mitigation efforts associated with Runway 33L and Runway 22R safety improvements are underway.
- **Logan Airport Runway 33L Light Pier Replacement Project (EEA 14442).** In January 2012, Massport submitted a Notice of Project Change (NPC) for the RSA Project (noted above) to include full replacement of the Runway 33L Light Pier, including all sections not already replaced by the Runway 33L RSA Project. All local, state, and federal permits were secured in 2012 and the replacement was completed in November 2012 coinciding with the completion of the Runway 33L RSA project. As part of this project, the Runway 33L Instrument Landing System (ILS) approach, originally approved in the Airside Improvements Planning Project, was upgraded from Category (CAT) I to CAT III. Reduction in approach minimums on Runway 33L was implemented in 2013 following the completion of the 33L Light Pier replacement and FAA testing of new ILS equipment.
- **Green Bus Depot (EEA 14629).** Design of a bus maintenance facility for Massport's clean fuel fleet buses in the North Service Area (NSA) began in 2009. The Green Bus Depot helps to minimize bus traffic on local neighborhood streets by serving as a central location for bus maintenance on Airport property rather than traveling for service at the off-site bus maintenance location in Chelsea. The Green Bus Depot is used to maintain the expanded clean fuel shuttle bus fleet that replaced Logan Airport's compressed natural gas (CNG) bus fleet and the rental car company diesel shuttle buses. Construction was completed in September 2012 and the facility is now in operation. The Green Bus Depot received LEED Silver certification in 2014.
- **Martin A. Coughlin (East Boston-Chelsea) Bypass Project (EEA 14661).** The Bypass is a limited-access roadway between Logan Airport and the new Chelsea Street Bridge. The Bypass roadway is designed to improve commercial vehicle access to the Airport, as well as reduce congestion on local East Boston streets in the vicinity of Day Square, Eagle Square, and the Neptune Road corridor by directing Airport-related commercial traffic to the new Bypass roadway. Construction was substantially completed in November 2012 when the roadway was opened. The road was named the "Martin A. Coughlin" Bypass Road for the late Martin A. Coughlin, an East Boston resident. The project includes the use of high efficiency light-emitting diode (LED) lighting and incorporates bio-swales for stormwater retention and drainage.
- **Renovations and Improvements at Terminal B.** This project includes renovations to Terminal B, Pier A. By modifying and expanding existing facilities to meet airlines' needs and providing a connection between Piers A and B, the project improves and simplifies the passenger traveling experience. The renovations include new ticket counters, a modified and enlarged passenger checkpoint, reconfigured departure lounges, concessions, new inbound and outbound baggage system, and a new airline club. With initial renovations that began in June 2012, the project came on-line on April 30, 2014.
- **Terminal B Garage Improvement Project.** Terminal B Garage repair and rehabilitation was completed in March 2012. In addition to overall upgrades, sustainable features were also installed, including 32 solar modules (200 kilowatt [kW]) on the top floor, high efficiency LED lighting throughout the garage, and two rainwater harvesting collection tanks to store and later re-use stormwater. The project also included enhanced curbside passenger drop-off and curbside operations.

- **North Service Area Roadway Corridor Project.** The NSA Roadway Corridor extends approximately from the State Police building up to and including Neptune Road. This corridor improvement project was intended to unify the existing roadway with new landscape and urban design elements along this highly visible roadway corridor, providing an important public edge along the corridor. Massport has located the WindWheels Sculpture by William Wainwright to a parcel southwest of Neptune Road. Construction of the NSA Roadway Corridor Project began in 2010 and was completed in the spring of 2012.
- **Greenway Connector Project.** The Greenway Connector is a pedestrian/bicycle path connecting the Bremen Street Park path to the future City of Boston pedestrian/bicycle path that begins at the Greenway Overlook and continues to Constitution Beach. The Greenway and the City of Boston Link provides a continuous pedestrian/bicycle path from Piers Park to Constitution Beach. Construction of the Greenway Connector began in spring 2013 and was completed in July 2014.
- **Hangar Upgrade Projects.** Architectural design commenced in December 2010 for two hangar upgrades in the North Cargo Area (NCA). The renovated JetBlue Airways hangar opened in 2012. The American Airlines hangar, formerly occupied by Northwest Airlines, was refurbished in 2013. Planning for demolition of the former American Airlines hangar (Hangar 16) commenced in late 2013.
- **Parking Consolidation Project.** Massport is planning the construction of structured and surface parking spaces that will consolidate 2,050 temporary parking spaces as part of an addition to the West Garage and other surface locations to be confirmed. The West Garage addition is atop the existing Hilton Hotel parking lot. The project will incorporate sustainable design and resiliency elements. The project will be in full compliance with the Logan Airport Parking Freeze. The consolidation is expected to be completed before 2017.
- **Landside Ground Access Operating Improvements.** The RCC, Green Bus Depot, East Boston-Chelsea Bypass Road, and the Economy Parking Garage are expected to yield substantial environmental benefits, particularly in the areas of ground access efficiencies and associated air quality emissions reductions on-Airport and in East Boston, as documented below.
  - The RCC reduces Airport VMT as well as improves roadway and intersection operations through: consolidating the rental car shuttle bus fleet and some Massport shuttle buses into a unified shuttle route system resulting in the elimination of eight rental car bus fleets (a net total of 66 buses would be eliminated); intersection and roadway infrastructure improvements including signal coordination and dedicated ramp connections; and creating a Ground Transportation Operations Center (GTOC) enabling efficient planning and operation of Airport-wide transit activities.
  - The Green Bus Depot (2012) serves as Logan Airport's on-Airport maintenance facility for Massport's new clean-fuel bus fleet. By shifting the bus maintenance operations out of the community, Massport is reducing bus traffic in East Boston and Chelsea.
  - The Martin A. Coughlin Bypass (2012) reduces commercial traffic through East Boston by providing a direct link from Logan Airport's NSA to the Chelsea Street Bridge for Airport-related commercial vehicle trips.
  - The Economy Parking Garage simplifies and reduces traffic and transit VMT by consolidating multiple overflow parking lots throughout the Airport into a single location served by a single shuttle route. Overall traffic circulating throughout the Airport will likely decrease resulting in significant operational and environmental benefits.
  - Logan Airport's new bus fleet, comprising 18 CNG buses and 32 clean diesel/electric buses, has fully replaced the entire fleet of diesel rental car shuttle buses now that the RCC is operational.

In addition to these facility enhancements, Massport has provided new covered bicycle parking at the RCC, Terminal E and the Economy Parking Lot.

As these facilities come on-line, future EDR and Environmental Status and Planning Report (ESPR) filings will report on the effects of more efficient operations and the predicted environmental benefits. Table 3-1 provides a summary of the status of each project and planning concept, as of December 31, 2013. Descriptions are provided in subsequent sections of this chapter.

Planning Initiatives

- **Strategic Planning**. Massport is conducting a strategic planning initiative that will position the Authority's aviation, maritime, and real estate lines of business, and its administrative support structures and workforce to meet the region's 21st century transportation and economic development challenges. The strategic planning initiative's primary goal is to formulate a vision for Massport as a transportation and economic development engine for the Commonwealth of Massachusetts focusing on the horizon years of 2022 and beyond. The strategic planning effort is expected to be completed in 2014.
- **Resiliency Planning.** At the end of 2013, Massport initiated the Disaster and Infrastructure Resiliency Planning (DIRP) Study for Logan Airport, the Port of Boston, and Massport's waterfront assets in South and East Boston. The DIRP Study includes a hazard analysis, modeling sea-level rise and storm surge, and projections of temperature and precipitation and anticipated increases in extreme weather events. The DIRP Study will make recommendations regarding short-term adaptation strategies to make Massport's facilities more resilient to the likely effects of climate change. The study is nearing completion and a Request for Proposals for implementing recommendations was issued in September 2014.
- **Logan Airport Sustainability Management Plan (SMP).** In 2013, Massport was awarded a grant by the FAA to prepare a SMP for Logan Airport. The Logan Airport SMP planning effort began in May 2013, and is expected to be completed by the end of 2015. The Logan Airport SMP takes a broad view of sustainability including economic vitality, social responsibility, operational efficiency, and natural resource conservation considerations. The Logan Airport SMP is intended to promote and integrate sustainability department-wide, coordinate on-going efforts within and across departments, develop a framework with targets to show progress over time, formulate a list of prioritized initiatives, and engage employees and tenants. A baseline data assessment was completed in winter 2014 to assess current sustainability performance at the Airport. The focus areas of the Logan Airport SMP include energy efficiency/greenhouse gas reduction, water conservation, waste management and recycling, and the well-being of employees and the community.

Table 3-1 Logan Airport Short- and Long-Term Development Initiatives

	Status as of 2013	Completion: Short-Term 2017	Completion: Long-Term 2030
Terminal Area Projects/ Planning Concepts			
Terminal E, Phase 1 and Phase 2	C		
Terminal E, Renovations and Enhancements	D	✈	
Terminal E, Future Phase (West Concourse replacement)	H/E		✈
Massport Satellite FIS Facility Project	H		
Terminal B Renovations	U	✈	
Terminal B Walkway Extension	E		
Terminal B Garage Repair and Rehabilitation	C		
Terminal C to E Connector	D	✈	
Terminal A to B Connector	E		✈
Terminal B to C Connector	E	✈	
Service Area Projects/ Planning Concepts			
Relocated CNG Station in the NCA	E		✈
Replacement Cargo Facilities in the NCA	E		✈
Replacement Hangar in the NCA	E		✈
New/Replacement GSE Consolidated Facility in the NCA	E		✈
Green Bus Depot in the NSA	C		
Flight Kitchen Consolidation in the NSA	C		
SWSA Program (Rental Car Center)	U	✈	
Ground Transportation Operations Center	C		
NSA Roadway Corridor Project	C		
Buffer Projects/ Open Space			
SWSA Buffer (Phase 2)	U	✈	
Neptune Road Airport Edge Buffer	D	✈	
North Service Area Roadway Corridor	C		
Greenway Connector	U	✈	
Navy Fuel Pier/Bremen Street Park	C	✈	
Airport Parking Projects/ Planning Concepts			
Economy Parking Project in the NCA	C		
Parking Garages Consolidation (West Garage additions and other surface locations to be determined)	E	✈	
Long-Term Parking Plan	E		✈
Airside Area Projects/ Planning Concepts			
Airside Improvements Planning Project	C		
Taxiway N Realignment/other taxiway improvements	E	✈	
Runways 22R and 33L Runway Safety Area Improvements	C (RW 33L)		
	U (RW 22R)	✈	
Former American Airlines Hangar Demolition	E	✈	
Runway 15L-33R RSA Project	R	✈	
Runway 4R Light Pier Replacement	E		✈
Governors Island Aircraft Parking	H		✈
High Occupancy Vehicle (HOV) Improvements			
Braintree Logan Express Site Acquisition	C		
Silver Line Improvements (mid-life fleet rebuild)	D	✈	
Framingham Logan Express Garage	R	✈	
Logan Express Back Bay Shuttle	D	✈	
Terminal Curbside Enhancement Project	C		
Airport-Wide Projects/ Planning Concepts			
Logan Airport Wayfinding System	C[1]		
Martin A. Coughlin Bypass	C		
Central Commissary	E	✈	
Massport Strategic Plan	E	✈	✈

Notes: Anticipated completion dates and status as of December 31, 2013 as denoted by ✈.
Short-term projects are anticipated to be completed by 2017 and long-term projects are anticipated to be completed by 2030.
Details of each project or planning concept are provided in the sections that follow.

C – Completed prior to or during 2013.
D – Project in design, or awaiting funding
E – Planning concepts undergoing evaluation and/or feasibility analysis
H – Project or planning concept on hold
1 – Design has been completed. At this time, the project is not funded; all Wayfinding Improvements are being achieved on a project-by-project basis.

X – Project cancelled
U – Project under construction
R – Project undergoing MEPA, NEPA/FAA, or other review

FIS – Federal Inspection Services
CNG – Compressed Natural Gas
NCA – North Cargo Area
GSE – Ground Support Equipment
NSA – North Service Area
SWSA – Southwest Service Area

Long-Term Parking Management Plan
As referenced in the June 14, 2013, Secretary's Certificate on the *2011 ESPR* (*Appendix A, MEPA Certificates and Responses to Comments*), Massport is in the process of developing a long-term parking management plan for Logan Airport. The Long-Term Parking Management Plan lays out a multi-part strategy for efficiently managing parking supply, pricing, and operations – both at Logan Airport and at Massport-controlled off-Airport locations –to maximize transit/shared-ride ground access while minimizing both drive-and-park and pick-up/drop-off modes. Key elements of the plan include:

- **Managing parking supply** by adding revenue-controlled parking spaces in the terminal area at Logan Airport to bring supply up to the maximum number of spaces allowed under the Logan Airport Parking Freeze. At the same time, Massport is working to increase the supply of Massport-controlled off-Airport parking at Logan Express sites.
- **Managing Parking Pricing** with a pricing policy designed to discourage air passengers from driving and parking at Logan Airport.
- **Managing Employee Parking** by continuing to reduce the number of Airport employees commuting by private automobile and parking at the Airport, by providing off-Airport parking both near Logan Airport and at Logan Express sites, as well as by implementing measures to enhance employee commuting options.
- **Managing Parking Operations** to improve the efficiency of its current system of addressing overflow conditions.

Massport is actively working to manage Airport parking. At the same time Massport is working hard to promote many options to access Logan Airport other than single occupant vehicles. Additional measures are currently under discussion as part of Massport's strategic planning efforts. The Long-Term Parking Management Plan is included in *Appendix G, Ground Access,* and additional details are provided in this chapter.

Terminal Area Projects/Planning Concepts

The terminal area accommodates most of the passenger functions at Logan Airport including the passenger terminals, terminal area roadways, central parking facilities, and the Hilton Hotel. Table 3-2 presents information on the status of each ongoing terminal area project. In addition, both Massport and its tenants are proposing projects or exploring planning concepts to modernize and carry out future improvements to the existing terminal facilities. These planning concepts are also detailed in Table 3-2. The location of the ongoing terminal area projects and the planning concepts are shown on Figure 3-1.

Figure 3-1 Location of Projects/Planning Concepts in the Terminal Area

Source: Massport
Notes: See Table 3-2 for a description of the numbered projects
1 International Gateway Project (Phases 1 and 2)
2 Terminal E Future Phase (West Concourse Replacement)
3 Terminal E Renovations and Enhancements
4 Renovations and Improvements at Terminal B
5 Terminal C to E Connector
6 Terminal A to B Connector
7 Terminal B to C Connector
8 Parking Consolidation Project (construction over the Hilton Hotel lot underway, locations of additional spaces to be determined)
9 Terminal B Garage Repairs

Table 3-2 Description and Status of Projects/Planning Concepts in the Terminal Area (December 31, 2013)

Description	Status
Massport Projects/Planning Concepts	
1. International Gateway Project (Terminal E) The project expands and upgrades Terminal E to provide better service to international passengers. This project is being constructed in phases:	
Phase 1 – A weather-protected airside bus portico linking the ground floor with the second floor to accommodate passengers arriving from remotely parked aircraft.	Completed in 2004.
Phase 2 – Expanded Federal Inspection Services (FIS) Facility, and improved meeter/greeter lobby and the ticketing area to maximize passenger convenience and reduce processing times. Includes accommodation for bicycles.	Completed in 2007. Bike racks added at Terminal E in summer 2012.
2. Future Phase – West Concourse Replacement Project The original Terminal E International Gateway Project included a concourse to be added to the west portion of Terminal E with additional international gates. As part of the strategic planning effort, Massport is re-evaluating planning options for future terminal improvements.	The terminal improvements are expected to be constructed beyond the 2022 timeframe. Additional information will be provided in the *2014 EDR* once the strategic planning effort is complete.
3. Terminal E Renovations and Enhancements Reconfiguration of existing gates and boarding jet bridges. In order to accommodate Group VI aircraft, including the A-380 used by international air carriers at Terminal E. The accommodations include addition of departure level concourse holding rooms and arrivals level de-boarding areas, adequately sized to accommodate Group VI aircraft, with concession areas and other support spaces.	Planning was initiated in 2014. Construction planned to be completed before 2017.
4. Renovations and Improvements at Terminal B The airline industry continues to react to financial and other operating pressures. This has led to a number of consolidations and realignments within the airlines. To address these changes and the continuing need for airlines to relocate with new partners, Massport has initiated analysis of terminal changes to better accommodate these ongoing airline partnership changes and facilitate broader flexibility in terminal utilization. This includes renovation of existing spaces, connecting of the Terminal B Piers, construction of some new spaces and reconfiguration of eight aircraft gates to better facilitate passenger processing.	Construction of the Terminal B renovations and improvements commenced in 2012 and were completed in 2014. Approximately 79,000 square feet of existing space was renovated and approximately 84,000 square feet of new space was added. Eight existing aircraft loading gates were reconfigured.
5. Terminal C to E Connector Massport is connecting Terminals C and E to provide a greater post-security connectivity between terminals and to provide greater flexibility for airlines. The project will include improvements to concessions that will further enhance the passenger experience.	Design is underway for the connector from Terminal C to E. Construction is expected to be completed by 2017.

Table 3-2 Description and Status of Projects/Planning Concepts in the Terminal Area (December 31, 2013) (Continued)

6. Terminal A to B Connector As part of an airport-wide effort to enhance terminal connectivity post-security, a connector between Terminals A and B is under consideration.	Planning is underway for the connector from Terminals A to B. Completion is expected after 2017.
7. Terminal B to C Connector Also part of the airport-wide effort to enhance terminal connectivity post-security, a connector between Terminals B and C is under consideration.	Planning is underway for the connector from Terminals B to C. Completion is expected after 2017.
8. Parking Consolidation Project. Massport is planning the construction of additional structured and surface parking spaces that will consolidate 2,050 temporary parking spaces as part of an addition to the West Garage and other surface locations to be confirmed. The West Garage addition is atop the existing Hilton Hotel parking lot. The project will incorporate sustainable design and resiliency elements. The project will be in full compliance with the Logan Airport Parking Freeze.	The consolidation is expected to be complete before 2017. On March 20, 2014, the EEA issued an Advisory Opinion confirming that no MEPA review was required for this parking consolidation.
Tenant Projects/Planning Concepts	
9. Terminal B Garage Repairs Structural repairs and garage lighting upgrades. Installed solar modules on garage roof. Reconfiguration of the first floor commercial parking area.	This project included routine maintenance as well as significant structural rehabilitation of the Terminal B Garage. The multi-year construction project is complete. While there were temporary reductions in garage capacity for construction, the project will not provide any additional parking capacity. The installed solar modules on the garage roof and new LED lighting have already begun to reduce energy consumption and improve air quality. Two 1,000-gallon rainwater collection tanks to recycle stormwater were set to provide water for maintenance and street sweeper use throughout Airport properties. The first floor of the Terminal B Garage was converted from commercial parking to accommodate taxis, limousines, buses and curbside improvements.

Note: See Figure 3-1 for the location of terminal area projects/planning concepts.

Service Area Projects/Planning Concepts

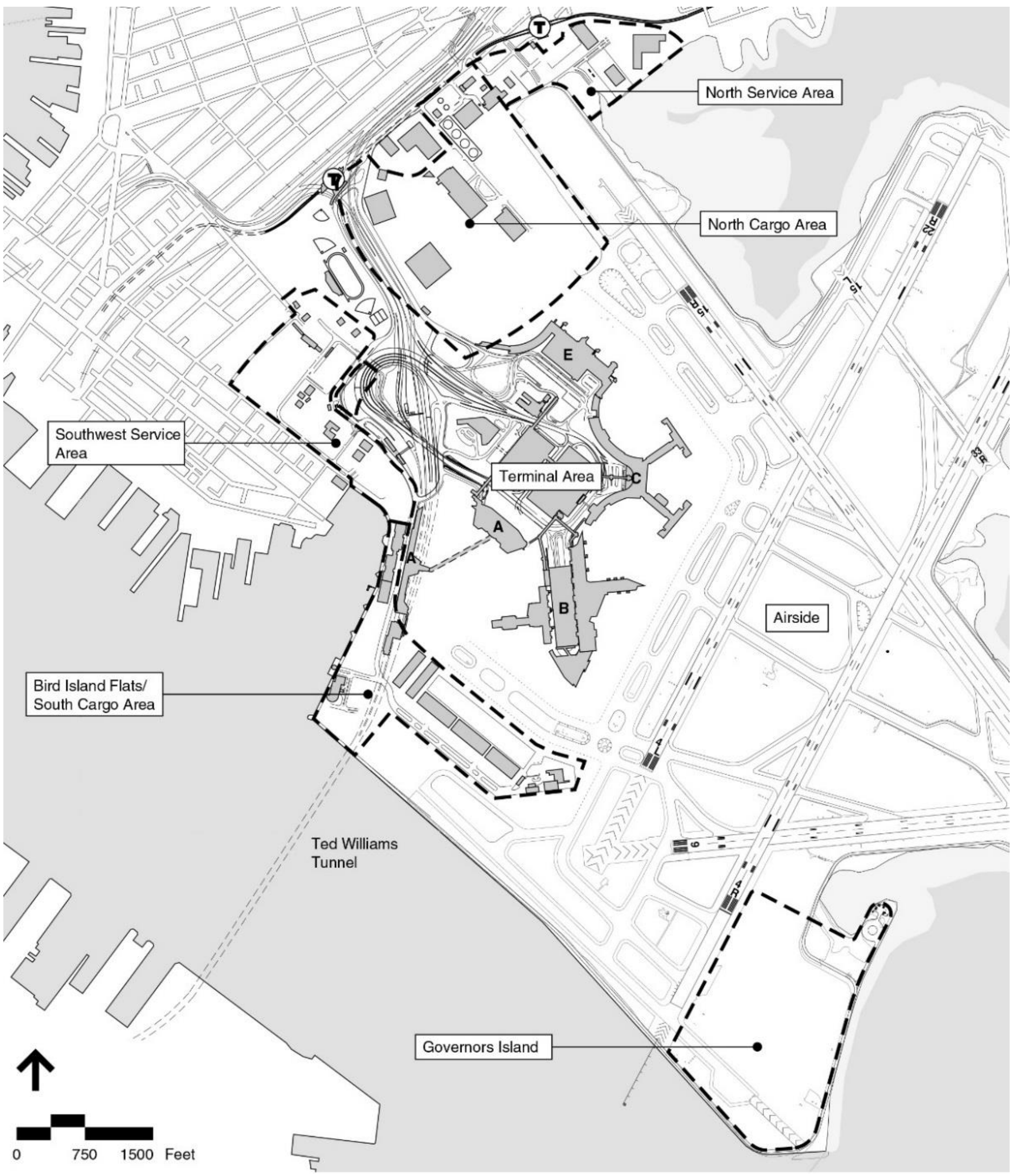
Logan Airport's service areas contain airline support businesses and operations. Land uses in the service areas continually evolve in response to changing airline business, customer, and tenant needs, as well as public works projects. Massport continues to explore ways of efficiently using the limited land resources in the service areas. The five service areas at Logan Airport are shown in Figure 3-2 and are described below.

- **North Cargo Area (NCA)** is located in Logan Airport's northwest corner. It is bounded by the main Logan Airport outbound roadway to the south, Route 1A to the west, the Jet Fuel Storage Facility to the north, and the airside apron area to the east. The NCA, which is adjacent to Logan Airport's airside area, is the Airport's primary airline support area. It accommodates air cargo and essential airline support businesses including hangars, ground service equipment (GSE) maintenance, and aircraft parking. The NCA will remain the most appropriate location for operations that require contiguous airside access. The NCA is the likely location for terminal gates, aircraft parking, hangars, and cargo. In the interim, portions of the NCA will continue to be used for economy parking.
- **North Service Area (NSA)** is located north of the NCA near the Massachusetts Bay Transportation Authority's (MBTA) Wood Island Station and Runway End 15R. The NSA includes two flight kitchens, weather and navigation equipment, the temporary bus/limousine pool, Neptune Road Airport edge buffer, and the new Green Bus Depot. Massport recently completed the Greenway Connector running parallel to the MBTA Blue Line corridor in this section of the Airport.
- **Southwest Service Area (SWSA)** is located south of Logan Airport's main access roadway and is bounded on the east by Harborside Drive. Because of its proximity to the terminals and the regional highway system, the SWSA functions as Logan Airport's primary ground transportation hub and includes the taxi and bus/limousine pools. The entire SWSA is being redeveloped to accommodate the new RCC and associated activities. As an interim measure during RCC construction, the bus and limousine pools were temporarily relocated to the NSA. The taxi pool was temporarily relocated to Lot B, which is on Harborside Drive between the Logan Office Center Garage and the Hyatt Hotel. These functions will return to the SWSA upon completion (before 2017). The former Gate Gourmet flight kitchen was relocated to a vacant flight kitchen facility in the NSA in 2012. The old Gate Gourmet building was demolished in 2012 to accommodate the new SWSA access roadway. The SWSA redevelopment project is scheduled for completion in 2014.
- **Bird Island Flats/South Cargo Area (BIF/SCA)** is located south and southeast of the Logan Airport's SWSA, and is generally bounded on the south by Boston Harbor and on the east and north by Logan Airport's airside area. The BIF/SCA is two service areas connected by Harborside Drive. The BIF portion has landside access via Harborside Drive and water access via the system of water taxis that shuttle passengers between downtown Boston, the South Shore, and Logan Airport. BIF development includes the Hyatt Hotel and Conference Center, the Logan Office Center and adjoining garage, an employee parking lot (Lot B), the Water Shuttle Dock, the Logan Airport Rescue and Fire Fighting Facility Marine Dock, and the Harborwalk that is a publicly accessible promenade along the harbor's edge. The SCA portion, which provides landside access and secured airside access, is Logan Airport's primary cargo area. It also accommodates domestic and some international cargo operations and temporary relocation of the taxi pool during SWSA redevelopment. During construction of the RCC project, the Lot B surface employee lot is being used as the interim taxi pool. Once the taxi pool is relocated to its permanent new home along Porter Street in the SWSA, Lot B will be returned to an employee parking lot.
- **Governors Island (GI)** is located at Logan Airport's southern tip and is bounded by Runway 14-32 and Boston Harbor to the east and south, by Runway 4R to the west, and Runway 9 to the north. GI has functioned as a storage site for the Central Artery/Tunnel (CA/T) Project and for construction stockpiles. The area also contains an Aircraft Rescue and Fire Fighting Facility training area, parking for snow

removal equipment, a biocell remediation area, and FAA aircraft navigation equipment. The area has been considered as a future location of remain overnight (RON) aircraft parking.

Table 3-3 presents information on the status of each ongoing project and planning concept in the service areas. Both Massport and Logan Airport tenants are proposing projects or exploring planning concepts to modernize and carry out future improvements to the service areas. These planning concepts are also detailed in Table 3-3. The location of the ongoing service area projects and planning concepts that may potentially be constructed in the future are shown on Figure 3-3.

Figure 3-2 Logan Airport Service Areas



Source: VHB.

Figure 3-3 Location of Projects/Planning Concepts in the Service Areas

Source:	Massport
Notes:	See Table 3-3 for a description of the numbered projects
1	SWSA Redevelopment Program, RCC, and GTOC
2	Relocated Compressed Natural Gas Station in the NCA (Location TBD)
3	Replacement Cargo Facilities in the NCA (Location TBD)
4	NSA Roadway Corridor Project
5	Replacement American Airlines Hangar in the NCA (Location TBD)
6	Green Bus Depot in the NSA
7	Flight Kitchen Consolidation in the NSA
8	New/Replacement Ground Support Consolidated Facility in the NCA (Location TBD)

Table 3-3 Description and Status of Projects/Planning Concepts in the Service Areas (December 31, 2013)

Description	Status
Massport Projects/Planning Concepts	
1. Southwest Service Area (SWSA) Redevelopment Program The SWSA Redevelopment Program consolidates on-Airport and most off-Airport rental car operations and facilities into one integrated facility (Rental Car Center [RCC]) in order to better serve tenants and the traveling public, reduce ground transportation and air quality impacts on-Airport and in the surrounding neighborhoods, and reduce associated off-Airport impacts. The program also accommodates a portion of off-Airport rental car operations. Redevelopment of the SWSA was needed because the existing SWSA and rental car facilities were inefficient and inadequate in meeting future needs at the Airport. The SWSA Redevelopment Program is replacing and upgrading existing ground transportation uses within the SWSA. The redevelopment includes a consolidated car rental facility with a four-level garage to accommodate rental car retail operations and storage; support facilities for the car rental operations; a new clean-fuel unified shuttle bus system; a relocated and reconfigured taxi pool; bus and limousine pool; and roadway improvements, pedestrian and bicycle facilities, and site landscaping. It also includes a customer service center and four quick turn-around maintenance and service facilities. Leadership in Energy and Environmental Design® (LEED) Silver certification is being pursued for the facility. RCC construction was preceded by numerous enabling activities that reorganized the SWSA through multiple sub-phases allowing for enough of the site to be cleared for staging and construction. Some of these enabling projects included reorganization of rental car operations within the SWSA. Others included temporary relocation of ground transportation operations for a limited time, including the taxi pool to Lot B, the Cell Phone Lot to an existing open parking lot across from the Logan Airport gas station, and the bus and limousine pool to the North Service Area (NSA). The project also included the demolition of the existing flight kitchen to allow the extension of Hotel Drive. Phase 2 of the SWSA Buffer (EEA #14137) (see Table 3-5) is being integrated with the proposed SWSA Redevelopment Program.	A Final Environmental Impact Report/Environmental Assessment (EIR/EA) was prepared in accordance with the Secretary of Energy and Environmental Affairs' Certificate on the Notice of Project Change (NPC). The Final EIR/EA was filed on March 1, 2010. An extended comment period closed on May 24, 2010. The Secretary's Certificate finding that the Final EIR adequately and properly complies with the Massachusetts Environmental Policy Act (MEPA) was issued on May 28, 2010. This project was under construction in 2013 and completion is anticipated in late 2014. Several of the enabling projects have been completed or are underway, including temporary relocation of the taxi pool to Lot B, relocation of the cell phone lot from Lot B to the intersection of Hotel Drive and North Service Road, and relocation of the bus and limousine pool to the NSA. These enabling projects were necessary to allow for mobilization and construction within the SWSA. In addition, the first quick-turnaround rental car maintenance and service facility is now under construction. Construction on the main portion of the RCC was completed in late 2013.

Table 3-3 Description and Status of Projects/Planning Concepts in the Service Areas (December 31, 2013) (Continued)

Description	Status
Massport Projects/Planning Concepts	
1. Southwest Service Area (SWSA) Redevelopment Program (Continued) **Ground Transportation Operations Center (GTOC)** The new GTOC within the RCC facility will function as the hub for management of ground transportation at the Airport. GTOC staff will assume direct responsibility for: ▪ Shuttle bus management and reporting via computer-aided dispatch (CAD) and automatic vehicle location (AVL) technology; ▪ Real-time bus and transit information collection and dissemination to Airport users; and ▪ Coordination with internal and external agencies related to ground transportation. GTOC staff will also provide indirect support for: ▪ Long-term ground transportation planning efforts; ▪ Taxi and limousine pool management; ▪ Parking management; ▪ Traffic management on Airport roadways; and ▪ Covered secure bicycle parking. The GTOC includes a video wall to graphically display information from a variety of sources including vehicle location and status information from the CAD/AVL system, curbside camera feeds from the Consolidated Camera Surveillance System (CCSS), flight arrival and departure information from Flight Information Display System (FIDS), the status of curbside Dynamic Message Signs (DMS), emergency alerts, and other information.	Construction of the GTOC was underway in 2012 as part of the RCC project and was completed in 2013.
2. Relocated Compressed Natural Gas (CNG) Station in the North Cargo Area (NCA) This would involve the relocation of Massport's existing CNG Station to accommodate the airside operations in the NCA.	Massport continues to examine several potential on-Airport parcels for relocation of the existing CNG station. Relocation is not expected to occur before 2017.
3. Replacement Cargo Facilities in the NCA Construction of new cargo facilities in the NCA would compensate for the loss of cargo facilities that resulted from the Central Artery/Tunnel (CA/T) Project, as well as for the projected growth in cargo demand.	The project remains under evaluation. If a decision were made to proceed with this project, construction would likely commence after 2017. Hangar upgrades for Buildings 8 and 9 are in the feasibility assessment stage.
4. North Service Area (NSA) Roadway Corridor Project The NSA Roadway Corridor Project coordinates the roadway and urban design vision for North Service Road and Frankfort Street with on-going design and construction efforts in the NSA. The project will coordinate with the NCA Logan Airport Economy Parking Garage, East Boston- Chelsea Bypass Project, the SWSA redevelopment enabling projects and the NSA Buffer Project to produce a unified utility, roadway, and landscape vision for the NSA roadway corridor between Prescott Street and Neptune Road.	The project was under construction and completed in 2012. The Greenway Connector pedestrian/bicycle path, which provides a section of the connection between Bremen Street and Constitution Beach adjacent to the NSA, is described in Table 3-5.

Table 3-3 Description and Status of Projects/Planning Concepts in the Service Areas (December 31, 2013) (Continued)

Description	Status
Massport Projects/Planning Concepts	
5. Replacement American Airlines Hangar in the NCA The former American Airlines Hangar is scheduled for demolition, since it can no longer serve the American Airlines fleet, Plans are underway for a new hangar that could accommodate Group V aircraft. The location of the replacement hanger in the NCA is still under consideration.	Planning and design for this proposal is in the planning stages. Demolition is scheduled for 2014, construction would be complete by 2017. American Airlines has already relocated to the refurbished Northwest Hangar.
6. Green Bus Depot in the NSA The Green Bus Depot occupies a 7.7-acre site in the North Service Area. The new facility would service the new fleet of Massport clean-fuel shuttles buses including approximately 30 hybrid-electric buses and 20 CNG buses. The new maintenance facility will allow the bus fleet to remain on the Airport instead of traveling to Chelsea where current maintenance facilities are located. Access to the facility would be from the existing Airport roadway system. LEED Silver certification was achieved for the facility.	An expanded Environmental Notification Form (ENF) was filed with MEPA in July 2010. No further MEPA review was required and construction commenced in 2011. Construction was completed in 2012.
Tenant Projects/Planning Concepts	
7. Flight Kitchen Consolidation in the NSA This project would consolidate existing on-Airport operations in the NSA.	Due to changes in the flight kitchen industry post-September 11, 2001, expansion of flight kitchen facilities is not anticipated. Initial consolidation of the flight kitchen functions occurred in 2005 with the consolidation of the LSG SkyChef facilities into one building in the NSA, leaving one adjacent flight kitchen facility vacant. The inactive flight kitchen was renovated and reactivated in early 2012 when Gate Gourmet relocated from the SWSA to the NSA.
8. New/Replacement Ground Support Equipment (GSE) Consolidated Facility in the NCA This planning concept would provide multi-tenant maintenance facilities for GSE.	In 2007, Signature Flight constructed a multi-tenant GSE facility as a component of its fixed-based operator facility and the proposed expansion of the GSE facility is under-going a feasibility analysis. If the conceptual planning for the proposal moves beyond feasibility screening, construction would not be complete by 2017.

Note: See Figure 3-3 for the location of service area projects/planning concepts.

Airside Area Projects/Planning Concepts

The airside area includes all Logan Airport land from the edge of the terminal buildings to the Logan Airport harbor boundary, incorporating the Logan Airport apron, runways, gates, and other airfield operating facilities. Airside improvements include upgrades and improvements to the airfield to enhance the operational efficiency and safety of Logan Airport. Table 3-4 describes the status of projects (shown on Figure 3-4) and planning concepts under consideration for Logan Airport's airside area as of December 31, 2013.

Figure 3-4 Location of Projects/Planning Concepts on the Airside

Source: Massport
Notes: See Table 3-4 for a description of numbered projects.
1 Runway 22R and 33L RSA Improvements
Logan Airside Improvements Planning Project (not shown on map)
2a Straightening and realignment of Taxiway N
2b Reduction in approach minimums on Runways 22L, 27, 15R, and 33L by the FAA (Operational change)
3 Replace Runway 4R Approach Light Pier
4 Governors Island Aircraft Parking
5 Runway 15L/33R RSA Improvement

Table 3-4 Description and Status of Projects/Planning Concepts on the Airside (December 31, 2013)

Description	Status
1. Runway 22R and 33L Runway Safety Area (RSA) Improvements The Federal Aviation Administration (FAA) requires RSAs to accommodate aircraft overruns, undershoots, and veer-offs in emergency situations. Consistent with FAA requirements, Massport is continuously looking for opportunities to increase the margin of safety for all runways and where practicable providing FAA standard RSAs at all locations. At Logan Airport, the FAA standard RSA is typically 500 feet wide by 1,000 feet long at each runway end. Where this space is not available, the FAA has approved the use of Engineered Materials Arresting System (EMAS) for aircraft overrun protection. EMAS uses a system of collapsible concrete blocks that can stop an aircraft by exerting predictable forces on the landing gear while minimizing aircraft damage. In 2004, the FAA approved installation of a 190-foot section of EMAS at Runway 22R. The FAA also directed Massport to evaluate opportunities for additional safety enhancements at this location. Massport installed a 158-foot of EMAS at Runway 33L in 2006, in anticipation of full environmental review of additional improvements. A detailed alternatives analysis was conducted to evaluate options for safety enhancements at both runway-ends. As described in the Final EA/EIR, an Inclined Safety Area (ISA) similar to what was constructed at Runway-End 22L is proposed for Runway End 22R. A pile-supported deck with EMAS approximately 460 feet long by 300 feet wide was approved for Runway End 33L.	Massport filed an Environmental Notification Form (ENF) with the Massachusetts Environmental Policy Act (MEPA) office on June 30, 2009 that described the proposed RSA enhancements at both runway ends. A Draft Environmental Assessment (EA)/ Environmental Impact Report (EIR) was filed on July 15, 2010. A Final EA/EIR was filed January 31, 2011 and the Secretary's Certificate was issued March 18, 2011. Remaining environmental permits were secured by May 2011 and construction of the 33L RSA was completed ahead of schedule in November 2012. Runway End 22R enhancements are under construction and will be completed by the end of 2014, including replacement of the EMAS installed in 2005.
Runway 33L Light Pier Replacement. The Runway 33L timber light pier was constructed in 1960 and extended to the southeast 2,400-feet from the runway end, predominantly over Boston Harbor. The Runway 33L RSA project initially proposed replacing the landward 500-feet of the light pier. During RSA construction, it was determined that the remaining 1,900-feet of the light pier should be replaced due to its advanced age and efficiencies of combining the construction with the RSA project in summer 2012 while the runway was already closed.	Massport filed a Notice of project Change (NPC) to the RSA project in January 2012. The Secretary's Certificate was issued March 9, 2012. All local, state, and federal permits were secured for the additional work in June 2012 and the full replacement was completed in October 2012. As part of this project, the Runway 33L Instrument Landing System (ILS) approach, originally approved in the Airside Improvements Planning Project, was upgraded from Category I to Category III. Reduction in approach minimums on Runway 15R and Runway 33L was implemented in 2013 following the completion of the 33L Light Pier replacement and FAA testing of new ILS equipment.

Table 3-4 Description and Status of Projects/Planning Concepts on the Airside (December 31, 2013) (Continued)

Description	Status
2. Logan Airside Improvements Planning Project The project involved construction of a new unidirectional Runway 14-32, Centerfield Taxiway, extension of Taxiway D, realignment of Taxiway N, improvements to the southwest corner taxiway system, relocation of cargo buildings, and reduction in approach minimums on Runways 22L, 27, 15R, and 33L. These airfield improvements were to reduce current and projected levels of aircraft delay and enhance airfield safety at Logan Airport. The new unidirectional Runway 14-32, Centerfield Taxiway, extension of Taxiway D, improvements to the southwest corner taxiway system, and relocation of cargo buildings are all complete. The remaining components of this project and status are presented below.	As part of its Record of Decision (ROD) for the Airside Improvements Planning Project under the National Environmental Policy Act (NEPA), the FAA initially deferred its decision on Centerfield Taxiway (Taxiway M) pending an operational review to identify any other potential beneficial actions. The FAA directed the technical work on the operational review and conducted briefings with a citizen panel. The FAA divided the study into two phases. Phase 1 focused on current conditions and Taxiway N, and Phase 2 included operations with both Taxiway N and the Centerfield Taxiway. Both of these Phases were completed and the public comment period on the project ended in September 2007. The FAA approved the Centerfield Taxiway in April 2007. Construction of the Centerfield Taxiway began in spring 2008 and was completed in August 2009. The Centerfield Taxiway is being used as intended by the Environmental Impact Statement (EIS) for taxiing for long-haul domestic and international flights using Runway 22L and to improve flow on the airfield and reduce taxiway congestion. Massport paved the taxiway with warm mix asphalt, which reduces energy consumption and has air quality benefits.
2a. Straightening and realigning Taxiway N. Other taxiway modifications are under consideration.	This project component is anticipated to be complete by 2017.
2b. Reduction in approach minimums on Runways 22L, 27, 15R, and 33L by FAA. (Operational change)	Reduction in approach minimums on Runways 15R and 33L was approved in the Airside EIS/EIR. Implementation will be affected by realignment of the ILS localizer. Construction impacts of relocation of the Instrument Landing System (ILS) localizer were addressed as part of the proposed enhancements to the RSA at the end of Runway 33L (see above). The new Runway 33L RSA deck accommodated the relocation of the localizer. Additional navigational upgrades were installed as part of the Runway 33L Light Pier Replacement Project in 2012. Runway 33L began operating as a Category III ILS in March 2013.
3. Runway 4R Light Pier Replacement. In the next five years, Massport plans to replace the aging Runway 4R approach light pier. This will likely be a replacement of the existing wooden light pier with concrete pier/pilings.	This project is still in the planning phase as of this 2014 filing.

Table 3-4 Description and Status of Projects/Planning Concepts on the Airside (December 31, 2013) (Continued)

Description	Status
4. Governors Island Aircraft Parking Massport has considered providing additional aircraft parking at Governors Island for the following: Remain overnight (RON) aircraft, cargo aircraft, and international aircraft. RON aircraft are generally commercial passenger aircraft that fly into the Airport at night and fly out in the morning. Airlines sometimes schedule and position more aircraft than there are gate positions, therefore remote aircraft parking positions are required. Remote aircraft parking is appropriate for cargo aircraft that generally arrive in the morning and remain on the ground until their late evening departure. Some international scheduled and charter aircraft that have long turnaround times should be parked remotely when there is a high demand for gates.	Preliminary concepts evaluated by Massport involve the development of 20 to 50 aircraft positions and ancillary uses. This project is on hold. If the concept is deemed feasible and planning continues, it is anticipated that construction would occur after 2017.
5. Runway 15L-33R RSA Improvement As part of an ongoing program to improve safety at Logan Airport, and in close coordination with the FAA, Massport proposed shifting existing Runway 15L-33R to accommodate an expanded RSA at the westernmost end (15L approach) of the runway. The project will shift the runway 200 feet to the southeast in order to comply with FAA standards requiring safety areas of 150 feet wide by 300 feet long at both ends of the runway. This project must be completed by 2015 in order to comply with the Congressionally-mandated FAA criteria.	FAA issued a Categorical Exclusion on April 1, 2014. The project was completed in 2014.

Note: See Figure 3-4 for the location of airside projects/planning concepts.

Airport Buffer Areas and Other Open Space

Massport has committed up to $15 million for the planning, construction, and maintenance of four Airport edge buffer areas and two parks along Logan Airport's perimeter. Three buffers have been completed, including the Bayswater Buffer, Navy Fuel Pier Buffer, and SWSA Buffer Phase I. The SWSA Buffer Phase 2 is now under construction. Planning and design of the Neptune Road Airport Edge Buffer began in 2012. Construction began in 2014. These areas are located generally along Logan Airport's perimeter boundary and are intended to provide attractive landscape buffers between Airport operations and adjacent East Boston neighborhoods. The buffer design occurs in consultation with Logan Airport's neighbors and other interested parties in an open community planning process. To collaborate in East Boston open space planning, Massport also participates in meetings with other agencies including Massachusetts Department of Transportation (MassDOT), the City of Boston, and the MBTA. Table 3-5 describes the status of ongoing buffer projects and other Massport green space projects under consideration as of October 2014. Figure 3-5 shows the location of these buffer projects.

Figure 3-5 Location of Airport Buffer Projects/Open Space

Source: Massport.
Notes: See Table 3-5 for a description of the numbered projects.

1 SWSA Buffer
2 Neptune Road Airport Edge Buffer
3 Navy Fuel Pier Buffer
4 Bayswater Embankment
5 Bremen Street Park
6 The Greenway Connector
7 North Service Area Roadway Corridor

Table 3-5 Description and Status of Airport Edge Buffer Projects/Open Space (December 31, 2013)

Description	Status
1. Southwest Service Area (SWSA) Buffer Phase 1 of this project involves the construction of an approximately half-acre linear area with landscaping and lighting improvements along Maverick Street that will include evergreen and deciduous trees, ornamental shrubs, and groundcovers.	Phase I construction was completed in 2006.
Phase 2 of this project involves additional landscaping and solid barriers.	Phase 2 of the SWSA Buffer design has been integrated with the SWSA Redevelopment Program. Phase 2 consists of installing landscaping (i.e., densely planted or planted atop earth berms for enhanced separation) and solid barriers such as fences and walls. The project will enhance bicycle and pedestrian connectivity between Maverick Street and East Boston Memorial Park and Stadium with extensive landscaping including trees, shrubs, flowering perennials, and decorative fences. The Secretary's Certificate on the SWSA Redevelopment Project Final Environmental Impact Report (FEIR) was issued in May 2010. Construction of the SWSA Phase 2 Buffer is anticipated to be completed in fall 2014.
2. Neptune Road Airport Edge Buffer The Neptune Road Airport Edge Buffer (the Neptune Road Buffer) is a Massport community mitigation project intended to buffer the East Boston Neighborhood at Logan Airport's northwestern edge. The 1.5-acre Neptune Road Buffer is at the nexus of Neptune Road, Vienna, and Frankfort Streets and is adjacent to the Massachusetts Bay Transportation (MBTA's) Wood Island Station. The majority of the parcel is located within the runway protection zone (RPZ) for Runway 15R/33L. The project consists of Olmsted-inspired landscape with various interpretive elements that will complement the adjacent North Service Area Roadway Corridor and be a continuation of the Corridor's pedestrian/bicycle path to Bennington Streets.	Completion of the buffer is expected in before 2017.
3. Navy Fuel Pier Buffer The Navy Fuel Pier Buffer project began with the Army Corps of Engineers' (ACOE) remediation of the former Navy Fuel Pier, which was completed in 2001. The project involved beautification of the property (0.7 acres) through landscape improvements and stabilization of the waterfront perimeter.	Final construction of the buffer was completed in 2007.
4. Bayswater Embankment This project involved creation of a landscaped buffer between Bayswater Street and Boston Harbor.	Construction of this Airport edge buffer was completed in 2003.
5. Bremen Street Park The 18-acre Bremen Street Park was constructed by the Central Artery/Tunnel (CA/T) Project as East Boston's second largest neighborhood park. The park contains a variety of facilities, a direct pedestrian connection to MBTA Blue Line Airport Station, and a half-mile segment of the three-mile East Boston Greenway. The park was built on land previously used as off-Airport parking.	Final construction of the park was completed in 2008.Massport continues to operate the park and provide community facilities.

Table 3-5 Description and Status of Airport Edge Buffer Projects/Open Space (December 31, 2013) (Continued)

6. The Greenway Connector The one-half mile pedestrian/bicycle path connects the Bremen Street Park pedestrian/bicycle path to the future City of Boston/ Narrow Gauge (currently in final planning phase) Connector to Constitution Beach. When completed there will be a continuous pedestrian/bicycle path from Piers Park to Constitution Beach that will connect Piers Park, Bremen Street Park, Stadium Park, and Constitution Beach.	Massport continued work with the City of Boston, community representatives, and others in 2012 regarding the design and construction of the Greenway Connector between Bremen Street Park and an Overlook at Wood Island Marsh. The City of Boston will construct a pedestrian/bicycle path from the Overlook to Constitution Beach. The Greenway Connector construction began in spring 2013 and was completed in July 2014.
7. North Service Area (NSA) Roadway Corridor The North Service Area Corridor Project (the NSA Corridor) is an approximately 7-acre project that created a unified streetscape, landscape context, and pedestrian/bicycle path connection for the future Neptune Road Airport Edge Buffer at Logan Airport's northwestern edge. The project encompasses various parcels along Airport Service Road that parallel an elevated section of Route 1A Highway. Cognizant of the importance of establishing a public space along Logan Airport's northwestern edge, Massport restored and relocated WindWheels, an important William Wainwright mobile sculpture and Massport's first piece of public art, to a prominent location at the Corridor's Neptune Road entrance.	Massport completed construction of the project in spring 2012 and has committed to the ongoing maintenance of the NSA Corridor.

Note: See Figure 3-5 for the location of Airport edge buffer projects/planning concepts.

Airport Parking Projects/Planning Concepts

The total number of employee and commercial parking spaces permitted at Logan Airport is limited by the Logan Airport Parking Freeze under the State Implementation Plan (SIP). Parking supply at Logan Airport has varied with respect to the specific locations and sizes of individual lots, the mix of parking spaces for air travelers and employee spaces, and the number of spaces in and out of service at any one time due to construction projects, while at all times remaining in compliance with the Logan Airport Parking Freeze. *Chapter 5, Ground Access to and from Logan Airport* contains additional information on the historic and existing supply of parking at Logan Airport. Table 3-6 describes current commercial parking projects at Logan Airport. The locations of parking projects are shown on Figure 3-6.

Figure 3-6 Location of Airport Parking Projects/Planning Concepts

Source: Massport.
Notes: See Table 3-6 for a description and status of numbered projects.
1 Logan Airport Economy Parking Garage Project in the NCA
2 Parking Consolidation Project (construction over the Hilton Hotel lot underway, locations of additional spaces to be determined)

Table 3-6 Description and Status of Airport Parking Projects/Planning Concepts (December 31, 2013)

Description	Status
1. **Logan Airport Economy Parking Project in the NCA (North Cargo Area).** This involved construction of an interim two-level deck above the existing surface economy parking lot on the Robie Parcel in the NCA. The two decks, above ground level parking, facilitated consolidation of existing temporary parking at various on-Airport locations to one location. The parking consolidation resulted in significant customer service improvements, operational and environmental benefits including reduced vehicle miles traveled with associated air quality benefits.	On June 23, 2010, the Massachusetts Executive Office of Energy and Environmental Affairs (EEA) issued an Advisory Opinion confirming that no Massachusetts Environmental Policy Act (MEPA) review was required for this parking consolidation. Construction of all the relocated parking spaces was completed in early 2011. Bicycle racks were added in 2012.
2. **Parking Consolidation Project.** Massport is planning the construction of additional structured and surface parking spaces that will consolidate 2,050 temporary parking spaces as part of an addition to the West Garage and other surface locations to be confirmed. The West Garage addition is atop the existing Hilton Hotel parking lot. The project will incorporate sustainable design and resiliency elements. The project will be in full compliance with the Logan Airport Parking Freeze.	The consolidation is expected to be complete before 2017. On March 20, 2014, the EEA issued an Advisory Opinion confirming that no MEPA review was required for this parking consolidation.
3. **Long-Term Parking Management Plan.** Massport is in the process of developing a long-term parking management plan for Logan Airport. Key elements of the plan include: • Managing parking supply at Logan Airport and Massport-controlled off Airport locations; • Managing parking pricing to discourage air passengers from driving and parking at Logan Airport; • Managing employee parking by continuing to reduce the number of Airport employees commuting by private automobile and parking at the Airport; • Managing parking operations to improve the efficiency of addressing overflow conditions in order to reduce VMT when cars are diverted or moved to non-garage parking areas, especially off-Airport parking locations. Massport will also continue its effort to encourage passengers and employees to take HOV modes to and from the Airport.	Additional measures are currently under discussion as part of Massport's strategic planning efforts. See *Appendix G, Ground Access* for additional information on the Long-Term Parking Management Plan

Note: See Figure 3-6 for the location of Airport parking projects/planning concepts.

Long-Term Parking Management Plan

As part of its ongoing review of ground access as well as a strategic planning initiative that commenced in 2013, Massport has been reviewing recent parking demand trends. That analysis shows that in 2013, Massport diverted or valet-parked passenger vehicles to various on-Airport locations approximately 80 out of 260 work days. While Logan Airport has experienced diversions in the past, the number of days per year has increased over the past several years. As presented in previous EDR/ESPR filings, diverting or valeting cars is inefficient and reduces customer service.

Massport is committed to an aggressive program of ground access and parking management designed to achieve a number of inter-related objectives:

- Minimize the traffic and environmental impacts associated with ground access to Logan Airport;
- Minimize the environmental impacts associated with the operation of Logan Airport;
- Provide excellent customer service to air passengers and others traveling to Logan Airport; and
- Operate the Airport, its road system, and its parking supply as efficiently as possible.

The Long-Term Parking Management Plan for Logan Airport proposes a comprehensive approach to parking operations, supply, and pricing that optimizes parking management within the constraints of the Logan Airport Parking Freeze. In essence, the Plan, which is included in *Appendix G, Ground Access,* represents Massport's current strategy to manage parking pricing, supply, and demand within the current Logan Airport Parking Freeze. The key elements of the Plan are described below.

- **Parking Supply**: The supply of parking at Logan Airport is constrained. To address the persistent use of valet parking and vehicle diversions (which, as demonstrated in *Chapter 5, Ground Access to and From Logan Airport*, increases VMT), Massport will add revenue-controlled parking spaces in the terminal area to bring supply up to the maximum number of spaces allowed under the Parking Freeze. At the same time, Massport will work to increase the supply of Massport-controlled off-Airport parking at Logan Express sites.
- **Parking Pricing**: Massport pricing policy will be designed to discourage air passengers from driving and parking at Logan Airport by ensuring that the least expensive Massport-controlled parking will be provided at remote Logan Express sites and will encourage more efficient use of available on-Airport parking by maintaining a meaningful price differential between prices at the Economy Parking Garage and terminal-area parking garages. Massport will evaluate increased parking prices for terminal-area parking in order to encourage Airport passengers and visitors to consider transit and shared-ride alternatives.
- **Employee Parking**: Massport will continue to reduce the number of Airport employees commuting by private automobile and parking at the Airport by providing off-airport parking both near Logan Airport and at Logan Express sites, as well as by implementing measures to enhance employee commuting options.
- **Parking Operations**: Massport will work to improve the efficiency of its current system of addressing overflow conditions. Massport will continue to explore other options that could reduce the number of days that Logan Airport operates in an overflow condition, such as a parking reservation system.

The availability of parking at Logan Airport is capped by the Logan Airport Parking Freeze (310 Code of Massachusetts Regulations 7.30), which is an element of the Massachusetts SIP under the Federal Clean Air

Act[1]. Currently 18,415 commercial parking spaces and 2,673 employee parking spaces are authorized in the Logan Airport Parking Freeze. The Parking Freeze is a constraint upon, as well as an element of Massport's multifaceted strategy for improving Logan Airport's connectivity by diversifying ground transportation options (for passengers and employees) and its efforts to reduce reliance on automobile travel to and from Logan Airport. Those efforts are described in detail in *Chapter 5, Ground Access to and from Logan Airport* of this *2012/2013 EDR*. The focus of the Long-term Parking Management Plan is therefore limited to setting out the efforts that Massport has undertaken, and will continue to implement in the future, in order to manage the supply, pricing, and operation of parking that it controls both at Logan Airport and at Massport-controlled off-airport locations to achieve its ground access objectives.

Airport-wide Projects and Plans

Massport regularly plans and implements Airport-wide projects/planning concepts such as those described in Table 3-7.

Massport is undertaking several airport-wide planning initiatives including:

- **Strategic Plan**. Massport is conducting a strategic planning initiative that will position the Authority's aviation, maritime, and real estate lines of business, and its administrative support structures and workforce to meet the region's 21st century transportation and economic development challenges. The strategic planning initiative's primary goal is to formulate a vision for Massport as a transportation and economic development engine for the Commonwealth of Massachusetts in the 21st century focusing on the horizon years of 2022 and beyond. The strategic planning effort is expected to be completed in 2014. The strategic planning initiative has these objectives:
  - To ensure the **safety and security** of the traveling public and Massport's staff, neighbors, and facilities;
  - To expand Massport's role as a driver of **economic growth that** strengthens the region's global position, advances new industries, and creates Massachusetts jobs;
  - To execute a business model for advancing long-term **financial excellence and viability, regional economic development, and world-class transportation facilities**;
  - To ensure that Massport has invested in the necessary infrastructure and workforce to meet forecast passenger and business demand for its airport and port facilities;
  - To utilize technology to enhance customer service, security, and business objectives;
  - To provide an approach for addressing immediate-action projects within the context of a future vision;
  - To enhance the intermodal connections among the Authority's transportation assets and other state transportation systems;
  - To be a proactive civic leader and "good neighbor" to impacted communities;
  - To identify best practices for enhancing work force development, diversity, and inclusion; and

1 Clean Air Act of 1990 including amendments

- To advance environmental stewardship, climate change adaptation, and sustainable design practices in the planning, construction, and operation of Massport facilities.

The findings of the effort will be presented to the Massport Board in late 2014 and will set the direction for future investments and plans at Logan Airport.

Table 3-7 Description and Status of Future Airport-wide Projects/Planning Concepts (December 31, 2013)

Description	Status
1. Logan Airport Wayfinding System This project provides a comprehensive wayfinding system for Logan Airport facilities including terminals, terminal curbside, parking garages, and approach roadways including Airport-wide signage analysis and planning, development or design guidelines and graphic standards, and a master implementation plan for future projects.	The main project was completed with improvements to the wayfinding system ongoing. This project currently has no funding and is being implemented in phases as part of other projects as feasible.
2. The Martin A. Coughlin Bypass (Dedicated Airport Access Road) (EEA 14661) This bypass was planned as a new roadway connection between Logan Airport and the Chelsea Street Bridge following an abandoned rail corridor. The dedicated Bypass roadway is for Airport access only and is for commercial vehicles only. The Bypass roadway will provide a means to remove Airport traffic (trucks, cargo vehicles, parking shuttles, taxis, transit buses, etc.) from the local road system. The Bypass road is expected to reduce congestion on local East Boston streets in the vicinity of Day Square, Eagle Square, and the Neptune Road corridor. The Bypass may also be used by MBTA transit vehicles.	An Environmental Notification Form (ENF) was filed in October 2010, and project construction began in 2011.The roadway was completed in November 2012 and the Bypass is now open. The road was named the "Martin A. Coughlin" Bypass Road for the late Martin A. Coughlin, a neighborhood activist who lobbied for a commercial road to reduce traffic congestion in Day Square.
3. Centralized Commissary Massport is planning for a centralized Commissary that will streamline inspection of vendor trucks and deliveries of food, beverages, and dry goods destined for the secure airside. The facility will allow for a centralized location for security inspections before entry and will also have the benefit of removing trucks from the terminal curbs. A location for the Commissary in South Cargo is being planned.	Construction of the Commissary would be complete after 2017.

- **Resiliency Planning.** A cross-cutting element of the strategic planning initiative is a high-level view of the resiliency of Massport's facilities to natural (hurricanes, storms, flooding, earthquakes), man-made (fires), and technological (data loss) threats. A Resiliency Working Group was established to identify threats and hazards, likely scenarios, and current vulnerabilities. The findings of the Working Group will inform overall strategic planning decisions and priority setting.

- **Disaster and Infrastructure Resiliency Planning (DIRP) Study.** This study takes a detailed review into resiliency at Logan Airport. The DIRP study will assess critical infrastructure and vulnerabilities the Airport may face during future climate scenarios. Several future scenarios will be considered given projected sea level rise and other environmental factors (e.g., high tide or low tide).

- **Sustainability Management Plan (SMP).** The purpose of the Logan Airport SMP is to enhance the efficiency of Logan Airport's operations and sustainability efforts, and to support the broader sustainability principles of the Commonwealth. The Logan Airport SMP is intended to promote and integrate sustainability department-wide, coordinate on-going efforts within and across departments, develop a framework with targets to show progress over time, formulate a list of prioritized initiatives, and engage employees and tenants. The Logan Airport SMP planning effort began in May 2013; a completed plan is anticipated in 2015. The planning process has included ongoing employee engagement, primarily through a Sustainability Working Group (SWG). A baseline data assessment was completed in winter 2013/2014 to assess current sustainability performance at the Airport. The Baseline Assessment will be used to inform the next phases of the plan and to develop sustainability mission statement, goals, objectives, and performance targets. Tenant and employee engagement will continue throughout the process and sustainability initiatives will be recommended and adopted to support the goals outlined in the SMP.

- **Bicycle Master Plan.** As part of Massport's goal to create viable and connected bicycle infrastructure, Massport's Bicycle Master Plan proposes connections between the Airport's current cycling facilities with East Boston's parks and with the city's larger network of cycling infrastructure. It identifies desirable cycling routes and the current barriers to implementation. Massport is working with the City of Boston on potential Hubway locations and including bicycle infrastructure on all new projects and upgrades.

4

Regional Transportation

Introduction

This chapter describes Logan Airport in the context of the New England region's intermodal transportation system and reports on the status of the region's airports in 2012 and 2013. Logan Airport, one of three airports[1] owned by the Massachusetts Port Authority (Massport), operates within a larger network of New England regional airports. Massport has committed ongoing efforts to support an efficient regional air and surface transportation network. Current air traffic levels and airline service trends at the New England regional airports are discussed in this chapter. Airport improvement projects and long-range regional transportation planning efforts relevant to the regional transportation network are also discussed. This chapter focuses on the past two years (2012 and 2013) and specifically describes:

- Passenger and aircraft activity levels at New England regional airports including:
  - Bradley International Airport, CT
  - T.F. Green Airport, RI
  - Manchester-Boston Regional Airport, NH
  - Portland International Jetport, ME
  - Burlington International Airport, VT
  - Bangor International Airport, ME
  - Tweed-New Haven Airport, CT
  - Portsmouth International Airport at Pease, NH
  - Worcester Regional Airport, MA
  - Hanscom Field, MA
- Changes in airline service levels and other factors that have contributed to trends in regional airport activity.
- The status of current improvement plans and projects at the regional airports.
- Massport's initiatives and joint efforts with other transportation agencies to improve the efficiency of the New England regional intermodal transportation system.
- Regional long-range transportation planning efforts.

1 Massport owns and operates Logan Airport, Hanscom Field, and Worcester Regional Airport.

2012/2013 Regional Transportation Highlights

Key findings for New England regional airports and the regional transportation system in 2012 and 2013 and status updates for long-range planning efforts include the following:

- The New England region is anchored by Logan Airport and a system of 10 other commercial service, reliever, and general aviation (GA) airports[2] (regional airports). Together, these 11 airports accommodate nearly all of New England's air travel demand. Logan Airport serves a major domestic origin and destination market and acts as the primary international gateway for the region. The region is also served by Amtrak which connects Boston to the New York/Washington DC metropolitan area to the south and Portland, ME to the north.
- In 2012, the total number of air passengers utilizing New England's commercial service airports, including Logan Airport, decreased by 1.3 percent from 44.7 million in 2011 to 44.1 million annual air passengers. The decline in the region's passenger traffic largely reflects airline service reductions at many of the regional airports in 2012. Due to a slow and uneven recovery in the economy following the recession in 2008/2009 and sustained high fuel prices, U.S. airlines have continued to face a challenging operating environment. Airlines have attempted to maintain tighter capacity control, which has resulted in ongoing service cuts at various secondary and tertiary airports across the nation. While passenger traffic at Logan Airport increased slightly in 2012, reduced passenger levels at the regional airports resulted in an overall decline for the region. Overall passenger growth in the New England region lagged slightly behind the overall U.S. passenger market, which saw an average increase of 1.1 percent in 2012.[3]
- In 2013, however, overall passenger traffic at New England commercial airports recovered somewhat, increasing 2.8 percent from 44.1 million to 45.4 million passengers. Passenger traffic at the New England airports in 2013 represented the highest passenger traffic level for the region since the economic downturn in 2008. Passenger traffic in the region has yet to return to the prior 2005 to 2007 peak levels, which exceeded 47.0 million. In 2013, total passenger traffic at the regional airports increased 1.6 percent from the previous year, while passenger traffic at Logan Airport increased by 3.4 percent. In comparison, U.S. passenger traffic increased by an average 1.3 percent[4] from the previous year, similarly reaching its highest total since the 2008 downturn. Logan Airport passenger traffic is increasing ahead of both the region and the nation.
- Logan Airport's share of regional passengers has increased since 2011.
  - Of the 44.1 million passengers using New England's commercial service airports in 2012, 66.2 percent of passengers (29.2 million) used Logan Airport compared to 64.7 percent (28.9 million) in 2011. Of the 45.4 million passengers using the region's commercial service airports in 2013, 66.6 percent of air passengers (30.2 million) used Logan Airport.
  - Passenger levels at the regional airports (excluding Logan Airport) decreased by 5.7 percent (0.9 million) in 2012, and then increased by 1.6 percent (0.2 million) in 2013. In comparison, passenger levels at Logan Airport increased by 1.1 percent (0.3 million) in 2012, followed by an increase of

2 The New England Regional Airports Air Passenger Service Study (Federal Aviation Administration, 1995) defined the Bradley International, T.F. Green, Manchester-Boston Regional, Portland International Jetport, Bangor, Burlington, Worcester Regional, and Tweed-New Haven Airports as the region's principal commercial airports, other than Logan Airport, since all of these airports either supported or had previously supported commercial jet passenger services. Subsequently, in 1999, limited commercial passenger service was introduced at Hanscom Field and at Portsmouth International Airport, though neither airport has been able to sustain commercial airline services over the long-term. These 11 airports are included in the New England Regional Airport System Plan Study, which was published in 2006.

3 Airports Council International, 2012 Worldwide Air Traffic Report.

4 Based on U.S. Department of Transportation, Bureau of Transportation Statistics for scheduled passenger traffic.

3.4 percent (1.0 million) in 2013. This trend reflects continued service cuts by legacy air carriers and low-cost carriers (LCCs) in the smaller secondary markets, while JetBlue Airways' expansion at Logan Airport has off-set weak growth or reductions by other airlines in the process of consolidating services after a series of airline mergers.

- Logan Airport's current share of regional passengers exceeds its share in 2005 to 2007, which ranged from 56 to 60 percent. Logan Airport's regional share remains below its historic peak of 73 percent in 1985.[5]

- Aircraft operations in the New England region decreased since 2011 levels.
  - Aircraft operations decreased by 3.2 percent in 2012, from 1.09 million operations in 2011 to 1.05 million operations in 2012. Commercial airline operations showed the largest decline in 2012, decreasing by 6.5 percent (40,660 operations), while GA increased slightly by 1.5 percent (6,360 operations) as part of a continued recovery in GA activity since the 2008/2009 economic recession. Military operations decreased by 2.3 percent (820 operations) in 2012.
  - In 2013, total aircraft operations in the region decreased by another 3.6 percent (38,240 operations). Commercial operations held largely steady with a slight 0.3 percent decrease (1,660 operations). However, GA operations declined by 7.9 percent (34,280 operations). Military operations also declined by 6.7 percent (2,300 operations).
  - Aircraft operations have declined significantly since 2000, as part of an ongoing trend of higher load factors, larger aircraft sizes and reduced service levels. Total aircraft operations in the region have declined by over one third, from 1.6 million in 2000 to 1.0 million in 2013.

- Massport continued to participate in state and metropolitan cooperative planning efforts including GreenDOT, the Healthy Transportation Compact,[6,7] and the Boston Metropolitan Planning Organization (Boston MPO).
- Massport is participating in the development of the Massachusetts Department of Transportation's (MassDOT) first statewide strategic multi-modal, long-range transportation plan known as *weMove Massachusetts*.[8] The goal of *weMove Massachusetts* is to build action-oriented policies based on stakeholder feedback to implement priorities for the present and future needs of the Massachusetts transportation system.
- MassDOT and the other New England state transportation agencies are collaborating with the Federal Aviation Administration (FAA) on the *New England Regional Airport System Plan – General Aviation* study to provide an understanding of GA airports, infrastructure, and capital needs for the New England region.

Additional information is provided in *Appendix F, Regional Transportation*.

5 Based on airport passenger statistics from 1985 to 2013.
6 Massachusetts Department of Transportation, www.eot.state.ma.us/default.asp?pgid=content/releases/pr060210_GreenDOT&sid=release, June 2, 2010.
7 Massachusetts Department of Transportation, www.massdot.state.ma.us/main/healthytransportationcompact.aspx.
8 Massachusetts Department of Transportation, Office of Transportation Planning. http://www.massdot.state.ma.us/wemove/ (Accessed November 2012).

New England Regional Airport System

As shown in Figure 4-1, the New England region is anchored by Logan Airport and a system of 10 other commercial service, reliever, and GA airports[9] (regional airports). Together, these 11 airports accommodate nearly all of New England's air travel demand. Logan Airport serves a major domestic origin and destination market and acts as the primary international gateway for the region. The regional airports range in role and activity levels from Bradley International Airport, which served over 5 million commercial passengers in 2013, to Hanscom Field, which does not currently handle any commercial or charter flights but serves as New England's largest GA facility.

Figure 4-1 New England Regional Transportation System

9 The New England Regional Airports Air Passenger Service Study (Federal Aviation Administration, 1995) defined the Bradley International, T.F. Green, Manchester-Boston Regional, Portland International Jetport, Bangor, Burlington, Worcester Regional, and Tweed-New Haven Airports as the region's principal commercial airports, other than Logan Airport, since all of these airports either supported or had previously supported commercial jet passenger services. Subsequently, in 1999, limited commercial passenger service was introduced at Hanscom Field and at Portsmouth International Airport, though neither airport has been able to sustain commercial airline services over the long-term. These 11 airports are included in the New England Regional Airport System Plan Study, which was published in 2006.

In addition to Logan Airport, Massport owns and operates two of the regional airports, Hanscom Field and Worcester Regional Airport. Both of these airports play important roles in the New England regional transportation system, as described below.

- Hanscom Field (BED) is a full-service GA airport that accommodates all segments of GA activity and functions as New England's premier facility for business/corporate aviation. Located in Bedford, MA, approximately 20 miles northwest of Logan Airport, Hanscom Field serves a critical role as a GA reliever airport for Logan Airport. Hanscom Field accommodated approximately 164,840 GA operations in 2012 and 153,640 GA operations in 2013, close to six times the number of GA operations that occurred at Logan Airport. In addition to its role as a GA facility, Hanscom Field has also accommodated niche commercial airline services from time to time in the past. The most recent such service was provided by Streamline Air from April 2011 to September 2012.
- Worcester Regional Airport (ORH) is located in central Massachusetts, approximately 50 miles west of Logan Airport. Worcester Regional Airport is recognized as an important aviation resource that can accommodate both corporate GA activity and commercial airline services. In 1995, Massport began collaborating with the City of Worcester, the Airport's then owner, to identify opportunities for increasing Worcester Regional Airport's utilization to accommodate some of the regional demand that would otherwise use Logan Airport. Massport assumed operation of Worcester Regional Airport in 2000 and later acquired the Airport in June 2010. Aircraft operations at Worcester Regional Airport totaled approximately 45,000 operations in 2012 and 35,830 operations in 2013, with GA accounting for 95 percent and 98 percent of aircraft activity respectively. Direct Air served Worcester Regional Airport from November 2008 to March 2012, shortly before the carrier filed for Chapter 7 bankruptcy. After the cessation of Direct Air's services, Massport, in conjunction with the City of Worcester and other community stakeholders, actively promoted the reintroduction of scheduled airline service at the airport and successfully secured new services from JetBlue Airways. On November 7, 2013, JetBlue Airways commenced nonstop services to Orlando International and Fort Lauderdale-Hollywood airports using 100-seat Embraer 190 aircraft.

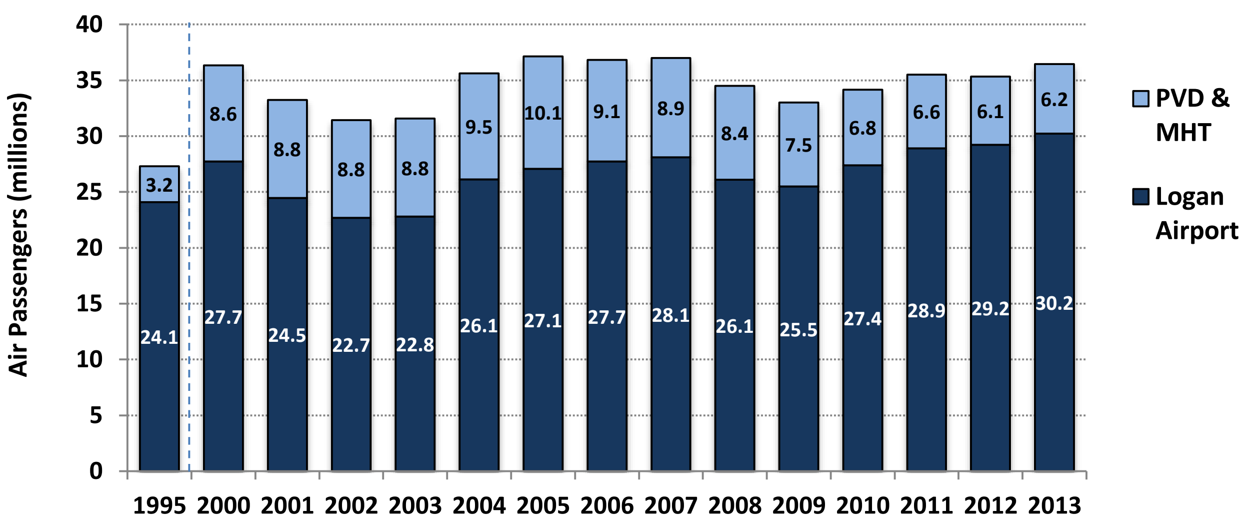
Apart from Hanscom Field and Worcester Regional Airport, the regional airports closest to Logan Airport are T.F. Green Airport (PVD) in Warwick, RI and Manchester-Boston Regional Airport (MHT) in Manchester, NH. Because of their proximity to Logan Airport and overlapping market areas, these airports may be convenient choices for some passengers in the Greater Boston Area. The New England Regional Airport System Plan (NERASP) Study, which was published in 2006, identified a high degree of cross-airport utilization within the Greater Boston airport system, which encompasses Logan Airport, T.F. Green Airport, and Manchester-Boston Regional Airport. In effect, the three airports act as a system of airports, with significant numbers of passengers choosing the most convenient airport in terms of access, airfares, and available air services depending on their individual air travel needs. [10]

In the first half of the last decade, the Central Artery/Tunnel construction project and high fares made Logan Airport less attractive for many air travelers in the Greater Boston area. Many passengers viewed T.F. Green Airport and Manchester-Boston Regional Airport as convenient alternatives to Logan Airport. After the introduction of low-cost services on Southwest Airlines, these two airports captured an increasing share of the Greater Boston market. However, with the completion of major portions of the Central Artery/Tunnel project in 2004, as well as JetBlue Airway's entry and expansion at Logan Airport, the Airport began to recapture passengers from its core service area that were previously using the regional airports.

10 New England Regional Airport System Plan, Federal Aviation Administration, 2006.

Logan Airport is now well-positioned in terms of access and competitive airfares, and available air services to meet the demands of the core Boston passenger market. Passenger traffic at T.F. Green Airport and Manchester-Boston Regional Airport peaked in 2005, and declined significantly in recent years due to an industry-wide trend of airline service reductions at smaller airports. However, T.F. Green Airport and Manchester-Boston Regional Airport remain positioned to serve their own catchment areas and continue to accommodate considerably more passengers than before the entry of Southwest Airlines in the late 1990s. In 2012 and 2013, T.F. Green and Manchester-Boston Regional Airports' share of the combined Greater Boston passenger market continued the declining trend from recent years. In 2012, the two airports served 18.6 percent (6.1 million) of the combined passengers at the three main commercial airports serving the Greater Boston area, down from a high share of 28.0 percent (8.8 million) in 2002. In 2013, the two airports served 18.3 percent (6.2 million) of the combined Greater Boston passengers. Figure 4-2 depicts the historical distribution of air passengers for Logan Airport, T.F. Green Airport, and Manchester-Boston Regional Airport.

Figure 4-2 Passenger Activity Levels at Logan Airport and T.F. Green and Manchester-Boston Regional Airports, 1995-2013



Source: Massport and individual airport data reports.

In addition to Logan Airport and the regional airports discussed above, a third tier of airports serves isolated communities or provides niche commercial airline services in New England. These airports include: Hyannis Airport, Martha's Vineyard Airport, Nantucket Memorial Airport, New Bedford Regional Airport, and Provincetown Municipal Airport in MA; Augusta State Airport, Bar Harbor Airport, Rockland Airport, and Northern Maine Regional Airport in ME; Lebanon Municipal Airport in NH; Block Island State Airport and Westerly State Airport in RI; and Rutland Southern Vermont Regional Airport in VT.

The third-tier airports support frequent commercial service to Logan Airport and, in some instances, T.F. Green Airport during the summer months. Most of these third-tier airports are not in close proximity to Logan Airport and are isolated due to geographic factors. Because of their remoteness and/or limited market areas, many of these airports are unlikely to attract passengers that now fly from Logan Airport. Instead, many of these airports are dependent on Logan Airport for connecting services.

Air Passenger Trends

The following section provides an overview of air passenger trends for the regional airports over the last decade.

Regional Airport Passengers

In 2012, New England's 11 commercial airports accommodated 44.1 million passengers. As shown in Table 4-1, total air passenger traffic at the New England airports decreased slightly by 1.3 percent in 2012, down from 44.7 million in the prior year. This compares to an overall average increase of 1.1 percent in the U.S. passenger market in 2012.[11] In 2013, overall passenger traffic at New England commercial airports recovered, increasing 2.8 percent to 45.4 million passengers. This represented the highest passenger traffic level in the region since the 2008 global economic downturn. Similarly, U.S. passenger traffic increased slightly in 2013, reaching the highest total since 2008.

Within the region, passenger traffic at Logan Airport increased in both 2012 and 2013, helping to offset continued declines at the regional airports. In 2012, air passengers at Logan Airport grew by 0.3 million or 1.1 percent over the prior year. Passenger traffic at the other regional airports declined by 0.9 million or 5.7 percent in 2012. Consequently, the 10 regional airports' share of New England passengers decreased to 33.8 percent in 2012, compared to 35.3 percent in 2011 (Figure 4-3). In 2013, Logan Airport passengers grew by 1.0 million or 3.4 percent. Passenger traffic at the regional airports continued to decline, decreasing by 0.2 million or 1.5 percent in 2013. The regional airports' share of New England passengers decreased further to 33.4 percent.

The decline in passenger traffic at the regional airports reflects the challenging operating environment facing U.S. airlines and is consistent with the national trend at secondary and tertiary airports. The global economic downturn that began in 2008 resulted in a drop in passenger demand and widespread airline capacity reductions, particularly at the smaller regional airports. Airlines eliminated less profitable routes, cut frequencies in smaller markets, and reduced flying with small regional jets (RJs), which had become uneconomical to operate with sustained high fuel prices. Airlines have remained conservative with growth plans and have not increased overall capacity significantly at the regional airports as of 2013. Despite the recent declines in regional airport passengers, the regional airports continue to accommodate a significant share of the region's passengers, up substantially from their 27.0 percent share in 1985.

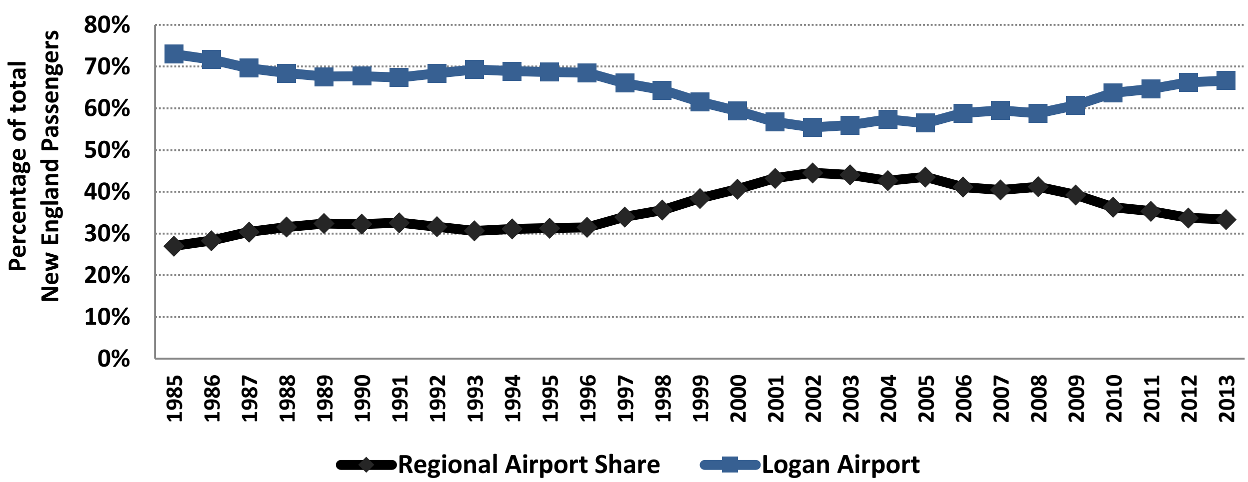
11 Airports Council International, 2012 Worldwide Air Traffic Report.

Table 4-1 Passenger Activity at New England Regional Airports and Logan Airport, 2009-2013

Airport	2009	2010	2011	2012	2013	Percent Change (2011-2012)	Percent Change (2012-2013)
	Passenger Levels (millions)[1]						
Bradley International	5.33	5.34	5.61	5.38	5.42	(4.1%)	0.7%
T.F. Green	4.33	3.94	3.88	3.65	3.80	(5.9%)	4.2%
Manchester-Boston Regional	3.18	2.81	2.71	2.45	2.42	(9.5%)	(1.2%)
Portland International Jetport	1.73	1.71	1.68	1.62	1.68	(3.8%)	3.7%
Burlington	1.43	1.30	1.30	1.23	1.23	(5.4%)	0.1%
Bangor	0.37	0.39	0.43	0.46	0.49	7.0%	6.0%
Worcester Regional	0.04	0.07	0.11	0.03	0.02	(75.6%)	(43.6%)
Tweed-New Haven	0.07	0.07	0.08	0.08	0.07	(5.7%)	(1.2%)
Hanscom Field	0.00	0.00	0.01	0.01	0.00	(13.9%)	(100.0%)
Portsmouth International[2]	0.00	0.00	0.00	0.00	0.00	N/A	N/A
Subtotal	**16.49**	**15.63**	**15.81**	**14.90**	**15.14**	**(5.7%)**	**1.6%**
Logan Airport	25.51	27.43	28.91	29.24	30.22	1.1%	3.4%
Total	**42.00**	**43.06**	**44.72**	**44.14**	**45.36**	**(1.3%)**	**2.8%**

Source: Massport and individual airport data reports.
Notes: Data for Logan Airport includes international and connecting passengers.
Numbers in parenthesis () indicate negative number.
N/A Not available
1 All passengers in millions. Passenger levels are enplaned plus deplaned passengers (where available) or enplaned passengers times two.
2 Portsmouth International served fewer than 5,000, but more than zero, passengers in 2013.

Figure 4-3 Regional Airports' Share of New England Passengers, 1985-2013



Source: Massport and individual airport data reports.
Note: For the 11 airports listed in Table 4-1.

Passenger levels at the majority of the regional airports declined between 2011 and 2013. Manchester-Boston Regional Airport experienced the largest decline, with passengers decreasing by 0.3 million or 9.5 percent in 2012 and by 0.03 million or 1.2 percent in 2013. T.F. Green Airport passengers decreased by 0.23 million or 5.9 percent in 2012, followed by an increase of 0.15 million or 1.2 percent in 2013. Passenger traffic at Bradley International Airport fell by 0.2 million or 4.1 percent in 2012, followed by a slight increase of 0.04 million or 0.7 percent in 2013. Only Bangor International Airport and Portsmouth International Airport saw some growth between 2011 and 2013. Passenger traffic at Bangor Airport increased by 0.03 million or 7.0 percent in 2012 due to some service increases in existing markets. Portsmouth International Airport had previously lost all scheduled service in 2008, but received new Allegiant Air service starting October 2013.

Aircraft Operation Trends

This section reports on recent aircraft operations trends for the regional airports, including passenger aircraft operations, GA operations, all-cargo aircraft operations, and aircraft load factors.

Regional Airports Aircraft Operations

As shown in Table 4-2, total aircraft operations in the New England region (including Logan Airport) decreased by 3.2 percent in 2012, from 1.09 million operations in 2011 to 1.05 million operations in 2012. Both Logan Airport and the regional airports saw declines in aircraft operations in 2012. Logan Airport's total operations declined by 3.8 percent (14,120 operations) compared to 2011, while total operations at the regional airports declined by 2.9 percent (20,990 operations). In 2013, total aircraft operations in the region decreased by an additional 3.6 percent to 1.01 million operations. Total operations at the regional airports continued to decline in 2013, decreasing by 6.4 percent compared to the prior year. Aircraft operations at Logan Airport increased by 1.8 percent in 2013.

Total aircraft operations in the region in 2012 and 2013 are well below the region's level of aircraft operations in 2000. Total aircraft operations are down by over one third, falling from 1.6 million in 2000 to 1.0 million in 2013. There were similarly large reductions in all three categories of activity – commercial, GA, and military. A number of factors have contributed to the declines. A shift to larger capacity aircraft and higher passenger load factors and a concurrent reduction in airline services at smaller regional airports have contributed to the declining trend in commercial airline operations. Factors negatively affecting GA operations include high fuel prices, a declining private pilot base, economic recessions and slow economic growth. Annual aircraft operations from 2000 to 2013 are provided in *Appendix F, Regional Transportation.*

Commercial operations in the New England region declined in 2012 and 2013, decreasing from approximately 624,520 operations in 2011 to 583,860 operations in 2012 and then 582,210 operations in 2013. This represented year-over-year reductions of 6.5 percent in 2012 and 0.3 percent in 2013. Commercial operations at Logan Airport fell by 4.1 percent in 2012, followed by an increase of 2.4 percent in 2013. In 2013, Logan Airport had approximately 334,660 commercial operations, compared to 370,905 commercial operations in 2007 and 452,760 commercial operations in 2000. Commercial operations at the regional airports decreased by 9.4 percent in 2012 and then decreased by an additional 3.7 percent in 2013. This reflects the trend of airlines monitoring and controlling capacity carefully following the more severe airline service cuts associated with the fuel spike in 2008 and the economic recession of 2008/2009. The same trend was seen across the nation. Aircraft operations have continued to decline even as passenger demand showed signs of recovery, with airlines moving towards larger aircraft sizes and operating with higher passenger loads. Total U.S. aircraft operations declined by 1.7 percent, while U.S. passengers increased by 1.1 percent in 2012.[12]

12 Airports Council International, 2012 Worldwide Airport Traffic Report.

Combined GA operations at the regional airports and Logan Airport increased slightly in 2012, but decreased in 2013. GA operations in the New England region totaled 434,730 operations in 2012, an increase of 1.5 percent from 2011. GA operations at Logan Airport remained relatively flat in 2012, with only a 0.4 percent decline from 2011. At the regional airports, GA operations increased by 1.6 percent in 2012, with increases at some airports such as T.F. Green and Portsmouth International, and decreases at others. In 2013, total GA operations declined falling by 5.1 percent at Logan Airport and by 8.1 percent at the regional airports. Military operations at the regional airports decreased by 2.3 percent in 2012 and by 6.7 percent in 2013.

GA operations continue to be the dominant type of aircraft activity at the regional airports. In 2012, GA accounted for 58.3 percent of total aircraft operations at the regional airports. In comparison, GA represented only 7.9 percent of aircraft activity at Logan Airport, which primarily accommodates the region's domestic and international commercial airline operations. In 2013, GA operations accounted for 57.2 percent of total aircraft operations at the regional airports, but only 7.4 percent of total aircraft operations at Logan Airport. Commercial airline operations accounted for 36.8 percent of total operations at the regional airports in 2012 and 37.9 percent of total operations in 2013. In comparison, commercial operations accounted for 92.1 percent and 92.6 percent of total operations at Logan Airport in 2012 and 2013, respectively.

Overall, the regional airports accommodated a much greater share of the region's aircraft operations than their share of air passengers due to high levels of GA traffic. In 2013, the regional airports accounted for 32.7 percent of the region's passenger traffic, but 64.4 percent of aircraft activity. On average, there were approximately 23.2 passengers per aircraft operation at the regional airports compared to 83.6 passengers per operation at Logan Airport in 2013.

Table 4-2 Aircraft Operations by Classification for New England's Airports, 2011, 2012, and 2013

	2011				2012				2013				
Airport	Commercial[1]	General Aviation[2]	Military[2]	Total	Commer-cial[1]	General Aviation[2]	Military[2]	Total	Commer-cial[1]	General Aviation[2]	Military[2]	Total	Share of NE Total
Bradley International	86,838	16,483	3,630	**106,951**	79,704	15,589	3,726	**99,019**	78,213	15,192	2,558	**95,963**	**9.5%**
T.F. Green	57,194	21,774	369	**79,337**	50,301	24,781	434	**75,516**	48,340	24,729	435	**73,504**	**7.2%**
Manchester-Boston Regional	51,379	12,497	874	**64,750**	45,379	12,504	1,073	**58,956**	43,572	11,432	1,224	**56,228**	**5.5%**
Portland International Jetport	35,157	21,453	533	**57,143**	33,118	20,864	584	**54,566**	31,076	20,021	471	**51,568**	**5.1%**
Burlington	29,166	42,562	5,890	**77,618**	27,067	42,352	7,079	**76,498**	26,814	40,413	6,972	**74,199**	**7.3%**
Bangor[3]	16,177	19,503	13,22	**48,900**	14,826	18,069	11,503	**44,398**	14,707	15,535	11,04	**41,287**	**4.1%**
Tweed-New Haven	3,367	33,919	310	**37,596**	3,936	34,775	416	**39,127**	4,094	28,794	423	**33,311**	**3.3%**
Worcester Regional	2,017	44,050	634	**46,701**	1,639	42,655	740	**45,034**	173	35,064	593	**35,830**	**3.5%**
Portsmouth International	1,717	27,056	8,158	**36,931**	502	30,186	7,917	**38,605**	560	28,951	7,573	**37,084**	**3.7%**
Hanscom Field	750	160,840	1,409	**162,999**	635	164,841	738	**166,214**	0		612	**154,251**	**15.2%**
Subtotal	**283,762**	**400,137**	**35,027**	**718,926**	**257,10**	**406,616**	**34,210**	**697,933**	**247,549**	**373,770**	**31,90**	**653,225**	**64.4%**
Logan Airport	340,757	28,230	NA	**368,987**	326,75	28,114	NA	**354,869**	334,657	26,682	NA	**361,339**	**35.6%**
Total	**624,519**	**428,367**	**35,027**	**1,087,913**	**583,86**	**434,730**	**34,210**	**1,052,80**	**582,206**		**31,90**		**100.0%**

	Percent Change (2011-2012)				Percent Change (2012-2013)			
Airport	Commer-cial[1]	General Aviation[2]	Military[2]	Total	Commercial[1]	General Aviation[2]	Military[2]	Total
Bradley International	-8.2%	-5.4%	2.6%	**-7.4%**	-1.9%	-2.5%	-31.3%	**-3.1%**
T.F. Green	-12.1%	13.8%	17.6%	**-4.8%**	-3.9%	-0.2%	0.2%	**-2.7%**
Manchester-Boston Regional	-11.7%	0.1%	22.8%	**-8.9%**	-4.0%	-8.6%	14.1%	**-4.6%**
Portland International Jetport	-5.8%	-2.7%	9.6%	**-4.5%**	-6.2%	-4.0%	-19.3%	**-5.5%**
Burlington	-7.2%	-0.5%	20.2%	**-1.4%**	-0.9%	-4.6%	-1.5%	**-3.0%**
Bangor[3]	-8.4%	-7.4%	-13.0%	**-9.2%**	-0.8%	-14.0%	-4.0%	**-7.0%**
Tweed-New Haven	16.9%	2.5%	34.2%	**4.1%**	4.0%	-17.2%	1.7%	**-14.9%**
Worcester Regional	-18.7%	-3.2%	16.7%	**-3.6%**	-89.4%	-17.8%	-19.9%	**-20.4%**
Portsmouth International	-70.8%	11.6%	-3.0%	**4.5%**	11.6%	-4.1%	-4.3%	**-3.9%**
Hanscom Field	-15.3%	2.5%	-47.6%	**2.0%**	-100.0%	-6.8%	-17.1%	**-7.2%**
Subtotal	**-9.4%**	**1.6%**	**-2.3%**	**-2.9%**	**-3.7%**	**-8.1%**	**-6.7%**	**-6.4%**
Logan Airport	-4.1%	-0.4%	NA	**-3.8%**	2.4%	-5.1%	NA	**1.8%**
Total	**-6.5%**	**1.5%**	**-2.3%**	**-3.2%**	**-0.3%**	**-7.9%**	**-6.7%**	**-3.6%**

Source: Massport; Federal Aviation Administration (FAA) Tower Counts; FAA Terminal Area Forecast; individual airport data reports.

Notes:

1 May include some Air Taxi operations by fractional jet operators. FAA Tower counts combine some fractional jet operations with small regional/commuter airline operations.

2 Includes itinerant and local operations at the regional airports. Military operations at Logan Airport are negligible and not included in Massport counts.

3 Commercial operations at Bangor include international aircraft making a technical stop.

4 Commercial operations at Hanscom Field include Streamline operations only; other air taxi operations included with GA.

NE New England

Airline Passenger Service in 2012/2013

Airlines can adjust service at an airport or on a specific route in two ways: by increasing or decreasing the number of flights operated, and/or by changing the size of the aircraft flown on the route. Changes in flight frequency and changes in aircraft size both affect the number of seats available to passengers, also known as seat capacity. Airline services are therefore typically discussed in terms of seat capacity as well as the number of flight departures.[13] This section examines changes in airline departures and seat capacity at the regional airports in 2012 and 2013 and provides an overview of new and discontinued routes.

Service Developments at the Regional Airports

In 2012, a total of 14 airlines provided scheduled passenger service from the 10 regional airports to 39 non-stop destinations.[14] In 2013, scheduled commercial services increased slightly overall at the regional airports. This marks an end to the steep airline service cuts seen in recent years, when high fuel prices and the Great Recession forced carriers to eliminate or sharply reduce frequencies on less profitable routes. The regional airports were all affected by airline service declines in previous years and saw only a slight recovery in service levels in 2011.

Table 4-3 shows the share of scheduled domestic departures for Logan Airport and the ten regional airports for the August peak travel month from 2009 to 2013. The regional airports' share of scheduled domestic departures in the New England region fell from 42.5 percent in 2011 to 40.4 percent in 2012 and 39.1 percent in 2013. The combined share for the medium-size airports – Bradley International Airport, T.F. Green Airport, and Manchester-Boston Regional Airport – fell over this period from 29.2 percent in 2011 to 26.3 percent in 2013, while the smaller airports largely maintained their share at approximately 13 percent. Details of scheduled passenger operations by market and carrier for the regional airports for the years 2000 to 2013 are presented in *Appendix F, Regional Transportation*.

Table 4-3 Share of Scheduled Domestic Departures – Logan Airport and the Ten Regional Airports, 2009-2013[1]

	2009	2010	2011	2012	2013
Logan Airport, MA	55.5%	57.8%	57.5%	59.6%	60.9%
Bradley International, CT; Manchester-Boston Regional Airport, NH; T.F. Green Airport, RI	30.3%	29.5%	29.2%	27.6%	26.3%
Bangor, ME; Burlington, VT; Hanscom Field, MA; Portland International Jetport, ME; Portsmouth International Airport, NH; Tweed-New Haven, CT; Worcester Regional, MA	14.2%	12.7%	13.3%	12.8%	12.8%

Source: Official Airline Guide Market Files.
Note:
1 For the peak travel month of August.

Bradley International Airport

Annual seat capacity at Bradley International Airport in Windsor Locks, CT decreased by 9.7 percent in 2012 before increasing by 1.0 percent in 2013. Expanded services to Florida accounted for a large share of the increases in scheduled departures and seat capacity. JetBlue Airways, which began service at the Airport in

13 A departure is an aircraft take off at an airport. While aircraft operations include both departures and arrivals, airline services are typically described in terms of departures, as the number of scheduled departures generally equals the number of scheduled arrivals. Changes in departures translate to changes in overall operations.

14 Includes Allegiant Air, Direct Air, and Streamline. Allegiant Air serves Bangor with scheduled services to Sanford and St. Petersburg. Direct Air provided regularly scheduled charter service to Myrtle Beach, Punta Gorda, Sanford, and West Palm Beach from Worcester Regional Airport in 2011. Streamline provides regularly scheduled charter services between Hanscom Field and Trenton.

November 2010 with nonstop service to Fort Lauderdale and Orlando, added service to San Juan and West Palm Beach in 2012 and added service to Fort Myers and Tampa in 2013. Southwest Airlines also maintained a new twice daily service to Orlando, introduced at the end of 2010, while increasing seat capacity to Denver and Midway and introducing new service to Fort Myers in 2012 and 2013. AirTran Airways, which recently merged with Southwest, entered the market in 2013 with service to Atlanta. Continental Airline's services to Cleveland and Newark were transitioned to United Airlines in 2012 and 2013 following their merger, with United Airlines increasing seat capacity on the Newark route by 37 percent between 2011 and 2013.

T.F Green Airport

T.F. Green Airport in Warwick, RI saw continued reductions in scheduled departures and available seat capacity by the majority of airlines at the Airport. The most significant cutbacks were implemented by Southwest Airlines, which discontinued service to Philadelphia and Phoenix in 2012 and Las Vegas in 2013. Southwest Airlines began service to Denver in 2012 before pulling out of the market in 2013. Other notable service losses include Delta Air Lines service to Washington National and US Airways service to New York La Guardia, which were both discontinued in 2012. Overall scheduled seat capacity at T.F. Green Airport decreased by 13.2 percent in 2012 before increasing by 1.1 percent in 2013. JetBlue Airways entered the T.F Green Airport market when it launched nonstop services to Orlando and Ft. Lauderdale on November 29, 2012 and maintained service levels throughout 2013.

Manchester-Boston Regional Airport

Manchester-Boston Regional Airport (NH) also experienced significant cutbacks by Southwest Airlines, United Airlines, US Airways, and Air Canada in 2012 and 2013. Southwest Airlines discontinued non-stop service to Philadelphia and Denver while also reducing scheduled frequencies on its Chicago Midway route. United Airlines exited the Washington Dulles market and reduced frequencies to Newark and Chicago O'Hare. US Airways exited the New York La Guardia market. Scheduled seat capacity at Manchester-Boston Regional Airport decreased overall by 16.5 percent in 2012 and 3.0 percent in 2013.

Portland International Jetport

Portland International Jetport (ME) experienced a 9.4 percent decline in airline capacity in 2012 followed by a modest recovery of 1.7 percent in 2013. US Airways exited the New York La Guardia market in 2012 and decreased the size of aircraft serving the Charlotte, Washington National, and Philadelphia routes. JetBlue Airways reduced its presence at the airport, discontinuing service to Orlando in 2012 and slightly reducing seat capacity to Orlando. Delta Air Lines continued to increase frequencies and aircraft size on its newly introduced service to New York La Guardia in both 2012 and 2013. Following their recent mergers, United Airlines took over Continental Airlines' existing services to Cleveland and Newark, and Southwest Airlines assumed AirTran Airways' service to Baltimore. Overall scheduled seat capacity at Portland International Jetport decreased by 9.4 percent in 2012, as compared to 2011 levels, before increasing by 1.7 percent in 2013, as compared to 2012 levels.

Burlington International Airport

Burlington International Airport (VT) also experienced slight declines in airline capacity through 2012 and 2013. JetBlue Airways discontinued service to Orlando in 2012 and reduced aircraft size in the New York JFK market in 2013. US Airways increased scheduled frequencies in the Washington National market but decreased aircraft size in the Philadelphia market and completely exited the New York La Guardia market following Delta Air Lines' competitive entry. Delta Air Lines entered the New York La Guardia market in 2012 and at the same time it exited the New York JFK market. In 2013 Delta Air Lines began new service to Atlanta. Similar to other markets, United Airlines took over Continental Airlines' service to Cleveland and Newark in 2012 following their successful merger. New Allegiant Air service to Orlando/Sanford, announced in 2013, commenced in

February 2014. Overall scheduled seat capacity at Burlington International Airport decreased by 10.2 percent in 2012 and 2.7 percent in 2013.

Worcester Regional Airport

In March 2012, Worcester Regional Airport (MA) lost regularly scheduled charter services provided by Direct Air, which filed for Chapter 7 bankruptcy in April 2012. Direct Air, which first entered the Worcester market in 2008, was the only carrier providing services at Worcester Regional Airport in 2012. After a concerted marketing effort on the part of Massport and the local Worcester community, services were re-introduced in November 2013 when JetBlue Airways began regional jet services to Fort Lauderdale and Orlando.

Bangor, New Haven, Portsmouth and Hanscom Airports

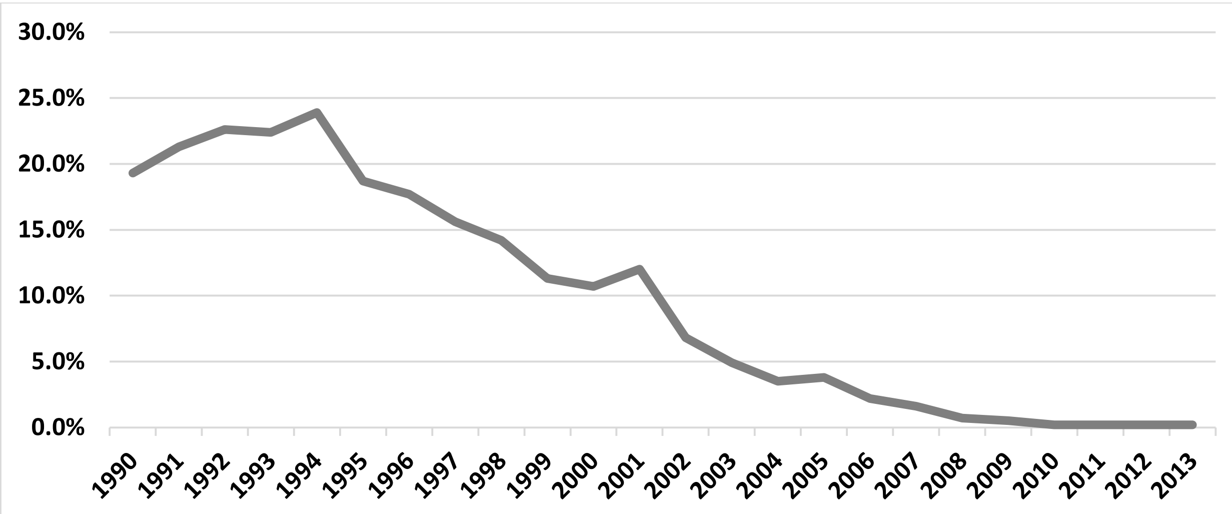
Among the other smaller regional airports, Bangor Airport (ME) was the only one to see a significant recovery of commercial service. Scheduled seats at Bangor Airport grew by 2.8 percent in 2012 and 6.8 percent in 2013, with US Airways increasing frequencies in the Washington National market and Allegiant Air increasing seat capacity in the Orlando-Sanford and St. Petersburg markets. Delta Air Lines continued increasing scheduled frequencies and seat capacity in the New York La Guardia market as US Airways gradually discontinued service on the route. Tweed-New Haven Airport (CT) experienced a decline in capacity as US Airways, the only carrier offering scheduled service, reduced seat capacity by 6.7 percent in 2012 and 2.3 percent in 2013. In 2011, the public charter carrier, Streamline, introduced regularly scheduled service on turboprop aircraft from Hanscom Field to Trenton, NJ but this service was discontinued in September 2012. Portsmouth, which had been unserved since Allegiant Air left the market in 2008, regained commercial passenger service late in 2013 when Allegiant Air re-entered the market providing nonstop service to Orlando-Sanford.

Regional Reliance on Logan Airport

Despite the service reductions at the regional airports in 2012 and 2013, the trend of decreased reliance on connecting service through Logan Airport continued. Figure 4-4 shows that the share of flights originating at regional airports, with Logan Airport as the destination, has been declining steadily since the mid-1990s. In the early 1990s, scheduled service to Logan Airport represented over 20 percent of regional airport flights. This share dropped as regional airports gained more non-stop service to both origin and destination (O&D) airports and airline connecting hubs. In 2010, the last scheduled commercial flights from the 10 regional airports to Logan Airport (listed in Table 4-3) were eliminated entirely. The significance of this trend is that it reduces pressure on Logan Airport to provide connecting service for small planes from small communities to other destinations, resulting in more convenient air service routings for passengers, and opening up capacity at Logan Airport for transcontinental and international flights.

However, while service between the 10 regional airports and Logan Airport has been virtually eliminated, other remote communities in New England continue to rely on Logan Airport for connecting services. Logan Airport acts as a connecting hub for a number of other New England airports, such as the Cape Cod and Island Airports. Logan Airport remains the sole commercial air service destination for some communities, such as Augusta, Presque Isle, and Rockland, ME, as well as Rutland, VT.

Figure 4-4 Share of Flights Originating at Regional Airports with Logan Airport as Destination, 1990-2013



Source: Official Airline Guide Market Files (August for each year).
Note: Includes the 10 regional airports listed in Table 4-3.

Regional Airport Facility Improvement Plans

The following section describes significant airport improvements that are planned or under construction at the regional airports in the near future.

T.F. Green Airport

In September 2011, the FAA issued a favorable Record of Decision (ROD) approving the Preferred Alternative for the T.F. Green Airport Improvement Program, which analyzed eleven projects including an extension to the airport's main runway to allow for nonstop flights to the West Coast. Construction of project elements of the T.F. Green Airport Improvement Program began in 2013 and is expected to continue through 2017. The Airfield Improvement Program includes the following projects:

- Phase 1 of the Runway 16 End Safety Area Improvements project will be completed by the end of 2014. Phase 1 involves preparation of the site of the Engineered Material Arresting System (EMAS), airfield electrical improvements on the Runway 16 end and reconfiguration of the taxi lane from the northeast ramp to the Runway 16 end.
- Phase 2 of the Runway 16 End Safety Area Improvements project, which involves installation of the EMAS will begin in May 2014 and is expected to be completed in June 2014.
- The demolition of Hangar 1 was completed in 2013. In addition to the hangar removal, this project involves the construction of an aircraft parking apron in a portion of the former hangar's footprint.
- Construction of a Deicer Management System, which will collect and treat the glycol used to de-ice aircraft at T.F. Green Airport, began in 2013. The system is expected to be operational by the end of 2015.
- The Runway 34 End Safety Area Improvements project will commence in 2014. Major elements of the project include the reconstruction of 1,600 feet of Runway 16-34, EMAS construction at the Runway 34 end, and construction of the associated airport service road. Construction is expected to be completed by the end of 2015.

- FAA System Upgrades, which will proceed concurrently with the Runway 34 Safety Area Improvement project, will include improvements to the approach lighting system and Glide Slope Antenna.
- The Runway 5 End Extension project is expected to begin in 2016 and be completed by the end of 2017. This project involves extension of the Runway from its current length of 7,166 feet to 8,700 feet, which will allow T.F. Green Airport to handle aircraft capable of long haul flights to West Coast destinations. The project also involves an extension of the parallel Taxiway M and construction of an EMAS at the Runway 5 end.
- The replacement of the Winslow Park facilities is expected to commence in 2014 and be completed in 2015 for the Main Avenue relocation to commence. Work includes replacing the existing soccer and softball fields, playground facility, concession and restroom facilities as well as roadway calming treatments and landscaping improvements.
- The construction of the Main Avenue relocation project is scheduled for June 2015 through May 2016.

Manchester-Boston Regional Airport

Since the early 1990s, over $500 million was invested in Manchester-Boston Regional Airport to improve and develop landside and airside facilities and infrastructure. Projects included a 158,000-square foot passenger terminal and two subsequent 75,000-square foot terminal additions, a 4,800-space parking garage with an elevated pedestrian walkway connection to the terminal, roadway improvements and extensive runway reconstruction and lengthening. Recent customer service enhancement initiatives have included the construction of a new cell phone lot in 2007 for motorists waiting to pick up passengers and various concessions improvements through 2008 and 2009.

Manchester-Boston Regional Airport completed an Airport Master Plan Update in 2011. The master plan update provides a blueprint for development and improvement of airport facilities and infrastructure through 2030. Recent and on-going improvement projects at the airport include:

- The Terminal Ramp Replacement Project to rehabilitate the concrete apron areas adjacent to the terminal building. This project began in 2012 and was completed in 2013.
- Demolition of structures in the runway protection zone (RPZ) of Runway 06 involves removing buildings with usages deemed non-compatible with RPZs as defined by the FAA. Elements of the project include demolishing the Highlander Inn and Conference Center and associated buildings.
- Upgrades to the terminal building heating, ventilation, and air conditioning (HVAC) systems will address certain deficiencies in the terminal cooling system and will provide significant improvements to customer comfort levels within areas of the terminal building.

Other potential projects over the coming years include:

- Roadway and parking improvements;
- Curbside enhancements;
- Refurbishing and expansion of baggage claim equipment;
- Construction of a glycol collection/treatment facility; and
- Construction of a snow removal equipment storage building.

Bradley International Airport

A $200 million airport modernization project at Bradley International Airport was completed in 2010. Originally launched in 2000, the modernization project introduced a refurbished and expanded Terminal A with an additional 260,000 square feet of new concourse, ticket counters and waiting areas, major gate renovations, and a state-of-the-art security and communications system. A 28,000-square foot International Arrivals Building was also completed.

In 2011, the Connecticut Airport Authority (CAA) was established to oversee the operation and development of Bradley International Airport. The CAA, a quasi-public agency consisting of an 11-member board, will manage day-to-day operations at Bradley International Airport, as well as at five GA airports in Connecticut. The goal of the CAA is to transform Bradley International Airport and the state's five GA airports (Danielson, Groton/New London, Hartford Brainard, Waterbury-Oxford, and Windham Airports) into economic drivers for the state. Bradley International Airport was previously run by a board under the Connecticut Department of Transportation.

A three-year renovation project for the airport hotel, the Sheraton Bradley Airport Hotel, was completed in 2011, featuring newly outfitted guest rooms, a redesigned lobby, and an expanded fitness center and pool. More recently the CAA has announced the completion of a food court renovation as well as the opening of a new cell phone waiting lot. The 2010-2013 Bradley International Airport Strategic Plan highlights several airport improvement projects between 2012 and 2013. These projects, which are currently in progress, include:

- A sound insulation program;
- The rehabilitation of Taxiway C North;
- The rehabilitation of Taxiway C South;
- Utility relocation and obstruction removal;
- The demolition of old Murphy Terminals and design of new Terminal B; and
- Construct roadway realignment.

The airport's $280 million capital improvement program for Fiscal Year (FY) 2014 – FY 2018 includes the following projects:

- A consolidated rental car facility;
- Demolition of the Murphy Terminal;
- Roadway demolition and re-alignment;
- Utility relocation; and
- Airfield improvements.

Hanscom Field

Massport continues to invest in Hanscom Field to improve and upgrade facilities and maintain a safe, secure, and efficient airport. Past and future capital investments ensure that Hanscom Field can continue to serve its role as a GA reliever to Logan and premiere business aviation facility for the region. In FY 2012, Massport invested $3.4 million in airfield, terminal, equipment, and other facility improvements at Hanscom Field.

Massport invested another $1.7 million in facility improvements in FY 2013. These airport improvement projects are summarized in the annual reports on *The State of Hanscom*.

Massport's FY 2012 and FY 2013 capital investment projects at Hanscom Field included:

- Relocating portions of the perimeter road at the approach to Runway 11 were completed in FY 2012 to comply with FAA Runway Safety Area mandates;
- Maintaining vegetation removal areas and the trail system that connects two Massport-owned parcels with portions of conservation land and open spaces in the towns of Bedford and Concord;
- Implementing an enhanced Access Control System in conjunction with the replacement of a portion of the perimeter fence which had reached the end of its useful life;
- Signage and landscape improvements along the airport entrance in 2012;
- Relocating portions of the perimeter road at the approach to Runway 29 were completed in FY 2013 to comply with FAA Runway Safety Area mandates;
- Rehabilitating pavement areas around the Old T-hangars was completed in FY 2013;
- Developing the 2014-2018 Vegetation Management Plan Update; and
- Replacing the electrical infrastructure to Hangar 3.

Planned projects for FY 2014 and beyond include:

- Rehabilitating pavement surrounding the Pine Hill T-hangars;
- Rehabilitating pavement areas along the entry roadway;
- Airfield pavement replacement will continue to be an ongoing project in coming years; and
- Permitting and implementation of the 2014-2015 Vegetation Management Plan.

In addition to Massport's investments, planned investments by Massport lessees also serve an essential role in safe and efficient Airport operation. The Authority solicits third-party development of facilities that support and enhance Hanscom Field's role in the regional transportation system. Many of the hangars at Hanscom Field are owned or leased by tenants who are responsible for maintaining them. On-going third-party projects at Hanscom Field include:

- In 2012, Rectrix Aviation was selected by Massport to develop fixed-base operator (FBO) facilities at the former Hangar 24 site. Demolition of the hangar was completed in September 2012. In 2013, Rectrix obtained required permits and began construction of the new hangar and FBO facility. Rectrix anticipates project completion in 2014.
- The Massport Board approved a proposal by Jet Aviation, a current FBO operator at Hanscom Field, to replace Hangar 17 with a more modern facility. In 2012 and 2013, Jet Aviation undertook the planning and design process. In 2013, Jet Aviation submitted an Environmental Assessment to the FAA to begin the permitting process. Jet Aviation anticipates construction to begin in 2015.

Worcester Regional Airport

The *Worcester Regional Airport Master Plan Update*, completed in 2008, was funded by the FAA and the former Massachusetts Aeronautics Commission. The Worcester Regional Airport Master Plan provides a strategic roadmap to guide airport development through 2020. Near-term projects were focused on maintaining essential operations; safety and security functions; and included runway pavement reconstruction, runway safety area upgrades, and a vegetation removal and maintenance plan. Long-term initiatives include upgraded corporate/GA facilities including a FBO facility and hangars, a new Airport Rescue and Firefighting Facility (ARFF) and ongoing runway and taxiway pavement rehabilitation. Various demand driven projects, including terminal enhancements and additional parking facilities, were also identified; however, these projects depend on the level and type of future aviation activity realized at Worcester Regional Airport. Massport is currently pursuing enhancements to Worcester Regional Airport's all-weather capability including upgrading the Runway 11 Instrument Landing Systems (ILS) from a Category I to a Category III system, and its associated required infrastructure and navigation aids along with a partial parallel taxiway. This project, which would allow aircraft to land on Runway 11 during virtually all weather conditions, is a safety and operational priority for the Airport. Massport submitted an Environmental Notification Form for the *Worcester Regional Airport CAT-III Instrument Landing System and Taxiway Project* to the Massachusetts Executive Office of Energy and Environmental Affairs in January 2014.

The following near-term projects identified in the Worcester Regional Airport Master Plan were completed as of 2011:

- Installed EMAS on the Runway 29 End;
- Resurfaced 3,000 feet of Runway 11;
- Installed EMAS on the Runway 11 End;
- Resurfaced 4,000 feet of Runway 29 and reconstructed Taxiway Delta; and
- Fuel facility improvement.

In January 2012, Massport approved a proposal by Rectrix to develop an aircraft hangar and office space at Worcester Regional Airport. Construction started on the $6.7 million project in August 2013. The Rectrix project includes 27,000 square feet of hangar and office space that will house large corporate jets and a regional aircraft maintenance facility. Rectrix will offer private jet charters and FBO services, including transient aircraft parking and fueling services from the new hangar facility.

Massport has committed to invest in the following additional airside and landside improvement projects over the next few years:

- Installation of a new terminal roof and HVAC system;
- Airside and landside pavement rehabilitation;
- Rehabilitation of the existing ARFF station;
- Security improvements; and
- Obstruction removal.

Long-term Worcester Roadway Improvements

In 2008, the Central Massachusetts Regional Planning Commission (CMRPC) initiated the Worcester Regional Mobility Study that was envisioned as a transportation plan with the goal of improving the movement of people and goods through the Greater Worcester Region. The final Study was released in May 2011. One of the Study's objectives was to improve ground transportation access between the regional roadways and Worcester Regional Airport within the context of an "economic development corridor" that could benefit other local businesses. Several alternative routes were identified and recommended for further study including a new Interstate 90 interchange in the vicinity of Route 56. The Study also assessed a range of alternatives to address regional mobility concerns and recommended thirteen roadway infrastructure improvements intended to reduce congestion, enhance regional mobility, and address existing interchange/intersection constraints. The study presented the recommended phasing and packaging of recommended alternatives into short-term (zero to five years), mid-term (five to ten years), and long-term actions (over ten years).

Near-term Worcester Directional Signage Improvement Program
CMRPC also supported Massport's goal to identify immediate actions for improving roadway access to Worcester Regional Airport through a signage improvement program. In collaboration with MassDOT and the City of Worcester, Massport identified six primary routes now used by travelers to access Worcester Regional Airport. The team also developed a sign design and placement plan. The goal was to improve directional signage on these roads between Worcester and the Massachusetts Turnpike and Interstate 290 by achieving the following objectives:

- To ensure that key decision points would be adequately signed;
- To reduce sign "clutter" by removing old and unnecessary signs; and
- To design and install new airport trailblazer signs consistent with Massport's and MassDOT's way finding standards.

MassDOT has installed the desired signs that were produced by the Massport Sign Shop. To date, more than 80 signs have been installed including several signs on Auburn roads approved by the Town of Auburn in March 2011.

Regional Long-Range Transportation Planning

A balanced regional intermodal transportation network would reduce reliance on Logan Airport as the region's primary transportation hub and provide New England travelers with a greater range of viable transportation options. This section highlights efforts to achieve this balance through cooperative transportation planning at a broad array of transportation agencies and concerned parties to promote an integrated, multi-modal regional transportation network.

The unified MassDOT brought together many Commonwealth entities that plan, build, own, operate, and maintain all modes of transportation, under a five-member board of directors. Massport remains an independent authority focused on airport and seaport needs with its own board of directors, including the Secretary of MassDOT. The creation of MassDOT was intended to help integrate, coordinate, and prioritize multimodal transportation policy and investment in Massachusetts, resulting in a more effective, efficient, equitable, rational, and innovative transportation system. As a fundamental part of the transportation framework in the Boston metropolitan area, and for all of New England, Massport supports an integrated multimodal transportation policy to improve the efficient use of transportation infrastructure on both a metropolitan and a regional scale. In 2011, MassDOT continued to make strides in improving the existing transportation infrastructure by addressing structurally deficient infrastructure with innovative construction techniques, developing a comprehensive environmental responsibility and sustainability initiative, and continuing to invest in the Boston metropolitan area's rapid transit.

Logan Airport's functional role is New England's premier commercial airport, providing an essential and efficient connection between the New England states and the global economy. Recent studies have indicated that there is a serious lack of usable aviation capacity in the coastal mega-regions[15] (although not in Boston itself) and identify a need for access to alternative forms of short-distance travel across these regions.[16] Since the construction of a second major Boston airport has been judged impractical in the past, the potential of high-speed rail is increasingly being viewed as an important complementary component in the regional transportation system and aviation planning.[17] Given the comparable travel times, proximity of service to downtown Boston, and the potential for highly efficient electrified propulsion, high-speed rail could provide efficient intercity connectivity for city-pairs in a corridor up to 600 miles long, which would be competitive with air travel.[18] Boston's South Station is undergoing planning and design for expansion that would support the current and future rail mobility in Massachusetts and along the NEC including supporting future high-speed rail. In 2012, Amtrak services in the NEC had a 54 percent share of the Boston-New York City markets (excluding traffic by other surface modes such as private car and bus) (Figure 4-5). Amtrak data were not available for 2013.

Regional Aviation Economic Impact Study

The Aeronautics Division of MassDOT completed a wide-ranging economic impact study of the statewide airports system's (the 39 public use airports including Logan Airport) contribution to the economy of Massachusetts. The analysis found that Massachusetts public use airports generated $11.9 billion in total economic activity, including $4.9 billion in total annual payroll resulting from 124,369 jobs that can be traced to the aviation industry.[19] In particular, Massport's three airports are noted to make significant contributions to the regional economy generating approximately $10.3 billion or 87 percent of the overall economic benefits generated by the Massachusetts airport system.[20] Specifically, Logan Airport supported over 94,000 jobs and the total economic impact is now estimated at approximately $8.87 billion per year.[21]

15 The coastal mega-regions are the continuously urbanized areas along the east and west coasts of the U.S. (Washington, D.C., Philadelphia, New York City, Hartford, Boston).
16 Federal Aviation Administration: Capacity Needs in the National Airspace system 2007-2025 (commonly referred to as FACT-2) and TRB: ACRP Report 31: Innovative Approaches to Addressing Aviation Capacity Issues in Coastal Mega-regions.
17 Transportation Research Board ACRP 03-23: Integrating Aviation and Passenger Rail Planning.
18 "Where High-Speed Rail Works Best" America 2050 - http://www.america2050.org/pdf/Where-HSR-Works-Best.pdf Page 1-2.
19 Massachusetts Department of Transportation Aeronautics Division. Massachusetts Statewide Airport Economic Impact Study Executive Summary. (2011). Accessed January 4, 2011 <http://www.massdot.state.ma.us/portals/7/downloads/aero_economicStudy_111021.pdf>
20 Ibid.
21 Ibid.

Hanscom Field supported 11,765 jobs and a total impact of $1.4 billion while Worcester Regional Airport supported 418 jobs and a total economic impact of $51.5 million. Hanscom Field is particularly important for its function as an active military facility, which is aided by its proximity to Boston-area technology and research industry. For every $100 spent by aviation-related businesses, an additional multiplier impact of $56 is created within Massachusetts according to the study. While the economic impact of the region's airports was the focus of the study, it also noted qualitative benefits of the state's airports including:

- Facilitating emergency medical transport;
- Providing police support;
- Supporting aerial surveying, photography, and inspection operations;
- Conducting search-and-rescue operations;
- Supporting the U.S. military and other government operations; and
- Providing youth outreach activities.

Massachusetts Statewide Airport System Plan (MSASP)

The MassDOT Aeronautics Division completed the MSASP in 2010. The MSASP provides guidance to state policy makers for the long term development of the Commonwealth's airport system. It documents the status of the current airport system; provides a long term vision for the system; identifies system goals and related improvements; establishes priorities for system and airport funding; and provides supporting data and materials.

Boston and Statewide Long-term Transportation Vision

The Boston MPO developed a long-range vision for the region and its transportation network in 2035.[22] The vision described by the Boston MPO identifies the Boston metropolitan region as continuing to be an economic, educational, and cultural hub which will continue to contribute to the high quality of life. The high quality of life will be supported by a well-maintained transportation system consisting of safe, healthy, efficient, and varied options. The variety of transportation options will allow people to find jobs and services within easy reach of affordable housing, and will reduce environmental impacts thereby improving air and environmental quality. This vision is possible through attentive maintenance, cost-effective management, and strategic investment in the region's transportation system. This vision is broad-based; more specifically for the Airport, the long-range vision finds that support for air cargo is critical as the State Freight Plan[23] finds air freight shipping to grow more quickly than any other shipping mode.

Although the other New England states have statewide long-term transportation plans, Massachusetts currently does not. MassDOT is currently undertaking the Commonwealth's first statewide strategic multi-modal transportation plan known as *weMove Massachusetts*.[24] The philosophy behind *weMove Massachusetts* is that MassDOT needs to make logical, defensible, and smart choices on how to invest the agency's limited resources based on the articulated values. The goals of *weMove Massachusetts* are to engage stakeholders through a bottom-up approach as well as internal agency stakeholders in a discussion about the present and future needs of the transportation system, to build action-oriented policies based on stakeholder feedback that can serve as a bridge between MassDOT's values and investments, and to develop a forward

22 Boston Region Metropolitan Planning Organization. Paths to a Sustainable Region. September 22, 2011.
23 Massachusetts Department of Transportation. State Freight Plan. September 2010.
24 https://www.massdot.state.ma.us/wemove/Home.aspx

thinking, data-driven, decision-making methodology to assist MassDOT in implementing its priorities transparently and measurably.

Massport is an active participant in the development of the Boston MPO long-range transportation plan and has a representative on the *weMove Massachusetts* Stakeholder Advisory Group.

Regional Cooperative Planning Efforts

Several regional transportation cooperation planning efforts are underway, as described below.

New England Regional Airport System Plan (NERASP)
In fall of 2006, the FAA New England Region, in concert with the New England Airport Directors and New England State Aviation Directors, completed the NERASP. The results of this study describe the foundation of a regional strategy for the air carrier airport system to support the needs of air passengers through 2020. To date, the development of that strategy has been instrumental in facilitating the investment and development of the primary commercial airport system in New England.

During preparation of the 2006 NERASP study, which analyzed the primary commercial airports in New England, the group recognized that a similar evaluation of GA would also prove useful. It would provide state aviation officials with a greater understanding of airport roles and infrastructure investment. Faced with the current struggling economy, rising airport and aircraft operational costs, declining operational activity, an aging infrastructure and with limited state and federal funds to address improvements, the importance of developing both a short-range and long-range perspective on the future performance of the New England GA airport system is clear.

New England Regional Airport System Plan – General Aviaton (NERASP-GA)
The New England state aviation officials, in partnership with the FAA, are currently conducting a study of the GA airport system in New England, including primary commercial service airports that service a GA component. This assessment of the New England GA airport system will provide state aviation officials with a common understanding of their state airport system in relation to the New England region as a whole. Assisted by this information, the FAA will be better positioned to make decisions regarding priority capital investments. Moreover, the NERASP study proved that the geographic boundary of the New England region, as well as its cultural identity, makes an overall study of New England an effective planning approach. Information on the NERASP-GA study can be found at http://www.nerasp-ga.com.

Conference of New England Governors and Eastern Canadian Premiers (NEG/ECP)
The Conference of NEG/ECP was a formally established body that coordinated regional policy programs in the areas of economic development, transportation, environment, energy, and health, among others. The NEG/ECP focused on aviation and intercity passenger rail, particularly in the northeastern coastal mega-region, as part of a larger transportation system that needs modal balance. MassDOT had a representative on the NEG/ECP Transportation and Air Quality Committee which covered regional transportation issues and infrastructure development, use, and efficiency. This organization served an important function helping to achieve a greater balance between air, rail, and auto trips, and ultimately helping to increase overall transportation capacity without overburdening Logan Airport and the New England aviation system.

In 2012, the NEG/ECP continued to implement its transportation action plan which focused on enhancing alternative-fuel vehicle infrastructure in the region, increasing multi-modal transportation options, and improving freight and passenger rail networks.[25] The NEG / ECP has been merged into the Coalition of Northeastern Governors as of September 1, 2012

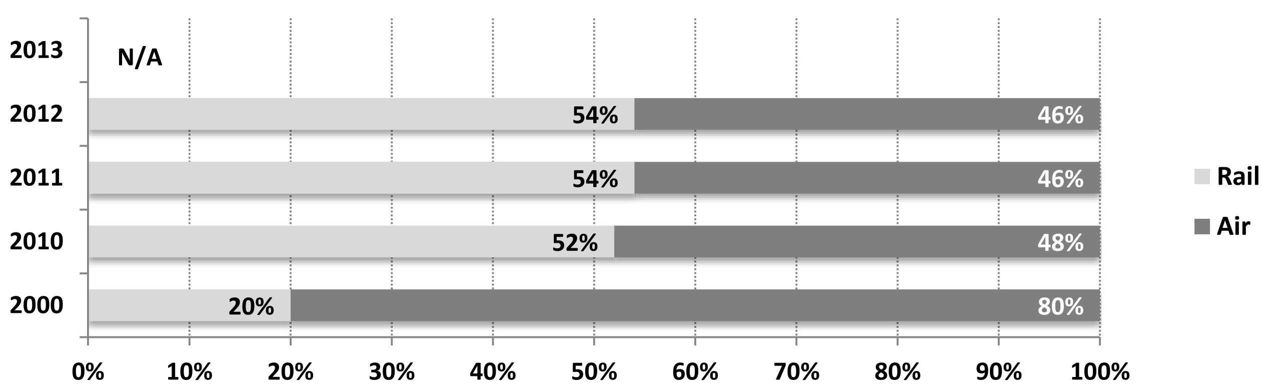
Regional Rail Transportation Initiatives

This section reports on recent developments and current rail service originating in Boston, the status of air-rail linkages in the NEC, and the expanding Pilgrim Partnership, which provides commuter rail between Massachusetts and Rhode Island.

Amtrak Northeast Corridor
Amtrak's NEC is an intercity rail line that operates between Boston-South Station and Washington, D.C. via New York City. Other major destinations served by the route include Providence, RI; New Haven, CT; Philadelphia, PA; and Baltimore, MD. Logan Airport passengers can connect directly to Boston-South Station via Silver Line bus rapid transit service or taxi. Amtrak operates two services between Boston and Washington, D.C.: the Acela Express (high-speed, limited-stop service) and the Northeast Regional (lower-speed service that makes local stops along the route). Travel times on the Acela Express range from 3.5 hours from Boston to New York to just over 6.5 hours from Boston to Washington, D.C. Travel times on the Northeast Regional range from about 4.25 hours from Boston to New York to approximately 7.75 hours from Boston to Washington, D.C. A total of 19 daily departures are offered from Boston-South Station to Penn Station in New York, of which about half are Acela Express. Most trips continue south to Washington, D.C, and a smaller number of Northeast Regional trains continue further south to Newport News, Virginia.

System-wide Amtrak ridership was 31.24 million one-way trips in FY 2012 and 31.56 million one-way trips in FY 2013. The NEC represented about 36 percent of total system-wide Amtrak ridership. In FY 2013 and 2012, the NEC carried 11.40 and 11.42 million passengers respectively for a total increase of 4.6 percent (0.5 million passengers) over the number of passengers in 2011 (10.9 million). In 2013 Acela Express accounted for 3.34 million passengers, while the Northeast Regional accounted for 8.04 million passengers. Overall NEC ridership reached a new record in 2012 before declining slightly in 2013, matching and surpassing the previous 2008 peak of 10.9 million passengers and up significantly from 8.4 million in 2000. Amtrak's share of the Northeast total passenger market has increased substantially since the introduction of Acela service in 2000. In 2012, Amtrak captured approximately 54 percent of the total air/rail market between Boston and New York, compared to 20 percent in 2000, as shown in Figure 4-5.

Figure 4-5 Rail-Air Market Share within the Northeast Corridor - Boston-New York City, 2000-2012



Source: Amtrak
N/A Not available

25 Conference of New England Governors and Eastern Canadian Premiers. Resolution 35-4, "Resolution Concerning Transportation". July 11, 2011.

Recent forecasts of Amtrak ridership along the NEC indicate that ridership could reach 17.4 million passengers in 2020, 26.2 million passengers in 2030, and expand to 43.5 million passengers in 2040. This forecast indicates that the substantially reduced travel times of high-speed rail transportation would become more attractive along the NEC.[26]

Northeast Corridor Infrastructure Master Plan and Next-Generation High Speed Rail Plan

The *Northeast Corridor Infrastructure Master Plan*, a new regional rail planning study, was released in May 2010. The Master Plan documents NEC growth needs through 2030, including expanded capacity and improvements in Boston-New York and New York-Washington intercity travel times. A 76-percent increase in rail ridership from 13 million to 23 million[27], a 36-percent increase in train movements from 154 average weekday to 210 average weekday, and the need for $52 billion in additional capital investment is expected over the next 20 years.

Following up on the release of the *Northeast Corridor Infrastructure Master Plan*, Amtrak also unveiled a Next-Generation High-Speed Rail proposal in September 2010 titled *A Vision for High-Speed Rail in the Northeast Corridor*. The proposal outlines a brand-new 426-mile two-track corridor running from Boston to Washington, offering high-speed rail service with sustained maximum speeds of 220 mph. The route would allow for an 84-minute trip time between Boston and New York and a three-hour trip time between Boston and Washington. Under this Next-Generation high speed rail plan, the New York City – Boston market would see a further shift from auto and air to rail due to the dramatic improvements in rail travel times, and projects the air market between the two city-pairs to be nearly eliminated by 2050.[28] This plan states that traveler's shift to high speed rail would reduce delays on competing modes (air and auto) and the shift away from shorter and smaller intraregional flights would free up air transport capacity for higher-value transnational and international flights.[29]

An update to the *Northeast Corridor Infrastructure Master Plan* and *A Vision for High-Speed Rail in the Northeast Corridor* was released in July 2012. Since these two documents were released, the two programs have been integrated into a single coherent service and investment program, called the Northeast Corridor Capital Investment Program. The Northeast Corridor Capital Investment Program would advance the near-term projects outlined in the Master Plan to benefit the NEC while incrementally phasing improvements to the Acela high-speed service to support the next-generation high-speed rail proposed.[30] The near-term NEC improvements are identified to occur between 2012 and 2025 and the long-term Next-Generation High-Speed Rail improvements are identified to occur between 2025 and 2040. The publication of the 2012 update is the first step in "improving the NEC for all users to sustainably support the population and economic growth facing the Northeast over the next 30 years" but a considerable amount of additional planning work is required by all stakeholders.[31]

In 2011, the U.S. DOT awarded Amtrak and the New York State DOT $745 million for two high-speed rail projects on the NEC. A major upgrade to tracks and overhead wires will be conducted along a 24-mile stretch in New Jersey, allowing for an improvement in Acela express train speeds from 135 mph today to 160 mph. Improvements to the Harold railroad interlocking in Queens, NY will also be completed, eliminating delays and reducing commuting time for Amtrak riders.

26 "The Amtrak Vision for the Northeast Corridor: 2012 Update Report." Amtrak. July 2012.
27 Includes ridership on Amtrak and state rail lines, but excludes ridership on commuter rail lines.
28 "A Vision for High-Speed Rail in the Northeast Corridor" Amtrak September 2010, Page 21.
29 Ibid.
30 "The Amtrak Vision for the Northeast Corridor: 2012 Update Report." Amtrak. July 2012.
31 Ibid. pg. v.

Boston-South Station Expansion
In support of the Northeast Corridor Capital Investment Program, MassDOT is currently designing and planning to expand the Boston-South Station to meet the infrastructure and capacity needs of the NEC. At present, South Station operates above its design capacity for efficient train operations and orderly passenger queuing. Operating with only 13 tracks, the current South Station constrains the current and future rail mobility within Massachusetts and through New England and the NEC.[32] The proposed expansion of South Station will result in the following benefits to rail mobility:[33]

- Improve the performance of existing and future high-speed and intercity passenger rail service to and from Boston. Today's NEC on-time performance is approximately 85 percent for Acela Express and 75 percent for Northeast Regional trains. The 2030 target for on-time performance is 95 percent for Acela Express and 90 percent for Northeast Regional. Without expanding South Station and its support facilities, not only will these targets be missed, but on-time performance will deteriorate even further in the future.
- Enable growth in high-speed and other intercity passenger rail service in the northeastern U.S., at a time when both the roadway and aviation networks are at or over capacity.
- Support sustainable economic growth and improved quality of life in NEC metropolitan areas, including Boston.
- Support a more attractive and increased Massachusetts Bay Transportation Authority (MBTA) Commuter Rail service, with associated benefits such as increased statewide transportation access, environmental sustainability, and improved personal mobility.

For the South Station track expansion to be implemented as currently conceived by MassDOT, the existing U.S. Postal Service (USPS) General Mail Distribution Facility located adjacent to South Station must be relocated. The USPS has undergone a national study of its facilities for streamlining and consolidation. While that process is still continuing, it is currently assumed that the USPS facility will remain in its current location and thus needs to be relocated for track expansion to occur.

Commuter Rail Services
The Pilgrim Partnership is an arrangement between the MBTA and the Rhode Island Department of Transportation (RIDOT), under which RIDOT allocates some of its federal funding to the MBTA in return for commuter rail service to Boston from Rhode Island. Sixteen daily round-trips are provided between Boston and Providence. Expanded commuter rail service to T.F. Green Airport in Warwick, RI was introduced in December 2010. Travel time between Boston and Warwick is approximately 1.25 hours, and 10 of the 16 daily Boston-Providence departures currently continue on to Warwick. Expanded service to Wickford, RI commenced in 2012, with an eventual extension down to Kingston, RI also planned.

The extended commuter rail enhances ground access options from the Boston metropolitan area to T.F. Green Airport. The passenger catchment areas of T.F. Green Airport and Logan Airport overlap, and this new commuter rail service has the potential to attract passengers in the overlapping catchment area living along the Providence/Stoughton MBTA commuter rail line to T.F. Green Airport.

32 "Boston South Station High Speed Intercity Passenger Rail Expansion Project." Massachusetts Department of Transportation. August 6, 2010.
33 Massachusetts Department of Transportation. "South Station Expansion Project Website." http://www.massdot.state.ma.us/southstationexpansion/Home.aspx. Accessed August 2, 2012.

Other Regional Cooperative Planning Efforts

Recognizing that Logan Airport is a substantial trip generator and key transportation resource in the metropolitan area, Massport participates in several interagency transportation planning forums pertaining to enhancing a variety of travel modes.

GreenDOT
GreenDOT is a comprehensive sustainability initiative with three primary goals: reduce greenhouse gas (GHG) emissions; promote the healthy transportation options of walking, bicycling, and public transit; and support smart growth development. GreenDOT is MassDOT's policy mechanism to achieve the GHG reduction targets set out in the Executive Office of Energy and Environmental Affairs (EEA) GHG reduction plan enabled by the Global Warming Solutions Act of 2008. Massport is fulfilling the intention of GreenDOT by working to reduce GHG emissions associated with surface transportation to the Airport, and by providing more accommodations for walking, bike, and public transit. MassDOT's mode shift goal is to triple the current mode share of bicycling, public transit, and walking, each by 2030. Massport supports GreenDOT's smart growth development goal by actively working to improve public transportation in the metropolitan area, a key component of smart growth principles (information on GreenDOT is provided at www.massdot.state.ma.us/GreenDOT.aspx).

Massport has participated in an interagency Transportation Sustainability Committee organized by MassDOT, leading up to the development of MassDOT's GreenDOT Implementation Plan. The final GreenDOT Implementation Plan was completed in December 2012 and developed to serve as the framework for embedding the sustainability goals of GreenDOT into the core business and culture of MassDOT. The Implementation Plan captures current MassDOT innovations, leading sustainability policies of the Commonwealth, and national best practices and presents a guide to achieve the sustainability and livability vision of MassDOT.[34] The Implementation Plan identifies fifteen sustainability goals organized under seven sustainability themes: Air; Energy; Land; Materials; Planning, Policy & Design; Waste; and Water. These goals work towards decreasing resource use, minimizing ecological impacts, and improving public health outcomes from MassDOT's operations and planning processes.

Healthy Transportation Compact
The Healthy Transportation Compact interagency initiative brings together the state departments of Health and Human Services, Energy and Environmental Affairs, the Commissioner of Public Health, the MassDOT Highway Division and the MassDOT Rail and Transit Division with the intention of facilitating transportation decisions that balance the needs of all transportation users, expand mobility, improve public health, support a cleaner environment and create stronger communities. Actions include facilitating better accommodations for those with mobility limitations, increasing opportunities for physical activities, increasing bicycle and pedestrian travel through additional, safer and better connected bicycle and pedestrian infrastructure, a statewide complete streets policy, implementing health impact analyses for transportation decisions, and the federal Safe Routes to School program.

Massport activities at Logan Airport will support the Healthy Transportation Compact through its ongoing development of the Southwest Service Area and North Cargo Area. The projects include an improved pedestrian environment for employees, neighborhood residents and visitors. Streetscape improvements and new pedestrian and bicycle routes strengthen connections between the neighborhood, terminals, airport buffers, mass transit and the Harborwalk (a multimodal off-road path), Bremen Street Park and the Greenway Connector; as well as the Logan Office Center and the on-airport shuttle bus. Pedestrian actuated crossings are

34 "Draft GreenDOT Implementation Plan." Massachusetts Department of Transportation. June 2012.

planned at signalized intersections along Harborside Drive and sidewalks provided along Harborside Drive, Jeffries Street, and Porter Street. Midblock crossings or crosswalks at unsignalized intersections will consider street and pedestrian level lighting, as well as advanced warning signs and/or systems, as necessary. As described previously, bicycle access and parking is planned in secured locations for public and employee use.

Boston Metropolitan Planning Organization (Boston MPO)
Massport supports multimodal transportation planning and improving integration with its facilities through its permanent voting membership on the Boston MPO, providing input on policy and programming decisions.

MPOs are established in large metropolitan areas and are responsible for conducting a federally required cooperative, comprehensive, and continuous metropolitan transportation planning process. Based on this planning, MPOs determine which surface transportation system improvements will receive federal capital (and occasionally, operating) transportation funds. The Boston MPO´s mission is to establish a vision and goals for transportation in the region and then develop, evaluate, and implement strategies for achieving them.

Massport plays an active role on the MPO's decision-making board, participating in policy decisions related to the Long-range Regional Transportation Plan and project programming for the Transportation Improvement Program. The MPO also guides the work conducted by Central Transportation Planning Staff (CTPS) via its Unified Planning Work Program. CTPS is occasionally used by Massport to support its ground transportation planning initiatives.

Metropolitan Area Planning Council (MAPC)
Massport is also an ex-officio member of MAPC, which is a regional planning agency serving the people who live and work in Metropolitan Boston. The MAPC mission is to promote smart growth and regional collaboration, which includes protecting the environment, supporting economic development, encouraging sustainable land use, improving transportation, ensuring public safety, advancing equity and opportunity among people of all backgrounds, and fostering collaboration among municipalities. MAPC membership includes 101 municipal government representatives, 21 gubernatorial appointees, 10 state officials (including Massport), and three City of Boston officials. A staff of approximately 40 individuals supports the Council and its Executive Committee of 25 selected members. Massport is not currently an executive committee member.

Summary of Regional Long-Range Transportation Planning Efforts

The aim of regional transportation planning efforts is to reduce reliance on Logan Airport, and to provide New England travelers with a variety of viable transportation options. The NERASP study conducted in 2006 has helped to develop the primary commercial airport system in New England to support these benefits. Meanwhile, the NEG/ECP works to coordinate the highway, aviation, freight, and commuter rail transportation networks. Rail service such as the Amtrak NEC and proposed improvements such as the Boston-South Station Expansion, also help to balance the passenger load among various forms of transportation. Other supporting planning forums include GreenDOT, the Healthy Transportation Compact, and Boston MPO.

5

Ground Access to and from Logan Airport

Introduction

This chapter describes the Massachusetts Port Authority's (Massport) achievements in diversifying and enhancing ground transportation options (for both passengers and employees) to minimize impacts to the transportation system and environment, while providing air passengers with as many alternatives as possible for convenient travel to and from the Airport. Massport's comprehensive ground transportation strategy is designed to maximize transit and shared-ride options for travel to Logan Airport as well as to provide convenient transit, shuttle, and pedestrian connections on the Airport.

In addition to highlighting recent changes to ground transportation services, operations, and pricing, this chapter reports on ground access conditions and activity levels in 2012 and 2013, which are compared to past conditions. Activity levels include measures of ridership, traffic volumes, and parking demand (and its impacts under Logan Airport's constrained supply).[1] This chapter also includes a summary of the findings of the 2013 Logan Airport air passenger ground-access survey, Massport's principal tool in measuring ground-access mode share.

Improving the multimodal connectivity of the Airport can provide traffic and environmental benefits by reducing vehicle trips, miles traveled, and greenhouse gas (GHG) emissions associated with travel to and from Logan Airport. The cost, speed, convenience, safety, and attractiveness of all modes of transportation connecting to the Airport affect how passengers and employees choose among these access modes. Offering a range of multimodal transportation options also reduces transportation costs and improves customer service for air passengers, employees, and other Airport users.

Regional transportation efforts, as they relate to the Airport and planning efforts to diversify transportation options in the New England region (primarily through commuter, passenger, and high-speed rail), are discussed in *Chapter 4, Regional Transportation.*

1 Appendix G,Ground Access includes additional figures and the Long-Term Parking Management Plan.

2012/2013 Ground Access Highlights

Highlights of ground access and surface transportation to Logan Airport in 2012 and 2013 include:

On-Airport Transportation and Activity

As air passenger levels have topped 30 million, Logan Airport faces real challenges managing demand for on-Airport parking, resulting in a growing number of days in which arriving vehicles are diverted or moved to non-garage parking areas on (and sometimes off) the Airport.

- The total number of annual air passengers at Logan Airport increased 1.4 percent to 29.3 million in 2012 and another 3.4 percent to 30.2 million in 2013, compared to 28.9 million in 2011.
- The average daily vehicular traffic on Airport roadways decreased by 0.2 percent from 99,449 in 2011 to 99,281 in 2012, and then increased by 3.5 percent to 102,771 between 2012 and 2013.
- A VISSIM[2] model was used to calculate and analyze vehicle miles traveled (VMT) on the Airport and roadway system. Based on the VISSIM model results, there was a 0.05-percent decrease in VMT between 2011 to 2012 and a 5.7-percent increase between 2012 to 2013.
- Weekday peak commercial parking demand has increased, placing additional pressure on roadway and parking operations under the Logan Airport Parking Freeze. In 2013, for example, due to high demand on Tuesdays, Wednesdays, and Thursdays, 31,071 cars were diverted to another garage or lot and 37,413 cars were valeted/stacked (when cars are parked in aisles, have their keys taken, and then are re-parked in empty spaces as they become vacant). There were about 39 weeks in which one or more of these measures were put into effect in 2013, an increase over conditions experienced in 2011 and 2012.
- Although the peak-day parking activity has increased, the total annual number of vehicles that parked on-Airport (as measured by revenue parking exits) decreased by 3.6 percent from 2,582,453 in 2011 to 2,490,000 in 2012 and another 1.0 percent to 2,466,137 in 2013 due to longer average duration of parking stays. These annual levels of parking activity continue to remain well below historic high levels (in the past 12 years, the highest level was recorded in 2000 at 3,423,118 vehicles that parked at the Airport).
- Massport continued to be in full compliance with the Logan Airport Parking Freeze[3] throughout 2012 and 2013. Despite an increase in terminal area parking rates on March 1, 2012, daily parking demand more frequently approached the Parking Freeze cap in 2012 and 2013. For further details, please find a copy of the Massachusetts Department of Environmental Protection (MassDEP) filings in *Appendix G, Ground Access*. The Parking Freeze limit is currently 21,088, of which 18,415 are dedicated to commercial parking spaces and 2,673 are dedicated to employee parking spaces (please refer to Tables 5-9 and 5-10 for further details).

Ground Access to and From Logan Airport

Massport has continued to invest in and operate Logan Airport with a goal of building upon its nation-leading program to maximize the number of passengers who arrive at the Airport by transit and other high occupancy vehicle modes.

- Massachusetts Bay Transportation Authority (MBTA) Silver Line bus boardings at the Airport continued to grow, based on ridership estimates.

2 PTV America. (2011). Verkehr In Städen Simulationsmodell- VISSIM version 5.40 [computer software]. Portland, OR.
3 310 Code of Massachusetts Regulations 7.30

- In 2012, Blue Line transit boardings at Airport Station increased about 7 percent over 2011 levels. MBTA ridership on the Blue Line has been increasing steadily over the past several years, and thus, has maintained mode share. In 2013, MBTA Blue Line ridership increased 6 percent over 2012 levels.
- In the summer of 2012, in an effort to boost ridership, Massport initiated a pilot program that allowed passengers to board for free on the Silver Line at Logan Airport. Massport also added customer service staff during peak arrivals periods in the summer and increased public transportation signs and wayfinding. The promising results of this program have demonstrated reduced dwell times at the curbs and faster travel times through the terminal area. Average peak-period dwell times at the terminals have been reduced by 30 seconds in some cases, resulting in travel times through the terminals that are up to two minutes faster. The free Silver Line boardings program is still in effect.
- In 2012, ridership levels on all types of water transportation to the Airport remained flat in comparison to the previous year. Ridership on the MBTA ferry continues its decreasing trend, while water taxi use has exhibited a slight growth since 2007. In 2013, ridership on private water taxis increased by 3 percent compared to 2012. MBTA water ferry ridership was not available.
- In 2012, air passenger ridership using Logan Express bus service increased 10 percent compared to 2011 levels; employee use of Logan Express increased by 16 percent and non-employee passengers increased nearly 5 percent. In 2013, non-employee passenger ridership increased nearly 8 percent over 2012 levels, and employee passenger activity increased almost 2 percent. With continued growth in each of the past five years, the 2013 total ridership is the highest in the history of Logan Express.
- In September 2013, Massport solicited an operator for a Back Bay express shuttle bus service, which would commence by April 2014. The Back Bay Logan Express, provides improved service to those transit riders impacted by the Government Station closure and increases high occupancy vehicle (HOV) use from the inner Boston area.
- In September 2013, Massport instituted a series of curb allocation improvements to enhance curbside usage and reduce congestion. The improvements included sign-posted designated areas for taxi and limousine staging, dedicated shuttle bus areas, and specific locations of active passenger drop-off and pick-up.

  Detailed ridership and activity figures are provided in Table 5-13.

Ground Transportation Mode Shares

While Logan Airport continues to rank at the top of U.S. airports with respect to HOV/transit mode share, pick-up/drop-off trips are a growing concern.

- Logan Airport continues to rank at the top of U.S. airports with respect to HOV/transit/shared-ride mode share.
- The *2013 Logan Airport Air Passenger Ground-Access Survey* indicates that share of HOV modes to the Airport has returned to 2007 levels at 28 percent HOV mode share. This represents a 2-percent decrease in HOV mode share from the levels reported in the *2010 Air Passenger Ground Access Survey*. HOV modes are defined as transit and shared-ride modes, including MBTA, Logan Express, scheduled bus, and shared-ride vans and limousines; private vehicles, rental cars, and taxicabs are classified as automobile or non-HOV modes, regardless of the number of passengers in a vehicle.

- Many private passenger vehicles arrive at Logan Airport with several occupants. In fact, the 2013 survey indicates that 76 percent of private vehicles carried two or more air passengers and thus frequently function as HOVs.
- A growing concern is private vehicle, taxi, and limousine pick-up/drop-off (see Table 5-4).

Although Logan Airport is a national leader in airport HOV mode share, Massport will find it increasingly difficult to increase or even maintain this leadership as passenger levels grow. As passenger volumes increase, Massport will need to increase the capacity of existing transit and shared-ride options and add additional services just to maintain the current mode share of these services. Massport is also challenged to operate the Airport within the existing Parking Freeze (21,088 total spaces) and this challenge will increase as air passenger levels increase.[4] Finally, a growing concern is that Massport's constrained parking supply on the Airport is increasing the pick-up/drop-off phenomenon, with its adverse environmental impacts. Achieving the HOV mode share goal alone will be insufficient to dampen the large and growing share of pick-up/drop-off trips (refer to the Long-Term Parking Plan in *Appendix G, Ground Access*).

Ground Transportation Modes of Access to Logan Airport

As noted earlier, for the purposes of tracking ground-access mode share over the years, HOV modes include transit and shared-ride modes, including MBTA, Logan Express, scheduled bus, and shared-ride vans and limousines; whereas private vehicles, rental cars, and taxicabs are classified as automobile or non-HOV modes (regardless of the number of passengers in a vehicle).

HOV (Shared-Ride) Modes

- Public transit (Blue Line rapid transit, Silver Line bus rapid transit, MBTA bus, and water transportation);
- Logan Express scheduled bus service;
- Scheduled buses and vans;
- Courtesy shuttle buses;
- Charter buses; and
- Unscheduled private limousines and vans.

Non-HOV (Automobile) Modes

- Private Autos;
- Taxi; and
- Rental Car.

4 The Logan Airport Parking Freeze authorizes a total of 21,088 spaces. Of these, 18,415 are commercial parking spaces and 2,673 are employee parking spaces.

Although private automobiles, taxis, and rental cars often carry multiple occupants, they are not categorized as HOV modes.[5] Please refer to the *Ground Access Planning Considerations* section later in this chapter for further discussion of the Logan Airport HOV mode share goal.

As part of its strategic planning initiative, however, Massport has begun to rethink the relationship between the different ground access modes and to focus on the trip generation associated with these modes. The total number of vehicle trips needed to get passengers and employees to and from Logan Airport affects the level of impacts on the transportation system and the environment, as well as congestion on Logan Airport's roadways and at terminal curbs. From a transportation system, environmental, and Airport roadway/curb congestion perspective, there is a hierarchy of modes with the most desirable being those that generate the fewest vehicle trips for each arriving or departing airport passenger.

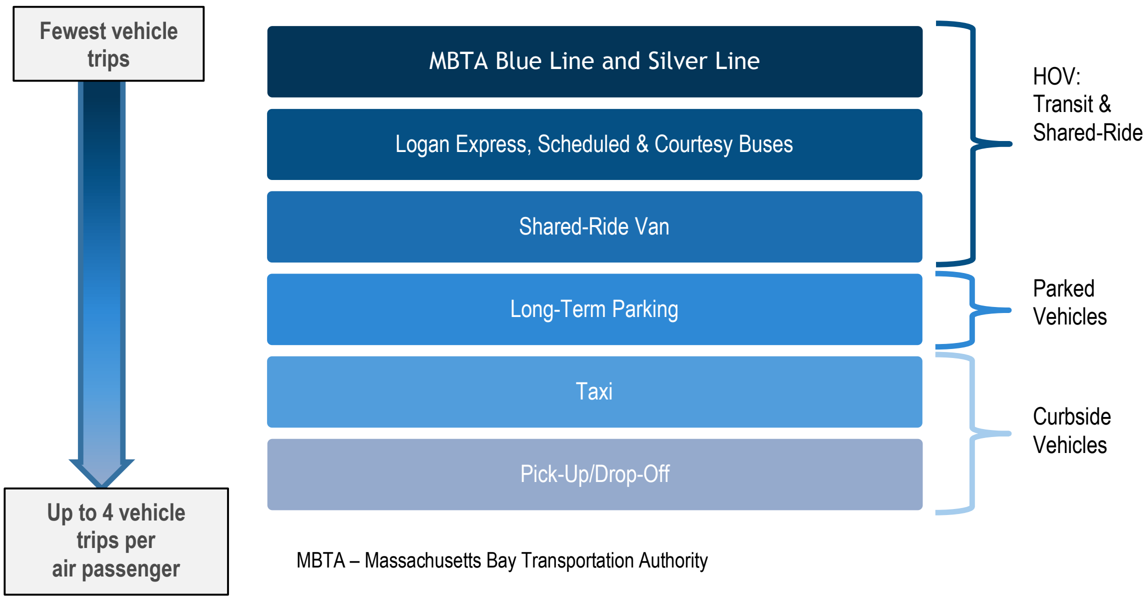
Air passengers have three major options for getting to Logan Airport: transit, HOV, or shared-ride service; drive to Logan Airport and park; or pick-up/drop-off mode which can involve a private vehicle, taxi, limousine or taxi alternative. In this categorization, the major "modes" are:

- Transit and shared-ride, consisting of:
  - MBTA services (Blue Line, Silver Line);
  - Massport services (Logan Express); and
  - Private operators (scheduled coach express bus, shared-ride vans, courtesy shuttles).
- Private vehicles that are parked for the duration of the trip.
- Vehicles that drop off passengers at the terminal curbs, but don't remain on-Airport; consisting of:
  - Private vehicles that don't park for the duration of a passenger's trip;
  - Taxicabs; and
  - "Black car" limousines.

As noted in Figure 5-1, transit and shared-ride modes are designed for use by more than one travel party (or multiple travelers). With a higher occupancy, the Airport vehicle trips per passenger is quite low. Private vehicles that park at the Airport (or an off-Airport lot), generate a single vehicle trip to the Airport for the departing passenger (and a single vehicle trip from the Airport for the arriving passenger). Vehicles that do not remain on the Airport for a passenger's trip duration, such as those private vehicles that have dropped off a passenger at the curb, generate a trip to and a trip from the Airport for a departing passenger. In the case of taxicabs and black car limousines, many of them depart Logan Airport empty after dropping off a passenger. As Figure 5-1 shows, when measured in terms of vehicle trips generated, the most environmentally desirable mode is transit/HOV/shared-ride, followed by drive-and-park, with the least desirable mode being pick-up/drop-off.

5 The 2013 Logan Airport Air Passenger Ground Access Survey indicates that the average occupancy of these automobile modes (private automobiles, taxis, and rental cars) is 1.9 persons per vehicle, indicating that Massport is somewhat conservative in the calculation of HOV/SOV split. The HOV mode share goal is based on modal categories and not on actual vehicle occupancy.

Figure 5-1 Hierarchy of Ground-Access Mode Choices (Based on Vehicle Trips per Passenger)



Logan Airport Air Passenger Ground Access Survey

Massport periodically administers an extensive survey of air passengers in order to better understand the ground access travel characteristics of air passengers to and from Logan Airport and to track historical trends of these characteristics. Since the late 1970s, the *Logan Airport Air Passenger Ground Access Survey* has been Massport's primary tool for understanding the changes in air passenger travel behavior, including ground access mode choices, travel patterns, and market characteristics. The survey provides the means to evaluate the effectiveness of its transportation policies and services and impacts of the regional transportation system. The survey is also used to shape the direction of ongoing and new Massport planning efforts to encourage Logan Airport travelers to use HOV/shared-ride modes instead of automobile modes. Since 2004, a survey has been administered every three years (2007, 2010, and 2013).

The survey is the principal means of measuring air passenger ground-access HOV mode share. Table 5-1 presents the air passenger ground access mode shares from the 2013 survey findings. Additional results of the *2013 Logan Airport Air Passenger Ground Access Survey* that relate to mode choice are presented in this section, as are comparisons of findings to those of recent past surveys. For more complete results, please refer to the final report of the survey, available on Massport's website.[6]

Being dropped-off at the curb by private vehicle is still the most utilized way of getting to Logan Airport; this mode is used by 28 percent of travelers. The use of taxicabs to arrive at the Airport is the second most common way, at a nearly 19-percent share. Driving and parking at the Airport is the mode used by 13 percent of air passengers. Public transit modes (including the MBTA's services, Logan Express and similar scheduled bus services) account for over 14 percent of air passengers traveling to the Airport.

6 Massport. *Logan Airport Air Passenger Ground-Access Survey*. Spring 2013. www.massport.com/environment/environmental_reporting/Pages/LoganAirportAirPassengerGround-AccessSurvey.aspx.

Table 5-1 Air Passenger Ground-Access Mode Share, 2013

Ground-Access Mode	Spring 2013 Air Passenger Survey Weekday	Weekend	All Trips
Automobile Modes:			
Private Vehicle	43.1%	43.5%	**43.2%**
Dropped off	26.7%	32.1%	**28.1%**
Parked On-Airport	13.5%	9.9%	**12.6%**
Parked Off-Airport	3.0%	1.4%	**2.6%**
Rental Vehicle	9.7%	12.5%	**10.4%**
Taxicab	18.4%	19.2%	**18.6%**
Subtotal	**71.2%**	**75.2%**	**72.2%**
HOV/Shared Ride Modes:			
Public Transit	15.3%	12.1%	**14.5%**
Logan Express Bus	4.4%	2.6%	**3.9%**
Other Express Bus	3.1%	2.4%	**2.9%**
MBTA Silver Line Bus	5.1%	3.5%	**4.7%**
MBTA Blue Line Subway	2.4%	3.5%	**2.7%**
Water Shuttle/Water Taxi	0.3%	0.1%	**0.2%**
Other Shared-Ride Vehicles	13.1%	12.4%	**12.9%**
Car Service (black car, private limousine, etc.)	6.1%	5.3%	**5.9%**
Shared ride van or limousine	2.5%	2.1%	**2.4%**
Free Hotel/Courtesy Shuttle	3.0%	4.3%	**3.3%**
Charter Bus	1.5%	0.8%	**1.3%**
Walk	0.3%	0.1%	**0.2%**
Other	0.2%	0.2%	**0.2%**
Subtotal	**28.8%**	**24.8%**	**27.8%**
Total	**100%**	**100%**	**100%**

Source: Massport, Logan Airport Air Passenger Ground Access Survey, Spring 2013.

Table 5-2 presents these aggregated air passenger ground access mode shares for survey years 2004 through 2013. As the data indicate, the overall HOV mode share for air passengers has fluctuated between 28 and 30 percent in each of the survey years during this time period. Thus, even with air passenger growth, the mode share split between HOV and automobile modes has remained relatively stable.

Table 5-2 Ground Access Mode Share (All Passengers) by Survey Year

Ground Access Mode	2004	2007	2010	2013
Non-HOV/Automobile				
Private Automobile	36.0%	40.2%	40.4%	43.2%
Taxi	22.8%	19.7%	18.8%	18.6%
Rental car	10.9%	12.4%	10.9%	10.4%
Total Non-HOV Share	**69.7%**	**72.3%**	**70.1%**	**72.2%**
HOV/Shared-Ride				
Unscheduled HOV	8.1%	7.3%	7.6%	8.3%
Scheduled HOV	10.6%	6.9%	8.2%	6.9%
Transit	6.5%	6.7%	7.6%	7.6%
Courtesy Shuttle	3.1%	3.5%	4.6%	3.3%
Other	2.0%	3.4%	1.8%	1.7%
Total HOV Share	**30.3%**	**27.8%**	**29.9%**	**27.8%**

Source: Spring 2004, 2007, 2010 and 2013 Air Passenger Ground Access Surveys.
For this table, air passenger ground access modes are grouped into the following categories:
- Private Automobile*:* Includes all passengers that are dropped-off by a privately-owned automobile, and all passengers who drive and park their vehicles at the Airport.
- Taxi: A passenger driven to Logan Airport in a licensed, commercial taxi.
- Rental Car: A passenger who rents a car from an on-Airport or nearby off-Airport rental car agency.
- Scheduled HOV Service: A passenger who arrives at Logan Airport via scheduled bus, limousine or van service, including privately-operated services and Massport's Logan Express.
- Unscheduled HOV Service: Includes passengers who travel to Logan Airport via unscheduled limousine or van providers.
- Transit: A passenger who takes an MBTA public transit service (including the Blue Line subway, Silver Line bus rapid transit) or one of the water transportation services (operated in conjunction with a dedicated Massport shuttle bus to/from Logan Airport terminals).
- Courtesy Shuttle: A passenger who arrives at the Airport in a courtesy shuttle, such as those offered by nearby hotels.
- Other: Includes passengers that access the Airport by walking, riding a bicycle, or taking a charter bus.

Average Vehicle Occupancy (Air Passengers) by Ground Access Vehicle Modes

Table 5-3 presents estimates of average vehicle occupancy and the share of ground-access trips made by single-occupant vehicles by various ground access modes (transit modes and charter buses are excluded). These estimates are made using the responses provided in the *2013 Logan Airport Air Passenger Ground Access Survey*. The average occupancy for automobile vehicle modes is about 2.0 passengers per vehicle (roughly the same as in 2007 and 2010). Most trips made by private automobile often carry more than one passenger per vehicle: only 24 percent of air passengers arriving by private vehicle were traveling by themselves.

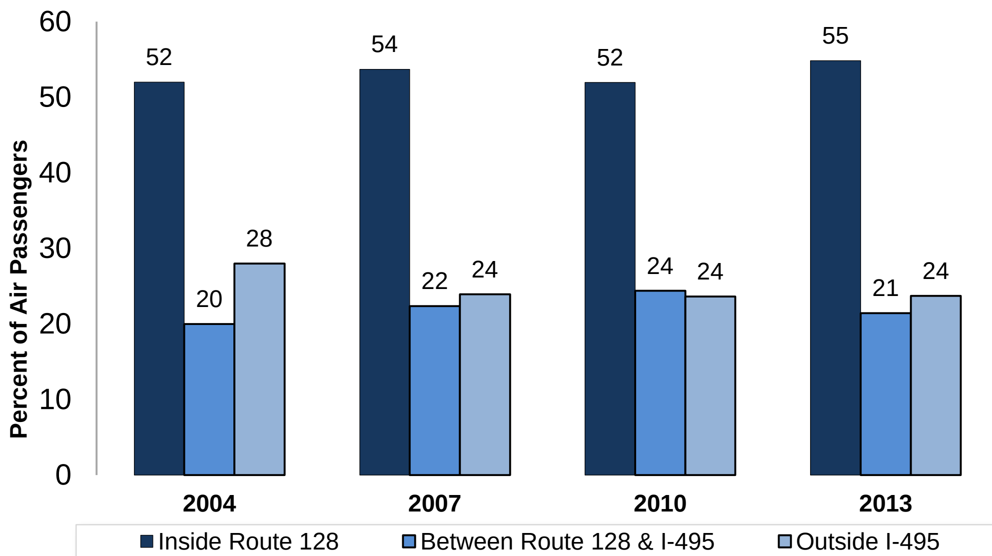
Table 5-3 Average Vehicle Occupancy by Vehicular Ground Access Mode (2013)		
Mode	**Vehicle Occupancy**	**% SOV Trips**
Private Vehicle	2.0	24%
Taxicab	1.8	28%
Rental Vehicle	1.6	37%
Subtotal for Automobile Modes	**1.9**	**28%**
Car Service ("black car" limousine by reservation)	1.9	30%
Courtesy Shuttle	3.6	7%
Shared-Ride Van or Limousine (scheduled or reservation)	4.4	7%

Source: Massport, 2013 Logan Airport Air Passenger Ground-Access Survey. Based on air passengers departing on both weekdays and weekend days.
Note: The true average occupancy per vehicle arriving at the Airport cannot be computed from the responses to the survey because it is not possible to identify multiple travel parties arriving in a single vehicle. Average occupancy in this table was calculated as the average occupancy of arriving vehicles across survey respondents.
An SOV (single occupancy vehicle) passenger is defined as an air passenger that arrives at the Airport with no other air passengers in the vehicle. Air passengers can arrive as the only traveling air passenger in any of the above modes; thus, drivers and/or occupants who are not traveling are excluded from the occupancy calculation.

Ground Access Origins of Air Passengers

Figure 5-2 indicates how the distribution of air passenger trips by geographic area has changed since 2004. The majority of trips still originate in Boston and other communities within Route 128. Nevertheless, Logan Airport draws nearly a quarter of its passengers from areas outside of I-495.

Figure 5-2 Logan Airport Air Passenger Ground Access Trip Origins



Source: Spring 2004, 2007, 2010 and 2013 Logan Airport Air Passenger Ground Access Surveys.
Note: Based on air passengers departing on both weekdays and weekend days.

The origin of an air passenger ground-access trip has a big influence on mode choice. Simply stated, transportation systems and services vary by geographic area, and thus affect the travel behavior of a passenger traveling to Logan Airport. This is apparent from the results shown in Table 5-4, in which the distribution of ground-access modes among passengers within four geographic areas is provided.

As expected, transit use is highest in the Urban Core (defined as Boston, Brookline, Cambridge, and Somerville) as this area is served by the MBTA's rapid transit system. Taxi use is also highest in this area, due in part to the proximity to the Airport, and it has the highest share of any mode from that area. The area outside of the Urban Core but within the Route 128 highway belt is the area with fewest HOV/transit options, and its mode share reflects this. Outside of Route 128, scheduled express bus services provide the bulk of the HOV/shared-ride services; correspondingly, these modes carry the highest HOV mode share in these areas. Private vehicles are the dominant mode of access for passengers originating in areas outside of the Boston metropolitan area urban core.

Table 5-4 Ground Access Mode Share by Air Passenger Ground Trip Origin

	Ground Trip Origin			
Ground Access Mode	**Urban Core**	**Between Urban Core and Route 128**	**Between Route 128 and I-495**	**Outside I-495**
Automobile Modes				
Private Vehicle				
Dropped off	19%	35%	34%	32%
Parked On-Airport	5%	13%	21%	18%
Parked Off-Airport	<1%	3%	3%	6%
Subtotal Private Vehicle	**25%**	**51%**	**58%**	**55%**
Rental Vehicle	5%	12%	11%	14%
Taxicab	38%	15%	5%	1%
Subtotal – Automobile Modes	**68%**	**78%**	**74%**	**71%**
HOV/Shared Ride Modes				
Public Transit				
Logan Express Bus	0%	3%	12%	4%
Other Express Bus	0%	0%	1%	12%
MBTA Silver Line Bus	9%	3%	1%	1%
MBTA Blue Line Subway	7%	1%	0%	0%
Water Shuttle/Water Taxi	<1%	0%	<1%	0%
Subtotal Public Transit	**17%**	**8%**	**15%**	**18%**
Other Shared-Ride Vehicles				
Car service (black car, private limousine, etc.)	5%	6%	8%	4%
Shared ride van or limousine	2%	1%	2%	4%
Free Hotel/Courtesy Shuttle	7%	4%	0%	1%
Charter Bus	1%	2%	0%	2%
Subtotal Other Shared-Ride Vehicles	**14%**	**13%**	**11%**	**12%**
Walk	1%	0%	0%	0%
Subtotal – HOV/Shared Ride/Other Modes	**32%**	**22%**	**26%**	**29%**

Source: *Spring 2013 Air Passenger Ground Access Survey*. Based on air passengers departing on both weekdays and weekend days. Rounded figures.

Table 5-4 also demonstrates the dominant role of pick-up/drop-off trips within Route 128. The share of air passengers who drive and park either on- or off-Airport varies from less than 6 percent in the urban core to 24 percent outside I-495. By contrast, pick-up/drop-off trips by private vehicles and taxis combined constitute 57 percent of all trips to the Airport from the urban core and 50 percent of trips from the area between the urban core and Route 128. These figures clearly demonstrates the need for Massport to focus its ground transportation efforts on minimizing pick-up/drop-off vehicle trips.

Market Segment: Trip Purpose and Residency

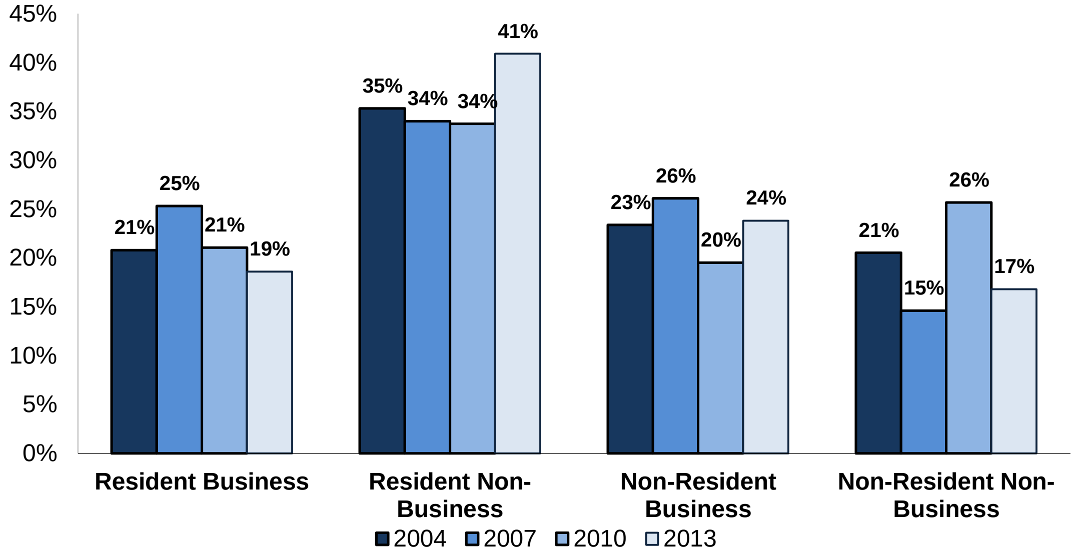
Massport characterizes air passengers into four distinct market segments:

- Resident Business: passengers living within the region served by Logan Airport and traveling for business reasons.
- Resident Non-Business: passengers living within the region served by Logan Airport and conducting personal travel (e.g., leisure trip).
- Non-Resident Business: passengers living outside the region served by Logan Airport and traveling to conduct business.
- Non-Resident Non-Business: passengers living outside the region served by Logan Airport and traveling for personal reasons (e.g., leisure or vacation travelers).

Residents are defined as passengers who use Logan Airport as their "home" airport, regardless of their proximity to other airports. It is important to study the passenger market in this manner because sensitivity to key factors that influence travel behavior such as convenience, time reliability, and pricing varies substantially among these passenger market segments. This information assists Massport in developing appropriate ground access services for passengers.

Figure 5-3 compares the share of weekday trips by market segment across four recent surveys. The resident non-business market is the largest market segment, contributing over one-third of all air passengers at Logan Airport. The market share of this segment increased in 2013 relative to levels seen in recent past surveys. The percentage of non-resident business trips also increased over 2010, to about a 24 percent share of weekday travel. Non-resident non-business travelers experienced a notable drop in share, whereas resident business travel remains at nearly 20 percent.

Figure 5-3 Weekday Market Segments (Combined Trip Purpose and Residency)[1]



Source: *Spring 2004, 2007, 2010, and 2013 Logan Airport Air Passenger Ground Access Surveys.*
1 Based on air passengers departing on weekdays only. Figures rounded.

Tables 5-5 and 5-6 present ground-access mode shares by market segment. HOV mode share is lowest among the resident business segment; business travelers typically have a high sensitivity to time, require flexibility and schedule reliability, and often make decisions related more to convenience than to cost (which is often covered by their employer not by the passenger). Public transit and scheduled HOV services (including Logan Express) have a higher share among the non-business market segments. Non-business market segments are more sensitive to ground transportation costs, travel less frequently but for longer time periods, and tend to travel at off-peak fly times/days.

Table 5-5 Ground Access Mode Share by Market Segment, 2013

	Resident Business	Resident Non-business	Non-resident Business	Non-resident Non-business
Private Automobile	62%	55%	14%	33%
Taxi	17%	13%	30%	18%
Rental Car	1%	1%	25%	20%
Subtotal Non-HOV	**80%**	**69%**	**69%**	**71%**
Unscheduled HOV/limousine	9%	9%	12%	4%
Scheduled HOV	6%	11%	2%	6%
Transit	5%	7%	9%	11%
Courtesy shuttle	0%	2%	6%	6%
Other	0%	1%	2%	2%
Subtotal HOV	**20%**	**30%**	**31%**	**29%**

Source: *Spring 2013 Air Passenger Ground Access Survey*. Based on air passengers departing on both weekdays and weekend days. Rounded figures.

Table 5-6 Ground Access Mode Share by Market Segment (Recent Surveys)

	Resident Business				Non-Resident Business			
Ground Access Mode	**2004**	**2007**	**2010**	**2013**	**2004**	**2007**	**2010**	**2013**
Automobile Modes								
Private Automobile	54%	54%	59%	62%	18%	12%	12%	14%
Taxi	19%	18%	16%	17%	30%	35%	36%	30%
Rental Car	1%	2%	<1%	<1%	24%	29%	27%	25%
Subtotal Automobile Modes	**74%**	**74%**	**76%**	**80%**	**72%**	**76%**	**75%**	**69%**
HOV Modes								
Unscheduled HOV	11%	13%	10%	9%	7%	8%	10%	12%
Scheduled HOV	8%	6%	6%	6%	7%	3%	3%	2%
Transit	5%	6%	4%	5%	6%	6%	5%	9%
Courtesy shuttle	1%	<1%	2%	1%	7%	5%	5%	6%
Other	1%	1%	1%	1%	1%	2%	2%	2%
Subtotal HOV Modes	**26%**	**26%**	**24%**	**20%**	**28%**	**24%**	**25%**	**31%**

	Resident Non-Business				Non-Resident Non-Business			
Ground Access Mode	**2004**	**2007**	**2010**	**2013**	**2004**	**2007**	**2010**	**2013**
Automobile Modes								
Private Automobile	49%	51%	49%	55%	38%	36%	36%	33%
Taxi	16%	14%	13%	13%	15%	19%	17%	18%
Rental Car	3%	2%	2%	1%	17%	19%	18%	20%
Subtotal Automobile Modes	**68%**	**67%**	**63%**	**69%**	**70%**	**73%**	**71%**	**71%**
HOV Modes								
Unscheduled HOV	9%	7%	8%	9%	5%	3%	4%	4%
Scheduled HOV	13%	12%	12%	11%	11%	6%	8%	6%
Transit	8%	11%	11%	7%	8%	9%	9%	11%
Courtesy shuttle	1%	3%	4%	2%	5%	5%	6%	6%
Other	1%	1%	2%	1%	1%	4%	2%	2%
Subtotal HOV Modes	**32%**	**33%**	**37%**	**30%**	**30%**	**27%**	**29%**	**29%**

Source: *Spring 2004, 2007, 2010, and 2013 Air Passenger Ground Access Surveys*. Based on air passengers departing on both weekdays and weekend days. Rounded figures.

On-Airport Vehicle Traffic: Volumes and Vehicle Miles Traveled (VMT)

This section reports on Logan Airport's traffic-related activity for 2012 and 2013, specifically:

- Traffic volumes
- VMT calculations

Central to these components is Massport's leadership and commitment to developing, promoting, and providing alternative means of ground transportation for access to and from Logan Airport. The diverse range of environmentally-responsible transportation modes to access the Airport by air travelers, employees and other Airport users has reduced reliance on automobile travel, thus reducing traffic congestion and contributing to improvements in air quality. Figure 5-4 shows the roadway infrastructure at Logan Airport in 2013.

Gateway Traffic Volumes

Gateway roadways are defined as access points to/from Logan Airport, which include the Route 1A roadway ramps, Ted Williams Tunnel (TWT) (Interstate 90) ramps, Frankfort Street/Neptune Road, and Maverick Street.

Data Collection and Annual Average Daily Calculation Method

All of the Airport's gateway roadways are now equipped with permanent traffic count stations, as part of the Airport-wide Automated Traffic Monitoring System (ATMS). These stations provide data to calculate:

- AADT, annual average daily traffic;
- AWDT, annual average weekday daily traffic; and
- AWEDT, annual average weekend daily traffic.

Since the data are collected continuously throughout the year, seasonal adjustment factors are only necessary when significant gaps in the data occur (typically due to equipment failure/malfunction or construction activity). When seasonal adjustment factors are used, these are based on a combination of the seasonality (monthly variation) of counts from other ATMS stations, air passenger levels, and parking exits. On occasion, traditional automated traffic recorder (ATR) counts are collected to supplement the ATMS data.

Annual Average Daily Activity Levels

Table 5-7 summarizes the daily gateway traffic volumes at Logan Airport for the years 2009 through 2013. It includes annual average daily traffic (AADT), annual average weekday daily traffic (AWDT), annual average weekend daily traffic (AWEDT), and annual air passengers, for reference.

The AADT entering and departing Logan Airport via its gateway roadways decreased by 0.2 percent between 2011 and 2012, and increased by 3.5 percent between 2012 and 2013. The change in average daily traffic can be attributed to:

- A 1.5-percent increase in air passenger activity in 2012 and a 3.4-percent increase in air passenger activity in 2013;
- A 4-percent increase in taxi dispatches in 2012 and a 5-percent increase in taxi dispatches in 2013; and
- A 3.6-percent decrease in parking activity (exits) in 2012 and a 1.0-percent decrease in parking activity (exits) in 2013.

Over the last five years, traffic volumes have increased at a slower rate than passenger volumes. Annual air passenger levels have increased at Logan Airport by 18.5 percent from 2009 to 2013, while traffic volumes increased by 14.7 percent from 2009 to 2013. This slower growth in traffic volumes could be attributed to improved operations within the transportation network continuing to make multimodal trips more feasible to more passengers.

Table 5-7 Logan Airport Gateways: Annual Average Daily Traffic, 2009 - 2013								
	AADT		AWDT		AWEDT		Annual Air Passengers	
Year	Volume	Percent Change	Volume	Percent Change	Volume	Percent Change	Level of Activity	Percent Change
2009	89,575	(6.9%)	93,670	(6.4%)	78,905	(2.3%)	25,504,845	(2.3%)
2010	94,179	5.1%	98,968	5.7%	82,595	4.7%	27,428,962	7.5%
2011	99,449	5.6%	104,863	6.0%	85,879	4.0%	28,907,938	5.4%
2012	**99,281**	**(0.2%)**	**104, 439**	**(0.4%)**	**86,494**	**0.7%**	**29,235,643**	**1.5%**
2013	**102,771**	**3.5%**	**107,656**	**3.1%**	**90,822**	**5.0%**	**30,218,631**	**3.4%**

Source: Massport
Notes: Numbers in parentheses () represent negative numbers.
AADT Annual average daily traffic.
AWDT Annual average weekday daily traffic.
AWEDT Annual average weekend daily traffic.

Vehicle Miles Traveled (VMT)

VMT is calculated as the total number of miles traveled by all vehicles within the Logan Airport roadway system. VMT is an important metric because it is used to calculate motor vehicle air quality emissions, and it is one indication of the traffic levels on roadways within specific areas and at specific times.

Calculation Method and Model Description

In 2011, Massport began using its on-Airport VISSIM[7] model to estimate VMT. This model can be easily adapted to reflect changes in the evolving Logan Airport roadway transportation network and is more robust than the previous model developed in 1994 and based on the prior terminal roadway system. The VISSIM model was developed for a larger study area than the original VMT model, which only focused on the major Airport gateways, the circulation roadways, and the terminal areas. The VISSIM model now accounts for a larger on-Airport study area from Lovell Street and the North Cargo Area (NCA) to Harborside Drive and the South Cargo Area (SCA), and includes the Southwest Service Area (SWSA). The overall VMT growth due to the slightly larger study area is negligible. The study area of the VISSIM model roadway network can be found in *Appendix G, Ground Access*. The VISSIM model not only estimates VMT associated with curbside activity and parking, but also with Logan Airport operations, rental car activity, and hotel activity.

Since the development of the model, some destinations (such as the taxi pool) have been relocated, vehicle routes have changed, and volumes have grown. All of these changes are accounted for in the 2012/2013 VISSIM model runs. The model was calibrated to existing evening (PM) peak hour volume data to improve the accuracy of the results. Similar to the VMT model, adjustment factors were determined to calculate morning, highest 8-hour, and average weekday VMT from the updated VISSIM model. The adjustment factors for the 2013 VMT calculations were determined by using 2011 to 2013 gateway, Airport roadway, and parking volume averages. Tables provided in *Appendix G, Ground Access* compare existing and simulated traffic volumes at Logan Airport for the 2012 and 2013 condition. The model does not yet include the benefits of the new Rental Car Center (RCC), as the project was not complete until the 4th quarter of 2013. The *2014 Environmental Data Report (EDR)* will report on the results of consolidating rental car activity.

7 PTV America. (2011). Verkehr In Städen Simulationsmodell- VISSIM version 5.40 [computer software]. Portland, OR.

Estimated VMT Calculations and Modeling Results

Consistent with previous years, the following specific time periods were analyzed for 2012 and 2013:

- Morning peak hour (AM Peak Hour);
- Evening peak hour (PM Peak Hour);
- Highest consecutive 8-hour (High 8-Hour); and
- Average AWDT.

Table 5-8 summarizes the VMT estimates for Logan Airport-related traffic from 2009 through 2013. The VMT for Airport-related traffic remained approximately the same from 2011 to 2012 given the 1.5 percent annual air passenger increase and is consistent with the change in traffic volumes at the Airport gateways which varied by less than one percent, decreasing slightly overall.

The weekday VMT increased by 5.7 percent from 2012 to 2013. This increase is consistent with the 3.4-percent increase in annual air passengers, the 3.5-percent increase in the AADT, and a 6.9-percent increase in evening peak hour traffic volumes. The results also indicate that the VMT model has captured the added VMT effect of vehicles being diverted from parking garages during peak demand days.

The weekday VMT increased by 13.9 percent from 2009 to 2013, growing at a slower pace than air passenger volume growth (18.5 percent) or the traffic volume growth (14.7 percent) over the same time period. This is reflective of Massport's efforts to reduce VMT through incremental changes in their transportation networks and improve alternate transportation systems.

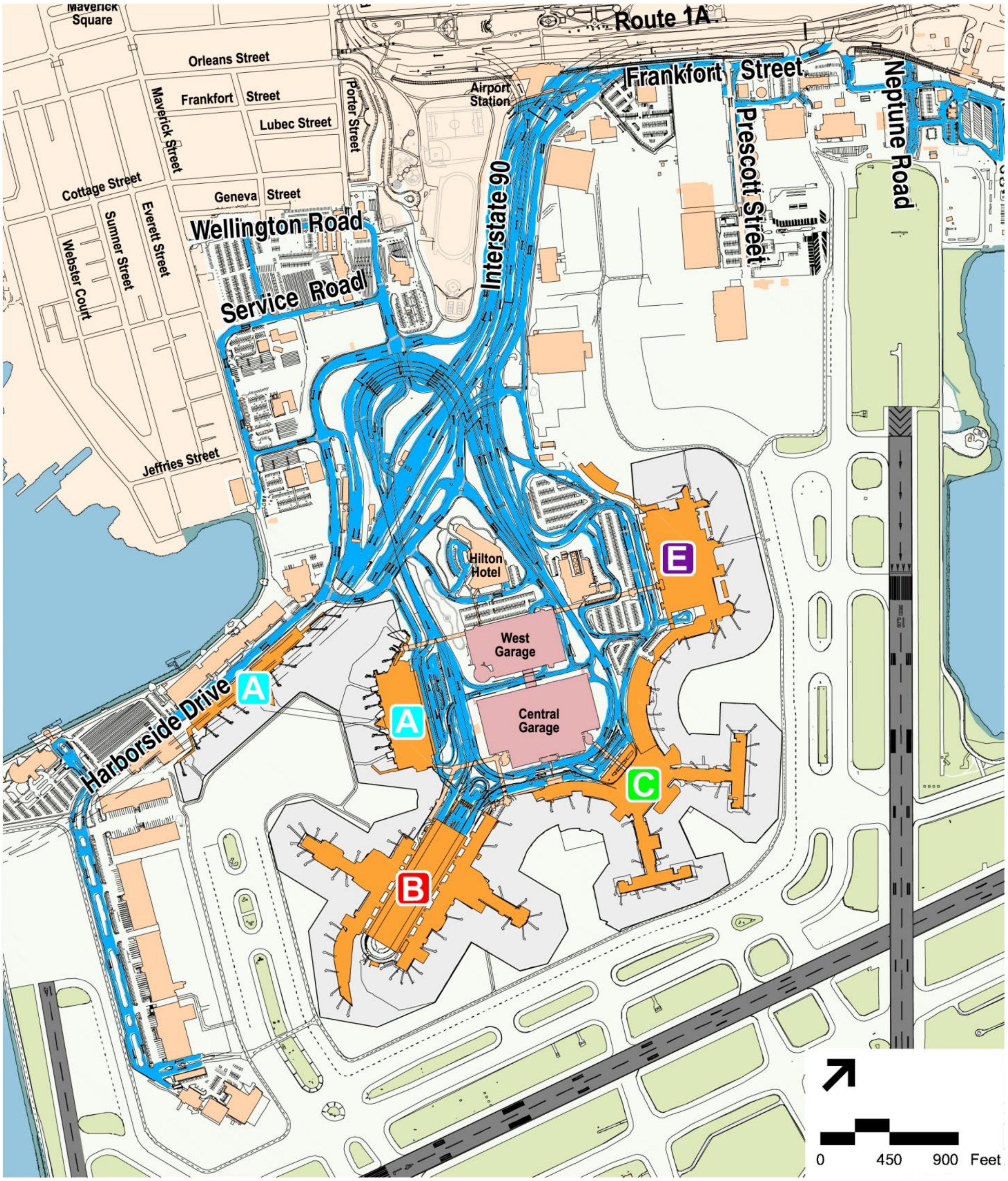
Details of the 2012/2013 VMT modeling results are presented in *Appendix G, Ground Access.*

Table 5-8 Airport Study Area Vehicle Miles Traveled (VMT) for Airport-Related Traffic, 2009 - 2013

Analysis Year	AM Peak Hour	PM Peak Hour	High 8-Hour	Average Weekday	Average Weekday Percent Change
2009 (VMT model)	8,098	10,379	74,612	155,442	(5.2%)
2010 (VMT model)	8,451	10,887	78,185	162,885	4.8%
2011 (VISSIM model)	8,391	10,978	76,920	167,647	2.9%
2012 (VISSIM model)	**8,387**	**10,974**	**76,883**	**167,564**	**(0.05%)**
2013 (VISSIM model)	**9,006**	**11,407**	**80,088**	**177,094**	**5.7%**

Source: VHB and Massport.
Note: Numbers in parentheses () represent negative numbers.

Figure 5-4 Logan Airport Roadway Network, 2012-2013



Parking Conditions

This section reports on Massport's monitoring and management of:

- On-Airport parking conditions, including parking facilities and supply, demand, and parking rates; and
- Parking programs (including preferred parking for hybrid vehicles).

Massport manages the on-Airport parking supply at Logan Airport to: (1) promote long-term rather than short-term parking (thus reducing the number of daily trips to Logan Airport); (2) support efficient utilization of parking facilities; (3) provide good customer service; and (4) comply with the provisions of the Logan Airport Parking Freeze. Details on current conditions are presented in the following sections, and a Long-Term Parking Management Plan is provided in *Appendix G, Ground Access*.

Logan Airport Parking Freeze[8]

The number of commercial and employee parking spaces allowed at Logan Airport is regulated by the Logan Airport Parking Freeze (310 Code of Massachusetts Regulations 7.30), which is an element of the Massachusetts State Implementation Plan (SIP) under the Federal Clean Air Act. As required, Massport submits semi-annual filings to MassDEP demonstrating Massport's compliance with the Logan Airport Parking Freeze. The reports for March and September of 2012 and 2013 are provided in *Appendix G, Ground Access.*

The Logan Airport Parking Freeze sets an upper limit to the supply of commercial and employee parking spaces at Logan Airport. As permitted (and encouraged) by the Parking Freeze provisions, Massport has periodically converted employee spaces to commercial spaces, within the overall limit imposed by the Parking Freeze. As explained in Table 5-9, Massport has also transferred Airport-related spaces from the East Boston Freeze[9] to the Logan Parking Freeze. Table 5-9 presents the total number of parking spaces permitted on-Airport and the allocation of those spaces as between commercial and employee spaces.

Under the Parking Freeze regulations, Massport must monitor the use of the on-Airport spaces to ensure that number of spaces used is below the Parking Freeze limit. If the number of commercial parking spaces used on any day exceeds the limit during any event, those additional vehicles are considered to be using "Restricted Use Parking Spaces" which are allowed under the regulation when Logan Airport experiences "extreme peaks of air travel and corresponding demand for parking spaces." Restricted Use Parking Spaces may be made available for use only at such times, up to ten days in any calendar year, and must be provided free of charge when demand exceeds the limit. Additional information on parking demand and conditions under constrained parking is provided later in this section.

8 310 Code of Massachusetts Regulations 7.30
9 310 Code of Massachusetts Regulations 7.31

Table 5-9 Logan Airport Parking Freeze: Allocation of Parking Spaces

Year	Type of Spaces: On-Airport Commercial Spaces	On-Airport Employee Spaces	Total Logan Airport Spaces Permitted
1992 - 1994	12,215	7,100	19,315
1995 - 1997	12,890	6,425	19,315
1998 - 2000	14,090	5,225	19,315
2001 - 2006	15,467	5,225	20,692[1]
2007 - 2010	17,319	3,373	20,692
2011 - 2012	18,019	2,673	20,692
2012 - 2013	18,265	2,673	20,938[2]
2013 - 2014	18,415	2,673	21,088[3]

Source: Massport.

1 In 2000, the Massachusetts Department of Environmental Protection and the U.S. Environmental Protection Agency approved an amendment to the Logan Airport Parking Freeze to permit the transfer of 1,377 spaces originally located in the East Boston Parking Freeze Area to the Logan Airport Parking Freeze Area.

2 In July 2012, Massport acquired property at 135B Bremen Street in East Boston, which supported 246 park-and-fly spaces that were in the East Boston Parking Freeze inventory. Massport's relocation of those park-and-fly spaces from the East Boston Parking Freeze Area to the Logan Airport Parking Freeze Area led to a revised Parking Freeze inventory for Logan Airport and East Boston.

3 In June 2013, Massport acquired property at 413-419 Bremen Street in East Boston at which 150 park-and-fly spaces that were located within the East Boston Parking Freeze Area. Massport's relocation of those park-and-fly spaces from the East Boston Parking Freeze Area (shifting space allocation to the Logan Airport Parking Freeze Area) led to a revised Parking Freeze inventory for Logan Airport and East Boston.

Parking Space Availability Changes

Table 5-10 provides a summary of the Logan Airport commercial parking space inventory. The more notable supply change in parking space availability occurred in late 2013 with the removal of parking spaces in the lower level of the Terminal B Garage. This area is now the limousine and taxicab pick-up locations for the two sides of Terminal B. This modification allowed for a more efficient curbside pick-up location for HOV/shared-ride modes, such as Logan Express bus, Silver Line bus, and Airport shuttle buses.

Daily Parking Occupancy

On-Airport commercial parking occupancy typically peaks mid-week (Tuesday through Thursday) with lower occupancies occurring on other days. The number of vehicles parked at Logan Airport in commercial spaces over the course of any 24-hour period was obtained from parked vehicle count data for Tuesdays, Wednesdays, and Thursdays, which are collected throughout the year. The peak daily parking occupancy data are presented in Figure 5-5.

Table 5-10 Logan Airport Parking Freeze: Allocation of Commercial Parking Spaces, 2011-2014

Location and Facility	Number of Spaces March 2011	March 2012	March 2013	March 2014	Status
Terminal Area					
Central Garage and West Garage	10,375	10,344	10,396	10,267	
Terminal B Garage	2,380	2,632	2,553	2,254	Lower level Terminal B garage now used for limousines/taxis pick-up.
Terminal E Lot 1	269	269	269	275	
Terminal E Lot 2	257	257	251	248	
Terminal E Lot 3	229	222	222	219	
North Cargo Area (NCA)					
Economy Parking Garage	2,880 *(+666 in temp. lots)*	2,789	2,809	2,809	In mid-2011, the temporary Southwest Service Area (SWSA) lots were permanently eliminated for RCC construction
Total in-service revenue commercial spaces	**17,056**	**16,513**	**16,500**	**16,072**	Excludes hotel and general aviation (GA) spaces (noted below)
Signature Flight Support (General Aviation)	35	35	35	35	No change
Hotel (Hilton, Hyatt)	505	505	505	505	No change
Total in- service commercial spaces	**17,596**	**17,053**	**17,040**	**16,612**	Includes hotel and GA spaces
Total commercial spaces (Freeze limit) [1, 2]	**17,619**[3]	**18,019**	**18,265**	**18,415**	Includes in-service and designated spaces

Source: Massport, Parking Freeze Inventory, March 2011, March 2012, March 2013, and March 2014.

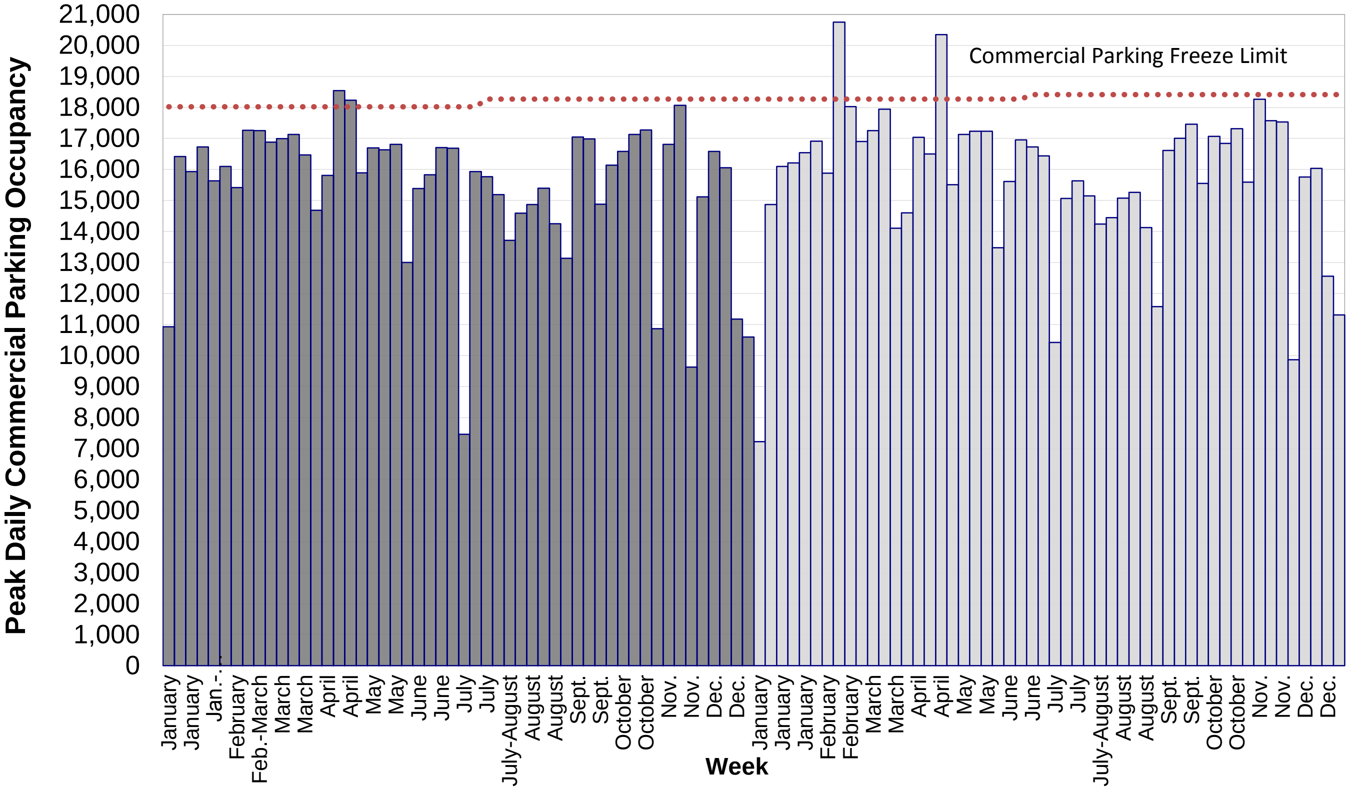
1 In July 2012, 246 spaces were transferred from the East Boston freeze allocation to the Logan Airport Commercial Parking Spaces inventory through the acquistion of Paul's Parking at 135B Bremen Street.

2 In June 2013, 150 spaces were transferred from the East Boston Freeze Area to the Logan Airport Parking Freeze Area through the acquistion of Paul's Parking at 413-419 Bremen Street.

3 There was a conversion between 2010 and early 2011 that shifted 300 employee spaces to commercial, yielding 17,319 in 2010 and 17,619 by March 2011.

Peak day demand for on-Airport parking has been increasing, resulting in daily demand frequently nearing the parking freeze cap (see Figures 5-5 and 5-6). On many weeks in 2012 and 2013, vehicles were diverted from a full Terminal B or Central Parking Garage to available spaces at the Economy Parking Garage or the Terminal E Lot 3 (in other words, parking customers were not able to park at their preferred garage). Vehicle diversions primarily occurred on Tuesdays and Wednesdays, when the peak parking demand during the day exceeded the availability of spaces in the terminal area. While remaining in full compliance with the Parking Freeze, in 2013, Massport diverted or valet-parked passenger vehicles approximately 80 out of 260 work days. Activity in 2012 and 2013 seem to indicate that peak-day demand has not dampened despite the March 2012 parking rate increases for on-Airport parking; however, since annual parking exits have been lower, parking demand may have decreased for non-peak days, such as Fridays and Saturdays.

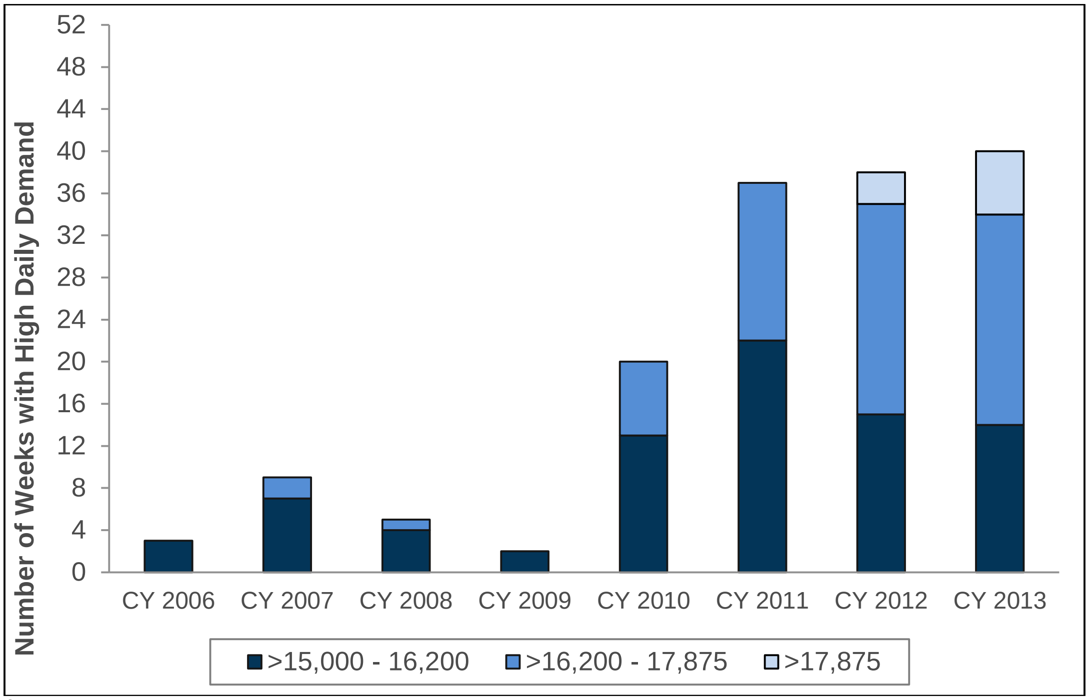
Figure 5-5 Commercial Parking: Bi-Weekly Peak Daily Occupancy, 2012-2013



Source: Massport.
Note: The chart shows the highest daily count for each week in 2012 and 2013. 2012 is shown in dark grey and 2013 is shown in light grey.
Since June 2013, the maximum number of commercial parking spaces permitted by the Logan Airport Parking Freeze is 18,415.
At no time in 2012 or 2013 did the Parking Freeze limit on Restricted Use Spaces exceed the allowed 10 days. Massport was in compliance with the Parking Freeze regulations in both 2012 and 2013.

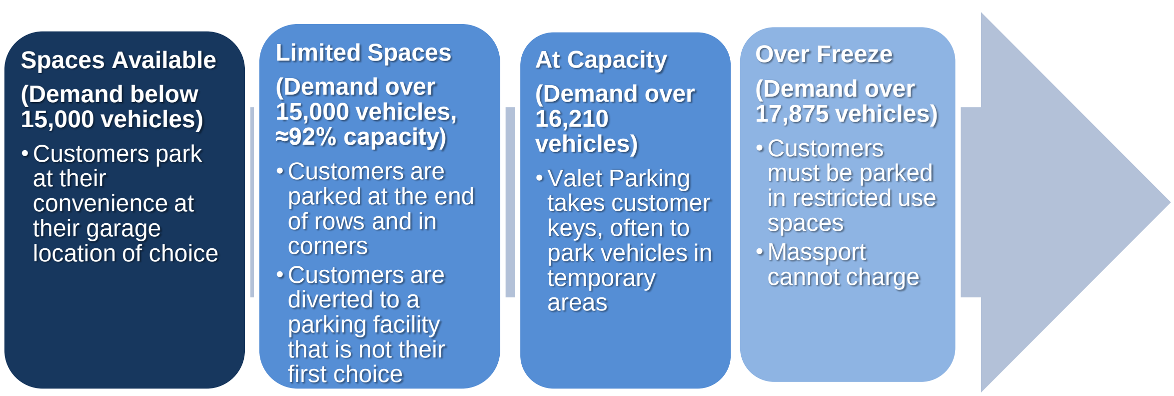
The inadequate supply of parking causes air passengers to circulate on Airport roadways to find parking and in overflow conditions, cars are diverted or moved to non-garage parking areas, especially off-Airport parking locations. Not only does parking demand activity above capacity lower customer service levels, it also increases Logan Airport's operating costs. As illustrated in Figure 5-7, at levels approaching capacity, ground transportation personnel are deployed to direct vehicles to remaining spaces and facilities; when demand exceeds capacity, valet operations are placed into effect, a labor-intensive activity. Diversions and valeting have become a regular occurrence at Logan Airport. These diversions decrease operational efficiency and compromise customer service (refer to the Long-Term Parking Plan in *Appendix G, Ground Access*).

Figure 5-6 Demand for Parking: Number of Weeks per Calendar Year with High Parking Demand



Source: Massport

Figure 5-7 Parking Demand Above Capacity Lowers Customer Service Level and Increases Operating Costs



Source: Massport

Parking Exits by Duration

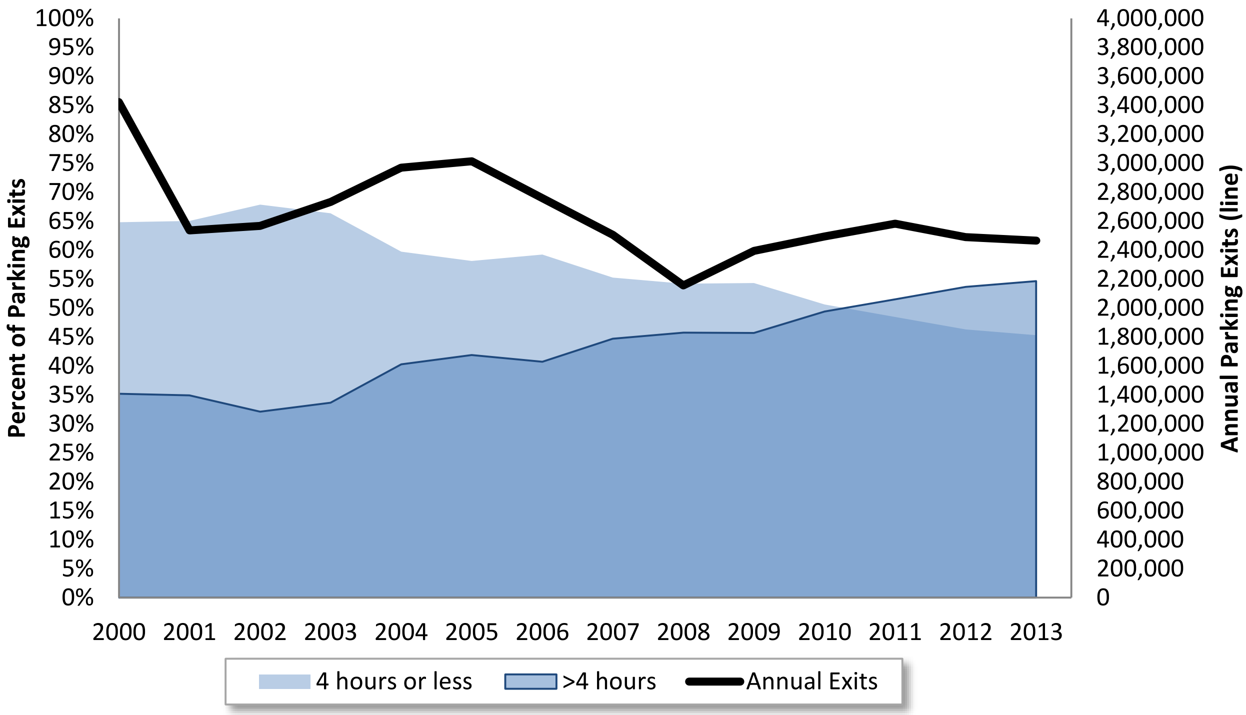
While peak day parking demand has increased, total annual parking activity (as defined by revenue parking exits) has decreased since 2011, as presented in Table 5-11. Notably, the distribution of parking exits by length of stay decreased for stays of up to four hours (Figure 5-8). This decrease occurred in both the number of exits in that category and as a share of all parking exits. In other words, vehicles were generally parked for longer durations in 2012 and 2013 compared to past years. This increase in parking duration likely contributed to a lower turnover of parking spaces, and therefore resulted in the higher peak days as shown earlier in Figure 5-5.

Table 5-11 Parking Exits by Length of Stay (Parking Duration)

		0-4 hrs.	>4-24 hrs.	>1-4 days	>4 days	Total
2009	Tickets	1,299,898	206,545	660,292	227,334	2,394,069
	Percent	54%	9%	28%	9%	
2010	Tickets	1,261,813	230,260	741,706	260,240	2,494,019
	Percent	51%	9%	30%	10%	
2011	Tickets	1,251,956	235,039	800,188	295,270	2,582,453
	Percent	48%	9%	31%	11%	
2012	**Tickets**	**1,153,781**	**215,028**	**815,266**	**305,925**	**2,490,000**
	Percent	46%	9%	33%	12%	
2013	**Tickets**	**1,118,218**	**209,437**	**823,187**	**315,295**	**2,466,137**
	Percent	45%	8%	33%	13%	45%
Percent change – 2011 to 2012		**(7.8%)**	**(8.5%)**	**1.9%**	**3.6%**	**(3.6%)**
Percent change – 2012 to 2013		**(3.1%)**	**(2.6%)**	**1.0%**	**3.1%**	**(1.0%)**

Source: Massport.
Note: Numbers in parenthesis () represent negative numbers.

Figure 5-8 Percent of Parking Exits by Duration: Short vs. Long-Term Parking



Source: Massport.

2012 and 2013 Commercial Parking Rates

One important reason for Massport periodically assessing its parking rate structure is to support its ground access strategy. As detailed in Table 5-12, parking rates in the central parking garage were increased in March 2012 and again in July 2014, while parking rates for Logan Express remote parking have remained substantially lower than those at Logan Airport. As noted above, however, demand for on-Airport parking in the terminal area is not price sensitive and these parking rate increases have so far failed to dampen parking demand.

With a pay-on-foot system, Massport requires parking fees to be pre-paid at kiosks inside the terminals and garage access points at the pedestrian walkways, thus improving parking exit flow, and reducing vehicle idling and associated emissions at exit plazas. Pay stations are located in the terminals and at the pedestrian entrances to the Central Garage, Terminal B garage, and Terminal E parking lot. About 80 percent of parking patrons use the pay-on-foot system to pre-pay their parking fees.

Several off-Airport parking facilities, such as PreFlight Airport Parking in Chelsea, are privately owned and operated, and they are outside of the Logan Airport Parking Freeze area. Massport has no control over rates at off-Airport parking lots. The parking rates for the three major off-Airport parking providers (PreFlight, Park Shuttle & Fly, and Thrifty) vary from $13.50 to $18.50 for daily parking and from $81 to $105 for weekly parking.

Table 5-12 On-Airport Commercial Parking Rates, 2011, 2012, 2013, and 2014

Terminal Area Facility	2011	2012	2013	2014	Economy Parking	2011	2012	2013	2014
Central/West Parking Garage, Terminal B Garage, Terminal E Lots		*Effective as of March 1, 2012*		*Effective as of July 1, 2014*	**Economy Parking Garage**		*No change*		*Effective as of July 1, 2014*
0 to 30 minutes	$3	$3	$3	$3	Daily Rate	$18	$18	$18	$20
31 minutes to 1 hour	$6	$6	$6	$6	Additional days 0 to 6 hours	$9	$9	$9	$10
1 to 1.5 hours	$9	$9	$9	$11	Additional days 6 to 24 hours	$18	$18	$18	$20
1.5 to 2 hours	$12	$12	$12	$14	Weekly Rate (6-7 days)	$108	$108	$108	$120
2 to 3 hours	$15	$17	$17	$19					
3 to 4 hours	$18	$21	$21	$23					
4 to 7 hours	$22	$25	$25	$27					
7 to 24 hours (Daily)	$24	$27	$27	$29					
Additional days 0 to 6 hours	$12	$14	$14	$15					
Additional day(s) 6 to 24 hours	$24	$27	$27	$29					

Source: Massport
Note: 2012 rates are effective as of March 1, 2012; new rate increases took effect on July 1, 2014.

Long-Term Parking Management Plan

As part of its ongoing review of ground access, as well as a Strategic Planning process that commenced in 2013, Massport has been reviewing recent parking demand and trends. That analysis shows that in 2013, Massport diverted or valet-parked passenger vehicles to various on-Airport locations approximately 80 out of 260 work days. While Logan Airport has experienced diversions in the past, the number of days per year has continually increased over the past several years. As presented in previous EDR/Environmental Status and Planning Report (ESPR) filings, diverting or valeting cars is inefficient and reduces customer service.

As described in *Chapter 3, Airport Planning,* Massport has prepared a Long-Term Parking Management Plan for Logan Airport. The plan proposes a comprehensive approach to parking operations, supply and pricing that optimizes parking management within the constraints of the Logan Airport Parking Freeze. The Plan, which is included in *Appendix G, Ground Access,* represents Massport's current strategy to manage parking pricing, supply, and demand within the current Logan Airport Parking Freeze.

Pedestrian Facilities and Bicycle Parking

Massport has made substantial progress in providing Airport-wide pedestrian access. Sidewalks along Harborside Drive and Hotel Drive connect to the terminals, where a series of overhead, enclosed walkways connect to the Central and West Parking garages as well as the Hilton Hotel. The sidewalks along Harborside Drive, Transportation Way, North Service Road, Maverick Street, and the Harborwalk facilitate pedestrian access to the Airport water shuttle boat dock, MBTA station, and the pedestrian and bicycle pathways at Memorial Stadium Park, Bremen Street Park, and the East Boston Greenway.

Bicycle parking racks are provided at many landside facilities. Generally, these racks are expected to primarily serve employees, but are open for use by air passengers as well. Terminal A, Terminal E, the Logan Office Center, Signature General Aviation Terminal, and Airport MBTA Station all have bicycle racks. In 2012, bicycle parking racks were also added at Terminal E, the Economy Parking Garage, and at the Green Bus Depot. The RCC has covered bicycle parking racks for use by both employees and passengers.

Pedestrian and bicycle safety is further enhanced through the design of streetscape, intersections, lighting, and defined vehicle zones with new curbing, crosswalks, sidewalks, plantings and fencing. Bicycle connections are available around Airport Station, Memorial Park, Bremen Street Park, and the East Boston Greenway. Connections in the SWSA are planned that will allow employees and customers of the Airport to arrive via bicycle and park in a secure covered area at the new RCC. Commuters could then utilize the unified bus system or pedestrian connections to the terminals. In the North Service Area, connections to/from Bremen Street Park and the Greenway Connector are under construction. These improvements will connect the existing shared-use path to a new, northern connector of the East Boston Greenway, which will be partially built by Massport (Logan Airport portion was completed in July 2014). Massport is also developing a Bicycle Plan for Logan Airport in order to identify the feasibility of multi-use paths and safe on-street routes for bicycle access to Airport buildings. When the study has been completed, these findings will be reported in the *2014 EDR.*

Bicycle parking racks at Terminal A (left) and Terminal E (right).
Source: Massport.

Ground Transportation Ridership and Activity Levels in 2012 and 2013

This section of the chapter:

- Provides an overview of transportation services available to Logan Airport users from the Boston metropolitan area;
- Reports on their 2012 and 2013 ridership levels and recent historical trends;
- Notes the progress in meeting ground access goals; and

- Reports on Massport's cooperative planning ventures with other transportation agencies in Massachusetts.[10]

Logan Express, MBTA Transit, and Water Transportation Modes

Annual ridership levels for HOV/transit/shared-ride transportation modes serving Logan Airport are summarized in Table 5-13.

Table 5-13 Annual Ridership and Activity Levels on Logan Express, MBTA, and Water Transportation Services, 2009 - 2013

	MBTA Transit		Logan Express Bus			Water Transportation[3]	
Year	Blue Line[1]	Silver Line[2]	Air Passengers	Employees	Total	MBTA Ferry[3]	Private Water Taxis
2009	2,329,370	789,324	636,847	448,601	1,085,448	37,861	50,734
2010	2,270,241	831,323	644,412	467,020	1,111,432	34,794	54,382
2011	2,277,311	900,359	649,609	536,513	1,186,122	33,403	58,879
2012	2,442,085	906,177	681,040	624,149	1,305,189	31,197	60,840
2013	2,597,306	*906,177*	733,005	634,693	1,367,698	N/A	70,378
Percent Change (2011-2012)	7%	1%	5%	16%	10%	(7%)	3%
Percent Change (2012-2013)	6%	*unknown*	8%	2%	5%	*unknown*	16%

Source: Massport
Notes: Numbers in parentheses () represent negative numbers.
N/A Not available.
1 Airport Station fare gate entrances only. Automatic Fare Collection introduced in January 2007. The Bremen Street Park entrance to MBTA Airport Station opened June 2007; station activity is not limited to only Airport-related passengers.
2 Boardings at Logan Airport. Silver Line: 2012 and 2013 values are estimates.
3 MBTA Ferry is the Harbor Express F2/F2H service, Quincy/Hull-Logan and Long Wharf. Service from Quincy Fore River was suspended in 2013. Private water taxis includes: City Water Taxi and Rowes Wharf Water Transport.

The *2013 Logan Airport Air Passenger Ground Access Survey*[11] revealed a 7.6 percent ground-access mode share for public transit modes, which is about the same share identified in the *2010 Logan Airport Air Passenger Ground Access Survey*. Similarly, Logan Express maintained its 4 percent share in 2013—the same as in 2010. The *2013 Air Passenger Ground Access Survey* is discussed in further detail earlier in this chapter.

Logan Express Bus Service

Massport provides frequent, scheduled, express coach bus service to Logan Airport for air passengers and Logan Airport employees from park-and-ride lots in Braintree, Framingham, Woburn, and Peabody. Full

10 For additional ridership figures, please refer to *Appendix G, Ground Access.*
11 To better understand the ground access travel characteristics of air passengers to and from Logan Airport and to track historical trends of these characteristics, Massport administers a periodic (typically every three years) extensive survey of air passengers. The air passenger ground-access survey is the principal means of measuring air passenger HOV mode share. While the ridership information presented in this document provides a status report on recent annual conditions, it cannot be used to determine mode shares for individual modes or for passengers or employees separately because the data do not discern between air passengers or employees. Moreover, non-Airport patrons, such as East Boston residents and car rental patrons, can be included in the ridership data.

service bus terminals and secure parking are provided at all four locations. Figure 5-9 depicts station locations with respect to the regional transportation network. Logan Express is used by about 4 percent of Logan Airport's air passengers, according to the *2013 Logan Airport Air Passenger Ground Access Survey*.

The round-trip adult fare is $22; reduced fares are offered to seniors and children under the age of 12 ride free with an adult. To encourage greater ridership, a parking rate restructuring went into effect on March 1, 2012, which featured lower parking rates at $7 per day (from $11 per day) at Logan Express parking lots.

Framingham Logan Express bus.
Source: Massport

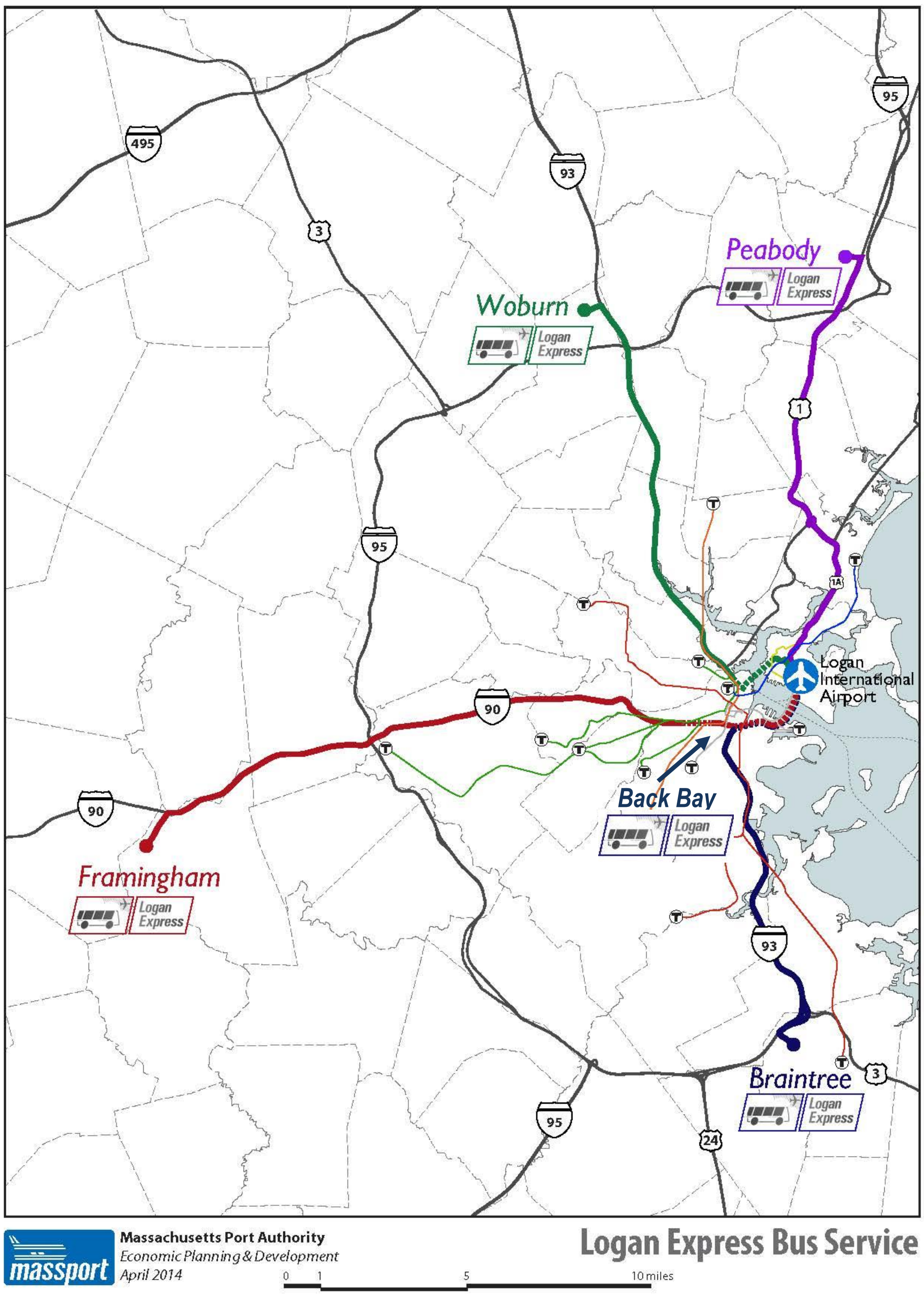
On weekdays and Sunday afternoons/evenings, scheduled half-hour headways are provided between the Braintree, Woburn, and Framingham locations and Logan Airport; one-hour headways are provided at these locations on Saturdays and Sunday mornings. In September 2009, the scheduled bus service to/from Peabody changed in response to low ridership and is now provided hourly on weekdays and every 1.5 hours during the weekend. Service hours for all four locations are roughly 3:15 AM to midnight.

Recent annual ridership trends for Logan Express are shown in Table 5-13. Air passenger ridership on Logan Express increased about 8 percent from 2012 to 2013, a greater increase than the 5-percent change between 2011 and 2012 annual levels. Employee ridership increased 2 percent in 2013, a lower increase than the 16-percent increase in ridership from 2011 to 2012. A detailed breakdown of the Logan Express ridership is presented in *Appendix G, Ground Access*.

Back Bay Logan Express

In late 2013, Massport issued a Request for Proposals (RFP) to solicit an operator for a Back Bay express shuttle bus service, which would commence by April 2014 (later branded Back Bay Logan Express, the service began running on April 28, 2014). The goals of the service are to provide an improved service to those transit riders impacted by the Government Center Green Line Station closure (a major transfer point for Logan Airport passengers and employees) and to increase HOV mode use from the inner Boston area. Additional information about this service, including ridership levels, will be provided in the *2014 EDR*.

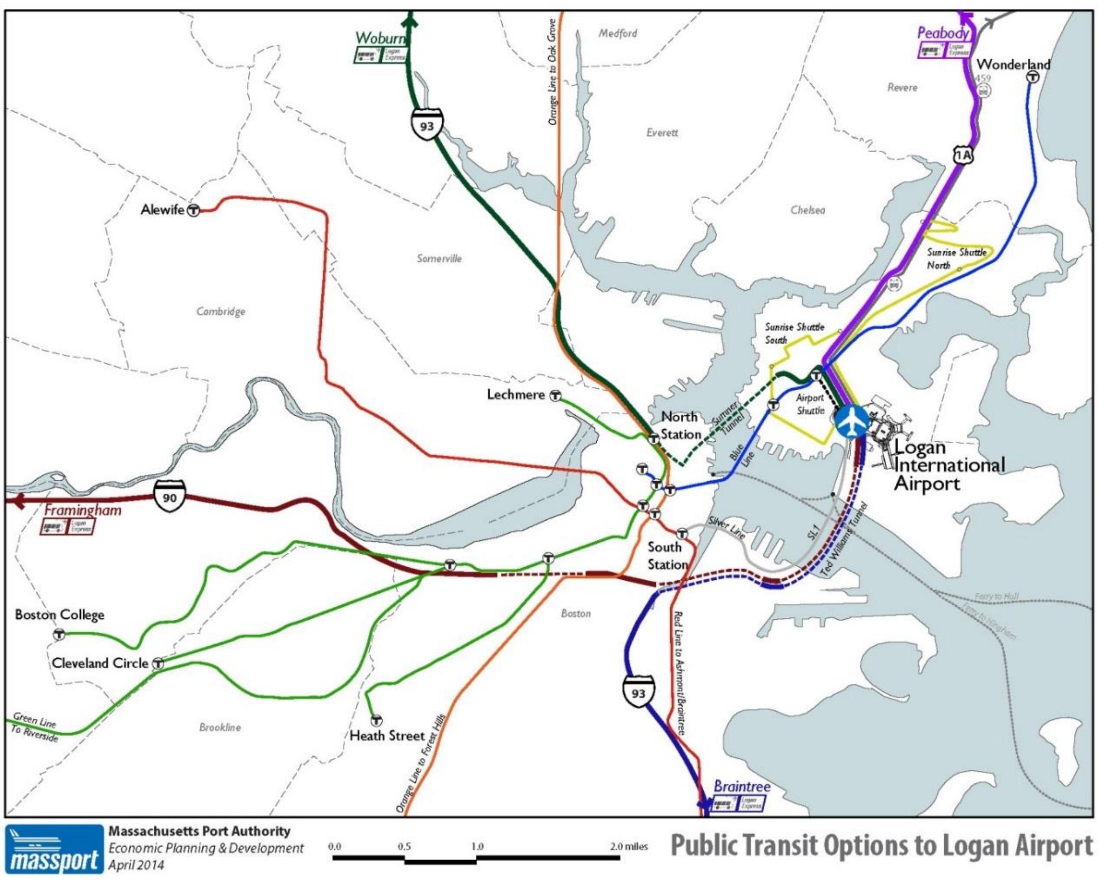
Figure 5-9 Logan Airport – Logan Express Coach Bus Service Locations and Routes, 2013



Rapid Transit

The MBTA provides direct connections to Logan Airport via the Blue Line at Airport Station and via the Silver Line to each of the terminals. According to the *2013 Logan Airport Air Passenger Ground Access Survey,* these services are used by over 7 percent of Logan Airport's air passengers (almost 17 percent of passengers with trip origins in Boston, Cambridge, Brookline, and Somerville used MBTA public transit to travel to the Airport). Both services are important for reducing automobile travel to the Airport: according to the survey, the majority of users of the Blue Line and Silver Line indicated that their alternative mode of travel to Logan Airport would have been a taxi or they would have been dropped off at the Airport by private vehicle. Figure 5-10 illustrates the public transportation options to access Logan Airport.

Figure 5-10 Logan Airport - Public Transportation Options, 2013



Blue Line Ridership / Airport Station Activity

Fare gate data indicate that nearly 2.6 million riders entered Airport Station in 2013 (see Figure 5-11). This is about a 6-percent increase over 2012, building on the 7-percent growth over 2011 (please note, that since fare gate data do not distinguish between Airport related riders and East Boston users, Airport passenger ridership levels on the Blue Line can no longer be directly identified as part of the ESPR/EDR reporting[12]).

Silver Line (SL1) Ridership

The Silver Line bus rapid transit service to Logan Airport provides a direct connection between South Station and the Airport terminals via the South Boston Transitway and the TWT. In 2012, an estimated 906,000 passengers boarded the Silver Line at Logan Airport, a slight increase over 2011. The introduction of free boardings of the Silver Line Airport buses (SL1) at Logan Airport has eliminated the need for fareboxes, thus, the actual 2013 figures of passenger boardings are not available (see Figure 5-11).

Eight SL1 buses are owned by Massport and are operated by the MBTA with a Massport subsidy. The Silver Line is the only MBTA rapid transit service that provides a direct, one-seat connection to each Airport terminal (the Blue Line requires a second-seat ride on a free Massport shuttle to connect riders to terminals, while express transit buses connect only at Terminal C, and local bus service to the Airport is very limited). Transfers between the Silver Line and the Red Line at South Station are free. At South Station, passengers may also connect to the MBTA commuter rail, Amtrak, and regional intercity buses.

Water Transportation: Water Taxis and MBTA Ferries

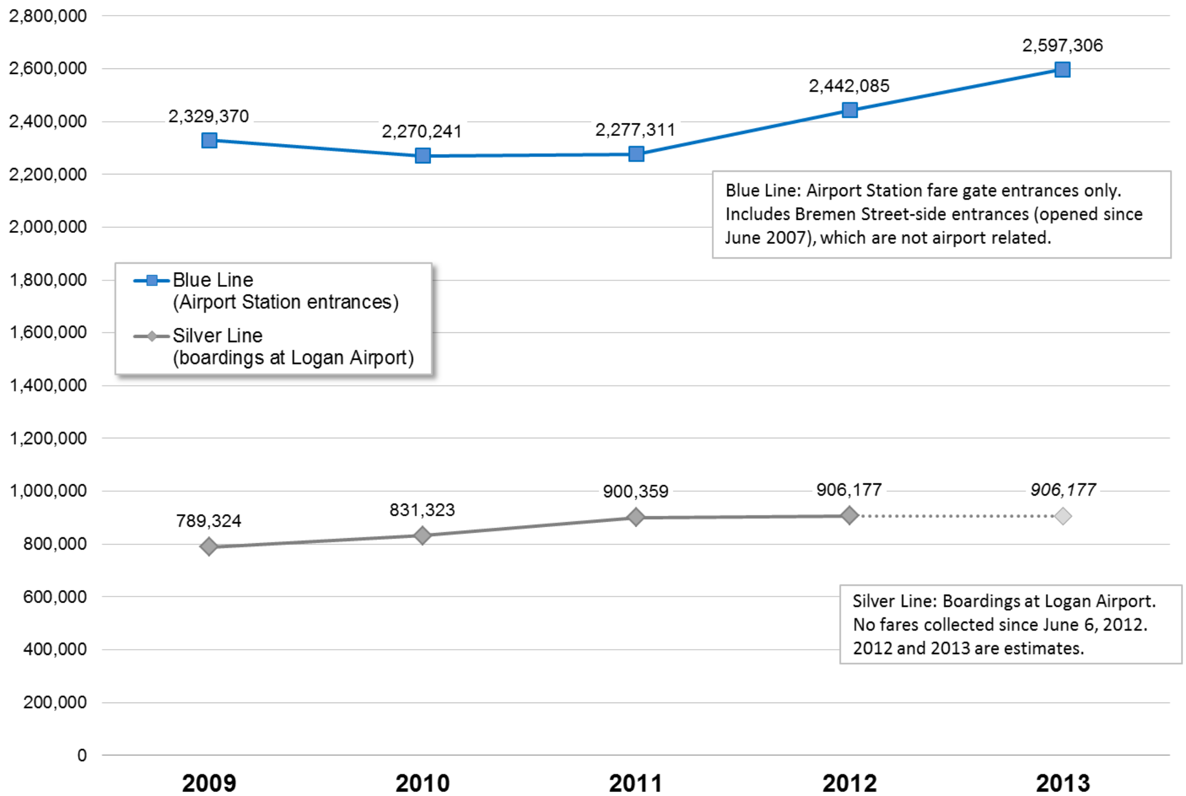
Three companies provide water transportation within the Boston area: City Water Taxi, Rowes Wharf Water Shuttle, and the MBTA's Harbor Express. Collectively, these companies serve numerous destinations throughout Boston Inner Harbor. The water taxi landing locations include: Long, Rowes, and Central Wharfs; the World Trade Center and the Moakley Courthouse in South Boston; Lovejoy Wharf near North Station; and stops in the North End, Charlestown, Chelsea, and East Boston. The MBTA Harbor Express provides services to Long Wharf and destinations outside of the Inner Harbor, including Quincy and Hull.[13] The water transportation services stop at the Logan Airport dock on Harborside Drive. Massport provides a courtesy shuttle bus service between the Logan Airport dock, the MBTA Airport Station, and all Airport terminals.

Water transportation accounts for less than 1 percent of the mode share to Logan Airport, according to the *2013 Logan Airport Air Passenger Ground Access Survey*. Annual ridership on privately-provided water transportation experienced an increase of over 16 percent in 2013 compared to 2012 and an increase of 3 percent in 2012 compared to 2011 (Table 5-13).

12 Based on automated fare gate entrance counts, approximately 50 percent of entrances occur via the Bremen Street Park fare gates at Airport Station. Based on Massport curbside observations, approximately 45 percent of Airport Station entrances are by airport users.

13 The MBTA ferry schedule from Quincy/Hull to the Logan Ferry Dock is not as frequent as Blue Line and Silver Line services, and does not run on frequent and consistent headways throughout the day. Headways between ferries on weekdays range from 20 minutes to 1 hour 20 minutes, or on weekends from 1.5 hours to 2.5 hours. There are 20 MBTA ferries to Logan Airport on weekdays, however there are no MBTA ferries direct to Logan from the South Shore during morning commuting times. The one-way fare to cross the Boston Harbor from Long Wharf to Logan Airport costs $10, and $12 from Quincy/Hull (twice the regular fare to Boston). The MBTA suspended ferry service from Quincy's Fore River stop in fall 2013, and has since added service to the Hingham service, which has incorporated the Hull stop.

Figure 5-11 Passenger Activity - Blue Line (Airport Station) and Silver Line (SL1), 2009-2013



Source: Massport

Other HOV Modes: Scheduled Buses, Shared-Ride Vans, Courtesy Vehicles, and Limousines

Massport provides designated curb areas at all Airport terminals to support the use of HOV modes, including privately-operated scheduled buses and shared-ride vans and limousine services. About 13 percent of air passengers use these shared-ride services to arrive at Logan Airport based on the *2013 Logan Airport Air Passenger Ground Access Survey*.

The majority of scheduled shared-ride carriers use a combination of 15- to 40-passenger vehicles and 40+ passenger coach buses. Scheduled express bus service is offered by several privately-operated carriers from outlying areas of the Boston metropolitan area and neighboring states. Shared-ride van services include services between Logan Airport and many hotels in the Greater Boston area. Shared-ride vans also provide service from western Massachusetts and other regional points throughout New England.

As shown in Table 5-14, with the exception of scheduled vans/limousines, the use of these HOV modes decreased slightly in 2013 compared to 2012 after experiencing an increase in 2012 compared to 2011. Scheduled vans and limousines experienced a decrease in dispatches the past two years, and thus the ridership estimate for this mode is lower than the 2011 level.

Table 5-14 Activity Levels (Estimated Ridership) for Other Scheduled and Unscheduled HOV Modes: Scheduled Buses, Shared-Ride Vans, Courtesy Vehicles, and Limousines, 2009 - 2013

	Scheduled and Unscheduled HOV Modes			
Year	Scheduled Buses	Scheduled Vans & Limousines	Courtesy Vehicles	Limousines *(unscheduled)*
2009	375,813	308,658	612,331	918,438
2010	375,223	391,122	635,127	1,035,195
2011	360,237	473,199	594,706	1,095,420
2012	377,608	311,737	653,728	1,199,011
2013	374,792	207,738	646,739	1,168,774
Percent Change (2011-2012)	5%	(34%)	10%	9%
Percent Change (2012-2013)	(1%)	(33%)	(1%)	(3%)

Source: Massport
Notes: Numbers in parentheses () represent negative numbers.
Ridership is estimated based on dispatched vehicles, according to records from the Logan Airport bus/limousine pool, and the average occupancy per vehicle, according to the ground-access survey.

Massport offers a 50-percent discount on the ground access fees for alternative fuel vehicles that use compressed natural gas (CNG) or are powered by electricity.

Non-HOV (Automobile) Modes

Logan Airport passengers can access the Airport by a number of automobile modes, including private automobiles, taxis, and rental cars. These modes account for about 72 percent of the access modes used by air passengers, based on the *2013 Logan Airport Air Passenger Ground Access Survey*, up 2 percent from the 2010 survey. Although these modes are categorized as non-HOV, they frequently carry more than one passenger per vehicle. Based on the 2013 survey results, the average vehicle occupancy for these automobile modes is estimated at 1.9 to 2.1 passengers per vehicle.

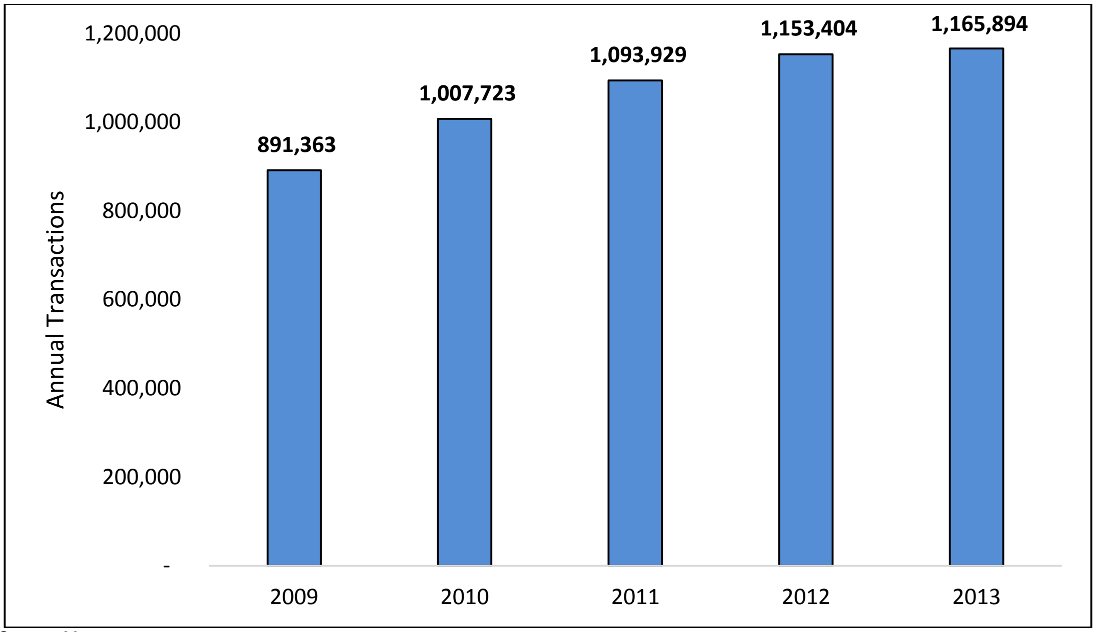
Automobile Access

Private automobile access to the Airport is classified as either curbside drop-off, or parked on-Airport (terminal area or remote/Economy). Traffic conditions associated with these trips are described in this chapter's section on traffic conditions.

Rental Car

At the opening of the RCC in 2013, nine rental car brands were serving Logan Airport: Advantage, Alamo, Avis, Budget, Dollar, Enterprise, Hertz, National, and Thrifty. At the end of 2013, Zipcar also began its operations at Logan Airport, and in 2014, Payless and Firefly are expected to initiate their respective operations. The results from the *2013 Logan Airport Air Passenger Ground Access Survey* indicate that approximately 10 percent of air passengers used rental cars to access the Airport. Rental car transactions (see Figure 5-12) have been increasing over the recent years, following the trend of air passenger activity.

Figure 5-12 Annual Rental Car Transactions at Logan Airport, 2009-2013



Source: Massport

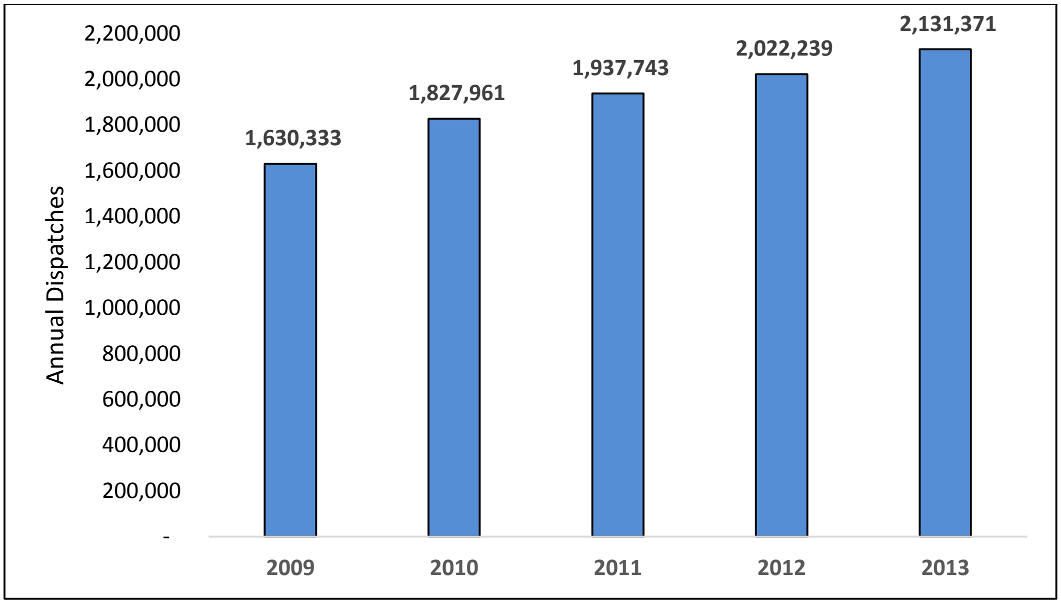
Prior to the opening of the RCC in late September 2013, each rental car (RAC) brand operated its own diesel-fueled shuttle bus fleet that served the airport terminals and their respective on- or off-Airport rental car facilities. The RCC/SWSA Redevelopment project has eliminated the use of the diesel-fueled RAC bus fleet, and those passengers are served by Massport's new clean diesel-electric hybrid and CNG fleet, which serves the terminals, the RCC, and the MBTA Airport Station, as part of a unified bus system.

Taxis

Taxi ridership trends are reflected in the total number of taxis dispatched from Logan Airport (serving outbound passengers). The number of taxis dispatched rose in 2013 by 5 percent over the 2012 level, similar to the increase of 4 percent between 2011 and 2012 (Figure 5-13). However, in 2013, there were approximately 345 hours (experienced on 194 days) during which Logan Airport had a shortage of cabs and had to resort to multiple passenger/party loading at the curbs. In 2012, Logan Airport experienced a shortage of cabs for 152 hours.

Taxi dispatches reflect the increase in air passenger levels. Taxi use in 2013 almost reached the highest recorded level at Logan Airport (2.14 million dispatches in 2000 when Logan Airport served 27.7 million annual air passengers).

Figure 5-13 Annual Taxi Dispatches at Logan Airport, 2009-2013



Source: Massport

The *2013 Air Passenger Ground Access Survey* found that approximately 19 percent of air passengers accessed the Airport via taxi, which is similar to the numbers from recent past surveys. Taxi vehicle occupancy is approximately 1.8 passengers per vehicle according to the *2013 Air Passenger Ground Access Survey*.

Green Cab Program

Since 2007, Massport has sponsored a "Head-of-Line" hybrid vehicle taxi incentive program, in partnership with the City of Boston. Under this program Boston taxis that qualify as a clean-fuel vehicle may obtain permission to proceed to the short job lane at Logan Airport's taxi pool; this allows these "green cabs" to be dispatched to the terminals in a shorter amount of time.

Ground Access Planning Considerations

Surface transportation modes have environmental impacts, and are considered a standard component of airport GHG emissions inventories (see *Chapter 7, Air Quality/ Emissions Reduction*). Enhancing multimodal transportation options is one way an airport can reduce GHG emissions and improve its environmental footprint.

Potential emissions reductions are one reason why Massport is committed to a long-term goal to promote and support public and private HOV/shared-ride services aimed at serving air passengers, Airport users and employees. Other benefits include:

- Reducing congestion on the terminal roadways and curbside pick-up/drop-off areas;
- Alleviating limited parking facilities; and
- Customer service (providing a range of transportation options for different traveler markets).

Passenger HOV Mode Share Goal

Massport's current ground access goal is to attain a 35.2-percent passenger HOV mode share when annual air passenger levels reach 37.5 million. The 35.2 percent HOV mode share figure was developed by a planning process involving Massport staff and was first presented in the Logan Growth and Impact Control (LOGIC) planning studies that were completed in the early 1990s.[14] In subsequent environmental documents, the 35.2-percent HOV mode share became a declared goal related to ground access to Logan Airport.[15]

Progress toward this goal is measured using the triennial air passenger ground-access survey. The latest survey, which was conducted in 2013, revealed an air passenger ground-access mode share of 28 percent for HOV/shared-ride modes, which is a share consistent with past surveys (see detailed discussion in the previous section in this chapter). This result demonstrates that Logan Airport has been able to maintain its HOV mode share in concert with improvements to roadway access to the Airport and despite increases in air passenger levels. Also, the result confirms Logan Airport's rank at the top of U.S. airports with respect to HOV/shared-ride mode share.[16]

Although generally useful, the calculation of overall HOV mode share is limited in that some modes can operate as both *high* occupancy and *low* occupancy vehicles (please refer to Table 5-15, below). Many automobile modes carry multiple passengers; for example, as seen in Table 5-15, the 2013 air passenger survey results indicate an average occupancy of 2.0 air passengers per private vehicle used for airport ground access.

Table 5-15 Average Vehicle Occupancy by Vehicular Ground Access Mode (2013)

Mode	Vehicle Occupancy	% SOV Trips
Private Vehicle	2.0	24%
Taxicab	1.8	28%
Rental Vehicle	1.6	37%
Subtotal for Automobile Modes	**1.9**	**28%**
Car Service ("black car" limousine by reservation)	1.9	30%
Courtesy Shuttle	3.6	7%
Shared-Ride Van or Limousine (scheduled or reservation)	4.4	7%

Source: Massport, 2013 Logan Airport Air Passenger Ground-Access Survey. Based on air passengers departing on both weekdays and weekend days.
Notes: The true average occupancy per vehicle arriving at the Airport cannot be computed from the responses to the survey because it is not possible to identify multiple travel parties arriving in a single vehicle. Average occupancy in this table was calculated as the average occupancy of arriving vehicles across survey respondents.
An SOV (single occupancy vehicle) passenger is defined as an air passenger that arrives at the Airport with no other air passengers in the vehicle. Air passengers can arrive as the only traveling air passenger in any of the above modes; thus, drivers and/or occupants who are not traveling are excluded from the occupancy calculation.

14 Logan Growth & Impact Control Study (LOGIC) Phase I Report (1990) and Logan Growth & Impact Control Study (LOGIC), Phase II Final Report (June 1993).
15 West Garage Final EIR (January 31, 1995) and 1994 & 1995 Annual Update of the Final Generic Environmental Impact Report (GEIR), vol. 1 (July 1996), which presents for the first time "Massport's Ground Access Management Plan" and states that its goals are "to achieve a 35 percent high-occupancy vehicle (HOV) mode share by air passengers…" [p. I-7-4]
16 It is useful to note that there is no standard aviation industry definition with respect to categorizing ground access modes as HOV versus SOV. While some modes (e.g., Logan Express and the Silver Line) clearly fall into the HOV mode category, the proper category for a limousine or taxi is less clear.

Through the strategic planning process, Massport has concluded that its overarching ground access goal must be to minimize the number of motor vehicles used by both passengers and employees traveling to and from Logan Airport. Achieving this goal will require balancing the need to accomplish three objectives:

- Maximizing the availability and use of transit, HOV and shared-ride options for Logan passengers and employees;
- Minimizing the number of pick-up/drop-off trips, particularly "dead head" trips in which a vehicle brings a passenger to Logan Airport and leaves with only the driver, effectively doubling the number of vehicle trips needed for that passenger to get to and later home from the Airport; and
- Managing parking supply, pricing, and operations to promote use of transit/HOV/shared-ride options and reduce the amount of diversions/valeting, all without increasing the number of pick-up/drop-off trips due to a constrained parking supply.

Massport is investigating alternative methods to describe the mode use and travel patterns of air passengers using Logan Airport in order to better reflect these considerations and track progress toward meeting all of its ground access goals, including, but not limited to, maintaining its high HOV mode share.

Conditions Under Constrained Parking

According to research conducted for Massport, Logan Airport is the only airport in the country where travelers may not find a parking space of their choice on the Airport.[17] As described earlier in this chapter, on many weeks in 2012 and 2013, vehicles were periodically diverted from Central Parking to Economy Parking or Terminal E lots, or valeted to other areas until lined spaces became available. Peak-day demand is not showing signs of dampening, and overflow conditions persist. These conditions exist despite the supply of over 2,700 parking spaces off-Airport at nearby private lots, and despite the increases in Logan Express use since the lowering of its parking rates.

With the Logan Airport Parking Freeze (and current capacity levels) remaining in place, demand is outpacing supply on a regular basis. With overflow conditions becoming such a regular occurrence, the ratio of growth in overall parking demand may begin to wane, but parking space utilization early in each week will remain at high levels. Under such conditions, travelers arriving at the Airport to park on Tuesdays and Wednesdays would find themselves unable to park their cars on Airport. Massport has developed a Long-Term Parking Management Plan, which is included in *Appendix G, Ground Access* of this *2012/2013 EDR*.

Massport recently reconfirmed with EEA that providing additional structured parking spaces up to the total allowed by the Parking Freeze does not require further environmental review.[18] As described in *Chapter 3, Airport Planning*, Massport plans to consolidate, through construction of new structured and surface parking facilities, approximately 2,050 spaces at Logan Airport that are in the Logan Airport Parking Freeze inventory. Under this initiative, no new parking spaces are being added to the Logan Airport Parking Freeze inventory; the new constructed parking facilities will consolidate existing on-Airport parking currently located at disparate locations within Logan Airport's Parking Freeze Area, and will help improve the operational challenge of handling the parking demands under the supply constraint.

17 LeighFisher, August 2011.
18 MEPA Advisory Opinion letter, March 20, 2014.

The newly constructed parking spaces will not attract new traffic to the Airport: this project will establish defined physical striped spaces for vehicles that would come to Logan Airport with or without the construction of the spaces. In other words, spaces in these areas will help to reduce the need for vehicle diversions on peak parking demand days.

Planning for Passenger Ground Access

In the past, the ground access strategy has operated within the constraints of the Logan Airport Parking Freeze. Future efforts will need to better address the growing use of pick-up/drop-off modes that include private vehicles, taxis, limousine, and taxi modes. Pick-up/drop-off appears to be growing in response to the constrained parking supply. Some travelers are increasingly choosing the pick-up/drop-off mode.

One model has indicated that this undesired behavior could occur; a predictive tool considering parking demand and pricing suggests that at higher parking rates, three-quarters of those travelers who would have parked at the Airport for their flight would choose to be dropped-off at the curb (by taxi or private vehicle), and only a quarter of them would seek HOV/shared-ride modes.[19] Accordingly, an unintended effect of constrained parking supply has been an increase in the total number of vehicle trips generated by Logan Airport passengers.

Therefore, the challenge is how to influence a mode shift so that the passengers generating the excess parking demand are encouraged to use sustainable transportation modes (including public transit, Logan Express, and other shared-ride services) rather than increase taxi and private vehicle drop-off and pick-up activity that would generate increased levels of traffic and curbside congestion (and associated emissions) at Logan Airport. This is a key planning issue that Massport will address in future Airport-wide planning efforts. Massport's longer-range ground access strategy will balance the need to maximize the HOV/transit/shared-ride mode share, manage on-Airport parking, and reduce pick-up/drop-off trips.

Ground Access Initiatives

Massport promotes ridership on HOV/transit/shared-ride modes and maintains efficient transportation access and parking options in and around Logan Airport to reduce the reliance on automobile modes as a means to achieving the HOV mode share goal. Measures implemented by Massport include a blend of strategies related to pricing (incentives and disincentives), service availability, service quality, marketing, and traveler information. Because of the diverse market segments of the air passenger traveler, not one single measure will accomplish the goal.

The March 2012 parking rate changes for Logan Airport commercial parking and Logan Express are a part of the recent package of initiatives to promote HOV/shared-ride ridership that include:

- The purchase of new low-floor, clean-fuel buses (which were put into service in October 2012);
- The implementation of the unified shuttle bus system operation (fall of 2013) in conjunction with terminal curbside allocation changes; and
- The deployment of "next bus" arrival notification signs at the terminals and the MBTA's Airport Station on the Blue Line.

19 LeighFisher parking demand modeling exercise, August 2011.

HOV/Transit/Shared-Ride Initiatives

Beginning in the spring of 2012, Massport, in partnership with the MBTA and the Massachusetts Department of Transportation (MassDOT), introduced an intensive promotion of public transit to airport users. Marketing and promotion of public transit and Logan Express consisted of a multimedia campaign (including radio announcements, web advertising, banners, bus cards, bus wraps, etc.) and enhanced in-terminal signs, column wraps, and terminal floor decals, directed at arriving passengers.

These elements supported the introduction of a Silver Line pilot program on June 6, 2012, which permits free boarding of the Silver Line buses at Logan Airport, in conjunction with added customer service staff during peak arrivals periods. This initial four-month pilot program was evaluated to assess the impacts on customer service, dwell times and curb operations, ridership changes and mode shifts, safety impacts, and fiscal impacts. The promising results of reduced dwell times and faster travel times through the terminal area led Massport to extend the free-fare program indefinitely.

Coinciding with the opening of the RCC (and the new on-Airport shuttle bus operations), in September of 2013 Massport made improvements to the terminal curbsides in order to increase access for HOV/transit/shared-ride modes. The improvements followed several general principles: situate HOV modes to the curb closest to the terminal and locate the airport's Blue Line/RCC shuttle stop adjacent to the Silver Line stop. Terminals B, C, and E underwent the most significant changes; the ground level of the Terminal B garage was converted to a taxi and limousine pick-up area, eliminating all commercial parking from that level, and allowing extra curb space to be better allocated among the remaining HOV and other modes. Terminal A, which already had the primary HOV modes pick-up at the terminal curb (and private vehicles pick-up at the second/outer curb), underwent the fewest changes.

In 2013, Massport explored options for an additional express bus service and consequently initiated the Back Bay Logan Express in April 2014. Using Massport's 42-foot CNG buses, this service provides travelers with three scheduled trips per hour between the Hynes Convention Center, Copley Square Station, and Logan Airport. Aside from serving an area that generates a significant number of trips to the Airport, the service will serve transit riders inconvenienced by the two-year closure of Government Center station where the Green Line meets the Blue Line.

In January 2014, a local private company began serving the airport under the Super Shuttle brand of shared-ride vans by reservation. This service is present in over three dozen U.S. airports, and has added a promising HOV mode option for travelers in the inner Boston metropolitan area.

Massport is also investing in expanding its Logan Express bus service, including spending $30 million to build a 1,100-space parking garage in Framingham to meet growing passenger and employee demand. The Framingham Logan Express carries the highest number of non-employee passengers of all the Logan Express services.

Parking Programs and Initiatives

Cell Phone Waiting Lot

In late 2010, the Cell Phone Waiting Lot was relocated to the intersection of Hotel Drive and North Service Road (SR-2), in an area across the roadway from the American Airlines hangar.[20] The new lot was expanded from 50 to 61 spaces.

This parking lot provides a location where drivers waiting for passengers on arriving flights may park. Before the creation of the Cell Phone Waiting Lot, drivers who were waiting for arriving passengers either used the short-term parking, circulated around the Airport, or dwelled at the curb until asked to move by State Police officers. Therefore, this facility reduces vehicle emissions by minimizing idling and VMT by such motorists. The maximum wait time permitted at this parking lot is 30 minutes and parking is free of charge.

Spot observations of the original cell phone lot revealed that the peak time of day for its use is typically late afternoon/early evening when the lot could be at 70 to 100 percent capacity. During peak holiday vacation periods, the lot was observed to be at capacity more frequently.

PASSport Gold and Parking PASSport

Parking PASSport Gold and Parking PASSport allow users to enter and exit Logan Airport's parking garages and lots with an access card that is linked to an established account for faster payment transactions. Parking fees are automatically charged to a registered credit card and the receipt is emailed to the account holder. Customers in the Parking PASSport programs account for approximately 3 to 4 percent of parking exits at Logan Airport.

Massport offers guaranteed parking through its Parking PASSport Gold program. Parking PASSport Gold eliminates the need for a motorist to circle the garage looking for available spaces. First implemented in 2006, the Parking PASSport Gold program had 7,544 customers as of December 31, 2013, compared to 5,782 at the end of 2011. About 8 percent of spaces in the Central/West Parking garage and 12 percent of spaces in the Terminal B garage are set aside for these customers.

Hybrid/Alternative Fuel Vehicle Preferred Parking

In the State's first preferred parking program for hybrid and alternative fuel vehicles (AFVs), Massport began offering preferred parking for customers driving hybrid and AFVs in the spring of 2007. Massport provides designated parking spaces at Logan Airport's Central Garage, Terminal B Garage, Terminal E surface lot, and Economy Parking.

Employee Ground Transportation Initiatives

Airport employee transportation has different ground access considerations than passenger transportation. Airport employees often have non-traditional (and often unpredictable) working hours that are difficult to match to typical transit service hours. Due to the time-sensitive nature of airline operations, on-time reliability is important for employee transportation, as is flexibility during severe weather or other delays which may extend a typical employee workday or workshift.

20 The original Cell Phone Waiting Lot opened in September 2007, with 50 parking spaces in an area of Lot B located off Harborside Drive.

Massport strives to reduce the number of Airport employees commuting by private automobile, to enhance commuter options, and to reduce traffic and parking demands at Logan Airport. To help accomplish these objectives Massport continues to:

- Provide off-Airport employee parking in Chelsea, which is served by frequent shuttle bus service to the terminals (Route 77);
- Run free employee shuttle buses between Airport Station and employment areas in the SWSA and the SCA locations (Routes 44, 66, and Logan Office Center);
- Operate early morning and late night Logan Express bus trips for commuters.
- Support the Logan Transportation Management Association (TMA);
- Support the Sunrise Shuttle for early morning bus service from East Boston;
- Create and maintain a comprehensive sidewalk/walkway system on Logan Airport to facilitate pedestrian access; and
- Provide bicycle racks.[21]

Two of these initiatives that are exclusively targeted to employees are described below.

Logan Transportation Management Association (TMA)

Massport established the Logan TMA in 1997 with the following goals:

- Reduce Airport employee parking needs, traffic congestion, air pollution, and commuting costs by organizing/supporting alternatives to drive-alone commuting;
- Enhance public and private transportation services to Logan Airport through advocacy and support for expanded HOV/shared-ride services and discount fares for Airport employees;
- Provide a forum for Logan Airport tenants and employees to address common transportation concerns; and
- Work with government entities to create coordinated transportation management programs.

The Logan TMA advises Airport employers on transit benefits and provides information on available commuting transportation alternatives, ride-matching services, and reduced-rate HOV/transit fare options. Massport contributes $65,000 annually to the Logan TMA. The Logan TMA works with airlines, rental car companies, cargo transport companies, and other tenants at Logan Airport to encourage and offer commuting incentives to employees. Several companies offer a subsidy to employees using public transit or Logan Express to travel to work at the Airport. The TMA is open to all companies and their employees at Logan Airport. Therefore all employees are eligible to benefit from its services.

Benefits and services provided by the Logan TMA to Logan employees in 2012-2013 included:

- East Boston early morning shuttle service (Sunrise Shuttle) (further details are provided below);

21 Bicycle racks are provided at Terminal A, Terminal E, Logan Office Center, MBTA's Airport Station, Economy Parking Garage (covered), Signature general aviation terminal, the Green Bus Depot (Bus Maintenance Facility), and the Rental Car Center (covered).

- Computerized ride-matching services for participating in carpools and vanpools; and
- Advocacy for improved service and reduced fares for its members from Massport, the MBTA, or other providers of mass transit and other alternative forms of transportation.

Sunrise Shuttle

Originally launched in August 2007, this shuttle service provides low-cost transportation to Airport employees who live in nearby East Boston and Winthrop. A second shuttle route was added in October 2011 that serves East Boston's Orient Heights neighborhood and Winthrop. Both are partnerships between Massport and the Logan TMA to operate the Sunrise Shuttle; the second service was added with assistance from the Jobs Access and Reverse Commute (JARC) federal funding program.

The Sunrise Shuttle services operate outside of MBTA service hours between 3:00 AM and 6:00 AM, with shuttles every half-hour transporting employees to the Airport terminals. Ridership levels have steadily increased since the shuttle's launch. The two-route service has reached over 1,000 riders per month.

Ground Access Goals

Table 5-16 lists each ground access goal and updates Massport's initiatives associated with each goal. Initiatives are planned, designed, implemented and continuously refined to account for the changing national, regional and local conditions that affect Logan Airport and its users.

Table 5-16 Ground Access Planning Goals and Progress (2012-2013)

Goal	2012 & 2013 Update
Increase air passenger ground access (high-occupancy vehicle) HOV mode share to 35.2 percent by the time Logan Airport accommodates 37.5 million annual air passengers	The *2013 Logan Airport Air Passenger Ground Access Survey* revealed that 28 percent of air passengers use HOV/shared-ride modes to access the Airport. As detailed below, Massport continues to provide and actively promote numerous HOV/shared-ride options to air passengers, including Logan Express bus service, the Silver Line, water shuttle service, and frequent, free shuttle bus service to and from the Massachusetts Bay Transportation Authority (MBTA) Blue Line rapid transit Airport Station. Massport is investigating ways to increase HOV mode share by implementing new HOV initiatives and pricing strategies. In early 2012, Massport lowered its parking rates at the Logan Express sites in order to encourage use of the HOV/shared-ride service; as seen earlier in the chapter both employee and non-employee ridership has increased. Also in early 2012, Massport increased its advertising and marketing of Logan Express and public transportation access to Logan Airport. This included radio ads, online banner ads, and ads in MBTA subway stations. In the summer of 2012, Massport partnered with the MBTA to offer free boardings of the Silver Line bus at the Airport; this pilot program will be evaluated to assess the effectiveness in increasing MBTA ridership, among other performance measures. Next-bus arrival digital dynamic signs have been added to the Terminal curb bus stops for the Silver Line, and are expected to later include Logan Express and other scheduled buses. Massport has addressed wayfinding for ground transportation (with an emphasis on public transportation) within the terminals, resulting in enhanced directional signs in the terminals for arriving air passengers. In late 2013, Massport issued a request for proposals (RFP) to solicit an operator for a Back Bay express shuttle bus service, which would commence by April 2014 (later branded Back Bay Logan Express, the service began running on April 28, 2014).
Reduce employee reliance on commuting alone by private automobile	Massport continues to support the Logan Transportation Management Association (TMA) with $65,000 annually (no dues are collected from Airport employers). Massport uses funds from the Logan TMA to operate the two early morning Sunrise Shuttle services that operate in East Boston and Winthrop. For employees who reside in neighborhoods and communities closer to the Airport, bicycle parking options have increased with the installation of bicycle racks at Terminal E, the Economy Garage, and the Green Bus Depot in 2012, and the Rental Car Center in 2013. Additional racks are located at Terminal A, the Logan Office Center, and the Signature general aviation terminal. Racks are installed in the new consolidated rental car center. Massport is also investigating ways to improve bicycle access to/around Logan Airport facilities. For example, the East Boston Greenway Connector construction was completed in July 2014.

Table 5-16 Ground Access Planning Goals and Progress (Continued)	
Goal	**2012 & 2013 Update**
Increase the overall efficiency of the metropolitan transportation system through interagency coordination	Massport participates in the Metropolitan Planning Organization (MPO) to promote planning and funding of transportation system options that enhance access to the Airport. Massport and the MBTA have worked together on several initiatives including the renovated Blue Line Airport Station and the Silver Line service to Logan Airport. Following the Massachusetts Department of Transportation's acquisition of a critical rail right-of-way, Massport constructed the East Boston-Chelsea bypass road (formally named Martin A. Coughlin Bypass Road), which adds an important roadway link to the Logan Airport ground access network. The road enhances both transit and commercial vehicle access to the Airport while reducing traffic and emissions in local East Boston neighborhoods. The road opened to traffic in November 2012.
Improve management of on-Airport ground access and infrastructure through technology	Massport disseminates ground access and parking information through the Internet (www.massport.com), social media (Twitter and Facebook), a toll-free telephone number (1-800-23-LOGAN), Smartraveler, and in-Airport kiosks. Massport's redesigned website has an interactive tool that helps users access Logan Airport, while providing multimodal options.[22] In 2013 Massport opened a Ground Transportation Operations Center (GTOC) located in the new Rental Car Center. The GTOC incorporates state-of-the-practice intelligent transportation system (ITS) features for managing the unified shuttle bus system as well as other ground transport operations. In 2012, Massport began implementing a Digital Passenger Information Program (DPIP). An objective of the program is to deploy digital signs to help customers with wayfinding in (and between) the terminals, including wayfinding to curbside transportation. The signs provide flight information, ground transit/transportation information (including real-time bus arrivals for Logan Express and Silver Line buses), and assist with meeting some American's with Disabilities Act (ADA) goals of the Airport for visual paging. In 2012, Massport completed the development of its first mobile device-optimized website. The website, http://m.massport.com, offers Logan Airport-specific content reformatted for a small screen mobile device. Content includes information on flights, ground transportation, concessions, and parking. An improved mobile-optimized site was released in 2013, which included added features such as geo-aware wayfinding and improved ground transit functionality. The Economy Parking Garage facility, which fully opened in March 2011, consolidated several smaller overflow lots into a two-deck parking structure at the former Robie parcel. In both 2012 and 2013, Logan Airport continued to experience peak levels of parking demand for the terminal area parking garages. In an effort to ameliorate the operational impacts of peak parking, Massport is planning for an addition (of up to 2,050 spaces) to the West Garage and the Terminal B Garage; a preferred alternative and design is expected in 2014. The total number of parking spaces at the Airport remains within the Logan Airport Parking Freeze (refer to the comprehensive discussion of parking allocations in this chapter and shown in Table 5-4).

22 Massport, GetUthereApp, www.massport.com/massport/gtu/Pages/default.aspx.

6

Noise Abatement

Introduction

The Massachusetts Port Authority (Massport) strives to minimize the noise effects of Logan Airport operations on its neighbors through the use of a variety of noise abatement programs, procedures, and other tools. Logan Airport has one of the most extensive noise abatement programs of any airport in the nation. Massport's comprehensive noise abatement program includes a dedicated Noise Abatement Office, residential and school sound insulation programs; flight tracks designed to optimize over-water operations (especially during nighttime hours); and preferential runway use goals. The foundation of Massport's program is the *Logan Airport Noise Abatement Rules and Regulations*[1] (the Noise Rules), which have been in effect since 1986. Massport's Noise Abatement Office is responsible for implementing noise abatement measures and generally monitoring community complaints and other aspects of the noise effects from Logan Airport operations. This chapter describes predicted noise conditions at Logan Airport related to aircraft operations during 2012 and 2013 and compares the findings to those for 2011.

Noise conditions for 2012 and 2013 were assessed primarily through computer modeling, supplemented by the analysis of measured noise levels from Logan Airport's noise monitoring system. The chapter presents summaries of the operational data used in the noise modeling, as well as the resultant annual Day-Night Average Sound Level (DNL) noise contours, a comparison of the modeled results with measured levels from the noise monitoring system, and estimates of the population residing within various increments of noise exposure. Analyses also include a number of supplemental noise metrics including Logan Airport's Cumulative Noise Index (CNI) and reporting on the Time Above (TA) various threshold sound levels and periods of dwell and persistence of noise levels. Massport's progress on implementing noise abatement measures also is presented.

Appendix H, Noise Abatement provides historical details of operations, runway use, the sound insulation program, and noise exposed population back to 1990. The appendix also contains the *Flight Track Monitoring Report* for 2012/2013 and a *Fundamentals of Acoustics and Environmental Noise* section, which gives an overview of key noise issues, noise metric definition, and terminology for the general reader.

1 The *Logan International Airport Noise Abatement Rules and Regulations*, effective July 1, 1986, are codified at 740 Code of Massachusetts Regulations (CMR) 24.01 et seq (also known as the Noise Rules).

2012/2013 Noise Abatement Highlights

In 2012 and 2013, the following changes occurred in the Airport and noise environment:

- Although passenger volumes continued to increase, annual aircraft operations decreased from 368,987 in 2011 to 354,869 in 2012 (3.8-percent decrease) with an increase to 361,339 in 2013 (1.8-percent increase) from 2012. Commercial (Passenger and Cargo) operations decreased by 4.1 percent from 340,727 in 2011 to 326,750 in 2012 and increased by 2.7 percent to 335,464 in 2013. This trend represents a reduction in total aircraft operations since 2000 (487,996 operations).
- General aviation (GA) operations decreased 0.4 percent from 28,230 operations in 2011 to 28,114 operations in 2012. GA operations in 2013 decreased 5.1 percent to 26,682 from 2012 levels. GA operations continue to represent only a small percentage (7.9 percent in 2012 and 7.4 percent in 2013) of total operations at Logan Airport. The 26,682 GA operations in 2013 remain well below the 35,233 GA operations that Logan Airport handled in 2000.
- Daily total aircraft operations in 2012 (366 days) averaged approximately 969 operations per day compared to approximately 1,011 operations per day in 2011. Daily operations in 2013 (365 days) averaged approximately 990 operations per day. Since 2000, the number of daily aircraft operations has declined by almost 29 percent (from 1,355 operations per day in 2000 to 990 operations per day in 2013). This trend reflects reductions in the use of small aircraft since 2000, legacy carriers reluctant to expand their routes, and increased efficiencies on the part of airlines.
- In, 2012 there was a significant drop in regional jet (RJ) operations (approximately 30 less flights per day) as airlines switched to using larger aircraft to carry more passengers on routes instead of adding operations, resulting in greater efficiencies and impacts. In 2013, there was a small rise in RJ operations (almost four operations per day) as some carriers expanded flights. RJ operations in 2013 were 21.3 percent higher than the 37,600 RJ operations in 2000.
- An updated version of the Federal Aviation Administration (FAA) Integrated Noise Model (INM) version 7.0d (INMv7.0d) was released in 2013 and was used for the 2013 modeling.
- Compared to 2011, the 2012 DNL 65-decibel (dB) contours were slightly larger in East Boston, Revere, South Boston, and Winthrop and smaller over Boston Harbor towards Long Island and south towards Columbia Point. The 2012 contours remained significantly smaller than the 2000 contours. There are several factors that influenced the contour changes, including:
  - Runway 15R-33L, which is the nighttime noise abatement runway, was temporarily closed from June 16, 2012 through October 2, 2012 to allow for the second and final period of construction of the enhanced Runway 33L Runway Safety Area (RSA). There were also partial construction closures of the runway before and after this period. Typically, this runway is used during these periods for head-to-head operations (arrivals to Runway 33L and departures from Runway 15R) at night, which keeps air traffic over Boston Harbor, and away from the community.
  - The 2012 RSA construction closure was a longer period than in 2011, which extended the use of other runways for nighttime operations during 2012. During this period, night operations primarily used Runway 22R and Runway 9 for departures and Runway 4R, 27, and 22L for arrivals.

- Compared to 2012, the 2013 DNL 65 dB contours were slightly larger in East Boston and slightly smaller in Revere, South Boston, and Winthrop. The 2013 contours remained significantly smaller than the 2000 contours. There are several factors that influenced the contour changes, including:
  - Runway use in 2013 was reflective of a typical year (return to pre-construction conditions), with an increased use (compared to 2012) of Runway 15R-33L and Runway 27.
  - The availability of all runway configurations in 2013 resulted in lower levels of arrivals to Runways 22L, 27, and 4R.
- Due to the runway closure in 2012, the overall number of people exposed to DNL values greater than 65 dB increased to 4,736 people in 2012 from 3,947 people in 2011 (an increase of 789 people).[2] In 2013 with runway use back to pre-construction levels, the overall number of people exposed to DNL values greater than 65 dB decreased to 4,307 people in 2013 (a decrease of 429 people from 2012). The number of people residing within the DNL 70 dB contour increased from 130 people in 2011 to 200 people in 2012 and decreased to 130 people in 2013. These levels are still well below the number of people exposed in the year 2000 when 17,745 people were exposed to DNL noise levels greater than 65 dB and 1,551 people were exposed to DNL levels greater than 70 dB. All of the residences exposed to levels greater than DNL 65 dB in 2012 and 2013 have been eligible to participate in Massport's residential sound insulation program (RSIP).
- Massport reports total annual fleet noise at Logan Airport, as defined in the Logan Airport Noise Rules by a metric referred to as the CNI. The CNI is a single number representing the sum of the entire set of single-event noise energy from each operation experienced at Logan Airport over a full year of operation. The CNI is weighted similarly to DNL so that activity occurring at night is penalized by adding an extra 10 dB to each event. This penalty is equivalent to multiplying the number of nighttime events of each aircraft by a factor of 10.
- The 2012 CNI of 152.2 Effective Perceived Noise Decibels (EPNdB)[3] and the 2013 CNI of 152.3 EPNdB remained well below the cap of 156.5 EPNdB established under Massport's noise regulations. For comparison, the 2000 CNI was 154.7 EPNdB (Table 6-10).
- Massport has an extensive sound insulation program in the areas surrounding Logan Airport. All of the residences exposed to levels greater than DNL 65 dB in 2012 and 2013 have been eligible to participate in Massport's RSIP. Participation in the program is voluntary and all of the homeowners who have chosen to participate in the Massport's RSIP have been sound insulated by Massport.

  An additional 76 residential units received sound insulation treatment in 2013 bringing the program total to 11,409 residential units treated. Massport will continue to seek funding for sound insulation for properties that are eligible and whose owners have chosen to participate.

Airspace and Airfield Changes:

- The FAA issued a Finding of No Significant Impact/Record of Decision (FONSI/ROD) in June 2013 for the Boston Logan International Airport Runway 33L aRea NAVigation (RNAV) Standard Instrument Departure (SID) Final Environmental Assessment (EA). The procedure became available for use by FAA on June 5, 2013 and is included in the 2013 results in this *2012/2013 Environmental Data Report (EDR)*.

2 Population data were derived from the most recent 2010 United States Census.
3 EPNdB is the metric used for Aircraft Noise Certification and forms the basis of the CNI.

- Massport is participating in an FAA aircraft noise study as part of the Airside Improvement Project mitigation. The primary focus of the Boston Logan Airport Noise Study (BLANS) is to determine viable ways to reduce noise from aircraft operations to and from Logan Airport without diminishing airport safety and efficiency.[4] The RNAV departure portions of Phase 1 of the project, first implemented in 2010, continued to be utilized in 2012 and 2013.
  - The Runway 33L departure is the last RNAV SID departure procedure to be implemented by the FAA.
  - FAA RNAV Standard Terminal Arrival Routes (STARs) were available to aircraft for all of 2013 and have consolidated arrival routes into Logan Airport airspace.
  - The visual approach procedure to Runway 33L which was first implemented by FAA in the summer of 2009, continued in 2012 and 2013. The procedure, also an outcome of Phase 1 of BLANS, keeps aircraft offshore avoiding areas of Cohasset and Hull at night in good weather when Visual Flight Rules (VFRs) are in use.
- The 2012 and 2013 Flight Track Monitoring reports in *Appendix H, Noise Abatement* show that 99 percent of shoreline crossings (locations where aircraft which have departed over the water pass back over land) are by aircraft above 6,000 feet, reflecting a slight increase from 2011 which is beneficial to communities under those flight paths.
- The percentage of aircraft following the Runway 27 departure procedure was at 75 percent for 2013, which continued to remain in compliance with the Runway 27 ROD.[5] The FAA determined in early 2012 that no further evaluation of the Runway 27 departure flight corridor is needed.[6] Massport will continue to monitor and publish compliance with the procedure in the annual Flight Track Monitoring Report in this and subsequent EDR/Environmental Status and Planning Report (ESPR) filings.

Noise Metrics

The common metrics used in this chapter to describe and evaluate aircraft noise are:

- The dB – The standard unit of measure for sound. It is a logarithmic quantity reflecting the ratio of the pressure of the sound source of interest and a reference pressure. This logarithmic conversion of sound pressure to sound pressure level results in a sound pressure level of about zero dB for the quietest sounds that one can detect and sound pressure levels of about 120 dB for the loudest sounds we can hear without pain. Many sounds in our daily environment have sound pressure levels on the order of 30 to 100 dB.
- The DNL – A measure of the cumulative noise exposure over a 24-hour day. It is the 24-hour, logarithmic (or energy) average; A-weighted sound pressure level with a 10 dB penalty applied to the nighttime event levels that occur between 10:00 PM and 7:00 AM. The DNL is the FAA-defined metric for evaluating noise and land use compatibility.
- TA – The TA metric describes the total number of minutes that instantaneous sound levels (usually from aircraft) are above a given threshold. For example, if 65 dB is the specified threshold, the metric would be referred to as "TA65." The TA metric is typically associated with a 24-hour annual average day but can be

4 For more information, visit the BLANS website at www.bostonoverflightnoisestudy.com/index.aspx.
5 FAA. Runway 27 Record of Decision. 1996.
6 FAA. Runway 27 Advisory Committee Meeting Notes 01/23/12, published March 5, 2012.

used to represent any time period. Any threshold may be chosen for the TA calculation. For this study, TA65, TA75, and TA85 were computed at each of the monitoring sites.

- Effective Perceived Noise Level (EPNL) – A time series of "tone corrected" perceived noise levels are used to compute EPNL, which is expressed in units of EPNdB. The tone corrected perceived noise level is determined by measuring the perceived noise level and adding to that value a "pure-tone" correction of up 6 dB. The EPNdB is an international standard for the noise certification of aircraft and is used in this report in the calculation of the CNI.

Regulatory Framework

Federal Aviation Regulation (FAR) Part 36

Logan Airport operates within a framework of federal aviation regulations that limits an airport operator's ability to control noise. For example, the FAA's FAR Part 36[7] sets noise limits for aircraft certification and the procedures by which aircraft noise emission levels must be measured to determine compliance. The regulation defines noise emission limits for turbojets, turboprops, and helicopters, classifying turbojets into categories referred to as stages based on noise levels at each of three locations: takeoff, landing, and to the side of the runway during takeoff (sideline). The stages are:

- Stage 1 aircraft are the oldest and usually have the loudest operations, having preceded the existence of any noise emission regulation. Rare examples include old, restored civil or military aircraft. There are no Stage 1 aircraft operating at Logan Airport.
- Stage 2 aircraft are less old and less noisy than Stage 1; they were the first aircraft types required to meet a noise limit. A subsequent regulation, FAR Part 91 (described in the next section), prohibits the operation of a Stage 2 aircraft in the continental U.S. unless its takeoff weight is 75,000 pounds or less. The FAA Reauthorization bill of 2012 also mandates the phase out of Stage 2 aircraft with a takeoff weight less than 75,000 pounds by 2015. Less than 0.3 operations per day in 2012 (approximately 107 operations) and fewer than 0.1 operations per day in 2013 (approximately six operations) occurred at Logan Airport.
- Stage 3 aircraft were certified for service before 2006 and have relatively quiet jets, although some are Stage 2 aircraft that have been re-engined or have been fitted with hushkits that enable them to meet Stage 3 noise limits.
- Stage 4 aircraft are the newest and quietest of the jets. These aircraft will be required to operate with noise levels at least 10 dB quieter than Stage 3 aircraft at three prescribed measurement points. Jet aircraft certificated after January 1, 2006 must meet the Stage 4 limits. Although not required, the majority of aircraft in the 2012/2013 Logan Airport fleet would also meet the new Stage 4 noise limits if they were recertificated.

FAR Part 150

First implemented in February 1981, FAR Part 150[8] defines procedures that an airport operator must follow if it chooses to conduct and implement an airport noise and land use compatibility plan. Part 150 Noise Compatibility studies require the use of DNL to evaluate the airport noise environment. FAR Part 150

7 14 CFR Part 36, "Noise Standards: Aircraft Type and Air Worthiness Certification."
8 14 CFR Part 150, "Airport Noise Compatibility Planning."

identifies noise compatibility guidelines for different land uses depending on their sensitivity. Key values include a DNL of 75 dB, above which no residences, schools, hospitals, or churches are considered compatible, and a DNL of 65 dB, above which those land uses are considered compatible only if they are sound insulated.

Noise abatement or mitigation measures that an airport operator must consider in a Part 150 study include acquisition of incompatible land, construction of noise barriers, sound insulation of buildings, implementation of a preferential runway program, use of noise abatement flight tracks, implementation of airport use restrictions, and any other actions that would have a beneficial effect on the public.

While Massport has implemented variations of all of these and additional measures at Logan Airport, Massport has not filed an official Part 150 noise compatibility study with the FAA because all of Logan Airport's program elements, while regularly reviewed and updated, preceded the promulgation of Part 150 and are effectively grandfathered under the regulation.

FAR Parts 91 and 161

The Airport Noise and Capacity Act of 1990 (ANCA)[9] directed the U.S. Secretary of Transportation to undertake three key noise-related actions:

- Establish a schedule for a phase out of Part 36 Stage 2 aircraft by the year 2000;
- Establish a program for FAA review of all new airport noise and access restrictions limiting operations of Stage 2 aircraft; and
- Establish a program for FAA review and approval of any restriction that limits operations of Stage 3 aircraft, including public notice requirements.

The FAA addressed these requirements through amendment of an existing federal regulation, "Part 91,"[10] and establishment of a new regulation, "Part 161."[11] ANCA effectively ended Massport's pursuit of any additional operational restrictions outside of this program.

Amendment to Part 91

The FAA establishes and regulates operating noise limits for civil aircraft operation in Subpart I, "Operating Noise Limits," of 14 CFR Part 91, "General Operating and Flight Rules." The noise limits are based on aircraft noise certification criteria set forth in 14 CFR Part 36, "Noise Standards: Aircraft Type and Airworthiness Certification." For transport category "large" aircraft (with maximum takeoff weights of 12,500 pounds or more) and for all turbojet-powered aircraft, Part 36 identifies four "stages" of aircraft with respect to their relative noisiness:

- Stage 1 aircraft, which have never been shown to meet any noise standards, because they have never been tested, or because they have been tested and failed to meet any established standards;
- Stage 2 aircraft, which meet original noise limits, set in 1969;
- Stage 3 aircraft, which meet more stringent limits, established in 1977; and
- Stage 4 aircraft, which meet the most stringent limits, established in 2005.

9 Pub. L. No. 101-508, 104 Stat. 1388, as recodified at 49 United States Code 47521- 47533.
10 14 CFR Part 91, "General Operating and Flight Rules."
11 14 CFR Part 161, "Notice and Approval of Airport Noise and Access Restrictions."

In 1976, the FAA ordered a phase out of all Stage 1 aircraft with a maximum gross takeoff weight (MGTOW) over 75,000 pounds, to be completed on January 1, 1985. After that date, Stage 1 civil aircraft over 75,000 pounds MGTOW were banned from operating in the U.S. (with limited exemptions related to commercial service at "small communities," which has since expired in 1988). ANCA required a similar phase out of Stage 2 aircraft over 75,000 pounds by December 31, 1999. The 75,000-pound weight limit exempts most "business" (or "corporate") jets and a very small number of the very smallest "air carrier" type jets until December 31, 2015 when a full ban will take effect.[12] Aircraft operators responded to the Stage 1 and 2 phase outs by retiring their non-compliant aircraft or modifying some of their aircraft to meet the more stringent standards. The modifications undertaken include installation of quieter engines, noise-reducing physical modifications to the airframe and/or existing engines, and limitation of operating weights and procedures to meet the applicable Part 36 limits. Some former Stage 2 airline aircraft that were "recertificated" as Stage 3 with these modifications still operate at Logan Airport, but are generally declining due to the aircrafts' age and high operating costs (in particular due to the generally low fuel efficiency of these older aircraft).

Part 161

FAA implemented the ANCA requirements related to notice, analysis, and approval of use restrictions affecting Stage 2 and 3 aircraft through the establishment of a new regulation, 14 CFR Part 161, "Notice and Approval of Airport Noise and Access Restrictions." In simple terms, Part 161 requires an airport operator that proposes to implement a restriction on Stage 2 or 3 aircraft operations to undertake, document, and publicize certain benefit-cost analyses, comparing the noise benefits of the restriction to its economic costs. Operators must obtain specific FAA approvals of the analysis, documentation, and notice processes, and – for Stage 3 restrictions – approval of the restriction itself.

Part 161 and ANCA define more demanding requirements and explicit guidance for Stage 3 restrictions. To implement a Stage 3 restriction, formal FAA approval is required. The FAA's role for Stage 2 restrictions is limited to commenting on compliance with Part 161 notice and analysis procedural requirements. Part 161 provides guidance regarding appropriate information to provide in support of these findings. While Part 161 does not require this information for a Stage 2 restriction, Part 161 states that it would be "useful." Moreover, the FAA has required airports to provide this same information for Stage 2 restrictions (and even for Stage 1 restrictions pursued under FAR Part 150), on the grounds that they are required for airports to comply with grant assurance 22(a), "Economic Nondiscrimination," which states that an airport operator "will make its airport available as an airport for public use on reasonable terms and without unjust discrimination to all types, kinds, and classes of aeronautical activities, including commercial aeronautical activities offering services to the public at the Airport."[13]

Although several (on the order of a dozen) airports have embarked on efforts to adopt both Stage 2 and 3 restrictions in the past two decades, the FAA has found that only one, Naples Municipal Airport, a GA airport in Naples, Florida, has fully complied with Part 161 analysis, notice, and documentation requirements for a ban on Stage 2 jet operations. FAA found the airport was in violation of prior FAA grant assurances. The airport operator successfully sued the FAA to overturn that ruling and has implemented the restriction.

12 The FAA Modernization and Reform Act of 2012 sets a January 1, 2016 ban of Stage 2 aircraft less than 75,000 lbs.

13 FAA Order 5190.6(b),"Airport Compliance Manual" Chapter 13, Section 14, paragraph (a). To be approved, restrictions must meet the following six statutory criteria: 1) The proposed restriction is reasonable, nonarbitrary, and nondiscriminatory. 2) The proposed restriction does not create an undue burden on interstate or foreign commerce. 3) The proposed restriction maintains safe and efficient use of the navigable airspace. 4) The proposed restriction does not conflict with any existing federal statute or regulation. 5) The applicant has provided adequate opportunity for public comment on the proposed restriction. 6) The proposed restriction does not create an undue burden on the national aviation system.

ANCA and Part 161 specifically exempt Stage 3 use restrictions that were effective on or before October 1, 1990 and Stage 2 restrictions that were proposed before that date. The Logan Airport Noise Rules were promulgated in 1986; therefore, ANCA and Part 161 have no bearing on their continued implementation in their current form. Any future proposals to make the rules more stringent with regard to Stage 2 operations or to restrict Stage 3 operations in any way would almost certainly trigger Part 161 notice, analysis, and approval processes for Stage 3 restrictions. In 2006, Massport requested an opinion from the FAA regarding the pursuit of a Part 161 waiver or exemption to allow Massport to implement a curfew of nighttime operations of hush-kitted Stage 3 aircraft. FAA informed Massport that a waiver or exemption from the requirements of Part 161 is not authorized under, or consistent with, federal statutory and regulatory requirements. A copy of FAA's letter to Massport was provided in *Appendix H, Noise Abatement* in the *2005 EDR.*

Logan Airport Noise Abatement Rules and Regulations

Massport's primary mechanism for reducing noise impacts from Logan Airport's operations is the Noise Rules.[14] The Noise Rules were designed to reduce noise impacts by encouraging use of quieter aircraft by requiring decreased use of noisier aircraft and by limiting nighttime activity by louder Stage 2 types. Many secondary goals aimed at limiting noise in specific areas also were stated.

Specific provisions of the Noise Rules, which continue to serve these goals, include:

- Limiting cumulative noise exposure at Logan Airport (as measured by Massport's CNI) to a maximum of 156.5 EPNdB;
- Maximizing use of Stage 3 aircraft;
- Restricting nighttime operations by Stage 2 aircraft;
- Placing limitations on times and locations of engine run-ups and use of auxiliary power units (APU); and
- Restricting use of certain runways by noisier aircraft and time of day.

Noise Modeling Process

The DNL, CNI, and TA noise metrics reported annually by Massport provide various means of interpreting and comparing Logan Airport's complex noise environment from one year to the next. The noise context is influenced by numbers of operations, types of aircraft operating during the day and at night, use of various runway configurations, and the location and frequency of use of flight paths to and from the runways. Changes in any one of these operational parameters from one year to the next can cause changes in the values of the noise metrics and alter the shapes of the noise exposure contours that represent the accumulation of noise events during an average day.

14 The Logan International Airport Noise Abatement Rules and Regulations, effective July 1, 1986, are codified at 740 Code of Massachusetts Regulations (CMR) 24.01 et seq (also known as the Noise Rules).

Massport continues to make use of state-of-the-art improvements in the noise modeling process, which has been updated each year. These developments in noise modeling technologies and techniques, which were first employed in the preparation of the *2005 EDR*, and have continued through this *2012/2013 EDR,* include:

- Continued use of the latest version update to the FAA's INM, while retaining the unique capability to account for over-water sound propagation and hill effects at Logan Airport. Massport's use of the latest FAA-approved version of the INM (INMv7.0c[15] to model the 2012 noise conditions and INMv7.0d[16] to model the 2013 noise conditions) along with additional provisions approved by FAA to accommodate the Airport's unique water and terrain characteristics that have been shown through earlier technical studies to affect sound propagation into surrounding neighborhoods, has improved the modeling results. Logan Airport is the only airport in the world that incorporates these features into its approved modeling process.
- This *2012/2013 EDR* is the fourth and fifth year Exelis data have been used for all aspects of the modeling process. The measured noise and the flight track data all come from the Massport Noise and Operations Management System (NOMS).
- The flight operations data from the NOMS system includes more information with each flight record, such as aircraft registration numbers, wherever possible providing better INM aircraft type selection. This allows for the assignment of the modeled INM aircraft type based on the specific aircraft and engine combination used on each flight at Logan Airport during 2012 and 2013.
- The modeling process includes continued use of U.S. Geological Survey (USGS) digital terrain data. INMv7.0c and INMv7.0d uses the detailed terrain data to evaluate each receptor location at its proper elevation, which enhances the accuracy of the results.
- Inputs to the modeling process include use of automated altitude profile and noise contour generation software. Massport purchased licenses to run two additional software packages, RealProfiles™ and RealContours™.[17] [18]
    - RealContours™ automates the production of noise contours directly from every individual radar trace. Approximately 342,347 traces were collected from the system in 2012 and 298,074 traces retained enough information to be modeled in the RealContours™ system. In 2013, approximately 358,129 traces were collected and 347,216 retained enough information to be modeled in the RealContours™ system. Each radar trace was converted to an INM model track, ensuring that the lateral dispersion of radar tracks was retained in the modeling. The operations on these radar traces were then scaled to account for all of the 354,869 operations in 2012 and 361,339 for all operations in 2013. This method also helps to develop more accurate noise contours by retaining the actual runway used and time of each operation.
    - RealProfiles™ analyzes each radar trace and automatically produces custom aircraft performance profiles using the INM aircraft database. The INM typically uses pre-defined profiles to "fly" each aircraft along the ground track. The custom profiles are designed to follow the actual flight of each aircraft allowing the INM to model each flight at its actual location on the ground and in the sky. For 2012, 276,197 flight tracks (92.7 percent) used these specially designed profiles of which 146,952 (97.4 percent) of the available departure profiles and 129,245 (87.8 percent) of the available arrival profiles were developed from the actual radar data. For 2013, 324,951 flight tracks (93.6 percent)

15 INM Version 7.0c was released in January 2011.
16 INM Version 7.0d was released in May 2013 with a technical update in Sept 2013.
17 RealProfiles™ and RealContours™ are methods to provide more accurate inputs to the INM but do not change or modify the algorithms of the FAA-required INM.
18 The *2004 ESPR* included a comparative analysis of the results of the standard INM modeling approach with RealProfiles™ and RealContours™

used these specially designed profiles of which 171,751 (98.8 percent) of the available departure profiles and 153,200 (88.3 percent) of the available arrival profiles were developed from the actual radar data.

- Accurate altitude modeling by using the aircraft performance profiles developed by RealProfiles™ from the radar data enhances the modeled noise results at each of the monitoring sites.
- This software incorporates the FAA-approved INM as the computational engine for calculating noise, but provides greater detail through the uses of individual flight tracks taken directly from radar systems rather than relying on consolidated, representative flight tracks data.

RealContours™ improves the precision of modeling by:

- Directly converting the radar flight track for every identified aircraft operation to an INM track, rather than assigning all operations to a limited number of prototypical or representative tracks;
- Modeling each operation on the specific runway that it actually used, rather than applying a generalized distribution to broad ranges of aircraft types;
- Selecting the specific airframe and engine combination to model, on an operation-by-operation basis, based on the published composition of the fleets of the specific airlines operating at Logan Airport; and
- Using each aircraft's actual performance and altitude profile to develop inputs to the model, which define the actual arrival, or departure profile.

RealContours™ uses INM to produce computations for each day of radar data and then compiles annual average noise exposure contours and supplemental metrics from each of the 365/366 days of computations. All of these enhancements are examples of Massport's continued commitment to improving the monitoring, reporting, and understanding the noise environment at Logan Airport. The following section of this chapter summarizes the basic operational data used to compute the DNL, CNI, and TA noise metrics reported for 2012 and 2013.

Noise Model Inputs

For this *2012/2013 EDR*, two versions of the FAA's INM are being used (INMv7.0c for 2012 and INM 7.0d for 2013). The FAA's INMv7.0c was released for general use on January 3, 2011, and has been used for the *2010 EDR*, the *2011 ESPR* and for the 2012 DNL contour in this report as the primary analytical tool to assess the noise environment at Logan Airport. A comparison of the enhancements between INMv7.0c and the prior version of INM, INMv7.0b was included in the *2011 ESPR*.

The FAA's INMv7.0d was released for general use on May 23, 2013 with a Software Service Update on September 24, 2013. The latest version has been used for the 2013 DNL contour in this report as the primary analytical tool to assess the noise environment at Logan Airport. Several new air carrier jets were added to the model replacing substitutes used in the prior version of the INM model. The Boeing 787-8, 747-800 and 777-300ER were added along with the Embraer family of aircraft. A comparison of the enhancements between INMv7.0d, and the prior version of INM, INMv7.0c is included in *Appendix H, Noise Abatement*.

The INM requires detailed operational data as inputs for its noise calculations, including numbers of operations per day by aircraft type and by time of day, which runway for each arrival and for each departure, and flight track geometry for each track. These data are summarized in tables that follow or are included in *Appendix H, Noise Abatement.* The following section summarizes the average-day operations for each year, 2012 and 2013, as used in the noise modeling and compares them to the previous year's data.

Fleet Mix

Since 2004, Massport has relied primarily on radar data as the main source of input for noise calculations, since radar data typically are more accurate than the information reported by air carriers. The radar data result in a list of approximately 500 different aircraft types that use Logan Airport during a year, including the wide variety of small corporate jets and propeller aircraft flown by GA users, as well as the large passenger and cargo jets operated by air carriers.

- For 2012, the aircraft types identified by the radar data were matched to the INMv7.0c database, which contains individual noise and performance profiles for 272 different fixed-wing aircraft types, 157 of which represent civilian aircraft, the balance being military aircraft.[19]
- For 2013, the aircraft types identified by the radar data were matched to the INMv7.0d database, which contains individual noise and performance profiles for 279 different fixed-wing aircraft types, 164 of which represent civilian aircraft, the balance being military aircraft.[20]

For those aircraft recorded in radar data that are not in the INM's database, the radar type is paired with the best available alternative using a standard FAA-approved substitution list. The final list of modeled aircraft, used as an input to the INM, is presented in detail in *Appendix H, Noise Abatement*.

As in previous ESPRs and EDRs, operations by aircraft types have been summarized into several key categories: commercial (passenger and cargo) operations, Stage 2 or Stage 3 jet aircraft, and turboprop and propeller (non-jet) aircraft. Aircraft that meet Stage 4 jet requirements are also broken out from the Stage 3 jet aircraft data for 2012 and 2013. These Stage 4 aircraft are defined as aircraft certified as Stage 4 and all Stage 3 aircraft, which, if recertified, would qualify as Stage 4 aircraft. FAA does not require aircraft to be recertified and there are no plans at this time to restrict Stage 3 operations. In addition, the operations are split into daytime and nighttime periods, where nighttime hours are defined as 10:00 PM to 7:00 AM, consistent with the definition of DNL. Table 6-1 summarizes the numbers of operations by categories of aircraft operating at Logan Airport in 2012 and 2013 and includes similar data for 2011 and prior years back to 2000. Data prior to 2000 are included in *Appendix H, Noise Abatement*.

Commercial Operations

RJs are defined as those aircraft with 90 or less seats, consistent with the categorization in *Chapter 2, Activity Levels*.[21] For years prior to 2010, the RJs in this chapter were classified as aircraft with less than 100 seats. When RJs first started gaining popularity, the aircraft types available were typically 50 seats or less with the traditional air carrier jet being 100 seats and higher. As newer aircraft types have become available, the smaller 35 to 50 seat types have been replaced by 70 to 99-seat types, with the 90 and above seat types flying many of the traditional air carrier routes. The majority of the newer types fall into two categories: the 70 to 75-seat category, which remain categorized as RJs, and the 91 to 99-seat category, which are categorized as air carrier jets.

The percent of RJs in the overall commercial fleet fell three percent between 2011 and 2012 and leveled off at 14 percent for both 2012 and 2013. Air carrier jets increased and offset by the decrease in RJs with all commercial

19 Some of these are military types as well as older Stage 1 and 2 airplanes that no longer operate in the U.S. or do not operate at Logan Airport. There are ordinarily no military aircraft operations at Logan Airport.

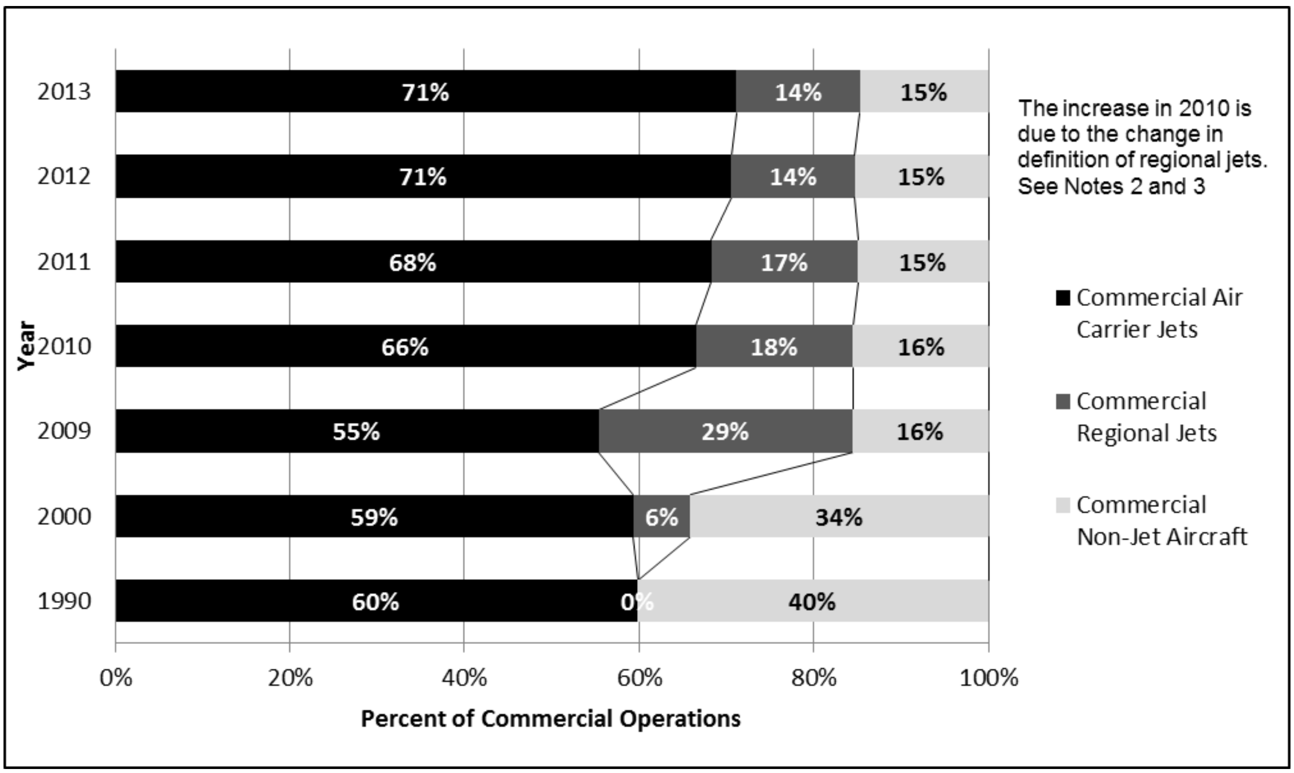
20 Some of these are military types as well as older Stage 1 and 2 airplanes that no longer operate in the U.S. or do not operate at Logan Airport. There are ordinarily no military aircraft operations at Logan Airport.

21 United States Code, 2006 Edition, Supplement 3, Title 49 – Transportation Subtitle VII – Aviation Programs Part A – Air Commerce and Safety, Subpart II, Economic Regulation, Chapter 417 - Operations or Carriers, Subchapter III - Regional Air Service Incentive Program, Sec. 41762 – Definitions – defines regional jet air carrier service to be aircraft with a maximum of 75 seats. Therefore, this report categorizes aircraft with 70-75 seats and below as regional jets and aircraft with 90 seats and higher aircraft as air carrier (Note: there are no types with 75 to 90 seats).

jets increasing to 71 percent overall in 2012 (a 3 percent increase from 2011) and remained at 71 percent in 2013. Non-jet commercial operations remained steady at 15 percent of the overall commercial fleet.

Figure 6-1 presents the commercial operations groups in terms of percent of the total for each year from 2009 through 2013 and including 1990 and 2000 for historical context. Figure 6-1 also shows the decrease in commercial non-jet operations after 2000 (34 percent of the fleet) and the rise of RJs, which were just six percent of the fleet in 2000 and increased to almost 30 percent of the fleet by 2009.

Figure 6-1 Fleet Mix of Commercial Operations (Passenger and Cargo) at Logan Airport



Source: HMMH, 2014.
Notes: Includes both passenger and cargo operations.
After 2009, the split between Air Carrier Jets and RJs is 90 seats with RJs having less than 90 seats.
Prior to 2010, the split between Air Carrier Jets and RJs is 100 seats with RJs having less than 100 seats.
The 2011 Percentage between Air Carrier and RJs was incorrect and has been corrected in this graphic.

Compared to 2011, the 2012 number of average daily operations (Table 6-1) indicates a modest decrease in air carrier activity, with overall commercial traffic decreasing by 4.4 percent in 2012 and then increasing by 3.0 percent in 2013. 2012 reflected a shift of operations away from the smaller RJ aircraft to larger air carrier aircraft on many routes increasing passengers but not operations. The number of RJ operations increased slightly between 2012 and 2013 (an increase of almost four operations per day). Night operations by commercial operators decreased in 2012 compared to 2011 but increased in 2013 compared to 2012 by approximately ten operations per night. The majority of the increase is due to an increase in passenger flights at night as airlines expand destinations and the number of flights per day. Commercial Non-jet operations decreased slightly between 2011 and 2012 (dropped from 140 operations per day to 137 operations per day) and declined slightly to 136 operations per day in 2013.

General Aviation Operations

Modeled GA activity in 2012 remained level compared to 2011, at approximately 77 daily operations; 2013 reflected a decrease in GA operations from 77 operations per day in 2012 to 71 operations per day in 2013 (Table 6-1). Use of Stage 2 GA jets increased in 2012 to 0.3 operations per day and remained at that level in 2013. Data prior to 2000 are included in *Appendix H, Noise Abatement.*

Stage 2, Stage 3, and Stage 4 Jet Aircraft

Jet aircraft currently operating at Logan Airport are categorized by FAA into the three groups: Stage 2, Stage 3, and Stage 4. As described previously, the designation refers to a noise classification specified in FAR Part 36 that sets noise emission standards based on an aircraft's maximum certificated weight. Generally, the heavier the aircraft, the more noise it is permitted to make within the limits set established by FAR Part 36.

The *ANCA of 1990* required operators of Stage 2 airplanes weighing more than 75,000 pounds to transition to Stage 3 aircraft by phasing out the older, noisier airplanes by December 31, 1999. Stage 2 aircraft weighing less than or equal to 75,000 pounds (most of them used in GA or for small commercial activities such as transporting checks between Federal Reserve Banks) are exempt from the phase-out deadline and have continued to fly after December 31, 1999.

Stage 4 aircraft have been added to the airlines' fleets as airlines add new aircraft. The new Stage 4 noise standard applies to any new jet aircraft type designs over 12,500 pounds requiring FAA approval after January 1, 2006. The International Civil Aviation Organization (ICAO) has already adopted a similar regulation for international operators, but neither the FAA nor ICAO have indicated there will be restrictions on the remaining recertificated Stage 3 aircraft from carrier fleets. Because of the noise differences between Stage 2, recertificated Stage 3, Stage 3 aircraft, and aircraft that meet Stage 4 requirements, Massport tracks operations by these categories to follow their trends. Table 6-2 provides the percentage of commercial jet operations by stage since 2009 with 2000 and 1990 reported for historical context. As noted by Table 6-2, almost 96 percent of the commercial jet fleet at Logan Airport met Stage 4 requirements in 2012 and this increased to over 97 percent in 2013.

Table 6-1	Modeled Average Daily Operations by Commercial and General Aviation Aircraft[1]							
		1990[3]	2000[3]	2009[3]	2010[2]	2011[2]	2012	2013
Commercial Aircraft								
Stage 2 Jets[4]	Day	312.40	5.13	0.00	0.01	0.01	0.01	0.01
	Night	19.99	0.26	0.00	0.01	0.00	0.00	0.00
	Total	**332.39**	**5.39**	**0.00**	**0.02**	**0.01**	**0.01**	**0.01**
Stage 3 Jets (All)	Day	288.89	727.09	667.45	674.25	684.19	649.22	667.65
	Night	57.25	103.66	103.05	107.92	109.38	106.55	115.91
	Total	**346.14**	**830.75**	**770.50**	**782.17**	**793.57**	**755.77**	**783.56**
Air Carrier Jets	Day	NA[5]	648.95	422.92	521.64	540.75	530.76	546.27
	Night	NA[5]	99.79	82.21	93.98	96.24	98.68	107.17
	Total	**NA[5]**	**748.74**	**505.14**	**615.62**	**636.99**	**629.44**	**653.44**
Regional Jets	Day	NA[5]	78.14	244.53	152.61	143.44	118.46	121.38
	Night	NA[5]	3.87	20.84	13.94	13.14	7.87	8.74
	Total	**NA[5]**	**82.01**	**265.37**	**166.55**	**156.58**	**126.33**	**130.12**
Non-Jet Aircraft	Day	444.41	409.62	136.43	138.53	135.18	133.92	132.33
	Night	11.72	21.58	5.56	5.21	4.73	3.06	3.21
	Total	**456.13**	**431.20**	**141.99**	**143.74**	**139.91**	**136.98**	**135.54**
Total Commercial	Day	1,045.70	1141.84	803.88	812.78	819.39	783.14	799.99
Operations	Night	88.96	125.51	108.62	113.13	114.11	109.62	119.12
	Total	**1,134.66**	**1267.35**	**912.50**	**925.91**	**933.50**	**892.76**	**919.12**
GA Aircraft								
Stage 2 Jets[4]	Day	NA[6]	7.29	0.09	0.27	0.08	0.25	0.31
	Night	NA[6]	0.64	0.01	0.04	0.00	0.04	0.02
	Total	**NA[6]**	**7.93**	**0.10**	**0.30**	**0.08**	**0.29**	**0.33**
Stage 3 Jets	Day	NA[6]	40.08	22.18	27.80	52.51	52.93	51.21
	Night	NA[6]	3.21	2.33	3.21	5.35	7.20	5.10
	Total	**NA[6]**	**43.29**	**24.51**	**31.01**	**57.87**	**60.13**	**56.31**
Non-Jets	Day	NA[6]	34.57	8.19	8.19	18.18	15.16	13.06
	Night	NA[6]	1.83	0.75	0.72	1.29	1.29	1.15
	Total	**NA[6]**	**36.40**	**8.93**	**8.92**	**19.48**	**16.45**	**14.22**
Total GA	Day	NA[6]	81.94	30.46	36.26	70.78	68.35	64.58
Operations	Night	NA[6]	5.68	3.08	3.97	6.65	8.52	6.28
	Total	**NA[6]**	**87.62**	**33.54**	**40.22**	**77.43**	**76.86**	**70.85**
Total	Day	1045.70	1,223.78	834.33	849.03	890.16	851.49	864.57
	Night	88.96	131.19	111.70	117.10	120.76	118.13	125.40
	Total[3]	**1,134.66**	**1,354.97**	**946.03**	**966.13**	**1,010.92**	**969.61**	**989.97**

Source: Massport's Noise Monitoring System, Revenue Office, HMMH 2014.

Notes:

1 Operations include scheduled and unscheduled operations. Data for years prior to 2009 are available in *Appendix H, Noise Abatement*.

2 After 2010, the split between Air Carrier Jets and RJs is 90 seats with RJs having less than 90 seats.

3 Prior to 2010, the split between Air Carrier Jets and RJs is 100 seats with RJs having less than 100 seats.

4 Stage 2 aircraft are exempt from meeting newer federal Stage 3 noise limits when their certificated maximum gross takeoff weight (MGTOW) is less than or equal to 75,000 pounds.

5 Regional Jets were not tracked separately prior to 1999.

6 Totals prior to 1998 do not include GA operations.

Table 6-2 Percentage of Commercial Jet Operations by Part 36 Stage Category[1]

Year	Stage 4 Requirements[2]	Certificated Stage 3	Recertificated Stage 3[4]	Stage 2 Greater than 75,000 lbs.	Total
1990	N/A	51.1%	0.0%	48.9%	100%
2000	N/A	70.0%	21.0%	9.0%	100%
2009	87.8%[3]	99.1%[3]	0.9%	0.0%	100%
2010	93.2%[3]	98.9%[3]	1.1%[5]	0.0%	100%
2011	95.5%[3]	99.5%[3]	0.5%[5]	0.0%	100%
2012	95.8%[3]	99.9%[3]	0.1%[5]	0.0%	100%
2013	97.4%[3]	100.0%[3]	0.0%[5]	0.0%	100%

Source: Massport's Noise Monitoring System, Revenue Office numbers, HMMH 2014.
Notes:
1 Data for years prior to 2009 are available in *Appendix H, Noise Abatement.*
2 Aircraft that meet Stage 4 requirements are aircraft that are certificated Stage 4 or would qualify if recertificated. Certificated Stage 4 aircraft were not available until 2006 and the level of aircraft that meet Stage 4 requirements has not been determined prior to 2008.
3 All aircraft listed as meeting Stage 4 requirements are also listed as Stage 3 aircraft.
4 Recertificated Stage 3 aircraft are aircraft originally manufactured as a certificated Stage 1 or 2 aircraft under FAR Part 36 that either have been retrofitted with hushkits or have been re-engined to meet Stage 3 requirements.
5 Only one commercial carrier, with more than 100 annual operations, continued to use recertificated Stage 3 aircraft at Logan Airport (Federal Express). A few charter operators also use these aircraft.

Nighttime Operations

Although Stage 2 aircraft over 75,000 pounds have been banned since January 1, 2000, aircraft certificated as Stage 2, which weigh less than 75,000 pounds, have continued to operate in the U.S. The Stage 2 aircraft currently allowed to operate are small corporate jet aircraft that are primarily in the GA fleet. However, FAA has issued a final ruling[22] on a prohibition of these aircraft operations after December 31, 2015. Logan Airport's Noise Rules prohibit Stage 2 aircraft of less than 75,000 pounds from using the Airport between the hours of 11:00 PM and 7:00 AM. Massport's PREFLIGHT™ system[23] alerts Noise Office staff of potential non-compliant flights when they occur. The Noise Office staff review these reports and can investigate the potential non-compliant flights. These violations are usually flight exempt from the Noise Rules such as medical or emergency flights. PREFLIGHT™ software is used to assist in compiling fleet, day/night splits, and runway use information from Massport's Passive Surveillance Radar System (PASSUR) radar data. This data is used as a secondary source to the Exelis Airscene NOMS, which is the Noise Office's primary source of data.

In addition, Massport monitors flights that operate between the broader DNL nighttime periods of 10:00 PM to 7:00 AM, when each modeled flight is penalized 10 dB in calculations of noise exposure. Table 6-3 shows this nighttime activity by different groups of aircraft. Nighttime flights by commercial jet operations decreased by 2.6 percent from 2011 to 2012 but increased by 8.8 percent between 2012 and 2013. Nighttime flights by commercial non-jet operations decreased by 35.3 percent from 2011 to 2012 but increased by 4.8 percent between 2012 and 2013. Nighttime flights by GA operations increased by 28.1 percent from 2011 to 2012 but decreased by 26.3 percent between 2012 and 2013. These changes resulted in an overall decrease in nighttime operations of 2.2 percent in 2012 and an increase of 6.2 percent in 2013. The majority of nighttime operations (between 10:00 PM and 7:00 AM) occurred either before midnight or after 5:00 AM. These nighttime operations represent only 12.2 percent of total operations for 2012 and only 12.7 percent of total operation for 2013 at Logan Airport.

22 FAA Final Rule "Adoption of Statutory Prohibition on the Operation of Jets Weighing 75,000 Pounds or Less that Are Not Stage 3 Noise Compliant", issued July 2, 2013 Federal Register, Volume 78 Issue 127
23 PREFLIGHT is the prior Flight track processing system, which is still operating using PASSUR radar data.

Table 6-3 Modeled Nighttime Operations (10:00 PM to 7:00 AM) at Logan Airport Per Night[1]

	Commercial Jets	Commercial Non-Jets	General Aviation[1]	Total
1990	77.24	11.72	NA	88.96
2000	103.92	21.58	5.68	131.19
2009	103.05	5.56	3.08	111.70
2010	107.93	5.21	3.97	117.10
2011	109.38	4.73	6.65	120.76
2012	106.55	3.06	8.52	118.13
Change (2011 to 2012)	**(2.83)**	**(1.67)**	**1.87**	**(2.63)**
Percent Change	**(2.59%)**	**(35.31%)**	**28.12%**	**(2.18%)**
2013	115.91	3.21	6.28	125.40
Change (2012 to 2013)	**9.36**	**0.15**	**(2.24)**	**7.27**
Percent Change	**8.79%**	**4.79%**	**(26.32%)**	**6.15%**

Source: Massport and Exelis radar data. HMMH, 2014.
Note:
1 Data for years prior to 2000 are available in *Appendix H, Noise Abatement*.

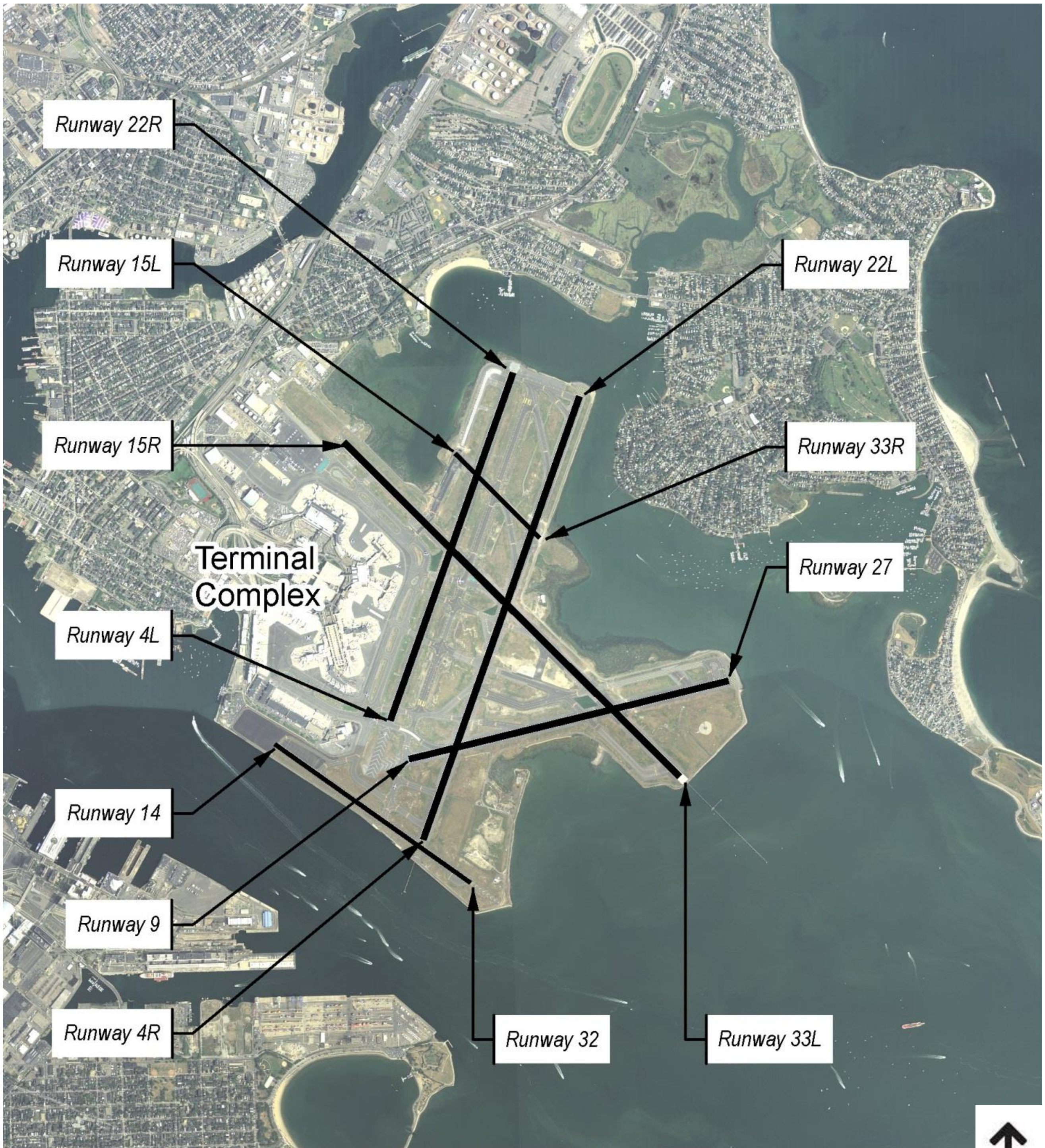
Cargo operations accounted for 7.4 percent of all commercial nighttime operations in 2012 and 7.2 percent in 2013. Nighttime Cargo operations did not decrease from 2012 to 2013 but are a smaller percentage due to the larger increase of passenger nighttime operations. Flights by cargo operators using recertificated Stage 3 aircraft comprised 0.2 percent in 2012 and almost zero percent in 2013 of the commercial nighttime activity compared to the 0.6 percent reported for 2011 and eight percent in the year 2000. Commercial increases at night are due to both increases in cargo and passenger operations.
Though ICAO and the FAA are not expected to require the phase-out of the remaining recertificated operations prevalent among cargo operators, the use of these aircraft will continue to remain at a minimum in the future as these aging aircraft age and are taken out of service.

Runway Use

Logan Airport's runways and taxiways are shown in Figure 6-2. Runway use refers to the frequency of which aircraft utilize each of these runways during the course of the year, as dictated or permitted by availability, wind, weather, aircraft performance, demand, and air traffic control conditions. Runway 15R-33L and Runway 4R-22L are Logan Airport's longest runways; each is just over 10,000 feet in length.

In 2012 and 2013, Runway 15R-33L was the preferred runway to use at night to reduce community noise, with arrivals to Runway 33L and departures from Runway 15R, thus keeping flights over Boston Harbor (these flights do fly over South Shore communities but at relatively high altitudes). During other periods of the day, Runway 22R is used primarily for departures, and Runway 22L is used primarily for arrivals. Runway 9 is used for departures, and Runways 15R, 27, and 33L are used for both arrivals and departures. Runway 14-32 is unidirectional; there are no arrivals to Runway 14 and no departures from Runway 32. Additionally, Runway 14-32 can be used only during northwest wind conditions when winds are 10 knots or greater. Under certain northwest wind conditions, Runway 32 provides the FAA with a second arrival runway, thereby reducing delays at the Airport. Runway 14 is available for departures but is rarely used in that manner. Runway 15L-33R is Logan Airport's shortest runway at under 3,000 feet long. This runway is primarily used for small non-jet aircraft arrivals.

Figure 6-2 Logan Airport Runways



Source: HMMH, Inc. 2011, U.S. Department of Agriculture, National Agriculture Imagery Program (NAIP), 2010.

Runway use conditions in 2012 and 2013 were as follows:

- Combined arrivals to Runways 4L and 4R decreased by 4 percent to 40 percent in 2012 compared to 2011. They continued to decrease by another 5 percent to 35 percent in 2013 compared to 2012. In 2012, departures from Runway 4R remained the same as 2011 at 6 percent, but declined by 1 percent to 5 percent in 2013.
- For 2012 and 2013, arrivals to Runway 22L remained the same as 2011 with departures increasing to 3 percent in 2012 and decreasing to 2 percent in 2013. Runway 22R departures increased by 2 percent to 38 percent in 2012 and decreased by 3 percent to 35 percent in 2013. Runways 22R and 9 remained consistently the most used departure runways at Logan Airport for both years.
- Departures on Runway 27 decreased by 1 percent to 6 percent in 2012 and doubled to 12 percent in 2013. Departures on Runway 9 decreased 2 percent to 34 percent in 2012 and decreased another 4 percent in 2013 to 30 percent. Arrivals to Runway 27 increased from 28 percent in 2011 to 34 percent in 2012 and decreased 2 percent to 32 percent in 2013.
- Since opening in late November 2006, Runway 14-32 has been used primarily for arrivals of RJs and turboprops over Boston Harbor, consistent with FAA operations restrictions based on wind (NW or SE) and speed (greater than 10 knots).
- Runway 15R-33L was closed for three months each during 2011 and 2012 for the construction of the Runway 33L RSA improvements, which resulted in reductions in departures and arrivals on Runway 33L and Runway 15R compared to prior years. The runway was fully operational in 2013, which resulted in an increase in departures and arrivals using Runway 33L compared to 2012. Runway 33L departures increased from 8 percent in 2012 to 12 percent in 2013 with arrivals increasing from 9 percent in 2012 to 15 percent in 2013. Runway 15R departures also increased from 4 percent to 5 percent from 2012 to 2013.

Table 6-4 Summary of Annual Jet Aircraft Runway Use[1]

	Runway									
	4L	4R	9	14[2]	15R	22L	22R	27	32[2]	33L
1990										
Departures	0%	3%	21%	NA	10%	2%	36%	20%	NA	7%
Arrivals	1%	25%	0%	NA	2%	14%	0%	28%	NA	29%
2000										
Departures	0%	8%	35%	NA	4%	3%	30%	15%	NA	6%
Arrivals	4%	40%	0%	NA	1%	7%	0%	28%	NA	20%
2009										
Departures	0%	7%	32%[3]	0%	3%	2%	34%	6%[3]	-	16%
Arrivals	7%	31%	0%[3]	-	3%	17%	0%	30%[3]	1%	11%
2010										
Departures	0%	4%	28%	<1%	8%	2%	31%	10%	-	17%
Arrivals	5%	28%	0%	-	1%	15%	0%	32%	1%	16%
2011										
Departures	0%	6%	36%	<1%	5%[4]	2%	36%	7%	-	7%[4]
Arrivals	7%	37%	0%	-	<1%[4]	16%	0%	28%	1%	11%[4]
2012										
Departures	<1%	6%	34%	<1%	4%[4]	3%	38%	6%	-	8%[4]
Arrivals	6%	34%	0%	-	1%[4]	16%	<1%	34%	<1%	9%[4]
2013										
Departures	<1%	5%	30%	<1%	5%	2%	35%	12%	-	12%
Arrivals	6%	29%	0%	-	1%	16%	<1%	32%	1%	15%

Source: Massport Noise Office and HMMH, 2014.
Notes: These data reflect actual percentages of jet aircraft operations on each runway end. They should not be confused with effective runway use, which is used by the Preferential Runway Advisory System (PRAS) to derive recommendations for use of a particular runway.
Jet aircraft are not able to use Runway 15L or 33R due to its length of only 2,557 feet.
Values may not add to 100 percent due to rounding.
NA = Not Available.
1 Data for years prior to 2000 are available in *Appendix H, Noise Abatement.*
2 Runway 14-32 opened in late November 2006. (Runway 14-32 is unidirectional with no arrivals to Runway 14 and no departures from Runway 32).
3 Runway 9-27 had extended weekend closings for resurfacing during 2009.
4 Runway 15R-33L was closed for 3 months in 2011 and 2012.

Runway use for all aircraft types for 2011, 2012 and 2013 is provided in *Appendix H, Noise Abatement.*

Preferential Runway Advisory System (PRAS)

Developed in 1982 and enhanced in 1990 and subsequent years, the PRAS is a set of short-term and long-term runway use goals that include the use of a computer program that recommends to FAA air traffic controllers, runway configurations that will meet weather and demand requirements and provide an equitable distribution of Logan Airport's noise impacts on surrounding communities. The two primary objectives of the PRAS goals are to distribute noise in on an annual basis, and to provide short-term relief from continuous operations over the same neighborhoods at the ends of the runways.

In February 2004, the FAA upgraded to the Standard Terminal Automation Replacement System (STARS) and Integrated Information Display & Dissemination System version 5 (IDS5)[24] radar during the consolidation of the Boston Terminal Control Center (TRACON) at the new facility in Merrimack, New Hampshire. As a result of this upgrade, a shutdown of the PRAS system computer was necessary. Updated PRAS software was installed in 2007. Technical difficulties related to processing input from the FAA's IDS5 system have continued.

During Phase 2 of the on-going BLANS the Logan Airport Community Advisory Committee (CAC) voted to abandon PRAS because it had not achieved the intended noise abatement.[25] Phase 3 of the BLANS is focusing on the development of an updated Runway Use Program.

For this *2012/2013 EDR*, Massport will continue to present the annual comparison data to the PRAS goals. Under the PRAS, each runway end has a specific annual utilization goal, defined separately for departures and arrivals. The goals are defined in terms of effective usage, which applies a factor of 10 to nighttime (10:00 PM to 7:00 AM) operations, equivalent to increasing nighttime exposure by 10 dB so that a change in effective utilization is roughly proportional to the change in DNL.

Table 6-5 provides a comparison of effective runway use in 2012 and 2013 to that of 2011, and to the PRAS goals. The 2012 and 2013 utilizations shown in bold indicate improvements toward the goals for each runway. The effective jet runway use in 2012 continued to diverge from the PRAS goals, with the three-month runway closure of Runway 15R-33L for the RSA improvements construction. Two of the arrival percentages moved closer to the PRAS goals in 2012 and only one of the departure percentages moved toward the PRAS goals. In 2013, three of the arrival percentages and three of the departure percentages moved toward the PRAS goals.

Table 6-5 Effective Jet Aircraft Runway Use in Comparison to PRAS Goals

Runway End	PRAS Effective Usage Goals		2011 Effective Usage		2012 Effective Usage		2013 Effective Usage	
	Arrivals	Departures	Arrivals	Departures	Arrivals	Departures	Arrivals	Departures
4R/L	21.1%	5.6%	36.0%	**5.5%**	**32.3%**	5.7%	34.6%	4.6%
9	0.0%	13.3%	0.0%	28.8%	0.0%	**28.0%**	0.0%	29.9%
15R	8.4%	23.3%	0.2%	16.1%	**0.8%**	14.7%	**1.0%**	4.9%
22L/R	6.5%	28.0%	26.1%	**32.6%**	26.3%	37.8%	**16.0%**	**36.6%**
27	21.7%	17.9%	19.5%	7.5%	25.5%	6.5%	32.1%	**11.6%**
33L	42.3%	11.9%	17.9%	**9.4%**	15.0%	7.3%	**15.3%**	**12.4%**
14[1]	NA	NA	-	<0.1%	-	<0.1%	-	<0.1%
32[1]	NA	NA	0.3%	-	0.2%	-	0.9%	-

Source: Massport Noise Office and HMMH, 2014.
Notes: PRAS goals are stated in terms of effective jet operations which exclude non-jet flights, but which multiply each nighttime (10:00 PM to 7:00 AM) operation by a factor of 10.
PRAS goals have not yet been established for Runways 14 and 32.
Bold text indicates runways use that is closer to PRAS goals from the prior year.
Runway 14-32 opened in late November 2006. (Runway 14-32 is unidirectional with no arrivals to Runway 14 and no departures from Runway 32).

24 STARS is FAA's replacement radar equipment and software for TRACON and tower facilities. Integrated Information Display & Dissemination System version 5 (IDS5) is an advanced information management toolset designed for air traffic control by Systems Atlanta, which works with the STARS system.
25 BLANS Level 3 Screening Analysis, FAA, December 2012, Page E-2

Flight Tracks

As described in the Methodology section, Massport continued to use the pair of software packages known as RealProfiles™ and RealContours™. *Appendix H, Noise Abatement* provides a summary discussion of RealProfiles™ and RealContours™. The software package RealContours™ is used to develop the INM inputs based on available radar track. Instead of using representative model tracks, RealContours™ converts each radar track to an INM model track and then models the scaled operation on that track.[26] This allows Massport to take into account runway closures and/or temporary or permanent airspace changes which occur during the year.

For this *2012/2013 EDR*, 298,074 flight tracks were modeled to calculate the noise levels surrounding Logan Airport for calendar year 2012 and 347,216 flight tracks were modeled to calculate the noise levels surrounding Logan Airport for calendar year 2013. Figures 6-3 through 6-9 provide a representative sample of flight tracks used with RealContours™ to develop the 2012 and 2013 contours.[27] The figures show arrivals and departures separately for each of three aircraft categories: air carrier jets, RJs, and non-jets. The following figures are from October and November 2012 and October 2013, when the runway use was similar to the 2012 yearly average and 2013 yearly average presented previously. Additional figures, and associated text, at the end of this chapter describe the RNAV[28] SID procedure and the changes that were in effect during 2012 and 2013.

- Figure 6-3 displays air carrier jet departures following the recommended departure routes. The departure procedures reflecting the updated FAA RNAV routes in 2013 are shown in this graphic. The Runway 33L RNAV procedure was first implemented by FAA in 2013, which is evident in the graphic as the 2012 data has a wider dispersion beyond the initial turning point in the procedure. Departures from Runway 22R also follow a more defined turn pattern in 2013, which has shifted the western edge of flight corridor away from South Boston. A memorandum discussing the updated FAA RNAV departure from Runway 22R is provided in *Appendix H, Noise Abatement.*
- Figure 6-4 displays air carrier jet arrivals. This graphic displays the east downwind configuration that the air carrier arrivals utilize to line up on final approach to the runways thus avoiding populated areas to the west of the Airport. The RNAV arrival procedures are very evident in the 2013-modeled data with a narrowing of the flight tracks into concentrated areas. In the fall of 2013, JetBlue Airways began a test of a RNAV visual approach procedure[29] which overlays the standard visual approach to Runway 4L. This procedure would give aircraft with advanced navigational capabilities a more stabilized approach to the visual Runway 4L.
- Figure 6-5 displays the RJ departures following the recommended departure routes with flights remaining north of the Hull peninsula and passing over the Nahant Causeway.

26 This method provides a one to-one correspondence of radar tracks to model tracks and ensures that the lateral and vertical dispersion of aircraft types are consistent with the radar data.

27 Runway use from each month was developed and compared to the annual runway use information. October and November 2012 and October 2013 provided the closest match to annual results.

28 RNAV enables aircraft to fly on any desired flight path within the coverage of ground- or spaced-based navigation aids, or within the limits of the capability of aircraft self-contained systems, or a combination of both capabilities.

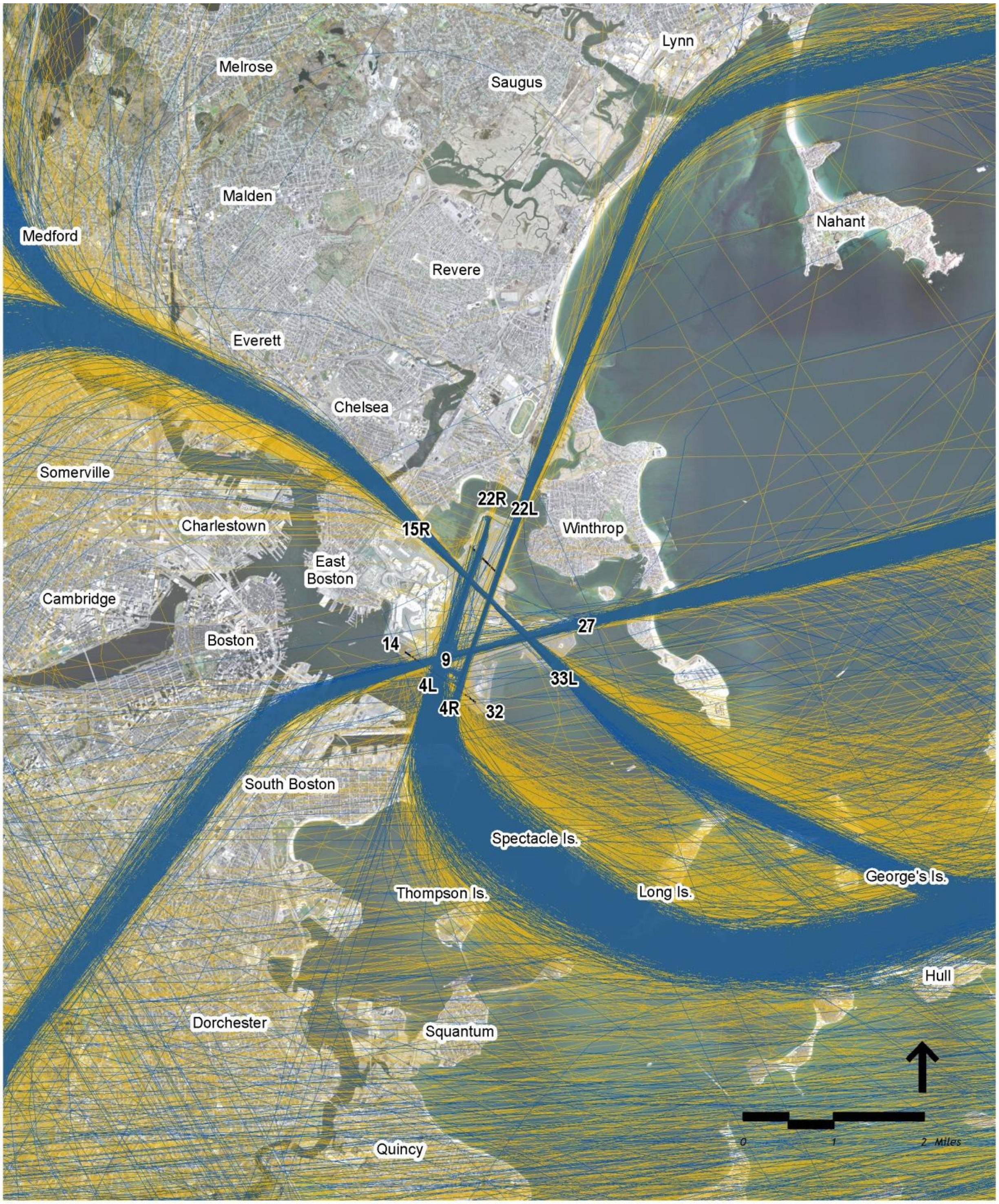
29 Boston-Logan Runway 4 Left Area Navigation RNAV) Visual Flight Procedure Test CATEX, approved 6/26/2013

- Figure 6-6 displays the RJ arrivals that utilize both east and west sides of the Airport for arrivals. Arrivals to Runway 32 are also displayed on this graphic.
- Figure 6-7 displays the non-jet departures that tend to turn early off the runways and do not follow the jet departure routes. Non-jet departures from Runways 4L, 22R, 33L, and 27 are allowed to turn over populated areas whereas the jet aircraft are not. This also keeps the non-jet aircraft out of the jet departure paths allowing for efficient jet departures.
- Figure 6-8 displays the non-jet arrivals and includes the Boston Harbor route for non-jet aircraft arriving to Runway 4L. The graphic also displays the non-jet arrivals to Runways 22R and 33R in addition to the other runways, which also accommodate jets.
- Figure 6-9 displays the night jet arrivals using the Light Visual Approach to Runway 33L during the sample period. This is a procedure developed from the BLANS project, which is available only during visual conditions in which pilots can follow a route offshore to reduce noise impacts. These flights remain offshore and avoid overflying Cohasset and Hull at night. Flights arriving to Runway 33L from the west pass over Saugus and Nahant at a higher altitude and then head south over the Boston Harbor to intersect with the visual approach procedure. In the fall of 2013, JetBlue Airways began a test of a RNAV visual approach procedure[30] which overlays the standard visual approach. This procedure would give aircraft with advanced navigational capabilities a more stabilized approach to the visual Runway 33L.

Meteorological Data

The INM has several settings that reflect aircraft performance profiles and sound propagation based on meteorological data. Meteorological settings include average temperature, barometric pressure, and relative humidity at the Airport. Massport obtained weather data for 2012 and 2013 from the National Climatic Data Center (NCDC). Average daily values for each of the settings were used in the development of the 2012 and 2013 noise conditions. The average conditions for each day allowed the modeling system used by Massport to develop performance profiles based on each day's conditions and allowed the INM model to use each day's conditions to assess the propagation of noise. The use of daily values allows the INM to better model aircraft profiles on days significantly different than the average such as during the winter and summer months.

30 Boston-Logan Runway 33 Left Area Navigation RNAV) Visual Flight Procedure Test CATEX, approved 6/26/2013

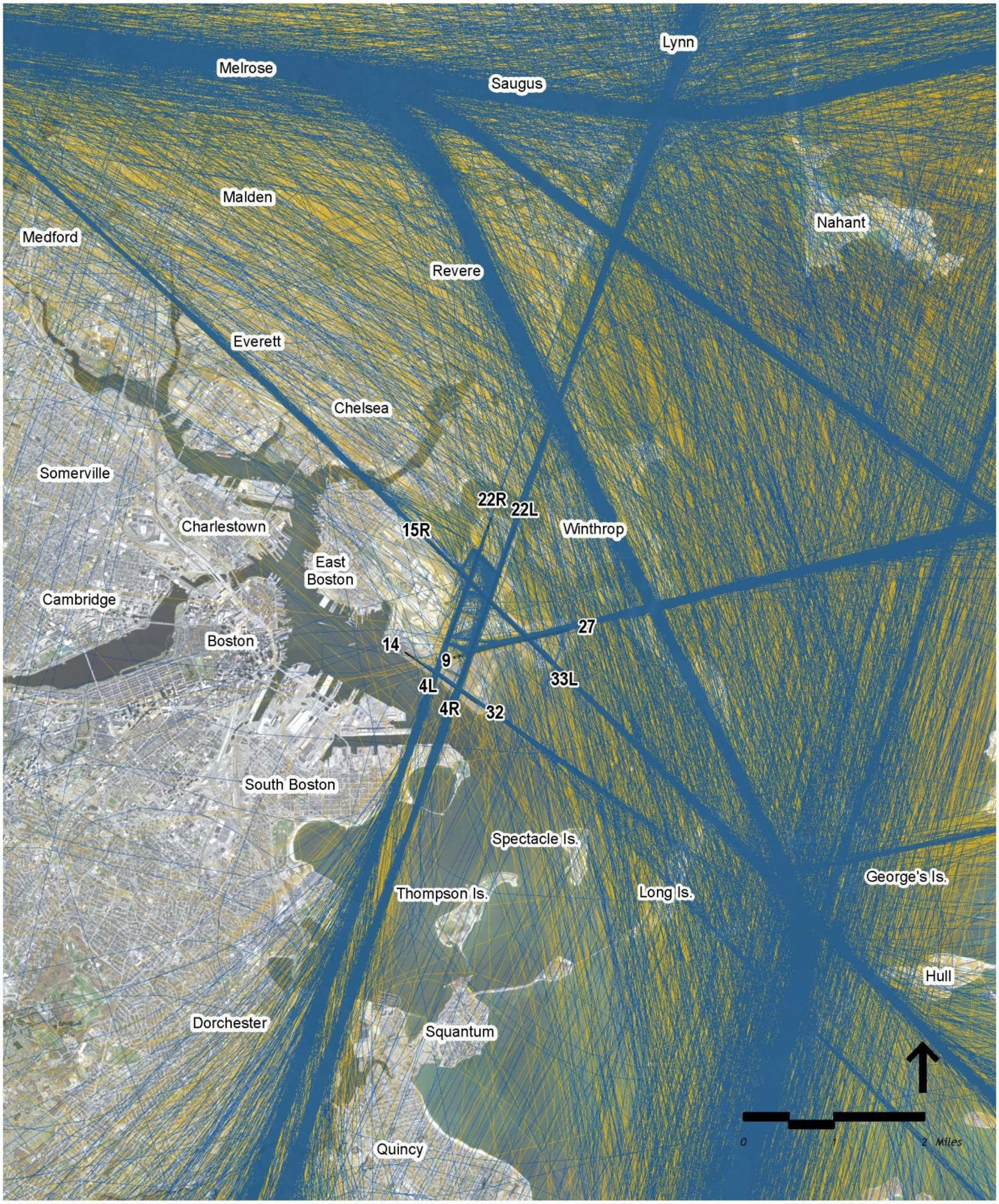


Source: Massport, Exelis NOMS, MassGIS, USDA NAIP 2010.

Departure Flight Tracks (2013)
Departure Flight Tracks (2012)

RealContours™ Air Carrier Jet Departure Tracks (October-November 2012 and October 2013)

Figure 6-3

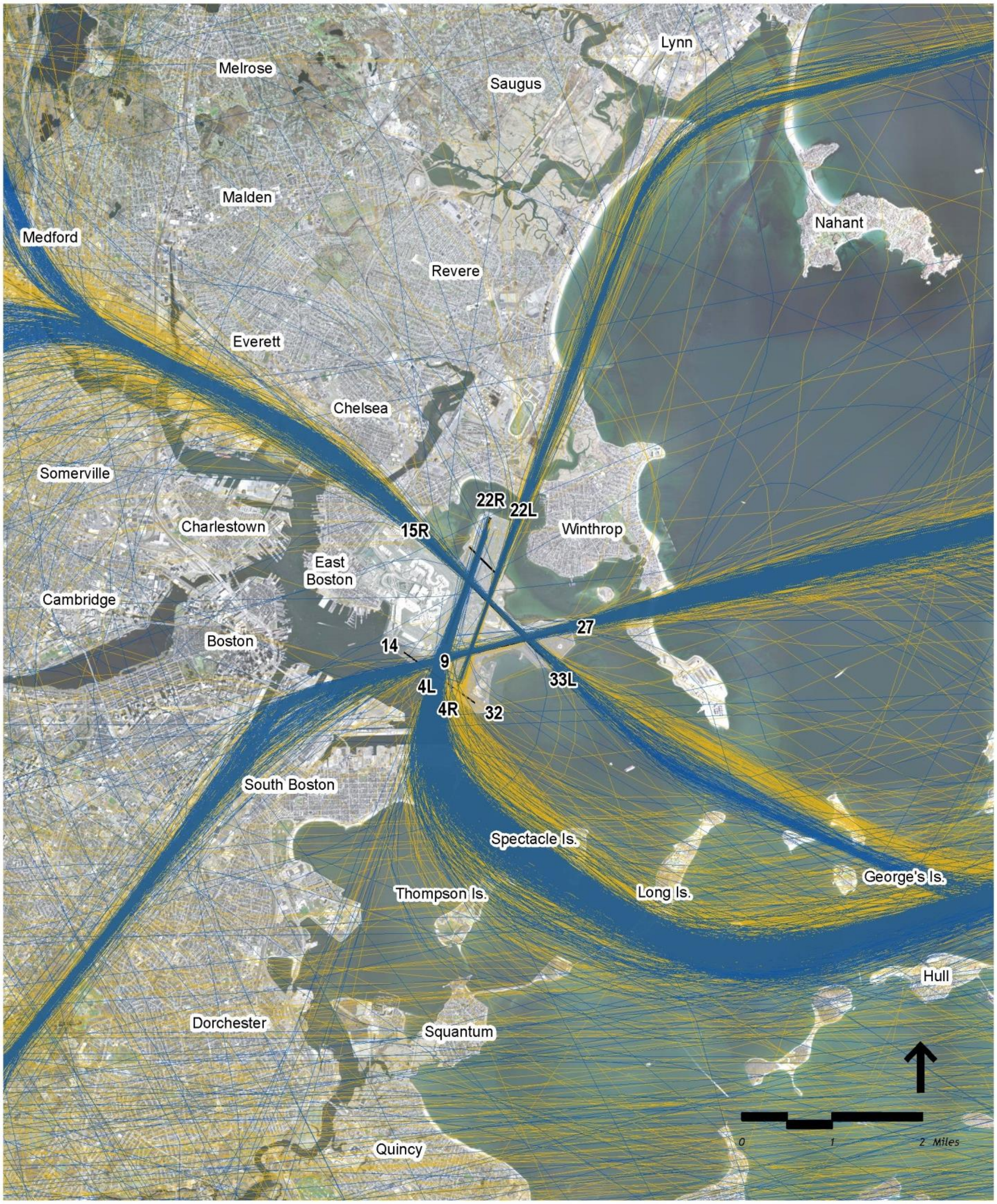


Source: Massport, Exelis NOMS, MassGIS, USDA NAIP 2010.

Arrival Flight Tracks (2013)
Arrival Flight Tracks (2012)

RealContours™ Air Carrier Jet Arrival Tracks (October-November 2012 and October 2013)

Figure 6-4

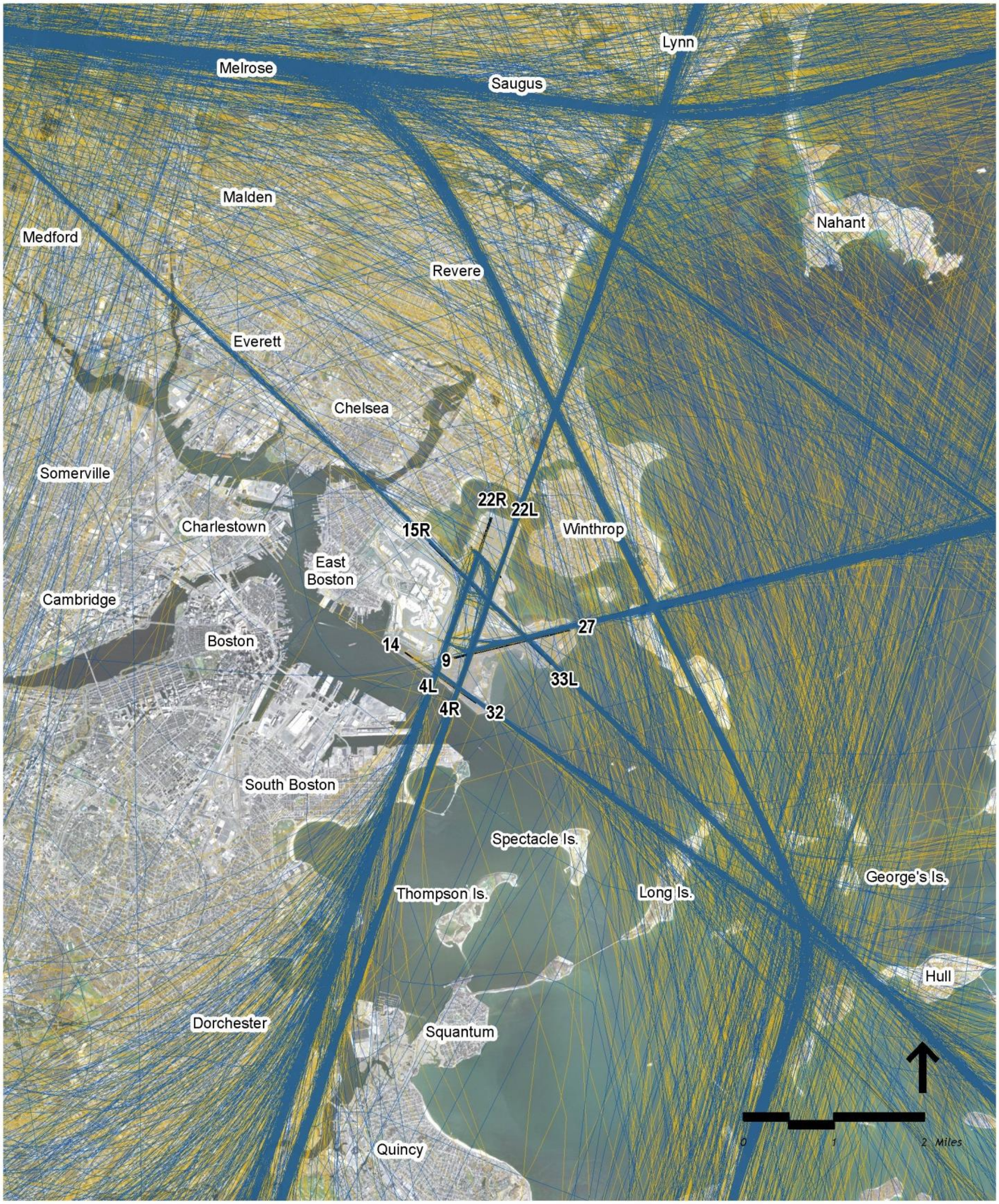


Source: Massport, Exelis NOMS, MassGIS, USDA NAIP 2010.

Departure Flight Tracks (2013)
Departure Flight Tracks (2012)

RealContours™ Regional Jet Departure Tracks (October-November 2012 and October 2013)

Figure 6-5

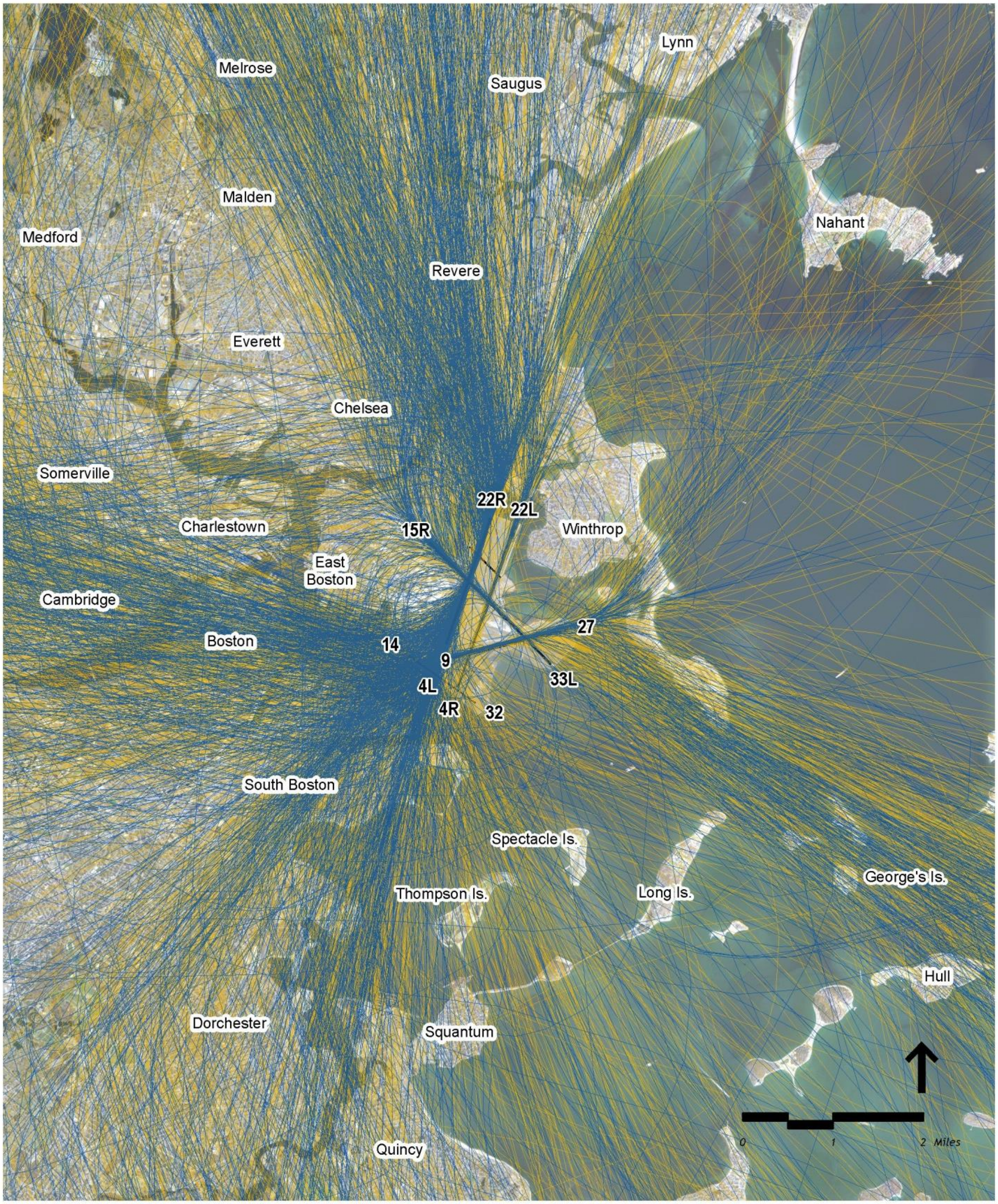


Source: Massport, Exelis NOMS, MassGIS, USDA NAIP 2010.

Arrival Flight Tracks (2013)
Arrival Flight Tracks (2012)

RealContours™ Regional Jet Arrival Tracks (October-November 2012 and October 2013)

Figure 6-6

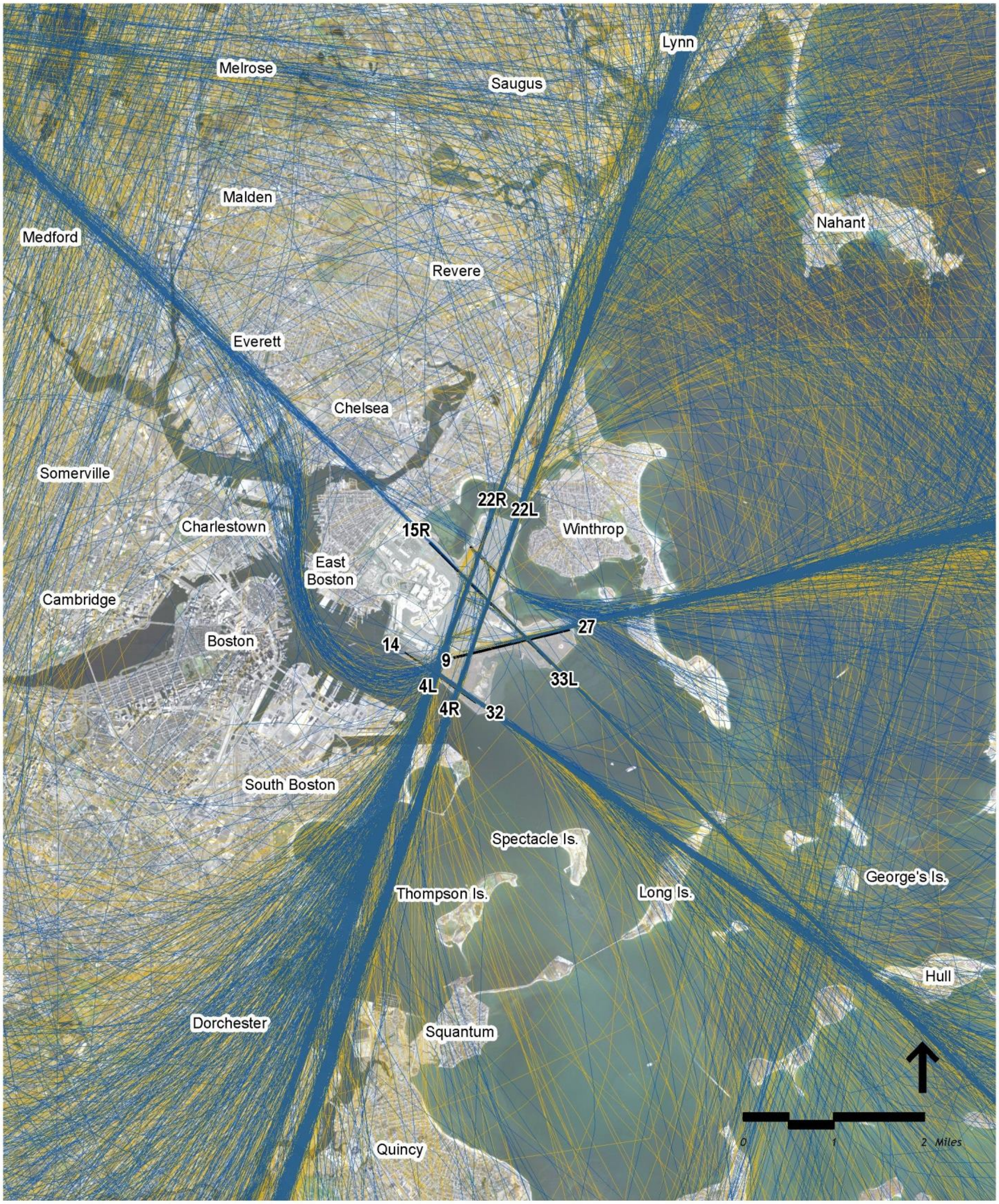


Source: Massport, Exelis NOMS, MassGIS, USDA NAIP 2010.

Departure Flight Tracks (2013)
Departure Flight Tracks (2012)
Note: Non-Jet tracks are non-RNAV

RealContours™ Non-Jet Departure Tracks (October-November 2012 and October 2013)

Figure 6-7

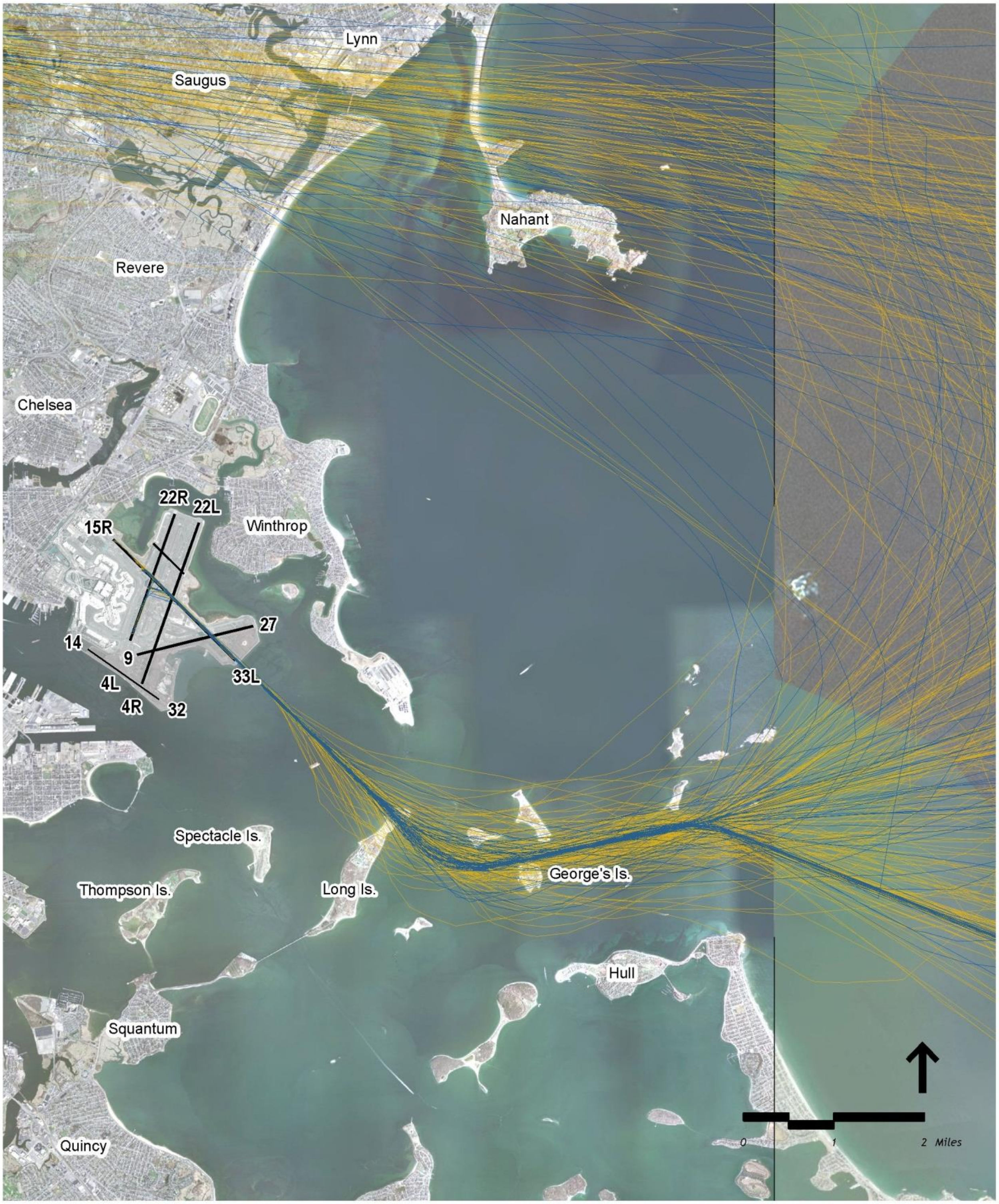


Source: Massport, Exelis NOMS, MassGIS, USDA NAIP 2010.

Arrival Flight Tracks (2013)
Arrival Flight Tracks (2012)
Note: Non-Jet tracks are non-RNAV

RealContours™ Non-Jet Arrival Tracks (October-November 2012 and October 2013)

Figure 6-8



Source: Massport, Exelis NOMS, MassGIS, USDA NAIP 2010.

Arrival Flight Tracks (2013)
Arrival Flight Tracks (2012)

Runway 33L Night (10:00pm – 07:00am) Light Visual Approach Tracks (October-November 2012 and October 2013)

Figure 6-9

Noise Levels

The following sections describe the DNL noise contours developed for this report and make comparisons between prior years and different version of the INM model. The year 2012 results were developed using both versions of the INM (INMv7.0c and INMv7.0d). The year 2013 results were developed only with INMv7.0d. The reasons for producing results using both versions of the INM for 2012 are to allow for comparisons between the two model versions using the same input data and to facilitate a clearer understanding of operational changes and those related to model versions.

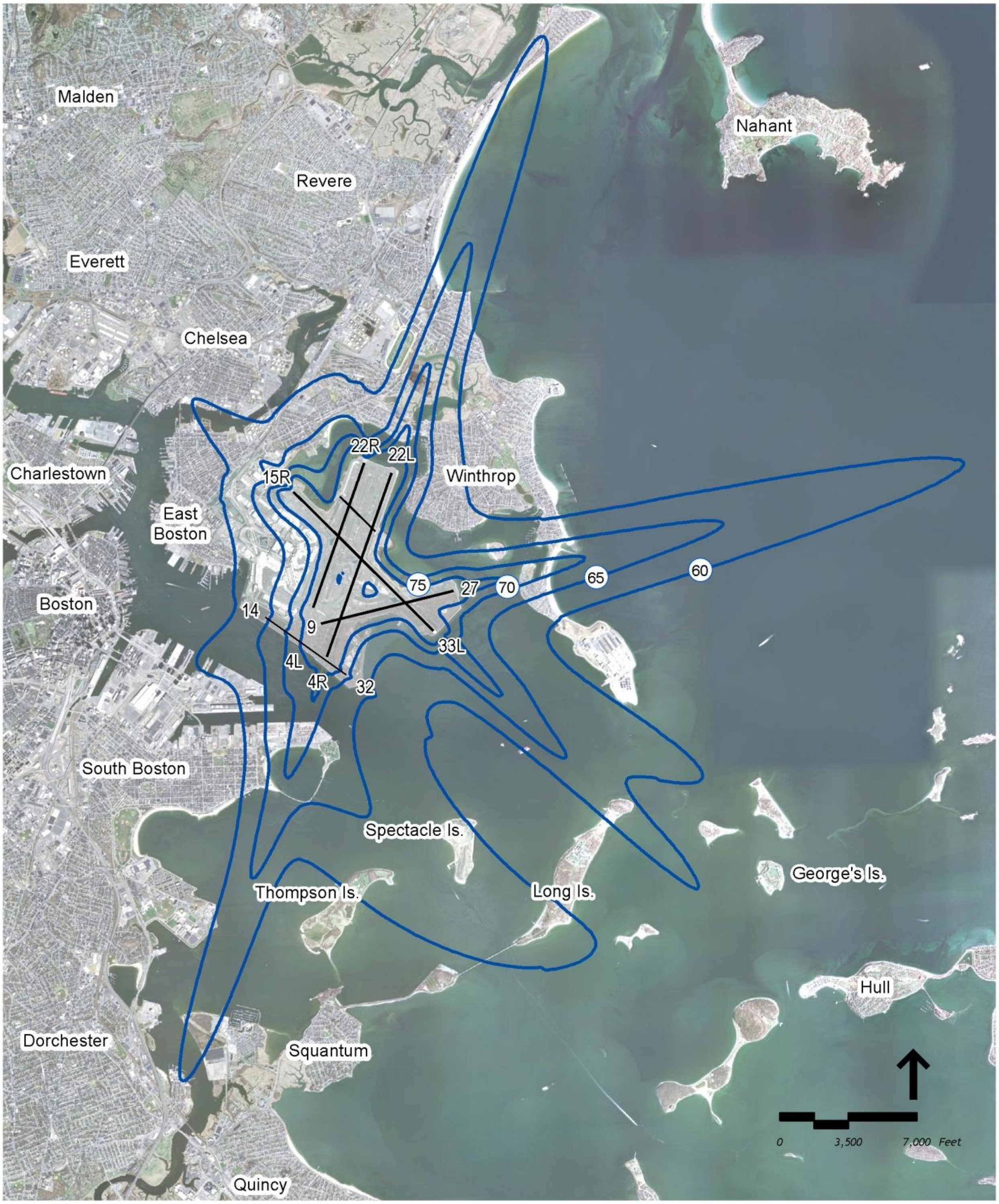
Day-Night Noise Contours for 2012

The 2012 DNL contours were prepared using FAA's then most recently available version of the INM (INMv7.0c) and are shown in Figure 6-10 for DNL values of 60, 65, 70, and 75 dB. Figure 6-11 is a closer view of the Airport and compares the DNL 65 dB contours for 2012 and 2011. Differences between these annual contours are a result of two factors: the operational differences (decreased operations in 2012, changes in fleet mix, and changes in runway use) from one year to the next. Both the 2011 and 2012 contours are modeled using INMv7.0c and continue to include the FAA-approved adjustments for over-water sound propagation and hill effects in Orient Heights, unique to Logan Airport.

In general, the shapes of the 2012 DNL 60 and 65 dB contours differ from the 2011 contours for two primary reasons. First, the crosswind runway, Runway 15R-33L, was closed between June 16, 2012 and October 2, 2012 for construction of the Runway 33L RSA improvements. This closure, which was a longer closure period than in 2011, shifted operations to the other runways, resulting in the DNL contour shrinking toward the Airport in the northwest and expanding slightly to the northeast and southwest. Even though operations decreased from 2011 to 2012, the reduced use of Runway 15R-33L caused the DNL contours to increase over populated areas. The second reason for changed contours is the implementation of new FAA navigation procedures for Runway 22 departures at the end of 2010 (the new procedure was in place for all of 2011 and 2012) as a result of the BLANS project. With the increase in departures from Runway 22R in 2012, the departures turn east over the water in a more constrained, narrower corridor, resulting in the expansion of the DNL 65 dB contour towards Spectacle Island.

An update to the INM (INMv7.0d) was released in 2013 and was used for the 2013 DNL contours. To evaluate changes due to the model and to make comparisons to 2013, the 2012 DNL contours were also modeled using the new version. The INMv7.0d improvements and how the 2012 DNL contours compare are discussed in *Appendix H, Noise Abatement.* In general, the 2012 INMv7.0d DNL 65 dB contour is slightly smaller in all areas except for the departure lobe over Boston Inner Harbor near Spectacle Island. The new aircraft types added to the model support a large portion of the aircraft in the Logan Airport fleet.

The small reduction of the 2012 DNL contour with INMv7.0d results in a small reduction in noise-exposed population. Results for both versions of the model are provided in Table 6-6. The 2012 DNL 65 dB contour is within populated areas already sound insulated by Massport (refer to the Noise Abatement discussion presented later on in this chapter).

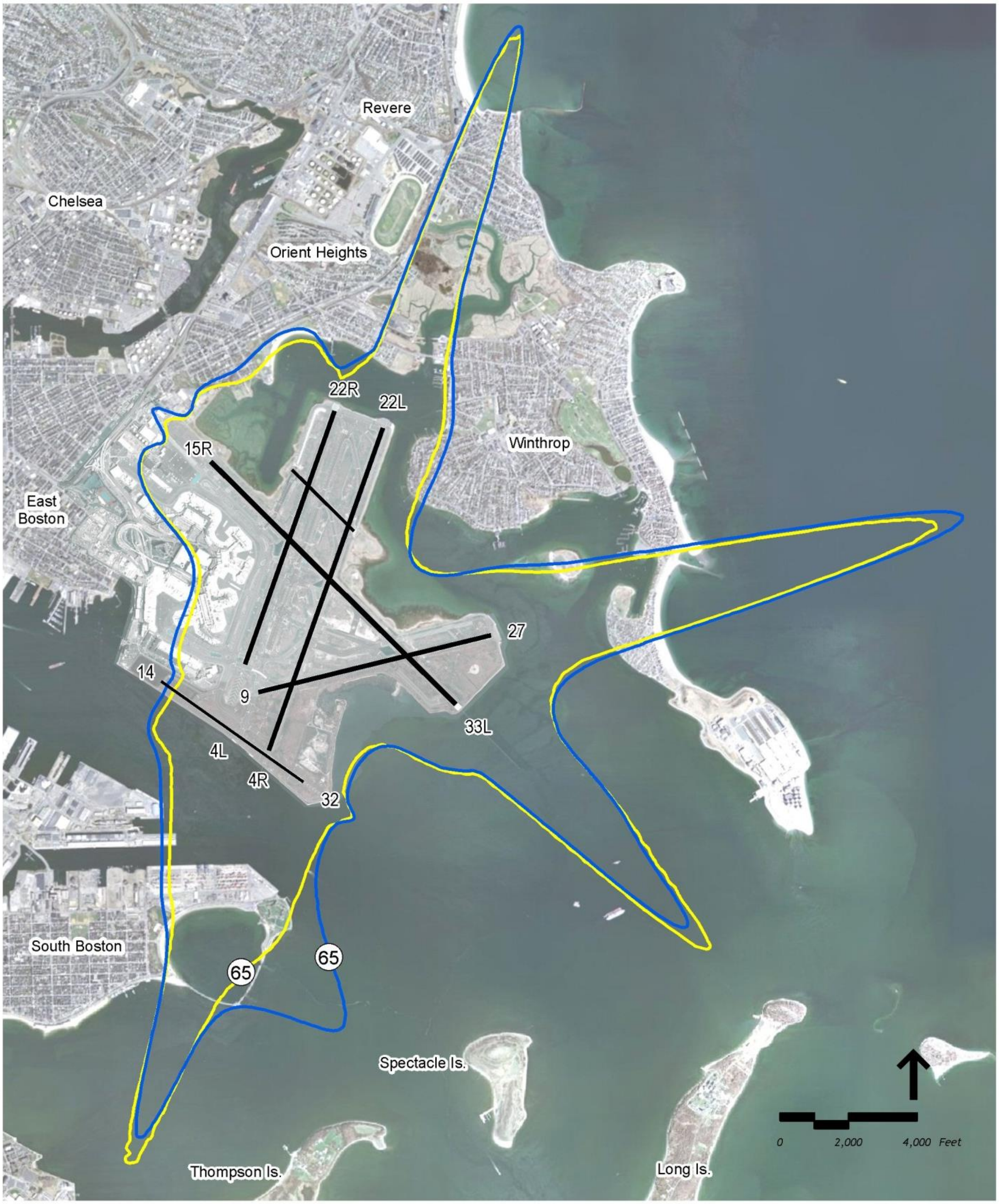


Source: HMMH, MassGIS, USDA NAIP 2010

60-75 DNL Contours for 2012 Operations Using INM 7.0c

Figure 6-10

2012 DNL Contour (INM 7.0c)



Source: HMMH, MassGIS, USDA NAIP 2010

2012 DNL Contour (INM 7.0c)
2011 DNL Contour (INM 7.0c)

Comparison of the DNL 65 dB Contours for 2011 and 2012 Operations Using INM 7.0c

Figure 6-11

Noise Levels in 2013

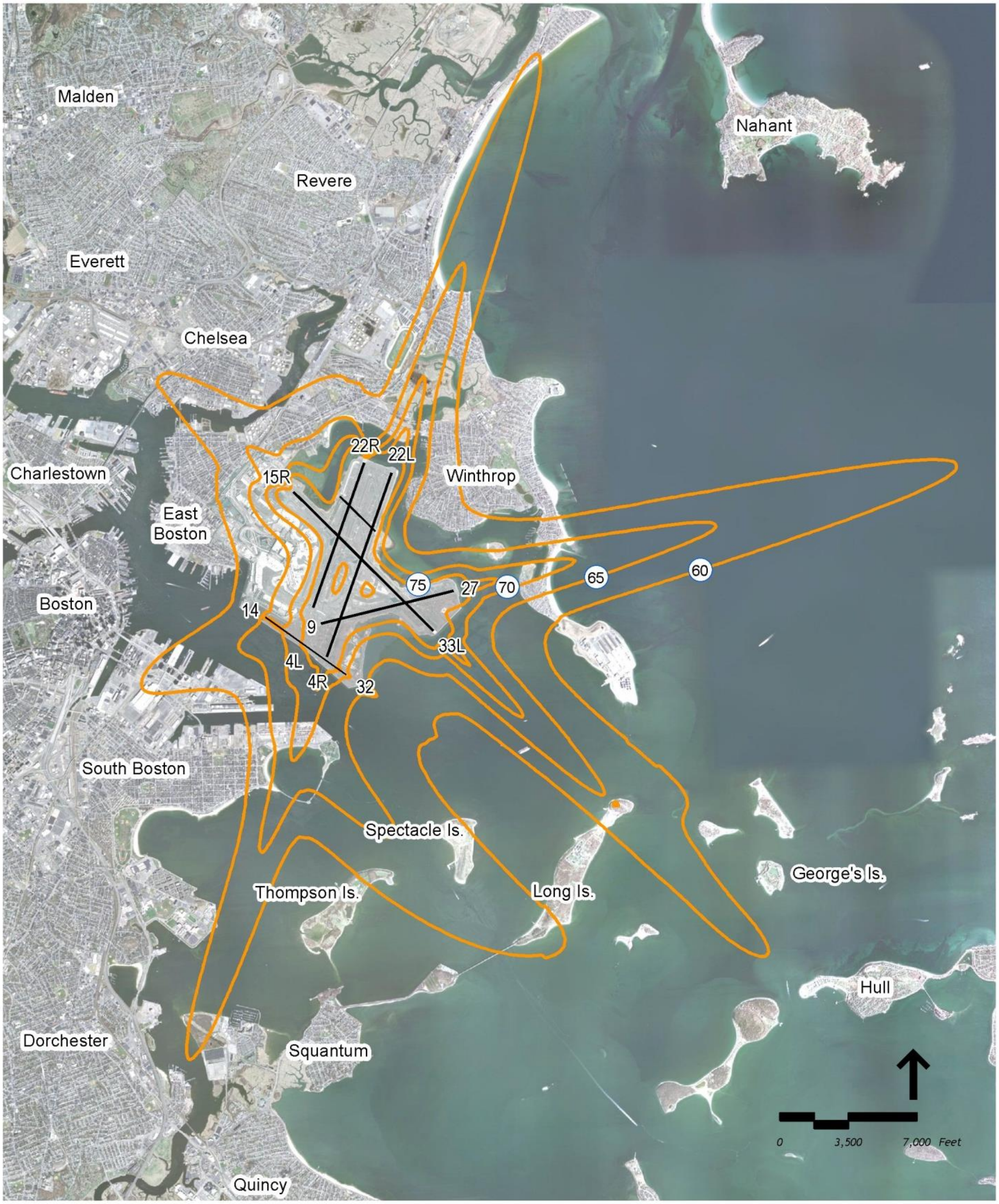
Day-Night Noise Contours for 2013

The 2013 DNL contours were prepared using FAA's most recently available version of the INM (INMv7.0d) and are shown in Figure 6-12 for DNL values of 60, 65, 70, and 75 dB. Figure 6-13 is a closer view of the Airport and compares the DNL 65 dB contours for 2012 and 2013. Differences between these annual contours are a result of several factors: the operational differences (increased operations in 2013, increased operations at night, and changes in fleet mix) and changes in runway use from one year to the next. Both the 2012 and 2013 contours in Figure 6-13 continue to include the FAA-approved adjustments for over-water sound propagation and hill effects in Orient Heights, unique to Logan Airport.

In general, the shapes of the 2013 DNL 60 and 65 dB contours differ from the 2012 contours for two primary reasons, increased operations and a change in the runway use. Runway 15R-33L being available all year in 2013 was the greatest contributor to the change in the shape of the contour. These changes returned the shape of the annual DNL contour back to pre-33L RSA construction extents. Due to this, the contour increased in East Boston and out over Boston Harbor, and decreased over Revere and Winthrop. Arrivals to Runway 4R and Runway 27 decreased compared to 2012 as arrivals to Runway 33L increased.

The modified FAA RNAV procedure for Runway 22L and 22R departures also reduced noise levels in South Boston and stretched the contour over Boston Inner Harbor out towards Spectacle Island. This is due to increased concentration of the tracks as more aircraft were able to fly the modified procedure. The procedure was modified after Massport identified an increase in overflights of the South Boston community and worked with FAA to modify the procedure. Increased departures from Runway 27 and Runway 33L resulted in slight increases in the DNL contour behind the start of takeoff roll in Winthrop and under the departure path in East Boston and South Boston. What is also evident is that even with the new FAA Runway 33L RNAV procedure being part of the 2013 modeling for more than half of the year, the procedure did not alter the shape of the DNL contours from previous years.

The 2013 DNL 65 dB contour is within populated areas already sound insulated by Massport (refer to the Noise Abatement discussion presented later on in this chapter).



Source: HMMH, MassGIS, USDA NAIP 2010

60-75 DNL Contours for 2013 Operations Using INM 7.0d

Figure 6-12

2013 DNL Contour (INM 7.0d)

Source: HMMH, MassGIS, USDA NAIP 2010

2013 DNL Contour (INM 7.0d)

2012 DNL Contour (INM 7.0c)

Comparison of the DNL 65 dB Contours for 2012 Operations Using INM 7.0c and 2013 Operations Using INM 7.0d

Figure 6-13

Population Impact Assessment

Population counts within selected 5 dB increments of exposure are reported each year to indicate how Logan Airport's noise environment changes over time. Population counts for 2012 and 2013 are shown in Table 6-6 by community and are compared to previous years. The 2010 U.S. Census data, previously reported in the *2010 EDR*, were used to determine population counts. Population counts from 2000 through 2009 are based on U.S. Census data for 2000. *Appendix H, Noise Abatement* presents counts for calendar year 2010 from both sets of Census data. The 2010 Census data include updated population counts and can be used to demonstrate the changes in population in an area over a ten year period.

Both the FAA and the U.S. Department of Housing and Urban Development (HUD) consider DNL exposure levels above 65 dB to be incompatible with residential land use. Table 6-6 compares impacted populations for each year, using the latest INM results. The noise analysis is based upon the most recently FAA-approved INM model (Version v7.0c for 2012 and Version 7.0d for 2013). Table 6-7 provides an additional breakdown of the estimated population in East Boston and South Boston residing within the DNL 65 dB contour.

The 2012 DNL contours were modeled with both versions of the INM to demonstrate changes in the model. There was a small reduction in population within the DNL 65 dB contour between the two 2012 model runs (INMv7.0c and INMv7.0d). The reductions were in Winthrop and Revere, resulting in 167 fewer people exposed to noise levels DNL 65 dB or higher. The INMv7.0d counts for 2012 are presented here to demonstrate how the changes in the noise model affected the population; however, the INMv7.0c counts for 2012 are the official counts for that year.

The differences in affected population between 2011, 2012, and 2013 in Tables 6-6 and 6-7 are due to fleet mix, levels of operations and runway use changes. The differences in the contours are attributed mostly to the difference in runway use due to the closure of Runway 15R-33L for RSA work in 2011 and 2012. Shifts in the flight tracks due to the new RNAV procedures have little effect on the DNL 65 dB contour except for the departure turns from Runway 22L and 22R. These procedures also concentrate the flight tracks over a smaller area, which tends to elongate the contours. The number of people within the DNL 65 dB increased by 789 people overall between 2011 and 2012. The number decreased by 429 people overall between 2012 and 2013. The number of people remaining within the DNL 70 dB contour increased to 200 in 2012 but decreased back down to 130 people in 2013. All of the people within the DNL 70 dB contour are located in Winthrop.

Table 6-6 Noise-exposed Population by Community[1]

		Boston					Revere				
Year	Census	> 75 DNL	70-75 DNL	65[2]-70 DNL	Total (65+)[2] DNL	Year	Census	> 75 DNL	70-75 DNL	65[2]-70 DNL	Total (65+)[2] DNL
1990	**1990**	0	1,778	28,970	30,748	**1990**	**1990**	0	0	4,274	4,274
2000	**2000**	0	234	9,014	9,248	**2000**	**2000**	0	0	2,496	2,496
2009 (7.0b)	**2000**	5	67	937	1,009	**2009 (7.0b)**	**2000**	0	0	2,512	2,512
2010 (7.0b)	**2010**	0	0	689	689	**2010 (7.0b)**	**2010**	0	0	2,413	2,413
2011 (7.0b)	**2010**	0	0	331	331	**2011 (7.0b)**	**2010**	0	0	2,547	2,547
2011 (7.0c)	**2010**	0	0	331	331	**2011 (7.0c)**	**2010**	0	0	2,547	2,547
2012 (7.0c)	**2010**	0	0	439	439	**2012 (7.0c)**	**2010**	0	0	2,772	2,772
2012 (7.0d)	**2010**	0	0	421	421	**2012 (7.0d)**	**2010**	0	0	2,762	2,762
2013 (7.0d)	**2010**	0	0	612	612	**2013 (7.0d)**	**2010**	0	0	2,505	2,505

Table 6-6 Noise-exposed Population by Community[1] (Continued)

Chelsea						Winthrop					
Year	Census	> 75 DNL	70-75 DNL	65[2]-70 DNL	Total (65+)[2] DNL	Year	Census	> 75 DNL	70-75 DNL	65[2]-70 DNL	Total (65+)[2] DNL
1990	1990	0	0	4,813	4,813	1990	1990	676	1,211	2,420	4,307
2000	2000	0	0	0	0	2000	2000	247	1,070	4,684	6,001
2009 (7.0b)	2000	0	0	0	0	2009 (7.0b)	2000	0	171	643	814
2010(7.0b)	2010	0	0	0	0	2010 (7.0b)	2010	0	130	598	728
2011 (7.0b)	2010	0	0	0	0	2011 (7.0b)	2010	0	130	939	1,069
2011 (7.0c)	2010	0	0	0	0	2011 (7.0c)	2010	0	130	939	1,069
2012 (7.0c)	2010	0	0	0	0	2012 (7.0d)	2010	0	200	1,325	1,5256
2012 (7.0d)	2010	0	0	0	0	2012 (7.0d)	2010	0	200	1,186	1,386
2013 (7.0d)	2010	0	0	0	0	2013 (7.0d)	2010	0	130	1,060	1,190
Everett						**All Communities**					
Year	Census	> 75 DNL	70-75 DNL	65[2]-70 DNL	Total (65+)[2] DNL	Year	Census	> 75 DNL	70-75 DNL	65[2]-70 DNL	Total (65+)[2] DNL
1990	1980	0	0	0	0	1990	1980	676	2,989	40,477	44,142
2000	2000	0	0	0	0	2000	2000	247	1,304	16,194	17,745
2009 (7.0b)	2000	0	0	0	0	2009 (7.0b)	2000	5	238	4,092	4,335
2010 (7.0b)	2010	0	0	0	0	2010 (7.0b)	2010	0	130	3,700	3,830
2011 (7.0b)	2010	0	0	0	0	2011 (7.0b)	2010	0	130	3,817	3,947
2011 (7.0c)	2010	0	0	0	0	2011 (7.0c)	2010	0	130	3,817	3,947
2012 (7.0c)	2010	0	0	0	0	2012 (7.0c)	2010	0	200	4,536	4,736
2012 (7.0d)	2010	0	0	0	0	2012 (7.0d)	2010	0	200	4,369	4,569
2013 (7.0d)	2010	0	0	0	0	2013 (7.0d)	2010	0	130	4,177	4,307

Source: HMMH 2014, Massport.
Notes: Population counts for 2009 are based on the 2000 U.S. Census block data and the contours beginning in 2004 from the RealContours™ system
Population counts for 2010 through 2013 are provided for the 2010 U.S. Census block data (as indicated) and the contours are from the RealContours™ system
1 Data for years prior to 2009 are available in *Appendix H, Noise Abatement*. 7.0b, 7.0c, and 7.0d refer to INMv7.0b, INMv7.0c, and INMv7.0d respectively.
2 65 dB DNL is the federally-defined noise criterion used as a guideline to identify when residential land use is considered incompatible with aircraft noise.
3 These values reflect the effect of the FAA-approved terrain adjustment in Orient Heights.

The extended closure of Runway 15R-33L in 2012 compared to 2011 led to a 16 percent increase in the total number of people living within the DNL 65 dB contour from 3,947 to 4,736 in 2012. The year 2012 was modeled with INMv7.0d to quantify changes due to model improvements and these results showed a small decrease in all populated areas. All runways were available in 2013 and as such, the total number of people living within the DNL 65 dB contour decreased from 4,736 in 2012 to 4,307 in 2013. Due to the shift in runway use in 2011 and 2012, East Boston had a decrease in the number of people exposed to noise levels DNL 65 dB or greater compared to prior years and in 2013 with conditions back to normal, the number of people exposed increased to 612. For historical context, noise impacts were greater in 2000 when 8,979 people were exposed to levels DNL 65 dB or greater in East Boston and 269 people in South Boston.

The higher use of Runways 4R for departures and 22L for arrivals in 2012 resulted in 201 more people exposed to DNL 65 dB in Revere. In 2013, reduced use of departures from Runway 4R and a reduction of arrivals to Runway 22L at night resulted in similar reductions over Revere. There was also an increase of 437 people in Winthrop exposed to DNL 65 dB and above due to increased use of Runway 9 for departures in 2012. These levels decreased in 2013 by 335 people due to reductions in Runway 9 departures and Runway 27 arrivals. Winthrop, similar to Boston, has experienced a dramatic reduction in exposed population dropping from 6,001 in 2000 to 1,525 in 2012 (INMv7.0c) and 1,190 in 2013.

Table 6-7 Estimated Population within 65 dB[1] DNL Contour[2]

		Boston							
Year	Census Base	East Boston	South Boston	Total	Chelsea	Revere	Winthrop	Everett	All Communities
1990	**1980**	NA	NA	**30,748**	4,813	4,274	4,307	0	**44,142**
2000	**2000**	8,979	269	**9,248**	0	2,496	6,001	0	**17,745**
2009 (INMv7.0b)	**2000**	1,009	0	**1,009**	0	2,512	814	0	**4,335**
2010 (INMv7.0b)	**2010**	689	0	**689**	0	2,413	728	0	**3,830**
2011 (INMv7.0c)	**2010**	331	0	**331**	0	2,574	1,069	0	**3,947**
2012 (INMv7.0c)	**2010**	439	0	**439**	0	2,772	1,525	0	**4,736**
2012 (INMv7.0d)	**2010**	421	0	**421**	0	2,762	1,386	0	**4,569**
2013 (INMv7.0d)	**2010**	612	0	**612**	0	2,505	1,190	0	**4,307**
Change from 2011 to 2012 (7.0c)		90	0	**90**	0	201	437	0	**789**
Change from 2012 (7.0c) to 2013 (7.0d)		173	0	**173**	0	(267)	(335)	0	**(429)**

Source: HMMH 2014, Massport.
Notes: Population counts for 2009 are based on the 2000 U.S. Census block data and the contours are from the RealContoursTM system
Population counts for 2010 through 2012 are provided for the 2010 U.S. Census block data (as indicated) and the contours are from the RealContoursTM system
Within the DNL 65 dB contour there was difference reduction in the number of people between the two 2011 INM model runs.
1 65 dB DNL is the federally-defined noise criterion used as a guideline to identify where residential land use is considered incompatible with aircraft noise.
2 Data for years prior to 2000 are available in *Appendix H, Noise Abatement.*
3 These values reflect the effect of the FAA-approved terrain adjustment in Orient Heights.

In 2012, altered runway use, primarily due to the RSA construction resulted in the higher number of people exposed in East Boston, Revere, and Winthrop with a net increase in population exposed. In 2013, with the runway use back to pre-construction levels, the number of people exposed in East Boston increased, however the numbers in Revere and Winthrop decreased resulting in a net decrease.

The total population exposed to noise levels between DNL 70 to 75 dB increased in 2012 to 200 people. In 2013, this level reduced to 130 people. Compared to 2000, there has been a significant reduction in the people exposed to the higher noise levels. The number in Boston has dropped from 234 people exposed in 2000 to zero in 2012 and 2013. Revere has remained at zero compared to 2000 with Winthrop having reductions from 1,317 people exposed in 2000 to 200 in 2012 and 130 in 2013.

Comparing Measured and Modeled Noise Levels

When changes in noise exposure are predicted by the INM, it is important to substantiate these modeled findings with actual noise measurements, such as those taken with Massport's permanent noise monitoring system. Massport's system continuously measures the noise levels at each of 30 microphone locations around the Airport and environs, as shown in Figure 6-14. During normal operation, noise monitors at the microphone locations measure noise exposure levels as well as a variety of metrics associated with individual noise events that exceed preset threshold sound levels. Noise monitoring data are transmitted back to Massport's Noise Office, where daily DNL values and other noise metrics are computed for each location and summarized in various reports.

This *2012/2013 EDR* compares the measured annual average DNL values from the monitors to INM-computed values of DNL at each of the specific noise monitor sites to check for reasonableness. Many sites produced small differences between measurements and predictions, particularly as adjustments were incorporated into the modeling process to account for the over-water sound propagation and hill effects. However, results at more distant locations have often produced substantial differences of 10 dB or more, especially at measurement sites where DNL values were often less than 60 dB. For 2012 and 2013, with the Airport's noise measurement equipment and monitoring system and its ability to correlate measured noise events with individual flight tracks, combined with the improvements in the INM database, differences between measured and modeled values have narrowed from the values even more than reported in previous EDRs and ESPRs.[31]

Aircraft altitude is a second factor that contributes to the differences between measured and modeled DNL values (especially at the more-distant noise monitoring sites). Typical noise modeling uses distance from origin to destination to determine the appropriate climb profile for an aircraft; however, many aircraft climb more slowly than the standard profiles would suggest, especially if the pilot must make a turn shortly after takeoff. By modeling the actual climb profile instead of selecting the best fit among a standard set, better measured versus modeled results should be expected. This technique resulted in modeling lower altitudes over many of the farther out monitoring sites, is a better reflection of reality, and further reduced the differences between measured and modeled sound levels at those locations. Finally, latitudes and longitudes of each measurement site were verified by survey and their exact coordinates entered into the INM. These improvements in modeling techniques are now fully integrated into the measured-versus-modeled INM comparisons that follow.

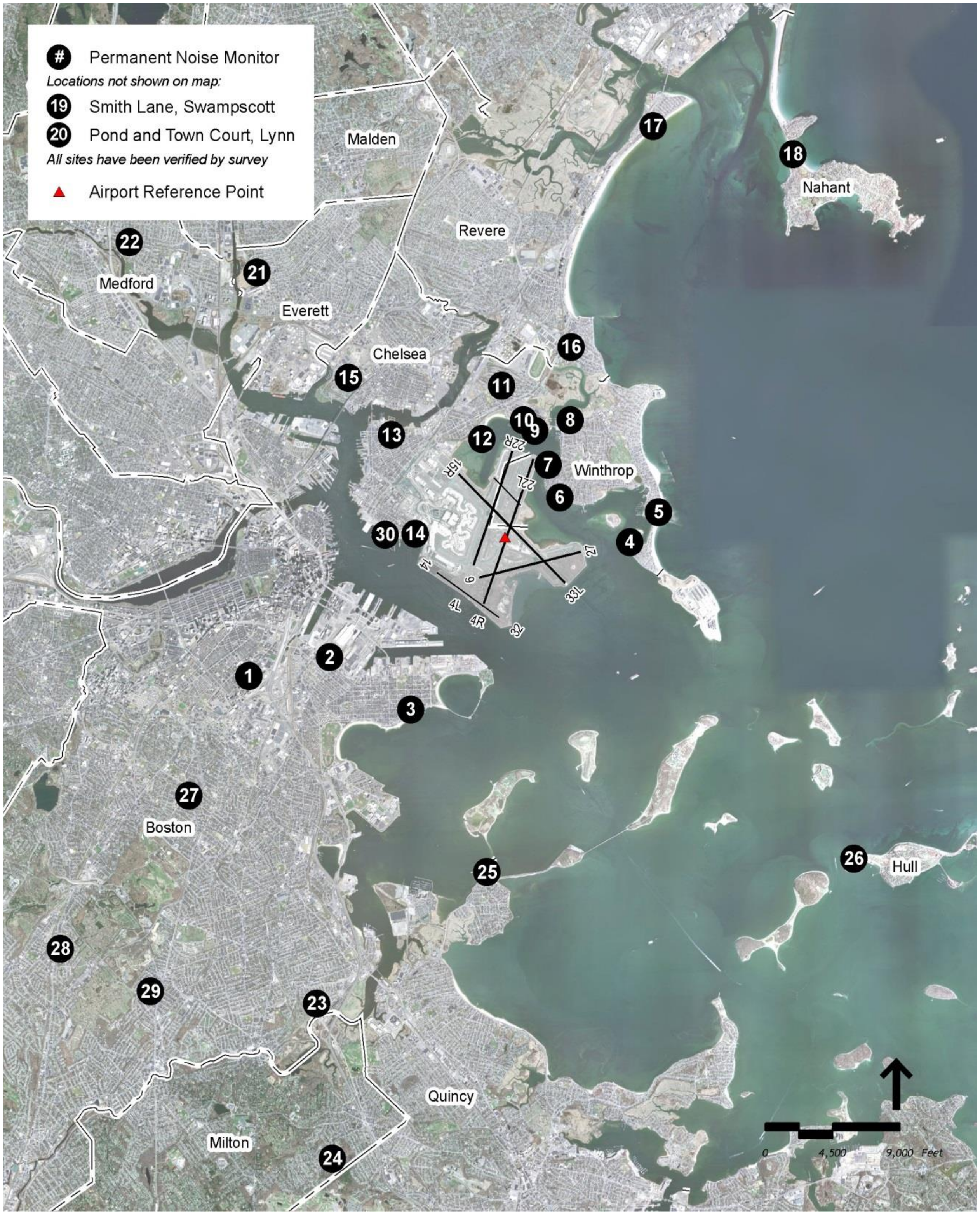
31 Several factors have resulted in better agreement between measured versus modeled levels. Beginning with the *2009 EDR*, flight track data and measurement data have come from the new monitoring system. The more accurate flight track data are used for the modeling inputs and for the measured aircraft event correlation.

Table 6-8 compares the measured 2011 DNL values to the measured 2012 DNL values and measured 2013 DNL values at each location. Measured sound levels generally dropped between 2011 and 2012 and increased between 2012 and 2013. In 2012, 12 locations had decreases of more than 2 dB while two had an increase of more than 2 dB; the remaining 17 locations had changes in levels of less than 2 dB. The average measured value for 28 of the sites was 54.1 dB in 2011 and dropped 0.2 dB to 53.9 dB in 2012 and increased to 54.1 dB in 2013 (Sites 3 and 12 are excluded from the averages due to issues at each site). During 2012 and 2013, Site 3 had issues due to noise interference from an outside source, which was not an issue in 2011. Site 12 was decommissioned in 2010 and will be relocated. To keep the sites used for the averages consistent, Site 3 and 12 were excluded from the computations.

Changes at various sites typically follow changes in runway use. For example, Site 22 in Medford remained at a similar level for 2011 and 2012 (reduced use of Runway 15R-33L due to the RSA project) but increased by 2.3 dB in 2013 due to a return to normal use of the runways. Sites 13, 15, and 21 also had increases due to the same reason. Site 24, in Milton dropped 1.3 dB due to reduced use of Runway 4L for arrivals and Site 23 in Quincy also dropped for the reason. The monitor in Nahant, Site 18, dropped by 3.5 dB from 2011 to 2012 and increased by 3.1 dB from 2012 to 2013. Departures from Runway 4R dropped slightly at night between 2011 and 2012 but overall departures from Runway 4R decreased between 2012 and 2013. Site 18 is also affected by community interference due to its location and these sources may have affected the results.

Distances reported in Table 6-8 and Table 6-9 are computed from the Airport Reference Point which is located along Runway 4L-22R near the intersection with Runway 15R-33L. This location is shown on Figure 6-14.

Figure 6-14 Noise Monitor Locations



Source: HMMH 2010, MassGIS, USDA NAIP 2010.

Table 6-8 Measured Versus Measured - Comparison of Measured DNL Values From 2011 to 2013

Location	Site	Distance from Logan Airport (miles)	2011 Measured Aircraft (DNL)	2012 Measured Aircraft (DNL)	Difference 2012 minus 2011	2013 Measured Aircraft (DNL)	Difference 2013 minus 2012
South End – Andrews Street	1	3.7	51.7	51.7	0.0	54.6	2.9
South Boston – B and Bolton	2	2.9	52.9	51.5	(1.4)	54.1	2.6
South Boston – Day Blvd. near Farragut	3	2.5	62.3	67.8	5.5	69.5	1.7
Winthrop – Bayview and Grandview	4	1.6	71.6	71.8	0.2	71.2	(0.6)
Winthrop – Harborview and Faun Bar	5	1.9	64.0	63.9	(0.1)	63.2	(0.7)
Winthrop – Somerset near Johnson	6	0.8	61.3	61.7	0.4	60.3	(1.4)
Winthrop – Loring Road near Court	7	1.0	65.5	66.4	0.9	64.4	(2.0)
Winthrop – Morton and Amelia	8	1.6	59.8	59.8	0.0	58.1	(1.7)
East Boston – Bayswater near Annavoy	9	1.3	66.6	68.1	1.5	65.6	(2.5)
East Boston – Bayswater near Shawsheen	10	1.3	62.2	62.3	0.1	60.4	(1.9)
East Boston – Selma and Orient	11	1.8	55.7	55.8	0.1	54.5	(1.3)
East Boston Yacht Club	12	1.2					
East Boston High School	13	1.9	58.5	58.5	0.0	59.9	1.4
East Boston – Jeffries Point Yacht Club	14	1.2	53.5	54.5	1.0	54.6	0.1
Chelsea – Admiral's Hill	15	2.8	57.1	56.5	(0.6)	58.3	1.8
Revere – Bradstreet and Sales	16	2.4	68.5	68.3	(0.2)	67.6	(0.7)
Revere – Carey Circle	17	5.3	59.6	59.7	0.1	58.7	(1.0)
Nahant – U.S.C.G. Recreational Facility	18	5.9	42.4	38.9	(3.5)	42.0	3.1
Swampscott – Smith Lane	19	8.7	40.5	41.8	1.3	39.8	(2.0)
Lynn – Pond and Towns Court	20	8.4	54.0	53.1	(0.9)	51.7	(1.4)
Everett – Tremont near Prescott	21	4.5	44.4	46.9	2.5	47.4	0.5
Medford – Magoun near Thatcher	22	6.0	46.6	46.2	(0.4)	48.5	2.3
Dorchester – Myrtlebank near Hilltop	23	6.3	52.6	55.4	2.8	55.0	(0.4)
Milton – Cunningham Park near Fullers	24	8.1	49.4	49.4	0.0	48.1	(1.3)
Quincy – Squaw Rock Park	25	4.2	43.5	37.7	(5.8)	39.7	2.0
Hull – Hull High School near Channel Street	26	6.0	56.1	54.5	(1.6)	56.9	2.4
Roxbury – Boston Latin Academy	27	5.3	50.1	50.0	(0.1)	53.4	3.4
Jamaica Plain – Southbourne Road	28	7.7	41.4	41.3	(0.1)	44.0	2.7
Mattapan – Lewenburg School	29	7.3	37.8	35.6	(2.2)	35.9	0.3
East Boston – Piers Park	30	1.5	47.0	48.5	1.5	47.4	(1.1)
Arithmetic Average			54.1	53.9	(0.2)	54.1	0.2

Source: HMMH.
Notes: Changes in ( ) represent a decrease in measured noise level.
Distance from Logan Airport calculated from the Airport Reference Point.
Site 12 is no longer operational.
Site 3 had interference from an outside source in 2012.
Site 15 had a power source issue (out 1/27/11 – 8/3/11).
Sites 3 and 12 are not included in the Average values.

Table 6-9 compares the measured 2012 and 2013 DNL values at each measurement site to the modeled DNL values.

The average measured value for 28 of the sites is 53.9 dB in 2012 and the average modeled value is 56.4 dB in 2012 (Sites 3 and 12 are excluded from the averages due to issues at each site). The closure of Runway 15R-33L (Runway 15R departures head out over Boston Harbor) increased use of other runways increasing the average value at the measurement sites. The average measured value for 28 of the sites is 54.1 dB in 2013 and the average modeled value is 57.0 dB in 2013. The average of the difference between the measured versus modeled values for 2011 is 2.0 dB, 2.5 dB in 2012, and 2.9 dB in 2013. In general, due to the modeled values being larger than the measured at most of the more distant monitors, the average difference will always be a positive value.

Using RealContours™, Massport is able to compute the modeled DNL for exactly the same periods for which the noise monitoring system was collecting data at each site. It is also able to capture runway use and airspace changes as they occur. The model however, only computes noise from aircraft and while it includes terrain it does not include other factors such as local weather phenomenon and the influence such as shielding from local buildings and trees.

As shown in Table 6-9, 11 of the sites in 2011 have a difference between measured and modeled less than 1 dB. In 2012, this reduced to nine sites and in 2013 reduced to eight sites. The majority of the locations where modeled exceeds measured in 2012 and in 2013, the measured levels are below DNL 60 dB. It is not unusual to experience differences between measured and modeled levels at the locations with lower measured DNL values. The monitor identification of aircraft noise events becomes more difficult, and long distance effects can reduce levels that the model cannot duplicate. Differences at these sites farther from the Airport can easily increase the overall difference between measured and modeled results. Site 19 in Swampscott and Site 29 in Mattapan have larger differences between measured and modeled in 2013 than 2012. Site 13 at the East Boston High School matches well with the modeling and both the modeling and the measured levels reflect an increase which is expected due to the increased traffic on Runway 15R-33L in 2013.

The measured data are not used to calibrate the model but are shown here to compare to the modeled values and in general, they should reveal similar trends. For example, both the measured and the modeled values in East Boston, Chelsea, Hull, and Medford increased due to the return to normal usage of Runway 15R-33L in 2013.

Table 6-9 Measured Versus Modeled - Comparison of Measured DNL Values to RealContours™-modeled DNL Values, 2012 and 2013

Location	Site	Distance from Logan Airport (miles)	2012 Measured Aircraft – Only DNL	2012 Modeled RC Results INMv7.0c (DNL)[1]	2013 Measured Aircraft – Only DNL	2013 Modeled RC Results INMv7.0d (DNL)[2]	2011 Difference Modeled minus Measured	2012 Difference Modeled minus Measured	2013 Difference Modeled minus Measured
South End – Andrews Street	1	3.7	51.7	50.9	54.6	53.8	(0.6)	(0.8)	(0.8)
South Boston – B and Bolton	2	2.9	51.5	54.9	54.1	57.9	2.5	3.4	3.8
South Boston – Day Blvd. near Farragut	3	2.5	67.8	62.0	69.5	60.5	(1.1)	(5.8)	(9.0)
Winthrop – Bayview and Grandview	4	1.6	71.8	73.8	71.2	72.8	1.5	2.0	1.6
Winthrop – Harborview and Faun Bar	5	1.9	63.9	64.8	63.2	64.2	0.3	0.9	1.0
Winthrop – Somerset near Johnson	6	0.8	61.7	62.6	60.3	62.3	0.5	0.9	2.0
Winthrop – Loring Road near Court	7	1.0	66.4	70.3	64.4	68.5	3.7	3.9	4.1
Winthrop – Morton and Amelia	8	1.6	59.8	62.8	58.1	62.6	2.2	3.0	4.5
East Boston – Bayswater near Annavoy	9	1.3	68.1	71.2	65.6	70.7	4.0	3.1	5.1
East Boston – Bayswater near Shawsheen	10	1.3	62.3	63.5	60.4	62.6	0.5	1.2	2.2
East Boston – Selma and Orient[3]	11[3]	1.8	55.8	54.7	54.5	57.3	(1.2)	(1.1)	2.8
East Boston Yacht Club	12	1.2		68.1		68.1			
East Boston High School	13	1.9	58.5	58.6	59.9	60.0	0.9	0.1	0.1
East Boston – Jeffries Point Yacht Club	14	1.2	54.5	55.5	54.6	56.1	1.6	1.0	1.5
Chelsea – Admiral's Hill	15	2.8	56.5	56.9	58.3	58.8	0.3	0.4	0.5
Revere – Bradstreet and Sales	16	2.4	68.3	69.2	67.6	67.6	(0.1)	0.9	0.0
Revere – Carey Circle	17	5.3	59.7	59.9	58.7	59.6	(0.3)	0.2	0.9
Nahant – U.S.C.G. Recreational Facility	18	5.9	38.9	45.4	42.0	44.6	2.6	6.5	2.6
Swampscott – Smith Lane	19	8.7	41.8	46.3	39.8	44.9	5.1	4.5	5.1
Lynn – Pond and Towns Court	20	8.4	53.1	53.8	51.7	53.6	(1.5)	0.7	1.9
Everett – Tremont near Prescott	21	4.5	46.9	50.0	47.4	51.7	4.7	3.1	4.3
Medford – Magoun near Thatcher	22	6.0	46.2	48.4	48.5	50.8	2.4	2.2	2.3
Dorchester – Myrtlebank near Hilltop	23	6.3	55.4	54.2	55	54.2	1.5	(1.2)	(0.8)
Milton – Cunningham Park near Fullers	24	8.1	49.4	54.3	48.1	54.0	4.6	4.9	5.9
Quincy – Squaw Rock Park	25	4.2	37.7	48.6	39.7	47.7	4.2	10.9	8.0
Hull – Hull High School near Channel Street	26	6.0	54.5	56.4	56.9	58.1	(0.4)	1.9	1.2
Roxbury – Boston Latin Academy	27	5.3	50.0	49.8	53.4	52.9	0.1	(0.2)	(0.5)
Jamaica Plain – Southbourne Road	28	7.7	41.3	46.1	44	49.1	5.1	4.8	5.1
Mattapan – Lewenburg School	29	7.3	35.6	44.5	35.9	46.6	7.1	8.9	10.7
East Boston – Piers Park	30	1.5	48.5	52.7	47.4	53.5	5.4	4.2	6.1
Arithmetic Average [4]			53.9	56.4	54.1	57.0	2.0	2.5	2.9

Source: HMMH.
Note: 2011 and 2012 Modeled results were computed for the whole year.
Distance from Logan Airport calculated from the Airport Reference Point.
NA = Not available.

I INMv7.0c with adjusted database. (Database modifications as described in the *Logan Airport 1994/1995 Generic Environmental Impact Report).*
2 INMv7.0d with adjusted database. (Database modifications as described in the *Logan Airport 1994/1995 Generic Environmental Impact Report).*
3 Includes FAA-approved terrain adjustment modifying normal INMv7.0c result for Site 11.
4 Sites 3 and 12 are not included in the average values.

Supplemental Metrics

To further describe the noise environment, this *2012/2013 EDR* includes supplemental noise metrics: CNI, dwell and persistence, and times above a noise threshold.

Cumulative Noise Index (CNI)

Massport reports total annual fleet noise at Logan Airport, as defined in the Logan Airport Noise Rules by a metric referred to as the CNI. The CNI is a single number representing the sum of the entire set of single-event noise energy from each operation experienced at Logan Airport over a full year of operation. The CNI is weighted similarly to DNL so that activity occurring at night is penalized by adding an extra 10 dB to each event. This penalty is equivalent to multiplying the number of nighttime events of each aircraft by a factor of 10.

The Logan Airport Noise Rules define CNI in units of EPNdB[32] and require that the index be computed for the fleet of commercial aircraft operating at Logan Airport throughout the year. In addition, in EDRs and ESPRs, Massport reports partial CNI values of noise at Logan Airport, so that various subsets of the fleet (cargo, night operations, passenger jets, etc.) are identified. Utilizing the expanded data available from the NOMS, all of the available aircraft registration data were used to select the proper noise certification levels from the latest aircraft noise registration database.[33]

The Noise Rules, adopted by Massport following public hearings held in February 1986, established a CNI limit of 156.5 EPNdB. The CNI generally has decreased since 1990, remaining below that cap, and typical changes from one year to the next have been within a few tenths of a dB. The 2012 CNI of 152.2 EPNdB represents a 0.1 dB increase from 2011 and the 2013 CNI of 152.3 EPNdB represents an increase of 0.1 dB from 2012 but both years remained well below the cap of 156.5 EPNdB. The partial CNI decreased in seven categories and increased in nine categories for 2012 when compared to 2011. The partial CNI decreased in five categories and increased 12 categories for 2013 compared to 2012. The CNI has increased slightly each year since 2010 primarily due to increases in commercial operations or night operations.

Partial Cumulative Noise Index Calculations

Partial CNI values were obtained by summing the noise from particular segments of Logan Airport's total operations. They are useful for identifying the greatest contributors to overall noise. As shown in Table 6-10, the sectors of the fleet with the highest numbers of partial CNI indicate a greater contribution to total noise. Table 6-10 also indicates that for 2012:

- Passenger jets increased in 2012 and 2013; however, the increase was less in 2013.
- Cargo jets decreased in 2012 with fewer operations and a quieter fleet and increased in 2013 due to increased operations.
- Nighttime operations continued to contribute more noise than daytime activity, and nighttime flights by air carriers contributed more noise than nighttime cargo operations.
- In 2012, there were two operations by a Stage 2 aircraft flown by a charter operator and in 2013 there were six operations by a Stage 2 aircraft (under 75,000 pounds) resulting in the increase in the Stage 2 values in 2013.

32 EPNdB is the noise metric used to certify aircraft by the FAA.
33 Type-certificate data sheet for noise database available from the European Aviation Safety Agency; //easa.europa.eu/certification/type-certificates/noise.php.

Table 6-10 Cumulative Noise Index (EPNdB)[1]

	Logan Airport CNI Cap – 156.5 EPNdB								
	1990	2000	2009	2010	2011	2012	2013	Change (2011-2012)	Change (2012-2013)
Full CNI (Entire Commercial Jet Fleet)	**156.4**	**154.7**	**152.3**	**151.9**	**152.1**	**152.2**	**152.3**	**0.1**	**0.1**
Total Passenger Jets	155.2	153.6	151.1	150.9	150.6	151.3	151.4	0.7	0.1
Total Cargo Jets	150.1	148.2	145.9	145.1	146.7	144.9	145.1	(1.8)	0.2
Total Daytime	152.5	149.5	147.1	146.8	146.9	147.0	147.0	0.1	0.0
Total Nighttime	154.4	153.1	150.7	150.3	150.6	150.6	150.8	0.0	0.2
Total Stage 2 Jets	NA	124.7	NA	113.6[2]	110.8[2]	104.9[2]	111.3[3]	(5.9)	6.4
Total Stage 3 Jets	NA	154.7	152.3	151.9	152.1	152.2	152.3	0.1	0.1
Daytime Stage 2	NA	122.6	NA	103.6[2]	NA	104.9	101.4	NA	(3.5)
Nighttime Stage 2	NA	120.5	NA	113.1[2]	110.8	NA	110.8	NA	NA
Daytime Stage 3	NA	149.5	147.1	146.8	146.9	147.0	147.0	0.1	0.0
Nighttime Stage 3	NA	153.1	150.7	150.3	150.6	150.6	150.8	0.0	0.2
Passenger Jet Stage 2	NA	124.2	NA	NA	NA	104.9[2]	101.4	NA	(3.5)
Passenger Jet Stage 3	NA	153.6	151.1	150.9	150.6	151.3	151.4	0.7	0.1
Cargo Jet Stage 2	NA	114.8	NA	113.6[2]	110.8[2]	NA	110.8	NA	NA
Cargo Jet Stage 3	NA	148.2	145.9	145.1	146.7	144.9	145.1	(1.8)	0.2
Daytime Passenger	NA	149.3	146.8	146.6	146.5	146.8	146.8	0.3	0.0
Nighttime Passenger	NA	151.6	149.1	149.0	148.5	149.4	149.6	0.9	0.2
Daytime Cargo	137.1	137.5	135.2	134.5	136.6	134.0	133.6	(2.6)	(0.4)
Nighttime Cargo	149.9	147.8	145.5	144.7	146.3	144.5	144.8	(1.8)	0.3
Daytime Passenger Stage 2	NA	122.3	NA	NA	NA	104.9[2]	101.4	NA	(3.5)
Daytime Passenger Stage 3	NA	149.2	146.8	146.6	146.5	146.8	146.8	0.3	0.0
Nighttime Passenger Stage 2	NA	119.8	NA	NA	NA	NA	NA	NA	NA
Nighttime Passenger Stage 3	NA	151.6	149.1	149.0	148.5	149.4	149.6	0.9	0.2
Daytime Cargo Stage 2	NA	111.1	NA	103.6[2]	NA	NA	NA	NA	NA
Daytime Cargo Stage 3	NA	137.5	135.2	134.4	136.6	134.0	133.6	(2.6)	(0.4)
Nighttime Cargo Stage 2	NA	112.3	NA	113.1[2]	110.8[2]	NA	110.8	NA	NA
Nighttime Cargo Stage 3	NA	147.8	145.5	144.7	146.3	144.5	144.8	(1.8)	0.3

Source: HMMH 2014.
Notes: General aviation and non-jet aircraft are not included in the calculation.
NA = Not available.
1 Data for years prior to 2009 are available in *Appendix H, Noise Abatement*.
2 The Stage 2 results are from a Falcon 20 aircraft arrival and departure flown by a Charter Operator during 2012.
3 The Stage 2 results during 2013 are from a GII-B aircraft flown by a Charter Operator and a LEAR 25 flown by a Cargo Operator.

Table 6-11 provides the number of flight operations, the resulting CNI by airline for 2012 and 2013 and the partial CNI per operation for 2011, 2012, and 2013. The table shows the relative contribution of each airline to total CNI and reflects the contributions of individual aircraft noise levels and the frequency with which they occur. The table is sorted by the Partial CNI by operation for 2013 and shows that the major cargo operators all are at the top of this list since they operate primarily at night. JetBlue Airways, with the largest number of operations, has the second highest CNI per airline at 145.5 in 2012 and 145.9 in 2013, but its partial CNI by operation is well below the other major airlines in part due to its use of newer, quieter aircraft. Federal Express has less than one tenth of the operations that JetBlue Airways has but its total CNI per airline is 143.7 in 2012 and 143.8 in 2013, or only less than two below JetBlue Airways. The partial CNI by operation for FedEx is the highest of all of the airlines and this is due to their use of older DC10 and MD11, which are the primary aircraft in their fleet and the fact that half of their operations are at night.

Regional carriers generally contribute the least to the partial CNI per operation whereas the international carriers, which operate larger aircraft and generally have more operations at night, are just below the cargo operators in rank. The relative positions for the domestic carriers are due mainly to their fleet characteristics and number of night operations. United Airlines has similar operations to Delta Air Lines and much less than JetBlue Airways, however, 22.5 percent of its operations are at night as compared to JetBlue Airways, which had only 14.4 percent at night. Delta Air Lines only has 12.7 percent of its operations at night but they fly an older fleet consisting of MD-80s and Boeing 767s.

Table 6-11 Annual Operations and Partial CNI by Airline and per Operation, 2012 and 2013

Airlines with more than 100 flights in 2012	2012 Operations[1]	2012 Total Airline CNI (EPNdB)	2013 Operations[1]	2013 Total Airline CNI (EPNdB)	Partial CNI (EPNdB) per Operation 2011	2012	2013	Airline Category
Federal Express	2,925	143.7	3,049	143.8	109.5	109.0	109.0	Cargo
Atlas Air	N/A	N/A	205	130.9	N/A	N/A	107.8	Cargo
Airborne Express	287	131.6	307	131.7	N/A	107.1	106.9	Cargo
United Parcel Service	1,367	137.1	1,408	137.4	106.03	105.8	106.0	Cargo
Swift Air	24	117.2	110	124.8	N/A	103.5	104.4	Domestic
British Airways	2,149	138.1	2,576	137.3	103.3	104.8	103.2	International
Miami Air	130	121.0	104	122.3	100.6	99.9	102.1	International
Air France	974	134.6	960	131.1	103.3	104.8	101.2	International
TACV-Cabo Verde	234	124.3	214	124.5	102.3	100.7	101.2	International
Lufthansa	1,784	133.1	1,725	132.6	100.5	100.6	100.2	International
SATA International	412	126.5	468	126.4	100.5	100.3	99.7	International
Swiss Air	716	127.3	720	128.0	99.3	98.7	99.5	International
United Airlines	25,660	142.9	25,239	142.8	98.9	98.8	98.8	Domestic
Southwest Airlines	12,784	139.3	15,937	140.6	97.5	98.2	98.6	Domestic
American Airlines	22,879	141.4	22,984	141.7	97.7	97.8	98.1	Domestic
Alitalia	530	124.1	542	125.3	97.1	96.9	97.9	International

Source: HMMH.

Table 6-11 Annual Operations and Partial CNI by Airline and per Operation, 2012 and 2013 (Continued)

Airlines with more than 100 flights in 2012	2012 Operations[1]	2012 Total Airline CNI (EPNdB)	2013 Operations[1]	2013 Total Airline CNI (EPNdB)	Partial CNI (EPNdB) per Operation 2011	2012	2013	Airline Category
Spirit Airlines	3,365	132.7	2,721	132.3	97.4	97.4	97.9	Domestic
Virgin Atlantic	711	126.2	712	126.4	98.4	97.7	97.9	International
Alaska Airlines	1,873	130.7	2,661	132.1	97.6	98.0	97.8	Domestic
Aer Lingus	1,278	128.1	1,513	129.1	97.1	97.0	97.3	International
Delta Air Lines	25813	140.7	24,011	141.0	96.8	96.6	97.2	Domestic
Iberia Air Lines Of Spain	441	123.3	404	123.1	97.0	96.8	97.1	International
Japan Airlines	474	123.6	646	125.1	N/A	96.9	97.0	International
JetBlue Airways	69,100	145.5	79,512	145.9	96.9	97.1	96.9	Domestic
Virgin America	3,897	134.5	3,360	131.9	97.8	98.6	96.7	Domestic
US Airways	36,784	141.0	35,806	141.1	95.8	95.4	95.6	Domestic
Sky Regional Airlines Inc. (Air Canada Express)	N/A	N/A	3,141	129.6	N/A	N/A	94.7	International
Shuttle America Corp	8,178	132.8	12,047	135.4	94.8	93.7	94.5	Regional
Air Canada	4,536	131.7	1,748	126.8	95.3	95.1	94.4	International
Sun Country Airlines	596	121.6	943	124.2	95.1	93.8	94.4	Regional
AirTran Airways	10,883	134.8	7,764	133.3	94.7	94.4	94.4	Domestic
Copa Airlines	N/A	N/A	347	119.0	N/A	N/A	93.6	International
Icelandair	938	122.7	1,120	123.9	93.4	93.0	93.4	International
US Airways Express/Republic	3,345	128.1	3,250	127.5	93.2	92.8	92.4	Regional
SkyWest Airlines	N/A	N/A	469	118.9	N/A	N/A	92.2	Domestic
Pinnacle Airlines	5,178	129.0	5,829	129.7	89.4	91.9	92.0	Regional
AWAC - US Air Express	6,664	129.7	6,440	129.9	91.4	91.4	91.8	Regional
Delta Connection/Atlantic SE	2,823	126.0	4,744	128.3	91.6	91.5	91.6	Domestic
Trans States Airlines	1,016	119.9	181	114.2	90.3	89.8	91.6	Regional
Chautauqua	3,087	126.8	3,387	125.9	90.2	91.9	90.6	Regional
Mesa Airlines	18	105.8	886	119.4	95.3	93.3	90.0	Regional
Air Canada Jazz	5,568	127.3	5,131	126.8	90.2	89.9	89.7	Regional
DHL Airways	220	129.8	N/A	N/A	105.7	106.3	N/A	Cargo
Frontier Airlines	343	119.6	N/A	N/A	97.1	94.2	N/A	Domestic
Delta Connection/Comair	5,824	130.9	N/A	N/A	93.0	93.3	N/A	Domestic
Compass Airlines	574	120.3	N/A	N/A	93.9	92.7	N/A	Regional

Source: Massport. 2014.

Notes: Operations for some carriers differ to those in *Chapter 2, Activity Levels* and *Chapter 7, Air Quality/Emissions Reduction* because this table only includes jet aircraft and not turboprops, and because it includes both scheduled and unscheduled air carriers.
NA = Airline had no operations at Logan Airport.

Dwell and Persistence Reduction Goals

Another supplemental measure of noise impact relates to the length of time noise impacts occur. To provide temporary relief to neighborhoods affected by regular overflights during single or multi-day periods, the PRAS Advisory Committee established two short-term goals for the system in addition to the annual goals:

- Provide relief from excessive dwell. Exceedance is defined as more than seven hours of operations over a given area during any day between the hours of 7:00 AM and midnight.
- Provide relief from excessive persistence. Exceedance is defined as more than 23 hours of operations over an area between 7:00 AM and midnight during a period of three consecutive days.

In contrast to the annual goals that count the number of equivalent operations on a runway, dwell and persistence are measured by the number of hours that a given location or area is subject to jet aircraft overflights. The PRAS Advisory Committee designated eight runway end combinations for computing the effects of dwell and persistence on the communities, as shown in Table 6-12.

Table 6-12 Representative Neighborhoods near Logan Airport Affected by Runway Use

Runway	Representative Affected Neighborhoods
4L and 4R Arrivals	South Boston (Farragut St.), Dorchester, Quincy, Milton, Weymouth, and Braintree
32 and 33L Arrivals	Boston Harbor, Hull, Cohasset, Hingham, Scituate, and other South Shore locations
14 and 15R Departures	Boston Harbor, Hull, Cohasset, Hingham, Scituate, and other South Shore locations
22L and 22R Departures	South Boston (Farragut Street), Boston Harbor, Hull, Cohasset, Hingham, Scituate, and other South Shore locations
27 Departures	South Boston (Fan Pier), Roxbury, Jamaica Plain, South End, West Roxbury, Roslindale, Brookline, Hyde Park, and other points South and West
4L and 4R Departures plus 22L and 22R Arrivals	East Boston (Bayswater, Orient Heights), Winthrop (Court Road), Revere, and Nahant
9 Departures plus 27 Arrivals	Winthrop (Point Shirley), Boston Harbor, and other points North
33 Departures plus 15 Arrivals	East Boston (Eagle Hill), Chelsea, Everett, Medford, Somerville, Arlington, Cambridge, and other points South and West

Source: Massport.

As required by Massport's commitments for the Logan Airside Improvements Planning Project,[34] this *2012/2013 EDR* reports on noise dwell and persistence levels. Higher levels of dwell or persistence for overwater areas represent a benefit since this produces a corresponding decrease in total hours over populated areas. Figures 6-15 and 6-16 illustrate the annual hours of dwell and persistence by runway end for 2009 through 2013. The RSA construction which altered annual runway use during 2011 and 2012 is evident in the figures as those two years are lower in the arrivals to 15R and departures from 33L runway end and higher in most of the remaining runway ends. Use of the runways returned to pre-construction levels in 2013. In 2012 and 2013, the largest contributor to dwell and persistence remained arrivals to Runway 27 and departures from Runway 9; persistence and dwell both increased in 2012 compared to 2011 but then decreased between 2012 and 2013. This was due to the higher use of Runway 27 for arrivals during 2013. Dwell and persistence has decreased for Runway 4L arrivals since its peak in 2011 and areas affected by Runway 4R departures and Runway 22L arrivals increased. Areas affected by departures from Runway 4R and arrivals to 22L have seen

34 Logan Airside Improvements Planning Project Final EIS, Section 4.2.3 PRAS Monitoring and Reporting June 2002.

an increase since 2011 and 2012. In 2013, Areas affected by arrivals to Runway 33L and Runway 32 as well as areas affected by departures from Runway 27 and Runway 33L showed an increase in dwell and persistence.

Figure 6-15 Comparison of Annual Hours of Dwell Exceedance by Runway End, 2009 to 2013

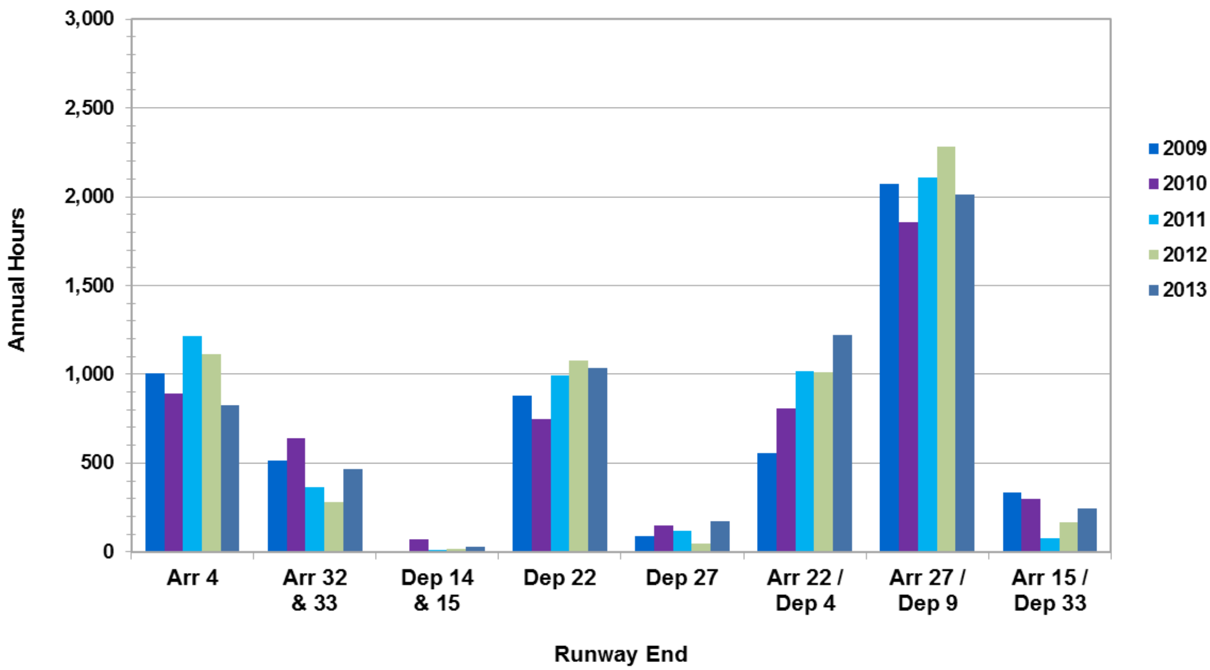
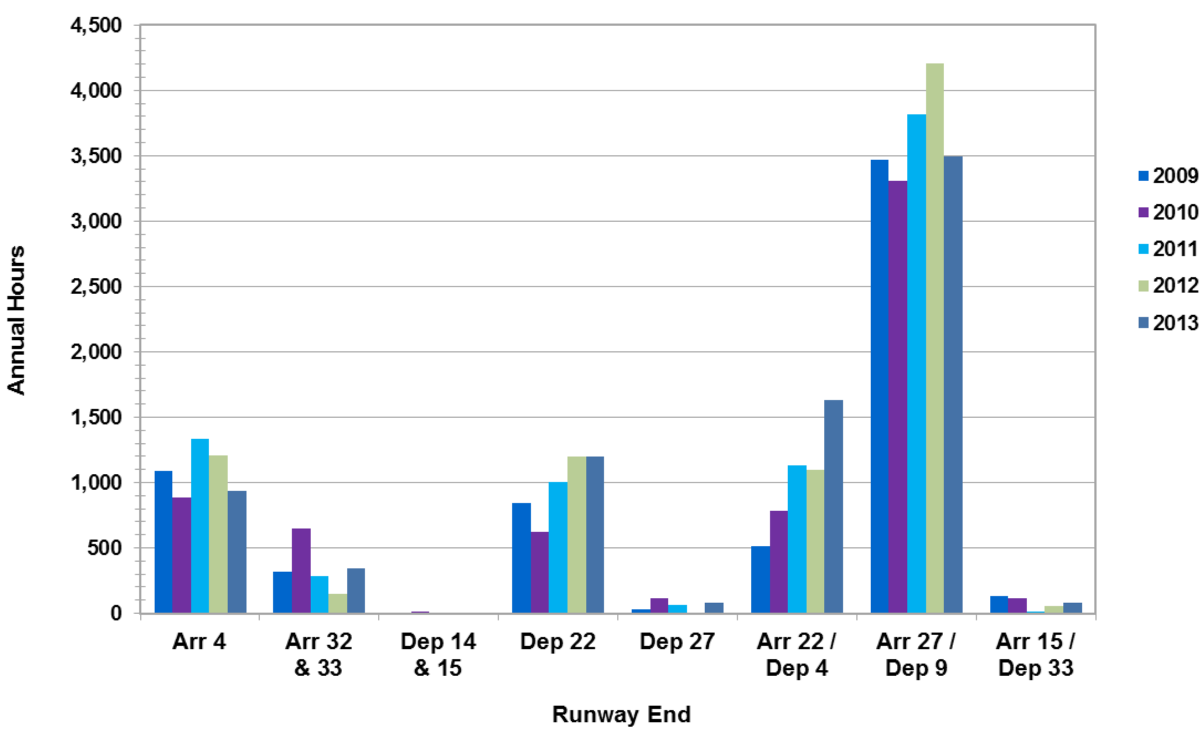


Figure 6-16 Comparison of Annual Hours of Persistence Exceedance by Runway End, 2009 to 2013



Time Above (TA)

The third supplemental noise metric reported in this *2012/2013 EDR* is the amount of time that aircraft noise is above each of three predefined threshold sound levels. The measure is referred to generally as TA, and the threshold sound levels used in the analysis are 65, 75, and 85 dBA (A-weighted dBs). Like DNL values, these times are computed using the FAA-approved INM as modified for Logan Airport. The calculations are made at each of Massport's permanent noise monitoring locations and are based on an average 24-hour day during the year as well as for the average nine-hour nighttime period from 10:00 PM to 7:00 AM. The threshold sound levels of 65, 75, and 85 dBA reflect different degrees of speech interference depending on factors such as whether people are outdoors, indoors with their windows open, or indoors with windows closed. Findings for 2012 and 2013 include:

- The TA results at many of the sites correspond to the change in the contour levels. At Site 2, which is affected by Runway 27 departures, the 24-hour TA65 level decreased from 11.1 minutes in 2011 to 10.2 minutes in 2012 and then increased to 18.1 minutes in 2013. This is consistent with the lower use of Runway 27 during 2011 and 2012 due to the RSA construction and the increase in 2013 with runway use returning to pre-construction levels.
- At Site 13 (East Boston High School), TA values increased from 15.1 minutes in 2011 to 15.7 minutes in 2012 but then increased to 22.7 minutes in 2013 reflecting the full use of Runway 15R-33L in 2013.

Tables 6-13 and 6-14 presents a summary of the calculated TA values for 2012 and 2013.

Table 6-13 Time Above (TA) dBA Thresholds in a 24 Hour Period for Average Day[1]

Location	Site	Distance from Logan Airport (miles)	Minutes above Threshold 2011			Minutes above Threshold 2012			Minutes above Threshold 2013			Modeled Day-Night Sound Levels	
			85 dBA	75 dBA	65 dBA	85 dBA	75 dBA	65 dBA	85 dBA	75 dBA	65 dBA	2012[2]	2013[3]
Winthrop – Bayview and Grandview	4	1.6	12.1	46.9	105.2	14.5	49.0	114.4	13.1	43.5	92.0	73.8	72.8
Winthrop – Harborview and Faun Bar	5	1.9	0.1	12.8	86.8	0.2	16.3	93.9	0.2	14.7	81.8	64.8	64.2
Winthrop – Somerset near Johnson	6	0.8	0.0	0.2	11.8	0.0	3.9	88.5	0.0	3.7	96.4	62.6	62.3
Winthrop – Loring Road near Court	7	1.0	0.3	7.2	48.9	3.3	31.7	150.0	2.5	26.7	154.5	70.3	68.5
Winthrop – Morton and Amelia	8	1.6	0.1	2.6	24.4	0.1	4.6	63.9	0.0	3.7	60.5	62.8	62.6
East Boston – Bayswater near Annavoy	9	1.3	2.1	17.3	48.8	2.6	26.7	73.1	1.7	25.2	74.1	71.2	70.7
East Boston – Bayswater near Shawsheen	10	1.3	0.2	4.1	30.6	0.3	7.7	46.7	0.2	6.2	42.8	63.5	62.6
East Boston – Selma and Orient	11	1.8	0.0	1.0	9.7	0.0	1.0	10.7	0.0	0.9	9.1	54.7	57.3
East Boston Yacht Club	12	1.2	0.1	1.8	49.4	1.0	36.7	150.0	1.0	38.6	171.5	68.1	68.1
East Boston High School	13	1.9	0.1	2.6	15.1	0.1	3.2	15.7	0.1	5.0	22.7	58.6	60.0
East Boston – Jeffries Point Yacht Club	14	1.2	0.0	0.4	6.8	0.0	0.5	8.7	0.0	0.5	10.2	55.5	56.1
East Boston – Piers Park	30	1.5	0.0	0.2	3.1	0.0	0.2	3.8	0.0	0.3	4.6	52.7	53.5
Chelsea – Admiral's Hill	15	2.8	0.1	1.6	12.6	0.1	2.1	13.3	0.1	3.8	20.1	56.9	58.8
Revere – Bradstreet and Sales	16	2.4	2.3	15.7	39.2	2.5	16.1	39.6	1.6	14.2	35.1	69.2	67.6
Revere – Carey Circle	17	5.3	0.0	1.8	28.0	0.0	1.8	28.4	0.0	1.2	26.6	59.9	59.6
Nahant – U.S.C.G. Recreational Facility	18	5.9	0.0	0.0	0.3	0.0	0.0	0.4	0.0	0.0	0.3	45.4	44.6
Everett – Tremont near Prescott	21	4.5	0.0	0.1	3.0	0.0	0.1	3.9	0.0	0.2	7.2	50.0	51.7
Medford – Magoun near Thatcher	22	6.0	0.0	0.1	2.7	0.0	0.1	3.0	0.0	0.1	6.1	48.4	50.8
Swampscott – Smith Lane	19	8.7	0.0	0.0	1.0	0.0	0.0	1.1	0.0	0.0	0.9	46.3	44.9
Lynn - Pond and Towns Court	20	8.4	0.0	0.0	6.5	0.0	0.0	7.7	0.0	0.0	7.6	53.8	53.6
South End – Andrews Street	1	3.7	0.0	0.1	5.3	0.0	0.1	5.4	0.0	0.3	10.9	50.9	53.8
South Boston – B and Bolton	2	2.9	0.0	1.0	11.1	0.0	1.0	10.2	0.0	2.5	18.1	54.9	57.9
South Boston – Day Blvd. near Farragut	3	2.5	0.2	5.4	58.8	0.2	5.9	64.5	0.1	4.1	54.1	62.0	60.5
Roxbury – Boston Latin Academy	27	5.3	0.0	0.1	4.7	0.0	0.1	4.6	0.0	0.2	9.5	49.8	52.9
Jamaica Plain - Southbourne Road	28	7.7	0.0	0.0	1.1	0.0	0.0	1.2	0.0	0.0	3.1	46.1	49.1
Mattapan – Lewenburg School	29	7.3	0.0	0.0	0.7	0.0	0.0	0.7	0.0	0.0	0.7	44.5	46.6
Dorchester – Myrtlebank near Hilltop	23	6.3	0.0	0.0	12.2	0.0	0.0	11.8	0.0	0.0	12.8	54.2	54.2
Milton – Cunningham Park near Fullers	24	8.1	0.0	0.0	14.1	0.0	0.0	14.1	0.0	0.0	13.2	54.3	54.0
Quincy – Squaw Rock Park	25	4.2	0.0	0.0	0.7	0.0	0.0	0.9	0.0	0.0	0.6	48.6	47.7
Hull – Hull High School near Channel Street	26	6.0	0.0	0.1	13.0	0.0	0.1	13.9	0.0	0.3	25.8	56.4	58.1
Average TA Value			0.6	4.1	21.9	0.8	7.0	34.8	0.7	6.5	35.8	64.2	63.4

Source: HMMH 2014.
Notes: Distance from Logan Airport calculated from the Airport Reference Point.
dBA = A-weighted decibel
1 INMv7.0c for all of 2011 and 2012 (12 months) with adjusted database. (Database modifications as described in the Logan Airport *2004 ESPR*).
2 Modeled using RealContoursTM and RealProfilesTM using INM (v7.0c and v7.0d).
3 INMv7.0d for all of 2013 (12 months) with adjusted database. (Database modifications as described in the Logan Airport *2004 ESPR*).

Table 6-14 Time Above (TA) dBA Thresholds in a Nine Hour Night Period for Average Day[1]

Location	Site	Distance from Logan Airport (miles)	Minutes above Threshold During the Night 2011			Minutes above Threshold During the Night 2012			Minutes above Threshold During the Night 2013			Modeled Day-Night Sound Levels	
			85 dBA	75 dBA	65 dBA	75 dBA	65 dBA	65 dBA	85 dBA	75 dBA	65 dBA	2012[2]	2013[3]
Winthrop – Bayview and Grandview	4	1.6	0.9	3.5	8.3	14.5	48.8	104.5	1.2	3.8	8.4	73.8	72.8
Winthrop – Harborview and Faun Bar	5	1.9	0.0	1.1	6.9	0.2	16.2	90.2	0.0	1.4	7.4	64.8	64.2
Winthrop – Somerset near Johnson	6	0.8	0.0	0.0	1.8	0	0.2	13.6	0.0	0.6	13.0	62.6	62.3
Winthrop – Loring Road near Court	7	1.0	0.0	1.0	8.3	0.4	8.5	57.9	0.3	3.1	20.9	70.3	68.5
Winthrop – Morton and Amelia	8	1.6	0.0	0.3	4.8	0.1	3.3	26.7	0.0	0.5	9.3	62.8	62.6
East Boston – Bayswater near Annavoy	9	1.3	0.4	3.8	9.3	2.3	17.9	51.2	0.3	4.5	13.7	71.2	70.7
East Boston – Bayswater near Shawsheen	10	1.3	0.0	0.3	5.3	0.2	4.6	32.6	0.0	0.5	8.5	63.5	62.6
East Boston – Selma and Orient	11	1.8	0.0	0.0	0.6	0	1.0	10.7	0.0	0.0	0.5	54.7	57.3
East Boston Yacht Club	12	1.2	0.0	0.2	6.2	0.1	2.3	58.5	0.2	5.6	25.2	68.1	68.1
East Boston High School	13	1.9	0.0	0.5	2.4	0.1	3.2	15.7	0.0	0.6	2.7	58.6	60.0
East Boston – Jeffries Point Yacht Club	14	1.2	0.0	0.0	0.7	0	0.5	8.7	0.0	0.0	1.2	55.5	56.1
East Boston – Piers Park	30	1.5	0.0	0.0	0.2	0	0.2	3.8	0.0	0.0	0.4	52.7	53.5
Chelsea – Admiral's Hill	15	2.8	0.0	0.3	1.9	0.1	2.1	13.3	0.0	0.5	2.4	56.9	58.8
Revere – Bradstreet and Sales	16	2.4	0.6	3.7	8.7	2.5	16.1	37.3	0.4	3.4	7.9	69.2	67.6
Revere – Carey Circle	17	5.3	0.0	0.4	6.6	0.0	1.8	28.4	0.0	0.2	6.4	59.9	59.6
Nahant – U.S.C.G. Recreational Facility	18	5.9	0.0	0.0	0.0	0.0	0.0	0.4	0.0	0.0	0.0	45.4	44.6
Everett – Tremont near Prescott	21	4.5	0.0	0.0	0.4	0.0	0.1	3.9	0.0	0.0	0.8	50.0	51.7
Medford – Magoun near Thatcher	22	6.0	0.0	0.0	0.4	0.0	0.1	3	0.0	0.0	0.7	48.4	50.8
Swampscott – Smith Lane	19	8.7	0.0	0.0	0.1	0.0	0.0	1.1	0.0	0.0	0.1	46.3	44.9
Lynn - Pond and Towns Court	20	8.4	0.0	0.0	1.8	0.0	0.0	7.7	0.0	0.0	2.2	53.8	53.6
South End – Andrews Street	1	3.7	0.0	0.0	0.7	0.0	0.1	5.4	0.0	0.0	1.7	50.9	53.8
South Boston – B and Bolton	2	2.9	0.0	0.1	1.4	0.0	1.0	10.2	0.0	0.4	2.6	54.9	57.9
South Boston – Day Blvd. near Farragut	3	2.5	0.0	0.3	5.5	0.2	5.8	62.6	0.0	0.2	5.3	62.0	60.5
Roxbury – Boston Latin Academy	27	5.3	0.0	0.0	0.6	0.0	0.1	4.6	0.0	0.0	1.4	49.8	52.9
Jamaica Plain - Southbourne Road	28	7.7	0.0	0.0	0.1	0.0	0.0	1.2	0.0	0.0	0.5	46.1	49.1
Mattapan – Lewenburg School	29	7.3	0.0	0.0	0.0	0.0	0.0	0.7	0.0	0.0	0.0	44.5	46.6
Dorchester – Myrtlebank near Hilltop	23	6.3	0.0	0.0	1.2	0.0	0.0	11.8	0.0	0.0	1.3	54.2	54.2
Milton – Cunningham Park near Fullers	24	8.1	0.0	0.0	1.6	0.0	0.0	14.1	0.0	0.0	1.6	54.3	54.0
Quincy – Squaw Rock Park	25	4.2	0.0	0.0	0.1	0.0	0.0	0.9	0.0	0.0	0.0	48.6	47.7
Hull – Hull High School near Channel Street	26	6.0	0.0	0.0	2.5	0.0	0.1	13.9	0.0	0.1	5.1	56.4	58.1
Average TA Value			0.1	0.5	2.9	0.7	4.5	23.2	0.1	0.9	5.0	64.2	63.4

Source: HMMH 2014.

Notes: Distance from Logan Airport calculated from the Airport Reference Point.

dBA = A-weighted decibel

1 INMv7.0c for all of 2011 and 2012 (12 months) with adjusted database. (Database modifications as described in the *2004 ESPR)*.

2 Modeled using RealContours™ and RealProfiles™ using INM v7.0c.

Noise Abatement

Noise levels at Logan Airport have decreased in recent years due to a decrease in operations and quieter aircraft. Massport's noise abatement program continues to play a critical role in helping to limit and monitor noise impacts. Massport's emphasis on noise abatement has focused on the benefits of better analysis tools and improved modeling techniques to identify the causes of noise problems. Massport also continues to coordinate with the FAA on matters related to runway use and the on-going BLANS project.

Installed in 2008, the upgraded NOMS system includes vastly improved analysis and mapping capabilities, better quality flight tracking data, use of multilateration radar (a separate and unique source of operational data), and direct correlation of noise events with radar flight paths and complaints (a feature that the prior system did not have). This latter capability has improved the ability of the system to differentiate between aircraft and community noise sources. All measured data and complaint information in this report were generated through the new NOMS.

Other continuing elements of Massport's noise mitigation program include:

- The Massport Noise Abatement Office, which was initiated in 1977. The Noise Office also maintains the noise section of the Massport website.[35] The site also provides information on Massport's sound insulation program, the Airport's noise monitoring system, various abatement measures, and other information of interest to the public.
- Preferred runway use designed to optimize Boston Inner harbor operations (especially during nighttime hours).
- One of the most extensive residential and school sound insulation programs in the nation. To date, Massport has installed sound insulation in 5,419 residences, including 11,409 dwelling units, and 36 schools in East Boston, Roxbury, Dorchester, Winthrop, Revere, Chelsea, and South Boston.
- To initiate the process with each new sound insulation grant, Massport's RSIP representatives mail applications to eligible homeowners and often follow up with phone calls to encourage participation. Historically, the percentage of eligible homeowners who respond and whose dwellings are ultimately treated varies significantly by community from a high of nearly 90 percent in Revere to a low of about 50 percent in South Boston. Eighty to 85 percent of homeowners in East Boston and Winthrop typically participate. Approximately eight percent of applicants also choose the Room-of-Preference option that allows the owner to identify a room (usually a bedroom or living room) for extra acoustical treatment.
- The Massport RSIP program is almost complete; if the DNL contour expands into untreated areas Massport would apply to the FAA for funds to sound insulate these areas.
- Development of annual noise contours (Figure 6-11 compares the DNL 65 dB contours for 2011 and 2012. Figure 6-13 compares the DNL 65 dB contours for 2012 and 2013).
- Continued support of a website that features an internet flight tracking system known as PublicVue. (http://www.massport.com/environment/environmental-reporting/noise-abatement/flight-monitor/). The site provides a link to the new PublicVue web portal. The PublicVue site allows the user to view flight tracks in near-real time, replay flight tracks, and enter noise complaints.

35 www.massport.com/environment/environmental_reporting/Noise%20Abatement/overview.aspx

- Summary reports of operations by airline, runway, aircraft type, and other parameters that help the Noise Office track potential changes in the noise environment. Tables 6-11 and 6-14 are examples of these reports.
- Where appropriate, FAA designed RNAV procedures to avoid highly populated areas and the use of an overwater visual approach at night to keep aircraft offshore as much as possible.

Airline Fleet Improvements

Commercial air carrier and cargo operators are deploying the newest engine technology at Logan Airport. Table 6-15 summarizes each airline operator and the percentage of its fleet that were originally manufactured as Stage 3 or Stage 4 aircraft. In 2012 and 2013, the majority of the commercial air carrier and cargo operations are in aircraft, which were originally manufactured as Stage 3 with a small percentage originally manufactured as Stage 4. Only two airlines of the 46 airlines listed were using aircraft originally manufactured as Stage 2 but have been recertificated to comply with Stage 3 requirements. Of the major cargo operators, UPS remained at 100 percent Stage 3 and Stage 4 operations, DHL (flown by Atlas Air in 2013) remained at 100 percent as it has phased out its fleet of older Boeing 727 aircraft prior to 2010 and FedEx dropped slightly from 92 to 91 percent in 2012 but increased to almost 100 percent in 2013.

Only one major U.S. airline, Delta Air Lines, had a fleet which is not composed of 100 percent originally manufactured Stage 3 or Stage 4 aircraft operating at Logan Airport. Prior to the merger with Northwest Airlines, Delta Air Lines was using a fleet at 100 percent of originally manufactured Stage 3 or Stage 4 aircraft. In 2010, Northwest Airlines aircraft combined with Delta Air Lines' fleet, which caused the percentage to drop to 93 percent, their combined fleet increased to 97 percent in 2011 and to 100 percent in 2012.

Noise Complaint Line

In 2012, Massport received 2,331 noise complaints from 54 communities, a decrease of 28.9 percent from 2011, when the Noise Abatement Office received 3,280 complaints. However, in 2013, Massport received 6,809 noise complaints from 74 communities, a substantial increase from 2012. The increase in complaints was associated with the FAA's public engagement associated with its EA for the new Runway 33L RNAV procedure as well as concentrations of flight tracks due to other FAA RNAV procedures.

Table 6-16 is a summary of noise complaints from the Massport Noise Abatement Office. The summary table presents the top ten communities for both 2012 and 2013 in terms of the number of complaints and number of callers. *Appendix H, Noise Abatement* has a full listing of the complaints by community.

Complaints in East Boston remained level from 2011 through 2013 whereas the number of complaints dropped in Winthrop during this period. The number of complaints from Lynn dropped slightly whereas the number of complaints from Milton decreased in 2012 but increased substantially in 2013 due to the implementation of the FAA's Runway 33L RNAV procedure.

Complaints increased in South Boston due to the changes in the FAA's Runway 22R RNAV procedure which is designed to keep flights as much as possible over Boston Inner Harbor and north of Hull, however the procedure has increased the concentration of tracks. The net increase in complaints is directly related to two factors, the FAA's Runway 33L RNAV procedure implementation and the return to pre-construction usage of the runways with departures and arrivals increasing on Runway 33L and departures increasing on Runway 27.

Table 6-15 Percentage of Airline Operations in Original Stage 3 or Equivalent Stage 4 Aircraft[1] (2009 to 2013)

Airlines with more than 100 flights	Number of Flights		Percentage of Original Stage 3 and 4 Operations[2]						
	2012	2013	2009[3]	2010[3]	2011[3]	2012 Stage 3	2012 Stage 4 Equiv.	2013 Stage 3	2013 Stage 4 Equiv.
JetBlue Airways	69,100	79,512	100%	100%	100%	0%	100%	0%	100%
US Airways	36,978	35,806	100%	100%	100%	4%	96%	1%	99%
United Airlines	25,647	25,239	100%	100%	100%	10%	90%	0%	100%
Delta Air Lines[4]	25,982	24,011	100%	93%	97%	14%	86%	10%	90%
American Airlines	22,879	22,984	100%	100%	100%	0%	100%	0%	100%
Southwest Airlines	12,784	15,937	100%	100%	100%	15%	85%	19%	81%
Shuttle America Corp	8,178	12,047	100%	100%	100%	0%	100%	0%	100%
AirTran Airways	10,883	7,764	100%	100%	100%	0%	100%	0%	100%
AWAC – US Air Express	3,897	6,440	100%	100%	100%	0%	100%	0%	100%
Pinnacle Airlines	6,664	5,829	100%	100%	100%	0%	100%	0%	100%
Air Canada Jazz	5,178	5,131	100%	100%	100%	0%	100%	0%	100%
Delta Connection/Atlantic SE	5,568	4,744	NA	100%	100%	0%	100%	0%	100%
Chautauqua	2,823	3,387	100%	100%	100%	0%	100%	0%	100%
Virgin America	3,087	3,360	100%	100%	100%	0%	100%	0%	100%
US Airways Express/Republic	3,345	3,250	100%	100%	100%	0%	100%	0%	100%
Sky Regional Airlines Inc. (Air Canada Express)	NA	3,141	NA	NA	NA	NA	NA	0%	100%
Federal Express[5]	2,925	3,049	83%	82%	92%	61%	31%	32%	68%
Spirit Airlines	3,365	2,721	100%	100%	100%	0%	100%	0%	100%
Alaska Airlines	1,873	2,661	100%	100%	100%	0%	100%	0%	100%
British Airways	2,149	2,576	100%	100%	100%	0%	100%	0%	100%
Air Canada	4,536	1,748	100%	100%	100%	0%	100%	0%	100%
Lufthansa	1,784	1,725	100%	100%	100%	0%	100%	0%	100%
Aer Lingus	1,278	1,513	100%	100%	100%	0%	100%	0%	100%
United Parcel Service	1,367	1,408	100%	100%	100%	0%	100%	0%	100%
Icelandair	938	1,120	100%	100%	100%	0%	100%	0%	100%
Air France	711	960	100%	100%	100%	0%	100%	0%	100%
Sun Country Airlines	974	943	100%	100%	100%	0%	100%	0%	100%
Mesa Airlines	596	886	NA	NA	NA	0%	100%	0%	100%
Swiss Air	18	720	100%	100%	100%	0%	100%	0%	100%
Virgin Atlantic	716	712	100%	100%	100%	0%	100%	0%	100%
Japan Airlines	474	646	NA	NA	NA	0%	100%	0%	100%
Alitalia	530	542	100%	100%	100%	0%	100%	0%	100%
SkyWest Airlines	NA	469	NA	NA	NA	NA	NA	0%	100%
SATA International Airlines	412	468	100%	100%	100%	0%	100%	0%	100%
Iberia Air Lines Of Spain	441	404	100%	100%	100%	0%	100%	0%	100%
Copa Airlines	NA	347	NA	NA	NA	NA	NA	0%	100%
Airborne Express	287	307	NA	NA	NA	0%	100%	36%	64%
TACV-Cabo Verde	234	214	100%	100%	100%	0%	100%	0%	100%
Atlas Air	NA	205	NA	NA	NA	NA	NA	100%	0%
Trans States Airlines	1,016	181	NA	100%	100%	0%	100%	0%	100%
Swift Air	24	110	NA	NA	NA	58%	42%	100%	0%
Miami Air	130	104	100%	100%	100%	15%	85%	56%	44%
Delta Connection/Comair	5,824	0	100%	100%	100%	0%	100%	NA	NA
Compass Airlines	574	0	100%	100%	100%	0%	100%	NA	NA
DHL Airways	220	0	95%	100%	100%	0%	100%	NA	NA
Frontier Airlines	343	0	NA	100%	100%	0%	100%	NA	NA

Source: Massport, 2014.

Notes:

1 Operations for some carriers differ with those in Chapter 2, Activity Levels, and Chapter 7, Air Quality/Emissions Reduction because the table only includes jet aircraft, not turboprops, and it includes scheduled and unscheduled air carriers.

2 Original Stage 3 means originally manufactured as a certificated Stage 3 aircraft under FAR Part 36. Stage 4 equivalent means the aircraft is either certificated Stage 4 or certificated Stage 3 and meets Stage 4 requirements.

3 2009 through 2011 report combined original Stage 3 and Stage 4 aircraft. 2012 and 2013 split out original Stage 3 and Stage 4 equivalent totals.

4 Delta acquired Northwest Airlines and 2010 is the first year of reported consolidated operations. Numbers for 2009 and prior are provided for Delta Air Lines only. Separate data for Northwest Airlines for 2009 and prior are provided in the 2009 EDR.

5 Federal Express total for 2012 is 92 % for 2013 less than 0.5 percent are recertificated Stage 2 aircraft.

Table 6-16 Noise Complaint Line Summary

Town	2011		2012		Change	2013		Change
	Calls	Callers	Calls	Callers	(2011 to 2012)	Calls	Callers	(2012 to 2013)
Belmont	0	0	0	0	0	605	65	605
Cambridge	154	10	127	8	(27)	266	33	139
East Boston	116	34	123	41	7	124	42	1
Hull	5	3	16	12	11	923	156	907
Hyde Park	3	1	0	0	(3)	189	6	189
Lynn	469	2	453	4	(16)	405	5	(48)
Medford	297	13	15	10	(282)	49	33	34
Milton	177	27	102	24	(75)	1,925	222	1,823
Nahant	74	26	70	17	(4)	17	9	(53)
Roxbury	81	3	77	2	(4)	74	5	(3)
Somerville	98	45	95	26	(3)	166	72	71
South Boston	53	24	218	22	165	438	22	220
Watertown	16	2	97	3	81	196	44	99
Weymouth	228	7	346	2	118	217	7	(129)
Winthrop	1,147	92	303	96	(844)	252	86	(51)
Total (Only for Towns listed above**)**	**2,918**	**289**	**2,042**	**267**	**(876)**	**5,846**	**807**	**3,804**

Source: Massport, 2014.
Note: The complete list of complaints is in *Appendix H, Noise Abatement*.

Boston Logan Airport Noise Study

The FAA's ROD approving construction of the unidirectional Runway 14-32 required that the FAA, Massport, and the Logan CAC jointly undertake a study to determine whether changes to existing noise abatement flight track corridors might further reduce noise impacts. In addition, the Massachusetts Environmental Policy Act (MEPA) Certificate for the *Boston-Logan Airside Improvements Planning Environmental Impact Report (EIR)* directed Massport to work with the FAA and local communities on a review of the Logan Airport PRAS. FAA has been implementing RNAV procedures at airports across the country. The noise study was able to influence the design of these RNAV procedures for implementation at Logan Airport.

Phase 1

This FAA study is being conducted in multiple phases. Phase 1, which was known as The Boston Overflight Noise Study (BONS), was initiated in the winter of 2004 and was completed in fall of 2007. During Phase 1, 55 airspace and operational alternatives to reduce noise related to Logan Airport overflights were identified and screened for safety, operational, and noise benefits. Of the 55 alternatives, 13 measures were identified as potentially implementable in the near term. This phase was completed in 2007 and a National Environmental Policy Act (NEPA) Categorical Exclusion was issued by FAA in October 2007 for several flight path changes mostly along the northeast and southeast shores from the Airport.[36]

36 FAA Documented Categorical Exclusion Record of Decision, October 16, 2007.

The conventional and radar vectored[37] changes which could be implemented without airspace changes were implemented in February 2008. RNAV and other changes began taking place in 2009 when FAA completed design of these procedures. RNAV procedures were published by FAA on October 22, 2009 and were implemented in 2010.

Eight new RNAV procedures were implemented by FAA in 2010 and 2011 for Runways 4R, 9, 15R, 22R and 22L. Under these procedures, aircraft immediately depart the Airport similar to existing procedures but then aircraft follow a precise path over Boston Harbor, then aircraft cross the shoreline and return back over land at a higher altitude than previous procedures. In 2013, Runways 27 and 33L were added to these procedures:

- Starting on 2/1/2010 all six RNAV procedures were in use from Runway 9;
- Starting on 5/3/2010 all six RNAV procedures were in use from Runway 4R;
- Starting on 11/18/2010 all six RNAV procedures were in use from Runways 15R, 22R, and 22L;
- Starting on 3/10/2011 all eight RNAV procedures were in use from Runways 4R, 9, 15R, 22R and 22L;
- Starting on 3/7/2013 all eight RNAV procedures were in use Runways 4R, 9, 15R, 22R, 22L, and 27; and
- Starting on 6/5/2013 all eight RNAV procedures were in use Runways 4R, 9, 15R, 22R, 22L, 27, and 33L.

On December 14, 2011, three new RNAV STARs were also implemented by FAA. These concentrate arrivals on routes leading into the Logan Airport's airspace and improve efficiency of arrivals. These have little effect on the noise environment close to the Airport and the DNL contours. However, usage of these procedures has increased since they were introduced and this increased usage is evident in the modeled flight track graphics.

The Runway 33L departure is the last RNAV to be implemented. FAA completed a separate EA in January 2013 (www.bostonrnavea.com) and the comment period for the EA was extended to March 15, 2013 (from February 15, 2013). The FAA issued a FONSI/ROD for the Runway 33L RNAV SID Final EA on June 4, 2013. The FAA also committed to a six-month post implementation review of the RNAV procedure. The review was posted on the web site in April 2014. All other major Logan Airport runways that are capable of accommodating RNAVs have been implemented by the FAA and are in operation today. Since the modeling is based on the radar data tracks, all of these changes as they have been implemented have been included in the EDR modeling for each year.

Implementation of several of these procedures has increased noise complaints in some towns surrounding Logan Airport; however, the procedures themselves have resulted in aircraft at higher altitudes and in more patterns that are concentrated over the communities.

Phase 2

Phase 2 of BLANS, which began in late 2007, included consideration of 53 proposed arrival, departure, and ground noise measures. After the first level of screening completed in 2009, thirty-two measures advanced to the next level of screening. Nine of these measures address ground noise issues, six are approach measures, and eleven address departure measures. The remaining measures address local air traffic issues such as helicopters and altitudes for VFR flights. The Level 2 screening was completed in 2011 and of the 32 measures, 10 were passed on to Level 3, five were determined as completed, and 17 were eliminated. The Level

37 Radar vector is the heading issued to aircraft to provide guidance by radar.

3 analysis, which consists of noise modeling for each individual measure along with a change analysis against the future baseline, was completed in 2012. The Level 3 Screening Report was published by the FAA in December 2012. Two of the flight measures were modified resulting in 12 measures evaluated (two measures are related to ground movements and 10 are related to flight procedures). Of these measures, eight were recommended for implementation by the CAC (the two ground movements and six flight procedures) and four flight procedures were rejected. The FAA and Massport reviewed the CAC recommendations and determined that the two ground measures would meet the criteria for implementation; however, the FAA determined that none of the flight procedures would meet the criteria for noise abatement under BLANS.

The approved two measures, with their status, are described below:[38]

- **Preferred Location for Run-ups away from Communities**. Massport has already tested this measure and identified a new location at the end of Runway 32 to be used when operationally feasible.
- **Holding Area for Delayed Departures**. Massport is prepared to commit to working with the FAA to seek approval and funding (subject to FAA operations/safety approval, environmental review, Massport capital budget process, availability of FAA funds) for construction of a hold pad to allow for short-term staging of aircraft at or near the midpoint of the airfield.

In addition, Massport and the FAA agreed to implement supplemental programmatic measures recommended by the CAC. One example is Massport's commitment to establish an airport/community noise advisory group that will meet on a regular basis to continue dialogue on airport related noise concerns.

Phase 3
Phase 3 began in August 2013 and is evaluating various runway use measures with the goal of developing a runway use program that can be implemented at Logan Airport to further reduce noise. The Logan CAC voted to abandon the PRAS in April 2012 with the goal of Phase 3 to look at runway use measures that can be successfully implemented. Massport will continue to report PRAS goals and information until a new program is in place.

Runway 22R Analysis

In the fall of 2011, Massport, in response to community inquiry, conducted an analysis reviewing departures from Runway 22R at Logan Airport. The RNAV departure procedures were implemented by FAA late in 2010 as a result of the BLANS project and the analysis compared departures on Runway 22R from December 2009 through October 2010 (pre-RNAV) and December 2010 through October 2011 (post-RNAV). The analysis showed that the new procedures were causing departures to fly a more gradual turn after departing the Airport to reach the first RNAV fix location. This was placing aircraft closer to the South Boston community when compared to the pre-RNAV departures. Massport shared this information with the community and the FAA. The results of the analysis are presented in the *2011 ESPR, Appendix H, Noise Abatement*.

The FAA reviewed the procedure and updated the procedure in March 2013. The modified procedure was evaluated again by Massport in the fall of 2013. The updated results demonstrated that the flight tracks had shifted and that the changes were expected to reduce noise levels. The results of the 2013 analysis are presented in *Appendix H, Noise Abatement*.

38 BLANS Level Three Screening Analysis, FAA, December 2012, Page E-3.

Reduced Engine Taxiing

Single or reduced engine taxiing has the potential to reduce noise at Logan Airport. When used, the largest benefit is achieved by reducing the use of the engines on the side of the aircraft closest to the community; however, this is not always practicable due to airline procedures, taxiway routings, and safety considerations. Massport has reached out to the airlines and encouraged the use of this procedure whenever practicable. The letter sent to airport users for 2012 and 2013 from Massport is published in *Appendix L, Reduced/Single Engine Taxiing at Logan Airport Memoranda*.

In 2009, Massachusetts Institute of Technology (MIT) in cooperation with Massport and FAA conducted a survey of pilots at Logan Airport and found that the procedure was widely used on arrivals but not frequently used on departures.[39] Key reasons cited for not using the procedure were safety-related or practical reasons such as a short taxi time. The survey indicated that for the procedure to be considered for arrivals, the taxi-in time would have to exceed 10 minutes and for departures, exceed 20 minutes. The average taxi-out times for Logan Airport for 2012 never exceeded 20 minutes and for 2013 exceeded 20 minutes only during the 5:00 PM to 7:00 PM period. During 2012 and 2013, the average taxi-in time never exceeded 10 minutes. The total average departure taxi out time at Logan Airport for 2012 is 17.2 minutes and the average taxi-in time is 6.8 minutes (the total average taxi/delay time for 2012 is 23.9 minutes). The total average departure taxi out time at Logan Airport for 2013 increased to 18.2 minutes and the average taxi-in time remained the same as 2012 at 6.8 minutes (the total average taxi/delay time for 2013 is 25.0 minutes).[40]

Mandatory single engine taxiing was also one of the proposed measures in the BLANS but was rejected by FAA due to safety concerns, and it is currently being implemented as a voluntary measure.

Noise Abatement Management Plan

Massport's noise abatement goals are achieved through the implementation of multiple elements. Table 6-17 lists these goals and the associated plan elements, and reports on progress toward achieving these goals.

39 The full report was published in the *2009 EDR* in *Appendix L, Survey of Airline Pilots Regarding Fuel Conservation Procedures for Taxi Operations.*
40 FAA Aviation System Performance Metrics: Avg. Taxi Time: Standard Report –accessed 06/13/2014.

Table 6-17 Noise Abatement Management Plan

Noise Abatement Goal	Plan Elements	2012/2013 Progress Report
Limit total aircraft noise	Limit on Cumulative Noise Index (CNI)	The CNI value for 2012 was 152.2 EPNdB and the CNI value for 2013 was 152.4 EPNdB, both are well below the cap of 156.5 EPNdB.
	Stage 3 percentage Requirement in Noise Rules	In 2012, Stage 3 operations represented 99 percent of Logan Airport's total commercial jet traffic. The few Stage 2 operations that occurred during the year were all older small corporate jets flown by charters or small cargo operators and because these aircraft were less than 75,000 pounds gross takeoff weight, they were in full compliance with FAR Part 91, but still prohibited from operating at Logan Airport during the hours of 11:00 PM to 7:00 AM.
Mitigate noise impacts	Residential Sound Insulation Program (RSIP)	76 dwelling units were sound insulated in 2012 and 2013, bringing the total of treated dwelling units to 11,409 since the start of the program in 1986. See *Appendix H, Noise Abatement* for additional details.
	School Sound Insulation Program	36 eligible schools have been sound insulated since this program began.
	Noise Abatement Arrival and Departure Procedures	Flight track monitoring and data analysis were used to verify adherence to noise abatement flight procedures. See *Appendix H, Noise Abatement* for copies of the 2012 and 2013 Monitoring Report.
	Preferential Runway Advisory System (PRAS) Runway End Use Goals	The PRAS computer system was last used early in 2004 but due to system changes is not in use. However, FAA and Massport continue to work toward the current goals. Phase 3 of BLANS is currently underway and will be developing a new runway use plan.
	Runway Restrictions	Noise-based use restrictions 24 hours per day on departures from Runway 4L and arrivals on Runway 22R were continued.
	Reduced-Engine Taxiing	Voluntary use of reduced-engine taxiing is encouraged when appropriate and safe.
Improve Noise Monitoring System	Replace Existing Noise Monitors, Install Multilateration Antennas for Flight Track Monitoring, and Install New Robust Software	The Airscene noise monitoring system is completely installed and in use at Logan Airport. The noise monitors provide 1/3 octave band data at all sites to aide with aircraft identification. Noise events, flight events, and complaints are all linked. Multilateration provides improved radar coverage near the ground to help in identification of aircraft and runway assignment. In 2014, Massport will be receiving the latest version of the noise monitoring software and will upgrade the community web portal for flight tracks.
Minimize nighttime noise	Nighttime Stage 2 Aircraft Prohibition	Prohibition on Stage 2 aircraft operations at Logan Airport between 11:00 PM and 7:00 AM was continued.
	Nighttime Runway Restrictions	Prohibitions on use of Runway 4L for departures and Runway 22R for arrivals between 11:00 PM and 6:00 AM were continued.
	Maximization of Late-Night Over-Water Operation	Efforts to maximize late-night over-water operations were continued. Use of Runway 15R for departures and Runway 33L for arrivals continued.
	Nighttime Engine Run-up and APU Restrictions	Restriction on nighttime engine run-ups and use of auxiliary power units (APUs) was continued.
Address/respond to noise issues and complaints	Noise Complaint Line	Massport continued operation of Noise Complaint Line, (617) 561-3333. In 2012, Massport's Noise Abatement Office responded to 2,331 calls from callers living in 53 communities. In 2013, this grew to 6,809 calls from 74 communities, see *Appendix H, Noise Abatement, due to concerns over the Runway 33L RNAV and increased use of Runway 33L and Runway 27 for departures* .
	Special Studies	Massport continued to provide technical assistance and analysis using noise monitoring system to support FAA and others in monitoring jet departure tracks from Runway 27 and Runway 33L . The BLANS Phase 3 is underway and will evaluate and establish a runway use program.

Source: Massport.

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7 Air Quality/ Emissions Reduction

Introduction

This chapter describes the air quality conditions at Logan Airport in the 2012 to 2013 time period and compares them to the 2011 conditions. This information is based on an up-to-date emissions inventory of modeled Airport-related volatile organic compounds (VOCs), oxides of nitrogen (NO_x), carbon monoxide (CO), and particulate matter (PM).[1] An inventory of greenhouse gases (GHGs) is included. Status reports are also provided on Massport's Air Quality Initiative (AQI), the Massport Air Quality Monitoring Study, and other Massport air quality and emissions reduction initiatives.

2012/2013 Air Quality Highlights

- The air quality modeled results reported in this section are largely a function of aircraft operations, fleet mix characteristics, and airfield taxi times combined with ground support equipment (GSE) usage, motor vehicle traffic volumes, and stationary source utilization rates. A synopsis of these important model input variables for 2012 and 2013 at Logan Airport includes:
  - Aircraft landing and takeoff operations (LTOs) decreased by approximately 4 percent in 2012 when compared to 2011 (i.e., 184,494 LTOs in 2011 and 177,439 LTOs in 2012) and taxi times decreased by 5 percent (i.e., 25.2 minutes in 2011 and 23.9 minutes in 2012). By comparison, aircraft LTOs increased approximately 2 percent in 2013 when compared to 2012 (i.e., 180,670 LTOs in 2013) and taxi times increased by 5 percent (i.e., 25.0 minutes in 2013). For comparison, there were 243,998 LTOs in 2000 and taxi times were 27.1 minutes.
  - Motor vehicle miles traveled (VMT) changed less than 1 percent in 2012 when compared to 2011 (i.e., 167,647 in 2011 and 167,564 in 2012) and increased about 6 percent in 2013 when compared to 2012 (i.e., 177,094 in 2013). VMT in 2000 was 178,798.

1 PM less than or equal to 10 microns (PM_{10}) and PM less than or equal to 2.5 microns ($PM_{2.5}$) are subsets of PM.

- Natural gas usage by stationary sources (e.g., boilers, snow melters, and space heaters) decreased by approximately 25 percent in 2012 when compared to 2011 (i.e., 480 million cubic feet in 2011 and 361 million cubic feet in 2012) and increased by 12 percent in 2013 when compared to 2012 (402 million cubic feet in 2013). Natural gas usage by stationary sources was 284 million cubic feet in 2000. Diesel fuel usage by the snow melters decreased in 2012 when compared to 2011 (218,081 gallons in 2011 and 42,109 gallons in 2012) and increased in 2013 when compared to 2012 (231,130 gallons in 2013).
- GSE fleet mix and time-in-mode data were obtained from a GSE survey conducted at Logan Airport as part of the *2011 ESPR*, and these data were used to model 2012 and 2013 conditions.

From the analysis of these data, modeled air quality conditions in the 2012 to 2013 time-period for Logan Airport were as follows:

- Motor vehicle emission factors for the 2012 analysis were obtained from the then most recent version of the United States Environmental Protection Agency's (EPA's) MOBILE model (MOBILE6.2.03) combined with Massachusetts Department of Environmental Protection (MassDEP)-recommended motor vehicle fleet mix data, operating conditions, and other Massachusetts-specific input parameters. Importantly, for the 2013 analysis, the new Motor Vehicle Emission Simulator (MOVES) model was used to estimate motor vehicle emission factors.[2] MOVES2010b is the EPA's latest motor vehicle emissions model and replaces MOBILE as the MassDEP-preferred model. Moreover, and for comparative purposes, both MOBILE and MOVES were used to generate the 2013 motor vehicle emission factors.
- Total VOC emissions in 2012 were 1,080 kilograms per day (kg/day), or approximately 3 percent lower than 2011 levels. By comparison, total VOC emissions in 2013 were 1,138 kg/day, or 5 percent higher than 2012 levels. The decrease in 2012 is primarily due to the corresponding decrease in aircraft LTOs when compared to 2011 and a decrease in aircraft taxi time. Similarly, the increase in 2013 is primarily due to the increase in LTOs when compared to 2012 and an increase in aircraft taxi time. For comparison, total VOC emissions were 1,777 kg/day in 2000.
- Total emissions of NO_X in 2012 were 4,099 kg/day, or less than 1 percent higher than 2011 levels. However, total emissions of NO_X in 2013 were 4,020 kg/day, or 2 percent lower than 2012 levels. The increase in 2012 is mostly attributable to the larger number of medium and large regional jets among the General Aviation (GA) aircraft category during this time period. Conversely, the decrease in 2013 compared to 2012 is primarily due to the decrease in the number of these aircraft types in the GA aircraft category. For comparison, total NO_X emissions were 5,707 kg/day in 2000.
- Total emissions of CO in 2012 were 6,739 kg/day, or 3 percent lower than 2011 levels. This decrease is mostly attributable to the decrease in GSE and motor vehicle emissions. However, total emissions of CO in 2013 were 7,340 kg/day, or 9 percent higher than 2012 levels. This increase in 2013 compared to 2012 is mostly attributable to the increase in aircraft LTOs and taxi time. For comparison, total CO emissions were 13,111 kg/day in 2000.
- Total emissions of $PM_{10}/PM_{2.5}$ increased in 2012 by approximately 7 percent to 72 kg/day compared to 2011 levels. This particular increase is unique and is mostly attributable to model changes. Total modeled emissions of $PM_{10}/PM_{2.5}$ again increased in 2013 by approximately 28 percent to 92 kg/day compared to 2012 levels. Notably, these increases are mainly attributable to the new versions of the computer models (i.e., Emissions and Dispersion Modeling System [EDMS] and MassDEP-preferred model –MOVES) used to calculate aircraft and motor vehicle emissions. Vehicle Miles Traveled (VMT) increased by 5 percent

2 The U.S. EPA MOVES model is an advancement to the former MOBILE6 model as it contains the most up-to-date emission factors, emission control measures, and other area-specific parameters for motor vehicle fleets nationwide (including the Boston area). For consistency with the Massachusetts State Implementation Plan (SIP), MOVES is also recommended for use by the MassDEP.

from 2012 to 2013. However, MOBILE6 PM emission factors decreased by the same amount (effectively cancelling each other out). Thus, if MOBILE6 had been used for the 2013 analysis, modeled PM emissions would have decreased by less than 1 percent from 2012 to 2013.

- Importantly, total emissions from all sources associated with Logan Airport in the 2012 to 2013 timeframe are significantly less than they were a decade ago. This continuous downward trend is consistent with Massport's longstanding objective to accommodate the demands of increasing passenger and cargo levels with fewer aircraft generating less emissions.
- With respect to Massport's AQI[3] 1999 benchmark, total NOx emissions in 2012 were 698 tons per year (tpy) lower than the benchmark and in 2013 were 730 tpy lower than the benchmark - which represents an overall decrease of 31 percent in NOx emissions since 1999. For comparison, total NOx emissions in 2000 were 51 tpy lower than the benchmark or a decrease of 2 percent since 1999.
- The year 2013 marks the seventh consecutive year in which Massport has voluntarily prepared a GHG emissions inventory for the EDR/ESPR. The 2012 and 2013 GHG emission inventory was again prepared following methodological guidance by the Transportation Research Board's (TRB) Airport Cooperative Research Program (ACRP).[4] The inventory assigns GHG emissions based on ownership or control (whether it is controlled by Massport, the airlines or other airport tenants, or the general public).
  - Total Logan Airport GHG emissions in 2012 were approximately 3 percent lower than 2011 levels primarily due to the decrease in fuel usage of stationary sources. Total Logan Airport GHG emissions in 2013 were approximately 6 percent higher than 2012 levels primarily due to the increase in usage of passenger ground access vehicles on off-airport roadways. In 2012, Massport-related emissions represented only 10 percent of total GHG emissions at the Airport, tenant-based emissions represented approximately 69 percent, electrical consumption represented 14 percent; and passenger vehicle emissions represented 6 percent. Similarly, in 2013, Massport-related emissions represented only 13 percent of total GHG emissions at the Airport, tenant-based emissions represented approximately 66 percent, electrical consumption represented 10 percent, and passenger vehicle emissions represented 10 percent.

This inventory is one of the three GHG emissions inventories Massport prepares annually; however, the other two comprise only stationary sources of GHGs and are filed with MassDEP and the EPA respectively. These reports are only for Massport owned and operated equipment, and do not cover any tenant owned/operated equipment.

Regulatory Framework

The federal Clean Air Act (CAA), the National Ambient Air Quality Standards (NAAQS), and similar state laws govern air quality issues in Massachusetts. The NAAQS and the Massachusetts State Implementation Plan (SIP), promulgated to demonstrate compliance with the CAA (and its 1990 amendments), regulate air quality issues in the Boston metropolitan area and the state, and are discussed in the next section.

3 Massport developed the AQI as a 15-year voluntary program with the overall goal to maintain NOx emissions associated with Logan Airport at, or below, 1999 levels.

4 Transportation Research Board, Airport Cooperative Research Program, ACRP Report 11, Project 02-06, Guidebook on Preparing Airport Greenhouse Gas Emissions Inventories. See http://onlinepubs.trb.org/onlinepubs/acrp/acrp_rpt_011.pdf for the full report.

National Ambient Air Quality Standards

EPA established NAAQS for a group of criteria air pollutants to protect public health, the environment, and the quality of life from the detrimental effects of air pollution. These NAAQS are set for the following seven pollutants: CO, lead (Pb), NO_2, ozone (O_3), PM_{10}, $PM_{2.5}$, and sulfur dioxide (SO_2). The NAAQS primary standards (designed to protect human health) and secondary standards (designed to protect human welfare) are summarized on Table 7-1.

Based on air monitoring data and in accordance with the CAA, all areas within Massachusetts are designated as either *attainment*, *nonattainment*, *maintenance*, or *unclassifiable* with respect to the NAAQS.[5] An area with air quality better than the NAAQS is designated as attainment; an area with air quality worse than the NAAQS is designated as nonattainment; and an area that is in transition from nonattainment to attainment is designated as attainment/maintenance. An area may also be designated as unclassifiable when there is a temporary lack of data to form a basis for determining attainment status. Nonattainment areas can be further classified as extreme, severe, serious, moderate, and marginal by the degree of non-compliance with the NAAQS. The current attainment/nonattainment designations for the Boston metropolitan area are summarized in Table 7-2.

The Boston area is currently designated as attainment/maintenance for CO, indicating that it is in transition back to attainment for this pollutant. Historically, the entire Boston metropolitan area has been designated as attainment for all other criteria pollutants except O_3, for which it was designated as "moderate" nonattainment based on the 1997 eight-hour ozone standard (see Table 7-1). The O_3 nonattainment area consisted of 10 counties in Massachusetts (Barnstable, Bristol, Dukes, Essex, Middlesex, Nantucket, Norfolk, Plymouth, Suffolk, and Worcester). Logan Airport is located in Suffolk County.

In May 2012, the EPA published a Clean Air Determination for the *Boston-Lawrence-Worcester 1997 Eight-Hour Ozone Nonattainment Area*, signifying that based on air monitoring data collected between 2007 through 2010, the area has now attained the 1997 eight-hour O_3 standard.[6] In April 2012, EPA began implementing the 2008 eight-hour O_3 standard and has determined, based on year 2008 through 2011 monitoring data, that the area is considered attainment/unclassifiable for the 2008 eight-hour O_3 standard.[7]

5 Environmental Protection Agency, The Green Book Nonattainment Areas for Criteria Pollutants (www.epa.gov/air/oaqps/greenbk/).
6 Approval and Promulgation of Air Quality Implementation Plans; Massachusetts and New Hampshire; Determination of Attainment of the One-Hour and 1997 Eight-Hour Ozone Standards for Eastern Massachusetts. (77 FR 31496)
7 Air Quality Designations for the 2008 Ozone National Ambient Air Quality Standards; Implementation of the 2008 National Ambient Air Quality Standards for Ozone: Nonattainment Area Classifications Approach, Attainment Deadlines and Revocation of the 1997 Ozone Standards for Transportation Conformity Purposes; Final Rules (77 FR 30088).

Table 7-1 National Ambient Air Quality Standards

Pollutant	Averaging Time	Standard ppm	Standard µg/m³	Notes:
Carbon Monoxide (CO)	1 hour	35	40,000	Not to be exceeded more than once a year.
	8 hour	9	10,000	Not to be exceeded more than once a year.
Lead (Pb)	Rolling 3-Month Average	—	0.15	Not to exceed this level. Final rule October 2008.
	Quarterly	—	1.5	The 1978 standard (1.5 µg/m3 as a quarterly average) remains in effect until one year after an area is designated for the 2008 standard, except that in areas designated nonattainment for the 1978 standard, the 1978 standard remains in effect until implementation plans to attain or maintain the 2008 standard are approved.
Nitrogen Dioxide (NO_2)	1 hour	0.100	188	The three-year average of the 98th percentile of the daily maximum 1-hour average at each monitor within an area must not exceed 0.100 ppm.
	Annual	0.053	100	Not to exceed this level.
Ozone (O_3)	8 hour[1]	0.08	—	The average of the annual 4th highest daily 8-hour maximum over a three-year period is not to exceed this level.
	8 hour[2]	0.075	—	The average of the annual 4th highest daily 8-hour maximum over a three-year period is not to exceed this level.
Particulate Matter with a diameter ≤ 10µm (PM_{10})	24 hour	—	150	Not to be exceeded more than once a year on average over three years.
Particulate Matter with a diameter ≤ 2.5µm ($PM_{2.5}$)	24 hour	—	35	The three-year average of the 98th percentile for each population-oriented monitor within an area is not to exceed this level.
	Annual (Primary)	—	12	The three-year average of the weighted annual mean from single or multiple monitors within an area is not to exceed this level.
	Annual (Secondary)	—	15	The three-year average of the weighted annual mean from single or multiple monitors within an area is not to exceed this level.
Sulfur Dioxide (SO_2)	1 hour	0.075	196	Final rule signed June 2, 2010. The three-year average of the 99th percentile of the daily maximum 1-hour average at each monitor within an area must not exceed this level.
	3 hour	0.5	1,300	Not to be exceeded more than once a year.

Source: EPA, 2014 (www.epa.gov/air/criteria.html).
1 The 1997 NAAQS for ozone.
2 The 2008 NAAQS for ozone.
ppm Parts per million
µg/m³ Micrograms per cubic meter

In May 2012, EPA issued a Clean Data Finding for the Boston area ruling that the area has attained the 1997 NAAQS, suspending many obligations related to SIP development and implementation so long as the area continues to demonstrate attainment based on ambient data. EPA has since proposed to revoke the 1997 8-hour NAAQS completely in June 2013; until this action appears in the Federal Register as a final rule, the Boston area is still subject to any requirements related to its former "moderate" nonattainment status under the 1997 NAAQS that are not excused by the clean data finding. Even despite the clean data finding, once the 1997 standard is officially revoked by final rule, the anti-backsliding requirements of the federal CAA (i.e., a rule established to ensure that air quality is not deteriorated due to EPA relaxing or revoking NAAQS) may still obligate the MassDEP to enforce select elements of any federally enforceable SIP prepared to attain the 1997 NAAQS.

Table 7-2 Attainment/Nonattainment Designations for the Boston Metropolitan Area

Pollutant	Designation
Carbon monoxide (CO)	Attainment/Maintenance[1]
Nitrogen Dioxides (NO_2)	Attainment
Ozone (Eight-hour, 1997 Standard)	Attainment[1]
Ozone (Eight-hour, 2008 Standard)	Attainment/Unclassifiable[2]
Particulate matter (PM_{10})	Attainment
Particulate matter ($PM_{2.5}$)	Attainment
Sulfur Dioxide (SO_2)	Attainment
Lead (Pb)	Attainment

Source: EPA, 2014 (www.epa.gov/air/oaqps/greenbk/).

1 The Boston area was previously designated nonattainment for this pollutant but has since attained compliance with the NAAQS. Maintenance plan requirements have yet to be established.

2 Attainment/Unclassifiable means that the initial data shows attainment but additional data is needed to verify longer term conditions.

State Implementation Plan (SIP)

A SIP is a state's regulatory plan for bringing nonattainment areas within that state into compliance with the NAAQS. As indicated previously, the entire Boston metropolitan area has until recently been designated as "moderate" nonattainment for the 1997 eight-hour O_3 standard, but has since received a Clean Air Determination from EPA classifying the area as "attainment." As long as the area continues to attain this standard, MassDEP is not required to comply with any outstanding SIP requirements. However, Maintenance Plan requirements stipulated under Section 110 of the federal CAA could eventually apply for the 1997 standard, but any associated rulemaking has yet to be promulgated. Additionally, as stated above, the area has been designated attainment/unclassifiable for the 2008 eight-hour O_3 standard, and accordingly SIP preparation relative to this standard is not required for the Boston area. The most current SIP submittals for the Boston area are summarized in Table 7-3.

Table 7-3 State Implementation Plan (SIP) for Ozone

Standard	Title	Status	Comments
One-Hour	One-hour Ozone Attainment Demonstration for the Massachusetts Portion of the Boston-Lawrence-Worcester, Massachusetts-New Hampshire Ozone Nonattainment Area.	Published December 6, 2002, as final rule.	The U.S. Environmental Protection Agency (EPA) approved this SIP revision and established an attainment date of November 15, 2007, for the entire multi-state nonattainment area. EPA has further determined that there are no additional obligations under the one-hour standard for this area.
Eight-Hour	Final Massachusetts State Implementation Plan To Demonstrate Attainment of the National Ambient Air Quality Standard for Ozone	Submitted to EPA, January 31, 2008, for approval.	This standard calls for the attainment of the 1997 eight-hour National Ambient Air Quality Standards (NAAQS) for ozone by 2010 and focuses on the control of oxides of nitrogen (NO_X) and volatile organic compounds (VOCs) as precursors to ozone. As of April 2012, EPA has determined that the Boston area is compliant with the 2008 standard, thus no SIP is required for eight-hour ozone. [1, 2]

Source: MassDEP (www.mass.gov/dep/air/priorities/sip.htm).
1 In 2007, the EPA promulgated a new eight-hour NAAQS for ozone. Informally called the "2008 standard" to differentiate it from the former "1997 standard", this new standard is more strict (i.e., lower) than the former standard.
2 The original SIP established the Logan Airport Parking Freeze and the limit of 17,319 commercial and 3,373 employee spaces at the Airport in 2007, which was changed to 18,019 commercial and 2,673 employee spaces in 2011.

Logan Airport Air Quality Permits for Stationary Sources of Emissions

Massport was granted a Title V Air Quality Operating Permit for Logan Airport in September 2004; a renewal permit was granted in January 2013. This permit covers all of the Massport-operated stationary sources including the Central Heating and Cooling Plant, snow melters, fuel dispensers, boilers, emergency electrical generators, and fuel storage tanks.

Methodology

For the purposes of the EDR, the analysis of air emissions associated with Logan Airport operations includes the following source categories, each of which has its own assessment methodology, database, and assumptions as described below.

- **Aircraft Emissions** — The Federal Aviation Administration (FAA) EDMS is the EPA-preferred and the FAA-required model for calculating aircraft emissions. Because the FAA continually improves the performance, precision, and adaptability of the EDMS, the program is subject to regular updates and revisions. For this analysis, the most recent version of EDMS was used to compute the Logan Airport emissions inventory (EDMS v5.1.3 for the 2012 analysis and EDMS v5.1.4.1 for the 2013 analysis). Compared to EDMS v5.1.3 used for the 2012 analysis, the most notable changes in EDMS v5.1.4.1 include updated aircraft engine emissions data from the International Civil Aviation Organization (ICAO) Aircraft Engine Emission Database (April 15, 2013), the addition of new aircraft and engine types, and revision to the calculation of aircraft $PM_{10}/PM_{2.5}$ emissions. These model changes in EDMS v5.1.4.1 generally had a small effect on aircraft emissions when compared to EDMS v5.1.3, except for $PM_{10}/PM_{2.5}$ emissions, which were significantly higher due to changes in the model.

  As with recent ESPRs and EDRs, the actual aircraft fleet mix at Logan Airport in 2012 and 2013 was used as a model input to analyze annual conditions. In a few instances where the aircraft/engine type or combinations operating at Logan Airport were not available in the EDMS database, consistent with

FAA guidance, substitutions were made based on the closest match of aircraft type and engine performance characteristic. Tables I-4 and 5 in *Appendix I, Air Quality/Emissions Reduction* contains the data that were used, including aircraft types, engine, LTOs, and aircraft taxi/delay times for 2012 and 2013. For the analysis, the aircraft are grouped into four categories: commercial air carriers, commuter aircraft, GA, and cargo aircraft.

From 2011 to 2012, total LTOs decreased by approximately 4 percent overall with air carrier LTOs decreasing by less than 1 percent, commuter LTOs decreasing by 12 percent, air cargo LTOs decreasing by about 11 percent, and GA decreasing by less than 1 percent. By comparison, from 2012 to 2013, total LTOs increased by approximately 2 percent overall with air carrier LTOs increasing by about 2 percent, commuter LTOs increasing by about 2 percent, air cargo LTOs increasing by about 3 percent, while GA decreased by about 5 percent.

Updated aircraft taxi/delay times are based on data obtained from the FAA Aviation System Performance Metrics (ASPM) database for 2012 and 2013.[8] According to this database, the average aircraft taxi/delay times at Logan Airport decreased from 25.2 minutes to 23.9 minutes from 2011 to 2012, or about 5 percent. In contrast, the average aircraft taxi/delay times reportedly increased to 25.0 minutes in 2013, or about 4 percent higher than 2012, primarily associated with the increase in operations compared to 2012. These parameters also served as inputs into the air quality modeling.

- **Ground Service Equipment/Auxiliary Power Units —** Estimates of GSE emissions were based on EDMS emission factors and continue to reflect emission reductions attributable to Massport's Alternative Fuel Vehicle (AFV) Program and the conversion of Massport and/or tenant GSE and fleet vehicles to compressed natural gas (CNG) or electricity. Model input data are based on an on-site GSE time-in-mode survey conducted in May 2012 at the Airport as part of the *2011 ESPR*, combined with the most recent information regarding GSE fuel use (e.g., gasoline, diesel, CNG, liquid petroleum gas (LPG), and electric) from the Logan Airport Vehicle Aerodrome Permit Application documentation.[9]
- **Motor Vehicles —** Motor vehicle emission factors for the 2012 analysis were obtained from the then most recent version of EPA's MOBILE model (MOBILE6.2.03) combined with MassDEP-recommended motor vehicle fleet mix data, operating conditions, and other Massachusetts-specific input parameters. Importantly, for the 2013 analysis, the new MOVES model was used to estimate motor vehicle emission factors.[10] MOVES2010b is the EPA's latest motor vehicle emissions model and replaces MOBILE as the MassDEP-preferred model. Moreover, and for comparative purposes, both MOBILE and MOVES were used to generate the 2013 motor vehicle emission factors. The MOBILE and MOVES input/output files are included in *Appendix I, Air Quality/Emissions Reduction*. In addition, *Chapter 5, Ground Access to and from Logan Airport* of this *2012/2013 EDR* provides a discussion of the VMT data used for this analysis. Starting with the *2011 ESPR*, VMT and vehicle speed data were predicted by the traffic simulation model, VISSIM.[11] (Refer to *Chapter 5, Ground Access to and from Logan Airport* for more information on ground transportation to and from Logan Airport, as well traffic conditions at the Airport).

8 FAA Aviation System Performance Metrics (ASPM) database for 2012 and 2013 (aspm.faa.gov/).

9 All vehicles and equipment (including GSE) that operate on the airfield must obtain a Logan Airport Vehicle Aerodrome Permit. The application form for this permit was modified in 2007 to request the fuel-type information (e.g., gasoline, diesel, etc.).

10 The U.S. EPA MOVES model is an advancement to the former MOBILE6 model as it contains the most up-to-date emission factors, emission control measures, and other area-specific parameters for motor vehicle fleets nationwide (including the Boston area). For consistency with the Massachusetts State Implementation Plan (SIP), MOVES is also recommended for use by the MassDEP.

11 PTV America. (2011). Verkehr In Städen Simulationsmodell- VISSIM version 5.40 [computer software]. Portland, OR.

- **Other Sources —** Emissions associated with fuel storage and handling, the Central Heating and Cooling Plant, snow melters, generators, space heaters, and fire training at Logan Airport were based on annual fuel throughput records for 2012 and 2013, combined with appropriate EPA emission factors (e.g., compilation of *Air Pollution Emission Factors* (*AP-42*) or emission factors obtained from NO_x Reasonably Available Control Technology (RACT) compliance testing). When 2012 is compared to 2011, No. 2 fuel oil, No. 6 fuel oil, natural gas usage from boilers, and diesel fuel from snow melter usage decreased approximately 45 percent, 40 percent, 24 percent, and 81 percent, respectively. When 2013 is compared to 2012, No. 2 fuel oil, No. 6 fuel oil, natural gas usage from boilers, and diesel fuel from snow melter usage increased approximately 37 percent, 161 percent, 11 percent, and 449 percent, respectively. The increased snow melter use is attributable to the unusually heavy snowfall in early 2013.

- **Particulate Matter —** Estimates of PM emissions associated with Logan Airport were first reported in the *2005 EDR* in response to the then recent availability of an FAA-updated method (i.e., *First Order Approximation*) for computing aircraft PM_{10}/$PM_{2.5}$ emission factors. PM_{10}/$PM_{2.5}$ emissions are now routinely reported in the EDRs/ESPRs - including this *2012/2013 EDR*. As discussed later in this section, the method used to estimate aircraft PM_{10}/$PM_{2.5}$ emissions has been revised in EDMS v5.1.4.1, resulting in higher modeled emissions overall. Modeled emissions are not directly tied to actual changes in operations.

- **Greenhouse Gases —** GHG emissions were calculated in much the same way the criteria pollutants (and their precursors) were calculated - through the use of input data such as activity levels or material throughput rates (i.e., fuel usage, VMT, electrical consumption) that are applied to appropriate emission factors (i.e., in units of GHG emissions per gallon of fuel). Input data were either based on Massport records, or data and information derived from the EDMS v5.1.4.1. Emission factors were obtained from the U.S. Energy Information Administration (EIA), the International Panel on Climate Change (IPCC), and the EPA.

  Consistent with prior EDR years, the 2012 and 2013 GHG emissions inventory includes aircraft operations within the ground-based taxi-idle/delay mode and up to the top of the 3,000–foot LTO cycle.[12] Again, GHG emissions associated with GSE/auxiliary power unit (APU), motor vehicles, a variety of stationary sources, and electricity usage were also included. Of note, Massport has direct ownership or control over a very small percentage (approximately 13 percent in 2013) of these GHG emissions and their sources (i.e., limited to Massport fleet vehicles, stationary sources, and electrical consumption within Massport buildings). As with most commercial service airports, the vast majority of the emission sources at Logan Airport are owned or controlled by the airlines, other airport tenants, and the general public (motor vehicles). Massport undertakes a variety of programs to reduce non-Massport emissions through its support of high-occupancy-vehicle (HOV) initiatives, including subsidizing free Silver Line Service, and supporting use of alternative fuels by airport taxis, the CNG station, and providing electric plug-ins for GSE, 400 Hz Power, and pre-conditioned air (PCA) at airplane gates.

12 Following the guidance issued by the Airport Cooperative Research Program, ACRP Report 11, *Guidebook on Preparing Airport Greenhouse Gas Emissions Inventories*.

Emissions Inventory in 2012 and 2013

This section provides a summary of the 2012 and 2013 Logan Airport emissions inventory for the pollutants VOC, CO, NO_x, and PM_{10}/$PM_{2.5}$. Emissions of O_3 are not directly computed as it is a secondary pollutant formed by the interactions of NO_x and VOCs throughout the region. Emissions of SO_2 and Pb are also not computed, as Logan Airport emission sources are very small generators of these two compounds.

As stated above, the aircraft emissions inventory was computed based on the actual number of aircraft operations (i.e., LTOs), fleet mix, and operational times-in-mode (TIM) at the Airport in 2012 and 2013. Similarly, emissions associated with GSE, motor vehicles, fuel storage and transfer facilities, and a variety of stationary sources (e.g., steam boilers, snow melters, live-fire training, emergency generators, etc.) associated with Logan Airport were also computed based on actual conditions.

As in preceding EDRs, the results of the 2012 emissions inventory are compared with the results for 2011 and the results of the 2013 emissions inventory are compared with 2012. Additionally, the 2012 and 2013 results are compared with previous years extending back to 1990. The data summary figures contain the previous results for 1990 and 2000 and then annually for 2009 to 2013.[13] In this way, the changes in Logan Airport air quality conditions can be evaluated in both the short- and long-term time frame and on a common basis. For the AQI, estimates of NO_x emissions are also provided as a way of tracking the progress of this voluntary emission management program. Finally, the results for the intervening years (e.g., 1995, 1996, 1997, etc.) are shown in previous EDRs and contained in *Appendix I, Air Quality/Emissions Reduction.*

Volatile Organic Compounds

In 2012, total modeled VOC emissions at Logan Airport were 435 tpy (1,080 kg/day) – a computed decrease of approximately 3 percent from 2011 levels. This decrease is due mostly to the decrease in VOC emissions associated with fewer aircraft operations and lower aircraft taxi times at the Airport during this time period. By comparison, in 2013, total modeled VOC emissions at Logan Airport were 458 tpy (1,138 kg/day) – a computed increase of approximately 5 percent from 2012 levels. This change is largely due to the increase in VOC emissions associated with a higher level of aircraft operations and taxi times at the Airport during this time frame. Importantly, Figure 7-1 depicts an overall, long-term downward trend in modeled VOC emissions at Logan Airport and Figure 7-2 shows the 2012 and 2013 percent breakdown of these emissions by source category. Similarly, Table 7-4 shows the computed VOC emissions in kg/day for each emission source from 1990, 2000, and 2009 to 2013. Other key findings from this analysis include the following:

- Total aircraft-related VOC emissions were approximately 5 percent lower in 2012, when compared to 2011. This decrease was mostly due to the decrease in aircraft LTOs and taxi time. By comparison, total aircraft-related VOC emissions were approximately 17 percent higher in 2013, when compared to 2012. This increase was largely due to the increase in aircraft LTOs and taxi time over this time frame.
- GSE-related VOC emissions were approximately 9 percent lower in 2012 than in 2011. This decrease was largely due to the decrease in aircraft LTOs of about 4 percent. Again, GSE-related VOC emissions were also approximately 13 percent lower in 2013 than in 2012. This decrease was largely due to the changes in the aircraft fleet mix which have an effect on the GSE fleet characteristics and usage. Notably, the aircraft

13 The results for the intervening years (e.g., 1995, 1996, 1997, etc.) are shown in previous EDRs and contained in *Appendix I, Air Quality/Emissions Reduction*.

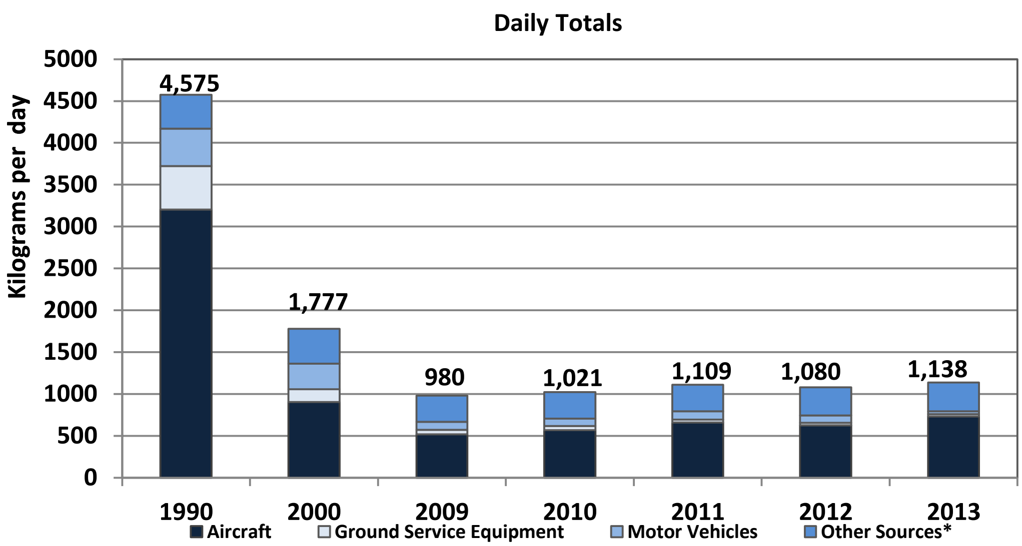
fleet mix for 2013 showed an increase in the number of commuter-sized jets among air carriers and a decrease in medium and large jets among the GA aircraft category, when compared to 2012. Smaller aircraft use fewer GSE with shorter operating times than larger aircraft resulting is lower GSE emissions.

- Total VOC emissions from motor vehicles in 2012 declined by about 13 percent from 2011 levels. This reduction in motor vehicle emissions is attributable mostly to lower emission factors of the 2012 motor vehicle fleet which are reflected in the MOBILE6 database along with a slight decrease in VMT. Significantly, total VOC emissions from motor vehicles in 2013 also declined by about 59 percent from 2012 levels. The large decrease is mostly attributable to lower VOC emission factors generated by MOVES, the EPA's new motor vehicle emissions model rather than an actual impact associated with changes in VMT.
- VOC emissions from stationary and other sources (e.g., fuel storage/handling, Central Heating and Cooling Plant, snow melter usage, and firefighter training) increased by approximately 7 percent from 2011 to 2012 - mostly due to the higher usage of jet fuel and gasoline. VOC emissions from stationary and other sources increased by approximately 3 percent from 2012 to 2013, again mostly due to the higher usage of jet fuel and gasoline.
- The effect on 2013 VOC emissions using the new EDMS v5.1.4.1 as compared to the previous model version (EDMS v5.1.3) was small with aircraft emissions decreasing by less than 1 percent and no change to GSE emissions. In contrast, the effect on 2013 emissions using the new MOVES motor vehicle emissions model was a notable decrease of 57 percent in total motor vehicle emissions when compared to MOBILE6. If MOBILE6 was used for the 2013 analysis, the decrease in VOC emissions from 2012 would have been about 5 percent.[14] The MOVES model provides a greater degree of accuracy than MOBILE6 and will be used in future EDRs.

As shown in Figure 7-2, in 2012 aircraft continued to represent the largest source (58 percent) of VOC emissions associated with Logan Airport, followed by stationary sources (31 percent), motor vehicles (8 percent), and GSE (3 percent). In 2013, aircraft are also the largest source (64 percent) of VOC emissions associated with Logan Airport, followed by stationary sources (30 percent), motor vehicles (3 percent), and GSE (2 percent). The 2012 results shown in Table 7-4 show a 3-percent decrease of total modeled emissions of VOCs when compared to 2011 and the 2013 results show a 5-percent increase of total modeled emissions of VOCs when compared to 2012. However, the overall, long-term trend over the past two decades reveals a substantial decrease in these emissions associated with the Airport.

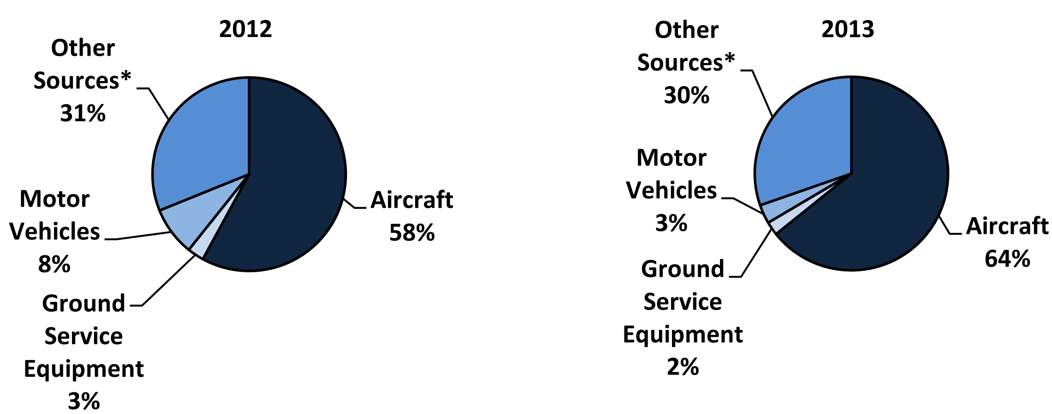
14 The U.S. EPA has reported that motor vehicle emission factors computed using the new MOVES model vary considerably than those that were computed by the older MOBILE6 model. Further details can be found in EPA Releases MOVES2010 Mobile Source Emissions Model – Questions and Answers, www.epa.gov/otag/models/moves.

Figure 7-1 Modeled Emissions of VOCs at Logan Airport, 1990, 2000, and 2009-2013



* Other sources include stationary sources (e.g., Central Heating and Cooling Plant, snow melter usage, fire training, etc.) and fueling sources.

Figure 7-2 Sources of VOC Emissions, 2012 and 2013



* Other sources include stationary sources (e.g., Central Heating and Cooling Plant, snow melter usage, fire training, etc.) and fueling sources.

Table 7-4 Estimated VOC Emissions (in kg/day) at Logan Airport, 1990, 2000, and 2009-2013[1]										
Aircraft/GSE Model:	**Logan Dispersion Modeling System (LDMS)**	**EDMS 4.03**	**EDMS v5.1**	**EDMS v5.1.2**	**EDMS v5.1.2**	**EDMS v5.1.3**	**EDMS v5.1.3**		**EDMS v5.1.3**	**EDMS v5.1.4.1**
Motor Vehicle Model:	**MOBILE 5a**	**MOBILE 6.0**	**MOBILE 6.2.03**		**MOBILE 6.2.03**		**MOBILE 6.2.03**		**MOBILE 6.2.03**	**MOVES 2010b**
Year:	**1990**	**2000**	**2009**		**2010**		**2011**	**2012**	**2013**	
Aircraft Sources										
Air carriers	2,175	514	237	235	292	292	305	378	448	447
Commuter aircraft	681	140	131	133	129	125	110	91	91	91
Cargo aircraft	303	207	71	71	70	70	69	63	44	44
General aviation	44	42	78	78	81	81	176	93	149	149
Total aircraft sources	3,203	903	517	517	572	568	660	626	732	731
Ground Service Equipment[2]	518	153	56	56	49	49	33	30	26	26
Motor Vehicles										
Ted Williams Tunnel through-traffic	NA	12	0[3]	0[3]	0[3]	0[3]	0[3]	0[3]	0[3]	0[3]
Parking/curbside[4]	192	89	22	22	20	20	20	18	17	5
On-airport vehicles	258	206	71	71	68	68	81	70	67	31
Total motor vehicle sources	450	307	93	93	88	88	101	88	84	36
Other Sources										
Fuel storage/handling	400	412	307	307	311	311	311	332	340	340
Miscellaneous sources[5]	4	2	7	7	5	5	4	4	5	5
Total other sources	404	414	314	314	316	316	315	336	345	345
Total Airport Sources	4,575	1,777	980	980	1,025	1,021	1,109	1,080	1,187	1,138

Source: Massport

Notes: Years 2009, 2010, and 2013 were computed with previous years EDMS version to provide for a common basis of comparison. Year 2013 was also computed with the previous year motor vehicle emission factors model.
kg/day = kilograms per day. 1 kg/day is equivalent to approximately 0.40234 tons per year (tpy).

NA Information not available.

1 See *Appendix I, Air Quality/Emissions Reduction* for 1993 to 2008 emission inventory results.

2 GSE emissions include aircraft APUs as well as vehicles and equipment converted to alternative fuels.

3 Due to the new roadway configuration and opening of the Ted Williams Tunnel there was no Ted Williams Tunnel through-traffic at Logan Airport beginning in 2003.

4 Parking/curbside is based on VMT analysis.

5 Includes the Central Heating and Cooling Plant, emergency electricity generation, snow melter usage, and other stationary sources.

Oxides of Nitrogen

In 2012, total NO_X emissions from all Airport-related sources were estimated to be 1,649 tpy (4,099 kg/day), which is an increase of less than 1 percent from 2011 levels. However, this occurrence should be taken within the context of an overall decrease of 30 percent from 1999 levels. In 2013, total NO_X emissions from all Airport-related sources were estimated to be 1,617 tpy (4,020 kg/day), which is a decrease of about 2 percent from 2012 levels and again, this occurrence is also within the context of an overall decrease of 31 percent from 1999 levels. As discussed later in this chapter, the year 1999 is the benchmark of the AQI for NO_x emissions associated with the Airport. Figure 7-3 depicts these short- and long-term trends in NO_x emissions and Table 7-5 shows the NO_x contribution for each emission source in 1990, 2000, and 2009 through 2013.

Table 7-5 Estimated NO_X Emissions (in kg/day) at Logan Airport, 1990, 2000, and 2009-2013[1]

Aircraft/GSE Model:	Logan Dispersion Modeling System (LDMS)	EDMS 4.03	EDMS v5.1	EDMS v5.1.2	EDMS v5.1.2	EDMS v5.1.3	EDMS v5.1.3		EDMS v5.1.3	EDMS v5.1.4.1
Motor Vehicle Model:	**MOBILE 5a**	**MOBILE 6.0**	**MOBILE 6.2.03**		**MOBILE 6.2.03**		**MOBILE 6.2.03**		**MOBILE 6.2.03**	**MOVES 2010b**
Year:	**1990**	**2000**	**2009**		**2010**		**2011**	**2012**	**2013**	
Aircraft Sources										
Air carriers	4,554	4,202	2,944	2,952	3,031	3,037	3,128	3,154	3,090	3,158
Commuter aircraft	133	125	309	234	203	204	199	182	168	152
Cargo aircraft	237	284	215	204	197	197	196	192	188	188
General aviation	13	49	27	23	29	26	43	115	46	48
Total aircraft sources	4,937	4,660	3,495	3,413	3,460	3,464	3,566	3,644	3,492	3,546
Ground Service Equipment[2]	603	333	219	219	198	198	173	164	145	145
Motor Vehicles										
Ted Williams Tunnel through-traffic	NA	26	0[3]	0[3]	0[3]	0[3]	0[3]	0[3]	0[3]	0[3]
Parking/curbside[4]	25	52	13	13	12	12	11	10	9	16
On-airport vehicles	232	425	153	153	144	144	148	128	117	131
Total motor vehicle sources	257	503	166	166	156	156	159	137	126	147
Other Sources										
Fuel storage/handling[5]	0	0	0	0	0	0	0	0	0	0
Miscellaneous sources[6]	344	211	181	181	166	166	179	154	182	182
Total other sources	344	211	181	181	166	166	179	154	182	182
Total Airport Sources	6,141	5,707	4,061	3,979	3,980	3,984	4,077	4,099	3,945	4,020

Source: Massport
Notes: Years 2009, 2010, and 2013 were computed with previous years EDMS version to provide for a common basis of comparison. Year 2013 was also computed with the previous year motor vehicle emission factors model.
kg/day - kilograms per day. 1 kg/day is approximately equivalent to 0.40234 tons per year (tpy).
1 See *Appendix I, Air Quality/Emissions Reduction* for 1993 to 2008 emission inventory results.
2 GSE emissions include APUs as well as vehicles and equipment converted to alternative fuels.
3 Due to the new roadway configuration and opening of the Ted Williams Tunnel (TWT) there was no TWT through-traffic at Logan Airport beginning in 2003.
4 Parking/curbside data is based on VMT analysis.
5 Fuel storage/handling facilities are not a source of NOx emissions.
6 Includes the Central Heating and Cooling Plant, emergency electricity generation, snow melter usage, and other stationary sources.

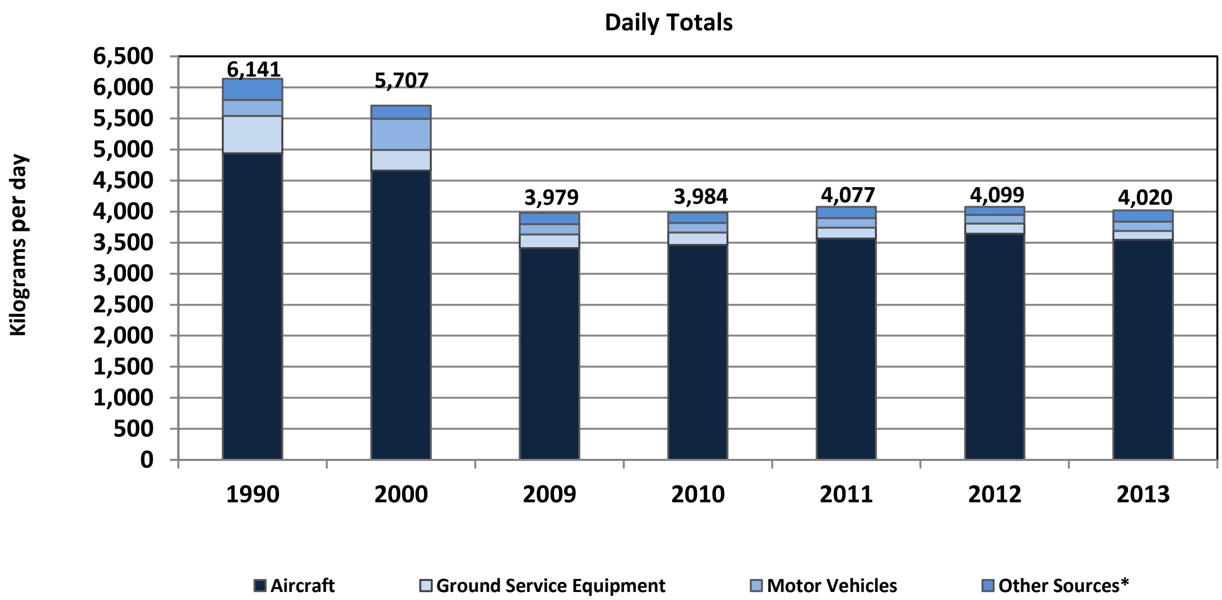
Other findings related to the NO_x emissions inventory results include the following:

- When compared to 2011 values, total aircraft-related NO_x emissions were 2 percent higher in 2012. Within the GA category, this increase is largely due to the increase in medium and large regional jets which have higher NO_x emission factors. When compared to 2012 levels, total aircraft-related NO_x emissions were 3 percent lower in 2013. This reduction is mostly due to the decrease in medium and large jets among the GA aircraft category compared to 2011 levels.
- GSE emissions of NO_x decreased by 5 percent in 2012 compared to 2011, due mostly to the decrease in aircraft LTOs of about 4 percent during this timeframe. In 2013, GSE emissions of NO_x again decreased by 12 percent (compared to 2012), due mostly to the changes in aircraft fleet mix which has an effect on the GSE fleet characteristics and usage. In particular, the aircraft fleet mix for 2013 showed an increase in the number of commuter sized jets among air carriers and a decrease in medium and large jets among the GA aircraft category, when compared to 2012. Smaller aircraft use fewer GSE (with shorter operating times) than larger aircraft, resulting in lower emissions overall.
- NO_x emissions from motor vehicles in 2012 decreased by approximately 14 percent from 2011 levels. This reduction is attributable mostly to lower emission factors of the 2012 motor vehicle fleet which are reflected in the MOBILE6 database. By comparison, computed NO_x emissions from motor vehicles in 2013 increased by approximately 7 percent from 2012 levels. The increase in motor vehicle emissions is attributable mainly to higher NO_x emission factors computed by MOVES - the EPA's new motor vehicle emissions model and a corresponding increase in on-Airport VMT.
- Stationary sources show a decrease of approximately 14 percent in NO_x emissions in 2012 compared to 2011 - largely due to the lower usage of the boilers and snow melters. Conversely, stationary sources show an increase of approximately 18 percent in NO_x emissions in 2013 compared to 2012 – again mostly due to the higher usage of the boilers and snow melters during that year (due to the cold, snowy winter).
- The effect on 2013 NO_x emissions by the new EDMS v5.1.4.1, as compared to the previous version (EDMS v5.1.3), was an increase in aircraft emissions of less than 2 percent and no change to GSE emissions. The effect on 2013 emissions calculations by the new MOVES motor vehicle emissions model was a substantial increase of about 17 percent in total modeled motor vehicle emissions when compared to MOBILE6[15]. If MOBILE6 was used for the 2013 analysis, total motor vehicle NO_x emissions would have decreased about 8 percent from 2012 levels.

Again, the overall, long-term trend over the past two decades reveals a substantial decrease in total NO_x emissions associated with the Airport.

15 The U.S. EPA has reported that motor vehicle emission factors computed using the new MOVES model vary considerably than those that were computed by the older MOBILE6 model. Further details can be found in EPA Releases MOVES2010 Mobile Source Emissions Model – Questions and Answers, www.epa.gov/otag/models/moves.

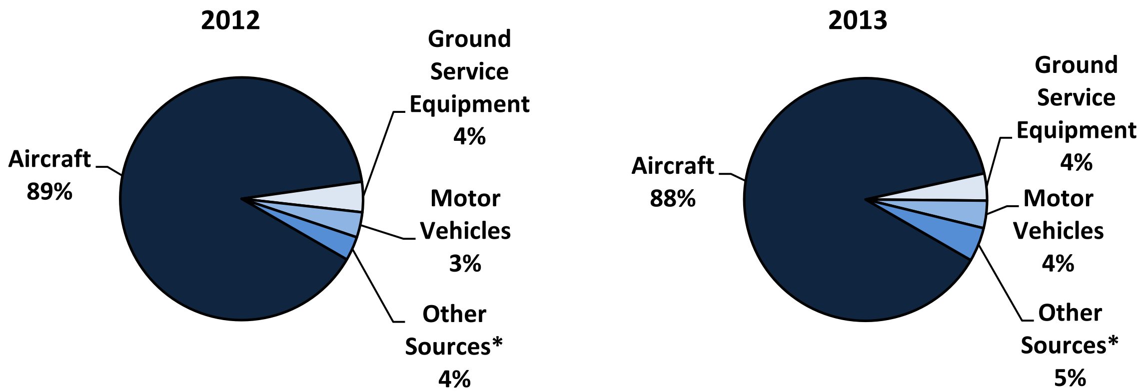
Figure 7-3 Modeled Emissions of NO_X at Logan Airport, 1990, 2000, and 2009 to 2013



* Other sources include stationary sources (e.g., Central Heating and Cooling Plant, snow melter usage, firefighter training, etc.).

As shown in Figure 7-4, in 2012, aircraft continued to represent the largest source (89 percent) of NO_x at Logan Airport, followed by GSE and stationary sources (4 percent each), and motor vehicles (3 percent). In 2013, aircraft again continued to represent the largest source (88 percent) of NO_x, followed by stationary sources (5 percent), and GSE and motor vehicles (4 percent each).

Figure 7-4 Sources of NO_X Emissions, 2012 and 2013



* Other sources include stationary sources (e.g., Central Heating and Cooling Plant, snow melter usage, fire training, etc.). Values may not add to 100 percent due to rounding.

Carbon Monoxide

Total modeled CO emissions at Logan Airport in 2012 were 2,711 tpy (6,738 kg/day), approximately 3 percent lower than 2011 levels. By comparison, total CO emissions at the Airport in 2013 were 2,953 tpy (7,340 kg/day), or approximately 9 percent higher than 2012 levels. However, Figure 7-5 depicts a long-term downward trend (58 percent overall reduction from 1990 to 2013) in CO emissions associated with Airport activities. Table 7-6 also shows the breakdown of these emissions, by source category, for the years 1990, 2000, and 2009 to 2013. Other notable findings of the analysis include:

- Aircraft-related CO emissions decreased in 2012 by less than 1 percent compared to 2011 levels due mostly to the decrease in aircraft LTOs and taxi time. In contrast, aircraft-related CO emissions increased in 2013 by about 9 percent compared to 2012 due to the corresponding increase in aircraft LTOs and taxi time during that year.
- GSE CO emissions decreased by approximately 11 percent in 2012 compared to 2011 due mostly to the decrease in aircraft LTOs. Moreover, GSE emissions of CO decreased by about 14 percent in 2013 compared to 2012 - again due mostly to the changes in aircraft fleet mix which has an effect on the GSE fleet characteristics and usage. The aircraft fleet mix for 2013 showed an increase in the number of commuter-sized jets among air carriers and a decrease in medium and large jets among the GA aircraft category, when compared to 2012. Smaller aircraft use fewer GSE with shorter operating times than larger aircraft resulting in lower emissions.
- CO emissions from motor vehicles declined in 2012 by approximately 8 percent from 2011 levels. This reduction is attributable mostly to the lower emission factors of the motor vehicle fleet, which are reflected in the MOBILE6 database. However, computed CO emissions from motor vehicles in 2013 increased by approximately 23 percent from 2012 levels. The particular increase in motor vehicle emissions is unique

and mostly aligned with the higher CO emission factors from MOVES - the EPA's new motor vehicle emissions model and an increase in VMT.[16]

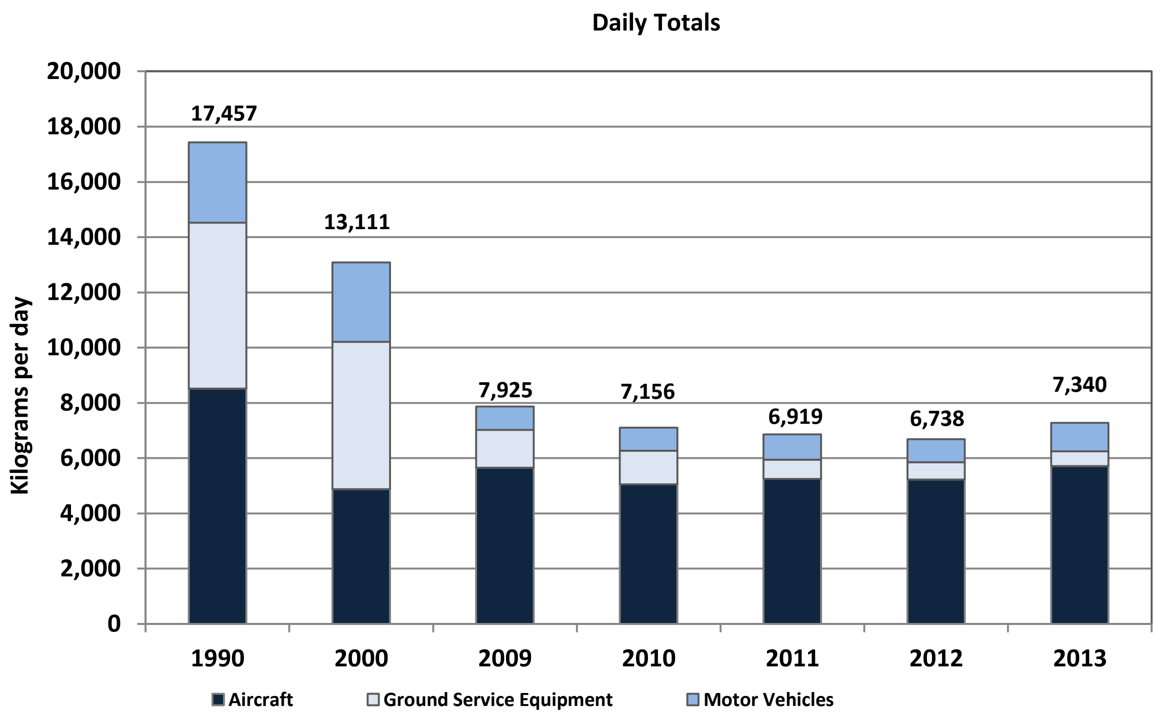
- Stationary sources show a decrease of approximately 19 percent in CO emissions in 2012 compared to 2011, largely due to the lower usage of the boilers and snow melters. Conversely, stationary sources show an increase of approximately 23 percent in CO emissions in 2013 compared to 2012 - again due to the higher usage of the boilers and snow melters during that year.
- The effect on 2013 CO emissions calculated using the new EDMS v5.1.4.1 model as compared to the previous version (EDMS v5.1.3), was small with aircraft emissions decreasing by about 1 percent and resulting in no change to GSE emissions. The effect on 2013 emissions by the new MOVES motor vehicle emissions model was a substantial increase of 22 percent in total motor vehicle emissions when compared to MOBILE6.[17] If MOBILE6 was used for the 2013 analysis, the increase in CO emissions from 2012 would have been less than 1 percent. [18]

Again, as with total emissions of VOCs and NO_x, the overall, long-term trend over the past two decades reveals a substantial decrease in total CO emissions associated with the Airport.

As shown in Figure 7-6, for 2012, aircraft emissions continued to represent the largest source (78 percent) of CO at Logan Airport, followed by motor vehicles (12 percent), GSE (9 percent), and stationary sources (less than 1 percent). For 2013, aircraft emissions also continued to represent the largest source (78 percent) of CO at Logan Airport, followed by motor vehicles (14 percent), GSE (7 percent), and stationary sources (less than 1 percent).

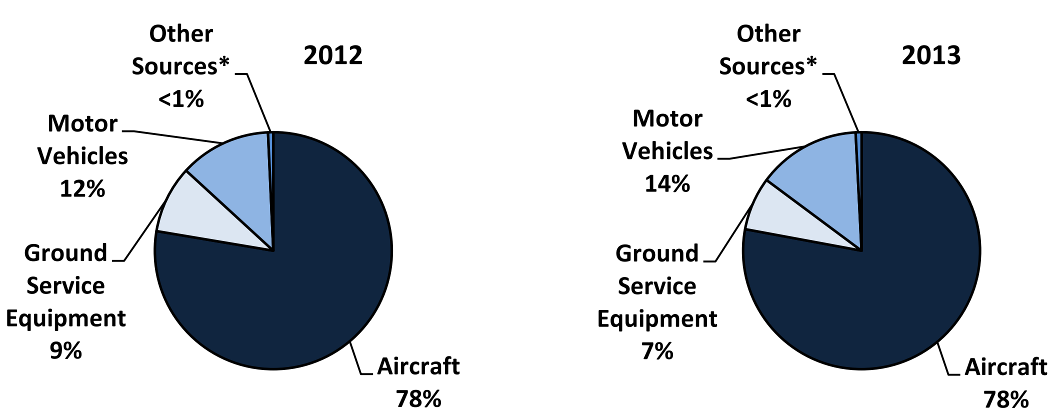
16 See footnote No. 11.
17 Ibid.
18 The U.S. EPA has reported that motor vehicle emission factors computed using the new MOVES model vary considerably than those that were computed by the older MOBILE6 model. Further details can be found in EPA Releases MOVES2010 Mobile Source Emissions Model – Questions and Answers, www.epa.gov/otag/models/moves.

Figure 7-5 Modeled Emissions of CO at Logan Airport, 1990, 2000, and 2009 to 2013



Note: Other stationary sources not shown (this source made up less than 1 percent of the total).

Figure 7-6 Sources of CO Emissions, 2012 and 2013



* Other sources include stationary sources (e.g., Central Heating and Cooling Plant, snow melter usage, fire training, etc.).

Table 7-6 Estimated CO Emissions (in kg/day) at Logan Airport, 1990, 2000, and 2009-2013[1]

Aircraft/GSE Model:	Logan Dispersion Modeling System (LDMS)	EDMS 4.03	EDMS v5.1	EDMS v5.1.2	EDMS v5.1.2	EDMS v5.1.3	EDMS v5.1.3		EDMS v5.1.3	EDMS v5.1.4.1
Motor Vehicle Model:	**MOBILE 5a**	**MOBILE 6.0**	**MOBILE 6.2.03**		**MOBILE 6.2.03**		**MOBILE 6.2.03**		**MOBILE 6.2.03**	**MOVES2010b**
Year:	**1990**	**2000**	**2009**		**2010**		**2011**	**2012**	**2013**	
Aircraft Sources										
Air carriers	6,613	2,994	2,460	2,448	2,531	2,531	2,592	2,816	3,320	3,323
Commuter aircraft	977	1,188	2,364	2,795	2,629	2,086	2,042	1,928	1,978	1,907
Cargo aircraft	576	400	256	266	248	259	246	183	155	155
General aviation	352	295	145	150	177	173	370	304	345	334
Total aircraft sources	8,518	4,876	5,225	5,659	5,585	5,049	5,250	5,232	5,798	5,719
Ground Service Equipment[2]	6,001	5,335	1,364	1,364	1,222	1,222	694	618	533	533
Motor Vehicles										
Ted Williams Tunnel through-traffic	NA	133	0[3]	0[3]	0[3]	0[3]	0[3]	0[3]	0[3]	0[3]
Parking/curbside[4]	1,218	495	107	107	106	106	110	104	104	94
On-airport vehicles	1,689	2,245	740	740	726	726	806	737	742	935
Total motor vehicle sources	2,907	2,873	847	847	832	832	916	840	846	1,029
Other Sources										
Fuel storage/handling[5]	0	0	0	0	0	0	0	0	0	0
Miscellaneous sources[6]	31	27	55	55	53	53	59	48	59	59
Total other sources	31	27	55	55	53	53	59	48	59	59
Total Airport Sources	17,457	13,111	7,491	7,925	7,692	7,156	6,919	6,738	7,236	7,340

Source: Massport

1 See *Appendix I, Air Quality/Emissions Reduction* for 1993 to 2008 emission inventory results.
2 GSE emissions include aircraft APUs as well as vehicles and equipment converted to alternative fuels.
3 Due to the new roadway configuration and opening of the Ted Williams Tunnel there was no Ted Williams Tunnel through-traffic at Logan Airport beginning in 2003.
4 Parking/curbside is based on VMT analysis.
5 Fuel storage/handling facilities are not a source of NOx emissions.
6 Includes the Central Heating and Cooling Plant, emergency electricity generation, snow melter usage, and other stationary sources.

Particulate Matter

Table 7-7 shows that total estimated $PM_{10}/PM_{2.5}$ emissions at Logan Airport in 2012 were 29 tpy (72 kg/day), or approximately 7 percent higher than 2011 levels. Total estimated $PM_{10}/PM_{2.5}$ emissions at Logan Airport in 2013 were 37 tpy (92 kg/day), or approximately 28 percent higher than 2012 levels. Explanations of these results and other key findings of the analysis are summarized as follows:

- Estimated aircraft-related $PM_{10}/PM_{2.5}$ emissions increased approximately 13 percent in 2012 compared to 2011 levels. Similarly, estimated aircraft-related $PM_{10}/PM_{2.5}$ emissions also increased by approximately 22 percent in 2013 compared to 2012 levels. This particular increase is unique and is mostly attributable to the increase in a select group of aircraft with higher $PM_{10}/PM_{2.5}$ emission factors in 2012/2013 and changes in how aircraft PM emissions are calculated in EDMS v5.1.4.1 for 2013.

- Modeled $PM_{10}/PM_{2.5}$ associated with GSE/APU emissions remained approximately the same in 2012 when compared to 2011. However, $PM_{10}/PM_{2.5}$ emissions decreased about 8 percent in 2013 when compared to 2012 due mostly to the changes in aircraft fleet mix which has an effect on the GSE fleet characteristics and usage. Specifically, the aircraft fleet mix for 2013 showed an increase in the number of commuter-sized jets among air carriers and a decrease in medium and large jets among the GA aircraft category when compared to 2012. Smaller aircraft use fewer GSE with shorter operating times than larger aircraft resulting in fewer air emissions.

- $PM_{10}/PM_{2.5}$ emissions from motor vehicles remained approximately the same in 2012 when compared to 2011 levels. However, $PM_{10}/PM_{2.5}$ emissions showed a computed increase of approximately 150 percent in 2013 when compared to 2012 levels, primarily attributable to the higher assumed emission factors of MOVES - the EPA's new motor vehicle emissions model. Importantly, if the MOBILE6 model had been used to compare 2012 and 2013 modeled conditions, the results would have remained the same.

- Stationary sources represent only 3 percent of the overall total of $PM_{10}/PM_{2.5}$ emissions at Logan Airport. Stationary source emissions of $PM_{10}/PM_{2.5}$ decreased by approximately 33 percent in 2012 compared with 2011, again largely due to the lower usage of the boilers and snow melters over this timeframe. Conversely, stationary source emissions of $PM_{10}/PM_{2.5}$ increased by approximately 50 percent in 2013 compared with 2012, largely due to the higher usage of the boilers and snow melters during this year.

- The effect on 2013 $PM_{10}/PM_{2.5}$ emissions by the new EDMS v5.1.4.1 as compared to the previous version (EDMS v5.1.3) was a 29 percent increase in aircraft emissions and no change in GSE emissions. Moreover, the effect on calculated 2013 emissions by the new MOVES motor vehicle emissions model was a significant increase of 150 percent in total motor vehicle emissions when compared to MOBILE6.[19] Again, if MOBILE6 was used for the 2013 analysis, $PM_{10}/PM_{2.5}$ emissions would be approximately the same as in 2012.[20]

19 The U.S. EPA has reported that motor vehicle emission factors computed using the new MOVES model vary considerably than those that were computed by the older MOBILE6 model. Further details can be found in EPA Releases MOVES2010 Mobile Source Emissions Model – Questions and Answers, www.epa.gov/otag/models/moves.

20 Vehicle Miles Traveled (VMT) increased by 5 percent from 2012 to 2013. However, MOBILE6 PM emission factors decreased by the same amount (effectively cancelling each other out). Thus, if MOBILE6 had been used for the 2013 analysis, modeled PM emissions would have decreased by less than 1 percent from 2012 to 2013.

Table 7-7 Estimated $PM_{10}/PM_{2.5}$ Emissions (in kg/day) at Logan Airport, 2009-2013[1]

Aircraft/GSE Model:	EDMS v5.1	EDMS v5.1.2	EDMS v5.1.2	EDMS v5.1.3	EDMS v5.1.3		EDMS v5.1.3	EDMS v5.1.4.1
Motor Vehicle Model:	MOBILE 6.2.03		MOBILE 6.2.03		MOBILE 6.2.03		MOBILE 6.2.03	MOVES2010b
Year:	2009		2010		2011	2012	2013	
Aircraft Sources								
Air carriers	43	36	34	34	35	43	41	48
Commuter aircraft	5	5	4	4	3	2	2	7
Cargo aircraft	4	3	3	3	3	3	2	3
General aviation	2	2	2	2	4	3	3	4
Total aircraft sources	54	46	43	43	45	51	48	62
Ground Service Equipment[2]	14	14	13	13	13	13	12	12
Motor Vehicles								
Ted Williams Tunnel through-traffic	0[3]	0[3]	0[3]	0[3]	0[3]	0[3]	0[3]	0[3]
Parking/curbside[4]	<1	<1	<1	<1	<1	<1	<1	<1
On-airport vehicles	6	6	6	6	6	6	6	14
Total motor vehicle sources	6	6	6	6	6	6	6	15
Other Sources								
Fuel storage/handling[5]	0	0	0	0	0	0	0	0
Miscellaneous sources[6]	5	5	2	2	3	2	3	3
Total other sources	5	5	2	2	3	2	3	3
Total Airport Sources	79	71	64	64	67	72	69	92

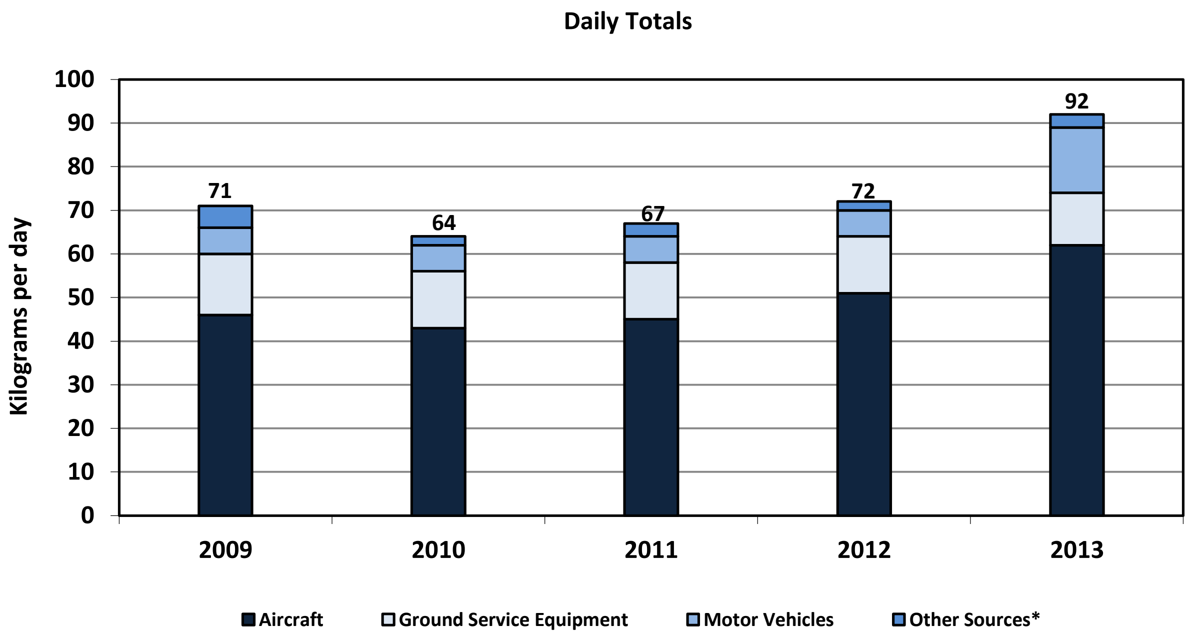
Source: Massport

Notes: Years 2009, 2010, and 2013 were computed with previous years EDMS version to provide for a common basis of comparison. Year 2013 was also computed with the previous year motor vehicle emission factors model. Information back to 2990 is provided in *Appendix I,* Air Quality.
kg/day - kilograms per day. 1 kg/day is approximately equivalent to 0.40234 tons per year (tpy); PM - particulate matter

1 It is assumed that all PM are less than 2.5 microns in diameter ($PM_{2.5}$). See *Appendix I, Air Quality/Emissions Reduction* for 2005 to 2008 emission inventory results.
2 GSE emissions include APUs as well as vehicles and equipment converted to alternative fuels.
3 Due to the new roadway configuration and opening of the Ted Williams Tunnel there was no Ted Williams Tunnel through-traffic at Logan Airport beginning in 2003.
4 Parking/curbside is based on VTM analysis.
5 Fuel storage and handling facilities are not sources of PM emissions.
6 Includes the Central Heating and Cooling Plant, emergency electricity generation, fire training, snow melters, and other stationary sources.

As shown in Figures 7-7 and 7-8, aircraft represent the largest (67 percent) source of $PM_{10}/PM_{2.5}$ followed by GSE (20 percent), motor vehicles (9 percent), and stationary sources (e.g., Central Heating and Cooling Plant, snow melter usage, fire training, etc.) (3 percent).

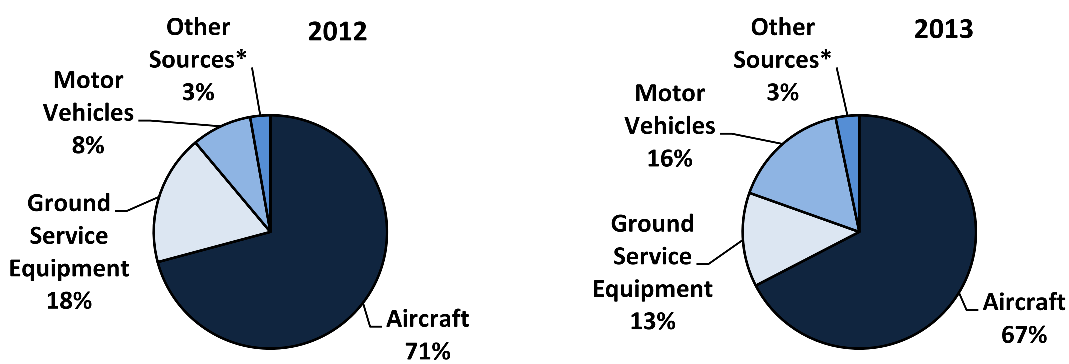
Figure 7-7 Modeled Emissions of $PM_{10}/PM_{2.5}$ at Logan Airport, 2009-2013



Note: The increase in emissions from 2012 to 2013 were primarily due to changes in the current EDMS and MOVES computer models.

* Other sources include stationary sources (e.g., Central Heating and Cooling Plant, snow melter usage, fire training, etc.).

Figure 7-8 Sources of $PM_{10}/PM_{2.5}$ Emissions, 2012 and 2013



* Other sources include stationary sources (e.g., Central Heating and Cooling Plant, snow melter usage, fire training, etc.)

Greenhouse Gas Assessment

GHGs are known to contribute to climate change (also known as global warming), although there is still some uncertainty regarding the global magnitude of this impact and the associated short- and long-term remedies. In April 2009, the EPA issued a proposed finding that GHGs also contribute to air pollution that may endanger public health or welfare. This action has laid the initial groundwork for the regulation of GHG emissions nation-wide under the CAA, although currently there are no specific U.S. laws or regulations that call for the regulation of GHGs associated with airports. The climate change bills proposed in Congress have thus far focused on entities that emit significant amounts of GHGs and have direct control over these emissions (e.g., power plants, fuel producers, cement manufacturing, etc.). Current estimates of aviation-related GHG emission contributions to man-made totals range from 2 to 4 percent world-wide and approximately 3 percent nationwide.[21,22]

In May 2010, the Massachusetts Executive Office of Energy and Environmental Affairs (EEA) revised the *Massachusetts Environmental Policy Act (MEPA) Greenhouse Gas Emissions Policy and Protocol*.[23] Under the revised policy, certain projects undergoing review under MEPA (not specifically this *2012/2013 EDR*) are required to:

- Quantify the GHG emissions generated by proposed projects; and
- Identify measures to avoid, minimize, or mitigate such emissions.[24]

Massport has voluntarily agreed to the goals in the Leading by Example—Clean Energy and Efficient Buildings targets.[25] To achieve these goals, Massport has many ongoing initiatives including (but are not limited to) the purchase of renewable energy credits, and other capital investments that will conserve fossil fuel and energy in both the short- and long-term. In conjunction with the Massachusetts Global Warming Solutions Act, Massport has participated in working groups primarily focused on reducing transportation and building energy demand by increasing energy efficiency, providing incentives to increase passengers per vehicle, and expanding upon opportunities for alternative (low-emitting) fuel use within the transportation sector.

Since October 2009, Massport is also part of the Commonwealth's Climate Adaptation Advisory Committee. Within this committee, the Key Infrastructure team looked at potential issues at airports related to service disruption, access issues, flooding, and other storm-related impacts. The final *Climate Change Adaptation Report* was issued in September 2011.

21 Fourth Assessment Report of the Intergovernmental Panel on Climate Change, Cambridge University Press, New York City, NY. 2007.
22 U.S. Governmental Accountability Office (GAO), Aviation and the Environment, NextGen and Research and Development Are Keys to Reducing Emissions and Their Impact on Health and Climate, May 6, 2008.
23 Revised MEPA Greenhouse Gas Emissions Policy and Protocol, Massachusetts Executive Office of Energy and Environmental Affairs, effective May 5, 2010.
24 These GHG are comprised primarily of carbon dioxide (CO2), methane (CH4), nitrous oxides (N2O), and three groups of fluorinated gases (i.e., sulfur hexafluoride [SF6], hydrofluorocarbons [HFCs], and perfluorocarbons [PFCs]). GHG emission sources associated with airports are generally limited to CO2, CH4, and N2O.
25 Executive Order No. 484, Leading by Example—Clean Energy and Efficient Buildings, Massachusetts Executive Office of Energy and Environmental Affairs, April 18, 2007.

With respect to the GHG emissions inventory conducted for 2012 and 2013, the following information is noteworthy:

- Even though the *2012/2013 EDR* is not subject to the MEPA GHG policy since it does not propose any discrete projects, Massport has voluntarily prepared an inventory of GHG emissions directly and indirectly associated with the Airport starting with the *2007 EDR*.
- For this assessment, the 2012 and 2013 GHG emissions inventory includes aircraft operations within the ground-based taxi-idle/delay mode and up to the top of the 3,000–foot LTO cycle. GHG emissions associated with GSE/APU, motor vehicles, a variety of stationary sources, and electricity usage were also included.
- Massport has direct ownership or control over a small percentage of these GHG emission sources (i.e., limited to Massport fleet vehicles, stationary sources, and electrical consumption within Massport buildings). The vast majority of the emission sources are owned or controlled by the airlines, other airport tenants (such as rental car companies), and the general public (such as passenger motor vehicles).
- Massport also prepares two other GHG emissions inventories for Logan Airport:
  - A 2012 and 2013 GHG emissions inventory for the MassDEP GHG Emissions Reporting Program for those sources meeting the criteria for Category 1 and Scope 1 (i.e., only those sources under the direct ownership and control of Massport);[26] and the
  - EPA Greenhouse Gas Summary Report.[27]

This EDR analysis followed the EEA guidelines and uses widely-accepted emission factors that are considered appropriate for airports, including International Organization for Standardization (ISO) New England electricity-based values. The analysis is also consistent with the ACRP guidance with the exception that only a portion of aircraft cruise mode emissions (below the 3,000-foot LTO cycle) were included.

For the EDR, GHG emissions are categorized by ownership and control including: (1) emissions related to Massport activities were assigned to the Massport category; (2) emissions related to airport tenants were assigned to the tenant category; and (3) emissions related to the public, such as private automobiles, were assigned to the public category. These three categories (identified in Table 7-8) are also characterized by the degree of control that the airport operator (Massport) has over GHG emissions.

- Category 1 – GHG emissions from sources that are owned and controlled by the reporting entity (e.g., Massport). Category 1 typically represents sources which are owned by the entity - or sources which are not owned by the entity, but over which the entity can exert control. At Logan Airport, these sources include airport-owned and controlled stationary sources (e.g., boilers, generators, etc.), fleet vehicles, and purchased electricity. On-airport ground transportation and off-airport employee vehicle trips are included as Category 1 emissions as they are partly controlled by the airport.
- Category 2 – This category comprises sources owned and controlled by airlines and airport tenants, and include aircraft (on-ground, within the LTO up to 3,000 feet), GSE/APU, electrical consumption, and employee vehicles.

26 Boston Logan International Airport, Massachusetts Department of Environmental Protection GHG Emissions Reporting Program, April 23, 2013 and April 15, 2014.
27 U.S. EPA Greenhouse Gas Summary Report for Boston Logan International Airport for calendar years 2012 and 2013.

- Category 3 – This category generally comprises GHG emissions associated with passenger ground access vehicles. These include public automobiles, taxis, limousines, buses, shuttle vans, etc. operating on the off-airport roadway network.

Consistent with the ACRP guidelines, once the ownership categories are determined, the operational boundaries are also set, reflecting the Scope of the emission source (refer to Table 7-8) and include:

- Scope 1 /Direct – GHG emissions from sources that are owned and controlled by the reporting entity (e.g., Massport) such as stationary sources and airport-owned fleet motor vehicles.
- Scope 2 /Indirect – GHG emissions associated with the generation of electricity consumed, but generated off-site at public utilities.
- Scope 3 /Indirect and Optional – GHG emissions that are associated with the activities of the reporting entity (e.g., Massport), but are associated with sources that are owned and controlled by others. These include aircraft-related emissions, emissions from airport tenant's activities, as well as ground transportation to and from the airport.

Table 7-8 Ownership Categorization and Emissions Category/Scope

Owning/Controlling Entity Categories	Source	Category/Scope
Massport Owned and/or Controlled	Massport Fleet Vehicle	Category 1/Scope 1
	On-airport Ground Transportation	Category 1/Scope 1
	Off-airport Employee Vehicle Trips	Category 1/Scope 3
	On-airport Parking Lots	Category 1/Scope 1
	Stationary Sources (includes generators, boilers, etc.)	Category 1/Scope 1
	Fire Training	Category 1/Scope 1
	Electrical Consumption	Category 1/Scope 2
Tenant Owned and/or Controlled (includes airlines, government, concessionaires, aircraft operators, fixed-based operators, etc.)	Aircraft (on-ground, within the LTO up to 3,000 feet)	Category 2/Scope 3
	Auxiliary Power Units	Category 2/Scope 3
	Ground Support Equipment	Category 2/Scope 3
	Off-airport Employee Vehicle Trips	Category 2/Scope 3
	Electrical Consumption	Category 2/Scope 2
Public Owned and Controlled	Off-airport Vehicle Trips (Includes private automobiles, taxis, limousines, buses, shuttle vans, etc., operating on the off-airport roadway network)	Category 3/Scope 3

Source: Massport
Note: Follows Airport Cooperative Research Program (ACRP) guidance.
LTO Landing and Takeoff.

The GHG emissions inventory included in this *2012/2013 EDR* is consistent with the data provided in MassDEP and EPA GHG inventories. However, the *2012/2013 EDR* GHG emissions inventory is more comprehensive as it covers all three scopes of GHG emissions at Logan Airport including those from tenants and the public, which is consistent with ACRP guidance.[28] The EPA GHG Reporting Program covers only stationary sources (i.e., Category 1 and Scope 1).

Tables 7-9 and 7-10 present the 2012 and 2013 GHG emissions inventory, respectively, reported in CO_2 equivalent values.[29] As shown, in 2012 Massport-related emissions represent only 10.3 percent of total GHG emissions at the Airport. By comparison, tenant-based emissions represent 69.2 percent, purchased electricity represents 14.2 percent, and passenger vehicle emissions represent 6.3 percent of total GHG emissions. Similarly, in 2013 Massport-related emissions represent only 13.4 percent of total GHG emissions at the Airport. Again, tenant based emissions represent 66.4 percent, electrical consumption from Massport, common areas, and tenants represents 10.1 percent, and passenger vehicle emissions represent 10.2 percent of total GHG emissions. For both 2012 and 2013, aircraft represent the largest source of emissions followed by motor vehicles and electricity generation as shown in Figures 7-9 and 7-10, respectively.

When segregated by Scopes, tenants and passenger vehicles (Scope 3) represent the largest source of GHG emissions at 75 to 77 percent, followed by electrical consumption (Scope 2) at 10 to 14 percent, and Massport (Scope 1) at 10 to 13 percent (again, see Figures 7-9 and 7-10). Overall, total GHG emissions associated with the Airport were lower by 3 percent when compared to 2011 levels. By comparison, total 2013 GHG emissions increased by about 6 percent from 2012 levels due partly to an increase in aircraft operations and passenger automobile traffic during this time frame.

Massport plans to continue to update this GHG Emissions Inventory for Logan Airport annually.

28 However, aircraft cruise mode emissions above the 3,000-foot LTO cycle were not included.

29 CO2 equivalent values are based upon the Global Warming Potential values of 1 for CO2, 25 for CH4, and 298 for N2O (based on a 100 year period) as presented in the Intergovernmental Panel on Climate Change (IPCC) Fourth Assessment Report, 2007.

Table 7-9 Estimated Greenhouse Gas Emissions Inventory (in MMT of CO_2eq) at Logan Airport, 2012[1]

Source	Category	Scope	CO_2	N_2O	CH_4	Totals
Massport Emissions						
Ground Support Vehicles[2]	1	1	<0.01	<0.01	<0.01	0.01
Massport Shuttle Bus	1	1	<0.01	<0.01	<0.01	<0.01
Massport Express Bus	1	1	<0.01	<0.01	<0.01	<0.01
On-Airport Roadways[3]	1	1	0.02	<0.01	<0.01	0.02
Off-Airport Roadways (Employees)[4]	1	3	<0.01	<0.01	<0.01	<0.01
Parking Lots	1	1	<0.01	<0.01	<0.01	<0.01
Stationary Sources[5]	1	1	0.02	<0.01	<0.01	0.02
Total Massport Emissions (10.3%)			**0.06**	**<0.01**	**<0.01**	**0.06**
Tenant Emissions						
Aircraft – Ground[6]	2	3	0.18	<0.01	<0.01	0.19
Aircraft – Ground to 3000 feet[7]	2	3	0.17	<0.01	<0.01	0.17
Aircraft Engine Startup	2	3	<0.01	<0.01	<0.01	<0.01
Ground Support Equipment	2	3	0.01	<0.01	<0.01	0.01
Auxiliary Power Units	2	3	0.01	<0.01	<0.01	0.01
Off-Airport Roadways (Employees)[4]	2	3	0.02	<0.01	<0.01	0.02
Total Tenant Emissions (69.2%)			**0.39**	**<0.01**	**<0.01**	**0.39**
Purchased Electricity Emissions[8]						
Massport	1	2	0.01	<0.01	<0.01	0.01
Tenant and Common Area	2 and 3	2	0.07	<0.01	<0.01	0.07
Total Purchased Electricity Emissions (14.2%)			**0.08**	**<0.01**	**<0.01**	**0.08**
Passenger Vehicle Emissions						
Off-Airport Roadways[4]	3	3	0.04	<0.01	<0.01	0.04
Total Passenger Vehicle Emissions (6.3%)			**0.04**	**<0.01**	**<0.01**	**0.04**
Total Logan Airport Emissions[9]			**0.56**	**<0.01**	**<0.01**	**0.57**
Percent of Statewide Totals[10]			<1.0%	<1.0%	<1.0%	<1.0%

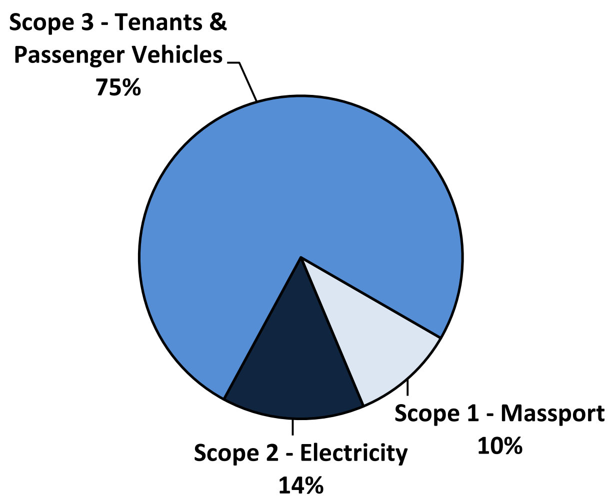
Source: Massport
1 MMT - million metric tons of CO_2 equivalents (1 MMT = 1.1M Short Tons). CO_2 equivalents (CO_2eq) are bases for reporting the three primary GHGs (e.g., CO_2, N_2O, and CH_4) in common units. Quantities are reported as "rounded" and truncated values for ease of addition.
2 Ground Support Vehicles include the Logan Airport fleet. Emissions were calculated based on fuel usage.
3 On-airport roadways based on on-site vehicle miles traveled (VMT) and includes all vehicles.
4 Off-site roadways based on off-site Airport-related VMT and an average round trip distance of 60.5 miles (2010 Passenger Ground Access Survey).
5 Other sources include Central Heating and Cooling Plant, emergency generators, snow melters, and live fire training facility.
6 Aircraft – Ground emissions include taxi-in, taxi-out and ground-based delay emissions.
7 Aircraft – Ground to 3,000 feet include takeoff, climbout, and approach emissions up to a height of 3,000 feet (as specified by the ACRP guidance).
8 Emissions from electrical consumption occurs off-airport at power generating plants.
9 Total Emissions = Airport + Tenant + Public.
10 Percentage based on relative amount of total emissions to statewide total from World Resources Institute (cait.wri.org).

Table 7-10 Estimated Greenhouse Gas Emissions Inventory (in MMT of CO_2eq) at Logan Airport, 2013[1]

Source	Category	Scope	CO_2	N_2O	CH_4	Totals
Massport Emissions						
Ground Support Vehicles[2]	1	1	0.01	<0.01	<0.01	0.01
Massport Shuttle Bus	1	1	<0.01	<0.01	<0.01	<0.01
Massport Express Bus	1	1	<0.01	<0.01	<0.01	<0.01
On-Airport Roadways[3]	1	1	0.03	<0.01	<0.01	0.03
Off-Airport Roadways (Employees)[4]	1	3	<0.01	<0.01	<0.01	<0.01
Parking Lots	1	1	0.01	<0.01	<0.01	0.01
Stationary Sources[5]	1	1	0.03	<0.01	<0.01	0.03
Total Massport Emissions (13.4%)			**0.08**	**<0.01**	**<0.01**	**0.08**
Tenant Emissions						
Aircraft – Ground[6]	2	3	0.19	<0.01	<0.01	0.19
Aircraft – Ground to 3000 feet[7]	2	3	0.16	<0.01	<0.01	0.17
Aircraft Engine Startup	2	3	<0.01	<0.01	<0.01	<0.01
Ground Support Equipment	2	3	0.01	<0.01	<0.01	0.01
Auxiliary Power Units	2	3	0.01	<0.01	<0.01	0.01
Off-Airport Roadways (Employees)[4]	2	3	0.02	<0.01	<0.01	0.02
Total Tenant Emissions (66.4%)			**0.39**	**<0.01**	**<0.01**	**0.40**
Purchased Electricity Emissions[8]						
Massport	1	2	<0.01	<0.01	<0.01	0.01
Tenant and Common Area	2 and 3	2	0.05	<0.01	<0.01	0.06
Total Purchased Electricity Emissions (10.1%)			**0.06**	**<0.01**	**<0.01**	**0.06**
Passenger Vehicle Emissions						
Off-Airport Roadways[4]	3	3	0.06	<0.01	<0.01	0.06
Total Passenger Vehicle Emissions (10.2%)			**0.06**	**<0.01**	**<0.01**	**0.06**
Total Logan Airport Emissions[9]			**0.60**	**<0.01**	**<0.01**	**0.60**
Percent of Statewide Totals[10]			<1.0%	<1.0%	<1.0%	<1.0%

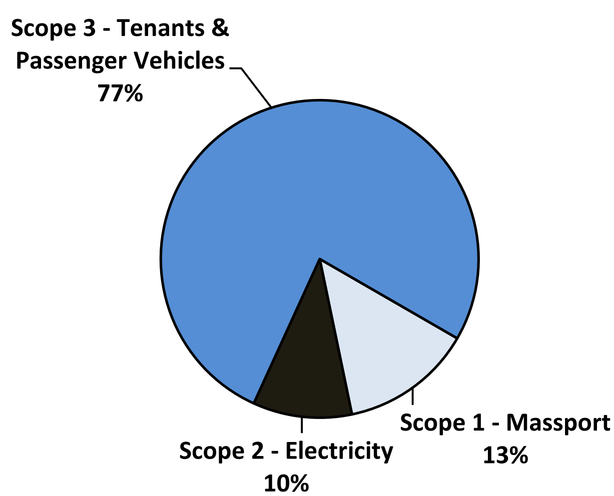
Source: Massport
1 MMT - million metric tons of CO_2 equivalents (1 MMT = 1.1M Short Tons). CO_2 equivalents (CO_2eq) are bases for reporting the three primary GHGs (e.g., CO_2, N_2O, and CH_4) in common units. Quantities are reported as "rounded" and truncated values for ease of addition.
2 Ground Support Vehicles include the Logan Airport fleet. Emissions were calculated based on fuel usage.
3 On-airport roadways based on on-site vehicle miles traveled (VMT) and includes all vehicles.
4 Off-site roadways based on off-site Airport-related VMT and an average round trip distance of 60 miles (2013 Logan International Airport Air Passenger Ground-Access Survey).
5 Other sources include Central Heating and Cooling Plant, emergency generators, snow melters, and live fire training facility.
6 Aircraft – Ground emissions include taxi-in, taxi-out and ground-based delay emissions.
7 Aircraft – Ground to 3,000 feet include takeoff, climbout, and approach emissions up to a height of 3,000 feet (as specified by the ACRP guidance).
8 Emissions from electrical consumption occurs off-airport at power generating plants.
9 Total Emissions = Airport + Tenant + Public.
10 Percentage based on relative amount of total emissions to statewide total from World Resources Institute (cait.wri.org).

Figure 7-9 Sources of GHG Emissions, 2012



Note: Scope 1 emissions are from sources that are owned or controlled by Massport, Scope 2 emissions are from electrical consumption, which are generated off-Airport at power generating plants, and Scope 3 emissions are from airport tenants and ground transportation to and from the Airport.

Figure 7-10 Sources of GHG Emissions, 2013



Note: Scope 1 emissions are from sources that are owned or controlled by Massport, Scope 2 emissions are from electrical consumption, which are generated off-Airport at power generating plants, and Scope 3 emissions are from airport tenants and ground transportation to and from the Airport.

Air Quality Emissions Reduction

As part of implementing the ongoing air quality management strategy for Logan Airport, Massport has established a number of goals and objectives to address air emissions from Airport operations, including the minimization of Airport-related emissions through the AQI and the reduction of GSE and Massport fleet emissions with AFV. This section presents an update on the AQI and the AFV Program at Logan Airport.

Air Quality Initiative

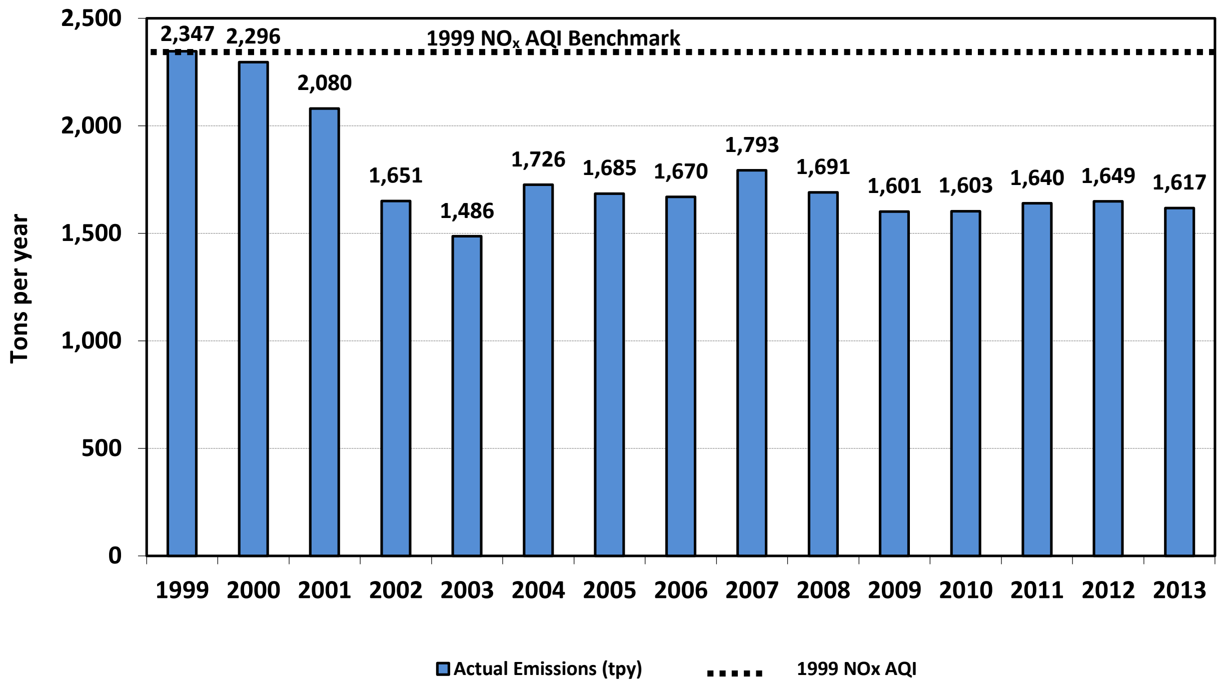
Massport developed the AQI as a 15-year voluntary program with the overall goal to maintain NO_x emissions associated with Logan Airport at, or below, 1999 levels. The AQI has four primary commitments, shown below, along with Massport's progress in meeting the AQI commitments.

- **Expand on the initiatives already in-place at Logan Airport.** See Table 7-11 for the initiatives in place at the time the AQI was developed.
- **As necessary to maintain NO_x emissions at or below 1999 levels, retire emissions credits, giving priority to mobile sources.** Massport updates the AQI inventory of NO_x emissions annually to reflect new information and changing conditions associated with the Airport's operations. Table 7-11 presents the updated emissions inventory and shows that, in 2012 and 2013, it was not necessary to purchase and retire mobile source emission credits to maintain NO_x emissions at, or below, 1999 levels.
- **Report the status and progress of the AQI in the ESPR or EDR.** Massport reports on the status of the AQI in the Logan Airport EDRs and ESPRs and has done so since 2001 (Table 7-11).
- **Continue to work at international and national levels to decrease air emissions from aviation sources.** Massport maintains memberships and active participation in a number of organizations involved in addressing aviation-related environmental issues, including air quality. These include serving on technical review committees of the American Association of Airport Executives (AAAE), and Airports Council International (ACI).

As shown in Table 7-11, NO_x emissions at Logan Airport in 2012 (net total with reductions) were approximately 698 tpy lower than the 1999 AQI benchmark and in 2013 were approximately 730 tpy lower than this threshold. Since 1999, this trend represents a 30 and 31 percent decrease in 2012 and 2013, respectively. Between 1999 and 2013, the greatest reductions of NO_x emissions were associated with aircraft, GSE, and on-Airport motor vehicles: 24 percent, 67 percent, and 72 percent reductions, respectively.

Figure 7-11 compares the 1999 threshold level of 2,347 tpy of NO_X emissions to modeled NO_x emissions for 2001 through 2013. Cumulatively, as of December 31, 2013, NO_x emissions at Logan Airport were approximately 8,695 tons below the benchmark set by the AQI. As shown in Table 7-11, based upon current projections, Massport expects that because the emission inventory is projected to be well below the 1999 threshold of 2,347 tpy through 2015, no credits will need to be purchased through the AQI timeframe.

Figure 7-11 Modeled NO_X Emissions Compared to AQI[1]



1 Includes emission reductions from the use of alternative fuel vehicles, shuttle buses, and ground service equipment. See Table 7-11.

As part of the reporting process, the AQI also calls for an itemization of NO_x emissions generated by activities at Logan Airport according to the individual airline operator. Table 7-12 shows the estimated amounts of NO_x air emissions in 2012 and 2013 generated by each airline in units of tpy and tons per LTO.

Table 7-11 AQI Inventory Tracking of Modeled NO_X Emissions (in tpy)[1] for Logan Airport

	Actual Conditions[2]						Forecasted Conditions[3]	
	2000	2009	2010	2011	2012	2013	2014	2015
Total Annual Emissions	2,315	1,609	1,608	1,647	1,654	1,627	1,719	1,740
Above (Below) 1999 Levels Before Reductions	(32)	(738)	(739)	(700)	(693)	(720)	(628)	(607)
Potential Reductions/ Increases[4]								
Alternative Fuel Vehicles/Shuttle Bus	(4)	(4)	(2)	(1)	0	(6)	0	1
Alternate Fuel Ground Service Equipment[5]	(14)	(4)	(3)	(6)	(5)	(4)	(11)	(11)
Total Potential Reductions	(19)	(8)	(5)	(7)	(5)	(10)	(11)	(10)
Above (Below) 1999 Levels After Reduction	(51)	(746)	(744)	(707)	(698)	(730)	(639)	(617)
Credit Trading[6]	NA	NA	NA	NA	NA	NA	NA	NA
Net Total w/Reductions and Credits	2,296	1,601	1,603	1,640	1,649	1,617	1,708	1,730

Source: Massport
Notes: Values in parentheses, such as "(250)" are negative values. Values without parentheses are positive values.
NA Not available.
1 For consistency with the AQI, the NOx emission values in this table are reported in tpy. The EDR/ESPR Emissions Inventory values are reported in kg/day. A conversion factor of 0.40234 is used to convert kg/day to tpy.
2 The 2009 analysis was completed using EDMS v5.1.2 and MOBILE6.2.03. The 2010 through 2012 analysis was completed using EDMS v5.1.3 and MOBILE6.2.03. The 2013 analysis was completed using EDMS v5.1.4.1 and MOVES2010b.
3 The years 2014 and 2015 were interpolated using the 2030 analysis provided in Table 7-8 of the *2011 ESPR*.
4 Other initiatives that Massport and Logan Airport tenants may use for possible emission reductions include: Central Heating and Cooling Plant boilers, 400-Hz power at gates, and low NO_X fuels in Logan Express buses.
5 Massport's current plan for the conversion of GSE to alternative fuels is being re-evaluated based on the new diesel rule (2007). GSE AFV credits were based on fuel type data obtained from the aerodrome vehicle permit applications beginning in 2007.
6 Since the AQI threshold is not exceeded in 2012 or 2013, nor are the emissions expected to exceed the threshold in the near future, no credits will need to be purchased in the immediate term.

Table 7-12 Contribution of NO_X Air Emissions by Airline, 2012 and 2013 (Estimated)

	Total Emissions (tons/year)				Normalized Emissions (tons/LTO)	
	LTOs		NO_X		NO_X per LTO	
Air Carrier, by Airline	2012	2013	2012	2013	2012	2013
ABX Air	144	154	3.32	3.53	0.023	0.023
Aer Lingus	639	757	19.94	23.36	0.031	0.031
Air Canada[1]	5,811	5,657	27.45	12.81	0.005	0.002
Air France	487	480	23.49	26.99	0.048	0.056
Airtran Airways	5,441	3,882	40.72	27.74	0.007	0.007
Alaska Airlines	936	1,331	11.64	15.71	0.012	0.012
Alitalia	265	271	7.06	7.20	0.027	0.027
American Airlines[2]	11,441	11,493	154.47	152.19	0.014	0.013
Atlantic Southeast	1,412	2,372	4.45	8.44	0.003	0.004
Atlas Air	--	102	--	2.87	--	0.028
British Airways	1,075	1,287	79.20	89.97	0.074	0.070
Cargojet	--	1	--	0.01	--	0.009
Chautaugua	1,544	1,693	4.59	5.06	0.003	0.003
Colgan	1,289	--	0.79	--	0.001	--
Continental	6	--	0.06	--	0.010	--
Copa	--	173	--	1.72	--	0.010
Delta Air Lines[3]	18,792	14,929	177.04	161.70	0.009	0.011
DHL	110	--	2.05	--	0.019	--
FedEx	1,462	1,525	60.55	57.31	0.041	0.038
Frontier	171	--	1.51	--	0.009	--
General Aviation	14,025	13,341	47.98	19.67	0.003	0.001
Hyannis Air Service	18,592	18,597	0.53	0.54	<0.001	<0.001
Iberia	220	202	7.47	6.91	0.034	0.034
Icelandair	469	560	9.91	11.77	0.021	0.021
Japan Airlines	237	323	5.79	10.34	0.024	0.032
JetBlue Airways	34,557	39,756	304.30	297.93	0.009	0.007
Lufthansa	891	863	34.74	33.88	0.039	0.039

	Total Emissions (tons/year)				Normalized Emissions (tons/LTO)	
	LTOs		NO_X		NO_X per LTO	
Air Carrier, by Airline	2012	2013	2012	2013	2012	2013
Mesa	9	442	0.03	1.48	0.003	0.003
Miami Air	64	52	0.76	0.53	0.012	0.010
Mountain Air Cargo	2	11	<0.01	0.01	0.001	0.001
Other Air Carrier	13	19	0.35	0.13	0.027	0.007
Other International	5	34	0.07	1.36	0.014	0.040
Peninsula Air	1,134	2,192	0.63	1.19	0.001	0.001
Porter Airlines	1,862	1,866	1.67	1.66	0.001	0.001
Republic	1,672	1,734	5.37	4.45	0.003	0.003
Royal Air Freight	1	--	<0.01	--	0.001	--
SATA International	206	234	3.86	4.03	0.019	0.017
Shuttle America	4,089	6,024	13.41	15.88	0.003	0.003
SkyWest	--	234	--	0.75	--	0.003
Southwest Airlines	6,392	7,969	60.65	75.78	0.009	0.010
Spirit	1,682	1,361	17.44	14.20	0.010	0.010
Sun Country	298	472	3.12	4.98	0.010	0.011
Swift Air	12	55	0.07	0.45	0.006	0.008
Swiss International	358	360	11.71	11.74	0.033	0.033
TACV-Cabo Verde	117	107	2.05	1.88	0.018	0.018
Trans States	508	91	1.51	0.27	0.003	0.003
United Air Lines	12,824	12,619	163.54	159.89	0.013	0.013
UPS Airlines	684	704	17.75	18.20	0.026	0.026
US Airways[4]	22,939	22,099	164.63	157.81	0.007	0.007
USA Jet	23	--	0.20	--	0.009	--
Virgin	355	356	14.78	13.33	0.042	0.037
Virgin America	1,949	1,680	19.30	17.13	0.010	0.010
XTRA	12	--	0.10	--	0.008	--
Wiggins	213	206	0.03	0.03	<0.001	<0.001
Total	**177,439**		**1,532**		**0.009**	

Notes: Other International may include: Yemenia, Royal Jordanian, etc.
The “Other” Categories may include airlines with less than 10 operations.
Normalized emissions are based on a Landing and Takeoff Cycle (LTO).
This list combines the major airlines with their commuters (i.e., Jazz with Air Canada and American Eagle with American Airlines, etc.).
Cargo carriers include: ABX, Atlas, Cargojet, DHL, FedEx, Mountain Air Cargo, Royal Air Freight, UPS, and Wggins.

1 Includes Jazz.
2 Includes American Eagle.
3 Includes Delta Connection and Delta Shuttle.
4 Includes US Airways Express.

Based on Table 7-12, international carriers are the higher NO_x emitters per LTO because their longer stage lengths require aircraft equipped with larger and/or additional engines and heavier takeoff weights. Overall, international carriers emit 16 percent of the total aircraft NO_x emissions at Logan Airport in 2012 and 17 percent in 2013. Other notable findings include:

- Carriers with the greatest number of flights tended to generate the highest percentage of total NO_x emissions;
- Combined, the four largest air carriers (by LTO), emitted 53 percent of the total aircraft NO_x emissions in 2012 and 52 percent in 2013;
- Commercial airlines (excludes cargo and GA) accounted for 91 percent of total aircraft NO_x emissions in 2012 and 93 percent in 2013;
- Cargo aircraft operators accounted for 5.5 percent of total aircraft NO_x emissions in both 2012 and 2013; and
- GA aircraft accounted for 3 percent of total aircraft NO_x emissions in 2012 and 1 percent in 2013.

Alternative Fuel Vehicles Program

A component of Massport's Air Quality Management Program is the AFV Program. The AFV Program is designed to replace conventionally-fueled fleet with alternatively fueled or powered vehicles, when feasible, to help reduce emissions associated with Logan Airport operations. Massport now operates 94 vehicles powered by CNG, propane, E85 flex fuel, or operates hybrids powered by gasoline or diesel. Massport established a vehicle procurement policy in 2006 that requires consideration of AFVs when purchases are made. For example, beginning in 2013, as part of the Southwest Service Area (SWSA) redevelopment, the existing fleet of diesel rental car shuttle buses was replaced by CNG or clean diesel-electric hybrid buses. Table 7-13 shows the number of Massport AFVs by vehicle type in 2012 and 2013. As discussed in *Chapter 1, Introduction/Executive Summary,* several projects and programs support AFVs at Logan Airport including:

- The replacement of 94 rental car buses and older CNG buses with a fleet of 50 alternative fuel (diesel-electric hybrids and CNG) buses, serves the new Rental Car Center (RCC), Massport terminals and other shuttle routes. This project was partially funded by the FAA's Voluntary Airport Low Emissions (VALE) Program grant;
- Operation for almost two decades of one of the largest privately operated, publicly-accessible, CNG stations in New England, which in 2013, dispensed approximately 19,500 gasoline-equivalent gallons per month for Massport vehicles;
- The introduction of battery powered tugs and belt loaders for the Delta Air Lines ground service fleet at Terminal A;
- As part of the new RCC, electric vehicle charging stations that conform to the new North American fast-charging standard; renovation to the existing gas station in the North Cargo Area in 2008, which included the installation of an E85 (first-generation biofuel) fuel dispensing tank; and
- Continued operation of Massport's "CleanAirCab" incentive program for AFVs, which allows hybrid or alternative fuel taxis to go to the head of the taxi line to serve passengers.

In addition, Logan Airport's new Green Bus Depot is designed to maintain the expanded CNG-fueled and clean diesel-electric hybrid shuttle bus fleet.

Massport also began offering preferred parking for customers driving hybrid and AFVs in the spring of 2007.

Table 7-13 Massport's Alternative Fuel Vehicle Fleet Inventory at Logan Airport

Fuel Type	Vehicle	2011	2012	2013
Diesel/Electric Hybrid	Shuttle Bus[1]	3	3	32
Compressed Natural Gas (CNG)	Van	2	2	3
	Pick-Up Truck	6	6	5
	Honda Civic	9	9	9
	CNG Shuttle Bus	26	26	0
	CNG NABI Bus[2]	18	18	18
Gasoline/Electric Hybrid	Ford Escape	8	8	8
Propane	Non-Road Vehicles (Forklifts)	2	2	2
E85 Flex Fuel	Crown Victoria	1	1	0
	Pick-Up Truck	8	11	13
	Van	1	3	2
	Ford Escape	4	4	2
	Total	**88**	**93**	**94**

Source: Massport.
Note:
1 The 32 diesel/electric hybrid shuttle buses, added to the fleet in 2013, replaced the diesel rental car buses.
2 The CNG NABI buses replaced the 26 aging CNG shuttle buses.

With further respect to motor vehicle emissions, Massport is continually evaluating the effects of increasing Airport-related VMT and mitigating these impacts before they occur. For example, ensuring that there are adequate parking spaces to meet this demand will help to reduce the number of cars roaming about the site looking for parking and generating excess emissions.

Air Quality Management Goals

Massport's air quality management strategy for Logan Airport focuses on decreasing emissions, when feasible, from all Airport-related sources, in addition to studying innovative means to achieve emissions reductions. Massport's air quality improvement goals, the measures proposed to accomplish them, and some 2011/2012 milestones are listed in Table 7-14.

In addition to measures described in Table 7-14, Massport, through its involvement in the Massachusetts Clean Cities Program, has supported the education of the general public and corporate and public fleet managers with respect to sustainable transportation through its sponsorship and support of the Altwheels Transportation Festival and Altwheels Fleet Day since its inception in 2003.

Table 7-14 Air Quality Management Strategy Status

Air Quality Emissions Reduction Goals	Plan Elements	2012 and 2013 Status
Reduce emissions from Massport fleet vehicles	Convert Massport fleet vehicles to electricity or compressed natural gas (CNG) by retrofitting or procurement.	Massport uses the Energy Policy Act (EPAct) of 1992 to expedite Massport's Alternative Fuel Vehicle (AFV)/Alternative Power Vehicle (APV) program. In 2012, Massport acquired a fleet of 18 AFV (CNG) NABI buses, which replaced the aging fleet of 26 CNG shuttle buses. In 2013, an additional 29 diesel/electric hybrid shuttle buses were acquired.
Encourage use of alternative fuel and alternative power vehicles by private fleet and airside service vehicle owners	Provide infrastructure to support alternative fuels including CNG and electricity.	Massport continues to operate one of New England's largest retail CNG stations, which is open to the public. In calendar year 2012, the CNG station pumped approximately 41,617 gallon equivalents per month and in 2013 the station pumped approximately 31,145 gallon equivalents per month. Sixty-five percent of the fuel is purchased by Massport and 35 percent by outside vendors. Massport plans to support the current and future standard systems for plug-in electric vehicles (EVs). For example, the RCC currently under construction in the Southwest Service Area (SWSA) will include the infrastructure necessary to accommodate future plug-in stations for electric vehicles. Central Garage and Terminal B garage both have plug-ins for EVs.
	Work with ground access fleet and airside service-vehicle owners to encourage conversion.	Massport Garage encourages conversion to AFVs/APVs by others through such policies as 50 percent discounts in AFV/APV ground access fees to limousines, vans, and buses; limited "front-of-line" taxi pool privileges to hybrid and AFVs/APVs; and preferred parking for hybrid and AFVs/APVs at Logan Airport parking facilities.
	Use of pre-conditioned air (PCA) at new and renovated terminals and terminal gates.	The majority of contact gates have PCA and/or 400-Hz power. This reduces the need for auxiliary power unit (APUs) and, consequently, reduces associated emissions. The improvements of Terminal B will also include the installation of PCA at all renovated gates.
Minimize emissions from motor vehicles	Implement a program to increase high occupancy vehicle (HOV) ridership by air passengers.	As described in detail in *Chapter 5, Ground Access to and from Logan Airport,* there are a number of HOV services serving Logan Airport that are aimed at air passengers, including the MBTA Blue Line and Sliver Line, Logan Express, and water transportation. Massport promotes the use of these services by employees, primarily through the Logan Airport Employee Transportation Management Association (Logan TMA) and various pricing incentives.
	Expand the Logan TMA for Airport employees.	The Logan TMA continues to provide commuting information to all Airport employees.
	Encourage employees to use bicycling as a mode of commuting.	Massport includes bike racks at all new facilities and at appropriate existing facilities to promote employees biking to work. Bicycle racks are currently provided at Terminal A, Terminal E, Logan Office Center, MBTA's Airport Station, Economy Parking Garage, Signature general aviation terminal, and the Green Bus Depot (Bus Maintenance Facility). Additional racks were installed at the RCC facility.
Minimize emissions from Construction Equipment	Incorporate Clean Air Construction Initiative (CACI) into major earthwork construction projects.	For all construction projects heavy construction equipment is required to be equipped with diesel particulate filters or diesel oxidation catalysts in accordance with CACI.
Reduce emissions from fuel vapor loss	Provide state-of-the-art fuel storage and distribution equipment.	The Fuel Storage and Distribution System is in operation.
	Implement Tank Management Program.	Refer to *Chapter 8, Water Quality/Environmental Compliance and Management*. Tank management focuses on proper maintenance.

Table 7-14 Air Quality Management Strategy Status (Continued)

Air Quality Emissions Reduction Goals	Plan Elements	2012 and 2013 Status
Reduce emissions from stationary sources	Employ Reasonable Available Control Technologies (RACT) for NO_x at Central Heating/Cooling Plant.	RACT policies have been implemented.
	Use alternative fuels in snow melters.	Ultra Low Sulfur Diesel (ULSD) fuel is used in all Massport snow melting equipment.
	Incorporate green building technologies and energy use reduction strategies.	Massport participates in the State Sustainability Program. Terminal A and the Signature Flight Support GA Facility are certified under the U.S. Green Building Council Leadership in Energy and Environmental Design® (LEED) Green Building Rating System™ and Terminal E features green building elements. An overview of sustainability initiatives is presented in *Chapter 1, Introduction/Executive Summary*.
	On-site renewable energy	Massport has installed and is planning to expand on-site renewable energy systems in the form of Solar Photovoltaic (Solar PV) panels and micro-wind turbines. Further details on these installations can be found in *Chapter 1, Introduction/Executive Summary.*
Reduce aircraft emissions	Work with the FAA to study and implement airfield-improvement concepts and operational changes that may have air quality benefits.	Massport promoted such concepts through the Logan Airside Improvements Planning Project Environmental Impact Statement, which recommended physical and operational improvements to Logan Airport including construction of the new Runway 14-32 and Centerfield Taxiway, and taxiway improvements. Runway 14-32 became operational in November 2006 and the Centerfield Taxiway was fully opened in summer of 2009. In addition, in coordination with Massport, the Massachusetts Institute of Technology (MIT) completed a detailed survey of pilots at Logan Airport to better understand the use of single engine taxiing and issued a paper in March 2010, and in January 2011, MIT issued a paper on aircraft pushback control strategy to reduce congestion and taxi delay.

Updates on Other Air Quality Initiatives

This section highlights other air quality initiatives at Massport in 2012 and 2013.

Massachusetts Department of Public Health Study

In 2004, the Massachusetts Legislature appropriated funds for the Department of Public Health (DPH) to undertake an assessment of potential health impacts of Logan Airport in the East Boston section of the city and any other communities located within a five-mile radius of the Airport, with a focus on noise and air quality. This study was completed in May 2014 and consists of an epidemiological survey combined with computer modeling of noise levels and air pollution concentrations. Massport has cooperated in this effort by providing funding to complete the study and Airport operational data in support of it. In the spring of 2011, Massport also gave technical assistance in support of the DPH study by providing geographic information systems (GIS) analysis of the roadway network in and around Logan Airport in a format compatible with the FAA's EDMS. Massport is working with DPH on implementing DPH recommendations related to Massport. The findings from this Study can be viewed from the DPH website at:

http://www.mass.gov/eohhs/gov/departments/dph/programs/environmental-health/investigations/logan-airport-health-study.html.

Massport Air Quality Monitoring Study

Massport has now completed a $1.6 million air quality monitoring study in and around Logan Airport in compliance with its MEPA Section 61 findings for the Centerfield Taxiway component of the Logan Airside Improvements Project. The study gathered air quality data in the communities around Logan Airport before and after the new Centerfield Taxiway became operational, with an emphasis on ambient (i.e., "outdoor") levels of particulate matter and hazardous air pollutants (HAPs). The intent of the study was to assess potential air quality changes related to the operation of the new taxiway. Massport worked cooperatively with MassDEP and DPH to develop the scope of the monitoring study.

Air monitoring commenced in 2007 at ten different stations located on and off the Airport. The monitoring comprised both "real-time" and "time-integrated" monitoring methods, and includes measurement of fine particulates, VOCs, carbonyls, black carbon, and polynuclear aromatic hydrocarbons (PAHs). Massport also met periodically with MassDEP and DPH regarding the progress and results of the air monitoring.

The first year of the two-year study was completed September 2008 and the second phase concluded in September 2011 following the completion of the Centerfield Taxiway, which is now fully operational. The report is posted on Massport's website. The final report for this Study will be submitted to MassDEP in by early 2015. For details on the study see Massport's website at:
https://www.massport.com/environment/environmental-reporting/air-quality/centerfield-taxiway-study/

Single Engine Taxiing

Single engine taxiing is one measure that is being used by air carriers to help reduce fuel use and emissions. As a result, Massport supports the use of single engine taxiing, when it can be done safely, voluntarily and at the discretion of the pilot. Massport has conducted three surveys of Logan Airport air carriers (2006, 2009, and 2010) to understand the extent single engine taxiing is used at Logan Airport. In addition, Massport is an active member of the FAA Partnership for Air Transportation Noise and Emissions Reduction (PARTNER) program on reducing noise and emissions. In 2009, Massport offered to facilitate a more detailed survey of pilots at Logan Airport by the Massachusetts Institute of Technology (MIT) to better understand the use of single engine taxiing. MIT completed its survey and issued a paper in March 2010, which was provided in the *2009 EDR*. The MIT survey confirms earlier Massport survey findings that single engine taxiing is an important operational measure used by airlines to conserve fuel and is extensively used at Logan Airport. MIT issued a paper in January 2011 reporting on a control strategy to minimize airport surface congestion, and thus taxiing time, by regulating the rate at which aircraft are pushed back from their gates. Also in January 2011, Massport sent a memorandum to air carriers in support of single engine taxiing when consistent with safety procedures. The memorandum highlighted best practices for single engine taxiing use based on the MIT survey findings. In January 2012 and April 2013, Massport sent an additional memoranda to air carriers in support of single/reduced-engine taxiing and the use of idle reverse thrust as strategies. Copies of these memoranda are provided in *Appendix L, Reduced/Single Engine Taxiing at Logan Airport Memoranda.*

MIT and the Center for Air Transportation Systems Research developed a methodology to account for single engine taxi procedures during the taxi in or out modes.[30,31,32] Some of the single engine taxi challenges noted in these studies include: (1) excessive thrust and associated issues; (2) maneuverability problems, particularly related to tight taxiways turns and weather; (3) problems starting the second engine; and (4) distractions and workload issues. Thus, pilots do not use single engine taxiing during each aircraft operation in practice, and when they do use it, it is not for the entire operation. Pilots use it even less often during taxi out.

When using the MIT methodology and available data (such as aircraft pilot surveys) applied to the most recent set of aircraft operational data for Logan Airport (i.e., 2013), the results show a savings of approximately 1,500,000 gallons of jet fuel and the reduction of approximately 14,000 metric tons of GHG emissions associated with this initiative.

Logan Airport Energy Planning

In an effort to reduce energy consumption and air emissions associated with the Central Utility Plant, Massport commissioned a study to evaluate operational, economic and environmental benefits through cogeneration.[33] In general, institutional, manufacturing, and large commercial facilities such as Logan Airport require both thermal energy (heat) and electricity. Traditionally, as is the case with Logan Airport, these products have been produced in two separate processes. Thermal energy is produced with a boiler while electricity is typically purchased from an electric utility or third party supplier, which generates power through a large central plant. By generating electricity alone, 67 percent of the available energy in the fuel is lost due to heat rejection and inherent system processing inefficiencies. By combining the two processes into one, the waste heat is captured and used as thermal energy. This process is referred to as cogeneration or a Combined Cooling, Heat and Power (CCHP) Plant. The potential benefits of developing a CCHP could enhance Logan Airport's energy profile by improving the operations of its Central Utility Plant to serve Logan Airport's thermal needs and a portion of its electrical requirements. The cogeneration study identified five different potentially feasible options for a CCHP that could satisfy the needs of the Airport and reduce its energy consumption Airport-wide. Massport is currently reviewing the results of this study.

In 2009, Massport began preparing an Energy Master Plan for all Massport facilities. The planning process involved data collection and establishing regulatory targets and baselines. One of the goals of the Energy Master Plan is to help Massport meet the State's Leading by Example Clean Building Targets [34], which by 2012, aim to reduce GHG from state-controlled buildings by 25 percent, reduce energy intensity at state-owned and leased buildings by square foot by 20 percent, and procure 15 percent of energy through renewable energy sources. The Energy Master Plan will provide Massport with a comprehensive strategy to reduce energy use using a portfolio of achievable measures that will result in quantifiable energy savings and cost reduction. In 2010, the Massport Board approved the Energy Master Plan and approved funding to implement energy efficiency improvements targeted at achieving energy and renewable energy targets as defined by the Governor's Executive Order 484 - Leading by Example.

30 A Survey of Airline Pilots Regarding Fuel Conservation Procedures for Taxi Operations, Massachusetts Institute of Technology.
31 Opportunities for Reducing Surface Emissions through Airport Surface Movement Optimization, Massachusetts Institute of Technology, 2008.
32 Analysis of Emissions Inventory for Single Engine Taxi-out Operations, Center for Air Transportation Systems Research.
33 Logan International Airport Energy Strategic Plan, prepared for Massport, prepared by Source One, February 2008.
34 Massachusetts' *Leading By Example Program* is intended to reduce the environmental impacts of state government buildings and operations. The program includes energy efficiency standards for state buildings, such as clean energy and greenhouse gas goals, as well as sustainable practices such as waste reduction, water conservation, and recycling.

Southwest Service Area Redevelopment Program

The principal feature of the SWSA Redevelopment Program is the new RCC and associated support facilities. The RCC consolidates on-airport rental car operations and facilities into one integrated user-friendly facility to better serve both the tenants and the traveling public, and reduce ground transportation and air quality impacts on-Airport and off-Airport in the surrounding neighborhoods. The RCC is designed, constructed and operated for Leadership in Energy and Environmental Design® (LEED) certification (striving to achieve a LEED Silver rating or better) and to meet the Massachusetts LEED Plus sustainable design and construction standards established by the Commonwealth's Executive Office for Administration and Finance.[35]

By constructing an on-site consolidated rental car facility, the RCC reduces the need for the rental car operators to shuttle vehicles from off-Airport storage locations, resulting in fewer VMT and lower air emissions (including mobile source GHG emissions) within the East Boston community, Route 1A, and adjacent neighborhoods. Through the implementation of the Unified Bus System, the new RCC facilitates the reduction of the current rental car shuttle bus fleet by 70 percent and the associated VMTs, and air emissions. The Unified Bus System utilizes clean fuels (CNG and clean diesel-electric hybrid), further reducing emissions compared to the former rental car bus fleet. Also, the Unified Bus System includes combining the rental car shuttle bus service with existing Massport buses that service the Massachusetts Bay Transportation Authority (MBTA) Blue Line Airport Station (routes 22/33/55), resulting in further decreases to the size of the overall bus fleet serving the Airport, and reduced VMT and air emissions. Other air quality benefits of the SWSA Redevelopment Program include the reduction of curb-side congestion at the main terminal complex through implementation of the Unified Bus System and reduced overall energy demand (and associated stationary source GHG emissions) through improved building energy design.

On May 28, 2010, the Secretary of EEA issued a Certificate that determined that the project adequately and properly complies with MEPA. *Chapter 3, Airport Planning* provides detail on the environmental and operational benefits of the SWSA Redevelopment Program related to the consolidation of ground transportation facilities and services, and traffic circulation and access improvements. Benefits of the consolidation will include customer service improvements, environmental management enhancements, reduced VMT and the associated reductions in air emissions. RCC construction began in July 2010, starting with various enabling phases of construction and will be fully completed in 2014.

Engagement in Aviation-Related Environmental Issues

Massport maintains memberships and active participation in a number of organizations involved in addressing aviation-related environmental issues, including air quality. These include serving on environmental committees for the TRB, AAAE, ACI, and Women's Transportation Seminar (WTS) and symposia.

Ultrafine Particles (UFP)

To date, there are no Massachusetts or Federal air quality standards for the emissions or the ambient levels of UFP due to limited health effects evidence and air quality data.[36] Future ESPRs/EDRs will report on UFP standards as they develop. The monitoring of UFP is being conducted at two airports in the U.S. but the data

35 According to Executive Order 484, titled "Leading by Example: Clean Energy and Efficient Buildings," all new construction and significant renovation projects for state government buildings over 20,000 square feet must meet the Massachusetts LEED* Plus green building standard.

36 National Ambient Air Quality Standards for Particulate Matter, Final Rule, "Federal Register 78:10 (15 January 2013) p. 3122.

from these programs are preliminary and not necessarily adaptable to other airports. These UFP monitoring studies include the following:

- T.F. Green Airport (PVD) – Located in Warwick R.I., this UFP monitoring study is being conducted by the Rhode Island Airport Cooperation (RIAC) in accordance with state regulations. Under this multi-year program, UFP are being measured continuously at four sites located around the perimeter of the airport. Weather data (i.e., wind direction and speed) are also being collected. The UFP data from this program are provided to the Rhode Island Department of Environmental Management (RIDEM), but no findings or relationships to airport activity have been reported thus far.
- Los Angeles International Airport (LAX) – UFP were measured at this California airport as part of a research study undertaken by Los Angeles World Airports. In this study, UFPs were measured over two seasonal campaigns at locations both on and off the airport property. Again, meteorological data were collected along with airport operational data as a means of evaluating the source(s) of the UFP. To date, this study found that UFPs in the vicinity of LAX result from the combined contributions from airport activities, motor vehicles traveling on the off-airport roadway network, nearby powerplants, and from the transport of particles from other outlying sources.

Statewide, National and International Initiatives

Advancements on the national and international levels to decrease Airport-related air emissions have continued to focused primarily on three initiatives through the 2012 and 2013 time-periods: (1) the advanced quantification of PM and HAPs emissions from aircraft engines; (2) the continued phasing-in of AFV; and (3) the implementation of GHG emissions reduction strategies. These initiatives are briefly described below.

- **Particulate Matter and Hazardous Air Pollutant Research—**Conducted by the FAA/National Aeronautics and Space Administration (NASA)/EPA and others, research continues to better characterize PM and HAPs emissions from aircraft engines. Similarly, air quality monitoring efforts at other airports were also conducted at various locations to advance what is known about ambient ("outdoor") levels of air pollutants in the vicinities of the nation's airports.[37] In addition to conducting its own air monitoring programs (Measured NO_2 Concentrations [*Appendix I, Air Quality/Emissions Reduction*]) and Massport Air Quality Monitoring Study [above]), Massport continues to closely track these issues through its involvement in aviation industry organizations such as ACI and AAAE.
- **Alternative Fuel Vehicle Conversions—**Airlines and other GSE users are continually replacing their older fossil-fueled vehicles and equipment with more fuel-efficient, low- and non-emitting (e.g., electric) technologies. Airport-fleet vehicles are also being converted to alternative fuels (e.g., propane). In response, GSE and automobile manufacturers are offering a wider selection of AFVs, many of which are designed specifically for airport use. Massport continues to support the conversion of fossil-fueled vehicles and equipment to alternative or lower-emitting fuels.

37 These air quality monitoring programs at other airports include T.F. Green Airport (Providence, R.I.); Los Angeles International and Santa Monica Airports in CA.

- **Participation in Massachusetts Climate Protection Plan—**Massport was one of 15 state agencies and authorities that participated in the development of the state's Climate Protection Plan: the Commonwealth's initial step towards reducing GHG. Massport is participating on two of the Plan's teams: Transportation System Planning and Transportation Technologies and Operations, with a focus in GHG emission reductions associated with Airport operations. Current reduction strategies include:
  - Include energy use and GHG emissions as criteria in transportation decisions;
  - Maintain and update public transit systems;
  - Expand programs to promote efficient travel;
  - Seek opportunities to reduce emissions at Logan Airport;
  - Improve aircraft movement efficiency;
  - Promote the use of cleaner vehicles and fuels in public transit fleets;
  - Continue to promote the use of clean diesel equipment on publicly-funded construction projects;
  - Eliminate unnecessary idling of buses; and
  - Advocate for aircraft efficiency at regional and national levels.

In August 2008, the Commonwealth passed the Global Warming Solutions Act (GWSA). The GWSA requires the reduction of GHG emissions by 80 percent from 1990 levels by 2050, with a reduction of up to 25 percent by 2020. In May of 2012, the EEA Secretary convened an Implementation Advisory Committee (IAC) that will advise the Commonwealth's implementation of the GWSA. The IAC features leaders from the business, energy, environmental, building, transportation, and academic communities in Massachusetts. Massport is participating on the Climate Adaptation subcommittee of the IAC.

On a parallel track, to address adaptation, the Commonwealth also commenced a Climate Change Adaptation project. An Advisory Committee was established to define and assess potential state-wide vulnerabilities associated with potential climate change impacts, and evaluate strategies for adapting to the predicted effects of climate change. In this ongoing effort, and since October 2009, Massport participated in the transportation sector meetings of the "Key Infrastructure" working group. In addition to considering potential impacts to Massport and other statewide maritime facilities, the Key Infrastructure team examines the potential issues at airports related to service disruption, access issues, flooding, and other storm-related impacts.

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Water Quality/ Environmental Compliance and Management

Introduction

The Massachusetts Port Authority's (Massport's) approach to environmental management and compliance is a key component of its commitment to sustainability and responsible stewardship at Logan Airport (refer to *Chapter 1, Introduction/Executive Summary* for details). Through monitoring and documentation, environmental performance is assessed, allowing policies and programs to be developed, implemented, evaluated, and continuously improved.

Massport's primary water quality goal is to prevent or minimize pollutant discharges, thus limiting adverse water quality impacts associated with airport activities. Massport employs several programs to promote awareness of Massport and tenant activities that may impact surface and groundwater quality, thus improving water quality. Programs include implementing best management practices (BMPs) for pollution prevention by Massport, its tenants, and its construction contractors; training of staff and tenants; and a comprehensive stormwater pollution prevention plan. In addition, Massport voluntarily participates in the State's Leading by Example Program,[1] continuing its commitment to operate Logan Airport in an environmentally sound manner. Massport complies with the Massachusetts Contingency Plan (MCP) by monitoring fuel spills and tracks the status of spill response actions. The MCP lays out a set of regulations that govern the reporting, assessment, and cleanup of spills of oil and hazardous materials in Massachusetts.[2] Massport also maintains a

1 Massachusetts' Leading By Example Program is intended to reduce the environmental impacts of state government buildings and operations. The program includes energy efficiency standards for state buildings, such as clean energy and greenhouse gas goals, and as well as sustainable practices such as waste reduction, water conservation, and recycling.
2 310 Code of Massachusetts Regulations (CMR) 40.0000.

Tank Management Program, which includes a tank permitting, monitoring, upgrade, and replacement program. Information on Massport's Logan Airport Stormwater Pollution Prevention Plan (SWPPP)[3], Spill Prevention Control and Countermeasure Plan (SPCC)[4], and the MCP are provided in this chapter.

The federal Clean Water Act (CWA) requires permits for pollutant discharges into U.S. waters from point sources and for stormwater discharges associated with industrial activities. Massport holds permits under the U.S. Environmental Protection Agency's (EPA) and Massachusetts Department of Environmental Protection's (MassDEP) National Pollutant Discharge Elimination System (NPDES) Program. The NPDES permit covers Massport and its co-permittees at Logan Airport. It establishes effluent limitations and monitoring requirements for discharges from specified stormwater outfalls.

Massport is responsible for ensuring compliance with applicable state and federal environmental laws and regulations. Massport promotes appropriate environmental practices through pollution prevention and remediation measures. Massport also works closely with airport tenants and airport operations staff in an effort to improve compliance. Massport's environmental programs pertaining to water quality and environmental compliance and management include:

- Stormwater management;
- Water quality management;
- Fuel use and spills;
- MCP compliance;
- Storage tank compliance;
- Compliance auditing and inspections;
- Environmental Management System (EMS) implementation; and
- Clean State Initiative and Leading by Example Program participation.

2012/2013 Water Quality/Environmental Compliance Highlights

The following summarizes the key water quality and compliance findings for 2012/2013:

- International Organization for Standardization (ISO) 14001 certification for Facilities II (vehicle maintenance, landscaping, and snow removal) began in December 2006. Recertification of Facilities II was obtained in December 2009. In 2010, Massport began the process of expanding the Logan Airport EMS to include Facilities I (Central Heating and Cooling Plant), Facilities II (Vehicle Maintenance, Landscaping, and Snow Removal), and Facilities III (Electrical and Structural). A certification audit of the expanded Logan Airport EMS took place in early June 2011, and a certificate was issued in July 2011. The current

3 In accordance with the requirements of the current Logan Airport NPDES stormwater permit that was issued on July 31, 2007, Massport and its co-permittees were required to develop SWPPPs.
4 In accordance with the Clean Water Act, 40 CFR 112, *Oil Pollution Prevention*.

Logan Airport EMS covers Facilities I (Central Heating and Cooling Plant), Facilities II (vehicle maintenance, landscaping, and snow removal), and Facilities III (Electrical and Structural).

- In 2012, there were five oil and hazardous material spills that required reporting to MassDEP, two of which involved a storm drainage system.[5] In 2013, there were six spills that required reporting, none of which involved a storm drainage system. Further details on spills can be found in the *Fuel Use and Spills* section of this chapter.
- In 2012, two outfall samples out of a total of 22 samples at the West Outfall and one sample out of a total of 15 samples at the Maverick Street Outfall, exceeded the regulatory limits of the NPDES Permit for the North, West, Northwest, Porter Street, and Maverick Street Outfalls. These exceedances were reported in July and November 2012, respectively, as required. In 2013, one outfall sample out of a total of 21 samples at the North Outfall exceeded the regulatory limits of the NPDES Permit. This exceedance was reported in December, 2013, as required. Massport's SWPPP addresses stormwater pollutants in general, and also addresses deicing and anti-icing chemicals, potential bacteria, fuel and oil, and other sources of stormwater pollutants. The 2012 Annual Certificates of Compliance were submitted to EPA and MassDEP on December 27, 2012, for Massport and each tenant co-permittee, and the 2013 Annual Certificates of Compliance were submitted on December 23, 2013 for Massport and each tenant co-permittee.
- In accordance with the MCP, Massport continues to assess, remediate, and bring to regulatory closure areas of subsurface contamination. Massport is working towards achieving regulatory closure of the remaining Logan Airport MCP sites associated with known releases, as well as addressing sites encountered during construction. Progress has been made for all MCP sites with updates included in Table 8-4.

Stormwater Management in 2012/2013

On July 31, 2007, EPA and MassDEP issued an individual NPDES Stormwater permit for Logan International Airport (NPDES Permit MA0000787). The new permit became effective on September 29, 2007, replacing the previous NPDES Permit dated March 1, 1978. The NPDES permit is on EPA's website at: www.epa.gov/NE/npdes/logan/pdfs/finalma0000787permit.pdf. Massport holds a separate NPDES permit for the Fire Training Facility (NPDES Permit MA0032751). The following sections describe the requirements of the two permits, and Massport's compliance with these requirements.

Stormwater Outfall NPDES Permit Requirements and Compliance

The following sections describe stormwater outfalls that are subject to the NPDES Permit, the monitoring requirements, and the monitoring results for 2012/2013.

Outfalls Subject to the NPDES Permit

The NPDES permit regulates stormwater discharges from the North, West, Northwest, Porter Street, and Maverick Street Outfalls, and all of the airfield outfalls. The areas drained by the outfalls are the North

5 State environmental regulations require that oil spills of 10 gallons or more in volume be reported to MassDEP.

Drainage Area (152 acres); West Drainage Area (560 acres); Northwest Drainage Area (23 acres); Porter Street Drainage Area (127 acres); Maverick Street Drainage Area (40 acres); and the Airfield Outfall Drainage Areas (A1 through A44) which drain the remainder of the airfield including runways, taxiways, and the perimeter roadway (910 acres). The North and West Drainage Areas also drain a portion of the airfield. These drainage areas are shown in Figure 8-1 and further detailed in Table 8-1. The North and West Outfalls have end-of-pipe pollution control facilities for the removal of debris and floating oil and grease from stormwater prior to discharge into Boston Harbor.

Table 8-1 Stormwater Outfalls Subject to NPDES Permit Requirements

Outfall Name and Number	Drainage Area (Acres)	Boston Harbor Discharge Location	Major Land Uses
North (001)	152	Wood Island	Terminal E, apron, taxiway, cargo areas, fuel farms, and runways
West (002)	560	Bird Island Flats	Taxiways, terminal areas, aprons, cargo areas, runways, and roadways
Porter Street (003)	127	Bird Island Flats	Hangars, vehicle maintenance facilities, cargo areas, car rental facilities, and
Maverick Street (004)	40	Jeffries Cove	Car rental facilities, bus/limousine pools, parking areas
Northwest (005)	23	Wood Island Bay	Flight kitchen, bus maintenance facility
Airfield (A1 through A44)[1]	910	Perimeter of Airfield	Runways, taxiways, and perimeter roadway

Source: Massport

1 In accordance with the requirements of the NPDES permit, Massport developed an Airfield Stormwater Outfall Sampling Plan (March 27, 2008). The Plan requires quarterly wet weather sampling at a minimum of seven of the airfield outfalls (A1 through A44) to obtain representative samples of the quality of stormwater runoff from the airfield.

Monitoring Requirements

The NPDES permit requires grab samples (single samples collected at a particular time and place) to be taken monthly from the North, West, Porter Street, and Maverick Street Outfalls. Samples are tested for pH, oil and grease, total suspended solids (TSS), benzene, surfactants, fecal coliform bacteria, and *Enterococcus* bacteria during both wet and dry weather. Grab samples are also taken quarterly from these four outfalls during wet weather to test for eight different polycyclic aromatic hydrocarbons (PAHs).

Figure 8-1 Logan Airport Outfalls

Source: Aerial photo, Massport

Additional sampling requirements of the NPDES permit include sampling for deicing compounds twice during the deicing season (October through April) at the North, West, and Porter Street Outfalls. The NPDES permit sets discharge limitations for pH, oil and grease, and TSS from the North, West, and Maverick Street Outfalls and for pH from the Porter Street Outfall. The NPDES permit does not include any discharge limitations for the Northwest Outfall, airfield outfalls, or the deicing monitoring, and requires only that the sampling results be reported. *Appendix J, Water Quality/ Environmental Compliance and Management* contains additional information on the sampling requirements of the NPDES permit.

Monitoring Results

The following section describes monitoring results for reporting years 2012 and 2013.

2012 Results

During 2012, two stormwater samples collected from the West Outfall and one stormwater sample collected from the Maverick Street Outfall exceeded the limit for TSS established in the NPDES permit. The 2012 TSS exceedances at the West Outfall occurred during two separate sampling events on June 25, 2012 and November 13, 2012 and the TSS exceedance at the Maverick Street Outfall occurred on June 25, 2012. Wet weather stormwater samples collected at the West Outfall and Maverick Street Outfalls on June 25, 2012, exceeded the 100 milligrams per liter (mg/L) daily maximum limit for TSS at respective concentrations of 110 mg/L and 160 mg/L. Field staff noted that the samples were turbid during the sampling event. As indicated in the Discharge Monitoring Report dated July 15, 2012, the exceedances of the TSS may be attributable to the significant quantity of soil that is stockpiled onsite as part of the construction of Massport's Rental Car Center (RCC) Project that was underway in 2012. The stormwater controls implemented within the RCC project area are being monitored and maintained on a daily basis.

TSS was measured above the permit limit of 100 mg/L at a concentration of 160 mg/L in the wet weather sample collected from the West Outfall on November 13, 2012. Field staff noted that the sample was very turbid with black suspended solids and a gray to black color. A follow-up sample was collected at the West Outfall during wet weather conditions on November 27, 2012. The TSS result was 25 mg/L, which is below the Permit limit.

In 2012, there were no TSS exceedances reported at the North Outfall. The highest concentration of TSS observed at the North Outfall was 26 mg/L, which occurred on March 8, 2012 and July 13, 2012. There were no other exceedances for the other NPDES permit discharge limits in 2012, which include oil and grease and pH.

The NPDES permit requires only that sampling results be reported for the Porter Street, Northwest Outfall and airfield outfalls, and the permit does not contain discharge limits for these outfalls. In 2012, the highest average concentrations observed at the Porter Street Outfalls were 137 mg/L of TSS (April 12, 2012) and 5.3 mg/L of oil and grease (July 13, 2012). In 2012, the highest concentration of TSS observed at the Northwest Outfall was 31 mg/L (April 23, 2012). Oil and grease was not measured above the laboratory detection limit (<4.0 mg/L) in any of the samples collected from the Northwest Outfall in 2012. The highest average concentrations observed at the airfield outfalls were 19.2 mg/L of TSS (June 25, 2012) and 1.4 mg/L of oil and grease

(September 19, 2012).[6] One stormwater sample collected from Porter Street Outfall 003 on November 13, 2012 had a pH of 8.63, which is outside the range of 6.0 to 8.5.

Wet weather deicing monitoring was not conducted in 2012 as it was not required.[7]

2013 Results

TSS was measured above the permit limit of 100 mg/L at a concentration of 120 mg/L in the wet weather sample collected from the North Outfall on December 23, 2013. Field staff noted that the sample was dark gray and turbid. Based on field observations, the sample was submitted for a rush 48-hour turnaround time in accordance with project protocol. Subsequently, a follow-up sample was collected at the North Outfall on December 27, 2013. The sample was observed to have a yellow tint and was free of visible suspended solids. The second TSS result was below the Permit limit at a concentration of 20 mg/L.

In 2013, there were no TSS exceedances reported at the West or Maverick Outfalls. The highest concentration of TSS observed at the West Outfall was 75 mg/L, which occurred on April 11, 2013. The highest concentration of TSS observed at the Maverick Outfall was 29 mg/L, which occurred on December 23, 2013. There were no other exceedances for the other NPDES permit discharge limits in 2013, which include oil and grease and pH.

In 2013, the highest average concentrations observed at the Porter Street Outfalls were 115 mg/L of TSS (December 23, 2013) and 7.1 mg/L of oil and grease (December 21, 2013). In 2013, the highest concentration of TSS observed at the Northwest Outfall was 48 mg/L (December 23, 2013). Oil and grease was not measured above the laboratory detection limit (<4.0 mg/L) in any of the samples collected from the Northwest Outfall in 2013. The highest average concentrations observed at the airfield outfalls were 26 mg/L of TSS (April 11, 2013) and 0.9 mg/L of oil and grease (December 23, 2013).[8] Three stormwater samples collected from Porter Street Outfalls were measured outside the range of 6.0 to 8.5. On January 16 and November 22, 2013 Porter Street Outfall 002 had a pH of 9.03 and 8.52, respectively. On April 11, 2013 Porter Street Outfall 001 had a pH of 5.62.

Deicing sampling at the North, West, Porter Street, and airfield outfalls occurred during wet weather in January and March 2013. Sampling results are reported as required by the EPA and MassDEP (see Tables J-22 and J-23 in *Appendix J, Water Quality/ Environmental Compliance and Management).*

The NPDES water quality monitoring results are posted on Massport's website (http://www.massport.com/environment/environmental-reporting/water-quality/monitoring-results/), and Massport provides copies of the monitoring results to EPA and MassDEP.

Due to the large size of the drainage areas and relatively low concentration of pollutants, it is not always possible to trace exceedances to specific events. Where a known event such as a spill is reported, Massport routinely checks the drainage system for impacts from the event and takes corrective actions if necessary. The 2012/2013 water quality monitoring results for discharge from the outfalls is provided in

6 The 2007 NPDES permit does not set maximum daily discharge limitations for the Runway/Perimeter Stormwater Outfalls.
7 Wet weather deicing monitoring was only required during the first and third year of the NPDES permit.
8 The 2007 NPDES permit does not set maximum daily discharge limitations for the Runway/Perimeter Stormwater Outfalls.

Appendix J, Water Quality/ Environmental Compliance and Management along with the history of water quality monitoring results that dates back to 1993.

Stormwater and Sanitary Sewer System Inspections and Repairs

Between 2006 and 2008, Massport conducted inspections of the sanitary sewer and stormwater drainage system serving Logan Airport to document the condition of the systems and identify potential impacts from the sewer to the stormwater drainage system. Such impacts could result from leaks or breaks from the sanitary sewer or from direct, inadvertent, illegal cross connections to the stormwater drainage system. As a result of these surveys, the Boston Water and Sewer Commission (BWSC) completed replacement of sections of the sanitary sewer during 2009 and 2010.

The sanitary sewer inspections identified deficiencies in the sewer maintained by Massport at several locations throughout the Airport. Massport retained the engineering services of a consulting engineer to review the sewer investigation report, supplement the investigations, design sewer line repairs to address the deficiencies, and prepare construction documents. In 2012, the consultant completed cleaning and camera inspection of the system and identified additional sections of sewer line that required repair.

Construction bid documents for the sewer repair work were completed in July 2013. The work was completed in November 2013 at a total cost of approximately $550,000, which includes engineering and construction costs. The nature of the repairs and locations are depicted in Table 8-2.

Table 8-2 Sewer Repair Work and Locations

Location	Repairs
Lovell Street	300 linear feet (LF) of cured-in-place liner; repair MH brickwork
Facilities III Parking Lot	165 LF of cured-in-place liner; clear intruding taps
U.S. Air Hangar Parking Lot	Excavate and replace 240 LF of pipe
Airside near Facilities II and U.S. Air Hangar	375 LF of cured-in-place liner
Airside near Signature Ramp	410 LF of cured-in-place liner
Airside near Signature Ramp	Grout-in-place sleeve for spot repair
Arrivals Roadway near West Garage	105 LF of cured-in-place liner
Terminal C	Grout-in-place sleeve at three locations; 170 LF of cured-in-place liner

Source: Massport

In 2012 and 2013, Massport's Facilities Department conducted inspections and cleaning of manhole and catch basin structures at locations throughout the Airport. In accordance with Part I.B.10.h of the Logan Airport NPDES Permit, the inspection and cleaning activities focused on structures within 100 yards of aircraft, vehicle, and equipment maintenance facilities. Unlike the inspection/cleaning program completed in 2010, the work conducted in 2012/2013 did not include the drainage system located within the Southwest Service Area, which is presently under construction. A total of 163 manhole and catch basin structures were inspected in 2012 and a total of 208 structures were inspected in 2013. Sediment depths were recorded and the sediment was then removed, as necessary, from the structures. A total of approximately 20 cubic yards of sediment and debris was removed during cleaning of the structures in 2012; 85 cubic yards of sediment and debris was removed in 2013. In addition to the inspection and cleaning of manhole and catch basin structures, Massport directed its term contractor to inspect and clean 15 water quality control structures (i.e., stormceptor units). The units were inspected and cleaned twice in 2012, during the months of May and November, and once in 2013 during the month of May. In late 2013, Massport's Facilities Department assumed responsibility for inspecting and cleaning the water quality control structures. Weather and traffic conditions prohibited work on the structures during November and December of 2013 however the structures were inspected in January 2014. The condition of the units was documented and any accumulated sediment or debris was removed.

Bacteria Source Tracking

Massport continues to monitor bacteria levels at stormwater outfalls by obtaining samples during wet weather and dry weather sampling events for laboratory analysis. Review of the analytical data indicates that bacteria levels continue to be highly variable, with no consistent trends that would indicate an ongoing source such as a cross-connection to a sanitary sewer line.

Massport will continue to review the development of bacteria-source tracking technologies and evaluate the appropriateness of additional testing

Fire Training Facility NPDES Permit Requirements and Compliance

NPDES Permit No. MA00327519 regulates treated wastewater from the Fire Training Facility on Governors Island (Figure 8-1). The treated wastewater from fire training exercises is stored, treated by separation and a carbon filter to remove fuel contaminants, and is typically beneficially reused onsite to recharge the fire training pit. If no storage is available, treated wastewater is tested prior to discharge to the storm sewer to ensure compliance with the Fire Training Facility's NPDES permit. Discharge monitoring reports are submitted monthly to EPA. In 2012, Massport reused all but approximately 17,600 gallons of wastewater generated at the Fire Training Facility. In 2013, Massport reused all but 32,000 gallons. The excess water was shipped off-site for disposal at NewStream located in Attleboro, Massachusetts.

Fuel Use and Spills in 2012/2013

Management of fueling operations at Logan Airport is designed to minimize impacts on water quality through the implementation of Stormwater Pollution Prevention BMPs, including the use of reliable storage, secondary containment, and effective spill cleanup procedures. Massport's jet fuel storage and distribution infrastructure, installed in 2000 and 2001, includes a zoned leak detection system for underground fuel piping, which identifies volumetric changes of product in the pipe at operating pressure and zero pressure. The system combined the storage facility with a hydrant fuel system that reduced the need for trucks and dispensing. The former fuel farms were removed in 2000.

The fuel storage and distribution system was designed to ensure, to the extent technologically feasible, the reliable detection of leaks. The aboveground jet fuel storage facility and distribution system are leased and operated by a single party, BOSFUEL, an airline consortium. The management of the facility by one entity was put in place to minimize potential fuel spills and maximize water quality protection for the storage and distribution facilities. Cathodic protection, leak detection, secondary containment, and tank overfill protection

9 NPDES Permit No. MA0032751 - *Logan International Airport Fire Training Facility*. Issued November 1, 2006.

methods such as alarms, inventory gauging sensors in the tanks, and emergency fuel shut-off systems have been installed. The operation and maintenance of these controls have been included in the Operation and Maintenance Manual used by BOSFUEL's contractor to operate and maintain the facility. Built-in environmental controls, unified operations, and the ongoing contingency planning provide heightened environmental protection and more efficient fuel handling operations than the previous system. In 2010, BOSFUEL, in coordination with Massport, completed the replacement of the portion of the jet fuel distribution system that had not been part of the fuel storage and distribution system improvements completed in 2001. The fuel line replacement, which began in 2008, involved the installation of approximately 6,500 linear feet of pipe in the vicinity of Terminals B and C.

The Massport Fire Rescue Department keeps logs of all spills at Logan Airport (see Table 8-3). State environmental regulations require that oil spills of 10 gallons or more in volume be reported to MassDEP. Spills that enter storm drains of any volume must also be reported to Massport. During 2012, two of the fuel spills entered the storm drainage system and during 2013 none of the 94 fuel spills entered the storm drainage system. Massport keeps records of all spills, including those less than the reporting threshold. In 2012, of the oil and hazardous material spills reported to the Massport Fire Rescue Department, five spills (4 percent) were reportable, due to their volume. In 2013, six spills (6 percent) were reportable due to their volume. Of the five reportable spills in 2012, a commercial airline was responsible for one of the spills; one fixed-based operator was responsible for one spill; and two spills were the result of aircraft fueling. By volume, jet fuel spills accounted for 74 percent of total fuel spilled; hydraulic oil accounted for 13 percent; diesel fuel accounted for 6 percent; gasoline accounted for 2 percent, and motor oil and other fuels accounted for 5 percent. Of the six reportable spills in 2013, four of the six were related to commercial aircraft; two of the six were associated with private aircraft. By volume, jet fuel spills in 2013 accounted for 78 percent of total fuel spilled; hydraulic oil accounted for 11 percent; diesel fuel accounted for 7 percent; gasoline, motor oil, and other fuels accounted for the remaining 4 percent. A summary of Logan Airport jet fuel usage and spill records from 1990 to 2013, and greater detail pertaining to type and quantity of the spills can be found in *Appendix J, Water Quality/Environmental Compliance and Management*.

Table 8-3 Logan Airport Oil and Hazardous Material Spills[1] and Jet Fuel Handling

Year	Total Number of all Spills	Total Number of all Spills >10 gallons	Total Volume of all Spills (Gallons)	Estimated Volume of Jet Fuel Handled (Gallons)	Total Volume of Jet Fuel Spilled (Gallons)
2004	126	18	894	373,996,141	574
2005	97	15	2,319	368,645,932	585
2006	92	11	752	364,450,864	644
2007	108	7	604	367,585,187	361
2008	99	20	944	345,631,788	662
2009	95	6	1004	327,358,619	915
2010	87	15	476	335,693,997	360
2011	108	12	572	340,421,373	337
2012	132	5	593	343,731,127	439
2013	94	6	452	349,397,940	351

Source: Massport Fire Rescue Department and Massport Environmental Management Department.
Notes: Oil and hazardous material spills and jet fuel handling data from 1990 through 2013 is provided in *Appendix J, Water Quality/Environmental Compliance and Management*.
1 Materials include: jet fuel, hydraulic oil, diesel fuel, gasoline, and other materials such as glycol and paint.

Tank Management Program

Since 1993, Massport has had a Tank Management Program in place that is designed to ensure that all Massport-owned tanks are in regulatory compliance with federal and state tank regulations. From 1993 through 2005, Massport completed six construction phases of storage tank modifications that included removal, replacement, and upgrades to existing tanks and the related piping systems to comply with federal and state tank regulations. In 2009, Massport installed a remote tank monitoring system for heating oil underground storage tanks (USTs) to allow for continuous monitoring of inventory levels, as well as leak detection. As a BMP, Massport continues to monitor tank systems and upgrade facilities, as needed.

Massport and its tenant tank owners spent much time and effort in 2012 and 2013 continuing to comply with new state storage tank regulations.[10] These new regulations transferred jurisdiction of all USTs from the Department of Fire Services (DFS) to MassDEP. Jurisdiction of all aboveground storage tanks (ASTs) with capacity volumes greater than 10,000-gallon remains with the DFS, and those ASTs with less than 10,000-gallons capacity are now under local (Massport Fire Department) jurisdiction. There are three ASTs at Logan Airport with volumes greater than 10,000 gallons; two of these tanks are located in the North Service Area, and contain glycol; and the third tank is located at the Central Heating Plant, and is used for storage of heating oil**.** Compliance with the new tank regulations included the following:

- Completed third party inspection of all Massport owned USTs, and submitted to MassDEP in July 2013;
- Re-permitting all ASTs using a newly created Massport Fire Department annual permit;[11] and
- Updating and tracking of AST permit status, using the Massport AST database.

Massport is also implementing a successful tank release prevention strategy, which includes:

- A continuing program of monthly inspections, testing, and minor repairs of all Massport-owned tanks, related piping, and tank monitoring systems. Annual Stage II Vapor Recovery testing was conducted in May 2012 and May 2013, of Massport's USTs and piping systems at four facility locations. Stage II Vapor Recovery Systems collect gasoline vapors from vehicles' fuel tanks when customers dispense gasoline products into their vehicles at gasoline dispensing facilities. The Stage II system uses special nozzles and coaxial hoses at each gasoline pump to capture vapors from vehicle fuel tanks during the refueling process and reroute them to the station's storage tank(s). Testing included replacement of defective hoses and/or nozzles, as needed.
- Annual DFS inspections of all three of Massport's ASTs greater than 10,000 gallons in volume, and submittal to MA Department of Fire Services.
- Review of all proposed tenant tank upgrades, installations, and tank removals (under Massport's Tenant Alteration Application process) to ensure compliance with applicable state and federal regulations and with Massport policy.

10 527 Code of Massachusetts Regulations (CMR) 9.00.

11 Although ASTs with a capacity of less than 10,000-gallons is no longer under the jurisdiction of the Massachusetts DFS, the ASTs are still subject to the Massachusetts fire regulations and therefore must obtain an annual permit through the Massport Fire Department which has jurisdiction over the less than 10,000-gallon ASTs. ASTs with capacity of over 10,000 gallons also need to obtain this annual permit before those tank owners may obtain a permit from DFS.

- Ongoing upgrade and maintenance of a database that contains information on all USTs located on Massport property. For each tank, the database tracks location, permit status, compliance status with applicable tank regulations, and tank and monitoring system equipment summaries. Information on ASTs is kept in a separate database which was developed in 2010.
- Massport also provides tenants with information regarding the revised storage tank regulatory requirements and offers assistance with tenants' tank permitting procedures.

Site Assessment and Remediation

The MCP (310 Code of Massachusetts Regulations 40.0000), which is administered by the MassDEP, pertains to releases of oil or hazardous materials into the environment. The MCP prescribes the site cleanup process based on the nature and extent of a release's contamination. The MCP defines the roles for those parties affected by and potentially responsible for the release and establishes the release reporting program and submission deadlines for tracking events from initial release to regulatory closure.

In accordance with the MCP, Massport continues to assess, remediate, and bring to regulatory closure areas of subsurface contamination. There are a number of phases for the investigation of contaminated sites. Phase I involves initial site investigations for the presence of contamination and Phase II assessments are more comprehensive site investigations. Phase III identifies, evaluates, and selects remediation actions and Phase IV involves the implementation of selected remedial actions. Phase V involves the operation, maintenance and/or monitoring of the remediation program. Massport leads the performance of a variety of response actions, including remediation at sites where Massport is the responsible party, where there are multiple responsible parties, and where no responsible party has been identified. Table 8-4 describes Massport's progress in 2012/2013 in achieving regulatory closure of the MCP sites identified in Figure 8-2.

Figure 8-2 Massachusetts Contingency Plan Sites

Note: Refer to Table 8-4 for the numbered projects.

Table 8-4 MCP Activities Status of Massport Sites at Logan Airport	
Location (Release Tracking Number) and MassDEP Reporting Status	**Action/Status**
1. Fuel Distribution System (3-1287)	
Phase II Report filed in April 1997	Indicated fuel floating on the groundwater table in 10 discrete locations in the terminal areas; cleanup required to achieve regulatory closure.
Phase III Report filed in April 1997	Reported product recovery as the preferred cleanup alternative; none of the areas to be cleaned up by a responsible party (i.e., a tenant responsible for the contamination). Cleanup was anticipated to span a minimum of three years.
Phase IV Remedy Implementation Plan filed in March 1998	The plan described seven discrete locations of separate phase hydrocarbons (SPH) (jet fuel floating on the groundwater) to be remediated at Terminals C and E as well as three discrete areas at Terminal B to be remediated by tenants who were responsible for the historical release. The remediation strategies that Massport undertook at the seven areas differed depending on the product thickness. Strategies included trench-based product recovery, multi-phase extraction, excavation, and dewatering during construction, and passive remediation.
Phase V Inspection and Monitoring Status Reports filed in September 1998, March 1999, and October 1999	The Status Reports documented remedial actions at seven areas including passive recovery of SPH at Areas 1, 6, and 7, and pumping to recover SPH at Area 3. Interim passive recovery was also implemented at Areas 2 and 4, pending the evaluation of active recovery systems. Remedial objective of less than 1/2 inch of product has been met at Areas 1, 2, 5, 6, and 7, but monitoring continues. MCP closure will be achieved at these areas by applying for an AUL.
Tier II Extension Request submitted in March 2000	Site Closure was not achieved by the March 2000 deadline. A Tier II Extension Request was submitted, providing a plan for continued SPH recovery and monitoring until the remedial objective has been accomplished.
Response Action Outcome (RAO) Submitted March 2001	Under the Class C RAO, monitoring continues at this location along the fuel line for the presence of SPH.
Tier II Extension Request Submitted in July 2002	The Tier II Extension Request and RAM Plan were submitted prior to construction of the Baggage Screening Project in the area of the Fuel Distribution System.
2003	Massport submitted status reports detailing fuel recovery efforts along the distribution system.
2004	Massport submitted status reports to MassDEP detailing fuel recovery efforts along the distribution system in March and September 2004.
2005	Inspection and Monitoring Status Reports were submitted to the MassDEP in March 2005 and March 2006 detailing monitoring and product recovery efforts along the fuel distribution system during the period between September 2004 and September 2005.
2006	An Inspection and Monitoring Status Report was submitted to the MassDEP detailing monitoring and product recovery efforts along the Fuel Distribution System (FDS) between March and September 2006. Massport continues to review data for tightness testing of the fuel line, and completed leak testing of fuel hydrants pits adjacent to Terminal B and Terminal C. Massport continues to meet with BOSFUEL the operator of the FDS, to assess conditions along the FDS at Terminal B and Terminal C, referred to as the Retained Facilities portion of the FDS, and to coordinate the replacement of the Retained Facilities.

Table 8-4 MCP Activities Status of Massport Sites at Logan Airport (Continued)

Location (Release Tracking Number) and MassDEP Reporting Status	Action/Status
1. Fuel Distribution System (3-1287) (continued)	
2007	Inspection and Monitoring Status Reports were submitted to the MassDEP detailing monitoring and product recovery efforts along the FDS between September 2006 and September 2007. A Periodic Evaluation Report was submitted in January 2008 which indicated that a Condition of No Substantial Hazard existed at the FDS and a permanent solution was not currently feasible. Massport coordinated with BOSFUEL who prepared construction documents for replacing a portion of the FDS. Construction was conducted under a RAM Plan.
2008	Inspection and monitoring reports were submitted to the MassDEP detailing monitoring and product recovery efforts along the FDS between September 2007 and September 2008. Massport coordinated with BOSFUEL during construction to replace a portion of the FDS. The work was conducted under a RAM Plan that was submitted to the MassDEP in May 2008. A RAM Status Report was submitted in September 2008. Construction of the pipeline replacement was approximately 90 percent complete.
2009	Inspection and monitoring reports were submitted to the MassDEP detailing monitoring and product recovery efforts along the FDS between September 2008 and December 2009. The BOSFUEL project to replace a portion of the FDS continued, with work being completed on pipeline connections, testing of the new fuel line, and abandonment of the old fuel line. RAM Status Reports for the BOSFUEL Project were submitted in February and September 2009.
2010	Inspection and monitoring reports were submitted to the MassDEP detailing monitoring and product recovery efforts along the FDS between September 2009 and September 2010. A RAM Completion Report for the BOSFUEL Project was submitted in February, and the report was revised in March 2010.
2011	A Periodic Review of the Temporary Solution for the FDS was submitted in April 2011. Additionally, three Post-Class C RAO Status Reports were submitted for the FDS in February, June, and December 2011, summarizing the routine inspection and monitoring activities.
2012	Post-Class C RAO Status Reports were submitted in May and November 2012, summarizing the routine inspection and monitoring activities.
2013	Post-Class C RAO Status Reports were submitted in May and November 2013, summarizing the routine inspection and monitoring activities.
2. North Outfall (3-4837)	
Phase II and Phase III Reports filed in March 1997	Indicated petroleum contamination present at the site was likely the result of decades of airport operation; risk assessment reported no significant risk to human health, or to the aquatic and avian community.
RAO submitted in March 1998	Class C RAO using a Temporary Solution (periodic site monitoring and assessment); remediation steps included (not limited to) installation of a new fuel distribution system and decommissioning of certain fuel lines, and natural biodegradation processes; goal is to have petroleum contamination reduced to an area less than 1,000 square feet. Installation of the new fuel distribution system and decommissioning of sections of the old system were completed.
	Massport initiated site evaluation to document the reduction of petroleum contamination following the decommissioning of the North Fuel Farm and fuel distribution system.
Post Class C RAO evaluation report submitted in December 2002	Massport has eliminated substantial hazards at this site and submitted a Class C RAO statement. In accordance with applicable regulations, Massport will conduct a periodic evaluation at five-year intervals until a Permanent Solution has been achieved. The next periodic evaluation was scheduled for 2007.
2004	Evaluation report indicated that a “Condition of No Significant Risk” has not been achieved at this site. Massport scheduled another assessment in 2007.

Table 8-4 MCP Activities Status of Massport Sites at Logan Airport (Continued)

Location (Release Tracking Number) and MassDEP Reporting Status	Action/Status
2. North Outfall (3-4837) (continued)	
2005	No change in status for 2005.
2006	Massport prepared the five-year review of the Class C RAO for this site, which was due in December 2007.
2007	Massport completed its five-year review of the Class C RAO and transmitted it to MassDEP in December 2007. It was determined that a "Condition of No Significant Risk" has not been achieved at this site at this time. The next five-year re-evaluation will be conducted in 2012.
2008	No change in status.
2009	No change in status.
2010	No change in status.
2011	No change in status. Massport provided updated data for the MassDEP website.
2012	Response Action Outcome submitted to DEP on December 27, 2012. No further MCP response action is required.
3. Former Robie Park (3-10027)	
2005	A Phase I was completed in 2005 with an RAO retraction. The RAO had been completed by the former property owner.
2006	No change in status for 2006.
2007	No change in status for 2007.
2008	A Phase II Scope of Work was prepared on May 9, 2008. A RAM Plan was submitted to MassDEP on September 16, 2008.
2009	A Phase V Remedy Operation Status Plan was submitted on March 31, 2010.
2010	Two Remedy Operation Status Reports were submitted on September 29, 2010 and March 28, 2011. The next status report was scheduled for September 30, 2011.
2011	Phase IV Project Status Reports 2 and 3 were submitted in March and September 2011, respectively.
2012	Phase V Status Reports 4 and 5 were submitted in March and September, 2012, respectively.
2013	Phase V Status Reports 6 and 7 were submitted in March and September, 2013, respectively.
4. Former Robie Property (3-23493)	
2005	A Phase I was completed in 2005.
2006	No change in status for 2006.
2007	No change in status for 2007.
2008	A Phase II was submitted to MassDEP on October 21, 2008.
2009	An Activity and Use Limitation (AUL) was recorded with the Suffolk County Registry of Deeds for the site on December 16, 2009.
2010	A Class A-3 RAO was submitted on January 4, 2010, corresponding with the recording of an AUL. On May 21, 2010, a RAM Plan for the Economy Parking Structure was submitted. The first RAM Status Report was submitted on September 21, 2010. An AUL Amendment was recorded on December 9, 2010.
2011	A RAM Completion Statement was submitted on March 15, 2011. Regulatory closure has been achieved. No further response actions are required.

Table 8-4 MCP Activities Status of Massport Sites at Logan Airport (Continued)

Location (Release Tracking Number) and MassDEP Reporting Status	Action/Status
5. Tomahawk Drive (3-27068)	
2007	Release notification form submitted in August 2007.
2008	A Class B-1 RAO was submitted to MassDEP on January 9, 2009. No further response actions were required.
2009	No further response actions were required.
2010	No further response actions were required.
2011	No further response actions required.
6. Fire Training Facility (3-28199)	
2008	Oral notification of release was provided to MassDEP/BWSC on December 10, 2008
2009	A Phase I/Tier classification was submitted on December 17, 2009.
2010	A RAM Plan was submitted to MassDEP on August 6, 2010. A RAM Status Report was submitted to MassDEP on December 3, 2010.
2011	A RAM Completion Statement was submitted on April 25, 2011.
	A Phase II Scope of Work was prepared and submitted to MassDEP on January 18, 2011. Phase II and Phase III Reports were submitted on December 8, 2011. A RAM Completion Statement was submitted on April 25, 2011.
2012	Phase 4 Status Report transmitted in June 2012; the Phase IV Remedy Implementation Plan was submitted in December 2012.
2013	Phase 4 Status Report transmitted in June 2013, the Phase IV Completion Report was transmitted in December 2013.
7. Southwest Service Area (3-28792)	
2009	Release notification form was submitted to MassDEP/BWSC on October 8, 2009.
2010	A Class B-1 RAO was submitted to MassDEP on October 18, 2010. No further response actions required.
2011	No further response actions required.
8. Airfield Duct Bank Site (3-29716)	
2010	Release notification form was submitted on December 22, 2010.
2011	A Class A-1 RAO was submitted on December 23, 2011. No further response actions required.
9. West Outfall Release (3-29792) 2011	Release notification form was submitted on April 8, 2011. Two IRA Status Reports were submitted to MassDEP on June 9 and December 5, 2011. An RAO was submitted on February 13, 2012. No further response actions required.
10. Hertz Parking Lot Site (3-30260) 2011	Release notification form was submitted on August 29, 2011. A RAM Plan was submitted to MassDEP on September 1, 2011.
2012	A Class A-2 RAO was submitted on September 10, 2012. No further response actions required.

Table 8-4 MCP Activities Status of Massport Sites at Logan Airport (Continued)	
11. Former Butler Aviation Hangar (3-30654)	
2012	Verbal notification of a release was provided to the DEP on February 14, 2012, when RCC construction encountered an unidentified underground storage, and a Release Notification Form was submitted on April 23, 2012. An IRA Plan was submitted on May 21, and IRA Status Reports were submitted on June 18 and December 26, 2012.
2013	Phase I Report and Tier Classification submitted February 21, 2013 and IRA Completion Report submitted on July 11, 2013

Source: Massport
Notes: This list includes Massport MCP sites only. Additional sites are the responsibility of Logan Airport tenants. Refer to Figure 8-2 for location of MCP sites.

AUL	Activity and Use Limitation	Phase I	Initial Site Investigation
MCP	Massachusetts Contingency Plan	Phase II	Comprehensive Site Assessment
RAM	Release Abatement Measure	Phase III	Identification, Evaluation, and Selection of Comprehensive Remedial Actions
RAO	Response Action Outcome	Phase IV	Implementation of Selected Remediation Action
SPH	Separate Phase Hydrocarbon	Phase V	Operation, Maintenance and/or Monitoring
FDS	Fuel Distribution System		
ROS	Remedy Operation Status		
IRA	Immediate Response Action		

Environmental Compliance and Management

Massport works to minimize environmental impacts at Logan Airport through ongoing programs and new initiatives. In October 2000, the Massport Board approved an Authority-wide Environmental Management Policy, which articulates Massport's commitment to protect the environment and to implement sustainable design principles.

> *"Massachusetts Port Authority (Massport) is committed to operate all of its facilities in an environmentally sound and responsible manner. Massport will strive to minimize the impact of its operations on the environment through the continuous improvement of its environmental performance and the implementation of pollution prevention measures, both to the extent feasible and practicable in a manner that is consistent with Massport's overall mission and goals."*

Massport's overall environmental compliance and management efforts address the following goals:

- Protect water quality Airport-wide;
- Protect groundwater resources;
- Protect surface water resources (Boston Harbor);
- Minimize air quality impacts;
- Protect resources during construction;
- Mitigate construction impacts;
- Reduce occurrences of fuel leaks and spills; and
- Preserve coastal resources adjacent to the Airport.

The progress report for environmental compliance and management in Table 8-5 summarizes Massport's mechanisms for implementing these goals and details where changes to these efforts occurred in 2012/2013.

Table 8-5 Progress Report for Environmental Compliance and Management

Plan Elements	Progress Report for 2012/2013
Environmental Compliance Inspections	In 2012 and 2013, Massport performed tenant inspections at a number of its National Pollutant Discharge Elimination System (NPDES) co-permittees' (Logan Airport tenants) leaseholds and made recommendations suggesting how to rectify issues identified during the inspections.
Environmental Management System (EMS) and International Organization for Standardization (ISO) 14001	ISO 14001 certification began for Facilities II (vehicle maintenance, landscaping, and snow removal) in December 2006. Recertification of Facilities II was obtained in December 2009. In 2010, Massport began the process of expanding the Logan Airport EMS to include Facilities I (Central Heating and Cooling Plant), Facilities II and Facilities III (Electrical and Structural). A certification audit of the expanded Logan Airport EMS took place in early June 2011, and a certificate was issued in July 2011. The current Logan Airport EMS covers Facilities I (Central Heating and Cooling Plant), Facilities II (vehicle maintenance, landscaping, and snow removal), and Facilities III (Electrical and Structural). The next recertification was in May 2014.
Tenant Technical Assistance	Massport continued publication of *EnviroNews*, a quarterly newsletter that informs tenants of regulatory calendar milestones, permitting requirements, pollution prevention, and best management practices (BMPs). It recommends use of sustainable materials and provides information on Massport and other environmental requirements (2012/2013 newsletters are provided in *Appendix J, Water Quality/Environmental Compliance and Management)*.
Stormwater Pollution Prevention Plan (SWPPP)	In accordance with the requirements of the current stormwater outfall NPDES permit for Logan Airport that was issued on July 31, 2007, Massport and 25 other co-permittees were required to develop SWPPPs. Massport completed its SWPPP in December of 2007. An update to the SWPPP was completed in December 2013 and distributed to Massport and all stormwater co-permittees. Massport's SWPPP addresses stormwater pollutants in general, and also addresses deicing and anti-icing chemicals, potential bacteria, fuel and oil, and other sources of stormwater pollutants. BMPs are included in the SWPPP. In accordance the other requirements of the NPDES permit, Massport is required to conduct training for personnel responsible for implementing activities identified in the SWPPP. The 2012 and 2013 Annual Certificates of Compliance were submitted to EPA and MassDEP in December 2012 and 2013, respectively, for Massport and each of its co-permittees.
Construction	Massport developed Sustainable Design Standards and Guidelines (SDSG) for use by architects, engineers, and planners who manage capital improvement projects for Massport (More information on SDSG is provided in *Chapter 1, Introduction/Executive Summary*). The SDSG, first issued in 2009 and revised in 2011, are designed to foster innovation yet include clear targets to achieve more sustainable project design and practices. The SDSG are intended to evolve over time, based on changes in technologies and industries. *Chapter 1, Introduction/Executive Summary* contains additional information on the SDSG. Massport provides a generic SWPPP to contractors for all Logan Airport construction projects, which provides guidance in preparing project-specific SWPPPs and BMPs to control sedimentation and other pollutants from construction projects. Massport monitors construction projects at Logan Airport for compliance with project SWPPPs and regulatory requirements. For all construction projects, Massport requires the use of ultra-low-sulfur diesel fuel in construction equipment, recycling of all construction waste to the maximum extent possible, and construction equipment retrofits with pollution control devices such as diesel oxidation catalysts and/or particulate filters.

Table 8-5 Progress Report for Environmental Compliance and Management (Continued)

Plan Elements	Progress Report for 2012/2013
Spill Prevention Control and Countermeasure (SPCC) Plans	Tenants meeting certain thresholds are required to prepare their own SPCC plans for their facilities. Massport checks for SPCC plans during its environmental compliance inspections. Additionally, tenants receive information on Massport BMPs, which focus on spill management and prevention.
Air Emissions Reduction	All Massport diesel vehicles are now fueled with ultra-low-sulfur diesel. In 2007, Massport investigated the use of parking heaters, which operate independently of a vehicle's engine, to measure fuel savings/air emissions reductions of reduced vehicle idling during snow operations. The investigation was discontinued in 2008 after Massport found that the parking heaters resulted in draining vehicle batteries. Massport will continue to explore anti-idling technologies as part of the EMS.

Source: Massport

Clean State Initiative and Leading By Example Program

- On April 18, 2007, the Governor signed Executive Order 484, establishing the Leading by Example – Clean Energy and Efficient Buildings Program (known as the Leading by Example Program).[12] Executive Order 484 supersedes Executive Order 438 which established Massachusetts' former Sustainability Program. The Leading by Example (LBE) Program was created to help state agencies minimize the environmental impacts of their operations and activities and to promote innovative solutions to critical environmental problems. The Executive Order sets aggressive targets for state facilities in greenhouse gas emission reductions, energy conservation and efficiency, renewable energy, green buildings, and water conservation. Massport participates in this program voluntarily.
- As of 2009, Massport resolved all outstanding environmental matters of the Clean State Initiative, which was established under Executive Order 350.[13] The Clean State Initiative was established to ensure that all state agencies are aware of and are in compliance with the environmental laws of the Commonwealth. Massport worked to identify, evaluate, and correct matters of environmental noncompliance, which included re-plumbing of stormwater/sanitary piping work in the Terminal B garage in 2009. No other noncompliance issues have been identified.
- In 2009, Massport began developing an Energy Master Plan to reduce energy use and associated greenhouse gas emissions and increase the use of renewable energy for all Massport facilities. To help frame a comprehensive strategy for achieving the LBE energy targets and reduce overall energy use, Massport's Board and Executive Staff approved an Energy Master Plan and funded an energy efficiency initiative to support implementation of the plan in spring 2010. Massport most recently completed an analysis of its progress to date on FY2012 and FY2020 LBE targets. Massport is ahead of its energy intensity target and has far surpassed the target for renewable energy procurement; Massport is behind in achieving its FY2012 target for GHG emissions reduction. Further details on the Energy Master Plan are provided in *Chapter 7, Air Quality/Emissions Reduction.*

12 Governor Deval Patrick, Commonwealth of Massachusetts. Executive Order 484, Leading by Example – Clean Energy and Efficient Buildings. April 18, 2007. Available: http://www.mass.gov/governor/legislationeexecorder/executiveorder/executive-order-no-484.html.

13 Governor William Weld. Commonwealth of Massachusetts. Executive Order 350, Massachusetts Statewide Environmental Coordinating Council. February 3, 1993. Available: http://www.lawlib.state.ma.us/source/mass/eo/eotext/EO350.txt.

9

Project Mitigation Tracking

Introduction

This *2012/2013 Environmental Data Report (EDR)* provides an update on the Massachusetts Port Authority's (Massport) mitigation commitments under the Massachusetts Environmental Policy Act (MEPA) for Logan Airport projects where an Environmental Impact Report (EIR) was filed. Each of the projects completed the state and federal environmental review processes and adopted a mitigation plan that has been formalized with individual Section 61 Findings.[1] Massport tracks both Massport and Logan Airport tenants' progress toward implementing and achieving their environmental mitigation commitments on schedule and according to the requirements set out in the Section 61 Findings for each project. As each project moves forward through its design and construction phases, its mitigation plan is implemented with ongoing tracking to ensure compliance. This chapter provides Section 61 mitigation commitment updates in 2012 and 2013 for projects for which mitigation is ongoing or upcoming (Tables 9-1 through 9-7). Projects for which mitigation has been completed are not reported on in EDRs and Environmental Status and Planning Reports (ESPRs). For projects with ongoing requirements, once those projects are constructed, mitigation tracking will report only on the continuing requirements.

Projects with Ongoing Mitigation

- **West Garage Project**, Executive Office of Environmental Affairs (EOEA, now Executive Office of Energy and Environmental Affairs (EEA)) #9790 (Phase I complete. Phase II construction was completed in early 2007). The status of continuing requirements is documented.
- **International Gateway Project**, EOEA #9791 (Phase I was completed in 2004; Phase II was completed in 2007; the final phase is not expected to be completed before 2015). The status of continuing requirements for Phases I and II is documented.
- **Replacement Terminal A Project**, EOEA #12096 (Terminal A opened March 16, 2005). The status of continuing requirements is documented.
- **Logan Airside Improvements Planning Project**, EOEA #10458 (Runway 14-32 opened on November 23, 2006. The Centerfield Taxiway was completed and became fully operational in 2009). The status of continuing requirements is documented.

1 Massachusetts General Law, Chapter 30, Section 61 (M.G.L. c. 30, § 61).

- **Southwest Service Area (SWSA) Redevelopment Program**, EEA #14137; on May 28, 2010, the Secretary of EEA issued a Certificate that determined that the Final EIR adequately and properly complied with MEPA and its implementing regulations. Massport's Board approved the Section 61 Findings for the SWSA Redevelopment Program on June 17, 2010. Construction of the Rental Car Center (RCC) program began in summer of 2010, and the first phase of the facility opened in the fall of 2013. Other phases of the project were under construction in 2014. The status of ongoing requirements is documented.
- **Logan Airport Runway Safety Areas (RSA) Project**, EEA #14442; on March 18, 2011, the Secretary of EEA issued a Certificate that determined that the Final Environmental Assessment (EA)/EIR adequately and properly complied with MEPA and its implementing regulations. Construction on the Runway 33L RSA began in June 2011 and was completed in November 2012. The replacement of the Runway 33L approach light pier was completed concurrently with Runway 33L RSA construction. Construction of the Runway 22R Inclined Safety Area (ISA) is scheduled to begin in fall 2014. The status of the Runway 33L RSA enhancement project ongoing requirements is documented. Both project elements are expected to be complete by the end of 2014.

Projects with Section 61 Mitigation

West Garage Project – EOEA #9790

Permitting History

- Certificate on the Final EIR issued on March 16, 1995
- Section 61 Findings approved on March 27, 1995

Project Status

The West Garage Project (Figure 9-1) was initially proposed to be constructed in two phases. Phase I of the Project provided 3,150 parking spaces that were consolidated from other areas of Logan Airport. The West Garage is directly connected to the Central Garage, centralizing the two structures' parking into a larger, single functioning, easily accessible garage. The West Garage Project also included construction of elevated walkways connecting the West Garage to Terminals A and E, and improvements to the terminal roadways. The original design of Phase II of the West Garage included the construction of a new structured parking facility adjacent to the West Garage. Instead, Massport concluded it was more cost efficient to proceed with Phase II by adding three additional levels (Levels 5, 6, and 7) to the existing Central Garage. Phase II of the West Garage Project provided approximately 2,800 additional parking spaces.

- Phase I – Construction commenced in October 1995 and the garage opened on September 8, 1998. The elevated walkways to the terminals were completed in 2002. Improvements to terminal roadways were completed in 2003.
- Phase II – Permitting completed in 2000 to add three levels to the Central Garage. Construction commenced in 2004 and the entire facility was completed in 2007.

Table 9-1 lists each of the continuing Section 61 mitigation commitment for the West Garage Project and Massport's progress in achieving these measures. Table 9-2 details the elements and status of the Alternative Fuels Program, which was a key mitigation effort associated with the West Garage Project. The mitigation measures in Tables 9-1 and 9-2 are from Section IV Mitigation of the *West Garage Project Final EIR*, January 31, 1995, and those measures referenced in the Massport Board vote on the West Garage Project. Many of the mitigation measures for this project have long since been implemented but it is noted in the tables when there have been recent updates.

Figure 9-1 West Garage Project

Phase I West Garage Construction
Phase II Addition to Central Garage

**Table 9-1 West Garage Project Status Report (EOEA #9790)
Details of Ongoing Section 61 Mitigation Measures (as of December 31, 2013)**

Mitigation Measure	Status
Parking Pricing	
Parking pricing initiatives: keeping first-hour price high enough to provide a disincentive for pick-up/ drop-off.	**Implemented.** Massport continues to evaluate and adjust the first-hour price of parking. In light of the security prohibition on curbside parking, in 2002, Massport reduced the cost of the first half-hour from $4 to $2, the first time it had changed since the first-hour free rate was rescinded in 1998. In June 2007, rates increased to $3 for the first half-hour. Parking rates increased in March 2012 for on-Airport parking; further details on parking rate increases are provided in Table 5-12 of *Chapter 5, Ground Access to and from Logan Airport.*
Parking pricing initiatives: keeping the weekly price low enough to encourage vacation travelers to park for a week.	**Implemented.** Massport encourages long-term parking by providing lower cost parking at its Economy Lot. Data on long-term parking use are provided in *Chapter 5, Ground Access to and from Logan Airport.*
Massport will consider means to encourage the use of limited amount of on-Airport commercial parking for long-term parking and promote environmentally positive modes of airport access by air passengers.	**Implemented.** An important element of Massport's strategy to reduce the impact of Airport-related traffic on regional highways and local streets in neighboring communities is the Massport Parking Pricing Policy. Historically, Massport's Parking Pricing Policy encouraged long-term parking over short-term parking. That was accomplished by charging a premium for time spent in the on-Airport parking facilities between one and four hours and substantially reducing the per hour rate for parking durations longer than four hours. This strategy has proved to be a successful incentive for passengers to drive themselves and park long-term at Logan Airport rather than having someone else drop them off or pick them up. Additional information on parking is provided in *Chapter 5, Ground Access to and from Logan Airport*.
Once sufficient data have been collected, Massport will evaluate parking behavior that may be attributable to the modified rates and consider further adjustments in pricing that will assist in achieving Massport's ground transportation goals.	**Implemented.** Massport's parking rate structure is compatible with continued growth in long-term parking, and the continued goal to increase the total high occupancy vehicle (HOV) use by air passengers toward 35.2 percent HOV access mode share. Adjustments to hourly parking rates have been made over time to reflect usage patterns. Additional information on parking pricing is provided in *Chapter 5, Ground Access to and from Logan Airport*.
Executive Director shall report to Massport annually regarding the effectiveness of parking pricing policy in achieving Massport's ground access goals initiatives and recommend appropriate policy adjustments.	**Implemented.** In October 2001, the Massport Board granted approval of commercial parking rates consistent with Massport's ground access goals. The higher rates went into effect November 12, 2001. In addition, in light of the new security restrictions on curbside parking, Massport reduced the cost of parking for the first half-hour from $4 to $2. In June, 2007, the cost of parking for the first half-hour increased to $3. These modifications foster the use of alternate forms of transportation for getting to Logan Airport, whereas the weekly cap at Economy Parking encourages long-term parking over pick-up and drop-off as a mode of access. Please refer to *Chapter 5, Ground Access to and from Logan Airport*, for additional details on Massport's parking pricing efforts.

Table 9-1 West Garage Project Status Report (EOEA #9790)
Details of Ongoing Section 61 Mitigation Measures (as of December 31, 2013) (Continued)

Mitigation Measure	Status
Concurrent Ground Access Improvement Mitigation Measures	
Employee Trip Reduction Measures	
Massport will form a Transportation Management Association (Logan TMA) for Logan Airport employees to provide new opportunities for the development of targeted transportation demand management (TDM) strategies for Massport and airport tenant employees.	**Implemented.** In the 1995 Board Resolution, Massport's Executive Director was authorized to expend an initial amount of up to $50,000 for the purpose of organizing the Logan TMA. The Logan TMA was created in March 1997. Currently the Logan TMA is managed by Massachusetts Department of Transportation (MassDOT) through its MassRides program (www.commute.com). Massport continues to support the Logan TDM strategies by funding the Logan Sunrise Shuttle at an annual cost of $65,000. In turn, MassRides has a Logan TMA Coordinator who develops coordinates, and implements TDM strategies.
Massport will seek to develop, coordinate, and implement effective TDM strategies to reduce the number of single-occupant trips made by all Logan Airport employees.	**Implemented.** Massport continues to work with the MassDOT (which provides the Logan TMA coordinator position through its MassRIDES program) to support the Logan TMA. The 1995 Board Resolution authorized Massport to actively explore with the Logan TMA the feasibility of implementing various services. Massport assists the Logan TMA in providing services and by periodically conducting the Logan Airport Employee Survey (a survey was conducted in 2010). Results of the 2010 survey are summarized in *Chapter 5, Ground Access to and from Logan Airport.*
Massport will encourage participation by all employees, but will particularly target the airport's largest employers.	**Implemented.** Massport continues to target Logan Airport's largest employers. Refer to *Chapter 5, Ground Access to and from Logan Airport* for more details on the Logan TMA and its membership.
Massport will report on the formation and activities of the Logan TMA in the next Generic Environmental Impact Report (GEIR).	**Implemented.** The Environmental Status and Planning Reports (ESPRs) and Environmental Data Reports (EDRs) provide information on the Logan TMA, its services, membership, and employee commuter choices (via the Logan Airport Employee Survey). Information on Logan TMA is summarized in *Chapter 5, Ground Access to and from Logan Airport.*
Massport proposes to implement a new Logan Express service or other HOV service depending on the needs of the targeted market before Phase II of the West Garage Project is operational.	**Implemented.** The Peabody Logan Express facility opened in September 2001 (See *Chapter 5, Ground Access to and from Logan Airport* for additional information on Peabody Logan Express). Despite low ridership, Massport continues to operate this service.

**Table 9-1 West Garage Project Status Report (EOEA #9790)
Details of Ongoing Section 61 Mitigation Measures (as of December 31, 2013) (Continued)**

Mitigation Measure	Mitigation Measure
Provide an airport shuttle service from South Station Transportation Center. Massport is preparing a feasibility and business plan for a South Station-Logan Airport shuttle service and will implement this service when the Third Harbor Tunnel is opened for commercial traffic. This service will be modeled on the existing, successful Logan Express services and will include frequent bus service between South Station and the airport terminals.	**Implemented.** In 1997, Massport sponsored the development of a joint public/private partnership with intercity bus operators serving the South Station Transportation Center. This partnership resulted in a bus connection that both the carriers and Massport promote. The service had limited success largely because of variable operator schedules and the fact that the service operates out of the South Station Transportation Center instead of a location closer to the South Station Red Line stop. Following the interim Logan DART service between Logan Airport and South Station in 2000 and coordination of other available bus services, in June 2005, Massport and the Massachusetts Bay Transportation Authority (MBTA) jointly commenced full Silver Line Airport Service providing a direct connection between South Station and each Logan Airport terminal. Refer to *Chapter 5, Ground Access to and from Logan Airport* for additional information on the Silver Line.
Massport will regularly evaluate the frequency of, and demand for, such shuttle service and will provide such service at the greatest frequency that is practical and effective.	**Implemented.** Massport continues regular collaboration with MBTA on the Silver Line Airport Service and makes adjustments as necessary. Since May 2012, Massport has sponsored a pilot program offering free rides on the Silver Line from Logan Airport to downtown Boston to promote HOV usage and heighten awareness of public transit options. The purpose of the pilot program is to promote ridership, operations, and customer service. Free service will continue as of the date of this *2012/2013 EDR*.
Massport will implement a new water shuttle service in Boston Harbor before the opening of Phase I of the West Garage Project. The water shuttle would run between Logan Airport and one, or possibly, more sites in the Harbor.	**Implemented.** Massport identified a number of possible destinations for a new water shuttle service, with the Quincy Shipyard and Long Wharf sites meeting the basic service parameters. Harbor Express was chosen as the water shuttle operator and began operation between the Airport and these two sites in November 1996. Massport continues to support the Rowes Wharf Water Taxi and City Water Taxi operations. Refer to *Chapter 5, Ground Access to and from Logan Airport* for water shuttle ridership information.
The Executive Director shall make recommendations to Massport for budgetary appropriations to establish and implement the new ground access services on a schedule that permits Massport to implement the new ground access services within these time frames.	**Implemented.** The Executive Director/CEO recommends budgetary appropriations for ground access services on an annual basis.
Enhancement of Existing HOV Services: Logan Express	
Expand Logan Express hours of service.	**Implemented.** Service is offered from Braintree as early as 3:00 AM and as late as 11:00PM; from Framingham as early as 3:15 AM and as late as 11:00 PM; from Woburn as early as 3:00 AM and as late as 11:00 PM; and from Peabody as early as 3:15 AM and as late as 10:45 PM. Buses leave every hour or half hour. Logan Express buses now depart from Logan Airport as late at 1:15 AM. The Logan Express schedule is available at https://www.massport.com/logan-airport/to-and-from-logan/logan-express/.
Provide a guaranteed ride home for Logan Express users.	**Implemented and subsequently modified.** From January 1995 until November 2001, Massport provided this service for air passengers and Logan TMA members. Due to financial constraints following September 11, 2001, this program was suspended for those passengers arriving after midnight with pre-purchased round-trip Logan Express tickets.

**Table 9-1 West Garage Project Status Report (EOEA #9790)
Details of Ongoing Section 61 Mitigation Measures (as of December 31, 2013) (Continued)**

Mitigation Measure	Mitigation Measure
Provide Logan Express price incentives.	**Implemented.** Massport continues to monitor price incentives and implements additional incentives to promote Logan Express ridership, particularly during vacation periods and other periods of peak airport activity. In April 2011, Logan Express sites offered a discounted rate for parking. A survey of Logan Express passengers revealed that drop off activity at Logan Airport was reduced and the demand for parking at Logan Airport was reduced during the period of the discounted Logan Express parking. To encourage greater ridership, Massport restructured parking rates, which lowered parking rates to $7 per day from $11 per day at Logan Express parking lots. These rates went into effect on March 1, 2012 (and have resulted in increased Logan Express passenger activity at rates greater than the increase in Logan Airport air passengers).
Develop an additional Logan Express service.	**Implemented.** Massport opened a fourth Logan Express in Peabody, Massachusetts in September 2001, several years before the Section 61 Commitment date of the opening of Phase II of the West Garage Project. While the new service was initially planned to operate on a half-hour schedule like the Braintree, Framingham, and Woburn services, because of the dramatic air passenger reductions after September 11, 2001, (during Peabody's first week of service), to cut costs, Massport operated the Peabody Logan Express on hourly headways. In January 2004, in light of low levels of ridership on the Peabody Logan Express, Massport doubled service by going to a half-hourly schedule in an effort to stimulate ridership growth at Peabody. The service now operates on an hourly weekday schedule.
Enhancement of Existing HOV Services: Water Transportation	
In conjunction with the MBTA, Massport will pursue joint ticketing opportunities for the Hingham Commuter Boat and the Logan Airport Water Shuttle.	**Implemented.** This ticketing program was explored, implemented in mid-1995 and discontinued in 2000 since many of the former users of this program now use the Harbor Express Service direct from Quincy to Logan Airport.
Massport is reviewing the fee schedules and operating requirements of the dock to make it more accessible and convenient to potential water taxi operators.	**Implemented.** In the fall of 1995, Massport made physical improvements to a low-freeboard float at the Logan Dock to create a dock capable of accommodating smaller vessels such as water taxis. In the fall of 2002, Massport completed expansion of the Harborside dock to accommodate the demand of additional vessels and to comply with handicapped accessibility requirements. The improved dock increases capacity from a two float system to a seven float system to accommodate the various water shuttles, taxis, and charter boats that are licensed to use it.
Initiate a new Boston Harbor Water shuttle service.	**Implemented.** Harbor Express service, between Logan Airport and the South Shore, began in November 1996, well before the opening of Phase I of the West Garage in September 1998. In 2001, the MBTA took over operations of this service.
Expand docking capacity at Logan Airport for water taxi and other services.	**Implemented.** Massport accommodates water taxi services, enhanced the dock as described above, provides communication links for passengers to call the taxi, and allows taxi passengers to use the free water shuttle buses to access the terminals from the dock. Water taxi information is posted on the Massport website. Details on the Water Taxi are provided in *Chapter 5, Ground Access to and from Logan Airport*.

**Table 9-1 West Garage Project Status Report (EOEA #9790)
Details of Ongoing Section 61 Mitigation Measures (as of December 31, 2013) (Continued)**

Mitigation Measure	Mitigation Measure
Other Measures	
Coordinate with public and private entities to provide more extensive radio, television, and telephone announcements of poor traffic conditions with suggestions for alternative access modes.	**Implemented.** The 1-800-23LOGAN Customer Information Line includes the number of the telephone text information line. Callers to Customer Information Line may access the latest traffic information, flight status, parking information, cell phone waiting lot information, or learn about alternative forms of transportation to and from Logan Airport. Starting in August 1999, real-time traffic information and parking became accessible on Massport's website. Massport regularly contacts the media to inform the public about roadway changes, parking shortages and to encourage travelers to use HOV services. Similar information is disseminated on the Logan Airport e-mail subscriber list, the Massport website, Facebook, and on Twitter at twitter.com/bostonlogan.
HOV Marketing and advertising. Massport will continue the advertising and marketing programs for HOV services with an emphasis on promoting MBTA, Logan Express and water shuttle services to and from the airport.	**Implemented.** Massport continues to marketing Logan Express services via Massport's website and other media. Massport continues to promote HOV services including availability, schedules and fares to consumers through the ground transportation Information Line at 1-800-23LOGAN and the website that provides up to the minute information. HOV advertising boards, schedules, and maps are placed at all Logan Airport terminals, at the MBTA Airport Station and at all shuttle bus pick-up/drop-off locations. Massport has actively promoted passenger water transportation in Boston Harbor for more than 20 years, playing a leadership role in policy development, planning, and promotions. This has included promoting vessel services at Logan Airport in the following ways: ▪ Annual updates and in-terminal and citywide distribution of a brochure promoting water transportation at Logan Airport; ▪ Annual updates of harbor-wide water transportation map showing routes serving Logan Airport and other routes and landings as well – Massport provides this map to the MBTA, area non-profits, and others interested in promoting passenger water transportation in Boston Harbor; ▪ Updated information promoting passenger water transportation at Logan Airport on 1-800-23-Logan and www.massport.com; and ▪ Collecting, tracking, and disseminating passenger water transportation ridership data for Logan Airport passengers to aid in planning and facility development.

**Table 9-1 West Garage Project Status Report (EOEA #9790)
Details of Ongoing Section 61 Mitigation Measures (as of December 31, 2013)
(Continued)**

Mitigation Measure	Mitigation Measure
Prepare an inventory of private scheduled services including origins/destinations, schedule, and cost.	**Implemented.** Massport continues to update and track information and services by more than 700 privately operated passenger services certified to operate at Logan Airport. Industry changes with such operations make publication of reliable service and schedule information impractical, if not impossible. However, Massport continued to expand and update information on transportation options to Logan Airport using the latest information technologies, including: ▪ Information and links to transportation companies on the Massport website. Some sites accessed through internet links provided passengers with on-line reservation services; ▪ Most scheduled service operators provided placards with current schedules posted in bus stop shelters located on the curb at each terminal. Individual bus schedules were also available at the information booths; and ▪ Transportation information database for on-line assistance at Logan Airport terminal information booths.
Proceed with environmental review and seek funding for construction of People Mover system.	**Implemented.** Massport completed the Environmental Assessment (EA) and Major Investment Study for the Logan Airport Inter-modal Transit Connector (AITC). The AITC evolved out of the People Mover process and evaluated new access routes to both the Blue Line and the South Station Transportation Center. On February 25, 1997, Massport submitted to the U.S. House Committee on Transportation and Infrastructure an application for the Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA) funds for the next phase of environmental review, planning and design of the AITC. Congressman J. Joseph Moakley was the congressional sponsor; the project also has the support from the Secretary of Transportation and the U.S. Environmental Protection Agency (EPA). The Logan AITC was included, for an unspecified funding level, in the 1997 ISTEA reauthorization bill. In 1998, Massport received a certificate on a Notice of Project Change (NPC) for the People Mover from the Secretary of EEA and a Finding of No Significant Impact (FONSI) on an EA from the Federal Transit Authority. In June 2001, Massport and the MBTA executed an interagency agreement for the purchase of eight Silver Line dual mode buses and the Massport Board approved the expenditure of approximately $13 million for this purchase. In 2004, Massport and the MBTA finalized the 10-year/$20 million dollar Inter-Agency Operating & Maintenance Agreement. Initial Silver Line service to the Airport began in December 2004 and full service began in June 2005 (refer to *Chapter 5, Ground Access to and from Logan Airport* for additional details).
Alternative Fuels program. Massport is carrying out an extensive program to convert existing Massport-owned service vehicles to environmentally preferable sources.	**Implemented.** Table 9-2 of this *2012/2013 EDR* details Massport's progress in achieving these measures.

Table 9-1 West Garage Project Status Report (EOEA #9790)
Details of Ongoing Section 61 Mitigation Measures (as of December 31, 2013) (Continued)

Mitigation Measure	Mitigation Measure
Measuring, Monitoring, and Evaluating Ground Access Improvements	
Massport will assess progress towards the achievement of HOV goals using on-Airport Automated Traffic Monitoring Systems (ATMS).	**Implemented.** Massport has an ATMS plan that provides daily traffic counts at all gateways and other critical locations. Massport uses technologies that utilize on-Airport traffic signal controllers and loops for traffic counting. The Logan ATMS uses technologies that detect vehicle movement: inductive loop lines, and microwave sensors. Upgrades of the ATMS equipment, program software and infrastructure are underway and will result in accurate, meaningful vehicle counts. With the completion of the Terminal Area Roadway system and other regional highways expected in the near future, The project is complete and the upgraded ATMS is functioning as planned and designed.
Massport will assess progress towards the achievement of HOV goals by monitoring parked vehicles using systems such as the parking and revenue control (PARC) system.	**Implemented.** Massport monitors all parking activity at Logan Airport and inventories all commercial parking facilities on a daily basis. Updated PARC systems were installed in the Terminal B Garage in 2004, with Central/West Garage following in 2005. Terminal E and Economy Garage also have PARC systems.
Monitor HOV Services (Logan Express, MBTA, water shuttle, limousine/bus, and taxi).	**Implemented.** Massport maintains a "real time" log of dispatcher reports for Logan Express, the taxi pool, and the bus/limousine pool and other ground transportation operations at Logan Airport. Massport coordinates with the MBTA and the operators of all water shuttles serving Logan Airport to track ridership and service schedules. Daily Logan Express ridership and operations data are submitted monthly to Massport. Massport maintains a Passenger Water Transportation Ridership Summary on a monthly basis. Massport maintains a continuing record, the Ground Transportation Unit (GTU) Daily Event Log, of all occurrences impacting the Airport roadways, terminal curbs, and access roads. This log cites such events as accidents, lane closures, bus delays, as well as routine and non-transportation events.
Monitor passenger activity and employee modes of transportation.	**Implemented.** The most recent air passenger survey was conducted in the spring of 2013 and is summarized in *Chapter 5, Ground Access to and from Logan Airport.*
Massport supports the use of Automated Vehicle Identification (AVI) to monitor, manage, and facilitate efficient traffic operations at Logan Airport and elsewhere on the regional transportation system.	**Implemented.** An AVI system for Massport's Logan Airport shuttles and Logan Express buses was implemented. All new buses are being procured with AVI/global positioning system (GPS), in anticipation of a planned "next bus" arrival notification system. In addition, the recently opened Rental Car Center (RCC) has an operations room with the required equipment to track the new clean-fuel unified bus fleet.
Track the effectiveness of ground access measures.	**Implemented.** Massport continues to track the effectiveness of its ground access mitigation programs in its annual MEPA filings. See *Chapter 5, Ground Access to and from Logan Airport* for 2012/2013 details.

Source: Massport
Note: Text in italics detailing the mitigation measures is from Section IV, Mitigation of the West Garage Final EIR, January 31, 1995.

Table 9-2 describes the Alternative Fuels Program, which was part of the West Garage Section 61 commitments.

Table 9-2 Alternative Fuels Program — Details of Ongoing Section 61 Mitigation Measures for the West Garage Project (as of December 31, 2013)

Program Element	Projected Date of Completion/ Acquisition	Status
Purchase four electric passenger utility vehicles	Winter 1995	**Implemented.**
Purchase five electric sedans	Winter and Summer 1995	**Implemented.**
Build compressed natural gas (CNG) quick-fill station	Spring 1995	**Implemented.** The CNG station has been operational since 1995. It is one of New England's largest retail CNG quick fill stations and serves approximately 30 of Massport's CNG vehicles (18 of which are the Massport-owned 42' CNG buses) along with a dozen Airport tenants including nearby hotel CNG shuttle bus fleets. In calendar year 2012, the station pumped approximately 41,617 gallon equivalents per month and in 2013 the station pumped approximately 31,145 gallon equivalents per month. Sixty-five percent of the fuel is purchased by Massport and 35 percent by outside vendors.
Purchase five electric buses	Spring and Summer 1995	**Implemented.** Massport purchased two electric buses and leased one. These vehicles operated at Logan Airport between 1996 and 2001. After more than six years of testing and evaluation, Massport determined that electric buses are neither durable nor dependable enough to function effectively in the demanding operating environment at Logan Airport. Massport's new unified bus fleet includes clean diesel/electric hybrid buses. Massport will continue to evaluate electric and other alternative fuel vehicles (AFV) as new technologies become available.
Purchase five electric pick-up trucks	Spring 1995	**Implemented.**
Use soy-blend diesel fuel	Spring 1995	**Implemented.** Massport's shuttle fleet operated on soy diesel from 1995 to 1999. In 1999, all the buses were replaced with CNG buses. This fleet was fully replaced in 2012 by CNG and clean-diesel/electric hybrid buses.
Purchase additional AFVs	Spring 1995	**Implemented.** Refer to *Chapter 7, Air Quality/ Emission Reductions* for a list of AFVs.
Purchase six CNG buses	Summer 1995	**Implemented.** The initial fleet of 26 CNG shuttle buses was fully replaced in 2012 with 32 60-foot clean diesel/electric hybrid buses and 18 42-foot CNG buses.
Purchase four electric vans	Summer 1995	**Implemented.**
Install quick-charge kiosks for electric vehicles	Summer 1995	**Implemented.**
Develop slow-charge infrastructure	Ongoing	**Implemented.** The electric charging infrastructure included 15 inductive charging locations but these are not in use since there are no vehicles currently using inductive charging. In 2012, Massport installed 13 new electric vehicle charging stations to accommodate a total of 26 vehicles in the Central and Terminal B parking areas.

Source: Massport

International Gateway Project (Terminal E) – EOEA #9791

Permitting History:

- Certificate on the Final EIR issued on December 2, 1996
- Section 61 Findings submitted to EEA June 26, 1997

Project Status

The International Gateway Project (Figure 9-2) expanded and upgraded Terminal E to provide better service to international passengers. The original Terminal E was opened in 1974 and over time became outdated and too small to accommodate the growth in international travel. This project is being constructed in phases:

- **Phase 1 – Complete.** This phase of the project included a weather-protected outside airside bus portico with an elevator and escalator linking the ground floor with the second floor to accommodate passengers arriving on remotely parked aircraft that are unable to park at a gate because it is occupied by another aircraft.
- **Phase 2 – Complete.** This phase of the project enlarged Logan Airport's congested Federal Inspection Services (FIS) Facility, and improved the meeter/greeter lobby and the ticketing area of Terminal E to maximize passenger convenience and reduce processing times in the terminal. The project called for the reconstruction and expansion of Terminal E in and around the existing terminal while keeping it operational and safe. The new departure hall includes high ceilings, wood paneling, built-in artwork, and views of the city skyline. Additionally, to reduce curb and roadway congestion at Terminal E, this project also included a new separated roadway system for arrivals and departures.
- **Future Phase – Pending.** Planning for future terminal improvements is underway as part of the ongoing strategic planning effort.

Construction of this project commenced in the summer of 1998. Phase 1 was completed in 2004. The departure level of the terminal, including the new ticketing hall and departure level roadway, opened in May 2003. Enlargement of the FIS Facility and construction of the new arrivals level was completed in July 2007. Phase 2 is now complete. Preliminary work was completed for the West Concourse; however, the schedule for further work is not finalized. Additional information on the status of this project is available in *Chapter 3, Airport Planning.*

Table 9-3 lists each of the continuing mitigation measures for the International Gateway Project in the Section 61 Findings along with Massport's progress in achieving these measures through the end of 2013. Many of the mitigation measures for this project have long since been implemented but it is noted in the tables when there have been recent updates. Completed design and construction phase measures are described in previous EDRs.

Figure 9-2 International Gateway Project

Note: Runway 14-32 construction completed in November, 2006.

Table 9-3 International Gateway Project Status Report (EOEA #9791) Section 61 Mitigation Measures (as of December 31, 2013)

Mitigation Measure	Status
Alternative Fuel Outreach Program	
Massport is working cooperatively with the Environmental Protection Agency (EPA) and regional utility providers in coordinating an ongoing outreach program aimed at promoting the use of clean-burning alternative fuels. This program, which is also supported by fuel providers, vendors, and state and federal agencies, will offer information to airport tenants in the following areas: ▪ *Notification of grant programs or other financial incentives for vehicle conversions.* ▪ *Assistance in cost-benefit analysis for conversion of conventionally fueled vehicles to AFVs.* ▪ *Assistance in placing airport tenants in contact with alternative fuel suppliers and product vendors.*	**Implemented.** Massport continues to work cooperatively with National Grid, Alternative Vehicle Service Group (AVSG), the City of Boston, and the Massachusetts Clean Cities Coalition to promote the implementation and integration of Alternative Fuel Vehicles (AFVs) into local private and public fleets. In May 2007, Massport adopted two new policies to promote alternative fuel and hybrid vehicle usage at Logan Airport by others: 1) limited front-of-line taxi pool privileges; and 2) preferred Parking locations in the Central Garage and the new Economy Garage. These policies remain in effect. In addition, Massport has supported and financially sponsored the Boston GreenFest since 2009 and AltWheels Fleet Day since 2003. These are annual forums to promote alternative fuels and sustainable transportation modes.
High Occupancy Vehicle (HOV) Promotion	
Massport will reserve terminal space for ground transportation ticket sales, reservations, and information.	**Implemented.** This space has been provided in a staffed information area in the arrivals area of the new terminal. In a joint venture with Massachusetts Bay Transportation Authority (MBTA) new Charlie Card automated fare collection equipment was installed in all Logan Airport terminals in 2006. In mid-2012, in an effort to encourage greater transit ridership, Massport commenced a pilot program for free boarding of the Silver Line at Logan Airport.
Attractive and distinctive signage and graphics will be utilized inside the terminal and out at the curb to clearly mark access to Logan Express, MBTA, water transportation, and other HOV options.	**Implemented.** Signage has been installed in the terminal and at the curbside identifying HOV curb locations. In 2012, Massport installed new digital signage at all terminal Silver Line curb locations to indicate next bus wait times.
As HOV services continue to develop and expand at Terminal E, Massport will expand its web page to encompass these new services and initiatives.	**Implemented.** Massport continues to reflect service changes on its website.
Massport and the MBTA will offer, on a trial basis, the sale of MBTA tokens via a vending machine in the baggage claim area of Terminal C.	**Implemented.** The MBTA Charlie Card machines (which replaced tokens) are located at the MBTA's Blue Line Airport Station and in each of the Logan Airport passenger terminals. Massport continues to offer free service to Airport Station and the water shuttle dock with its new fleet of CNG and clean diesel/electric hybrid buses. Since the summer of 2012, Massport has also sponsored a pilot program offering free rides on the Silver Line from Logan Airport to downtown Boston.

Note: Text in italics detailing the mitigation measures is excerpted from the Section 61 Findings submitted to the EEA, June 26, 1997.

Replacement Terminal A Project – EOEA #12096

Permitting History

- Certificate on the Final EIR issued on November 16, 2000
- Section 61 Findings submitted to EEA on August 31, 2001

Project Status

The Replacement Terminal A Project (Figure 9-3) involved the complete demolition of the pre-existing Terminal A and construction of a new facility by Delta Air Lines, consisting of a main terminal linked to a satellite concourse. The old Terminal A was closed in May 2002 and demolition commenced shortly thereafter. The project was designed to be constructed in five phases. However, as a result of September 11, 2001, air traffic at Logan Airport reduced dramatically allowing Massport to relocate the airlines at Terminal A to other terminals with minimal impact, and to shut down Terminal A entirely rather than having to phase construction concurrent with passenger activity. As a result, construction progressed ahead of schedule in 2003 and 2004. Terminal A opened on March 16, 2005.

In the spring of 2006, Delta Air Lines and Massport submitted an application for certification of Terminal A under the U.S. Green Building Council Leadership in Energy and Environmental Design® (LEED) Green Building Rating System™. LEED certification was awarded in June 2006, making Terminal A the first airport terminal in the world to be awarded LEED certification.

The following sustainable elements were incorporated into the design of Terminal A:

- Water conservation — low-flow toilets, and drip rather than spray irrigation.
- Atmosphere protection — zero use of chlorofluorocarbon (CFC)-based, hydrochlorofluorocarbon (HCFC) based, or halon refrigerants.
- Energy conservation — special roofing and paving materials that reflect solar radiation. Solar panels were installed on the roof of Terminal A in 2012.
- Materials and resources conservation — more than 10 percent of all the building materials used to construct the terminal were from recycled materials.
- Enhanced indoor environmental air quality — low and volatile organic compound (VOC) free adhesives, sealants, paints, and carpets were used.
- Sustainable sites — bicycle racks were installed in proximity to bus and subway systems.

Figure 9-3 Replacement Terminal A Project

Note: Runway 14-32 construction completed in November, 2006.

Table 9-4 lists each mitigation measure in the Section 61 Findings along with Massport's progress in achieving these measures through the end of 2011.

Table 9-4 Replacement Terminal A Project Status Report (EOEA #12096) Section 61 Mitigation Measures (as of December 31, 2013)

Mitigation Measure	Status
Project Design Mitigation	
Logan Transportation Management Association (TMA) Participation	
Delta Air Lines, Inc. has joined Massport's Logan TMA. Delta Air Lines will designate an Employee Transportation Advisor at Terminal A to be the conduit between the Logan TMA Coordinator and Delta Air Lines employees.	**Implemented.** Delta Air Lines joined the Logan TMA and designated an Employee Transportation Advisor.
Additionally, Delta Air Lines will provide the following services as part of their Transportation Demand Management Program through the Logan TMA Transportation subsidy for full-time Delta Air Lines employees at Logan Airport; ride matching/carpooling; vanpooling; guaranteed ride home; preferential parking for HOVs; shuttle to and from employee parking.	**Implemented.** Transportation Demand Management (TDM) services are provided through the Logan TMA.
Recycling Program	
The Replacement Terminal A will be included in within Massport's terminal recycling program.	**Implemented.** Paper, plastic, aluminum, glass, and cardboard are recycled at Terminal A.
High Occupancy Vehicle (HOV) Promotion	
HOV access can be accommodated on the departures level and will be designated near main entrances to the terminal building to ensure efficient and convenient unloading by air passengers who use these mode-types to access the Airport. *The inner-most curb of [the arrivals level] will be designated exclusively for HOVs and taxis, similar to the departures level.*	**Implemented.** HOV access has been incorporated into the final design. HOV lanes give HOV modes preferential access to Terminal A for passenger convenience at both the arrival and departure levels. Coinciding with the opening of the Rental Car Center (RCC) (and the new on-Airport shuttle bus operations), in September of 2013, Massport made improvements to the terminal curbsides to increase access for HOV/transit/shared-ride modes. The improvements followed several general principles: situate HOV modes to the curb closest to the terminal and locate the airport's Blue Line/RCC shuttle stop adjacent to the Silver Line stop. Terminals B, C, and E underwent the most significant changes; in fact, the ground level of the Terminal B garage was converted to a taxi and limo pick-up area, eliminating all commercial parking from that level, and allowing extra curb space to be better allocated among the remaining HOV and other modes. Terminal A, which already had the primary HOV modes pick-up at the terminal curb (and private vehicles pick-up at the second/outer curb), underwent the fewest changes (notably relocating the Silver Line bus stop to be adjacent to the Blue Line/RCC shuttle stop). The curb improvements also included adding electronic "next bus arrival time" displays for the Massport shuttles and the Logan Express buses.

Table 9-4 Replacement Terminal A Project Status Report (EOEA #12096) Section 61 Mitigation Measures (as of December 31, 2013) (Continued)

Mitigation Measure	Status
Ground Service Equipment (GSE) Conversion *In conjunction with the Project, Delta Air Lines will implement a program for conversion of its entire GSE fleet at Terminal A as soon as viable alternative fueled fleet vehicles become available and can be effectively integrated into Delta Air Lines' operations at Terminal A. Delta Air Lines will introduce battery powered baggage tugs and belt loaders with the replacement terminal and convert this portion of the GSE fleet by the end of 2008. This represents over 40 percent of Delta Air Lines' current GSE fleet.*	**Implemented.** The Terminal A design incorporates infrastructure for GSE charging. In September 2009, Massport approved a $3 million dollar loan to Delta Air Lines for the purchase of battery-powered baggage tugs and battery powered-baggage conveyor belt vehicles. Delta Air Lines purchased 50 electric baggage cart tugs, 25 electric baggage conveyor belt vehicles, and charging stations for each vehicle. Thirty-two GSE charger installations have been completed, and are currently serving electric GSE.
Delta Air Lines will also examine the feasibility of locating a Compressed Natural Gas (CNG) fill station at Terminal A. The availability of a CNG fueling station would facilitate conventionally-fueled vehicles to be replaced with CNG-fueled vehicles where this vehicle option is offered. Delta Air Lines will introduce these vehicles into its GSE fleet as soon as they become available and are determined to be feasible and practicable for use at Terminal A.	**Implemented.** Delta Air Lines examined the feasibility of locating the CNG fill station at Terminal A and determined it to be infeasible given that the GSE conversions are trending toward electric vehicles. A CNG fuel facility is available on the Airport at 81 North Service Road.
Where new alternative fuel vehicles (AFVs) are developed and determined to be cost effective and in available supplies, Delta Air Lines will integrate their use into its Terminal A GSE fleet operations.	**Implemented.** As described earlier, Delta Air Lines has purchased electric baggage tugs and belt loaders and will continue to determine the feasibility of integrating other alternative fuel GSE, as available.
Finally, Delta Air Lines will provide Massport with an annual status report/update on the GSE conversion program at Terminal A, for inclusion in Massport's annual Environmental Data Report (EDR).	**Implemented.** Terminal A includes 32 electric charging stations for Delta Air Lines' electric ramp vehicles. Delta Air Lines continues to study which AFVs and infrastructure are best suited for its future GSE operations.
Operational Mitigation Measures *Minimizing nighttime movement of aircraft to and from hardstand positions.*	**Implemented.** In accordance with the Noise Rules, Massport continues to restrict nighttime movement of aircraft under their own power between 10:00 PM and 7:00 AM, and Massport also requires towing during this time period.

**Table 9-4 Replacement Terminal A Project Status Report (EOEA #12096)
Section 61 Mitigation Measures (as of December 31, 2013) (Continued)**

Mitigation Measure	Status
Using single engine taxiing and pushback to the extent feasible and practicable, recognizing that such use always at the discretion of the pilot in charge of the aircraft based upon his or her experience and safety and operational considerations.	**Implemented.** Massport has conducted two surveys of Logan Airport air carriers (2006 and 2009) to understand the extent single engine taxiing is used at Logan Airport. Massport also issued letters to air carriers in support of single engine taxiing when consistent with safety procedures. Massport is an active member of the Federal Aviation Administration (FAA) Partnership for Air Transportation Noise and Emissions Reduction (PARTNER) program on reducing noise and emissions. In 2009, Massport offered to facilitate the undertaking by the Massachusetts Institute of Technology (MIT) of a more detailed survey of pilots at Boston Logan Airport to better understand the use of single engine taxiing. MIT completed its survey and issued a paper in March 2010 (as provided in the *2010 Environmental Data Report [2010 EDR]*). The MIT survey confirms earlier Massport survey findings that single engine taxiing is an important operational measure used by airlines to conserve fuel and is extensively used at Logan Airport. Based on the more detailed survey results, Massport will tailor future communication to airlines to further encourage the use of single engine taxiing, when safe to do so, within the Logan Airport operational context. In January 2012 and April 2013, Massport sent letters to the Boston Airline Community and the Logan Airport user community encouraging them to consider the use of single engine taxiing when safe to do so. This is provided in *Appendix L, Reduced/Single Engine Taxiing at Logan Airport Memoranda* of this *2012/2013 EDR.*
Testing alternative de-icing methods to reduce the amount of glycol usage.	**Ongoing.** Delta Air Lines is currently using sodium formate, an environmentally friendly deicing material, for pavement deicing. Delta Air Lines will continue to investigate additional de-icing alternatives.

Source: Massport
Note: Text in italics detailing the mitigation measures is excerpted from the Section 61 Findings submitted to the EEA, August 31, 2001.
1 Details are available in the Section 61 Findings.

Logan Airside Improvements Planning Project – EOEA #10458

Permitting History

- Certificate on the Final EIR issued on June 15, 2001.
- Section 61 Findings dated June 8, 2001 on the Final EIR.
- In June 2002, the Federal Aviation Administration (FAA) filed a Final Environmental Impact Statement (FEIS) and issued the Record of Decision (ROD) in August 2002 approving a unidirectional runway and other improvements, but deferred a decision on the centerfield taxiway pending additional review by the FAA.
- In November 2003, the Superior Court of the Commonwealth modified a 1976 injunction prohibiting construction of a new runway at Logan Airport, pending further environmental review. The injunction modification allowed construction of the runway in accordance with the MEPA Certificate on the Final EIR and the FAA's ROD on the Final EIS.
- In accordance with the Secretary of EEA's Certificate on the Final EIR, Massport amended its final Section 61 Findings issued in 2001 to incorporate mitigation measures added or refined through the federal environmental review process. As a result, Massport amended its initial Section 61 Findings on October 21, 2004, to include mitigation measures required of it in the FAA's ROD.
- In April 2007, the FAA issued a ROD on the centerfield taxiway improvements based on its review of supplemental information.

Project Status

- Project construction commenced in 2004. Runway 14-32 opened on November 23, 2006. 2007 was the first full year of operation of Runway 14-32.
- Realignment of the southwest corner taxiway system was completed in 2007.
- Taxiway D extension was completed in 2010.
- Taxiway N realignment is anticipated to commence after 2015.
- Reduction in approach minimums on Runway 15R and 33L was implemented in 2013 following completion of the 33L Light Pier replacement and FAA testing of new Instrument Landing System (ILS) equipment.

The Logan Airside Improvements Planning Project (Figure 9-4) involved the construction of a new unidirectional Runway 14-32 and centerfield taxiway, extension of Taxiway D, realignment of Taxiway N, improvements to the southwest corner taxiway system, and reduction in approach minimums on Runways 22L, 27, 15R, and 33L. Reduction in approach minimums on Runway 15R and 33L were approved in the EIS. However, implementation for approach minimum reductions depends upon realignment of the ILS. The construction impacts of relocating the ILS localizer and new CAT III ILS equipment were addressed in the environmental review of the RSA enhancements for Runway 33L (EOEA #14442). The CAT III ILS began operations in 2013.

Table 9-5 summarizes the mitigation measures contained in the amended Section 61 Findings issued on October 21, 2004 and reports on the status of implementation. Table 9-5 addresses only ongoing requirements, and it is noted when there are recent updates. Documentation on design and construction measures is contained in previous EDRs.

Figure 9-4 Logan Airside Improvements

Note: Runway 14-32 construction completed in November, 2006.

**Table 9-5 Logan Airside Improvements Planning Project (EOEA #10458)
Details of Ongoing Section 61 Mitigation Measures (as of December 31, 2013)**

Mitigation Measures	Status
Runway 14-32 Operations and Construction Mitigation	
Operational procedures for unidirectional Runway 14-32 will include over water flight operations only, arrival operations in east-to-west direction from Runway 32 approach end, and departure operations from west-to-east direction from the Runway 14 departure end. Massport will enter into contract with appropriate government body and/or community group(s) to enforce intended unidirectional runway, if requested. Lighting, marking, and instrumental components of Runway 14-32 will be designed for a unidirectional runway. No parallel or other type taxiway facility will be constructed to allow east-to-west direction departures from the Runway 32 end. *The Federal Aviation Administration (FAA) endorsed the unidirectional limitations on Runway 14-32 and has agreed to develop air traffic control procedures to ensure safe and efficient operation of the unidirectional limitation, subject to variances that may be required to accommodate particular aircraft emergencies.*	**Implemented.** Runway 14-32 was constructed for unidirectional operation. All lighting, marking, and navigational instrumentation was constructed and is operated for unidirectional use only. There is no parallel or other type of taxiway facility that would facilitate east-to-west direction departures from the Runway 32 end. The construction mitigation measures were incorporated into the final design specifications and were implemented during construction. Runway 14-32 opened on November 23, 2006.
Wind-Restricted Use of Runway 14-32 Restrict the use of Runway 14-32 to those times when winds are equal to or greater than 10 knots from the northwest or southeast (between 275 degrees and 005 degrees, or 095 degrees and 185 degrees, respectively).	**Implemented.** Massport provided initial data to support FAA's effort. The FAA implements the wind restriction in compliance with the federal Record of Decision (ROD).
Mitigation Policies/Programs	
Regional Transportation Policy *Engage in promoting increased utilization of regional airports* *Cooperative transportation planning with the various transportation agencies to ensure an integrated regional transportation infrastructure (i.e., improved highways, public transportation, high-speed rail, private transportation services to improve regional airport access).*	**Implemented.** During 2001, Massport, together with the FAA and the six New England Regional State Aviation Directors developed a scope of work and selected a technical team to undertake the New England Regional Aviation System Plan (NERASP) Update study. In 2002, the Massport Board approved 10 percent funding with a 90 percent federal match toward the $1.6 million study. Please refer to *Chapter 4, Regional Transportation*, for additional information on Massport's cooperation on regional transportation efforts.
Massport will continue to exercise operational control over Worcester Regional Airport.	**Implemented.** The Authority exercised operational control over Worcester Regional Airport as part of Massport's agreement with the City of Worcester which went into effect on January 15, 2000. In April 2004, Massport and the City of Worcester agreed to a three-year extension of the Operating Agreement, extending Massport's operation of the Airport through June 2007. Subsequently, both parties agreed to a further extension. Legislation was passed in 2009 requiring Massport to assume ownership of Worcester Regional Airport. Massport's ownership of Worcester Regional Airport commenced on July 1, 2010.

**Table 9-5 Logan Airside Improvements Planning Project (EOEA #10458)
Details of Ongoing Section 61 Mitigation Measures (as of December 31, 2013) (Continued)**

Mitigation Measure	Status
Massport will continue to attract new air service to Worcester Regional Airport	**Implemented.** Following the events of September 11, 2001, the last commercial operator, US Airways Express, ceased operations out of Worcester in early 2003. In 2003 and 2004, Massport continued to work with the City to attract passenger service for the Worcester Regional Airport. Service by Allegiant Airways commenced in December 2005 but ceased in September 2006. Commercial passenger service was regained when Direct Air began scheduled charter services in November 2008, but commercial passenger services ceased again in 2012. Massport continues to work with carriers and make other facility improvements to develop and sustain commercial service from Worcester. In 2013, JetBlue Airways began commercial service to two Florida locations from Worcester Regional Airport; as of this filing, over 100,000 passengers have been served.
Traveler and air service awareness will be provided to Worcester Regional Airport via marketing campaigns.	**Implemented.** In 2011, Massport continued marketing of Worcester Regional Airport following the beginning of Direct Air commercial service at the airport in November 2008. Direct Air ceased operations at Worcester Airport in 2012. Massport continues to aggressively market the Airport to potential commercial air service carriers. Massport worked with JetBlue Airways to begin service out of Worcester Regional Airport in November 2013.
Develop and maintain an aviation information database to include: aviation trend tracking reports for distribution to interested parties; statistical summaries of passenger levels, aircraft operations and airline schedule data at major New England regional airports; include a summary of regional airport trends and service developments an Annual Report.	**Implemented.** Massport collects regional airport data. A summary of individual airport activity is published annually in the Environmental Data Reports (EDR), and in the Environmental Status and Planning Reports (ESPR).
Participate in other regional/state aviation forums.	**Implemented.** The NERASP study was completed in the fall of 2006. Massport continues to participate in regional and state aviation forums as they exist. Please refer to *Chapter 4, Regional Transportation*, for additional information on Massport's cooperation on regional transportation efforts.
Continue to work with FAA/regional airport directors to complete a New England Airports System Study to evaluate regional airports performance. FAA committed to work with other participants in the preparation of the study.	**Implemented.** The NERASP Study was published in October 2006.
Encourage transportation initiatives (i.e., commuter rail, rail or other links between regional airports) by relevant agencies or other governmental bodies through Transportation Bond Bill or other legislative initiatives to implement an improved effective regional transportation system.	**Implemented.** Massport continues to provide support for regional transportation legislation and funding for other modes of transportation including the MBTA Silver Line and water transportation. Massport's support was instrumental in the opening of the Anderson Regional Transportation Center (RTC) in Woburn which provides a station building for ticketing, baggage and passenger services, approximately 2,400 parking spaces for daily and overnight parking, loading platforms for Logan Express and local buses, improved access from Interstate 93 via a new interchange constructed and opened by the Massachusetts Department of Transportation (MassDOT, formerly the Massachusetts Highway Department) and a new high-level platform commuter rail station.

**Table 9-5 Logan Airside Improvements Planning Project (EOEA #10458)
Details of Ongoing Section 61 Mitigation Measures (as of December 31, 2013) (Continued)**

Mitigation Measure	Status
Continue to support inter-city rail planning through the Boston Metropolitan Planning Organization (MPO).	**Implemented.** Massport continues to actively participate in the Boston MPO and contributes to the policy discussions in all modes of transportation.
Allow Massport's Logan Express satellite parking lots and stations available for third-party bus and park-and-ride connections to other regional airports, including Worcester, Manchester, and Providence.	**Implemented.** Upon request and review, Massport will continue to allow third party bus operators to provide service to regional airports from Logan Express facilities. In 2007, Massport enacted an agreement with Manchester-Boston Regional Airport to allow operation of a shuttle service between Manchester-Boston Regional Airport and the RTC in Woburn. That pilot program was replaced by hourly van service in 2008.
Sound Insulation: *Sound insulation is being provided within the Boston Logan Airside Improvements Planning Project Mitigation Contour including the affected residences of Chelsea, East Boston, Winthrop, and Revere. Through special project mitigations, FAA funding will be provided for residences with building code considerations to allow for the necessary upgrades thereby ensuring eligibility and participation in the sound insulation program. If FAA funding is unavailable to complete sound insulation to residences within the DNL 65 dB contour as a result of project implementation, Massport will provide the funding." See Chapter 6, Noise Abatement for additional details on Sound Insulation.*	**Implemented.** Sound insulation is being implemented in full compliance with state and federal regulatory requirements and mitigation commitments. Since 1986, Massport has sound insulated over 6,000 homes totaling over 11,400 dwelling units.
Preferential Runway Advisory System (PRAS) *Massport will develop and implement a PRAS monitoring system and a new distribution system for reporting that will expand the contents of Massport's Quarterly Noise Reports and will involve the expansion of the distribution list to include the Logan Airport Citizens Advisory Committee (CAC). Runway utilization, dwell, and persistence reports will be included in the ESPR filings with MEPA. Massport will continue to work with FAA to design additional reports to enhance the attainment of PRAS and Massport will begin to work with CAC to update PRAS. The current PRAS system will remain in place until superseded.*	**Implemented.** Massport, FAA, and the CAC initiated a noise study of Logan Airport. PRAS review and reporting are incorporated into the noise study. During Phase 2 of the on-going Boston Logan Airport Noise Study (BLANS) the Logan Airport Community Advisory Committee (CAC) voted to abandon PRAS because it had not achieved the intended noise abatement. For additional information, refer to *Chapter 6, Noise Abatement*. Runway utilization, dwell and persistence reports continue to be included in the annual ESPR and EDR filings.
Noise Abatement Study *FAA has committed to undertake a noise abatement study that will include enhancing existing or developing new noise abatement measures applicable to aircraft overflight impacts, which will take into account environmental benefit, operational impact, aviation safety and efficiency, and consistency with applicable legal requirements. The scope of this study has been completed through the joint efforts of FAA, the CAC, and Massport as required by the ROD. Massport will work with the CAC and FAA to assess the existing PRAS at Logan Airport in accordance with Section 10.0 of the Section 61 Findings and will continue to participate in the noise study as contemplated in the ROD.*	**Implemented.** The FAA, in conjunction with Massport and the Logan Airport CAC, initiated the Boston Overflight Noise Study (BONS). Phase 1 of the study, completed in early 2007, defined and will seek to implement changes to flight tracks to minimize impacts from aircraft overflights which do not require a detailed Environmental Assessment (EA). Federal funding for Phase 2 was requested early to ensure seamless continuation of the study and transition. Phase 2, of the Boston Logan Airport Noise Study (BLANS), was completed in 2012. It addressed additional noise abatement alternatives that will require detailed analysis to meet FAA environmental requirements. FAA has begun implementing new aRea NAVigation (RNAV) procedures that were designed in Phase 1. Please refer to website www.bostonoverflight.com for more details.

Table 9-5 Logan Airside Improvements Planning Project (EOEA #10458)
Details of Ongoing Section 61 Mitigation Measures (as of December 31, 2013) (Continued)

Mitigation Measure	Status
Peak Period Monitoring and Demand Management Program (DMP) *Massport will develop and implement a Peak Period Pricing (PPP) program or an alternative DMP. Massport will identify standards to allow airlines to accurately predict scheduling costs and modify accordingly. Massport will establish and maintain a monitoring system.* *Massport will comply with its commitments with respect to PPP or alternate DMP. FAA has indicated in the ROD that it stands ready to assist Massport in this endeavor.*	**Implemented.** In July 2004, Massport filed a proposed rule with the Office of the Massachusetts Secretary of State to formally initiate the state rulemaking process and public review of a proposed rule to establish a peak period surcharge during designated peak delay periods at Logan Airport. The filing was followed by a public comment period that lasted through November 15, 2004. During the comment period, Massport conducted two public hearings to receive comments on the proposed regulation. The Massport Board voted to establish the peak period surcharge program on January 16, 2005. The program has been in place since that date. Please refer to *Appendix K, 2012/2013 Peak Period Pricing Monitoring Report.*
Single Engine Taxi Procedures *Develop and implement a program designed to maximize the use of single engine procedures by all tenant airlines, consistent with safety requirements, pilot judgment and Federal law requirements.*	**Implemented.** Massport supports the use of single engine taxiing when it can be done safely, voluntarily and at the discretion of the pilot. Massport has conducted two surveys of Logan Airport air carriers (2006 and 2009) to understand the extent single engine taxiing is used at Logan Airport. Massport also issued a letters to air carriers in support of single engine taxiing when consistent with safety procedures. Massport is an active member of the FAA Partnership for Air Transportation Noise and Emissions Reduction (PARTNER) program on reducing noise and emissions. In 2009, Massport offered to facilitate the undertaking by MIT of a more detailed survey of pilots at Boston Logan Airport to better understand the use of single engine taxiing. MIT completed its survey and issued a paper in March 2010 (as provided in *Appendix L, Demonstration of Reduced Airport Congestion through Pushback Rate Control* of the *2011 ESPR*). The MIT survey confirms earlier Massport survey findings that single engine taxiing is an important operational measure used by airlines to conserve fuel and is extensively used at Logan Airport. In January 2012 and April 2013, Massport issued letters to air carriers in support of single engine taxiing when consistent with safety procedures. A copy of these letters is included in *Appendix L, Reduced/Single Engine Taxiing at Logan Airport Memoranda of this 2012/2013 EDR.*
Report on Progress of Logan Transportation Management Association (TMA)	**Implemented.** *Chapter 5, Ground Access to and from Logan Airport* of the *2011 ESPR* discusses the status of the Logan TMA and efforts to increase Logan TMA membership and overall high occupancy vehicle (HOV) access to Logan Airport. Since MassRIDES began management of the Logan TMA in January 2006, the joint focus has been on expanding Logan TMA services, broadening HOV options, and supporting all major Logan Airport tenants to become members and actively participate in the Logan TMA. In 2007, the Logan TMA implemented three new programs: Sunrise Shuttles; Logan TMA Preferential Carpooling; and Commuter Cash program.

Source: Massport
Note: The mitigation measures in italics are those that were referenced in the FAA's ROD and later incorporated into the October 21, 2004 amended Section 61 Findings.

Southwest Service Area (SWSA) Redevelopment Program, EOEA # 14137

Permitting History

- Certificate on the Final EIR issued on May 28, 2010
- Section 61 Findings submitted to EEA on June 29, 2010

Project Status

Massport is redeveloping the SWSA and constructing the new RCC. In addition to customer service benefits, consolidation of the rental car operations and their shuttle buses into one coordinated operation will result in reduced vehicle miles traveled and associated air emissions.

Construction of enabling projects commenced in late summer 2010 as final design of the facility continued through 2011. All RCC facilities (the Garage Structure, Customer Service Center (CSC), permanent Quick Turnaround Areas (QTAs) 1 and 2, and temporary QTAs 3 and 4) would be constructed first. The first rental car companies moved into the QTA 1 in mid-2013 and the remaining companies by early 2014. By 2014, the entire project will be completed and operational. Table 9-6 outlines the SWSA Redevelopment Program Section 61 commitments which Massport, the construction contractors, and the rental car companies will implement as part of the design, construction and operation of the facility. This project is currently nearing completion and there is updated progress for each mitigation measure.

Table 9-6 Southwest Service Area (SWSA) Redevelopment Program (EEA # 14137) Details of Ongoing Section 61 Mitigation Measures (as of December 31, 2013)

Mitigation Measure	Status
Site Design	
Stormwater Management	
Improve quality of runoff by upgrading stormwater management facilities site-wide, reducing the volume of flow to the Maverick Street Outfall by increasing pervious area site-wide, utilization of Low Impact Design elements, and replacing uncovered parking areas with buildings.	**To be implemented.** These stormwater design features are included in the final project design and are part of the project. The stormwater features include 27 stormceptors that were constructed as part of this project. Stormceptors are prefabricated, underground units that separate oils, grease, and sediment from stormwater runoff when installed as part of a pipe conveyance system.
Design new sanitary and drainage systems to result in an overall reduction in combined sewer overflow volumes at the Porter Street Outfall and eliminate discharge to Maverick Street Outfall and Bird Island Flats/West Outfall.	**Implemented.** The sanitary sewer system designed for the RCC project adds new connections at Gove Street and Harborside Drive. Sanitary flows to the Maverick Street sewer will be significantly reduced once the connection is completed. Massport submitted a pre- and post-development stormwater analysis with the Notice of Intent (NOI) for the RCC project, as required by the Massachusetts Department of Environmental Protection's (MassDEP's) Stormwater Management Regulations. The stormwater analysis shows an overall reduction in the post-development stormwater flows for the project, as well as reductions in flows to the Porter Street and West Outfalls and elimination of stormwater flow to the Maverick Street Combined Sewer. Both the sanitary sewer system and stormwater drainage system are now under construction.
Remediation and Underground Fuel Storage Systems	
Remove all existing car rental fueling systems and associated tanks and replace with current, state-of-the-art vehicle fueling and washing facilities.	**To be implemented.** This element has been implemented as part of the quick turnaround facilities that have been constructed. The completion of the remaining quick turnaround facilities will meet this requirement.
Develop a Soil Management Plan and submit to the MassDEP prior to construction for the Activity and Use Limitations (AUL) areas.	**Implemented.** As required by the RCC project specifications, the Project Contractor submitted an Excavated Materials Management & Disposal Plan prepared by a Licensed Site Professional (LSP) and submitted it on March 25, 2011 for Massport review and approval. Two Release Abatement Measure (RAM) Plans for work within AUL areas were submitted by the Contractor's LSP to MassDEP in accordance with the Massachusetts Contingency Plan (MCP). Construction occurred within two AUL areas, associated with MCP sites identified by Release Tracking Number (RTNs) 3-00956 and 3-2690, and submittal of the RAM Plans were required to detail procedures for managing contaminated soil. RAM Status Reports have been submitted on a 6-month schedule documenting soil management activities, and electronic files of these reports can be accessed by searching the RTNs on the MassDEP website.

Table 9-6 Southwest Service Area (SWSA) Redevelopment Program (EEA # 14137) Details of Ongoing Section 61 Mitigation Measures (as of December 31, 2013) (Continued)

Mitigation Measure	Status
Noise Reduction Measures	
Eliminate individual rental car shuttle buses and combine Massport Airport Station buses (routes 22/33/55) through the Unified Bus System; thereby, reducing the overall number of rental car-related buses circulating on-airport and associated noise.	**Implemented.** Massport purchased a new Bus Fleet which was put into operation in 2012. The bus fleet is comprised of 18 compressed natural gas (CNG) buses and 32 clean diesel/electric buses that have already replaced Massport's older fleet of 26 CNG buses and have replaced the entire fleet of diesel rental car shuttle buses with the RCC opening in 2013.
Incorporate noise reduction strategies into site design, such as solid fences/walls, gateway signs/walls, and landscaped berms.	**To be implemented.** This element is included in the final design and is nearing completion.
Phase 2 SWSA Airport Edge Buffer and Other Site Landscaping	
Construct other site landscaping that encourages walking/biking by providing safe and welcoming corridors, reduces environmental impact (water efficient; reduce and filter runoff), and screens the SWSA from neighboring properties.	**To be implemented.** This element is included in the final design and will be part of the completed project, which is under construction and set to be completed by the end of 2014.
Building Design	
Energy Efficiency	
Optimize daylight and natural ventilation within the Garage Structure (a Code classification for an "open parking structure") to eliminate the need for substantial mechanical ventilation systems.	**Implemented.** This element is included in the completed project.
Reduce energy consumption by a minimum of 20 percent (as required by MA LEED Plus) by properly sizing building mechanical systems and incorporating high performance/energy efficient mechanical and electrical building systems, such as highly-reflective (high-albedo) roofing materials, reduced lighting intensities, high-efficient heating and cooling systems, and daylighting techniques with window and skylight glazing.	**Implemented.** This element is included in the completed project.
Reduce overall electricity consumption by 2.5 percent through the use of on-site renewable energy (which contributes to the overall 20 percent energy efficiency performance criteria above).	**Implemented.** This element is included in the completed project.
Conduct a third-party commissioning process to ensure the effectiveness of building systems (as required by MA LEED Plus).	**Implemented.** Third party commissioning will occur upon building completion

Table 9-6 Southwest Service Area (SWSA) Redevelopment Program (EEA # 14137) Details of Ongoing Section 61 Mitigation Measures (as of December 31, 2013) (Continued)

Mitigation Measure	Status
Water Efficiency and Wastewater Reduction	
Reduce water use demand by a minimum of 20 percent (as required by MA LEED Plus) and to strive for a 30 percent reduction through utilization of high-efficiency/ low-flow plumbing fixtures and car wash water reclamation systems.	**Implemented.** This element is included in the completed project.
Reduce water use demand and wastewater generation by reclaiming and reusing car washing water.	**Implemented.** This element is included in the completed project.
Potential collection of and reuse of stormwater runoff for irrigation of landscaped areas.	**To be implemented.** This element is being considered as part of the final design. A rain garden has been included in the final design as a method to control stormwater runoff.
Noise Reduction Measures	
Improve the Quick Turnaround Areas (QTAs), including the elimination of outdoor loudspeakers, elimination of car drying blowers through state-of-the-art equipment, enclosed vacuum compressors, and incorporation of six to eight-foot high solid walls/fences designed to further reduce noise from activities at the QTA facilities, including car washing and vehicle movements.	**To be implemented.** This element is included in the final design and is under construction.
Transportation and Parking	
Roadway Improvements	
Reconstruct Porter Street, including turnaround for exiting taxis.	**To be implemented.** This element is included in the final design and is under construction.
Reconfigure SR-14 and new alignment of Ramp 1A-S.	**Implemented.** This element is included in the final design and the completed project.
Construct new dedicated Unified Bus System access and ramp off of SR-14.	**Implemented.** This element is completed.
Reconstruct traffic signals and pedestrian accommodations at the Harborside Drive/Porter Street intersection.	**Implemented.** This element is included in the final design and the completed project.
Reconstruct, widen and convert Jeffries Street to one-way northbound, between Harborside Drive and Tomahawk Drive.	**Implemented.** This reconfiguration is complete.
Reconstruct traffic signals and pedestrian accommodations at the Harborside Drive/Jeffries Street intersection.	**Implemented.** This element is completed.
Construct the extension of Tomahawk Drive –a one-way westbound roadway connecting Harborside Drive with the Maverick Street Gate and Garage Structure.	**Implemented.** This element is completed.

**Table 9-6 Southwest Service Area (SWSA) Redevelopment Program (EEA # 14137)
Details of Ongoing Section 61 Mitigation Measures (as of December 31, 2013) (Continued)**

Mitigation Measure	Status
Reconstruct traffic signals and pedestrian accommodations at the Harborside Drive/Hotel Drive intersection.	**Implemented.** This element is completed.
Reconfigure inbound lane of the Maverick Street Gate to provide additional queue storage.	**Implemented.** This element is completed.
Airport Transportation System Improvements	
Reduce the rental car shuttle bus fleet by approximately 70 percent through the creation of the Unified Bus System when compared to the 2007 Existing Condition and future No-Build/No-Action Conditions.	**Implemented.** Massport purchased a new Unified Bus Fleet of diesel/electric hybrid and CNG buses. The initial buses were put into operation in 2012. Full implementation of the new bus fleet occurred when the RCC opened in the fall of 2013.
Reduce rental car shuttle bus terminal curbside congestion through the creation of the Unified Bus System resulting in reduced emissions.	**Implemented** upon project opening. Massport purchased a new Unified Bus Fleet which was put into initial operation in 2012.
Utilize clean- and low-emission fuel for the Unified Bus System to further reduce emissions.	**Implemented** upon project opening. Massport has purchased a new Unified Bus Fleet. The new fleet is comprised of diesel/electric hybrid and CNG buses.
Install Intelligent Transportation System features, as part of the Unified Bus System to further reduce emissions and improve operational efficiency.	**Implemented** upon project opening. Massport purchased a new Unified Bus Fleet which was put into initial operation in 2012.
Implement new wayfinding signage to increase the efficiency of the circulating vehicles within and around the SWSA.	**Implemented** upon project opening.
Pedestrian and Bicycle Facilities	
Provide new pedestrian and bicycle facilities, including secure and covered bicycle storage at the Customer Service Center (CSC) and QTA buildings for employees, customers and the general public, as well as shower/changing facilities within the QTA buildings for employees.	**To be implemented.** This element is planned to be completed by the end of 2014.
Provide enhanced pedestrian connections to and from the SWSA, airport terminals, the Logan Office Center, Memorial Stadium Park, Bremen Street Park, the Harborwalk, on-airport buses, public transit (MBTA Airport Station), along Porter Street, and surrounding East Boston neighborhoods.	**To be implemented.** This element is included in the final design and is under construction
Provide street and pedestrian-level lighting and advanced warning signals and/or systems at crosswalks.	**To be implemented.** This element is included in the final design and is under construction
Transportation Demand Management (TDM) Plan	
Provide limited SWSA employee parking on-site.	**Implemented.**

Table 9-6 Southwest Service Area (SWSA) Redevelopment Program (EEA # 14137) Details of Ongoing Section 61 Mitigation Measures (as of December 31, 2013) (Continued)

Mitigation Measure	Status
Provide new access to public transit through the Unified Bus System (direct connection to MBTA Blue Line at Airport Station) and new/enhanced pedestrian facilities at the station.	**Implemented.**
Require rental car companies to participate in the Logan Transportation Management Association (TMA).	**Implemented.** This requirement is included in new RCC tenant leases.
Alternative-Fuel Vehicles	
The rental car companies would provide fuel-efficient and/or alternative-fueled rental vehicles (quantity to be determined by the rental car companies).	**Implemented.** This requirement is included in new RCC tenant leases.
Off-Airport Improvements/Benefits	
Reconstruct Frankfort Street/Lovell Street intersection to provide a new traffic signal control and pedestrian-related improvements (for temporary impacts of the relocation of the Bus and Limousine Pools to the North Service Area (NSA) during construction).	**Implemented.** This element is completed.
Reduce the amount of off-airport car shuttling to and from off-airport locations, further reducing traffic on Route 1A and local roadways surrounding the airport due to the consolidated and expanded rental car "ready/return" parking spaces and QTA areas at the SWSA.	**Implemented** upon project opening.
Construction Management	
Aim to divert/reduce construction waste to landfills.	**Implemented,** construction underway.
Implement Erosion and Sedimentation Control Program.	**Implemented,** construction underway.
Retrofit certain diesel construction equipment types with diesel oxidation catalyst and/or particulate filters (in accordance with the DEP Clean Air Construction Initiative).	**Implemented,** construction underway.
Require the use of ultra-low sulfur diesel fuel for off-road construction vehicles and/or equipment.	**Implemented,** construction underway.
Construction worker vehicle coordination and trip limitation, including requiring contractors to provide off-airport parking and use of high-occupancy vehicle transportation modes for employees.	**Implemented,** construction underway.
To ensure no changes in the conditions of abutting homes due to pile driving, Massport will require the Contractor to inspect the conditions of the abutting homes prior to and following pile driving activities.	**Implemented.** Preconstruction residential survey completed. Construction underway.

Source: Massport

Logan Airport RSA Project – EEA #14442

Permitting History

- Certificate on the Final EA/EIR issued on March 18, 2011.
- The FAA issued a Finding of No Significant Impact (FONSI) on April 4, 2011, which documents that the proposed Federal action is consistent with the National Environmental Policy Act of 1969 (NEPA) and other applicable environmental requirements and will not significantly affect the quality of the human environment with the mitigation requirements referenced in Table 9-7.
- Section 61 Findings were submitted to EEA on May 27, 2011, and published in the *Environmental Monitor* on June 8, 2011.
- Certificate on the Notice of Project Change (NPC) for the replacement of the Runway 33L approach light pier issued on March 9, 2012.
- On April 12, 2012 the FAA found that the replacement of the Runway 33L approach light pier was a Categorical Exclusion and thus exempt from further consideration under NEPA.

Project Status

- The first construction season for the Runway 33L RSA commenced in June 2011 and ended in November 2011. The second construction season started again in June 2012 and the project was completed in November 2012.
- Replacement of the Runway 33L approach light pier commenced in July 2012 and was completed in November 2012. The upgraded CAT III system was put in service in 2013.

As described in previous EDRs/ESPRs, Massport has periodically undertaken RSA improvement projects at other Logan Airport runways. Massport has completed safety improvements for Runways 22L, 4L/4R, and 27 under EOEA #5122. In 2005, Massport began undertaking safety improvements at Runway 22R with the construction of an Engineered Materials Arresting System (EMAS) bed at the end of the runway in compliance with FAA directives, although no MEPA review was needed. In 2006, as part of a separate project, Massport installed an EMAS bed at the Runway 33L End. The current project, the Logan Airport RSA Project, considered further enhancements to the Runway 33L and Runway 22R RSAs. Massport prepared a combined EA in accordance with NEPA and an EIR in accordance with MEPA for the proposed enhancements at the Runway 33L and Runway 22R RSAs. The ENF was filed with MEPA on June 30, 2009, and the Draft EA/EIR was submitted to FAA and EEA on July 15, 2010. The Final EA/EIR was submitted to FAA and EEA on January 30, 2011. Figure 9-5 indicates the status of RSA projects at Logan Airport.

The Runway 33L RSA improvements include a 600-foot long RSA with an EMAS bed, portions of which are on a 460-foot long by 303-foot wide pile-supported deck extending over Boston Harbor. Additional elements of the RSA improvements include two emergency access ramps located on either side of the deck and relocation of the perimeter access road. Construction of the pile-supported deck was completed in November, 2012.

The current Runway 33L RSA project replaced the inner 500 feet of the light pier. As construction progressed on the Runway 33L RSA improvements, Massport determined that it would be feasible to replace the remaining Runway 33L approach light pier. In summer of 2012, Massport began replacing the outer approximately 1,900 feet of the existing timber light pier that extends approximately 2,400 feet southeast of Runway End 33L. The existing timber pier was replaced with a new concrete structure along the runway centerline, approximately 10 feet south of the old pier, using concrete pilings. The in-kind replacement reduced the total number of pilings significantly (from over 500 to approximately 150). As part of the reconstruction, the new light pier was also constructed to accommodate upgraded navigational aids. The pier improvements provide the infrastructure necessary to support navigational aids that facilitated implementation of the reduced aircraft approach minimums previously reviewed and approved by the FAA in a ROD dated August 2, 2002, for the *Logan Airside Improvements Planning Project (Airside Project)*. Massport filed a NPC with MEPA for the proposed light pier replacement on January 31, 2012. On March 9, 2012, the EEA Secretary issued an NPC Certificate determining that no further MEPA review was required for the light pier replacement. On April 12, 2012 the FAA found that the replacement of the Runway 33L approach light pier was eligible for a Categorical Exclusion and thus exempt from further review under NEPA.

The Runway 22R improvements will enhance the existing RSA at this location by constructing an inclined safety area (ISA), similar to the ISA constructed at the Runway 22L end. Massport chose to construct an ISA because it would enhance the existing RSA and rescue access in the event of an emergency, at a feasible construction cost while minimizing impacts to environmental resources. Construction of the Runway 22R ISA is underway and planned to be completed by 2015. Table 9-7 lists the Section 61 commitments for the Logan Airport RSA Project and Massport's progress in achieving these measures.

Figure 9-5 Runway End Safety Improvements

Table 9-7 Logan Airport Runway Safety Area Improvement Program (EEA # 14442) Section 61 Mitigation Commitments to be Implemented

Mitigation Measure	Status
Protected Resources	
Eelgrass	
Develop a mitigation program that will replace lost eelgrass area and functions by creation of new eelgrass, at a 3:1 replacement to loss ratio.	**Implemented.** Eelgrass was transplanted in 2011, but did not survive through 2012. In 2012, Massport continued to work with the Eelgrass Mitigation Working Group (comprised of federal, state, and local agencies) through 2013 to identify alternative means of eelgrass mitigation.
Implement sediment control measures.	**Implemented.** Sedimentation control measures were installed and fully maintained.
Store construction barges outside of any eelgrass beds overnight.	**Implemented.** There was no overnight barge storage in or immediately adjacent to eelgrass beds.
Restrict barge movement to designated construction corridors outside of the eelgrass bed.	**Implemented.** There was limited barge movement in or immediately adjacent to eelgrass beds.
Provide post-construction monitoring and restoration or any additional areas of eelgrass beds that are inadvertently damaged during construction.	**Implemented.** The post-construction monitoring was conducted in November, 2012.
Salt Marsh	
Restore new salt marsh at a 2:1 replacement to loss ratio.	**To be implemented** as part of Runway 22R habitat mitigation at Rumney Marsh.
Monitor compensatory salt marsh for success and invasive plant species, and implement an invasive species control plan.	**To be implemented** as part of Runway 22R habitat mitigation at Rumney Marsh.
Implement erosion and sedimentation control measures according to the Soil Erosion and Sediment Control Plan.	**To be implemented** as part of Runway 22R habitat mitigation at Rumney Marsh.
Shellfish	
Monitor pilings and substrate at Runway 33L.	**Implemented.** Monitoring conducted summer 2013 and 2014.
Restore approximately 1.1 acres of habitat.	**To be implemented** as part of Runway 22R habitat mitigation at Rumney Marsh.
Harvest and transplant shellfish from the footprint of the Runway 22R Inclined Safety Area (ISA).	The MA Division of Marine Fisheries (MassDMF) has identified a risk of shellfish disease in the Logan Airport flats, including 22R and has determined that the shellfish should not be relocated.
Execute Memorandum of Agreement with the Massachusetts Division of Marine Fisheries for resource enhancement.	**Implemented.** A Memorandum of Agreement (MOA) with MassDMF was executed on July 30, 2012 and the requirements of the MOA have been implemented.
State-Listed Rare Species	
Identify equivalent area of pavement for removal to maintain area of available habitat at Logan Airport for the upland sandpiper if required by the Massachusetts Natural Heritage and Endangered Species Program.	**To be implemented.** The Massachusetts Natural Heritage & Endangered Species Program (NHESP) has determined that construction time of year restrictions will avoid impacts to state-listed species. These seasonal restrictions will be implemented when construction of Taxiway C-1 is initiated in the future.

Table 9-7 Logan Airport Runway Safety Area Improvement Program (EEA # 14442) Section 61 Mitigation Commitments to be Implemented (Continued)

Mitigation Measure	Status
Cultural Resources	
Develop an Unanticipated Discovery Plan in accordance with the Board of Underwater Archaeological Resources' Policy Guidance	**Implemented.** An Unanticipated Discovery Plan was developed in accordance with the Board of Underwater Archaeological (BUA) Resources' Policy Guidance and approved by BUA. No resources were discovered during Runway 33L construction.
Water Quality	
Develop and implement a comprehensive Soil Erosion and Sediment Control Plan in accordance with NPDES and MassDEP standards.	**Implemented.** A comprehensive Soil Erosion and Sediment Control Plan was developed and implemented at the outset of Runway 33L construction in June 2011 and maintained through the end of construction in 2012.
Apply water to dry soil to prevent dust production.	**Implemented.** Completed for Runway 33L construction; to be implemented for Runway 22R construction.
Stabilize any highly erosive soils with erosion control blankets and other stabilization methods, as necessary.	**Implemented.** Completed for Runway 33L construction; to be implemented for Runway 22R construction.
Use sediment control methods (such as silt fences and hay bales) during excavation to prevent silt and sediment entering the stormwater system and waterways.	**Implemented.** Completed for Runway 33L construction; to be implemented for Runway 22R construction.
Maintain equipment to prevent oil and fuel leaks.	**Implemented.** Completed for Runway 33L construction; to be implemented for Runway 22R construction.
Use silt curtains and semi-permanent (overnight) debris booms and other secondary booms and silt fencing around barges for additional containment.	**Implemented.** Completed for Runway 33L construction; to be implemented for Runway 22R construction.
Contain and pump slurry and/or silty water to a containment area on a construction barge to contain runoff	**Implemented.** Completed for Runway 33L construction; to be implemented for Runway 22R construction.
Noise	
Maintain mufflers on construction equipment.	**Implemented.** Completed for Runway 33L construction; to be implemented for Runway 22R construction.
Keep truck idling to a minimum in accordance with Massachusetts anti-idling regulations.	**Implemented.** Completed for Runway 33L construction; to be implemented for Runway 22R construction.
Fit any air-powered equipment with pneumatic exhaust silencers.	**Implemented.** Completed for Runway 33L construction; to be implemented for Runway 22R construction.
Do not allow nighttime construction.	**Implemented.** Completed for Runway 33L construction; to be implemented for Runway 22R construction.
Air Quality	
Keep truck idling to a minimum in accordance with Massachusetts anti-idling regulations.	**Implemented.** Completed for Runway 33L construction; to be implemented for Runway 22R construction.
Retrofit appropriate diesel construction equipment with diesel oxidation catalyst and/or particulate filters.	**Implemented.** Completed for Runway 33L construction; to be implemented for Runway 22R construction.

Table 9-7 Logan Airport Runway Safety Area Improvement Program (EEA # 14442) Section 61 Mitigation Commitments to be Implemented (Continued)

Mitigation Measure	Status
Implement construction worker vehicle trip management, including requiring contractors to provide off-airport parking, use high-occupancy vehicle transportation modes for employees, and join the Logan TMA.	**Implemented.** Completed for Runway 33L construction; to be implemented for Runway 22R construction. Contractors assemble offsite and access the airfield in shared vans. Contractors have access to Logan Airport Transportation Management Association (TMA) services through MassRides.
Traffic	
Limit construction traffic to federal or state highways, restricting the use of East Boston local roadways by construction vehicles.	**Implemented.** Completed for Runway 33L construction; to be implemented for Runway 22R construction.
Implement construction worker vehicle trip management, including requiring contractors to provide off-airport parking, use high-occupancy vehicle transportation modes for employees, and join the Logan TMA.	**Implemented.** Completed for Runway 33L construction; to be implemented for Runway 22R construction. Contractors assemble offsite and access the airfield in shared vans. Contractors have access to Logan TMA services through MassRides.

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MEPA Appendices

- Appendix A – MEPA Certificates and Responses to Comments
- Appendix B – Comment Letters and Responses
- Appendix C – Proposed Scope for the *2014 EDR*
- Appendix D – Distribution List

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MEPA Certificates and Responses to Comments

- Secretary of the Executive Office of Energy and Environmental Affairs Certificates on the *Logan Airport 2011 Environmental Status and Planning Report (ESPR)* and Massport's Responses to Comments raised in the Certificate.
- Copies of Secretary of the Executive Office of Energy and Environmental Affairs Certificates issued for the reporting years 2004, 2005, 2006, 2007, 2008, 2009, and 2010.

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Copies of Secretary of the Executive Office of Energy and Environmental Affairs Certificates issued for the Reporting Years 2004, 2005, 2006, 2007, 2008, 2009, and 2010

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June 14, 2013

CERTIFICATE OF THE SECRETARY OF ENVIRONMENTAL AFFAIRS
ON THE
2011 LOGAN AIRPORT ENVIRONMENTAL STATUS AND PLANNING REPORT

PROJECT NAME	: 2011 Environmental Status and Planning Report
PROJECT MUNICIPALITY	: Boston and Winthrop
PROJECT WATERSHED	: Boston Harbor
EOEA NUMBER	: 3247
PROJECT PROPONENT	: Massachusetts Port Authority (Massport)
DATE NOTICED IN MONITOR	: April 24, 2013

As Secretary of Environmental Affairs, I hereby determine that the Environmental Status and Planning Report submitted on this project **adequately and properly complies** with the Massachusetts Environmental Policy Act (G. L. c. 30, ss. 61-62H) and with its implementing regulations (301 CMR 11.00). A-1

The environmental review process for Logan Airport has been structured to occur on two levels: airport-wide and project-specific. The Environmental Status and Planning Report (ESPR) has evolved from a largely retrospective status report on airport operations to a broader analysis that also provides a prospective assessment of long-range plans. It has thus become, consistent with the objectives of the MEPA regulations, part of Massport's long range planning. The ESPR provides a "big picture" analysis of environmental impacts associated with current and anticipated levels of activities, and presents an overall mitigation strategy aimed at avoiding increases in such impacts. The ESPR analysis is supplemented by (and ultimately incorporates) the detailed analyses and mitigation commitments of project-specific Environmental Impact Reports (EIR). The ESPR is generally updated on a five year basis, with much less detailed Environmental Data Reports (EDR) (formerly Annual Updates) filed in the years between ESPRs. The 2011 ESPR is the subject of this review. In addition, Massport has requested to combine the 2012-2013 EDRs into one document. I have considered and granted this request. This Certificate also contains a Scope for the 2012-2013 EDR. A-2

A-3 In general, the ESPR has responded to the scope. In particular, the 2011 ESPR contains a wealth of useful data on activity levels and impacts, and lays out a forecast for trends in the future years. The technical studies in the 2011 ESPR include reporting on and analysis of key indicators of airport activity levels, the regional transportation system, ground access, noise, air quality, environmental management, and project mitigation tracking. The 2011 ESPR updates and compares the data presented in the 2010 EDR, and presents activity levels (including aircraft operations and passenger activity) and environmental conditions at Logan Airport for calendar year 2011. In addition to the annual report on 2011 conditions, two other primary functions of this 2011 ESPR are to provide a discussion of future activity levels at Logan Airport through the year 2030 based on an updated forecast, and to predict the associated potential environmental conditions at the Airport in 2030. The 2011 ESPR also presents historical data on the environmental conditions at Logan Airport dating back to 1990 in instances where historical information is available. Historical data are included in the technical appendices. Overall the 2011 ESPR provides a comprehensive, cumulative analysis of the effects of all Logan Airport activities based on actual and predicted passenger activity and aircraft operation levels in 2011 and 2030 and presents environmental management plans for addressing areas of environmental concern.

The majority of comments received on the 2011 ESPR focused on noise issues, including measurement of noise, modeling of noise contours, and noise abatement. In addition to responding to these comments, the 2012-2013 EDR should also report on the progress and other refinements for tracking noise and abatement efforts, as further described in the Scope below.

Background

In 1979, the Secretary of the Executive Office of Environmental Affairs issued a Certificate requiring Massport to define, evaluate, and disclose, every three years, the impact of long-term growth at the airport through a Generic Environmental Impact Report (GEIR). The Certificate also required the submission of interim Annual Updates to provide data on conditions for the years between the GEIRs. The GEIR provided projections of environmental conditions where the cumulative effects of individual projects could be understood. The Secretary's Certificate on the *1997 Annual Update* proposed a revised environmental review process for Logan Airport. As a result, Massport evaluates the cumulative impacts associated with airport activities through preparation of an ESPR every five years and provides data updates annually through the EDRs.

Review of the 2011 ESPR and Scope for the 2012-2013 EDR

Framework for the 2011 ESPR

Massport has adopted a new, long-term forecast for the long-range planning horizon,

2030. Previous forecasts for the 1999 ESPR and the 2004 ESPR forecasts anticipated that Logan Airport would be handling 37.5 million annual passengers in 2015 and 42.8 million passengers in 2020, respectively. The 2011 ESPR revisits previous forecasts and revises them based on current and predicted conditions, and to consider a more distant time horizon.

For this 2011 ESPR, Massport updated the Logan Airport long-range forecast with 2015, 2020, and 2030 as the forecast years. Three scenarios were also developed (Low, Moderate, and High). Massport views the Moderate forecast scenario as the most likely forecast of future activity levels at Logan Airport. Massport's forecast under the Moderate scenario predicts that there will be 39.8 million passengers using Logan Airport in 2030. The updated forecast takes into account slower-than-anticipated passenger growth (compared to previous forecasts), the increasing efficiency of aircraft (higher passenger load factors), and fleet mix trends, including a growing prevalence of larger capacity jet aircraft. This 2011 ESPR examines both airside and landside activities, including planned Massport projects, and projects being carried out by others that affect the Airport, such as the FAA's Boston Logan Airport Noise Study (BLANS). Future year projections incorporate available information about projects that have undergone or are currently under MEPA review.

Cumulative analysis of airport activities are based on actual and projected passenger activity levels, aircraft operations, and the facilities and services needed to serve them. Analysis conditions for current and future years are used to assess environmental conditions and to develop, evaluate, and adjust environmental management actions.

General

The 2012-2013 EDR should follow the general format of the 2010 EDR status report on Massport's planning initiatives, projects, and mitigation measures. The 2012-2013 EDR should include an Executive Summary and Introduction, similar to previous ESPRs and EDRs. A-4

Massport must provide necessary background information to allow reviewing agencies and the public to understand the environmental policies and planning which form the context of the environmental reporting, technical studies, and environmental mitigation initiatives at Logan Airport. A-5

Specifically, the 2012-2013 EDR should provide an update on conditions at Logan Airport for calendar year 2012 and 2013. The EDR should continue to serve as a background/context against which projects at Logan Airport can be evaluated. It should also report on the cumulative effects of Logan Airport operations and activities, compared to previous years, as appropriate. A-6

The 2012-2013 EDR should report on 2012 and 2013 passenger and aircraft operation activity levels. This will be followed by a status report on Massport's proposed planning initiatives and projects and mitigation. In this way, Massport should provide the necessary background information to allow the reviewer to understand the environmental policies and A-7

A-7 cont. planning which form the context of the environmental reporting, technical studies, and environmental mitigation initiatives at Logan Airport.

A-8 The technical studies in the 2012-2013 EDR should include reporting on and analysis of key indicators of airport activity levels, the regional transportation system, ground access, noise, air quality, environmental management, and project mitigation tracking. The 2012-2013 EDR must also respond to those issues explicitly noted in this Certificate and the comments received on the 2011 ESPR.

A-9 A distribution list for the 2012-2013 EDR (indicating those receiving documents, CDs, or Notices of Availability) should be provided in the document. This section must also include copies of all ESPR and EDR Certificates issued since the 2004 Logan Environmental Status and Planning Report (issued on August 16, 2006) to provide context for reviewers. Supporting technical appendices should be provided as necessary.

Responses to Comments

A-10 The 2012-2013 EDR must include responses to comments that address all of the substantive comments from the letters listed at the end of this Certificate. The responses to comments included in the 2011 ESPR is well-constructed and cross-referenced. Massport may follow the same format in addressing comments in the 2012-2013 EDR.

The majority of comments received on the 2011 ESPR focus on noise related issues, including measurement of noise, modeling of noise contours, and noise abatement, and emission reduction issues. A-11 In addition to responding to these comments, the 2012-2013 EDR should continue to report on the refinements to noise tracking and abatement efforts. Massport should consult directly with individual commenters where appropriate.

Activity Levels

The Activity Levels chapter provides a solid analysis of major activity issues and the technical appendix contains useful and detailed information. This section in the 2011 ESPR specifically presents aviation activity statistics for Logan Airport in 2011 and compares activity levels to the prior year. The specific activity measures discussed include air passengers, aircraft operations, fleet mix, and cargo/mail volumes. This chapters also provides Massport's long-range 2030 aviation forecast for Logan Airport.

A-12 The 2012-2013 EDR must report on airport activity levels, including information on aircraft operations, including fleet mix, passenger activity levels, and cargo and mail operations. A primary purpose of this section of the 2012-2013 EDR will be to report on airport activity levels for 2012 and 2013, including:

- Aircraft operations, including fleet mix and scheduled airline services at Logan Airport;

- Passenger activity levels;
- Cargo and mail activities; A-12 cont.
- Compare 2012 and 2013 aircraft operations, cargo/mail operations, and passenger activity levels to 2011 activity levels; and
- Report on national aviation trends in 2012/2013 and compare to trends at Logan Airport.

It should also report on Massport's activity level forecasts that will become the basis for the planning and impact sections that follow and for Massport's strategic planning initiatives over the next few years. A-13 In addition to reporting the analysis of major activity issues, I advise Massport to consider and attempt to address all comments related to activity levels in the 2010 EDR. A-14

Planning

The Airport Planning chapter in the 2011 ESPR provides an overview of planning, construction, and permitting activities that occurred at Logan Airport in 2011. It also describes known future planning, construction, and permitting activities and initiatives.

The 2012-2013 EDR should continue to assess planning strategies for improving Logan Airport's operations and services in a safe, secure, more efficient, and environmentally sensitive manner. As owner and operator of Logan Airport, Massport also must accommodate and guide tenant development. Therefore, the 2012-2013 EDR should describe the status of planning initiatives for the following areas: A-15

- Roadway Corridor Project;
- Airport Parking;
- Terminal Area;
- Airside Area;
- Service and Cargo Areas; and
- Airport Buffers and Landscaping.

The 2012-2013 EDR should continue to assess the status of long-range planning activities. The chapter should report on the status of public works projects implemented by other agencies within the boundaries of Logan Airport. A-16 The chapter will also report on the status and effectiveness of the ground access related changes including roadway and parking projects, which consolidate and direct airport-related traffic to centralized locations and minimize airport-related traffic on external streets in adjacent neighborhoods. A-17

Regional Transportation

In general, the 2011 ESPR has met the requirements with respect to regional transportation issues. It describes activity levels at New England's regional airports in 2011 and updates recent regional planning activities. A-18

Overall, aviation activity at New England's regional airports increased in 2011, because the regional airports experienced a modest recovery after the 2008/2009 Economic Recession. Highlights for the regional airports and the status of long-range regional transportation planning efforts in the region which are relevant to Massport's three airports as well as the regional transportation network are provided in the 2011 ESPR.

The 2012-2013 EDR should describe Logan Airport's role in the region's intermodal transportation system by reporting on the following:

A-19

Regional Airports

- 2012 and 2013 regional airport operations, passenger activity levels, and schedule data within an historical context;
- Status of plans and new improvements as provided by the regional airport authorities;
- Ground access improvements to the regional airports; and
- The role that Worcester Regional Airport and Hanscom Field play in the regional aviation system and Massport's efforts to promote these airports.

Regional Transportation System

- Massport's role in managing the regional transportation facilities within the restructured Massachusetts Department of Transportation (MassDOT);
- Massport's cooperation with other transportation agencies to promote efficient regional highway and transit operations; and
- Report on metropolitan and regional rail initiatives and ridership.

<u>Ground Transportation</u>

The 2011 ESPR reported on transit ridership, roadways, traffic volumes and parking for 2011. It also provides forecasts for traffic volumes, parking, and VMT for the year 2030.

A-20

The 2012-2013 EDR should report on 2012 and 2013 conditions and provide a comparison of 2012 and 2013 findings to those of 2011 for the following:

- Detailed description of compliance with Logan Airport Parking Freeze;
- High occupancy vehicle (HOV) ridership (including Blue Line, Silver Line, Scheduled, Unscheduled, Water Transportation, and Logan Express);
- Logan Airport Employee Transportation Management Association (Logan TMA) services;
- Logan Airport gateway volumes;
- On-airport traffic volumes;
- On-airport vehicle miles traveled (VMT);
- Parking demand and management (including rates and duration statistics);
- Status of long-range ground access management strategy planning; and

- Results of the 2013 Logan Airport Passenger Survey.

The 2012-2013 EDR should also present a discussion of the following topics:

- Definition of HOV;
- Massport's target HOV mode share along with incentives;
- Non-Airport through-traffic;
- Massport's cooperation with other transportation agencies to increase transit ridership to and from Logan Airport via the Blue Line and Silver Line;
- Report on Logan Express usage and efforts to increase capacity and usage;
- Progress on enhancing water transportation to and from Logan Airport;
- Progress on rental car consolidation;
- Report on results of ground access study; and
- Strategies for enhancing services and increasing employee membership in the Logan Airport TMA.

A-20 cont.

Noise

The 2011 ESPR updates the status of the noise environment at Logan Airport in 2011, and describes Massport's efforts to reduce noise levels. It also provides noise contour population counts for 2030. The technical appendix contains useful and detailed information, while the main document provides a solid analysis of major noise issues. Many of the issues raised in the noise analysis are ongoing and require continuous monitoring. The future 2012-2013 EDR represents an appropriate forum to serve this updating function and to address the noise issues raised by numerous commenters on the 2011 ESPR. A-21

In 2011 the following changes occurred in the Airport noise environment:

- Compared to 2010, the 2011 DNL decibel (dB) contours were smaller in East Boston and over Boston Harbor toward Hull. The DNL 65 dB contour was slightly larger in Revere, South Boston, and in most of Winthrop for 2011.
- The overall number of people exposed to DNL values greater than 65 dB increased to 3,947 people in 2011 from 3,830 people in 2010 (an increase of 117 people). The number of people residing within the DNL 70 dB contour remained at 130 people. These levels are well below the numbers of people exposed in the year 2000 when 17,745 people were exposed to DNL noise levels greater than 65 dB and 1,551 people were exposed to DNL levels greater than 70 dB.
- In 2011, Massport provided sound insulation to 114 homes, 84 percent of which were in Chelsea. The focus of the program in Chelsea was to fulfill federal and state mitigation commitments related to the opening of Runway 14-32. Since the inception of Massport's residential sound insulation program (RSIP), 11,333 homes have received sound insulation treatment in East Boston, South Boston, Winthrop, Revere, and Chelsea.

Based on the 2030 forecast of aircraft operations and expected aircraft fleet mix, the following conditions are expected in 2030:

- There is forecast to be a larger number of operations and a higher percent of jet fleet activity than in 2011. The higher level of operations is not a capacity challenge as the Airport has operated in the past with over 1,300 operations per day.
- The 2030 fleet mix consists of 81 percent commercial jets whereas the 2011 fleet mix consists of 78 percent commercial jets. The 2000 fleet mix had a lower proportion of commercial jets at 62 percent of the fleet.
- Total operations are expected to increase by 29 percent or 290 operations per day from 2011 to 2030, from 1,011 operations per day in 2011 to 1,301 operations per day in 2030. Compared to 2000, which is the last year that Logan Airport had over 1,300 daily operations, 2030 is forecasted to have 54 fewer daily operations (1,355 in 2000 and 1,301 in 2030). Daytime commercial operations are projected to increase by 254 operations per day from 819 in 2011 to 1,073 in 2030, however this is still fewer than the 1,142 daytime operations in 2000. Nighttime commercial operations are projected to increase from 114 in 2011 to 154 in 2030. This is an increase compared to 2000 when 126 daily operations occurred at night.
- The 2030 operations forecast produced a larger set of DNL noise contours with the number of people exposed to noise levels greater than DNL 65 dB increasing from 3,947 in 2011 to 12,211 people in 2030. This is still significantly fewer than the number of people exposed in 2000 (17,745 people). The number of people within the DNL 70 dB is also projected to increase from 130 in 2011 to 352 people in 2030 but still remaining well below the 1,551 people within the DNL 70 dB in 2000. All of the residences within the forecasted 2030 DNL 65 dB contour are in areas where Massport has implemented its sound insulation program.

A-22

The information in this chapter is very informative and I encourage Massport to continue with detailed analysis in the 2012-2013 EDR. I strongly advise Massport to consider and address the comments on noise and noise related issues.

A-23

The 2012-2013 EDR should provide an overview of the environmental regulatory framework affecting aircraft noise, the changes in aircraft noise, and the updates in noise modeling. The chapter should report on 2012 and 2013 conditions and compare those conditions to those of 2011 for the following:

- Fleet Mix, including Stage II, Recertified (Hushkitted) Stage III, newly manufactured Stage III, and qualifying Stage IV aircraft;
- Nighttime operations;
- Runway utilization (report on aircraft and airline adherence with runway utilization goals);
- Preferential runway advisory system (PRAS) tracking; and
- Flight tracks.

The 2012-2013 EDR should also report on 2012 and 2013 conditions and compare those to 2011 conditions for the following noise indicators:

- Using the Federal Aviation Administration's (FAA) most current version of the Integrated Noise Model (INM), and RealContoursTM and RealProfilesTM, produce an accurate set of Day-Night Sound Level (DNL) noise contours. Adjustments made to account for over-water sound propagation and the propagation of sound to areas of higher terrain will be reported;
- Noise-impacted population;
- Measured versus modeled noise values, including reasons for differences and any improvements attributable to the use of RealContoursTM and RealProfilesTM;
- Cumulative Noise Index (CNI);
- Times-Above for 65, 75, and 85 dBA threshold values/Dwell and Persistence of noise levels;
- Installation and benefits of the new noise monitoring system; and
- Flight track monitoring noise quarterly reports.

A-23 cont.

The 2012-2013 EDR should also report on noise abatement efforts, results from Boston Logan Airport Noise Study (BLANS) study, and provide a status update on the new noise and operations monitoring system.

A-24

Air Quality

The 2011 ESPR provides an overview of airport-related air quality issues in 2011 and efforts to reduce emissions. It also predicts emission levels for 2030. Overall total volatile organic compounds (VOC) emissions were 1,109 kilograms per day (kg/day), or 9 percent higher than 2010 levels, but still follow a long-range (i.e., a period of over 20 years) downward trend decreasing by almost 76 percent since 1990. This one-year increase is primarily due to the increase in landing and takeoff operations (LTOs) when compared to 2010 (176,322 LTOs in 2010 and 184,494 LTOs in 2011). Total emissions of oxides of nitrogen (NOX) were 4,077 kg/day, or 2 percent higher than 2010 levels. In 2011, total NOx emissions at Logan Airport were approximately 29 percent lower than 2000 levels. Also, total NOx emissions in 2011 were 707 tons per year (tpy) lower than Massport's 1999 Air Quality Initiative (AQI) benchmark. This represents an overall decrease of 30 percent in NOx emissions since 1999. Total emissions of carbon monoxide (CO) were 6,919 kg/day, or 3 percent lower than 2010 levels and 53 percent lower than 2000 levels; following the same long-range downward trend as VOCs and NOx. Total emissions of particulate matter (PM10/PM2.5) associated with Logan Airport increased in 2011 by approximately 5 percent to 67 kg/day compared to 2010 levels, but still following a long-range downward trend decreasing by 19 percent since 2005 (2005 is the first year that PM10/PM2.5 emissions were reported). This one-year increase is mostly attributable to the corresponding increase in stationary source use, particularly snow melters in conjunction with the unusually heavy snowfall in early 2011.

Since 1999, there has been a continuing trend of decreasing nitrogen dioxide (NO2) concentrations at both the Massport and Massachusetts Department of Environmental Protection (MassDEP) monitoring sites located in the vicinity of Logan Airport. In addition, the annual NO2 concentrations at all monitoring locations in 2011 continued to be well within the National Ambient Air Quality Standards (NAAQS) for NO2. The NO2 monitoring program was discontinued in 2012. Massport's Air Quality Monitoring Study is now complete, having collected data on a variety of ambient air pollutants over a two-year period as a means of
A-25 assessing any air quality changes attributable to the operation of the Centerfield Taxiway which was completed in 2009. The findings from this Study will be submitted to MassDEP in 2013, and reported in the next Logan Airport EDR.

2011 marks the fifth consecutive year in which Massport has voluntarily prepared a greenhouse gas (GHG) emissions inventory for the EDR/ESPR. The 2011 GHG emission inventory was prepared following methodological guidance by the Transportation Research Board's (TRB) Airport Cooperative Research Program (ACRP). The 2011 inventory assigns GHG emissions based on ownership or control (whether it is controlled by Massport, the airlines or other airport tenants, or the general public). Total Logan Airport GHG emissions in 2011 were 5 percent higher than 2010 levels primarily due to the increase in aircraft operations and passenger vehicles accessing the Airport. Massport-related emissions represent only 12 percent of total GHG emissions at the Airport, tenant-based emissions represent approximately 68 percent, electrical consumption represents 14 percent; and passenger vehicle emissions represent 6 percent. This inventory is one of the three GHG emissions inventories Massport prepares annually; however, the other two only comprise stationary sources of GHGs and are filed with MassDEP and the U.S. Environmental Protection Agency (EPA) respectively.

The 2012-2013 EDR should include an overview of the environmental regulatory framework affecting aircraft emissions, changes in aircraft emissions, and the changes in air quality modeling. The chapter should provide discussion on progress on the national and
A-26 international levels to decrease air emissions to provide context for this chapter. The chapter will also discuss analysis methodologies and assumptions and report on 2012 and 2013 conditions using the most recent versions of the Emissions Dispersion Modeling System (EDMS) and MOBILE motor vehicle emissions. The 2012-2013 EDR should include:

- Emissions inventory for carbon monoxide (CO)
- Emissions inventory for oxides of nitrogen (NOx)
- Emissions inventory for volatile organic compounds (VOCs)
- A-27 Emissions inventory for particulate matter (PM)
- Nitrogen dioxide (NO2) monitoring
- NOx emissions by airline

The 2012-2013 EDR should also report on the following air quality initiatives (AQI) for
A-28 2012 and 2013:

- Air Quality Initiative Tracking;

- Massport's and Tenant's Alternative Fuel Vehicle Programs; and
- The status of Logan Airport air quality studies undertaken by Massport or others, as available. A-28 cont.

Massport has also committed to include an inventory of greenhouse gas (GHG) emissions from Logan Airport in 2012 and 2013. GHG emissions should be quantified for aircraft, ground service equipment (GSE), motor vehicles and stationary sources using emission factors and methodologies outlined in the MEPA Greenhouse Gas Emissions Policy and Protocol. The results of the 2012 and 2013 GHG emissions inventory should be compared to the 2011 results. A-29 This chapter should also include an update on Massport's efforts to encourage the use of single engine taxiing under safe conditions. A-30

Water Quality/Environmental Compliance

The 2011 ESPR describes Massport's ongoing environmental management activities including National Pollutant Discharge Elimination System (NPDES) compliance, stormwater, fuel spills, activities under the Massachusetts Contingency Plan (MCP), and tank management.

The 2012-2013 EDR should report on the 2012/2013 status of:

- National Pollutant Discharge Elimination System (NPDES) Permit and monitoring results for Logan Airport's outfalls and the Fire Training Facility;
- Jet fuel usage and spills;
- Massachusetts Contingency Plan (MCP) Activities;
- Tank management;
- Update on the environmental management plan; and A-31
- Fuel spill prevention.

The chapter should also present a discussion of the following topics:

- Future stormwater management improvements (if any); and
- Future MCP and tank management activities.

Sustainability at Logan Airport

This chapter describes Massport's airport-wide sustainability goals. In October 2000, the Massport Board approved an Authority-wide Environmental Management Policy that articulates Massport's commitment to protect the environment and to implement sustainable design principles. In October 2004, the Massport Sustainability Team produced the *Massachusetts Port Authority Sustainability Plan* (Sustainability Plan). The Environmental Management Policy is incorporated in the Sustainability Plan as Massport's long-term sustainability goal or vision. It also identifies the actions necessary to achieve the goals, the staff members responsible for each sustainability goal, and the timeline for achieving the goals.

A-32 The 2012-2013 EDR should report on the status of mitigation commitments for specific Massport and tenant projects at Logan Airport that have undergone MEPA review and other commitments and have commenced construction. The status of mitigation commitments made in the Section 61 Findings for the following projects should also be reported:

- West Garage/Central Garage
- International Gateway
- Runway Ends 22R and 33L Runway Safety Area Improvements
- Replacement Terminal A
- Logan Airside Improvements Planning
- Southwest Service Area Redevelopment Program

A-33 This chapter should also update the status of Massport's mitigation commitments and also will identify projects for which mitigation is complete.

<u>Distribution of the 2012-2013 EDR</u>

A-34 Massport should explore opportunities to advance the reporting of information through
Massport's website. Massport should strive to collect and analyze the information required for
A-35 the 2012-2013 EDR and report this information in a timely manner. For several recent projects,
including the 2011 ESPR, Massport has published bi-lingual meeting and project notices and
A-36 made the services of an interpreter available upon request. Massport should consider continuing
these services for the 2012-2013 EDR submittal.

<u>Conclusion</u>

A-37 I have determined that the 2011 ESPR for Logan Airport has adequately complied with MEPA and that Massport must submit a 2012-2013 EDR that responds to the issues raised in comments received. The 2012-2013 EDR must include a copy of this Certificate and a copy of each comment letter received on the 2011 ESPR. In particular, Massport should provide a thorough examination of issues raised regarding individual noise monitoring locations, noise measurement and modeling, noise abatement, and air quality issues.

June 14, 2013
Date

Richard K. Sullivan Jr.

Comments Received:

06/06/2013	Philip Johenning
06/07/2013	Nancy Timmerman
06/07/2013	Stephen Kaiser, PhD
06/07/2013	Darryl Pomicter
06/07/2013	Town of Milton
06/14/2013	The Boston Harbor Association

RKS/ACC/acc

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Comment #	Author	Topic	Comment	Response
A.1	Richard K. Sullivan, Jr., Secretary		As Secretary of Environmental Affairs, I hereby determine that the Environmental Status and Planning Report submitted on this project adequately and properly complies with the Massachusetts Environmental Policy Act (G. L c. 30, ss. 61-62H) and with its implementing regulations (301 CMR 11.00).	Thank you for your comment.
A.2	Richard K. Sullivan, Jr., Secretary		In addition, Massport has requested to combine the 2012/2013 EDRs into one document I have considered and granted this request. This Certificate also contains a Scope for the *2012/2013 EDR*.	As directed, Massport has prepared the *2012/2013 Environmental Data Report (EDR)*.
A.3	Richard K. Sullivan, Jr., Secretary		In general, the ESPR has responded to the scope. In particular, the *2011 ESPR* contains a wealth of useful data on activity levels and impacts, and lays out a forecast for trends in the future years.	Thank you for your comment.
A.4	Richard K. Sullivan, Jr., Secretary		The *2012/2013 EDR* should follow the general format of the *2010 EDR* status report on Massport's planning initiatives, projects, and mitigation measures. The *2012/2013 EDR* should include an Executive Summary and Introduction, similar to previous ESPRs and EDRs.	The *2012/2013 EDR* follows the same general format of the *2010 EDR* status report. The *2012/2013 EDR* provides a status update on Massport's planning initiatives, projects, and mitigation measures. Refer to *Chapter 3, Airport Planning*, and *Chapter 9, Project Mitigation Tracking*. The *2012/2013 EDR* includes an Executive Summary and Introduction, as previous ESPRs and EDRs have contained.
A.5	Richard K. Sullivan, Jr., Secretary		Massport must provide necessary background information to allow reviewing agencies and the public to understand the environmental policies and planning which form the context of the environmental reporting, technical studies, and environmental mitigation initiatives at Logan Airport.	Each chapter of the *2012/2013 EDR* provides an overview and regulatory context, where applicable, so that agencies and the public can understand the context for each reporting parameter.
A.6	Richard K. Sullivan, Jr., Secretary		Specifically, the *2012/2013 EDR* should provide an update on conditions at Logan Airport for calendar year 2012 and 2013. The EDR should continue to serve as a background/context against which projects at Logan Airport can be evaluated. It should also report on the cumulative effects of Logan Airport operations and activities, compared to previous years, as appropriate.	The *2012/2013 EDR* provides the background and a comprehensive baseline for the cumulative effects of Logan Airport operations.

Comment #	Author	Topic	Comment	Response
A.7	Richard K. Sullivan, Jr., Secretary	Activity Levels	The *2012/2013 EDR* should report on 2012 and 2013 passenger and aircraft operation activity levels. This will be followed by a status report on Massport's proposed planning initiatives and projects and mitigation. In this way, Massport should provide the necessary background information to allow the reviewer to understand the environmental policies and planning which form the context of the environmental reporting, technical studies, and environmental mitigation initiatives at Logan Airport.	*Chapter 2, Activity Levels*, reports on updates to passenger and aircraft operation activity levels, and compared activity levels for 2012 and 2013 to previous years.
A.8	Richard K. Sullivan, Jr., Secretary		The technical studies in the *2012/2013 EDR* should include reporting on and analysis of key indicators of airport activity levels, the regional transportation system, ground access, noise, air quality, environmental management, and project mitigation tracking. The *2012/2013 EDR* must also respond to those issues explicitly noted in this Certificate and the comments received on the *2011 ESPR*.	The *2012/2013 EDR* reports on the technical studies outlined in the Secretary's Certificate. *Chapter 2, Activity Levels*, reports on and analyzes the airport activity levels. The regional transportation system is presented in *Chapter 4, Regional Transportation*. *Chapter 5, Ground Access to and from Logan Airport,* provides information on ground access. *Chapter 6, Noise Abatement*, reports on and analyzes noise. *Chapter 7, Air Quality/Emissions Reduction*, reports on and analyzes air quality. Environmental management and water quality is reported on and analyzed in *Chapter 8, Water Quality/ Environmental Compliance and Management*. *Chapter 9, Project Mitigation Tracking*, provides project mitigation tracking. Finally, this appendix and Appendix B, Comment Letters and Responses, provides responses to comments in the Certificate and other comment letters.
A.9	Richard K. Sullivan, Jr., Secretary		A distribution list for the *2012/2013 EDR* (indicating those receiving documents, CDs, or Notices of Availability) should be provided in the document. This section must also include copies of all ESPR and EDR Certificates issued since the 2004 Logan Environmental Status and Planning Report (issued on August 16, 2006) to provide context for reviewers. Supporting technical appendices should be provided as necessary.	The distribution list for the *2012/2013 EDR* is provided in Appendix D, Distribution. The Environmental Status and Planning Report (ESPR) and EDR certificates for previous reporting years back to 2004 are provided in Appendix A, MEPA Certificates and Responses to Comments. Supporting technical appendices are provided as necessary.

Comment #	Author	Topic	Comment	Response
A.10	Richard K. Sullivan, Jr., Secretary		The *2012/2013 EDR* must include responses to comments that address all of the substantive comments from the letters listed at the end of this Certificate. The responses to comments included in the *2011 ESPR* is well-constructed and cross-referenced. Massport may follow the same format in addressing comments in the *2012/2013 EDR*.	Individual responses to comments are provided in Appendix B, Comment Letters and Responses, of the *2012/2013 EDR*.
A.11	Richard K. Sullivan, Jr., Secretary		In addition to responding to these comments, the *2012/2013 EDR* should continue to report on the refinements to noise tracking and abatement efforts. Massport should consult directly with individual commenters where appropriate.	*Chapter 6, Noise Abatement*, provides information on the requested topics. All comments have been addressed in Appendices A and B of the *2012/2013 EDR*.
A.12	Richard K. Sullivan, Jr., Secretary		The *2012/2013 EDR* must report on airport activity levels, including information on aircraft operations, including fleet mix, passenger activity levels, and cargo and mail operations. A primary purpose of this section of the *2012/2013 EDR* will be to report on airport activity levels for 2012 and 2013, including: • Aircraft operations, including fleet mix and scheduled airline services at Logan Airport; • Passenger activity levels; • Cargo and mail activities; • Compare 2012 and 2013 aircraft operations, cargo/mail operations, and passenger activity levels to 2011 activity levels; and • Report on national aviation trends in 2012/2013 and compare to trends at Logan Airport.	This *2012/2013 EDR* includes a report on national aviation trends since 2009 and provides an overview of the significant changes in the airport industry since that time. See *Chapter 2, Activity Levels*.
A.13	Richard K. Sullivan, Jr., Secretary		It should also report on Massport's activity level forecasts that will become the basis for the planning and impact sections that follow and for Massport's strategic planning initiatives over the next few years.	*Chapter 2, Activity Levels*, provides a summary of Massport's forecasts that are used for planning initiatives at Massport.
A.14	Richard K. Sullivan, Jr., Secretary		In addition to reporting the analysis of major activity issues, I advise Massport to consider and attempt to address all comments related to activity levels in the *2010 EDR*.	Comments related to activity levels in 2010 are addressed in *Chapter 2, Activity Levels.*

Comment #	Author	Topic	Comment	Response
A.15	Richard K. Sullivan, Jr., Secretary		The *2012/2013 EDR* should continue to assess planning strategies for improving Logan Airport's operations and services in a safe, secure, more efficient, and environmentally sensitive manner. As owner and operator of Logan Airport, Massport also must accommodate and guide tenant development. Therefore, the *2012/2013 EDR* should describe the status of planning initiatives for the following areas: • Roadway Corridor Project; • Airport Parking; • Terminal Area; • Airside Area; • Service and Cargo Areas; and • Airport Buffers and Landscaping.	As part of planning for the safe and efficient operation of Logan Airport, Massport is mindful of environmental concerns and seeks to reduce the environmental impacts associated with Logan Airport activities. Updates on the status of the Roadway Corridor Projects, Airport Parking, Terminal Area, Airside Area, Service and Cargo Areas, and Airport Buffers and Landscaping are provided in *Chapter 3, Airport Planning*. Additional information is also provided in *Chapter 5, Ground Access* to and from Logan Airport.
A.16	Richard K. Sullivan, Jr., Secretary		The *2012/2013 EDR* should continue to assess the status of long-range planning activities. The chapter should report on the status of public works projects implemented by other agencies within the boundaries of Logan Airport.	The *2012/2013 EDR* reports on the status of long-range planning activities and public works projects.
A.17	Richard K. Sullivan, Jr., Secretary	Ground Access	The chapter will also report on the status and effectiveness of the ground access related changes including roadway and parking projects, which consolidate and direct airport-related traffic to centralized locations and minimize airport-related traffic on external streets in adjacent neighborhoods.	*Chapter 5, Ground Access to and from Logan Airport*, reports on the status and effectiveness of ground access changes that have consolidated and directed airport-related traffic to centralized locations minimizing the amount of airport-related traffic in adjacent neighborhoods.
A.18	Richard K. Sullivan, Jr., Secretary	Regional Transportation	In general, the *2011 ESPR* has met the requirements with respect to regional transportation issues. It describes activity levels at New England's regional airports in 2011 and updates recent regional planning activities.	Comment noted.

Comment #	Author	Topic	Comment	Response
A.19	Richard K. Sullivan, Jr., Secretary	Regional Transportation	The *2012/2013 EDR* should describe Logan Airport's role in the region's intermodal transportation system by reporting on the following: Regional Airports • 2012 and 2013 regional airport operations, passenger activity levels, and schedule data within an historical context; • Status of plans and new improvements as provided by the regional airport authorities; • Ground access improvements to the regional airports; and • The role that Worcester Regional Airport and Hanscom Field play in the regional aviation system and Massport's efforts to promote these airports. Regional Transportation System • Massport's role in managing the regional transportation facilities within the restructured Massachusetts Department of Transportation (MassDOT); • Massport's cooperation with other transportation agencies to promote efficient regional highway and transit operations; and • Report on metropolitan and regional rail initiatives and ridership.	The *2012/2013 EDR* reports on Massport's efforts to strengthen the regional transportation system, the agency's cooperation with other transportation agencies to promote efficient regional highway and transit operations; and metropolitan and regional rail initiatives and ridership. See *Chapter 4, Regional Transportation*.

Comment #	Author	Topic	Comment	Response
A.20	Richard K. Sullivan, Jr., Secretary		The *2012/2013 EDR* should report on 2012 and 2013 conditions and provide a comparison of 2012 and 2013 findings to those of 2011 for the following: • Detailed description of compliance with Logan Airport Parking Freeze; • High occupancy vehicle (HOV) ridership (including Blue Line, Silver Line, Scheduled, Unscheduled, Water Transportation, and Logan Express); • Logan Airport Employee Transportation Management Association (Logan TMA) services; • Logan Airport gateway volumes; • On-airport traffic volumes; • On-airport vehicle miles traveled (VMT); • Parking demand and management (including rates and duration statistics); • Status of long-range ground access management strategy planning; and • Results of the 2013 Logan Airport Passenger Survey. The *2012/2013 EDR* should also present a discussion of the following topics: • Definition of HOV; • Massport's target HOV mode share along with incentives; • Non-Airport through-traffic; • Massport's cooperation with other transportation agencies to increase transit ridership to and from Logan Airport via the Blue Line and Silver Line; • Report on Logan Express usage and efforts to increase capacity and usage; • Progress on enhancing water transportation to and from Logan Airport; • Progress on rental car consolidation; • Report on results of ground access study; and • Strategies for enhancing services and increasing employee membership in the Logan Airport TMA.	*Chapter 5, Ground Access to and from Logan Airport*, reports on 2012 and 2013 conditions and compares 2012 and 2013 findings to those of 2011 for: parking levels, HOV ridership, Logan TMA, Logan gateway volumes, on-airport traffic volumes, on-airport VMT, parking demand and management, and a status of long-range ground access management strategy planning. This *2012/2013 EDR* uses an updated ground traffic analysis model - called VISSIM, which provides finer-grained information on the airport roadway system. The VISSIM model was used to calculate VMT for the *2011 ESPR* so differences between 2011 and 2012/2013 can be assessed accurately. Massport continues to make strides in improving ground access options to and from Logan Airport. The results of the 2013 Logan Airport Air Passenger Survey is reported in the *2012/2013 EDR*. The additional requested information is provided in *Chapter 5, Ground Access to and from Logan Airport.*

Comment #	Author	Topic	Comment	Response
A.21	Richard K. Sullivan, Jr., Secretary	Noise	The future *2012/2013 EDR* represents an appropriate forum to serve this updating function and to address the noise issues raised by numerous commenters on the *2011 ESPR* .	Information on noise is provided in *Chapter 6, Noise Abatement* , of this *2012/2013 EDR* . All comments have been addressed in Appendices A and B of the *2012/2013 EDR.*
A.22	Richard K. Sullivan, Jr., Secretary	Noise	The information in this chapter is very informative and I encourage Massport to continue with detailed analysis in the *2012/2013 EDR* . I strongly advise Massport to consider and address the comments on noise and noise related issues.	Information on noise is provided in *Chapter 6, Noise Abatement,* of this *2012/2013 EDR.* All comments have been addressed in Appendices A and B of the *2012/2013 EDR* .

Comment #	Author	Topic	Comment	Response
A.23	Richard K. Sullivan, Jr., Secretary	Noise	The *2012/2013 EDR* should provide an overview of the environmental regulatory framework affecting aircraft noise, the changes in aircraft noise, and the updates in noise modeling. The chapter should report on 2012 and 2013 conditions and compare those conditions to those of 2011 for the following: • Fleet Mix, including Stage ll, Recertified (Hushkitted) Stage Ill, newly manufactured Stage III, and qualifying Stage IV aircraft; • Nighttime operations; • Runway utilization (report on aircraft and airline adherence with runway utilization goals); • Preferential runway advisory system (PRAS) tracking; and • Flight tracks. The *2012/2013 EDR* should also report on 2012 and 2013 conditions and compare those to 2011 conditions for the following noise indicators: • Using the Federal Aviation Administration's (FAA) most current version of the Integrated Noise Model (INM), and RealContoursTM and RealProfilesTM, produce an accurate set of Day-Night Sound Level (DNL) noise contours. Adjustments made to account for over-water sound propagation and the propagation of sound to areas of higher terrain will be reported; • Noise impacted population; • Measured versus modeled noise values, including reasons for differences and any improvements attributable to the use of RealContoursTM and RealProfilesTM; • Cumulative Noise Index (CNI); • Times-Above for 65, 75, and 85 dBA threshold values/Dwell and Persistence of noise levels; • Installation and benefits of the new noise monitoring system; and • Flight track monitoring noise quarterly reports.	Massport reports on 2012 and 2013 conditions and compares them to those of 2011 for the following: fleet mix including: Stage II, Recertified Stage II, newly manufactured Stage III, and qualifying Stage IV aircraft; nighttime operations; runway utilization; PRAS compliance; and flight tracks. See Chapter 6, Noise Abatement. The *2012/2013 EDR* reports on 2012 and 2013 conditions and compares them to those of 2011 for the following noise parameters: DNL noise contours, noise impacted population, measured versus modeled noise values, CNI, Times-Above for 65, 75, 85 dBA threshold values, noise monitoring system status, and flight track monitoring reports. See *Chapter 6, Noise Abatement.*

Comment #	Author	Topic	Comment	Response
A.24	Richard K. Sullivan, Jr., Secretary	Noise	The *2012/2013 EDR* should also report on noise abatement efforts, results from Boston Logan Airport Noise Study (BLANS) study, and provide a status update on the new noise and operations monitoring system.	Phase 3 of the BLANS project began in 2013. Information on this project can be found at http://bostonoverflight.com/phase3.aspx. Phase 3 will identify and evaluate potential runway use measures to be included in a runway use program to replace the Preferential Runway Advisory System (PRAS). The Noise and Operations monitoring system continues to be updated. In March of 2014, Massport renewed and expanded its contract with the NOMS vendor to upgrade the system to the new EnvironmentalVue software and the deployment of a new community web tracking portal.
A.25	Richard K. Sullivan, Jr., Secretary	Air Quality	Massport's Air Quality Monitoring Study is now complete, having collected data on a variety of ambient air pollutants over a two-year period as a means of assessing any air quality changes attributable to the operation of the Centerfield Taxiway which was completed in 2009. The findings from this Study will be submitted to MassDEP in 2013, and reported in the next Logan Airport EDR.	A summary and findings of Massport's Air Quality Monitoring Study have been included in *Chapter 7, Air Quality/Emissions Reduction* .
A.26	Richard K. Sullivan, Jr., Secretary	Air Quality	The *2012/2013 EDR* should include an overview of the environmental regulatory framework affecting aircraft emissions, changes in aircraft emissions, and the changes in air quality modeling. The chapter should provide discussion on progress on the national and international levels to decrease air emissions to provide context for this chapter. The chapter will also discuss analysis methodologies and assumptions and report on 2012 and 2013 conditions using the most recent versions of the Emissions Dispersion Modeling System (EDMS) and MOBILE motor vehicle emissions.	The *2012/2013 EDR* reports on modeled air quality using EDMS and MOBILE/MOVES motor vehicle emissions models to model carbon monoxide (CO), nitrogen oxides (NOx), volatile organic compounds (VOCs), and particulate matter (PM). In addition, Massport modeled NOx emissions by airline. *Chapter 7, Air Quality/Emissions Reduction* , reports on the model updates to EDMS and MOBILE/MOVES and uses the most recent versions of the models to assess air quality conditions.

Comment #	Author	Topic	Comment	Response
A.27	Richard K. Sullivan, Jr., Secretary	Air Quality	The *2012/2013 EDR* should include: • Emissions inventory for carbon monoxide (CO) • Emissions inventory for oxides of nitrogen (NOx) • Emissions inventory for volatile organic compounds (VOCs) • Emissions inventory for particulate matter (PM) • Nitrogen dioxide (N02) monitoring • N0x emissions by airline	*Chapter 7, Air Quality/Emissions Reduction*, of this *2012/2013 EDR* includes emissions inventories for CO, NOx, VOC, PM, NO2 monitoring, and NOx emissions by airline.
A.28	Richard K. Sullivan, Jr., Secretary	Air Quality	The *2012/2013 EDR* should also report on the following air quality initiatives (AQI) for 2012 and 2013: • Air Quality Initiative Tracking; • Massport's and Tenant's Alternative Fuel Vehicle Programs; and • The status of Logan Airport air quality studies undertaken by Massport or others, as available.	The *2012/2013 EDR* reports on the air quality initiative tracking, Massport's and tenant's alternative fuel vehicle programs; and the status of other air quality studies. See *Chapter 7, Air Quality/Emissions Reduction.*
A.29	Richard K. Sullivan, Jr., Secretary	Air Quality	GHG emissions should be quantified for aircraft, ground service equipment (GSE), motor vehicles and stationary sources using emission factors and methodologies outlined in the MEPA Greenhouse Gas Emissions Policy and Protocol.	*Chapter 7, Air Quality/Emissions Reduction*, of this *2012/2013 EDR* includes a report on greenhouse gas (GHG) emissions at Logan Airport in 2012 and 2013 and compares it to 2011 levels. The GHG emissions are quantified for aircraft, ground access equipment (GSE), motor vehicles, stationary sources, and electrical usage. The methodologies deployed follow Executive Office of Energy and Environmental Affairs (EOEEA) and ACRP guidelines.
A.30	Richard K. Sullivan, Jr., Secretary	Air Quality	The results of the 2012 and 2013 GHG emissions inventory should be compared to the 2011 results. This chapter should also include an update on Massport's efforts to encourage the use of single engine taxiing under safe conditions.	See the response to Comment A.29 and *Chapter 7, Air Quality/Emissions Reduction.*

Comment #	Author	Topic	Comment	Response
A.31	Richard K. Sullivan, Jr., Secretary	Water Quality	The *2012/2013 EDR* should report on the 2012/2013 status of: • National Pollutant Discharge Elimination System (NPDES) Permit and monitoring results for Logan Airport's outfalls and the Fire Training facility; • Jet fuel usage and spills; • Massachusetts Contingency Plan (MCP) Activities; • Tank management; • Update on the environmental management plan; and • Fuel spill prevention. The chapter should also present a discussion of the following topics: • Future stormwater management improvements (if any); and • Future MCP and tank management activities.	These water quality and environmental compliance activities are reported in *Chapter 8, Water Quality/ Environmental Compliance* and Management. Massport and its tenants continue to make progress on bringing various sites to regulatory closure. These and other water quality/ environmental compliance activities are also reported in *Chapter 8, Water Quality/ Environmental Compliance and Management.*
A.32	Richard K. Sullivan, Jr., Secretary	Sustainability	The *2012/2013 EDR* should report on the status of mitigation commitments for specific Massport and tenant projects at Logan Airport that have undergone MEPA review and other commitments and have commenced construction. The status of mitigation commitments made in the Section 61 Findings for the following projects should also be reported: • West Garage/Central Garage • International Gateway • Runway Ends 22R and 33L Runway Safety Area Improvements • Replacement Terminal A • Logan Airside Improvements Planning • Southwest Service Area Redevelopment Program	The status of these mitigation efforts is reported in *Chapter 9, Project Mitigation Tracking* .
A.33	Richard K. Sullivan, Jr., Secretary	Sustainability	This chapter should also update the status of Massport's mitigation commitments and also will identify projects for which mitigation is complete.	The status of these mitigation efforts is reported in *Chapter 9, Project Mitigation Tracking.*

Comment #	Author	Topic	Comment	Response
A.34	Richard K. Sullivan, Jr., Secretary	Distribution	Massport should explore opportunities to advance the reporting of information through Massport's website.	Massport is continuing to expand the reporting of environmental information on the website (http://www.massport.com/environment/Pages/Default.aspx). Currently, a visitor to Massport's environmental website could find information on green initiatives at Massport facilities, Massport's achievements in environmental efforts, Massport's environmental management policy, environmental reporting, and related links. Massport also published 2012 findings for air quality, noise, and ground access parameters on the environmental website in March 2014.
A.35	Richard K. Sullivan, Jr., Secretary	Distribution	Massport should strive to collect and analyze the information required for the *2012/2013 EDR* and report this information in a timely manner.	Please see the response to comment A.34.
A.36	Richard K. Sullivan, Jr., Secretary	Distribution	For several recent projects, including the *2011 ESPR,* Massport has published bi-lingual meeting and project notices and made the services of an interpreter available upon request. Massport should consider continuing these services for the *2012/2013 EDR* submittal.	Massport publishes bi-lingual meeting and project notices for all meeting and project notices and will make the services of an interpreter available upon request for the *2012/2013 EDR* and future EDR and ESPR filings.
A.37	Richard K. Sullivan, Jr., Secretary		I have determined that the *2011 ESPR* for Logan Airport has adequately complied with MEPA and that Massport must submit a *2012/2013 EDR* that responds to the issues raised in comments received. The *2012/2013 EDR* must include a copy of this Certificate and a copy of each comment letter received on the *2011 ESPR* . In particular, Massport should provide a thorough examination of issues raised regarding individual noise monitoring locations, noise measurement and modeling, noise abatement, and air quality issues.	Individual responses to comments are provided in Appendix A and Appendix B of this *2012/2013 EDR* .

Copies of Secretary of the Executive Office of Energy and Environmental Affairs Certificates issued for the Reporting Years 2004, 2005, 2006, 2007, 2008, 2009, and 2010

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August 16, 2006

CERTIFICATE OF THE SECRETARY OF ENVIRONMENTAL AFFAIRS
ON THE
ENVIRONMENTAL STATUS AND PLANNING REPORT

PROJECT NAME	: 2004 Logan Environmental Status and Planning Report
PROJECT MUNICIPALITY	: Boston / Winthrop
PROJECT WATERSHED	: Boston Harbor
EOEA NUMBER	: 3247
PROJECT PROPONENT	: Massachusetts Port Authority
DATE NOTICED IN MONITOR	: June 7, 2006

As Secretary of Environmental Affairs, I hereby determine that the Environmental Status and Planning Report submitted on this project **adequately and properly complies** with the Massachusetts Environmental Policy Act (G. L. c. 30, ss. 61-62H) and with its implementing regulations (301 CMR 11.00).

The environmental review process at Logan Airport has been structured to occur on two levels: airport-wide and project-specific. The Environmental Status and Planning Report (ESPR) has evolved from a largely retrospective status report on airport operations to a broader analysis that also provides a prospective assessment of long-range plans. It has thus become (consistent with the objectives of the MEPA regulations) part of Massachusetts Port Authority's (Massport) long range planning. The ESPR provides a "big picture" analysis of environmental impacts associated with current and anticipated levels of activities, and presents an overall mitigation strategy aimed at avoiding increases in such impacts. The ESPR analysis is supplemented by (and ultimately incorporates) the detailed analyses and mitigation commitments of project-specific EIRs. The ESPR is currently updated on a five-year basis, with much less detailed Environmental Data Reports filed in the years between submission of the ESPRs. The 2004 ESPR is the subject of this Certificate.

Background

In 1979, the Secretary of the Executive Office of Environmental Affairs (EOEA) issued a Certificate requiring Massport to define, evaluate, and disclose, every three years, the impact of long-term growth at the airport through a Generic Environmental Impact Report (GEIR). The Certificate also required the submission of interim Annual Updates to provide data on conditions for the years between the GEIRs. The GEIR provided projections of environmental conditions

where the cumulative effects of individual projects could be understood. The Secretary's Certificate on the *1997 Annual Update* proposed a revised environmental review process for Logan Airport. As a result, Massport evaluates the cumulative impacts associated with airport activities through preparation of an ESPR every five years and provides data updates annually through the EDRs.

This 2004 ESPR was originally scheduled to be completed in 2005, but was postponed until 2006. The 2004 ESPR was delayed because of delays associated with the completion of the New England Regional Aviation System Plan (NERASP). Massport adopted the NERASP forecasts for its 2020 Logan Airport forecast of aviation activity in this ESPR, and upon which the analysis of 2020 environmental conditions is based. Postponing completion of the 2004 ESPR ensured that the forecasts used in the ESPR are the most current and accurate forecasts available.

Review of the 2004 ESPR

In general, the ESPR has responded to the scope. In particular, the ESPR contains a wealth of useful data on activity levels and impacts, and lays out a forecast for trends in the future years. The technical studies in the 2004 ESPR included reporting on and analysis of key indicators of airport activity levels, the regional transportation system, ground access, noise, air quality, environmental management, and project mitigation tracking.

As always, EOEA remains committed to evaluating and addressing the cumulative impacts of airport operations on the nearby communities. In June 2001, Massport agreed to work with EOEA on structuring a proposed Air Quality Initiative (AQI). The Certificate indicated that Massport was "to solicit project submissions from local governments and community groups, which will be reviewed in an objective, science-based process by a neutral organization such as NESCAUM." This Certificate on the ESPR reiterates that Massport has committed to the Air Quality Initiative, a key program designed to mitigate the cumulative air quality impacts of airport operations. The 2005 EDR should detail how Massport is meeting this commitment. The 2005 EDR must also address all of the air quality issues raised by the commenters.

Although Massport has presented a detailed ESPR, I remain concerned with a number of environmental issues, specifically air quality and noise related issues, as outlined below.

Follow-up

Massport should submit the next EDR (analyzing conditions for the 2005 calendar year no later than December 15, 2006. I recognize that this Certificate requires the inclusion of considerable follow-up in that document. However, ESPRs invariably raise important issues which require follow-up sooner rather than later, and this ESPR is no exception. I anticipate that the EDR in a year following the publication of an ESPR will always have to include such analytical follow-up to the ESPR and respond to comments on the ESPR. Other EDRs should provide more of a "snapshot" of the previous year's operations and impacts, with more substantial analysis awaiting the next GEIR. EDRs in years other than the year immediately following publication of an ESPR should therefore be considerably less voluminous and Massport should strive to submit these documents by July 31 of the year following the subject year.

Responses to Comments

The next EDR must include Responses to Comments which addresses all of the substantive comments from the letters listed at the end of this Certificate. The Response to Comments included in this ESPR is well-constructed and cross-referenced (although several comments have complained of general responses or document references in response to specific questions). Massport may follow the same format in addressing comments in the next EDR, although the Responses to Comments should pay particular attention to increased specificity, where necessary.

The majority of comments received on the EDR focused on air quality and noise related issues, including measurement of noise, modeling of noise contours, and noise abatement. In addition to responding to these comments, the 2005 EDR and future EDRs should also continue to report on the refinements to noise tracking and abatement efforts.

Airport Activity Levels

The ESPR included a chapter on airport activity levels, including information on aircraft operations, fleet mix, passenger activity levels, and cargo and mail operations. This chapter also reported on Massport's forecasts that will become the basis for Massport's strategic planning initiatives over the next few years. Past forecasts were based on low, medium, and high passenger activity levels. New forecasts are now based on the forecasts for 2020 developed for the New England Regional Airport System Plan (NERASP) study. This chapter included aircraft operations and passenger activity forecasts, and provided a discussion of methodologies and assumptions, including anticipated fleet mix changes and other trends in the aviation industry.

Air passenger traffic at Logan Airport continued to rebound in 2004, but remained below the peak year level reached in 2000. The total number of passengers using Logan Airport in 2004 increased by 14.7 percent over 2003 levels to 26.1 million passengers. Although the recovery in passenger demand was underway in 2004 at Logan Airport and throughout the industry, legacy commercial airlines continued to struggle financially as competition from low cost carrier (LCC) rivals increased and fuel prices remained high.

For the first time since 1998, total annual aircraft operations (arrivals and departures) at Logan Airport increased compared to the previous year and were at their highest level since 2001. Daily operations in 2004 averaged approximately 1,107 compared to approximately 1,027 in 2003, an increase of about 80 operations per day or about 8.6 percent. 2004 levels remain below historic peaks. The growth in aircraft activity was driven primarily by the entry and expansion of LCCs at Logan Airport in 2004. This increase in LCC services in 2004 stimulated growth in airport

passenger demand.

In 2004, Logan Airport ranked 19th among US airports in total cargo volume. All-cargo operations at Logan Airport declined by less than 1 percent in 2004. However, total cargo volume, including cargo carried in the belly compartments of passenger aircraft, rose by 0.6 percent.

Airport Planning

This section described the status of planning initiatives and projects through the planning horizon year (2020) for the Terminal Area; Airside Area; Service and Cargo Areas; and Edge Buffers and Landscaping. The Airport Planning Chapter also reported on the status of public works projects implemented by other agencies within the boundaries of Logan Airport.

Several projects were completed in 2004:

- The majority of construction of the main terminal and satellite concourse of Delta Air Lines' Replacement Terminal A Project was completed in 2004.
- A dedicated hourly parking area opened on the lower level of the Terminal B Garage in July 2004.
- Massport also launched Exit Express, Massport's convenient way to pay for parking.
- The Massachusetts Bay Transportation Authority's (MBTA's) $23 million new Blue Line Airport Station opened in June 2004.
- Demolition of the old MBTA Airport Station was completed in 2004.
- By the end of 2004, completion of the Central Artery/Tunnel (CA/T) Project and improvements to the roadway system were complete, allowing for a more efficient roadway network with shorter and more direct routes between destinations in the airport and the regional highway system.
- The Silver Line, the most recent addition to the transit system and Boston's first Bus Rapid Transit line, began limited service to Logan Airport in December 2004.

Both Massport and Logan Airport's tenants are proposing projects or exploring planning options to modernize and carry out future improvements at Logan Airport. Massport's planning criteria for Logan Modernization are based on accommodating 45 million annual passengers in airport terminals, facilities, and on airport roadways. Future projects and planning concepts include:

- Both Massport and Logan Airport's tenants are proposing projects or exploring planning options to modernize and carry out future improvements to the existing terminal facilities. Some projects and planning concepts include ongoing expansion and upgrade of Terminal E and constructing a new satellite Federal Inspectional Services (FIS) Facility at the southeast end of Terminal B.
- Some projects and planning concepts that are underway or under consideration include, consolidating flight kitchen facilities in the north service area, constructing new multi tenant maintenance facilities for ground service equipment (GSE), and constructing new

hangar facilities in the north cargo area.

- Airside improvements include upgrades and improvements to the airfield to enhance the operations efficiency and safety of Logan Airport. Some projects and planning concepts that are underway or under consideration include, installing a security wall along the perimeter of the air operations area, providing additional aircraft parking for certain types of aircraft, and an airside improvements planning project to reduce current and projected levels of aircraft delay.
- Buffer areas are being designed in consultation with Logan Airport's neighbors and other interested parties in an open community planning process. Some future airport buffer projects and planning concepts include, landscaping the former Navy Fuel Pier at Jefferies Point, installing a landscaped border in conjunction with the north service area Economy Parking Lot construction, and constructing a half-acre linear area with landscaping and lighting improvements along Maverick Street.
- Massport is considering a parking strategy to address future on-airport parking demands. Some ongoing and future parking projects and planning concepts include redeveloping three parcels into a combined economy parking facility with the capacity for up to 1,750 vehicles, proposed parking facility in the Southwest Service Area, and a new consolidated facility for all car rental operations

<u>Regional Transportation Context</u>

Overall, aviation activity levels at New England's regional airports increased in 2004, as passenger demand continued to rebound both within the region and nationally after the 2001 downturn. Just as the passenger decline seen at the regional airports in the wake of September 11, 2001 was less severe than the declines experienced at Logan Airport, the traffic recovery seen at the regional airports in 2004 was not as strong as the rebound experienced at Logan Airport. Growth at Logan Airport was largely fueled by a growing presence of LCC services.
At the same time, regional airports continued to experience growth in 2004 and served a significant (42.5 percent) share of the region's air passenger traffic. Several factors have contributed to the success of the regional airports in recent years:

- Many of the regional airports benefited from the introduction and growth of LCC services over the past several years. This trend began when Southwest Airlines entered the New England market in 1996 by serving T.F. Green Airport in Warwick, Rhode Island and later expanding into the Manchester and Hartford/Bradley International Airports. The trend continued in 2004 when Spirit Airlines began service from T.F. Green Airport, Independence Air5 initiated low-fare service at several of the regional airports, and Southwest Airlines continued to increase service from its New England airports.
- Several of the smaller airports, particularly Burlington, Bangor, and Tweed-New Haven continued to benefit from the introduction of regional jets and gained new non-stop services to airline connecting hubs, which increase service options for regional airport passengers.

<u>Ground Transportation</u>

The chapter reported on 2004 conditions and provided a comparison of 2004 findings to previous years for variety of ground transportation indicators. The chapter also presented a discussion of analysis methodologies and assumptions for future year conditions for the planning horizon year 2020 for Traffic volumes, On-airport Vehicle miles traveled (VMT) and Parking demand.

- Completion of the CA/T and Logan Airport Modernization projects created a more efficient roadway network with shorter and more direct routes to destinations within Logan Airport.
- With the exception of water transportation, all scheduled and unscheduled high occupancy vehicle (HOV) transportation to Logan Airport saw increased ridership in 2004.
- Overall HOV mode share for air passengers increased from 25.8 percent in 1990 to 32 percent in 2003. Although the data shows a slight decrease to 30.3 percent in HOV modes in 2004, the 2003 HOV mode share was an all-time high, reflecting Massport's success in generally maintaining or increasing the percentage of passengers using HOV modes in all market segments.
- The most recent employee survey showed an employee HOV mode share of 26.8 percent.
- Airport-related average annual daily traffic (ADDT) volumes increased by 12.6 percent in 2004 over 2003 volumes. Despite this increase in ADDT volumes, the vehicle miles traveled (VMT) on Logan Airport's roadway system only increased by 3.5 percent in 2004 compared with the 2003 VMT. This reflects the effects of the changes in the airport roadway system resulting from the CA/T and Logan Airport Modernization projects, which result in a shorter average trip length, creating a much smaller increase in total VMT than in average weekday daily traffic volumes.
- Massport executed a Memorandum of Understanding with the MBTA to commence Silver Line bus rapid transit service in late 2004. Massport's support of the Silver Line Airport service will total more than $30 million over ten years.

Between 2003 and 2004, membership in the Transportation Management Association (TMA) declined by 800 employees, a 13.3% reduction. Massport stated in the ESPR that significant TMA funds had been expended for administrative functions resulting in underfunded programming. The Executive Office of Transportation's MassRIDES program will now provide a TMA coordinator at state expense. The EOT identified its expectation that Massport will "maintain its current level of effort, including both cash contributions and in-kind services.

The Secretary's June 15, 2001 Certificate on the AIPP directs Massport to require that all Logan employers join the TMA at the earliest possible opportunity. This mitigation measure is not listed in Table 10-7 and no plan is presented for meeting this requirement. A plan should be detailed in the 2005 EDR.

The ESPR indicated that two FAA programs had relocated to New Hampshire in 2004 and that Beacon-Skanska, having completed the construction of Terminal A, was no longer at Logan. Four additional corporate members left the TMA in 2004. The 2005 EDR should provide explanation for this.

The 2003 EDR stated that TMA shuttle ridership declined by 32.4 percent due to the elimination of services at mid-year due to lack of funding., but that the decrease in shuttle ridership had been more than off-set by increased Logan Express use. Massport should identify any efforts such as more active marketing of car/ridesharing options targeted to those who previously used the cancelled shuttles. This information should be provided in the 2005 EDR.

Noise

This chapter began with an overview of the environmental regulatory framework affecting aircraft noise, the changes in aircraft noise, the methodologies used to track noise, and what if any changes there was in noise modeling. The information in this chapter built upon the findings of the Boston Logan Overflight Noise Study. This chapter also updates the status Massport's efforts to reduce noise levels and provides noise contours population counts for 2020.

- Massport has continued to make improvements in the noise modeling process as the sophistication of noise models and data acquisition systems has advanced. Recent developments in noise modeling technologies and techniques employed in this 2004 ESPR and to be used in future years include: use of a new radar data acquisition system, known as a long-range PASSUR, for the source of all radar-based operations data; a new upgrade to Massport's radar data processing software; use of the latest update to the FAA's Integrated Noise Model, while retaining the unique capability to account for over-water sound propagation and hill effects unique to Logan Airport; incorporation of more than 1,800 modeled flight tracks, checked and updated where necessary to reflect 2004 radar data; use of radar data to determine the "best-fit" match among each of the nearly 402,000 radar traces captured by Logan Airport's noise monitoring system and the available climb profile contained within the INM database; procurement of an improved noise and operations monitoring system; procurement of automated altitude profile and noise contour generation software.
- From May to August 2004, Runway 4L-22R was closed either completely or partially to accommodate repaving. Due to this closure, jet aircraft departures on Runway 22R decreased by approximately 23 percent compared to 20036 while departures on other runways increased.
- As a result of changes in airport operations in 2004, the number of people exposed to Day-Night Sound Level (DNL) values greater than 65 dB increased compared to the number in 2003. An estimated 10,720 people were exposed to DNL levels greater than 65 dB in 2004, compared to 7,183 in 2003, and 8,309 in 2002. The majority of the increase occurred in East Boston off the northwest end of Runway 33L. The increases within the

65dB are in areas that were previously sound insulated. Despite these increases, the total count of people exposed to 65 dB DNL and above was 23 percent lower than in 2001.

- The 2004 Cumulative Noise Index (CNI) of 153.4 Effective Perceived Noise Level (EPNdB) remained well below the cap of 156.5 EPNdB. Although CNI also increased compared to 2003 and 2002 as a result of the increased number of operations, the 2004 level remained below the 2001 CNI value.

- The number of residential dwelling units for which Massport provided sound insulation in 2004 was 791. Since the program's inception, the total number of dwelling units receiving sound insulation is now 8,615. In addition, Massport completed sound insulation of a 36th school – the new Center School located in Winthrop.

The Logan Airport Noise Study is now expected to be conducted in at least three phases. I strongly encourage Massport to include a phase for the monitoring and assessment of altered flight paths so that any necessary modifications can be identified and implemented.

In addition, the ESPR indicated that there will be an increase from 2004 to 2020 in the number of Boston residents who will experience noise in the 70-75 DNL and the 75-80 DNL due to the use of parallel runways. Massport strive to identify ways to ensure that these increases do not occur. The 2005 EDR should include a preliminary discussion about how Massport will address projected exceedances.

Air Quality

This chapter presented an overview of the environmental regulatory framework affecting aircraft emissions, changes in aircraft emissions, and the changes in air quality modeling. It also predicts emission levels for 2020.

- To ensure consistency and comparability between 1999 and 2004 air quality emissions, the 1999 air emissions inventory was updated with information that was not available when first reported and 1999 emissions were recalculated using the new version of the FAA's Emissions and Dispersion Modeling System (EDMS) v4.21. Additional data were also added to the 2004 inventory in order to increase the accuracy of the results, for example curbside queue times were updated and new parking areas were added to the inventory.

- In 2004, the emission inventory results were driven by an 8 percent increase in aircraft operations compared to 2003 activity levels. Increases in stationary source (fuel storage facilities, heating plant, etc.) emissions further contributed to the increase in levels of volatile organic compounds (VOCs) and oxides of nitrogen (NOx).
- In 2004, total VOC emissions at Logan Airport were estimated to be approximately 1,360

kilograms (kg)/day, which is an increase of 17 percent from 2003 levels. However, total VOC emissions at Logan Airport were 41 percent lower in 2004 than in 1999. The increase of VOC emissions between 2003 and 2004 was due to the increase in aircraft operations in 2004.

- In 2004, total NOx emissions from all airport-related sources were estimated to be 4,290 kg/day, which is an increase of 16 percent from 2003 levels, but is a 26 percent decrease as compared to 1999 levels. Once again, the increase in aircraft operations contributed the most to this increase in airport-related NOx in 2004.

- Total carbon monoxide (CO) emissions at Logan Airport in 2004 were estimated to be 9,852 kg/day, or 3 percent below 2003 levels. In 2004, total CO emissions at Logan Airport were 32 percent lower than 1999 levels. While CO emissions from aircraft increased due to increased aircraft operations, the use of alternative fuel vehicles (AFVs) and the lower emission rates of the motor vehicle fleet helped to reduce the overall CO emissions in 2004. Massport added three new AFVs to its fleet in 2004.

- Massport developed an Air Quality Initiative (AQI) in 2001 as a long-range program with the overall goal to maintain NOx emissions associated with Logan Airport at or below the 1999 level of 2,347 tpy. In 2004, NOx emissions from all airport-related sources were estimated to be 1,726 tpy, well below the 1999 level.

Through the June 15, 2001 Certificate of the Secretary of EOEA on the FEIR for the AIPP, Massport was directed to develop a program to maximize the use of single-engine taxiing procedures by all of its tenant airlines. Massport must describe in the 2005 EDR how it presently encourages reduced-engine (single-engine) taxiing. The cited issues of safety and practicality should be discussed and the program that will be implemented as noted in Table 10-7of the 2005 ESPR should be outlined.

Massport was also directed in the same Certificate to conduct follow-up air quality monitoring in neighborhoods surrounding the airport and surrounding flight paths. This mitigation measure does not appear in Table 10-7, "Logan Airside Improvements Planning Project, Details of Ongoing Section 61 Mitigation Measures." The 2005 EDR should address this measure in detail.

Table 7-13 of the 2004 ESPR , "Inventory of Tracking of NOx Emissions in tons per year for Logan Airport," contains numbers that have been "adjusted to reflect know reductions achieved by Massport and its tenants at Logan Airport." The 2005 EDR should include unadjusted numbers and detailed information about the means for achieving reductions and the emissions value of each reduction method.

Massport had agreed to work with EOEA on structuring a proposed Air Quality Initiative (AQI) in the June 2001 Certificate for the AIPP. The Certificate indicated that Massport was "to solicit

project submissions from local governments and community groups, which will be reviewed in an objective, science-based process by a neutral organization such as NESCAUM." There is no information in the ESPR about the substance and status of any process with EOEA or about the solicitation of information and objective, neutral, scientific review. The 2005 EDR should address this matter in detail.

Environmental Management/Water Quality/Environmental Compliance

This chapter reported on the activities of Massport's Environmental Management Unit in meeting the state's environmental regulatory requirements.

- In 2004, of the 126 spills reported to the Logan Airport Fire-Rescue Department, 18 spills (14 percent) were ten gallons or greater in quantity. Jet fuel spills accounted for 82 (65 percent) of the total spills, with 12 spills (15 percent) being ten gallons or greater in quantity. The remaining 44 spills involved gasoline, hydraulic oil, diesel fuel, ethylene glycol, propylene glycol, paint, and AVGAS. Of these spills, 6 (14 percent) were ten gallons or greater. Since 2002 there has been a reduction in the total volume of all spills.

- In accordance with the Massachusetts Contingency Plan (MCP), Massport continues to assess, remediate, and bring to regulatory closure areas of subsurface contamination.

Massport indicates that it has had limited success in identifying the causes of exceedances due to "first flush" pollutants in stormwater, the number of potential sources at Logan, and the size of drainage areas serving outfalls. Massport needs to develop a plan for maximizing its ability to identify causes. This plan should be identified in the 2005 EDR. Massport should also include in the 2005 EDR copies of any new NPDES stormwater and fire training permits.

Sustainability Initiatives

This Chapter presented Massport's on-going and upcoming sustainability initiatives at Logan Airport. Massport continues to demonstrate forward thinking in sustainability policies and practices for transportation agencies. I encourage Massport to require tenant participation and compliance with all elements of the plan as leases are renewed.

As I stated at the beginning of this Certificate, the 2005 EDR must provide responses to the issues raised in comments received. The 2005 EDR must include a copy of this Certificate and a copy of each comment letter received on the 2004 ESPR. In particular, Massport should provide a thorough examination of issues raised regarding individual noise monitoring locations, noise measurement and modeling, and noise abatement. Massport should consult directly with individual commentors where necessary.

A distribution list for the 2005 EDR (indicating those receiving documents, CDs, or Notices of

Availability) should be provided in the document. This section must also include copies of all GEIR/Annual Update Certificates issued since 1995 to provide context for reviewers. Supporting technical appendices should be provided as necessary.

August 16, 2006
Date

Robert W. Golledge, Jr.

Comments received:

07/25/06	Stephen Kaiser
08/08/06	Nancy Timmerman
08/09/06	MA Executive Office of Health and Human Services
08/09/06	John Vitagliano
08/09/06	Bruce Egan, Egan Environmental
08/10/06	City of Boston Environment Department
08/14/06	Boston Transportation Department

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February 15, 2007

CERTIFICATE OF THE SECRETARY OF ENVIRONMENTAL AFFAIRS
ON THE
2005 LOGAN AIRPORT ENVIRONMENTAL DATA REPORT

PROJECT NAME	: 2005 Environmental Data Report
PROJECT MUNICIPALITY	: Boston / Winthrop
PROJECT WATERSHED	: Boston Harbor
EOEA NUMBER	: 3247
PROJECT PROPONENT	: Massachusetts Port Authority
DATE NOTICED IN MONITOR	: December 23, 2006

As Secretary of Environmental Affairs, I hereby determine that the Environmental Data Report submitted on this project **adequately and properly complies** with the Massachusetts Environmental Policy Act (G. L. c. 30, ss. 61-62H) and with its implementing regulations (301 CMR 11.00).

The environmental review process at Logan Airport has been structured to occur on two levels: airport-wide and project-specific. The Environmental Status and Planning Report (ESPR) has evolved from a largely retrospective status report on airport operations to a broader analysis that also provides a prospective assessment of long-range plans. It has thus become (consistent with the objectives of the MEPA regulations) part of Massachusetts Port Authority's (Massport) long range planning. The ESPR provides a "big picture" analysis of environmental impacts associated with current and anticipated levels of activities, and presents an overall mitigation strategy aimed at avoiding increases in such impacts. The ESPR analysis is supplemented by (and ultimately incorporates) the detailed analyses and mitigation commitments of project-specific EIRs. The ESPR is currently updated on a five-year basis, with much less detailed Environmental Data Reports (EDR) filed in the years between submission of the ESPRs. The 2005 EDR is the subject of this Certificate.

Background

In 1979, the Secretary of the Executive Office of Environmental Affairs (EOEA) issued a Certificate requiring Massport to define, evaluate, and disclose, every three years, the impact of long-term growth at the airport through a Generic Environmental Impact Report (GEIR). The Certificate also required the submission of interim Annual Updates to provide data on conditions for the years between the GEIRs. The GEIR provided projections of environmental conditions where the cumulative effects of individual projects could be understood. The Secretary's Certificate on the *1997 Annual Update* proposed a revised environmental review process for Logan Airport. As a result, Massport evaluates the cumulative impacts associated with airport activities through preparation of an ESPR every five years and provides data updates annually through the EDRs.

Review of the 2005 EDR

In general, the EDR has fulfilled its purpose of providing a "snapshot" of year 2005 passenger and impact levels at Logan Airport. Most environmental parameters showed significant improvement in calendar year 2005. In particular, the technical studies in the 2005 EDR included reporting on and analysis of key indicators of airport activity levels, airport planning, the regional transportation system, ground access, noise, air quality, environmental management, and project mitigation tracking.

As always, EOEA remains committed to evaluating and addressing the cumulative impacts of airport operations on the nearby communities. In June 2001, Massport agreed to work with EOEA on structuring a proposed Air Quality Initiative (AQI). The Certificate indicated that Massport was "to solicit project submissions from local governments and community groups, which will be reviewed in an objective, science-based process by a neutral organization such as NESCAUM." The 2005 EDR reiterates that Massport has committed to the Air Quality Initiative, a key program designed to mitigate the cumulative air quality impacts of airport operations. The 2005 EDR details how Massport is meeting this commitment. The 2006 EDR should continue to report on the details of Massport's committment. In addition to the environmental issues listed below, the 2006 EDR should address all of the air quality and noise related issues raised by the commenters during the review of the 2005 EDR.

Follow-up

Massport should file the next EDR (covering operations for the 2006 calendar year) in calendar year 2007. The EDR should provide more of a "snapshot" of the 2006 operations and impacts, with more substantial analysis awaiting the next GEIR. Massport should also address the comments received on the current EDR when developing its 2006 EDR.

Responses to Comments

The next EDR must include Responses to Comments which addresses all of the substantive comments from the letters listed at the end of this Certificate. The Response to Comments included in this EDR is well-constructed and cross-referenced. Massport may follow the same format in addressing comments in the next EDR, although the Responses to Comments should pay particular attention to increased specificity, where necessary.

The majority of comments received on the 2005 EDR focused on air quality and noise related issues, including measurement of noise, modeling of noise contours, and noise abatement. In addition to responding to these comments, the 2006 EDR and future EDRs should also continue to report on the refinements to noise tracking and abatement efforts.

Activity Levels

The Activity Levels chapter presents aviation activity statistics for Logan Airport in 2005 and compares activity levels to the prior year including air passengers, aircraft operations, fleet mix, and cargo/mail volumes. Air passenger traffic at Logan Airport continued to rebound in 2005, but remained below the peak year level reached in 2000. Specifically, the total number of passengers using Logan Airport in 2005 increased by 3.6 percent over the prior year to 27.1 million passengers. In 2005, total aircraft operations (409,066 operations) at Logan Airport increased by 0.9 percent over 2004 levels. While 2005 passenger traffic at Logan Airport was approximately equal to 1999 levels, in 2005 these passengers were being carried on approximately 86,000 fewer flights (495,000 flights in 1999 versus 409,066 flights in 2005). Several commenters raised concerns with the increase in passenger levels requesting long-term solutions to meeting demand which do not include expansion of Logan Airport's capacity or footprint. I advise Massport to consider and attempt to address these comments in the next 20006 EDR.

Planning

The Airport Planning chapter provides an overview of planning, construction, and permitting activities that occurred at Logan Airport in 2005. It also describes known future planning, construction, and permitting activities. Specifically, several projects were completed in 2005 including the majority of construction of the main terminal and satellite concourse of Delta Air Lines' Replacement. Terminal A Project was completed in 2004, with final fit up and commissioning in 2005. Massport also launched Exit Express as part of an on-going program to improve parking facilities and improve air quality through enhanced circulation and reduced idling at the toll booths. In addition, as part of a cooperative venture between the Massachusetts Bay Transportation Authority (MBTA) and Massport, initial Silver Line service to the airport began in December 2004. Full Silver Line service to Logan Airport began on June 1, 2005.

The chapter also includes future planning including: ongoing expansion and upgrade of Terminal E and completion of West Garage Phase II(Central Garage Expansion); more efficient ways of using the limited land resources in the service areas; airside improvements include upgrades and improvements to the airfield to enhance the operations, efficiency and safety of Logan Airport; In addition, buffer areas are being designed in consultation with Logan Airport's neighbors and other interested parties in a community planning process. Massport is also considering a parking strategy to address future on-airport parking demands. Some ongoing and future parking projects and planning concepts include redeveloping three parcels into a combined economy parking

facility with the capacity for up to 1,750 vehicles and a new consolidated facility for all car rental operations.

Regional Transportation

This chapter describes activity levels at New England's regional airports in 2005 and updates recent planning activities. Overall, the number of air passengers utilizing New England's primary commercial service airports in 2005 rose by 5.3 percent over 2004. When measured by aircraft operations, however, activity levels fell by 0.6 percent. This reflects sweeping changes in both the commercial aviation and general aviation (GA) sectors of the industry. Passenger numbers rose despite capacity reductions as airlines operated at higher load factors. Carriers flew fewer flights to the regional airports than in 2004, but used larger aircraft on average in 2005, and carried more passengers. GA operations at New England airports declined by 3.8 percent from the 2004 levels. The Boston Transportation Department has raised a number of suggestions related to the Regional Transportation that Massport should consider in the 2006 EDR.

Ground Transportation

This chapter reports on transit ridership, roadways, traffic volumes, and parking for 2005. Specifically, ground transportation activity levels increased from 2004 to 2005 as a result of a 3.6 percent increase in the number of air passengers. In addition, traffic volumes on airport roadways increased by 5.8 percent, while the vehicle miles traveled (VMT) on the airport increased by 4.2 percent. The lower VMT growth when compared to overall traffic volume growth suggests that more direct connections over shorter roadway distances are provided. The facilities at the MBTA Blue Line Airport Station were also substantially improved in 2005, including the conversion from a manual to an automated fare collection system. In addition, full MBTA Silver Line service to Logan Airport began on June 1, 2005. In 2005, Terminal A and its associated access roadways were fully opened for operation. There were no other roadway modifications completed in 2005. In addition, contract negotiations began between Massport and the C & J Bus Company in New Hampshire to expand early morning transportation between New Hampshire and Logan Airport. This service began in 2006. Massport also re-bid its Logan Airport Transportation Management Association (Logan TMA) contract with the Executive Office of Transportation (EOT) through the MassRIDES program.

Noise

The Noise Abatement chapter updates the status of the noise environment at Logan Airport in 2005, and describes Massport's efforts to reduce noise levels. In 2005, the number of people exposed to Day-Night Sound Level (DNL) values greater than 65 decibels (dB) decreased compared to 2004. An estimated 6,477 people were exposed to DNL levels greater than 65 dB in 2005, compared to 9,438 in 2004, and 7,183 in 2003. The total count of people exposed to 65 dB Day-Night Sound Level (DNL) and above was 55 percent lower than in 2001. Winthrop, which has always experienced the highest levels of noise exposure of any community around Logan Airport, continued its decline in the number of people exposed to levels greater than 65 DNL. This number has dropped 81 percent since reaching its peak in 1998. The number of residents exposed to noise over 75 DNL increased from 2004 but still remained below 2001 levels.

The 2005 Cumulative Noise Index (CNI) of 153.2 Effective Perceived Noise Level (EPNdB) remained well below the cap of 156.5 EPNdB. The CNI decreased slightly compared to 2004 even with a slight increase in the number of operations in 2005. This decrease is primarily due to decreased use of recertified aircraft by cargo operators. Massport provided sound insulation for 471 residential dwelling units in 2005. Since the program's inception, Massport has sound insulated a total of 9,086 dwelling units. The majority of the units insulated in 2005 were in Winthrop.

The information in this chapter is very informative and I encourage Massport to continue with its updates in the 2006 EDR. I also strongly advise Massport to consider and address the numerous comments received that have raised noise related concerns in comments.

Air Quality

The Air Quality/Emissions Reduction chapter provides an overview of airport-related air quality issues in 2005 and efforts to reduce emissions. The 2005 emissions inventory results are driven by the small increase in aircraft operations at Logan Airport compared to 2004 levels. Compared to 2004 levels, total emissions of volatile organic compounds (VOCs) are estimated to have decreased by approximately 6 percent to 1,285 kilograms per day (kg/day). In 2005, total emissions of oxides of nitrogen (NOx) were estimated to be 4,187 kg/day, which is a 2 percent decrease from 2004 levels. Total emissions of carbon monoxide (CO) in 2005 were 9,556 kg/day, or 3 percent lower than 2004 levels.

For the first time, estimates of particulate matter emissions associated with Logan Airport are reported in this 2005 EDR in response to the recent availability of an FAA-approved method for computing particulate matter emission factors for aircraft. Total emissions of particulate matter (PM2.5) at Logan Airport in 2005 were approximately 83 kg/day [33 tons/year (tpy)]. NOx emissions at Logan Airport in 2005 were approximately 662 tpy lower than 1999 levels—a 28 percent decrease. It appears that there is an ongoing trend of decreasing nitrogen dioxide (NO2) concentrations at both the Massport and Massachusetts Department of Environmental Protection (MassDEP) monitoring sites located in the general vicinity of Logan Airport. In addition, annual NO2 concentrations at all monitoring locations were well below the NO2 air quality standards in 2005. The 2006 EDR should continue updates on the information presented in the 2005 EDR.

Water Quality/Environmental Compliance

This chapter describes Massport's ongoing environmental management activities including NPDES compliance, stormwater, fuel spills, activities under the Massachusetts Contingency Plan, and tank management. Specifically, of the 97 spills reported in 2005, 15 (15 percent) were ten gallons or greater in quantity. Jet fuel spills accounted for 66 (68 percent) of the total spills, 12 of the jet fuel spills (18 percent) were ten gallons or greater in quantity. The remaining 31 spills involved gasoline, hydraulic oil, diesel fuel, and other substances. Of these spills, only

three (10 percent) were ten gallons or greater. In 2005, only eight samples exceeded the regulatory limits. The North Outfall had two samples which exceeded the 15 milligrams per liter (mg/L) National Pollutant Discharge Elimination System (NPDES) limit for oil and grease, and the Porter Street Outfall had one sample exceed this limit. The North Outfall had two samples which exceeded the 0.3 milliliters per liter (ml/L) daily maximum limit for settable solids, and the West Outfall had three samples exceed this limit. No other exceedances occurred. In accordance with the Massachusetts Contingency Plan (MCP), Massport should continue to report in the 2006 EDR how Massport will assess, remediate, and bring to regulatory closure areas of subsurface contamination.

Sustainability at Logan Airport

This chapter describes Massport's airport wide sustainability goals. In October 2000, the Massport Board approved an Authority-wide Environmental Management Policy, which articulates Massport's commitment to protect the environment and to implement sustainable design principles. In October 2004, the Massport Sustainability Team produced the *Massachusetts Port Authority Sustainability Plan* (Sustainability Plan). The Environmental Management Policy is incorporated in the Sustainability Plan as Massport's long-term sustainability goal or vision. This chapter describes Massport's continued efforts.

As I stated at the beginning of this Certificate, the 2006 EDR must provide responses to the issues raised in comments received. The 2006 EDR must include a copy of this Certificate and a copy of each comment letter received on the 2005 EDR. In particular, Massport should provide a thorough examination of issues raised regarding individual noise monitoring locations, noise measurement and modeling, and noise abatement. Massport should consult directly with individual commentors where necessary.

A distribution list for the 2006 EDR (indicating those receiving documents, CDs, or Notices of Availability) should be provided in the document. This section must also include copies of all GEIR/Annual Update Certificates issued since 1995 to provide context for reviewers. Supporting technical appendices should be provided as necessary.

February 15, 2007
Date

Ian A. Bowles

Comments Received:

01/30/07	State Representative Robert A. DeLeo
01/31/07	Joseph Felzani
02/05/07	Boston Transportation Department
02/06/07	Nancy Timmerman
02/07/07	Stephen Kaiser
02/13/07	City of Boston Environment Department

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November 1, 2007

CERTIFICATE OF THE SECRETARY OF ENERGY AND ENVIRONMENTAL AFFAIRS
ON THE
2006 LOGAN AIRPORT ENVIRONMENTAL DATA REPORT

PROJECT NAME	: 2006 Environmental Data Report
PROJECT MUNICIPALITY	: Boston / Winthrop
PROJECT WATERSHED	: Boston Harbor
EOEA NUMBER	: 3247
PROJECT PROPONENT	: Massachusetts Port Authority
DATE NOTICED IN MONITOR	: September 25, 2007

As Secretary of Executive Office of Energy and Environmental Affairs (EEA), I hereby determine that the Environmental Data Report submitted on this project **adequately and properly complies** with the Massachusetts Environmental Policy Act (G. L. c. 30, ss. 61-62H) and with its implementing regulations (301 CMR 11.00).

The environmental review process at Logan Airport has been structured to occur on two levels: airport-wide and project-specific. The Environmental Status and Planning Report (ESPR) has evolved from a largely retrospective status report on airport operations to a broader analysis that also provides a prospective assessment of long range plans. It has thus become (consistent with the objectives of the MEPA regulations) part of Massport's long range planning. In recognition of the increased role of planning in the GEIR process, the name of the document was changed to ESPR. The ESPR provides a "big picture" analysis of environmental impacts associated with current and anticipated levels of activities, and presents an overall mitigation strategy aimed at avoiding increases in such impacts. The ESPR analysis is supplemented by (and ultimately incorporates) the detailed analyses and mitigation commitments of project-specific EIRs. The ESPR is currently updated on a 5-year basis, with much less detailed Environmental Data

Reports (formerly Annual Updates) filed in the years between ESPRs. The 2006 EDR is the subject of this Certificate.

In general, the EDR has fulfilled its purpose of providing a "snapshot" of year 2006 passenger and impact levels at Logan Airport. Most environmental parameters showed improvement in calendar year 2006. In particular, the technical studies in the 2006 EDR included reporting on and analysis of key indicators of airport activity levels, airport planning, the regional transportation system, ground access, noise, air quality, environmental management, and project mitigation tracking. Mitigation of noise impacts and air quality remain key concerns both of this office and the commenters. These commitments take the form of project-specific Section 61 Findings, as well as more general mitigation that has emerged from the ESPR process.

Background

In 1979, the Secretary of the Executive Office of Environmental Affairs issued a Certificate requiring Massport to define, evaluate, and disclose, every three years, the impact of long-term growth at the airport through a Generic Environmental Impact Report (GEIR). The Certificate also required the submission of interim Annual Updates to provide data on conditions for the years between the GEIRs. The GEIR provided projections of environmental conditions where the cumulative effects of individual projects could be understood. The Secretary's Certificate on the *1997 Annual Update* proposed a revised environmental review process for Logan Airport. As a result, Massport evaluates the cumulative impacts associated with airport activities through preparation of an ESPR every five years and provides data updates annually through the EDRs.

Review of the 2006 EDR

As always, EEA remains committed to evaluating and addressing the cumulative impacts of airport operations on the nearby communities. In June 2001, Massport agreed to work with EEA on structuring a proposed Air Quality Initiative (AQI). The Certificate indicated that Massport was "to solicit project submissions from local governments and community groups, which will be reviewed in an objective, science-based process by a neutral organization such as NESCAUM." The 2006 EDR reiterates that Massport has committed to the Air Quality Initiative, a key program designed to mitigate the cumulative air quality impacts of airport operations. The 2006 EDR details how Massport is meeting this commitment. The 2007 EDR should continue to report on the details of Massport's commitment and address the concerns raised by the City of Boston's Environment Department on this issue. In addition to the environmental issues listed below, the 2007 EDR should address all of the air quality and noise related issues raised by the commenters during the review of the 2006 EDR.

Procedural

Given the overall strength of the analysis in the 2006 EDR, the 2007 EDR can restrict itself to providing an update on 2007 conditions, and respond to those issues explicitly noted in this

Certificate and the comments received as requiring response in the next EDR. The EDR should provide a "snapshot" of the 2007 operations and impacts, with more substantial analysis awaiting the next ESPR. Massport should file the 2007 EDR no later than October 15, 2008 (although I encourage Massport to file sooner, given the relatively few requirements for the next EDR).

A distribution list for the 2007 EDR (indicating those receiving documents, CDs, or Notices of Availability) should be provided in the document. This section must also include copies of all ESPR and EDR Certificates issued since the 2004 Logan Environmental Status and Planning Report (issued on August 16, 2006) to provide context for reviewers. Supporting technical appendices should be provided as necessary.

Responses to Comments

The comments received on the 2006 EDR are thoughtful and detailed although I note that some of the comments were received only one day before this Certificate was to be issued. I request that during the review of the 2007 EDR that commenters make every attempt to submit comments by the close of the comment period to allow time for review. The 2007 EDR must include Responses to Comments which addresses all of the substantive comments from the letters listed at the end of this Certificate. The Response to Comments included in this EDR is well-constructed and cross-referenced. Massport may follow the same format in addressing comments in the next EDR, although the Responses to Comments should pay particular attention to increased specificity, where necessary.

The majority of comments received on the 2006 EDR focused on air quality and noise related issues, including measurement of noise, modeling of noise contours, and noise abatement. In addition to responding to these comments, the 2007 EDR and future EDRs should also continue to report on the refinements to noise tracking and abatement efforts. Massport should consult directly with individual commentors where necessary.

Organization of the Certificate

I have organized the remainder of this Certificate to respond to issues raised roughly in the order in which they were presented in the 2006 EDR, although I have for the most part incorporated discussion of issues raised in the technical appendix into the discussion of the environmental impact analyses.

Activity Levels

The Activity Levels chapter provides a solid analysis of major activity issues and the technical appendix contains useful and detailed information. This chapter presents aviation activity statistics for Logan Airport in 2006 and compares activity levels to the prior year including air passengers, aircraft operations, fleet mix, and cargo/mail volumes. Air passenger traffic at Logan Airport reached 27.7 million, up from 27.1 million in 2005. The total number of aircraft

operations decreased in 2006 even though the total number of air passengers increased because airlines increased the number of passengers per aircraft operation. Specifically, the total number of aircraft operations declined from 409,066 in 2005 to 406,119 in 2006 which is a decrease of 0.7 percent. Air cargo volumes continued to decline from 728 million pounds in 2005 to 679 million pounds in 2006 with the largest volume decrease in the express/small packages. I advise Massport to consider and attempt to address all comments related to activity levels in the next 2007 EDR.

Planning

The Airport Planning chapter provides an overview of planning, construction, and permitting activities that occurred at Logan Airport in 2006. It also describes known future planning, construction, and permitting activities. Specifically, several projects were completed in 2006. The new Terminal A, which opened on March 16, 2005, achieved Leadership in Energy and Environmental Design (LEED) certification in June 2006. It is the first airport terminal in the U.S. to earn this ranking. In addition, in November, 2006 the MBTA Silver Line service was enhanced with the addition of the Massachusetts Bay Transportation Authority's (MBTA) Charlie Card automatic fare collection kiosks in all Logan Airport terminals. Several construction projects were also completed, including the construction of the North Service Road (SR-2) Roadway Buffer, which consists of a sidewalk linking the Blue Line Airport Station to Logan Airport Terminals, and a landscaped area adjacent to the sidewalk. Construction of Phase 1 of the Southwest Service Area (SWSA) buffer, which began in 2005, was completed in the fall of 2006, and the Navy Fuel Pier Edge Buffer was completed in December 2006.

Regional Transportation

This chapter describes activity levels at New England's regional airports in 2006 and updates recent planning activities. Massport has demonstrated that it is coordinating its planning with other transportation agencies, and that this planning effort is aimed at minimizing cumulative impacts from Logan Airport operations. The 2006 EDR includes estimates of potential passenger diversions from Logan, and outlines how Massport planning encourages those diversions.

In general, the 2006 EDR has met the requirements laid out in the ESPR Certificate. The directives in the ESPR Certificate were laid out to have Massport look at potential diversions, and explain how its planning and coordination with other agencies could impact potential diversions. The 2006 EDR has performed this task.

Overall, the number of air passengers utilizing New England's primary commercial service airports in 2006 declined marginally, from 48.0 million to 47.9 million. When measured by the number of aircraft operations, however, activity levels fell by 4.4 percent, from 1.4 million operations to 1.3 million operations. This reflects substantial changes in the commercial aviation sector and the continued decline of general aviation (GA) noted in the 2005 EDR. Major airlines reduced capacity at the regional airports in 2006 as they reconfigured their operations in an effort to consolidate gains made in bankruptcy and near-bankruptcy restructuring. Passenger declines were generally consistent with capacity reductions. In addition, the average aircraft size of scheduled flights to the regional airports declined in 2006 as airlines substituted regional jet service for mainline jets on certain routes. Declines in GA activity in New England (declined by 4.2 percent from 2005 levels) continue to outpace declines in the rest of the country. According to the FAA as reported in the 2006 EDR, GA activity declined by 1.3 percent nationally in 2006, largely due to rising fuel costs.

Ground Transportation

The 2006 EDR serves its purpose of updating 2006 ground access conditions on the airport, and has also adequately addressed the larger ground access issues identified in previous Certificates, as discussed below.

This chapter reports on transit ridership, roadways, traffic volumes, and parking for 2006. Specifically, ground transportation activity levels increased across the board from 2005 to 2006 as a result of a 2.4 percent increase in the number of air passengers. Also, a portion of I-90 connecting the City of Boston and areas to the south and west of Boston to Logan Airport was closed from July 2006 until early 2007, which is believed to have reduced traffic flows to and from the Airport. The 2006 EDR reports that ridership on the MBTA, Logan Express, water transportation, scheduled and unscheduled HOV Services, and taxis increased in 2006. This is due in part to the completion of roadway and other construction projects at the Airport, and to the closure of the I-90 connector to the Airport for much of 2006. Massport-subsidized service provided by the C & J Bus Company began in 2006 providing early morning transportation between New Hampshire and Logan Airport. The 2006 EDR also reports that the number of on-Airport parkers decreased by 8.4 percent in 2006.

Noise

The Noise Abatement chapter updates the status of the noise environment at Logan Airport in 2006, and describes Massport's efforts to reduce noise levels. The technical appendix contains useful and detailed information, while the main text provides a solid analysis of major noise issues. Many of the issues raised in the noise analysis are ongoing and require continuous monitoring a point raised by several commenters. The EDR represents an appropriate forum to serve this updating function.

In 2006, the overall number of people exposed to Day-Night Sound Level (DNL) values greater than 65 decibels (dB) decreased in 2006 compared to 2005. An estimated 5,583 people were exposed to DNL levels greater than 65 dB in 2006, compared to 6,477 in 2005, and 9,438 in 2004. For the second year in a row, fewer than 7,000 people experienced levels of 65 dB DNL and above. The 2006 Cumulative Noise Index (CNI) of 152.6 Effective Perceived Noise Level (EPNdB) remained well below the cap of 156.5 EPNdB. The CNI decreased compared to 2005

primarily because of decreased use of recertificated aircraft by cargo operators.

Massport provided sound insulation for 857 residential dwelling units in 2006. This is the largest number of units to receive sound insulation in the vicinity of the Airport in any one year since the beginning of the program. Since the program's inception, Massport has sound insulated a total of 9,943 dwelling units. The majority of the units insulated in 2006 were in Chelsea.

The information in this chapter is very informative and I encourage Massport to continue with its updates in the 2007 EDR. I also strongly advise Massport to consider and address the comments received that have raised noise related concerns.

Air Quality

The Air Quality/Emissions Reduction chapter provides an overview of airport-related air quality issues in 2006 and efforts to reduce emissions.

The emissions inventory results are driven largely by improvements to the FAA Emissions and Dispersion Modeling System (EDMS), v5.0.1. These include the addition of aircraft main engine startup VOC emissions; adjustments to how aircraft performance profiles are modeled, which changed aircraft times-in-mode and thus emissions of all pollutants; an advanced method to calculate aircraft PM10/PM2.5 emissions; and updated ground support equipment (GSE) emission factors using NONROAD2005. The in-place air quality initiatives at Logan Airport and other ongoing efforts by Massport to minimize emissions also played a role, as did changes to aircraft taxi time, fleet mix, and number of operations.

The 2006 EDR reports that emissions inventory changes show an increase in VOC over 2005 levels attributed to the changes to EDMS. The 2006 EDR reported that total VOC emission number is up 34 percent (1,724 kg/day). The total NO_x emissions were one percent lower than reported in the 2005 EDR. In 2006, NOx emissions at Logan Airport were approximately 677 tons per year (tpy) lower than the 1999 threshold level established by Massport's Air Quality Initiative. This represents a 28 percent decrease since1999. There was a continuing trend of decreasing NO2 concentrations at both the Massport and Massachusetts Department of Environmental Protection (MDEP) monitoring sites located in the general vicinity of Logan Airport. In addition, in 2006 the annual NO2 concentrations at all monitoring locations were well below the NO2 air quality standards.

For the second year (2005 EDR was the first year), estimates of particulate matter emissions associated with Logan Airport are reported in this 2006 EDR in response to the recent availability of an FAA-approved method for computing particulate matter emission factors for aircraft. The total CO decreased 15 percent and the total PM_{10} /$PM_{2.5}$ decreased seven percent below the 2005 EDR reported numbers.

The 2006 EDR emissions inventory analysis used the actual aircraft fleet mix, except in the few instances where aircraft/engine types or combinations were not available in the EDMS database. Data included aircraft type, engine, landing and takeoff operations (LTOs) and aircraft taxi times. Aircraft types are divided into four categories: commercial air carriers, commuter aircraft, general aviation and cargo.

The 2007 EDR should continue updates on the information presented in the 2006 EDR and address comments received related to air quality. In particular the City of Boston has raised several concerns the Massachusetts Department of Public Health's (DPH) Logan Airport Health Study and the air quality monitoring study. The 2007 EDR should update the status of discussions with the City of Boston related to this concern.

Last, I ask that Massport consult with the MEPA office regarding the recently promulgated Greenhouse Gas Emissions Policy and Protocol prior to subsequent filings.

Water Quality/Environmental Compliance

This chapter describes Massport's ongoing environmental management activities including NPDES compliance, stormwater, fuel spills, activities under the Massachusetts Contingency Plan, and tank management. Specifically, Logan Airport experienced 92 hazardous material spills in 2006, 11 (12 percent) were considered reportable (i.e., over 10 gallons) under the applicable environmental regulations. Jet fuel spills accounted for 65 (71 percent) of the total spills, with nine of the jet fuel spills exceeding 10 gallons. The remaining 27 spills (29 percent) involved gasoline, hydraulic oil, diesel fuel, and other substances, including two reportable spills.

In 2006, only four of 332 outfall samples exceeded the regulatory limits. The West Outfall and the Maverick Street Outfall each had one sample which exceeded the 15 milligrams per liter (mg/L) National Pollutant Discharge Elimination System (NPDES) limit for oil and grease. The North Outfall had two samples which exceeded the 0.3 milliliters per liter (ml/L) daily maximum limit for settable solids. This is an improvement compared to 2005, when eight samples exceeded the regulatory limits. In accordance with the Massachusetts Contingency Plan (MCP), Massport continues to assess, remediate, and bring to regulatory closure areas of subsurface contamination. In 2006, two of its five MCP sites were closed out, and Massport was working towards achieving regulatory closure of the three remaining MCP sites. In accordance with the Massachusetts Contingency Plan (MCP), Massport should continue to report in the 2007 EDR how Massport will assess, remediate, and bring to regulatory closure areas of subsurface contamination.

Sustainability at Logan Airport

This chapter describes Massport's airport wide sustainability goals. In October 2000, the Massport Board approved an Authority-wide Environmental Management Policy, which articulates Massport's commitment to protect the environment and to implement sustainable

design principles. In October 2004, the Massport Sustainability Team produced the *Massachusetts Port Authority Sustainability Plan* (Sustainability Plan). The Environmental Management Policy is incorporated in the Sustainability Plan as Massport's long-term sustainability goal or vision.

This chapter describes Massport's continued efforts including Massport-wide sustainability and details how sustainability is incorporated into many aspects of Massport's activities: Planning and Design; Construction; Operations, Maintenance and Management; and Monitoring of Environmental Performance.

Massport has been a leader in sustainable development. Terminal A, which opened in 2005, received LEED certification in 2006. It is the first airport terminal in the country to receive such certification, and is a model for other airports in the country. In addition, in an effort to reduce air pollutants, Massport is phasing in alternative fuel vehicles in place of conventionally-fuel vehicles. At the airport, Massport maintains electric vehicles infrastructure, as well as a privately operated CNG station to power newer vehicles. The information in this chapter is very informative and I encourage Massport to continue with its updates in the 2007 EDR.

November 1, 2007
Date

Ian A. Bowles

Comments Received:

10/24/07	Nancy Timmerman
10/25/07	Stephen Kaiser
10/26/07	**Town of Lincoln**, Lincoln Board of Selectmen
10/31/07	City of Boston's Environment Department
10/31/07	The Boston Harbor Association

IAB/ACC/acc

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October 31, 2008

CERTIFICATE OF THE SECRETARY OF ENVIRONMENTAL AFFAIRS
ON THE
2007 LOGAN AIRPORT ENVIRONMENTAL DATA REPORT

PROJECT NAME	: 2007 Environmental Data Report
PROJECT MUNICIPALITY	: Boston / Winthrop
PROJECT WATERSHED	: Boston Harbor
EOEA NUMBER	: 3247
PROJECT PROPONENT	: Massachusetts Port Authority
DATE NOTICED IN MONITOR	: September 24, 2008

As Secretary of Executive Office of Energy and Environmental Affairs (EEA), I hereby determine that the Environmental Data Report submitted on this project **adequately and properly complies** with the Massachusetts Environmental Policy Act (G. L. c. 30, ss. 61-62I) and with its implementing regulations (301 CMR 11.00).

The environmental review process at Logan Airport has been structured to occur on two levels: airport-wide and project-specific. The Environmental Status and Planning Report (ESPR) has evolved from a largely retrospective status report on airport operations to a broader analysis that also provides a prospective assessment of long range plans. It has thus become (consistent with the objectives of the MEPA regulations) part of Massport's long range planning. In recognition of the increased role of planning in the Generic Environmental Impact Report (GEIR) process, the name of the document was changed to ESPR. The ESPR provides a "big picture" analysis of environmental impacts associated with current and anticipated levels of activities, and presents an overall mitigation strategy aimed at avoiding increases in such impacts. The ESPR analysis is supplemented by (and ultimately incorporates) the detailed analyses and mitigation commitments of project-specific EIRs. The ESPR is currently updated on a 5-year basis, with much less detailed Environmental Data Reports (EDR) (formerly Annual Updates) filed in the years between ESPRs. The 2007 EDR is the subject of this Certificate.

In general, the EDR has fulfilled its purpose of providing a "snapshot" of year 2007 passenger and impact levels at Logan Airport. Most environmental parameters showed improvement in calendar year 2007. In particular, the technical studies in the 2007 EDR included reporting on and analysis of key indicators of airport activity levels, airport planning, the regional transportation system, ground access, noise, air quality, environmental management, and project mitigation tracking. Mitigation of noise impacts and air quality remain key concerns both of this office and the commenters. These commitments take the form of project-specific Section 61 Findings, as well as more general mitigation that has emerged from the ESPR process.

Background

In 1979, the Secretary of the Executive Office of Environmental Affairs issued a Certificate requiring Massport to define, evaluate, and disclose, every three years, the impact of long-term growth at the airport through a Generic Environmental Impact Report (GEIR). The Certificate also required the submission of interim Annual Updates to provide data on conditions for the years between the GEIRs. The GEIR provided projections of environmental conditions where the cumulative effects of individual projects could be understood. The Secretary's Certificate on the *1997 Annual Update* proposed a revised environmental review process for Logan Airport. As a result, Massport evaluates the cumulative impacts associated with airport activities through preparation of an ESPR every five years and provides data updates annually through the EDRs.

Review of the 2007 EDR

As always, EEA remains committed to evaluating and addressing the cumulative impacts of airport operations on the nearby communities. In June 2001, Massport agreed to work with EEA on structuring a proposed Air Quality Initiative (AQI). The Certificate indicated that Massport was "to solicit project submissions from local governments and community groups, which will be reviewed in an objective, science-based process by a neutral organization such as NESCAUM." The 2007 EDR reiterates that Massport has committed to the Air Quality Initiative, a key program designed to mitigate the cumulative air quality impacts of airport operations. The 2007 EDR details how Massport is meeting this commitment. The 2008 EDR should continue to report on the details of Massport's commitment and address the concerns raised by the commenters on this issue. In addition to the environmental issues listed below, the 2008 EDR should address all of the air quality and noise related issues raised by the commenters during the review of the 2007 EDR.

Procedural for 2008 EDR

Given the overall strength of the analysis in the 2007 EDR, the 2008 EDR can restrict itself to providing an update on 2008 conditions, and respond to those issues explicitly noted in this Certificate and the comments received as requiring response in the next EDR. The EDR should provide a "snapshot" of the 2008 operations and impacts, with more substantial analysis awaiting the next ESPR. Massport should file the 2008 EDR no later than October 15, 2009 (although I encourage Massport to file sooner).

A distribution list for the 2008 EDR (indicating those receiving documents, CDs, or Notices of Availability) should be provided in the document. This section must also include copies of all ESPR and EDR Certificates issued since the 2004 Logan Environmental Status and Planning Report (issued on August 16, 2006) to provide context for reviewers. Supporting technical appendices should be provided as necessary.

Responses to Comments

The comments received on the 2007 EDR are thoughtful and detailed. The 2008 EDR must include Responses to Comments which addresses all of the substantive comments from the letters listed at the end of this Certificate. The Response to Comments included in this EDR is well-constructed and cross-referenced. Massport may follow the same format in addressing comments in the next EDR, although the Responses to Comments should pay particular attention to increased specificity, where necessary.

The majority of comments received on the 2007 EDR focused on air quality and noise related issues, including measurement of noise, modeling of noise contours, and noise abatement. In addition to responding to these comments, the 2008 EDR and future EDRs should also continue to report on the refinements to noise tracking and abatement efforts. Massport should consult directly with individual commentors where appropriate.

Organization of the Certificate

I have organized the remainder of this Certificate to respond to issues raised roughly in the order in which they were presented in the 2007 EDR, although I have for the most part incorporated discussion of issues raised in the technical appendix into the discussion of the environmental impact analyses.

Activity Levels

The Activity Levels chapter provides a solid analysis of major activity issues and the technical appendix contains useful and detailed information. This chapter presents aviation activity statistics for Logan Airport in 2007 and compares activity levels to the prior year including air passengers, aircraft operations, fleet mix, and cargo/mail volumes. In 2007, the total number of air passengers reached 28.1 million, up from 27.7 million in 2006. The increase in the total number of air passengers at Logan Airport was 1.4 percent compared to 2.4 percent in the previous year. Specifically, the total number of aircraft operations declined from 406,119 in 2006 to 399,537 in 2007, a decrease of 1.6 percent. Operations by general aviation (GA) aircraft

decreased most significantly (8.9 percent) in 2007 as compared to passenger and cargo operations. As a result of continued passenger growth and a reduction in operations, the number of air passengers per aircraft operation continued to increase in 2007. Air cargo volumes, continued to decline from 679 million pounds in 2006 to 632 million pounds in 2007. In addition to reporting the analysis of major activity issues, I advise Massport to consider and attempt to address all comments related to activity levels in the 2008 EDR.

Planning

The Airport Planning chapter provides an overview of planning, construction, and permitting activities that occurred at Logan Airport in 2007. It also describes known future planning, construction, and permitting activities. Several projects were completed in 2007 including the International Gateway Project (Terminal E) Phase 2. The Federal Inspection Services (FIS) facility was enlarged and the new arrivals level was constructed with the other Phase 2 improvements. The replacement GA Facility in the North Cargo Area was completed and opened in June, 2007 and the southwest corner of Taxiway D was realigned. In addition, the Terminal Area Roadway Landscaping was completed in 2007 and significant portions of Bremen Street Park were completed in early 2007. Also Phase II of the West Garage Project was completed which added three levels of parking to the Central Garage.

Regional Transportation

In general, the 2007 EDR has met the requirements laid out in the ESPR Certificate with respect to regional transportation issues. This chapter describes activity levels at New England's regional airports in 2007 and updates recent planning activities. Massport has demonstrated that it is coordinating its planning with other transportation agencies, and that this planning effort is aimed at minimizing cumulative impacts from Logan Airport operations. The 2007 EDR includes estimates of potential passenger diversions from Logan, and outlines how Massport planning encourages those diversions. The total number of air passengers using New England's primary commercial service airports in 2007 increased marginally, from 47.13 million in 2006 to 47.2 million. Of the 47.2 million air passengers using New England's primary commercial service airports in 2007, 60 percent utilized Logan Airport as compared to 88 percent in 1995. When measured by the number of aircraft operations, activity levels fell by 2.1 percent, from 1.33 million operations in 2006 to 1.31 million operations in 2007.

The directives in the ESPR Certificate were laid out to have Massport look at potential diversions, and explain how its planning and coordination with other agencies could impact potential diversions. The 2007 EDR has performed this task. I direct Massport to continue the directive from the ESPR Certificate for the 2008 EDR.

This chapter also reflects that passenger traffic at the regional airports fell by 1.6 percent. Major airlines reduced capacity at the regional airports in 2007 because they eliminated unprofitable routes and reduced their domestic flying to deal with the high and rising cost of fuel. Passenger declines were generally consistent with capacity reductions. Declines in GA activity in New England (declined by 3.5 percent compared with 2.6 percent nationally in 2007) continue to outpace declines in the rest of the country, which is largely attributed to the impact of rising fuel costs on recreational flying.

Ground Transportation

The 2007 EDR serves its purpose of updating 2007 ground access conditions on the airport, and has also adequately addresses the updating of the three new programs to support employees' use of alternative transportation options.

This chapter reports on transit ridership, roadways, traffic volumes, and parking for 2007. Specifically, ground transportation activity levels increased across the board from 2006 to 2007 as a result of a 1.4 percent increase in the number of air passengers. The re-opening of Interstate 90 (I-90) connecting the City of Boston and areas to the south and west of Boston to Logan Airport resulted in increased traffic flows to and from the Airport when compared to previous years. The 2007 EDR reports that ridership on water transportation, scheduled and unscheduled high occupancy vehicle (HOV) services, and employee ridership on Logan Express increased over 2005 levels. The 2007 EDR also reports that the number of on-Airport parkers decreased by 16.9 percent in 2007 compared to 2005. A portion of this decrease is likely due to the increase of pick-up and drop-off at the Airport.

I also note that this chapter discusses that the Logan Employee Transportation Management Association (Logan TMA) introduced and implemented three new programs to support employees' use of alternative transportation options: the Sunrise Shuttle, which provides shuttle services between 3:00 AM and 5:30 AM for Airport employees who reside in East Boston; the Logan TMA Preferential Carpooling, which provides free terminal garage parking to employees in Logan TMA member companies who carpool in groups of three or more; and the Commuter Cash program, which financially rewards employees ($3/day) who switch from driving alone to either carpooling, bicycling, walking, or using public transportation. The 2008 EDR should continue to update 2008 ground access conditions on the airport and report on the use of the three new programs to support employees' use of alternative transportation options.

Noise

The Noise Abatement chapter updates the status of the noise environment at Logan Airport in 2007, and describes Massport's efforts to reduce noise levels. The technical appendix contains useful and detailed information, while the main text provides a solid analysis of major noise issues. Many of the issues raised in the noise analysis are ongoing and require continuous monitoring, a point raised by several commenters. The future 2008 EDR represents an appropriate forum to serve this updating function.

2007 was the first full year of operation for Runway 14-32. Consistent with the 2002 Record of Decision (ROD) on the Airside Improvements Planning Project and based on FAA data, the runway was used primarily for arrivals over Boston Harbor during 2007. Consistent with historical patterns, despite the introduction of Runway 14-23, the FAA continued to rely on Logan Airport's north-south traffic flow in 2007. However, within the north-west flow, the FAA increased reliance on Runway 33L for departures with an associated reduction in Runway 27 departures. The changes in runway utilization in 2007 have led to changes in the noise environment. Since 2006, the noise contours over East Boston increased in extent and, over the same period, decreased over South Boston, Revere, and Winthrop.

The population within the 75-80 decibel (dB) DNL contours decreased in 2007 compared to 2006. In 2006, the population in the 75-80 dB DNL contour was 104 but in 2007 zero population was located in this coutour. In 2006, the population in the 70-75 dB DNL contour was 597 compared to 416 in 2007. The overall number of people exposed to Day-Night Sound Level (DNL) values greater than 65 decibels (dB) increased 36 percent compared to 2006. An estimated 7,591 people were exposed to DNL levels greater than 65 dB in 2007, compared to 5,583 in 2006. This is still well below the pre-September 11, 2001, level of 17,745. The residences exposed to DNL levels greater than 65 dB in 2007 are located within the 65 dB sound insulation contour, and thus are within areas that have been sound insulated by Massport. The comments from the Boston Transportation Department, the City of Cambridge as well as from individuals such as Mr. Peter Koff and Ms. Nancy Timmerman have raised a number of concerns and suggestions related to noise that Massport should consider incorporating into the 2008 EDR.

In 2007, Massport provided sound insulation to 548 homes, the majority of which were in Chelsea. Since the inception of Massport's Sound Insulation program, 10,461 homes in East Boston, South Boston, Winthop and Chelsea have received sound insulation.

The information in this chapter is very informative and I encourage Massport to continue with its updates in the 2008 EDR. I also strongly advise Massport to consider and address the comments received that have raised noise related concerns.

Air Quality

The Air Quality/Emissions Reduction chapter provides an overview of airport-related air quality issues in 2007 and efforts to reduce emissions. The emissions inventory results were driven largely by three factors: changes in the aircraft fleet mix at the Airport (the airlines' substitution of select narrow-body aircraft with wide-body and commuter aircraft); the reported change in the aircraft average taxi/delay times at Logan Airport; and continual improvements to the FAA Emissions and Dispersion Modeling System (EDMS), v5.0.2, particularly in regard to the advanced method for calculating particulate matter (PM) emissions from aircraft engines. Because of the changes to the EDMS model, total modeled emissions of PM10/PM2.5 associated with Logan Airport in 2007 appeared to have increased by approximately 64 percent to 128 kilograms per day (kg/day) compared to 2006 levels. By comparison, using the EDMS version available in 2006 (v5.0.1) total emissions of PM10/PM2.5 would have increased by approximately 5 percent to 82 kg/day due to a combination of changes in aircraft fleet mix and aircraft taxi/delay time. This data shows that the estimated increase in PM10/PM2.5 was due mostly to the updated EDMS model and not the result of significant changes in Airport operations. Nonetheless, the increases in modeled emissions are notable and I encourage Massport to revisit all feasible efforts to mitigate PM10/PM2.5 emmissions.

The 2007 EDR reports that the total emissions of volatile organic compounds (VOC) were 1,673 kg/day, or 3 percent lower than 2006 levels. Total emissions of carbon monoxide (CO) were 9,233 kg/day, or 13 percent higher than 2006 levels. Total emissions of oxides of nitrogen (NOX) were 4,457 kg/day, or 7 percent higher than 2006 levels. In 2007, total NOx emissions at Logan Airport were approximately 541 tons per year lower than the 1999 Air Quality Initiative (AQI) benchmark which represents a 27 percent decrease in NOx emissions at Logan Airport since 1999. There was also a continuing trend of decreasing nitrogen dioxide (NO2) concentrations at both the Massport and Massachusetts Department of Environmental Protection (MA DEP) monitoring sites located in the general vicinity of Logan Airport. In addition, the annual NO2 concentrations at all monitoring locations in 2007 were within the NO2 Air Quality Standards.

In the 2007 EDR Massport for the first time has voluntarily submitted its first emission inventory of greenhouse gas (GHG) emissions directly and indirectly associated with Logan Airport. "Direct emissions" are those that occur in areas located within the Airport's geographic boundaries and "indirect emissions" are those that occur off the Airport site. "Direct" GHG emissions associated with Logan Airport in 2007 were 0.37 million metric tons (MMT), and the sum of "direct" and "indirect" emissions was 0.69 MMT (less than 0.1 percent of state-wide totals). Massport has control of only 18 percent of these combined totals and will implement plans by 2009 to reduce further GHGs associated with its operations at Logan Airport helping minimize the Airport's carbon footprint.

The 2008 EDR should continue updates on the information presented in the 2007 EDR and address comments received related to air quality. In particular the Mr. Peter Koff has raised several concerns related to air quality monitoring and the Massachusetts Department of Public Health's (DPH) Logan Airport Health Study. The 2008 EDR should clarify this issue and update the status of any air quality monitoring related to this concern.

Water Quality/Environmental Compliance

This chapter describes Massport's ongoing environmental management activities including NPDES compliance, stormwater, fuel spills, activities under the Massachusetts Contingency Plan, and tank management.

I note on July 31, 2007, the Environmental Protection Agency (EPA) and MA DEP issued a new National Pollutant Discharge Elimination System (NPDES) Program permit for Logan Airport's stormwater outfalls. The new NPDES permit regulates stormwater discharges from the North, West, Northwest, Porter Street, and Maverick Street Outfalls, and all of the airfield outfalls. The previous NPDES permit regulated stormwater discharges only from the North, West, Porter Street, and Maverick Street Outfalls. The new NPDES permit also has additional sampling requirements, including the requirement to sample for deicing compounds. In 2007, three of 404 outfall samples exceeded the regulatory limits contained in the NPDES permit. The Maverick Street Outfall had two samples exceed the 100 milligrams per liter (mg/L) daily maximum limit for Total Suspended Solids (TSS) and the West Outfall had one sample exceed this limit. This is an improvement compared to 2004 and 2006 when four samples exceeded the regulatory limits, and 2005 when eight samples exceeded the regulatory limits.

In 2007, Massport completed an update to the Airport's Stormwater Pollution Prevention Plan (SWPPP). The SWPPP addresses stormwater pollutants in general, and also addresses deicing and anti-icing chemical, potential bacteria, fuel and oil, and other sources of stormwater pollutants. Best management practices (BMPs) are included in the SWPPP. Also in accordance with the Massachusetts Contingency Plan (MCP), Massport continued to assess, remediate, and bring to regulatory closure areas of subsurface contamination. In 2007, Massport worked towards achieving regulatory closure of six remaining MCP sites. Massport should continue to report in the 2008 EDR how Massport will assess, remediate, and bring to regulatory closure areas of subsurface contamination.

Sustainability at Logan Airport

This chapter describes Massport's airport wide sustainability goals. In October 2000, the Massport Board approved an Authority-wide Environmental Management Policy, which articulates Massport's commitment to protect the environment and to implement sustainable design principles. In October 2004, the Massport Sustainability Team produced the *Massachusetts Port Authority Sustainability Plan* (Sustainability Plan). The Environmental Management Policy is incorporated in the Sustainability Plan as Massport's long-term sustainability goal or vision.

This chapter describes Massport's continued efforts including Massport-wide sustainability and details how sustainability is incorporated into many aspects of Massport's activities: Planning and Design; Construction; Operations, Maintenance and Management; and Monitoring of Environmental Performance which are detailed in this chapter. The replacement GA Facility in the North Cargo Area, which was constructed in early 2007 and opened in June 2007, is an example of planning and design sustainability initiatives being undertaken at Logan Airport. The new GA Facility incorporates sustainable design, construction, and operational elements. On the operations and maintenance in 2007, Massport created preferred parking areas in garages and parking areas throughout Logan Aiport to promote use of lower emitting vehicles. In cooperation with the City of Boston, in the spring of 2007, Massport began a limited head-of-line privilege program for taxis using AFVs, helping to increase the use of alternatively-powered taxis. Additionally, in 2007, Massport created a Cell Phone Waiting Lot, a new parking area where drivers picking up arriving passengers can park for a maximum of 30 minutes. The information in this chapter is very informative and I encourage Massport to continue with its updates in the 2008 EDR.

Conclusion

As I stated at the beginning of this Certificate, the 2008 EDR must provide responses to the issues raised in comments received. The 2008 EDR must include a copy of this Certificate and a copy of each comment letter received on the 2007 EDR. In particular, Massport should provide a thorough examination of issues raised regarding individual noise monitoring locations, noise measurement and modeling, noise abatement, and air quality issues. Massport should consult directly with individual commentors where appropriate.

October 31, 2008
Date

Ian A. Bowles

Comments Received:

10/20/2008	Boston Transportation Department
10/20/2008	Peter L. Koff, Engel & Schultz, LLP
10/24/2008	Stephen H. Kaiser, PhD
10/27/2008	City of Cambridge, Robert Healy, City manager
10/28/2008	Nancy Timmerman

IAB/ACC/acc

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November 13, 2009

CERTIFICATE OF THE SECRETARY OF ENVIRONMENTAL AFFAIRS
ON THE
2008 LOGAN AIRPORT ENVIRONMENTAL DATA REPORT

PROJECT NAME	: 2008 Environmental Data Report
PROJECT MUNICIPALITY	: Boston / Winthrop
PROJECT WATERSHED	: Boston Harbor
EOEA NUMBER	: 3247
PROJECT PROPONENT	: Massachusetts Port Authority
DATE NOTICED IN MONITOR	: October 7, 2009

As Secretary of Executive Office of Energy and Environmental Affairs (EEA), I hereby determine that the Environmental Data Report submitted on this project **adequately and properly complies** with the Massachusetts Environmental Policy Act (G. L. c. 30, ss. 61-62I) and with its implementing regulations (301 CMR 11.00).

The environmental review process at Logan Airport has been structured to occur on two levels: airport-wide and project-specific. The Environmental Status and Planning Report (ESPR) has evolved from a largely retrospective status report on airport operations to a broader analysis that also provides a prospective assessment of long range plans. It has thus become (consistent with the objectives of the MEPA regulations) part of Massport's long range planning. The ESPR provides a "big picture" analysis of environmental impacts associated with current and anticipated levels of activities, and presents an overall mitigation strategy aimed at avoiding increases in such impacts. The ESPR analysis is supplemented by (and ultimately incorporates) the detailed analyses and mitigation commitments of project-specific EIRs. The ESPR is currently updated on a 5-year basis, with less detailed Environmental Data Reports (EDR) (formerly Annual Updates) filed in the years between ESPRs. The EDR addressing airport operations during 2008 is the subject of this Certificate.

In general, the EDR has fulfilled its purpose of providing a "snapshot" of year 2008 passenger and impact levels at Logan Airport. Most environmental parameters showed improvement in calendar year 2008. In particular, the technical studies in the 2008 EDR included reporting on and analysis of key indicators of airport activity levels, airport planning, the regional transportation system, ground access, noise, air quality, environmental management, and project mitigation tracking. Mitigation of noise impacts and air quality remain key concerns both of this office and the commenters. These commitments take the form of project-specific Section 61 Findings, as well as more general mitigation that has emerged from the ESPR process.

Background

In 1979, the Secretary of the Executive Office of Environmental Affairs issued a Certificate requiring Massport to define, evaluate, and disclose, every three years, the impact of long-term growth at the airport through a Generic Environmental Impact Report (GEIR). The Certificate also required the submission of interim Annual Updates to provide data on conditions for the years between the GEIRs. The GEIR provided projections of environmental conditions where the cumulative effects of individual projects could be understood. The Secretary's Certificate on the *1997 Annual Update* proposed a revised environmental review process for Logan Airport. As a result, Massport evaluates the cumulative impacts associated with airport activities through preparation of an ESPR every five years and provides data updates annually through the EDRs.

The last Logan ESPR was filed for calendar year 2004. Following the recent sequence of annual environmental filings, the environmental filing scheduled for next year was previously anticipated to be in the form of an ESPR rather than an EDR. However, due to the current economic downturn, as described in this 2008 EDR, activity levels at Logan Airport and associated environmental impacts continue to remain well below historic levels and recent peaks. In 2009, near-term activity levels and associated environmental effects are also expected to remain well below levels previously analyzed for Logan Airport. Thus, the forecasted aviation growth presented in the 2004 ESPR, the predicate upon which the ESPR schedule was initially established, has not occurred. Therefore, I will allow Massport to prepare a 2009 EDR in lieu of the scheduled ESPR. The 2009 EDR should address the activity levels observed in 2009 in comparison with those predicted in the 2004 ESPR. The 2009 EDR should explain Massport's proposed schedule for filing the next ESPR in light of observed and expected activity levels and any other changes in airport operations that have occurred since the 2004 ESPR was filed. Where appropriate, Massport must continue to identify and address any longer term aviation and environmental trends in each annual filing whether that will be in the form of an EDR or ESPR.

Review of the 2008 EDR and Scope for the 2009 EDR

Procedural for 2009 EDR

The 2009 EDR must provide an annual update on conditions at Logan Airport for calendar year 2009. The 2009 EDR should continue to serve as a background/context against which projects at Logan Airport can be evaluated. It should also report on the cumulative effects of Logan Airport operations and activities, compared to 2008.

The 2009 EDR must respond to those issues explicitly noted in this Certificate and the comments received in the next EDR. The EDR should provide a "snapshot" of the 2009 operations and impacts, with more substantial analysis awaiting the next ESPR. Massport should file the 2009 EDR no later than October 15, 2010.

A distribution list for the 2009 EDR (indicating those receiving documents, CDs, or Notices of Availability) should be provided in the document. This section must also include copies of all ESPR and EDR Certificates issued since the 2004 Logan Environmental Status and Planning Report (issued on August 16, 2006) to provide context for reviewers. Supporting technical appendices should be provided as necessary.

Responses to Comments

The comments received on the 2008 EDR are thoughtful and detailed. The 2009 EDR must include Responses to Comments which addresses all of the substantive comments from the letters listed at the end of this Certificate. The Response to Comments included in this EDR is well-constructed and cross-referenced. Massport may follow the same format in addressing comments in the next EDR, although the Responses to Comments should pay particular attention to increased specificity, where necessary.

The majority of comments received on the 2008 EDR focused on air quality and noise related issues, including measurement of noise, modeling of noise contours, and noise abatement. In addition to responding to these comments, the 2009 EDR and future EDRs should also continue to report on the refinements to noise tracking and abatement efforts. Massport should consult directly with individual commentors where appropriate.

Organization of the Certificate

I have organized the remainder of this Certificate to respond to issues raised roughly in the order in which they were presented in the 2008 EDR, although I have for the most part incorporated discussion of issues raised in the technical appendix into the discussion of the environmental impact analyses.

Activity Levels

The Activity Levels chapter provides a solid analysis of major activity issues and the technical appendix contains useful and detailed information. This chapter presents aviation activity statistics for Logan Airport in 2008 and compares activity levels to the prior year including air passengers, aircraft operations, fleet mix, and cargo/mail volumes. The total number of air passengers at Logan Airport dropped to 26.1 million from 28.1 million in 2007. The decrease in the total number of air passengers was 7.1 percent. In addition, the total number of aircraft operations declined from 399,537 in 2007 to 371,604 in 2008, a decrease of 7 percent. The 2008 EDR also reports that the passenger aircraft operations decreased by 6.4 percent and operations by general aviation (GA) aircraft also declined by 16.8 percent from 2007. The average domestic load factor (average number of passengers per available seat) for flights also dropped to 72.8 percent, from 74.9 percent in 2007. However, the number of air passengers per aircraft operation was similar to the previous year with an average of 70.2 passengers per aircraft operation in 2008. In response to high and rising fuel prices and declining passenger demand, both low-cost carriers (LCCs) and legacy airlines reduced the number of aircraft operations at Logan Airport. Air cargo volumes, excluding mail, continued to decline from 632 million pounds in 2007 to 588 million pounds in 2008.

For the 2009 EDR, the Activity Levels chapter should include:

- Aircraft operations, including fleet mix and scheduled airline services at Logan Airport;
- Passenger activity levels;
- Cargo and mail activities;
- A comparison of the 2009 aircraft operations, cargo/mail operations, and passenger activity levels to 2008 activity levels; and
- A report on national aviation trends in 2009 and a comparison to trends at Logan Airport.

In addition to reporting the analysis of major activity issues, I advise Massport to consider and attempt to address all comments related to activity levels in the 2009 EDR.

Planning

The Airport Planning chapter provides an overview of planning, construction, and permitting activities that occurred at Logan Airport in 2008. It also describes known future planning, construction, and permitting activities. In 2008 the replacement Signature Flight Support GA Facility in the North Cargo Area (NCA) was certified under the U.S. Green Building Council Leadership in Energy and Environmental Design (LEED) Green Building Rating System. In addition, several other projects were also completed in 2008. The southwest corner taxiway system was realigned and the northern portion of the centerfield taxiway was constructed and was operational in 2008. Also Phase 1 of the Consolidated Maintenance Facility was constructed in the NCA and Phase 2, involving rehabilitation of the existing Facilities Building Number 2, began. Massport also completed renovations of the existing gas station in the NCA, which included installing Logan Airport's first E85 fuel dispensing tank. (E85 is an alcohol fuel mixture that typically contains a mixture of up to 85 percent denatured ethanol and gasoline or other hydrocarbon.) In 2008 Massport also completed the final construction of the Bremen Street Park. In addition, a security wall was installed along the perimeter of the air operations area in the North Service Area.

For the 2009 EDR, the Airport Planning chapter should describe the status of planning initiatives for the:

- Terminal Area;
- Airside Area;
- Service and Cargo Areas; and
- Airport Buffers and Landscaping.

The chapter should also report on the status of public works projects implemented by other agencies within the boundaries of Logan Airport. Massport should continue to assess planning strategies for improving Logan Airport's operations and services in a, safe, secure, efficient, and environmentally sensitive manner.

Regional Transportation

In general, the 2008 EDR has met the requirements with respect to regional transportation issues. This chapter describes activity levels at New England's regional airports in 2008 and updates recent planning activities. Massport has demonstrated that it is coordinating its planning with other transportation agencies, and that this planning effort is aimed at minimizing cumulative impacts from Logan Airport operations. The 2008 EDR includes estimates of potential passenger diversions from Logan, and outlines how Massport planning encourages those diversions. The total number of air passengers utilizing New England's primary commercial service airports decreased from 47.2 million in 2007 to 44.4 million in 2008. This represents a passenger traffic decline of 5.9 percent. Activity levels as measured by the number of aircraft operations fell by 7.7 percent, from 1.31 million operations in 2007 to 1.21 million operations in 2008.

The decreases in passenger traffic and aircraft operations at New England airports reflect national trends in the face of volatile fuel prices and a worsening global economy. Specifically, of the 44.4 million air passengers using New England's primary commercial service airports, 59 percent of air passengers used Logan Airport in 2008 and 60 percent in 2007, as compared to 88 percent in 1995. In addition, air passenger traffic in the region fell more quickly than in the overall U.S. domestic market. As reported in the 2008 EDR, airlines introduced major reductions in operations through the year, eliminating less profitable routes and cutting frequencies in smaller markets. Fuel prices also forced airlines to ground less fuel efficient aircraft, as well as aircraft with high per seat operating costs, such as the small regional jets (with 50 seats or fewer) prevalent at the regional airports. As a result, the average number of seats per scheduled flight at the regional airports increased from 84 in 2007 to 88 in 2008. In comparison to 2007 levels, the operations by GA aircraft at New England regional airports declined by 7.6

percent. Declines in GA activity in New England also outpaced declines in the rest of the country. According to the FAA, GA activity fell by 5.6 percent nationally in 2008, due to high fuel costs resulting in a sharp decrease in recreational flying.

The directives in the ESPR Certificate were laid out to have Massport look at potential diversions, and explain how its planning and coordination with other agencies could impact potential diversions. The 2008 EDR has performed this task.

I direct Massport to continue the directive from the ESPR Certificate for the 2009 EDR. In addition, for 2009 EDR the chapter on Regional Transportation should describe Logan Airport's role in the region's intercity transportation system by reporting on the following related to Regional Airports and Regional Transportation System:

Regional Airports

- 2009 regional airport operations, passenger activity levels, and schedule data within an historical context;
- Status of plans and new improvements as provided by the regional airport authorities;
- Ground Access improvements to the regional airports; and
- The role that Worcester Regional Airport and Hanscom Field play in the regional aviation system and Massport's efforts to promote these airports.

Regional Transportation System

- Massport's efforts in strengthening the regional transportation system;
- Massport's cooperation with other transportation agencies to promote efficient regional highway and transit operations; and
- Report on metropolitan and regional rail initiatives and ridership.

Ground Transportation

The 2008 EDR serves its purpose of updating 2008 ground access conditions on the airport, and has also adequately addresses the updating of the three new programs to support employees' use of alternative transportation options.

This chapter reports on transit ridership, roadways, traffic volumes, and parking for 2008. Specifically, ground transportation activity levels associated with Logan Airport generally decreased for all surface transportation modes from 2007 to 2008 as a result of a 7 percent decline in the annual number of air passengers. In addition, the average daily traffic on Airport roadways decreased by 13 percent from 2007 to 2008, while vehicle miles traveled (VMT) decreased by 11 percent. This can be attributed directly to a decrease in annual passengers at the Airport. Air passenger ridership on Logan Express bus service also decreased by 14 percent in 2008 compared to 2007. However, Silver Line boardings at the Airport increased 5 percent. The increase in Silver Line ridership is likely due to new ridership as well as diversion from other services, such as from water transportation, limousines, and taxis. Ridership on water transportation decreased by 12 percent, limousine ridership decreased by 19 percent, and taxi dispatches decreased 9 percent.

The 2008 EDR also documented that over the past several years, transit services have seen substantial increases in employee use. In 2008, the number of employees using Logan Express increased by 7 percent. In 2008, the Logan Transportation Management Association (Logan TMA) continued the operation of three programs that were introduced in 2007: 1) Sunrise Shuttle, which provides shuttle services between 3:00 A.M. and 5:30 A.M. for Airport employees who reside in East Boston; 2) Logan TMA Preferential Carpooling, which provides free parking at the West Garage to employees of Logan TMA member companies who carpool in groups of three or more; and 3) the Commuter Cash program, which financially rewards employees ($3/day) who switch from driving alone to either carpooling, bicycling, walking, or using public transportation. The number of vehicles parked on-Airport decreased by 14 percent in 2008 compared to 2007. The most significant change to the parking supply was the 40 percent reduction of spaces in the Economy Lot due to construction activities during most of the year.

The 2009 EDR should continue to update 2009 ground access conditions on the airport and report on the use of the three new programs to support employees' use of alternative transportation options. The chapter should also report on 2009 conditions and provide a comparison of 2009 findings to those of 2008 for the following:

- High occupancy vehicle (HOV) ridership (including Blue Line, Silver Line, Scheduled, Unscheduled, Water Transportation, and Logan Express);
- Logan Airport Employee Transportation Management Association (Logan TMA) membership and services;
- Logan Airport gateway volumes;
- On-airport traffic volumes;
- On-airport vehicle miles traveled (VMT). VMT will be calculated using the updated model created in 2004 that is based on the full build roadway network;
- Parking demand and management (including rates and duration statistics); and
- Ground access management strategy.

Noise

The Noise Abatement chapter updates the status of the noise environment at Logan Airport in 2009, and describes Massport's efforts to reduce noise levels. The technical appendix contains useful and detailed information, while the main text provides a solid analysis of major noise issues. Many of the issues raised in the noise analysis are ongoing and require continuous monitoring, a point raised by several commenters. The future 2009 EDR represents an appropriate forum to serve this updating function.

The decrease in aircraft operations in 2008 led to changes in the noise environment. The 2008 Day-Night Sound Level (DNL) contours were smaller in almost all locations compared to 2007. The 65 decibel (dB) DNL contour decreased in size in East Boston pulling back from

across the Chelsea River to the East Boston waterfront. Over Winthrop and Revere, the DNL 65 dB contour decreased slightly with additional reductions out over Boston Harbor. The population exposed to noise levels greater than DNL 70 dB decreased in 2008 compared to 2007. In 2007, the population exposed to noise levels greater than DNL 70 dB was 416 but in 2008 the number dropped to 249. The overall number of people exposed to DNL values greater than 65 dB decreased 26 percent in 2008 compared to 2007. An estimated 5,968 people were exposed to DNL levels greater than 65 dB as depicted in the 2008 contour, compared to 8,099 in 2007. The residences exposed to DNL levels greater than 65 dB in 2008 are located within the 65 dB sound insulation contour, and thus are within areas that already have been sound insulated by Massport.

In 2008, Massport provided sound insulation to 388 homes, the majority of which were in Chelsea. The focus of this program in Chelsea is to fulfill federal and state mitigation commitments related to the opening of Runway 14-32. Since the inception of Massport's Sound Insulation program, 10,849 homes have received sound insulation in East Boston, South Boston, Winthrop, and Chelsea.

In 2008, Massport continued installing an improved Noise Monitoring System (NOMS). The flight tracking system and all new noise monitors were operational in 2008. Combined with new noise monitor software, the system has an improved capability of correlating measured noise events with individual flight tracks. This has greatly reduced differences between measured and modeled DNL values.

The information in this chapter is very informative and I encourage Massport to continue with its updates in the 2009 EDR. I also strongly advise Massport to consider and address the comments received that have raised noise related concerns. Several commenters have requested further explanation of the reasons for the increased use of Runway 33L for jet aircraft departures and corresponding decrease in use of Runway 27. The comments from the Boston Transportation Department, the Town of Winthrop, the City of Cambridge, as well as from individuals such as Mr. Peter Koff and Ms. Nancy Timmerman have raised a number of concerns and suggestions related to noise that Massport should incorporate into the 2009 EDR.

For 2009 the Noise Abatement chapter should provide an overview of the environmental regulatory framework affecting aircraft noise, the changes in aircraft noise, and the updates in noise modeling. The chapter should report on 2009 conditions and compare 2009 conditions to those of 2008 for the following:

- Fleet Mix, including Stage II, Recertified (Hushkitted) Stage III, newly manufactured Stage III, and any qualifying Stage IV aircraft;
- Nighttime operations;
- Runway utilization (report on aircraft and airline adherence with runway utilization goals);
- Preferential runway advisory system (PRAS) compliance; and
- Flight tracks, including a discussion of the update on the Standard Terminal Automation

Replacement System (STARS) radar and consolidation of the Boston Terminal Radar Approach Control (TRACON) at Merrimac, plus Massport's installation and use of PASSUR data.

The chapter should also report on 2009 conditions and compare those to 2008 conditions for the following noise indicators:

- Using the Federal Aviation Administration's (FAA) most current version of the Integrated Noise Model (INM), and RealContours and RealProfiles, produce an accurate set of Day-Night Sound Level (DNL) noise contours. Adjustments made to account for over-water sound propagation and the propagation of sound to areas of higher terrain will be reported;
- Noise-impacted population;
- Measured versus modeled noise values, including reasons for differences and any improvements attributable to the use of RealContours and RealProfiles;
- Cumulative Noise Index (CNI);
- Times-Above for 65, 75, and 85 dBA threshold values;
- Installation and benefits of the new noise monitoring system; and
- Flight track monitoring noise quarterly reports.

The chapter should also report on noise abatement efforts and provide a status update on the new noise and operations monitoring system.

Air Quality

The Air Quality/Emissions Reduction chapter provides an overview of airport-related air quality issues in 2008 and efforts to reduce emissions. The modeled emissions inventory results were driven principally by three factors: the lower number of aircraft operations at Logan Airport compared to 2007; the reported change in the aircraft average taxi/delay times at the Airport; and continual improvements to the FAA Emissions and Dispersion Modeling System (EDMS), v5.1, which has revised methods for calculating particulate matter (PM) and hydrocarbon (HC) emissions from aircraft engines, and has new functionality of calculating PM emissions from auxiliary power units (APUs). Because of the changes to the EDMS model and decreased air traffic, total emissions of PM10/PM2.5 associated with Logan Airport have decreased by approximately 37 percent to 81 kilograms per day (kg/day) compared to 2007 levels. By comparison, using the earlier version of EDMS total emissions of PM10/PM2.5 would have decreased by approximately 20 percent to 102 kg/day. This difference is attributed to modifications in the EDMS versions.

The 2008 EDR reports that the total emissions of volatile organic compounds (VOC) were 1,208 kg/day, or 28 percent lower than 2007 levels. The total emissions of carbon monoxide (CO) were 8,361 kg/day, or 9 percent lower than 2007 levels and the total emissions of

oxides of nitrogen (NOX) were 4,204 kg/day, or 6 percent lower than 2007 levels. In 2008, total NOx emissions at Logan Airport (net total with reductions) were approximately 656 tons per year (tpy) lower than Massport's 1999 Air Quality Index (AQI) benchmark. This represents a 28 percent decrease in NOx emissions since 1999. The 2008 EDR notes that other contributing factors to the results of the emissions inventory include the change in stationary source fuel usage, and the change in VMT and parking volumes. Air quality initiatives in place at the Airport and other ongoing efforts by Massport to minimize emissions also played a role. For example, there is a continuing trend of decreasing nitrogen dioxide (NO2) concentrations at both the Massport and Massachusetts Department of Environmental Protection (MassDEP) monitoring sites located in the general vicinity of Logan Airport since 1999. In addition, the annual NO2 concentrations at all monitoring locations in 2008 were well within the National Ambient Air Quality Standards (NAAQS) for NO2.

For the second year, Massport prepared an emission inventory of greenhouse gas (GHG) emissions directly and indirectly associated with Logan Airport. "Direct" GHG emissions are those that occur in areas located within the Airport's geographic boundaries and "indirect emissions" are those that occur off the Airport site. "Direct" GHG emissions associated with Logan Airport were 0.35 million metric tons (MMT), and the sum of "direct" and "indirect" emissions was 0.65 MMT, or less than 1 percent of statewide totals. Massport operations at Logan Airport contribute only 18 percent of these combined totals. GHG emissions in 2008 were 6 percent lower than 2007 levels.

As part of the Section 61 findings for the centerfield taxiway component, the first phase of a two-phase Massport Air Quality Monitoring Study was initiated in September 2007 at ten locations on- and off-airport using both real time and time-integrated methods to measure fine particulates, volatile organic compounds (VOC), carbonyls, black carbon, and polynuclear aromatic hydrocarbons (PAHs). The 2008 EDR states that this first phase commenced in September 2007 and was completed September 2008, with a report summarizing the findings expected to be completed before the end of 2009. Massport has committed to post this report on Massport's website when completed. The study collected ambient data on a variety of air pollutants over a two year period and assessed air quality changes due to the operation of the new centerfield taxiway. Massport should consult with the Massachusetts Department of Public Health (DPH), the Massachusetts Department of Environmental Protection (MassDEP), the City of Boston Environment Department and Boston Public Health Commission (BPHC) to discuss the second phase of the protocol.

The 2009 EDR should continue updates on the information presented in the 2008 EDR and address comments received related to air quality. For 2009 the Air Quality/Emissions Reductions chapter should include an overview of the environmental regulatory framework affecting aircraft emissions, changes in aircraft emissions, and the changes in air quality modeling. The chapter should also discuss analysis methodologies and assumptions and report on 2009 conditions using the most recent versions of the Emissions Dispersion Modeling System

(EDMS) and MOBILE motor vehicle emissions. The chapter should also include:

- Emissions inventory for carbon monoxide (CO);
- Emissions inventory for oxides of nitrogen (NOx);
- Emissions inventory for volatile organic compounds (VOCs);
- Emissions inventory for particulate matter (PM);
- Nitrogen dioxide (NO2) monitoring; and
- NOx emissions by airline.

This chapter should also report on the following air quality initiatives (AQI) for 2009:

- Air Quality Initiative Tracking;
- Massport's and Tenant's Alternative Fuel Vehicle Programs; and
- The status of other Logan Airport air quality studies undertaken by Massport or others.

The Air Quality Chapter should also include an inventory of GHG emissions from Logan Airport in 2009. GHG emissions should be quantified for aircraft, GSE, motor vehicles and stationary sources using emission factors and methodologies outlined in the Greenhouse Gas Emissions Policy and Protocol issued by EEA. The results of the 2009 GHG emissions inventory should be compared to the 2008 results. The 2008 EDR indicates that Massport commissioned a study to evaluate operational, economic and environmental benefits of cogeneration as a way reduce air emissions associated with the Central Utility Plant. If cogeneration is found feasible, energy consumption could be reduced Airport-wide as could the emissions of criteria pollutants (i.e., CO, NOx, etc.) and GHGs. The status of this study is not described. Therefore, an update should be provided in the 2009 EDR.

Water Quality/Environmental Compliance

This chapter describes Massport's ongoing environmental management activities including NPDES compliance, stormwater, fuel spills, activities under the Massachusetts Contingency Plan, and tank management. In accordance with the requirements of the current NPDES permit for Logan Airport that was issued on July 31, 2007, Massport and all 27 co-permittees and tenants began preparation of updated Stormwater Pollution Prevention Plan (SWPPP). Massport completed its SWPPP in December of 2007 and tenant SWPPPs were completed in March 2008. Massport's SWPPP addresses stormwater pollutants in general, and also addresses deicing and anti-icing chemical, potential bacteria, fuel and oil, and other sources of stormwater pollutants.

The 2008 Annual Certificates of Compliance were submitted to U.S. Environmental Protection Agency and MA DEP in December 2008 for Massport and each co-permittee. Three out of a total of 73 outfall samples exceeded the regulatory limits of the National Pollutant Discharge Elimination System (NPDES) Program permit for the Airport's permitted outfalls. Two out of 23 samples exceeded the limits at the Maverick Street Outfall and one out of 24 samples exceeded a limit at the West Outfall. Over the past five years, the number of samples that exceeded the regulatory limits has ranged from three (2007) to eight (2005). Due to the large

size of the drainage areas and relatively low concentration of pollutants, it is typically not possible to trace exceedances to specific events. Where a known event, such as a spill, is reported, Massport routinely checks the drainage system for possible impacts from the event and takes corrective actions if necessary.

In accordance with the Massachusetts Contingency Plan (MCP), the 2008 EDR reports that Massport continues to assess, remediate, and bring to regulatory closure areas of subsurface contamination. The 2008 EDR states that Massport is working towards achieving regulatory closure of the remaining MCP sites. In addition, preparation of the Environmental Management System (EMS) for facilities, where fleet and field maintenance activities are conducted, was on-going in 2008.

For 2009 the Water Quality/Environmental Compliance and Management chapter should report on the 2009 status of:

- National Pollutant Discharge Elimination System (NPDES) Permit and monitoring results for Logan Airport's outfalls and the Fire Training Facility
- Jet fuel usage and spills
- Massachusetts Contingency Plan (MCP) Activities
- Tank Management
- Update on the environmental management plan
- Fuel spill prevention
- Future stormwater management improvements (if any)
- Future MCP and tank management activities

Massport should continue to report in the 2009 EDR how Massport will assess, remediate, and bring to regulatory closure areas of subsurface contamination.

Sustainability at Logan Airport

This chapter describes Massport's airport wide sustainability goals. In October 2000, the Massport Board approved an Authority-wide Environmental Management Policy, which articulates Massport's commitment to protect the environment and to implement sustainable design principles. In October 2004, the Massport Sustainability Team produced the *Massachusetts Port Authority Sustainability Plan* (Sustainability Plan). The Environmental Management Policy is incorporated in the Sustainability Plan as Massport's long-term sustainability goal or vision.

This chapter describes Massport's continued efforts including Massport-wide sustainability and details how sustainability is incorporated into many aspects of Massport's activities: Planning and Design; Construction; Operations, Maintenance and Management; and Monitoring of Environmental Performance which are detailed in this chapter. The information in this chapter is very informative and I encourage Massport to continue with its updates in the 2009 EDR.

The 2008 EDR outlines how Massport is committed to sustainable practices to help reduce impacts associated with construction. For example, Massport requires contractors to comply with construction guidelines regarding demolition waste recycling, soil reuse, and air emissions from construction equipment. In addition, in 2008, Logan Airport became the first airport in the U.S. to use warm mix asphalt for its airfield pavement (Runway 4R). Warm-mix as opposed to hot-mix asphalt is heated to a lower temperature, which saves energy resulting in 20 percent lower GHG emissions than hot-mix asphalt. It also contains 18 percent recycled material. Another environmental benefit of warm mix asphalt is that it can be applied in a thicker layer, requiring fewer passes with construction vehicles and fewer emissions of associated pollutants.

Massport has several programs in place that contribute to the environmentally sustainable operation and maintenance of Logan Airport and its facilities. Massport also encourages its tenants to do the same. These programs and other sustainability initiatives include developing a policy that states that new development projects obtain certification under the U.S. Green Building Council Leadership in Energy and Environmental Design® (LEED) Green Building Rating System™ and include LEED accredited professionals on the design team. Massport is also establishing and implementing an Alternative Fuel Vehicle Policy (AFV) Policy that requires key personnel to review and consider AFVs when there is a request for a new or replacement vehicle and to select AFVs unless there is a compelling reason not to. In March 2008, Massport installed twenty 10-foot-tall wind turbines on the roof of Logan Office Center. The wind turbines are expected to generate approximately 100,000 kWh annually, or about 2 percent of the building's monthly energy use.

In 2008 Massport completed renovations to the existing gas station in the NCA to include installing an E85 fuel dispensing tank. As discussed earlier in this Certificate, E85 is a first-generation biofuel. Massport also established a bicycle security program with State Police Troopers providing additional patrols on bicycle, which helps to reduce vehicle-related emissions and fossil fuel use. Finally, Massport created preferred parking areas in garages and parking areas throughout Logan Aiport to promote use of lower emitting vehicles. I commend Massport for the existing and planned sustainability measures.

For 2009, this chapter should report on the status of mitigation commitments for specific Massport and tenant projects at Logan Airport that have commenced construction. The mitigation commitments were made in the Section 61 Findings for the following projects which should be reported:

- West Garage/Central Garage;
- International Gateway;
- Runway Ends 22R and 33L Safety Improvements;
- Replacement Terminal A; and
- Logan Airside Improvements Planning.

This chapter should also update the status of Massport's mitigation commitments and identify

projects for which mitigation is complete.

Conclusion

I have determined that the 2008 EDR for Logan Airport has adequately compiled with MEPA and that Massport may prepare a 2009 EDR in lieu of a multi-year ESPR for submission in 2010. As I stated at the beginning of this Certificate, the 2009 EDR must provide responses to the issues raised in comments received. The 2009 EDR must include a copy of this Certificate and a copy of each comment letter received on the 2008 EDR. In particular, Massport should provide a thorough examination of issues raised regarding individual noise monitoring locations, noise measurement and modeling, noise abatement, and air quality issues. Massport should consult directly with individual commentors where appropriate.

November 13, 2009
Date

Ian A. Bowles

Comments Received:

10/26/2009	Peter L. Koff, Engel & Schultz, LLP
10/28/2009	Town of Winthrop, Noise Air Pollution & Airport Hazards Committee
11/05/2009	Nancy Timmerman
11/06/2009	City of Cambridge, Robert Healy, City Manager
11/09/2009	Boston Transportation Department
11/10/2009	City of Boston Environment Department

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November 12, 2010

CERTIFICATE OF THE SECRETARY OF ENERGY AND ENVIRONMENTAL AFFAIRS
ON THE
2009 LOGAN AIRPORT ENVIRONMENTAL DATA REPORT

PROJECT NAME	: 2009 Environmental Data Report
PROJECT MUNICIPALITY	: Boston / Winthrop
PROJECT WATERSHED	: Boston Harbor
EOEA NUMBER	: 3247
PROJECT PROPONENT	: Massachusetts Port Authority
DATE NOTICED IN MONITOR	: October 6, 2010

As Secretary of Energy and Environmental Affairs (EEA), I hereby determine that the Environmental Data Report submitted on this project **adequately and properly complies** with the Massachusetts Environmental Policy Act (G. L. c. 30, ss. 61-62I) and with its implementing regulations (301 CMR 11.00). The Proponent, the Massachusetts Port Authority (Massport) should submit an Environmental Data Report containing 2010 data no later than October 15, 2011.

The environmental review process at Logan Airport has been structured to occur on two levels: airport-wide and project-specific. With respect to airport-wide impacts, the periodic Environmental Status and Planning Report (ESPR) process has evolved from a largely retrospective status report on airport operations to a broader analysis that also provides a prospective assessment of long range plans. It has thus become part of Massport's long range planning (consistent with the objectives of the MEPA regulations), and a vehicle for analyzing cumulative impacts associated with airport operations. The ESPR provides a "big picture" analysis of environmental impacts associated with current and anticipated levels of activities, and presents an overall mitigation strategy aimed at avoiding increases in such impacts. The ESPR analysis is supplemented by (and ultimately incorporates) the detailed analyses and mitigation

commitments made by Massport in the context of project-specific environmental impact review. In addition, between preparation of each ESPR, Massport also provides more frequent (annual) Environmental Data Reports (EDRs) that contain data for the prior year's airport operations and impacts. EDRS also provide an updating on the status of outstanding mitigation commitments for all airport projects. The EDR addressing airport operations during 2009 is the subject of this Certificate.

In general, the EDR has fulfilled its purpose of providing a "snapshot" of year 2009 passenger and impact levels at Logan Airport. The technical studies in the 2009 EDR included reporting on and analysis of key indicators of airport activity levels, airport planning, the regional transportation system, ground access, noise, air quality, environmental management, and project mitigation tracking. Most environmental parameters showed improvement in calendar year 2009. However, mitigation of noise impacts and air quality remain key concerns both of this office and the commenters. In addition, there appears to be a trend of increased parking demand at the airport that should be carefully monitored by Massport, and which requires a corresponding focus on increasing public transit use. Finally, assessing the cumulative changes in airport operations and impacts associated with several recent Massport projects (e.g., the Consolidated Car Rental Facility, the Green Bus Depot, the East Boston-Chelsea Bypass and the parking consolidation in the North Cargo Area/Robie parcel) should be a priority of the airport-wide impact assessment reports moving forward. I expect that these topics will be addressed by Massport in the 2010 EDR (to be filed by October 15, 2011) as outlined further below. The next ESPR document containing farther-reaching planning and assessment measures will need to be submitted the following year.

Environmental Data Reporting Process

In 1979, the Secretary of the Executive Office of Environmental Affairs issued a Certificate requiring Massport to define, evaluate, and disclose, every three years, the impact of long-term growth at the airport through a Generic Environmental Impact Report (GEIR). The Certificate also required the submission of interim Annual Updates to provide data on conditions for the years between the GEIRs. The GEIR provided projections of environmental conditions where the cumulative effects of individual projects could be understood. The Secretary's Certificate on the *1997 Annual Update* proposed a revised environmental review process for Logan Airport. As a result, Massport evaluates the cumulative impacts associated with airport activities through preparation of periodic ESPR documents (typically every five years) and provides data updates annually through the EDRs.

The last Logan ESPR was filed for calendar year 2004. However, due to the current economic downturn, as described in this 2008 EDR submitted in the October, 2009, activity levels at Logan Airport and associated environmental impacts continued to remain well below historic levels. Therefore it was anticipated that in 2009, near-term activity levels and associated environmental effects were also expected to remain well below levels previously analyzed for

Logan Airport. As a result, the forecasted aviation growth presented in the 2004 ESPR, the predicate upon which the ESPR schedule was initially established, had not occurred. Therefore, I allowed Massport to prepare a 2009 EDR in lieu of the scheduled ESPR.

Massport has indicated in the 2009 EDR that in 2010, near-term activity levels and associated environmental effects continue to remain well below levels previously analyzed for Logan Airport. Because the forecasted aviation growth presented in the 2004 ESPR has not occurred, Massport has requested to delay filing of the next ESPR until 2011. In addition, Massport is also currently in the process of updating its passenger and operations forecast for the next twenty years. Significantly, this data will allow Massport to more accurately project passenger and operation needs that will directly influence planning for future projects at Logan Airport. The data from this forecasting process will not be available in time for filing the next annual report. Therefore, I will allow Massport to prepare a 2010 EDR followed by a 2011 ESPR (which will be filed in 2012, containing data for 2011 as well as more comprehensive analysis of future plans). Given the two-year extension of the original filing deadline for the ESPR document, I expect Massport to ensure that the 2011 ESPR will not be delayed any further.

REVIEW OF THE 2009 EDR AND SCOPE FOR THE 2010 EDR

General

The 2010 EDR must provide an annual update on conditions at Logan Airport for calendar year 2010. It should address the activity levels observed in 2010 in comparison with those predicted in the 2004 ESPR and should also report on the cumulative effects of Logan Airport operations and activities compared to 2009. The 2010 EDR should continue to serve as a background/context against which projects at Logan Airport can be evaluated. Where appropriate, Massport must continue to identify and address any longer term aviation and environmental trends that will impact airport impacts or planning.

The 2010 EDR must respond to those issues explicitly noted in this Certificate and the comments received in the next EDR. The EDR should provide a "snapshot" of the 2010 operations and impacts, while more substantial analysis and longer-range planning are expected to be presented in the next ESPR. Massport should file the 2010 EDR no later than October 15, 2011.

A distribution list for the 2010 EDR (indicating those receiving documents, CDs, or Notices of Availability) should be provided in the document. This section must also include copies of all ESPR and EDR Certificates issued since the 2004 Logan Environmental Status and Planning Report (issued on August 16, 2006) to provide context for reviewers. In addition, the document should contain copies of any MEPA Certificates issued for projects at Logan airport in 2010. Supporting technical appendices should be provided as necessary.

Activity Levels

The Activity Levels chapter provides a solid analysis of major activity issues and the technical appendix contains useful and detailed information. This chapter presents aviation activity statistics for Logan Airport in 2009 and compares activity levels to the prior year including air passengers, aircraft operations, fleet mix, and cargo/mail volumes. The total number of air passengers at Logan Airport during 2009 dropped to 25.5 million, compared to 26.1 million in 2008. The decrease in the total number of air passengers was 2.3 percent, compared to a decrease of 7.1 percent in the previous year. In addition, the total number of aircraft operations declined from 371,604 in 2008 to 345,306 in 2009, a decrease of 7.1 percent. The 2009 EDR also reports that the passenger aircraft operations decreased by 3.8 percent and operations by general aviation (GA) aircraft also declined by a dramatic 48.6 percent in 2009. Also the 2009 EDR reports that the cargo operations decreased by 23.2 percent in 2009, compared to 2008.

The EDR presents data indicating that the number of air passengers per aircraft operation increased, from an average of 70.2 passengers per aircraft operation in 2008 to an average of 73.9 passengers per aircraft operation in 2009. The passenger load factor (the percentage of seats occupied by revenue passengers) also increased slightly from 72.8 to 72.9. This reflects greater air carrier efficiency. While legacy airlines, such as Delta Air Lines, Continental Airlines, and US Airways, reduced aircraft operations significantly at Logan Airport, low-cost carriers (LCCs) operations increased by 12.3 percent. In addition to a continuing expansion in service offerings by JetBlue Airways, Logan Airport saw operations for two new LCCs, Southwest Airlines and Virgin America, begin in 2009. In addition, the 2009 EDR reports that the air cargo volumes declined 12.1 percent from 621 million pounds in 2008 to 546 million pounds in 2009. The largest volume decrease occurred in the express/small packages segment.

For the 2010 EDR, the Activity Levels chapter should include:

- Aircraft operations, including fleet mix and scheduled airline services at Logan Airport;
- Passenger activity levels;
- Cargo and mail activities;
- A comparison of the 2010 aircraft operations, cargo/mail operations, and passenger activity levels to 2009 activity levels; and
- A report on national aviation trends in 2010 and a comparison to trends at Logan Airport.

In addition to reporting the analysis of major activity issues, I advise Massport to consider and attempt to address all comments related to activity levels in the 2010 EDR.

Planning

The Airport Planning chapter provides an overview of planning, construction, and permitting activities that occurred at Logan Airport in 2009. It also describes known future planning, construction, and permitting activities. Construction of a 9,300-foot long centerfield taxiway (Taxiway M) was completed and opened in summer of 2009. Also in 2009 Massport continued the permitting for redevelopment of the Southwest Service Area (SWSA) at Logan Airport which includes consolidation of the rental car operations and their shuttle buses into a single coordinated operation that will result in reduced vehicle miles traveled and the associated air emissions. A Final EIR for the project was filed in March 2010, and a Certificate that determined that the EIR adequately and properly complies with MEPA. In addition, in 2009, Massport began the MEPA review process for the proposed Logan Runway Safety Area (RSA) Improvements at Runway ends 33L and 22R. A Draft EIR was submitted on that project in 2010. Preliminary design of a proposed Green Bus Depot for bus maintenance in the North Service Area (NSA) began in 2009 and an expanded ENF for the Green Bus Depot was filed in 2010.

During 2009 Massport published the Sustainable Design Standards and Guidelines (SDSG) for use by architects, engineers, and planners working on capital improvement projects for Massport facilities. The 2009 EDR reports multiple projects in the planning and design phase. Planning commenced for two hangar upgrades. Massport also commenced with Terminal B Garage repair and rehabilitation where solar panel "trees" were installed on the roof. An extension to Taxiway D was completed and the Taxiway G realignment construction commenced.

Planning for the North Service Area (NSA) Roadway Corridor project began. The NSA Roadway Corridor Project coordinates the roadway and urban design vision for North Service Road and Frankfort Street with ongoing design and construction efforts in the NSA. The 2009 EDR reports that the planning commenced for the Logan Airport Parking Deck Project on the Robie Parcel within the North Cargo Area (NCA) with the construction beginning in spring 2010. The NSA Roadway Corridor project will coordinate the NCA Logan Airport Parking Deck Project, East Boston-Chelsea Bypass Project, the SWSA Redevelopment Project, and the NSA Buffer Project to develop a unified utility, roadway, and landscape vision for the NSA roadway corridor between Prescott Street and Neptune Road. Massport has also begun planning for the East Boston-Chelsea Bypass Project, to develop a limited access roadway between Logan Airport and the new Chelsea Street Bridge. An ENF for this project is currently under review by the MEPA Office.

For the 2010 EDR, the Airport Planning chapter should describe the status of planning initiatives for the:

- Roadway Corridor Projects;
- Airport Parking;
- Terminal Area;
- Airside Area;
- Service and Cargo Areas; and
- Airport Buffers and Landscaping.

I expect that this chapter will contain a comprehensive discussion about the coordination of parking efforts at Logan in light of the construction of the Parking Deck Project on the Robie Parcel, beyond what was presented in the 2009 EDR (or that such information will be presented elsewhere in the document). The discussion should include information on the use of the new Parking Deck (or a schedule for implementing use) and the corresponding changes in use (e.g., uses that have been shifted or eliminated) of other parking areas at Logan. I understand that data will also be available about parking patterns as a result of ongoing passenger surveys being undertaken by Massport and the results of these surveys should inform the discussions about airport-wide parking operations.

I also note that several of the projects described in the planning chapter of the 2009 EDR are designed, at least in part, to consolidate and direct airport-related traffic to centralized locations and to minimize airport-related traffic on external streets in adjacent neighborhoods. The 2010 EDR should report, to the extent possible, on the status and effectiveness of these cumulative efforts.

The EDR should also report on the status of public works projects implemented by other agencies within the boundaries of Logan Airport. Massport should continue to assess planning strategies for improving Logan Airport's operations and services in a, safe, secure, efficient, and environmentally sensitive manner.

Regional Transportation

In general, the 2009 EDR has met the requirements with respect to regional transportation issues. The directives in the ESPR Certificate were laid out to have Massport look at potential diversions, and explain how its planning and coordination with other agencies could impact potential diversions. The 2009 EDR has performed this task.

The chapter describes activity levels at New England's regional airports in 2009 and updates recent planning activities. Massport has demonstrated that it is coordinating its planning with other transportation agencies, and that this planning effort is aimed at minimizing cumulative impacts from Logan Airport operations. The 2009 EDR includes estimates of potential passenger diversions from Logan, and outlines how Massport planning encourages those diversions.

The decreases in passenger traffic and aircraft operations at New England airports reflect national trends in the face of volatile fuel prices and a worsening global economy. Specifically, of the total number of air passengers utilizing New England's primary commercial service airports, including Logan Airport, decreased from 44.4 million in 2008 to 42 million in 2009. This represents a passenger traffic decline of 5.4 percent. In the region, activity levels as measured by the number of aircraft operations fell by 14.2 percent, from 1.21 million operations in 2008 to 1.03 million operations in 2009. In addition, air passenger traffic at the regional airports in New England declined, as the challenging operating environment for airlines affected smaller communities disproportionately. Airlines introduced major reductions in operations throughout the year, eliminating less profitable routes and cutting frequencies in smaller markets. LCCs, such as Southwest Airlines and JetBlue Airways, also stopped expanding their operations at regional airports in recent years, and are now instead focusing on expansion in larger air service markets with a strong business travel portfolio.

Massport also reported in the 2009 EDR that there were continued negotiations with the City of Worcester to purchase Worcester Regional Airport. In June 2010, the City of Worcester transferred the airport to Massport for $17 million.

Massport should continue the directive from the ESPR Certificate for the 2010 EDR. In addition, for 2010 EDR the chapter on Regional Transportation should describe Logan Airport's role in the region's intercity transportation system by reporting on the following related to Regional Airports and Regional Transportation System:

Regional Airports

- 2010 regional airport operations, passenger activity levels, and schedule data within an historical context;
- Status of plans and new improvements as provided by the regional airport authorities;
- Ground Access improvements to the regional airports; and
- The role that Worcester Regional Airport and Hanscom Field play in the regional aviation system and Massport's efforts to promote these airports.

Regional Transportation System

- Massport's efforts in strengthening the regional transportation system;
- Massport's cooperation with other transportation agencies to promote efficient regional highway and transit operations; and
- Report on metropolitan and regional rail initiatives and ridership.

<u>Ground Transportation</u>

The 2009 EDR serves its purpose of updating 2009 ground access conditions on the airport, and has also adequately addresses the updating of the three new programs to support employees' use of alternative transportation options.

This chapter reports on transit ridership, roadways, traffic volumes, and parking for 2009. Specifically, ground transportation activity levels associated with Logan Airport generally decreased for all surface transportation modes from 2008 to 2009 as a result of a 2.3 percent decline in the annual number of air passengers. The 2009 EDR reports that the average daily traffic on airport roadways decreased by 7 percent from 2008 to 2009, while vehicle miles traveled decreased by 5 percent.

Data in the 2009 EDR reports that Massachusetts Bay Transportation Authority (MBTA)

transit ridership to the Airport, including the Blue Line and the Silver Line, increased in 2009. Silver Line boardings at the Airport continued to grow, increasing by 11 percent in 2009 (compared to a 5 percent increase in 2008). In contrast, air passenger ridership on Logan Express bus, by water transportation, and by limousine decreased in 2009. From 2008 to 2009, Logan Express air passenger ridership decreased by 8 percent, ridership on water transportation decreased by 8 percent, limousine ridership decreased by 11 percent, and taxi dispatches decreased 7 percent. The 2009 EDR reports that over the past several years, transit services, including Logan Express, have experienced substantial increases in employee use. In 2009, employee use of Logan Express increased 4 percent over 2008 levels.

Despite improvements in use of the MBTA's Blue Line and Silver Line, the number of vehicles parked on-Airport increased by 11 percent in 2009 compared to 2008. The EDR states that Massport continued to comply with the Logan Airport Parking Freeze, and the document contained copies of Massport's bi-annual Parking Space Inventory reports that are submitted to the Massachusetts Department of Environmental Protection to document Massport's compliance with the Parking Freeze.

The 2010 EDR should continue to update 2010 ground access conditions on the airport and report on the use of the three new programs to support employees' use of alternative transportation options. The chapter should also report on 2010 conditions and provide a comparison of 2010 findings to those of 2009 for the following:

- Detailed description of compliance with the Logan Airport Parking Freeze;
- High occupancy vehicle (HOV) ridership (including Blue Line, Silver Line, Scheduled, Unscheduled, Water Transportation, and Logan Express);
- Logan Airport Employee Transportation Management Association (Logan TMA) membership and services;
- Logan Airport gateway volumes;
- On-airport traffic volumes;
- On-airport vehicle miles traveled (VMT). VMT will be calculated using the updated model created in 2004 that is based on the full build roadway network;
- Parking demand and management (including rates and duration statistics); and
- Ground access management strategy.

I am troubled by the increased demand for vehicle parking at Logan demonstrated by the 2009 data reported in the EDR, a concern that I understand is shared by Massport. Although Massport has already dedicated significant resources to encouraging transit use, the increased parking demand data suggest that greater efforts are warranted. The 2010 EDR should report on Massport's efforts in this regard. In addition, I expect that this will be a significant component of the long-range planning efforts Massport is currently undertaking.

<u>Noise</u>

The Noise Abatement chapter updates the status of the noise environment at Logan Airport in 2009, and describes Massport's efforts to reduce noise levels. The technical appendix contains useful and detailed information, while the main text provides a solid analysis of major noise issues. Many of the issues raised in the noise analysis are ongoing and require continuous monitoring. The future 2010 EDR represents an appropriate forum to serve this updating function.

The decrease in the number of aircraft operations in 2009 resulted in changes in the noise environment. The 2009 Day-Night Sound Level (DNL) contours were smaller in many locations compared to 2008. The 65 dB DNL contour decreased in size in East Boston. The contour reduced in size over Winthrop and towards South Boston from Runway 27, but increased slightly north of the Airport over Revere due to an increase in departures from Runway 4R. The contour also increased south of the Airport over South Boston due to an increase in arrivals to Runways 4L and 4R. These changes are due to extended closings of Runway 9-27 for resurfacing in 2009.

In 2009 Massport completed installation of an improved Noise Monitoring System (NOMS). The Era Systems Corporation's (ERA) flight tracking system and all new noise monitors were operational in 2009. Combined with new noise monitor software, the system has an improved capability of correlating measured noise events with individual flight tracks.

The 2009 EDR reports that the overall number of people exposed to DNL values greater than 65 decibels (dB) decreased by 43 percent in 2009 compared to 2008. An estimated 4,335 people were exposed to DNL levels greater than 65 dB, as depicted in the 2009 contour, compared to 7,579 in 2008. This is the first time that the number of people exposed to the 65 dB noise level has been fewer than 5,000 since reporting this data in the EDR format. The total population exposed to noise levels greater than DNL 70 dB decreased from 249 in 2008 to 243 in 2009. There was a reduction of noise for 73 people in Winthrop but an increase of noise for 67 people exposed to greater than DNL 70 dB in Boston. The EDR reports that all of the residences exposed to DNL levels greater than 65 dB in 2009 that have chosen to participate in the soundproofing program have been sound-insulated by Massport. In 2009, Massport provided sound insulation to 83 homes, nearly half of which were in Chelsea. The focus of this program in Chelsea was to fulfill federal and state mitigation commitments related to the opening of Runway 14-32. Since the inception of Massport's sound insulation program, 11,136 homes have been sound-insulated in East Boston, South Boston, Winthrop, Revere, and Chelsea.

The information in this chapter is very informative and I encourage Massport to continue this format in the 2010 EDR. I also strongly advise Massport to consider and address the comments received that have raised noise related concerns. Commenters have requested further explanation of the reasons for the increased use of Runway 33L for jet aircraft departures and corresponding decrease in use of Runway 27. The comments from the City of Cambridge, as well as from individuals such as Ms. Timmerman, P.E., have raised a number of concerns and

suggestions related to noise that Massport should incorporate into the 2010 EDR.

For 2010 the Noise Abatement chapter should provide an overview of the environmental regulatory framework affecting aircraft noise, the changes in aircraft noise, and the updates in noise modeling. The chapter should report on 2010 conditions and compare 2010 conditions to those of 2009 for the following:

- Fleet Mix, including Stage II, Recertified (Hushkitted) Stage III, newly manufactured Stage III, and any qualifying Stage IV aircraft;
- Nighttime operations;
- Runway utilization (report on aircraft and airline adherence with runway utilization goals);
- Preferential runway advisory system (PRAS) compliance; and
- Flight tracks, including a discussion of the update on the Standard Terminal Automation Replacement System (STARS) radar and consolidation of the Boston Terminal Radar Approach Control (TRACON) at Merrimac, plus Massport's installation and use of PASSUR data.

The chapter should also report on 2010 conditions and compare those to 2009 conditions for the following noise indicators:

- Using the Federal Aviation Administration's (FAA) most current version of the Integrated Noise Model (INM), and RealContours and RealProfiles, produce an accurate set of Day-Night Sound Level (DNL) noise contours. Adjustments made to account for over-water sound propagation and the propagation of sound to areas of higher terrain will be reported;
- Noise-impacted population;
- Measured versus modeled noise values, including reasons for differences and any improvements attributable to the use of RealContours and RealProfiles;
- Cumulative Noise Index (CNI);
- Times-Above for 65, 75, and 85 dBA threshold values;
- Installation and benefits of the new noise monitoring system; and
- Flight track monitoring noise quarterly reports.

The chapter should also report on noise abatement efforts and provide a status update on the new noise and operations monitoring system.

Air Quality

The Air Quality/Emissions Reduction chapter provides an overview of airport-related air quality issues in 2009 and efforts to reduce emissions. The modeled emissions inventory results were driven principally by the lower number of aircraft operations at the Airport compared to 2008, and continual refinements to the FAA Emissions and Dispersion Modeling System

(EDMS). The 2009 EDR reports that the total emissions of volatile organic compounds (VOC) were 980 kg/day, or 19 percent lower than 2008 levels. Total emissions of oxides of nitrogen (NOX) were 3,979 kg/day, or 5 percent lower than 2008 levels. In 2009, total NOx emissions at Logan Airport (net total with reductions) were approximately 746 tons per year (tpy) lower than the 1999 Massport's Air Quality Initiative (AQI) benchmark. This represents a 32 percent decrease in NOx emissions since 1999. Total emissions of carbon monoxide (CO) were 7,925 kg/day, or 5 percent lower than 2008 levels. Because of the refinements to the EDMS model and decreased air traffic, total emissions of particulate matter (PM) PM10/PM2.5 associated with operations at Logan Airport have decreased by approximately 12 percent to 71 kilograms per day (kg/day) compared to 2008 levels. By comparison, using the earlier EDMS v5.1 total emissions of PM10/PM2.5 would have decreased by approximately 2 percent to 79 kg/day. This variation is attributed to differences in the EDMS versions.

As part of the Section 61 findings for the centerfield taxiway component, the first phase of a two-phase Massport Air Quality Monitoring Study was initiated in September 2007 at ten locations on- and off-airport using both real time and time-integrated methods to measure fine particulates, volatile organic compounds (VOC), carbonyls, black carbon, and polynuclear aromatic hydrocarbons (PAHs). The 2009 EDR reports that since 1999 there has been a continuing trend of decreasing nitrogen dioxide (NO2) concentrations at both the Massport and Massachusetts Department of Environmental Protection (MassDEP) monitoring sites located in the general vicinity of Logan Airport. In addition, the annual NO2 concentrations at all monitoring locations in 2009 were well within the National Ambient Air Quality Standards (NAAQS) for NO2. The first phase of a two-phase Massport Air Quality Monitoring Study commenced in September 2007, and was completed September 2008, and a final report will be issued summarizing the findings. The study is collecting ambient data on a variety of air pollutants over a two-year period and will assess air quality changes attributable to the operation of the new centerfield taxiway. The second phase of the study will begin in September 2010 now that the centerfield taxiway is completed and fully operational.

Massport prepared an emission inventory of greenhouse gas (GHG) emissions directly and indirectly associated with Logan Airport. The 2009 GHG emission inventory has been updated incorporating guidance developed by the Transportation Research Board's (TRB) Airport Cooperative Research Program (ACRP). The ACRP guidance was published in April 2009 to be used by airport operators developing an airport specific GHG emissions inventory. While not including emissions from the cruise phase of flight above 3,000 feet, in a change from previous EDRs, the 2009 inventory assigns emissions based on ownership and control boundaries (i.e., emissions and sources associated with Massport, airport tenants and the general public). The vast majority of the emission sources at Logan Airport are owned or controlled by the airlines, other airport tenants, and passenger vehicles. Massport operations contribute only 11 percent of the total GHG emissions for the Airport. Total Logan Airport GHG emissions in 2009 were 14 percent lower than 2008 levels.

Massport has also made attempts to reduce aircraft emissions by working with the FAA to study and implement airfield-improvement concepts and operational changes that may have air quality benefits. Massport promoted such concepts through the Logan Airside Improvements Planning Project Environmental Impact Statement, which recommended physical and operational improvements to Logan Airport including construction of the new Runway 14-32 and centerfield taxiway, and other taxiway improvements. Runway 14-32 became operational in November 2006 and the centerfield taxiway was fully opened in summer 2009. In addition, in coordination with Massport, the Massachusetts Institute of Technology (MIT) completed a detailed survey of pilots at Logan Airport to better understand the use of single engine taxiing and issued a paper in March 2010 which was included in Appendix L. Commenters on the 2009 EDR have requested that Massport increase efforts to encourage the use of single engine taxiing. An update of these efforts should be reported in the 2010 EDR.

The 2010 EDR should continue updates on the information presented in the 2009 EDR and address comments received related to air quality. For 2010 the Air Quality/Emissions Reductions chapter should include an overview of the environmental regulatory framework affecting aircraft emissions, changes in aircraft emissions, and the changes in air quality modeling. The chapter should also discuss analysis methodologies and assumptions and report on 2010 conditions using the most recent versions of the Emissions Dispersion Modeling System (EDMS) and MOBILE motor vehicle emissions. The chapter should also include:

- Emissions inventory for carbon monoxide (CO);
- Emissions inventory for oxides of nitrogen (NOx);
- Emissions inventory for volatile organic compounds (VOCs);
- Emissions inventory for particulate matter (PM);
- Nitrogen dioxide (NO2) monitoring; and
- NOx emissions by airline.

This chapter should also report on the following air quality initiatives (AQI) for 2010:

- Air Quality Initiative Tracking;
- Massport's and Tenant's Alternative Fuel Vehicle Programs; and
- The status of other Logan Airport air quality studies undertaken by Massport or others.

The Air Quality Chapter should also include an inventory of GHG emissions from Logan Airport in 2010. GHG emissions should be quantified for aircraft, GSE, motor vehicles and stationary sources using emission factors and methodologies outlined in the Greenhouse Gas Emissions Policy and Protocol issued by EEA. The results of the 2010 GHG emissions inventory should be compared to the 2009 results.

<u>Water Quality/Environmental Compliance</u>

This chapter describes Massport's ongoing environmental management activities including NPDES compliance, stormwater, fuel spills, activities under the Massachusetts Contingency Plan, and tank management. In accordance with the requirements of the current

NPDES permit for Logan Airport that was issued on July 31, 2007, Massport and all 27 co-permittees and tenants began preparation of updated Stormwater Pollution Prevention Plan (SWPPP). Massport completed its SWPPP in December of 2007 and tenant SWPPPs were completed in March 2008. Massport's SWPPP addresses stormwater pollutants in general, and also addresses deicing and anti-icing chemical, potential bacteria, fuel and oil, and other sources of stormwater pollutants. The 2009 Annual Certificates of Compliance were submitted to the U.S. Environmental Protection Agency (EPA) and MassDEP on December 28, 2009, for Massport and each co-permittee.

In accordance with the Massachusetts Contingency Plan (MCP), the 2009 EDR reports that Massport continues to assess, remediate, and bring to regulatory closure areas of subsurface contamination. The 2009 EDR states that Massport is working towards achieving regulatory closure of the remaining MCP sites. In addition, preparation of the Environmental Management System (EMS) for facilities, where fleet and field maintenance activities are conducted, was on-going in 2009.

In 2009, there were six reportable oil and hazardous material spills detailed in the 2009 EDR. Massport received a Notice of Noncompliance (NON) from the MassDEP on September 18, 2009. The NON listed a total of 13 stormwater discharge samples that exceeded permit limits in the period since the NPDES permit was issued in July 2007. In response to the NON, Massport implemented corrective actions throughout the Airport directed at specific issues identified in the NON, as well as generally reviewing and updating standard practices at the Airport. One of the outfall samples out of a total of 72 samples at the Maverick Street Outfall exceeded the regulatory limits of the NPDES permit for the North, West and Maverick Street outfalls which was reported.

In accordance with the requirements of the NPDES permit for Logan Airport, Massport conducted a water quality study to evaluate the potential biological, chemical, and toxicological impacts of de-icer discharges on Boston Harbor. The study concluded that de-icer discharges do not negatively impact dissolved oxygen levels in the harbor, do not contain materials in concentrations over water quality criteria or toxicological benchmarks, and do not adversely affect the designated uses of the receiving waters.

For 2010 the Water Quality/Environmental Compliance and Management chapter should report on the 2010 status of:

- National Pollutant Discharge Elimination System (NPDES) Permit and monitoring results for Logan Airport's outfalls and the Fire Training Facility
- Jet fuel usage and spills
- Massachusetts Contingency Plan (MCP) Activities
- Tank Management
- Update on the environmental management plan
- Fuel spill prevention

- Future stormwater management improvements (if any)
- Future MCP and tank management activities

Massport should continue to report in the 2010 EDR how Massport will assess, remediate, and bring to regulatory closure areas of subsurface contamination.

Sustainability at Logan Airport

This chapter describes Massport's airport wide sustainability goals. In October 2000, the Massport Board approved an Authority-wide Environmental Management Policy, which articulates Massport's commitment to protect the environment and to implement sustainable design principles. In October 2004, the Massport Sustainability Team produced the *Massachusetts Port Authority Sustainability Plan* (Sustainability Plan). The Environmental Management Policy is incorporated in the Sustainability Plan as Massport's long-term sustainability goal or vision.

This chapter describes Massport's continued efforts including Massport-wide sustainability and details how sustainability is incorporated into many aspects of Massport's activities: Planning and Design; Construction; Operations, Maintenance and Management; and Monitoring of Environmental Performance which are detailed in this chapter. The information in this chapter is very informative and I encourage Massport to continue with its updates in the 2010 EDR.

The 2009 EDR outlines how Massport is committed to sustainable practices to help reduce impacts associated with construction. For example, Massport requires contractors to comply with construction guidelines regarding demolition waste recycling, soil reuse, and air emissions from construction equipment. In 2009, Massport undertook the 2010 Environmental Benchmarking Survey sponsored by Airport Council International North America (ACI-NA) to assess solar power, purchase of renewable energy, availability of low emission ground transportation, recycling and "green" purchasing.

The new Signature Flight Support GA Facility in the North Cargo Area, opened in 2007, the first LEED certified GA facility in the United States. This GA Facility at Logan Airport is serving as a model for new Signature Flight Support GA facilities around the U.S., including at Chicago O'Hare International Airport. The 2009 EDR also reports on the International Standards Organization (ISO) 14001 standard certification for Massport's Logan Airport Facilities II (vehicle maintenance, landscaping, and snow removal) that was completed in December 2006 and was recertified in December 2009. ISO Certification for Facilities I (Central Heating and Cooling Plant) and Facilities III (Electrical and Structural) is scheduled for 2010.
Massport began construction in 2010 on the new Consolidated Rental Car Facility (ConRAC). It will meet the Commonwealth of Massachusetts "LEED Plus" requirements and strive for LEED Silver level certification or better. The ConRAC will include the infrastructure necessary to accommodate future plug-in stations for electric vehicles and other alternative fuel sources such

as E-85 (ethanol). The ConRAC could accommodate car sharing services, such as ZipCar, at a later date. The ConRAC design includes pedestrian and bicycle accommodations including secure bicycle storage. The facility will include efficient water systems including water reclamation for vehicle wash water, and use of stormwater for non-potable uses such as vehicle washing and landscaping irrigation. At least 2.5 percent of the proposed program's overall electricity needs will be met with solar or wind power, or another form of renewable energy. Rental car companies have pledged to maintain rental car fleets which include hybrid or alternativefuel/ low-emitting vehicles.

In 2009, Massport began a four-year rehabilitation of the Terminal B parking garage, which includes the installation of solar panels on the top parking deck and high efficiency Light-Emitting-Diode (LED) lighting throughout the structure. The use of motion-detecting LED fixtures will use approximately 50 percent less electricity than the existing lighting, reducing existing usage by 2,261,218 killowatt-hours (kWhs) of electricity per year. This, along with other energy conservation measures, will reduce 1,307 metric tons of carbon dioxide (CO_2) the equivalent of not using 3,040 barrels of oil or 148,385 gallons of gasoline annually. The Airport expects a savings of $3.8 million in electrical usage over the next 20 years based on costs of $0.12 per kWh. Additionally, the installation of 16 solar panel trees is expected to produce 83,980 kWhs of electricity, or 2.5 percent of the total garage annual consumption. This is equal to the reduction of 50 metric tons of CO_2 the equivalent of not using 115 barrels of oil or 5,637 gallons of gasoline annually. Each solar panel is a single structure design with a stem and steel frame that uses solar panels as a roof over parked cars. The design has the added benefit of collecting rainwater that will be used for landscaping and cleaning projects on the Airport. Each solar array is mounted on an air ventilation unit on the roof of the garage and does not affect parking operations or the number or spaces available to travelers.

For 2010, this chapter should report on the status of mitigation commitments for specific Massport and tenant projects at Logan Airport that have commenced construction. The mitigation commitments were made in the Section 61 Findings for the following projects which should be reported:

- West Garage/Central Garage;
- International Gateway;
- Runway Ends 22R and 33L Safety Improvements;
- Replacement Terminal A;
- The Consolidated Rental Car Facility; and
- Logan Airside Improvements Planning.

This chapter should also update the status of Massport's mitigation commitments and identify projects for which mitigation is complete.

Responses to Comments

The 2010 EDR must include Responses to Comments which addresses all of the substantive comments from the letters listed at the end of this Certificate. The Response to Comments included in this EDR is well-constructed and cross-referenced. Massport may follow the same format in addressing comments in the next EDR, although the Responses to Comments should pay particular attention to increased specificity, where necessary.

The majority of comments received on the 2009 EDR focused on noise related issues, including measurement of noise, modeling of noise contours, and noise abatement, and emission reduction issues. In addition to responding to these comments, the 2010 EDR should continue to report on the refinements to noise tracking and abatement efforts. Massport should consult directly with individual commentors where appropriate.

Conclusion

I have determined that the 2009 EDR for Logan Airport has adequately compiled with MEPA and that Massport may prepare a 2010 EDR in lieu of a multi-year ESPR for submission in 2011.

November 12, 2010
Date

Ian A. Bowles

Comments Received:

11/04/10	Darryl Pomicter (email)
11/05/10	Nancy Timmerman
11/05/10	City of Cambridge, Executive Department
11/09/10	Jerome Falbo

IAB/ACC/acc

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December 16, 2011

CERTIFICATE OF THE SECRETARY OF ENVIRONMENTAL AFFAIRS
ON THE
2010 LOGAN AIRPORT ENVIRONMENTAL DATA REPORT

PROJECT NAME	: 2010 Environmental Data Report
PROJECT MUNICIPALITY	: Boston and Winthrop
PROJECT WATERSHED	: Boston Harbor
EOEA NUMBER	: 3247
PROJECT PROPONENT	: Massachusetts Port Authority (Massport)
DATE NOTICED IN MONITOR	: November 9, 2011

As Secretary of Executive Office of Energy and Environmental Affairs (EEA), I hereby determine that the Environmental Data Report submitted on this project **adequately and properly complies** with the Massachusetts Environmental Policy Act (G. L. c. 30, ss. 61-62I) and with its implementing regulations (301 CMR 11.00).

The environmental review process for Logan Airport has been structured to occur on two levels: airport-wide and project-specific. The Environmental Status and Planning Report (ESPR) has evolved from a largely retrospective status report on airport operations to a broader analysis that also provides a prospective assessment of long-range plans. It has thus become, consistent with the objectives of the MEPA regulations, part of Massport's long range planning. The ESPR provides a "big picture" analysis of environmental impacts associated with current and anticipated levels of activities, and presents an overall mitigation strategy aimed at avoiding increases in such impacts. The ESPR analysis is supplemented by (and ultimately incorporates) the detailed analyses and mitigation commitments of project-specific Environmental Impact Reports (EIR). The ESPR is generally updated on a five year basis, with much less detailed Environmental Data Reports (EDR) (formerly Annual Updates) filed in the years between

ESPRs. The 2010 EDR is the subject of this review. In addition, the Scope for the 2011 ESPR is provided in this Certificate.

In general, the EDR has fulfilled its purpose of providing a "snapshot" of 2010 passenger and impact levels at Logan Airport. Most environmental parameters showed improvement in calendar year 2010. In particular, the technical studies in the 2010 EDR included reporting on and analysis of key indicators of airport activity levels, airport planning, the regional transportation system, ground access, noise, air quality, environmental management, and project mitigation tracking. Mitigation commitments for noise impacts and air quality remain key concerns both of this office and the commenters, and are presented in the form of project-specific Section 61 Findings, as well as more general mitigation that has emerged from the ESPR process.

The majority of comments received on the EDR focused on noise issues, including measurement of noise, modeling of noise contours, and noise abatement. In addition to responding to these comments, the 2011 ESPR and future EDRs should also report on the progress and other refinements for tracking noise and abatement efforts, as further described in the Scope for the 2011 ESPR below.

Background

In 1979, the Secretary of the Executive Office of Environmental Affairs issued a Certificate requiring Massport to define, evaluate, and disclose, every three years, the impact of long-term growth at the airport through a Generic Environmental Impact Report (GEIR). The Certificate also required the submission of interim Annual Updates to provide data on conditions for the years between the GEIRs. The GEIR provided projections of environmental conditions where the cumulative effects of individual projects could be understood. The Secretary's Certificate on the *1997 Annual Update* proposed a revised environmental review process for Logan Airport. As a result, Massport evaluates the cumulative impacts associated with airport activities through preparation of an ESPR every five years and provides data updates annually through the EDRs.

The last Logan ESPR was filed for calendar year 2004. However, due to the current economic downturn, as described in the 2008 and 2009 EDRs, activity levels at Logan Airport and associated environmental impacts continue to remain well below historic levels. Therefore it was anticipated that in 2010, near-term activity levels and associated environmental effects were also expected to remain well below levels previously analyzed for Logan Airport. Thus, the forecasted aviation growth presented in the 2004 ESPR, the predicate upon which the ESPR schedule was initially established, did not occurr. Therefore, I allowed Massport to prepare a 2010 EDR in lieu of the scheduled ESPR. Massport has prepared the 2010 EDR, which will be followed by a 2011 ESPR. Massport proposed a schedule for filing the next ESPR in light of observed and expected activity levels and any other changes in airport operations that have occurred since the 2004 ESPR was filed.

Review of the 2010 EDR and Scope for the 2011 ESPR

General

The 2011 ESPR should follow the general format of the 2004 ESPR, presenting major policy discussions and an overview of the role of Logan Airport in the regional planning context. This should be followed by a status report on Massport's planning initiatives, projects, and mitigation measures. The ESPR should include an Executive Summary and Introduction, similar to previous ESPRs and EDRs. Massport must provide necessary background information to allow reviewing agencies and the public to understand the environmental policies and planning which form the context of the environmental reporting, technical studies, and environmental mitigation initiatives at Logan Airport.

The 2011 ESPR should report on updated passenger and operations activity forecasts for Logan Airport and Massport's other airports, Hanscom Field and Worcester Regional Airport. The new forecast used should begin with 2011 as the base year and project activity forecasts forward to calendar year 2030. In addition, the 2011 ESPR should use the results of the 2010 Logan Airport Air Passenger Survey and the findings of the Sustainable Ground Access Strategy and Service Plan effort to inform future access planning.

The technical studies in the 2011 ESPR should include reporting on and analysis of key indicators of airport activity levels, the regional transportation system, ground access, noise, air quality, environmental management, and project mitigation tracking. The 2011 ESPR must also respond to those issues explicitly noted in this Certificate and the comments received on the 2010 EDR.

A distribution list for the 2011 ESPR (indicating those receiving documents, CDs, or Notices of Availability) should be provided in the document. This section must also include copies of all ESPR and EDR Certificates issued since the 2004 Logan Environmental Status and Planning Report (issued on August 16, 2006) to provide context for reviewers. Supporting technical appendices should be provided as necessary.

Responses to Comments

The 2011 ESPR must include responses to comments that address all of the substantive comments from the letters listed at the end of this Certificate. The responses to comments included in the 2010 EDR is well-constructed and cross-referenced. Massport may follow the same format in addressing comments in the 2011 ESPR.

The majority of comments received on the 2010 EDR focus on noise related issues, including measurement of noise, modeling of noise contours, and noise abatement, and emission

reduction issues. In addition to responding to these comments, the 2011 ESPR should continue to report on the refinements to noise tracking and abatement efforts. Massport should consult directly with individual commenters where appropriate.

Activity Levels

The Activity Levels chapter provides a solid analysis of major activity issues and the technical appendix contains useful and detailed information. This chapter presents aviation activity statistics for Logan Airport in 2010 and compares activity levels to the prior year, including air passengers, aircraft operations, fleet mix, and cargo/mail volumes.

There were a number of significant changes in activity at Logan Airport in 2010. The total number of air passengers at Logan Airport increased by 7.5 percent to 27.4 million, compared to 25.5 million in 2009. In comparison, between 2008 and 2009 the number of air passengers using Logan Airport declined by 2.3 percent. This is below the historic peak reached in 2007. Also the total number of aircraft flights grew from approximately 345,310 in 2009 to 352,640, an increase of 2.1 percent. This remains below the historic peak achieved in 1998. Passenger aircraft operations did, however, decrease by 1.6 percent compared to 2009 levels. Compared to a decline of 48.6 percent in 2009, general aviation (GA) operations increased 19.9 percent in 2010, particularly as businesses increased their travel and use of GA transportation as the economy transitioned. GA accounted for 4.2 percent of aircraft activity at Logan Airport in 2010. In addition, dedicated air cargo operations decreased by 5.8 percent compared to the previous year.

The EDR reflects data that shows that the number of air passengers per aircraft operation increased, from an average of 73.9 passengers per aircraft operation in 2009 to an average of 77.8 in 2010. While legacy air carriers continued to reduce the number of aircraft operations at Logan Airport, low-cost carrier (LCC) operations increased by approximately 40 percent in 2010. The increase in operations by LCCs, primarily JetBlue Airways and Southwest Airlines, accounted for nearly all of this growth. Even though the number of dedicated air cargo aircraft operations decreased in 2010, air cargo volumes increased from 546 million pounds in 2009 to 572 million pounds in 2010, an increase of 4.7 percent.

The 2011 ESPR must report on airport activity levels, including information on aircraft operations, including fleet mix, passenger activity levels, and cargo and mail operations. It should also report on Massport's activity level forecasts that will become the basis for the planning and impact sections that follow and for Massport's strategic planning initiatives over the next few years.

For the 2011 ESPR, the Activity Levels chapter should include:

- Aircraft operations, including fleet mix and scheduled airline services at Logan Airport;
- Passenger activity levels;

- Cargo and mail activities;
- Compare 2011 aircraft operations, cargo/mail operations, and passenger activity levels to 2010 activity levels; and
- Report on national aviation trends in 2011 and compare to trends at Logan Airport.

It should also report on Massport's forecasts that become the basis for the planning and impact sections that follow and for Massport's planning initiatives over the next five years. Future year analyses should be based on the 2030 forecast. It should update the aircraft operations and passenger activity forecasts, and provide a discussion of analysis methodologies and assumptions, including anticipated fleet mix changes and other trends in the aviation industry. It should also report on the following:

- Compare 2011 operations to historic trends (to 2000) and forecasts for planning horizon year 2030;
- Present updated forecasts of Logan Airport's passenger volume, aircraft operations, and fleet mix; and
- Compare forecast activity levels to historic trends, prior Logan Airport forecasts, and Federal Aviation Administration (FAA) forecasts for Logan Airport and the U.S. industry.

In addition to reporting the analysis of major activity issues, I advise Massport to consider and attempt to address all comments related to activity levels in the 2010 EDR.

Planning

The Airport Planning chapter provides an overview of planning, construction, and permitting activities that occurred at Logan Airport in 2010. It also describes known future planning, construction, and permitting activities. In 2010 Massport completed the permitting process for redeveloping the Southwest Service Area (SWSA), a new consolidated rental car facility (ConRAC). Construction of this project began in July 2010. In July 2009, the MEPA review process began for the Logan Runway Safety Area (RSA) Improvements Project at Runway Ends 33L and 22R. In July 2010, Massport filed a combined federal/state Draft EA/EIR and the Final EA/EIR on January 31, 2011. Construction of the Runway 33L RSA improvements commenced in June 2011. In 2010 MEPA review was completed on the Green Bus Depot, a bus maintenance facility for Massport's clean fuel fleet buses in the North Service Area (NSA). The Green Bus Depot will be used to maintain the expanded shuttle bus fleet that will replace the Airport's aging compressed natural gas (CNG) bus fleet and the rental car company diesel shuttle buses. Construction of this project began in 2011.

The 2010 EDR reports multiple projects in the planning and design phase. Planning for the East Boston-Chelsea Bypass project commenced to develop a limited access roadway between Logan Airport and the new Chelsea Street Bridge. The Bypass roadway is expected to improve commercial vehicle access to the Airport, as well as reduce congestion on local East

Boston streets in the vicinity of Day Square, Eagle Square, and the Neptune Road corridor by directing airport-related commercial traffic to the new Bypass roadway. Massport filed an ENF on October 15, 2010, for which I determined that no further MEPA review was required. Construction is underway as of 2011. Massport also initiated planning for the Logan Airport Parking Deck Project (Economy Garage) along Prescott Street in the North Cargo Area (NCA) in 2010. The project was not subject to MEPA review and construction of the economy garage began in summer of 2010 and was completed and fully opened to the public in early 2011. Massport installed solar panel "trees" on the roof of the parking deck, and energy-efficient lighting throughout.

In the 2010 EDR, Massport also discusses completing the North Service Area (NSA) Roadway Corridor Project with final landscaping in 2011, which is a project to unify the existing roadway with new landscape. Construction of the NSA Roadway Corridor Project also began in 2010. Architectural design also commenced in December 2010 for two hangar upgrades in the NCA. In addition, Terminal B Garage repair and rehabilitation continued in 2010 where 32 solar panel trees (200 kilowatt (kW)) were installed on the top floor and the entire garage was fitted with high efficiency Light-Emitting Diode (LED) lighting. Taxiway G realignment construction was completed in 2010.

The 2011 ESPR should continue to assess planning strategies for improving Logan Airport's operations and services in a safe, secure, more efficient, and environmentally sensitive manner. As owner and operator of Logan Airport, Massport must accommodate and guide tenant development. The ESPR should describe the status of planning initiatives for the following areas:

- Roadway Corridor Project;
- Airport Parking;
- Terminal Area;
- Airside Area;
- Service and Cargo Areas; and
- Airport Buffers and Landscaping.

The 2011 ESPR should also indicate the status of long-range planning activities, including the status of public works projects implemented by other agencies within the boundaries of Logan Airport. The ESPR should also indicate the status and effectiveness of ground access changes, including roadway and parking projects, that consolidate and direct airport-related traffic to centralized locations and minimize airport-related traffic on streets in adjacent neighborhoods.

Regional Transportation

In general, the 2010 EDR has met the requirements with respect to regional transportation issues. It describes activity levels at New England's regional airports in 2010 and updates recent planning activities. Massport has demonstrated that it is coordinating its planning with other transportation agencies, and that this planning effort is aimed at minimizing cumulative impacts from Logan Airport operations. The 2010 EDR includes estimates of potential passenger diversions from Logan, and outlines how Massport planning encourages those diversions.

The total number of air passengers utilizing New England's commercial service airports, including Logan Airport, increased from 42.0 million in 2009 to 43.1 million annual air passengers, an increase of 2.5 percent in 2010. While Logan Airport passenger traffic grew, air passenger levels continued to decline at the other regional airports. Passenger levels at the regional airports declined by 5.2 percent in 2010, compared to an increase of 7.5 percent at Logan Airport. This was largely due to legacy carriers withdrawing from smaller secondary markets and reducing their use of small regional jets.

Aircraft operations in the New England region remained largely flat, increasing slightly by 0.7 percent, from 1.03 million operations in 2009 to 1.04 million operations in 2010. The 2010 EDR reports that commercial airline operations declined by 0.25 percent. General aviation and military flights increased by 1.9 percent and 4.7 percent respectively. For the 2011 ESPR, Massport should continue to engage in cooperative metropolitan planning efforts including GreenDOT and the Healthy Transportation Compact, and the Boston Metropolitan Planning Organization (Boston MPO).

The directives in the last ESPR Certificate were laid out to have Massport look at potential diversions, and explain how its planning and coordination with other agencies could impact potential diversions. The 2010 EDR has performed this task.

The 2011 ESPR should describe Logan Airport's role in the region's intercity transportation system by reporting on the following:

Regional Airports

- 2011 regional airport operations, passenger activity levels, and schedule data within a historical context;
- Status of plans and new improvements as provided by the regional airport authorities;
- Ground access improvements to the regional airports; and
- The role that Worcester Regional Airport and Hanscom Field play in the regional aviation system and Massport's efforts to promote these airports, including the updated 2030 forecasts for both airports.

Regional Transportation System

- Overview of the restructured Massachusetts Department of Transportation (MassDOT) and Massport's role in managing regional transportation facilities;
- Massport's cooperation with other transportation agencies to promote efficient regional highway and transit operations; and
- Report on metropolitan and regional rail initiatives and ridership.

Ground Transportation

The 2010 EDR reported on 2010 ground access conditions at the airport. This chapter reports on transit ridership, roadways, traffic volumes, and parking for 2010. Specifically, the total number of annual air passengers at Logan Airport increased 7.5 percent to 27.4 million, compared to 25.5 million in 2009. During the same period, average daily traffic on airport roadways increased by 5.1 percent from 2009 to 2010, while vehicle miles traveled (VMT) at the Airport increased by 4.8 percent. The number of vehicles parked at the Airport increased by four percent from 2009 to 2010. As stated previously, Massport began construction of the Logan Airport Parking Deck Project, located on the 1,000-space Economy Lot in the NCA. It consolidates an additional 2,000 commercial parking spaces from various on-airport temporary commercial parking lots into a single structured parking facility containing approximately 3,000 commercial parking spaces. The garage maintains on-airport parking capacity in compliance with the limits imposed by the Logan Airport Parking Freeze. The garage was fully opened in March 2011.

Ground access activity to Logan Airport generally increased for all travel modes from 2009 to 2010. In 2010, Massport administered the periodic *Logan Airport Air Passenger Ground Access Survey* which indicates that mode shares for high-occupancy vehicles (HOV) to the Airport have returned to 2004 levels (30 percent HOV mode share) after having decreased by two percent in the *2007 Air Passenger Ground Access Survey*. MBTA Silver Line boardings at the Airport continued to grow, increasing by five percent in 2010, while Blue Line boardings at Airport Station decreased slightly compared to 2009. In 2010, ridership on water transportation to the Airport increased by about one percent in comparison to the previous year. Limousine ridership increased by an estimated 16 percent, and taxi dispatches increased 12 percent from 2009 to 2010. In 2010, Logan Express air passenger ridership increased by about one percent compared to 2009 levels, whereas employee use of Logan Express increased by four percent, and accounts for 42 percent of the service's ridership.

The 2011 ESPR should report on 2011 ground access conditions at the airport and provide a comparison of 2011 findings to those of 2010 for the following:

- Detailed description of compliance with Logan Airport Parking Freeze;
- High-occupancy vehicle (HOV) ridership (including Blue Line, Silver Line, Water Transportation, and Logan Express);
- Logan Airport Employee Transportation Management Association (Logan TMA) services;
- Logan Airport gateway volumes;
- On-airport traffic volumes;
- On-airport vehicle miles traveled (VMT);
- Parking demand and management (including rates and duration statistics);
- Status of long-range ground access management strategy planning; and

- Results of the 2010 Logan Airport Air Passenger Survey.

The chapter should present a discussion of analytical methodologies and assumptions for the planning horizon year (2030) for traffic volumes, on-airport vehicle miles traveled (VMT) and parking demand.

The 2011 ESPR should present a discussion of the following topics:

- Massport's target HOV mode share along with incentives;
- Non-Airport through-traffic;
- Massport's cooperation with other transportation agencies to increase transit ridership to and from Logan Airport via the Blue Line, Silver Line, Water Transportation, and Logan Express;
- Report on Logan Express usage and efforts to increase capacity and usage;
- Progress on enhancing water transportation to and from Logan Airport;
- Progress on rental car consolidation;
- Report on results of ground access study; and
- Strategies for enhancing services and increasing employee membership in the Logan Airport TMA.

Noise

The EDR updates the status of the noise environment at Logan Airport in 2010, and describes Massport's efforts to reduce noise levels. The technical appendix contains useful and detailed information, while the main document provides a solid analysis of major noise issues. Many of the issues raised in the noise analysis are ongoing and require continuous monitoring. The future 2011 ESPR represents an appropriate forum to serve this updating function.

The 2010 Day-Night Sound Level (DNL) contours are similar in size compared to 2009. The DNL 65 decibel (dB) contour remained the same in Revere and in most of Winthrop. The extent of the DNL 65 dB contour decreased slightly in the Point Shirley section of Winthrop due to the reduced number of departures from Runway 9 and the reduced number of aircraft arrivals over South Boston and East Boston. The geographic extent of the DNL 65 dB contour, however, did increase in East Boston near the Airport and over Boston Harbor due to an increase in departures from Runway 15R.

The 2010 EDR also reported on the findings of the Integrated Noise Model's (INM) results of the population impacted by airport noise and used both the 2010 and 2000 U.S. Census data as a basis for comparison. Using the 2000 Census, the overall number of people exposed to values greater than DNL 65 dB decreased by 11 percent in 2010, compared to 2009. An estimated 3,870 people were exposed to levels greater than DNL 65 dB as depicted in the 2010 contour, compared to 4,335 in 2009. This is the first time that the number of people exposed to the DNL 65 dB noise level has been fewer than 4,000 and that the number of people within the

DNL 65 dB in Boston has dropped below 1,000 to 711 people. Also the total population exposed to noise levels greater than DNL 70 dB decreased in 2010 compared to 2009. In 2009, the total population exposed to greater than DNL 70 dB was 243, and in 2010 the number dropped to 198.

The 2010 EDR also reports that in 2010, Massport provided sound insulation to 83 homes, nearly half of which are in Chelsea. The focus of this program in Chelsea was to fulfill federal and state mitigation commitments related to the opening of Runway 14-32. Since the inception of Massport's Sound Insulation program, 11,219 homes have received sound insulation treatment in East Boston, South Boston, Winthrop, Revere, and Chelsea.

The information in this chapter is very informative and I encourage Massport to continue with more detailed analysis in the 2011 ESPR. I strongly advise Massport to consider and address the comments received that have raised noise related concerns. The comments from the City of Cambridge, as well as from individuals have raised a number of concerns and suggestions related to noise that Massport should address into the 2011 ESPR.

The 2011 ESPR should provide an overview of the environmental regulatory framework affecting aircraft noise, the changes in aircraft noise, the methodologies used to track noise, and any changes in noise modeling. The chapter must report on 2011 conditions and compare 2011 conditions to those of 2010 for the following:

- Fleet Mix, including Stage II, Recertified (Hushkitted) Stage III, newly manufactured Stage III, and qualifying Stage IV aircraft;
- Nighttime operations;
- Runway utilization (report on aircraft and airline adherence with runway utilization goals);
- Preferential runway advisory system (PRAS) tracking and
- Flight tracks.

The chapter must report on 2011 conditions and compare those to 2010 conditions for the following noise indicators:

- Using the Federal Aviation Administration's (FAA) most current version of the Integrated Noise Model (INM) produce an accurate set of Day-Night Sound Level (DNL) noise contours;
- Noise-impacted population (using the 2010 Census data);
- Measured versus modeled noise values, including reasons for differences and any improvements attributable to the use of most current version of the Integrated Noise Model (INM);
- Cumulative Noise Index (CNI);
- Times-Above for 65, 75, and 85 dBA threshold values/Dwell and Persistence of noise levels;
- Installation and benefits of the new noise monitoring system; and
- Flight track monitoring noise quarterly reports.

The chapter should report on noise abatement efforts, results from Boston Logan Airport Noise Study (BLANS) study, and provide a status update on the new noise and operations monitoring system. This chapter should also present a discussion of analysis methodologies and assumptions, including fleet mix and runway use assumptions, and report on future year conditions for 2030 for the following noise indicators:

- Runway utilization;
- DNL noise contours; and
- Population counts.

The chapter should also report on noise abatement efforts and provide a status update on any new noise and operations monitoring system. At the public meeting held on November 16, 2011, several residents of the Point of Pines section of Revere requested that their homes be included in Massport's Residential Sound Insulation Program (RSIP). As discussed at the public meeting and shown in the 2010 EDR, Point of Pines falls outside the 60 DNL contour, and, therefore, is ineligible for funding in the FAA's RSIP that begins at the 65 DNL contour. However, in response to a resident's and the City Council's request, Massport has already committed to conducting supplemental noise monitoring during 2012 in the Point of Pines area to validate the results of the permanent noise monitor (Carey Circle, #17) in that section of Revere. The results of that analysis should be reported in the 2011 ESPR.

Air Quality

The 2010 EDR provides an overview of airport-related air quality issues in 2010 and efforts to reduce emissions. The 2010 EDR reports that the total emissions of volatile organic compounds (VOC) were 1,019 kilograms per day (kg/day). This number is four percent higher than 2009 levels but is still following a long-term, downward trend decreasing by almost 78 percent since 1990. The increase is primarily due to the increase in landing and takeoff operations (LTOs) when compared to 2009. The total emissions of oxides of nitrogen (NOX) were 3,989 kg/day, or less than one percent higher than 2009 levels. In 2010, total NOx emissions at Logan Airport (net total with reductions) were approximately 742 tons per year (tpy) lower than Massport's 1999 Air Quality Initiative (AQI) benchmark. This represents a 32 percent decrease in NOx emissions since 1999. The total emissions of carbon monoxide (CO) were 7,160 kg/day, or 10 percent lower than 2009 levels. Due to the decreased use of No. 6 fuel oil, total emissions of particulate matter (PM) PM10/PM2.5 associated with Logan Airport heating and cooling decreased in 2010 by approximately 10 percent to 64 kg/day compared to 2009 levels.

The 2010 EDR reports that since 1999, there has been a continuing trend of decreasing nitrogen dioxide (NO2) concentrations at both the Massport and Massachusetts Department of Environmental Protection (MassDEP) monitoring sites located in the vicinity of Logan Airport. In addition, the annual NO2 concentrations at all monitoring locations in 2010 continued to be well within the National Ambient Air Quality Standards (NAAQS) for NO2. The 2010 EDR

also reported on Massport's two-phased Air Quality Monitoring Study that is collecting data on a variety of ambient air pollutants over a two year period and assessing air quality changes attributable to the operation of the new centerfield taxiway. The second phase of the Study concluded in 2011, after the centerfield taxiway became fully operational. Massport will submit the findings from this study to MassDEP in late 2011 or early 2012. The results of this study should also be reported in the 2011 ESPR.

Massport prepared an inventory of greenhouse gas (GHG) emissions directly and indirectly associated with Logan Airport operations. The 2010 GHG emission inventory was updated incorporating guidance developed by the Transportation Research Board's (TRB) Airport Cooperative Research Program (ACRP). The ACRP guidance was published in April 2009 for airport operators to develop an airport-specific GHG emissions inventory. The 2010 inventory assigns emissions based on ownership or control (e.g., Massport, airlines and other airport tenants, and the general public). The vast majority of emission sources at Logan Airport are owned or controlled by the airlines, airport tenants, and the general public (through emissions from motor vehicles). According to the EDR, Massport sources contribute 12 percent of the total GHG emissions for the Airport. Total Logan Airport GHG emissions in 2010 were slightly lower (0.4 percent) than 2009 levels.

The 2011 ESPR should include an overview of the environmental regulatory framework affecting aircraft emissions, changes in aircraft emissions, and the changes in air quality modeling. The chapter should also discuss analytical methodologies and assumptions and report on 2011 conditions using the most recent versions of the Emissions Dispersion Modeling System (EDMS) and MOBILE motor vehicle emissions. The chapter should also include:

- Emissions inventory for carbon monoxide (CO);
- Emissions inventory for oxides of nitrogen (NOx);
- Emissions inventory for volatile organic compounds (VOCs);
- Emissions inventory for particulate matter (PM);
- Nitrogen dioxide (NO2) monitoring; and
- NOx emissions by airline.

This chapter must also report on the following air quality initiatives (AQI) for 2011:

- Air Quality Initiative Tracking;
- Massport's and Tenant's Alternative Fuel Vehicle Programs; and
- The status of Logan Airport air quality studies undertaken by Massport or others, as available.

The 2011 ESPR should also include an inventory of greenhouse gas (GHG) emissions from Logan Airport in 2011. GHG emissions should be quantified for aircraft, motor vehicles and stationary sources using emission factors and methodologies outlined in the *Greenhouse Gas Emissions Policy and Protocol* issued by EEA and the Transportation Research Board's

Guidebook on Preparing Airport Greenhouse Gas Emissions Inventories (Airport Cooperative Research Program (ACRP) Report 11, Project 02-06). The results of the 2011 GHG emissions inventory should be compared to the 2010 results.

The ESPR should also present a discussion of analytical methodologies and assumptions and report on future year condition for 2030 for the following air quality indicators:

- Emissions Inventory for CO;
- Emissions Inventory for NOx;
- Emissions Inventory for VOCs; and
- Emissions Inventory for GHGs.

In a comment letter from Mr. Pomicter, there is a request for a program to encourage the use of single-engine taxiing and suggested that Massport has not fulfilled its Section 61 mitigation commitments associated with the Logan Airside Improvements Project (EOEA #10458), specifically related to single-engine taxi procedures. The ESPR should include an update on Massport's efforts to encourage the use of single engine taxiing under safe conditions. I encourage Massport to communicate with airlines regarding the use of single engine taxiing, when safe to do so, within the Logan Airport operational context. An update of this effort should be provided in the 2011 ESPR.

The 2011 ESPR should also report on the status of the Logan Health Study, as requested by a commenter, which is currently underway by the Massachusetts Department of Public Health (DPH), portions of which were funded by Massport. This DPH study was initially fully funded by the Commonwealth, but was later cut by the legislature. Massport agreed to fund the shortfall for a total of $195,000. This sum was transferred to the Commonwealth/ DPH in December 2010 and that study is now progressing to completion. Massport should continue to provide data to DPH in support of this analysis. The commenter also questioned why the Commonwealth had not yet completed the legislated study of health effects of particulate air pollution (and specifically fine and ultrafine particulate matter) from surface and air transportation required by the Transportation Reform Act of 2009. Because there are presently no federal or state public health standards for ultrafine particulate matter, Massport committed to provide $150,000 to MassDOT in support of the scoping of the analyses called for in the Transportation Reform Act. The 2011 ESPR should provide more details on this commitment.

<u>Water Quality/Environmental Compliance</u>

The 2010 EDR describes Massport's ongoing environmental management activities including National Pollutant Discharge Elimination System (NPDES) compliance, stormwater, fuel spills, activities under the Massachusetts Contingency Plan, and tank management. In accordance with the requirements of the current NPDES permit for Logan Airport that was issued on July 31, 2007, Massport and all 27 co-permittees and tenants began preparation of an updated Stormwater Pollution Prevention Plan (SWPPP). Massport completed its SWPPP in December

of 2007 and tenant SWPPPs were completed in March 2008. Massport's SWPPP addresses stormwater pollutants in general, and also addresses deicing and anti-icing chemical, potential bacteria, fuel and oil, and other sources of stormwater pollutants.

In accordance with the Massachusetts Contingency Plan (MCP), the 2009 EDR reported that Massport continues to assess, remediate, and bring to regulatory closure areas of subsurface contamination. The 2010 EDR states that Massport is working towards achieving regulatory closure of the remaining MCP sites. In addition, preparation of the Environmental Management System (EMS) for facilities where fleet and field maintenance activities are conducted was on-going in 2010.

In 2010, there were 15 oil and hazardous material spills that required reporting to MassDEP, five of which involved a storm drainage system. One outfall sample out of a total of 19 samples at the Maverick Street Outfall and one outfall sample out of a total of 23 samples at the North Outfall exceeded the regulatory limits of the NPDES permit for the North, West, and Maverick Street Outfalls. The 2010 EDR reports that these exceedances were reported during April and November of 2010, respectively, as required. The 2010 Annual Certificates of Compliance were submitted to the U.S. Environmental Protection Agency (EPA) and MassDEP on December 21, 2010, for Massport and each tenant co-permittee.

The 2011 ESPR should report on the 2010 status of:

- NPDES Permit and monitoring results for Logan Airport's outfalls and the Fire Training Facility;
- Jet fuel usage and spills;
- Massachusetts Contingency Plan (MCP) activities;
- Tank management;
- Update of the environmental management plan; and
- Fuel spill prevention.

The chapter should also present a discussion of the following topics:

- Future stormwater management improvements (if any) ; and
- Future MCP and tank management activities.

Massport should continue to report in the 2011 ESPR how it will assess, remediate, and bring to regulatory closure areas of subsurface contamination.

<u>Sustainability at Logan Airport</u>

This chapter describes Massport's airport-wide sustainability goals. In October 2000, the Massport Board approved an Authority-wide Environmental Management Policy that articulates Massport's commitment to protect the environment and to implement sustainable design principles. In October 2004, the Massport Sustainability Team produced the *Massachusetts Port Authority Sustainability Plan* (Sustainability Plan). The Environmental Management Policy is incorporated in the Sustainability Plan as Massport's long-term sustainability goal or vision. It also identifies the actions necessary to achieve the goals, the staff members responsible for each sustainability goal, and the timeline for achieving the goals. The short-term goals set out in the Sustainability Plan were described in the 2010 EDR. Massport participated in the 2010 Environmental Benchmarking Survey sponsored by Airports Council International-North America (ACI-NA) to assess solar power, purchase of renewable energy, availability of low-emission ground transportation, recycling, and environmentally preferred purchasing.

The EDR describes Massport's continued sustainability efforts and details how sustainability is incorporated into many aspects of Massport's activities. The information in this chapter is very informative and I encourage Massport to continue with its updates in the 2011 ESPR. The 2011 ESPR should report on the status of mitigation commitments for specific Massport and tenant projects at Logan Airport that have commenced construction. The mitigation commitments were made in the Section 61 Findings for the following projects which should be reported:

- West Garage/Central Garage;
- International Gateway;
- Runway Ends 22R and 33L Runway Safety Area Improvements;
- Replacement Terminal A;
- Logan Airside Improvements Planning; and
- Southwest Service Area Redevelopment Program.

The 2011 ESPR should also update the status of Massport's mitigation commitments and also identify projects for which mitigation measures have been completed.

Distribution of the 2011 ESPR

Several commenters have requested more timely filings of future EDRs and the forthcoming 2011 ESPR and other information related to the airport. Massport should explore opportunities to advance the reporting of information through Massport's website. Massport should strive to collect and analyze the information required for the 2011 ESPR and report this information in a timely manner. Many commenters have suggested ways to improve the text, maps and graphics and Massport should consider those changes for future filings. For several recent projects, Massport has published bi-lingual meeting and project notices and made the services of an interpreter available upon request. Massport should consider continuing these services for the 2011 ESPR and future EDR submittals.

Conclusion

I have determined that the 2010 EDR for Logan Airport has adequately complied with MEPA and that Massport must submit a 2011 ESPR that responds to the issues raised in

comments received. The 2011 ESPR must include a copy of this Certificate and a copy of each comment letter received on the 2010 EDR. In particular, Massport should provide a thorough examination of issues raised regarding individual noise monitoring locations, noise measurement and modeling, noise abatement, and air quality issues.

December 16, 2011
Date

for Richard K. Sullivan Jr.

Comments Received:

12/09/2011	Air, Inc.
12/09/2011	City of Cambridge, Executive Department
12/09/2011	Nancy Timmerman
12/09/2011	Stephen Kaiser, PhD
12/09/2011	Darryl Pomicter
12/15/2011	Boston Transportation Department
12/15/2011	The Boston Harbor Association
12/15/2011	City of Boston Environment Department

RKS/ACC/acc

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Comment Letters and Responses

- The six comment letters received by the Massachusetts Environmental Policy Act (MEPA) Office on the *2011 Environmental Status and Planning Report (ESPR)* are reprinted here in the order shown below. As requested in the Secretary of the Executive Office of Energy and Environmental Affairs' Certificate, Massport has provided responses to substantive comments raised in the following letters:
  - Annemarie Fagan, Milton Town Administrator
  - Philip Johenning, resident of the Town of Milton
  - Stephen Kaiser, PhD., Cambridge community member
  - Vivien Li, The Boston Harbor Association
  - Nancy Timmerman, P.E., consultant in Acoustics and Noise Control
  - Darryl Pomicter, member of the Citizen Advisory Committee (Emails dated March 21, March 24, and June 7, 2013)

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May 28, 2013

Honarable Richard K. Sullivan
Executive Office of Energy and Environmental Affairs
100 Cambridge Street, Suite 900
Boston, MA 02114

Re: Logan Airport 2011 ESPR, EOEA #3247

According to the Noise Abatement Chapter (6) of the 2011 Environmental Status and Planning Report (ESPR), Milton which is 13.5 square miles is one of the most heavily burdened communities experiencing a steadily increasing burden over time. This is evidenced by:

1. Table 6-8, page 6-41. Of the 30 noise monitor sites, there are 27 sites that are closer to Logan than Milton at site #24, and only two are farther. Three of the 27 that are closer were not included in the average. **Of the remaining 24 sites closer to Logan than the Milton site, 29% have smaller measured 2007 DNL than Milton's 49.4 value**. These sites are East Boston (Piers Park), Quincy (Squaw Rock Park), Everett, Nahant, Medford, Mattapan, and Jamaica Plain, which are all geographically closer to Logan. **This means that even Milton's greater distance from Logan does not protect it from Logan noise compared to these 7 sites**. Both Quincy (Squaw Rock Park) and Milton's DNL increased from the 2010 measured value. B-1
2. Figures 6-17 and 6-18, page 6-50. A significant part of Milton citizen's noise burden occurs because of R4 arrivals. These figures show the annual hours of dwell and persistence "exceedance" measures to be higher in 2011 **than in the 7 previous years**.
    1. According to Table 6-3, page 6-52, Milton's estimate of minutes above threshold in 2011 is 5.0 minutes GREATER (in an "average" day) than in 2010 even though the average across all 30 monitor sites DECREASED by 9.2 minutes.
    2. Page 6-53 shows that although most sites had a decrease in the minutes of average-day, **9-hour nighttime noise burden** (an average DECREASE of 1.2 minutes), Milton's nighttime noise burden INCREASED.
3. The 2011 ESPR fails to acknowledge that Milton is an Affected Neighborhood for 27 Departures (see Table 6-12 page 6-49). Planes using the 27 RNAV are extremely disturbing as they fly at low altitudes over the southwest neighborhoods of Milton. B-2
4. Given the increased and disproportionate burden of airplane noise that Milton is already experiencing, the addition of the proposed Runway 33L RNAV over Milton would clearly be extremely detrimental to Milton's residential quality of life and property values.

These increases in measures of noise burden for Milton residents--compared to the decrease in many areas closer to Logan--is consistent with the increasing number of individuals in our Town who report that the airplane noise wakes them and their family members (including children), interrupts their conversations, and interferes with the peaceful enjoyment of their home.

B-3 MIlton's noise burden has also been inadequately monitored. Currently only one-third of MASSPORT's noise monitors are south of Boston. Fairness and the trend toward more air traffic burden over Milton and other communities surrounding indicates that additional noise monitors in this area are required. Therefore the Town of Milton requests:

- B-4 The installation of at least five additional noise monitors are installed south of Boston during the next year, including one in southwest Milton.
- B-5 That next year's report include the maintenance schedules and calibration history of the noise monitors and that the noise monitor in Milton be checked for accuracy during this next year.
- B-6 A correction to page Table 6-12 page 6-49 to show that Milton is an Affected Neighborhood for 27 Departures. The 27 RNAV over Milton is acknowledged in slide presentations by Massport's Flavio Leo and there should be no disagreement that Milton is affected significantly by these departures.
- B-7 A reduction of flights, and elimination of low altitude flights, between 10pm and 7am over our densely populated area, particularly as arrivals and departures over the water are possible. Although the DNL measure penalizes nighttime flights, we believe the penalty is far outweighed by incentives to save time, fuel and expenses. The increase in nighttime and early morning noise from aircraft has been particularly disturbing to our Town.
- B-8 That Massport/FAA develop and utilize a true measure of community noise burden. We understand that the current estimate has been used for several decades and that is a *predicted* value – with no actual measurements used to calibrate the predictive model and no quantification of prediction error. There exist more recent and more valid ways to quantify noise burden and we encourage the use of them in future reports. These measures include the two exceedance measures, the Community Noise Equivalent Level that is required in the state of California, and the Noise Pollution Level measure which accounts for the variation in noise levels.
- B-9 That next year's report uses the newer AEDT software and that it includes comparisons between estimates from the old and new software. Our understanding is that in FY2014 the AEDT software will replace the INM software for environmental assessments.
- B-10 Future reports should include standard deviations or margin of errors of all noise measurements.
- B-11 Given the major changes in the operation of flights into and out of Logan, the use of RNAVs, and the availability of better noise measures and software, we request that future evaluations consider a complete reevaluation of the current standard analyses and reporting to reflect current patterns and use of Logan air traffic.
- B-12 That the goals specified by the Preferential Runway Advisory System (PRAS) should continue to be shown in future reports.
- B-13 Finally, historical wind direction information from Massport should comport with Massport's runway used data from 2012, 2011 and 2010. The number one issue appears to be the extreme under use of runway 15R for arrivals when there is a southeast wind (17%).

Comment #	Author	Topic	Comment	Response
B.1	Annemarie Fagan, Milton Town Administrator	Noise	Table 6-8, page 6-41. Of the 30 noise monitor sites, there are 27 sites that are closer to Logan than Milton at site #24, and only two are farther. Three of the 27 that are closer were not included in the average. Of the remaining 24 sites closer to Logan than the Milton site, 29% have smaller measured 2007 DNL than Milton's 49.4 value. These sites are East Boston (Piers Park), Quincy (Squaw Rock Park), Everett, Nahant, Medford, Mattapan, and Jamaica Plain, which are all geographically closer to Logan. This means that even Milton's greater distance from Logan does not protect it from Logan noise compared to these 7 sites. Both Quincy (Squaw Rock Park) and Milton's DNL increased from the 2010 measured value.	Sites 23,24, and 25 (Dorchester, Milton and Quincy) all experienced an increase in measured levels in 2011 due to the increased use of Runway 4L-4R for arrivals. Each monitor location is affected by different types of operations so it is not appropriate to compare all of the sites solely based on distance. For example, the Milton site is under the arrival path to Runway 4R and arriving aircraft typically descend in a gradual path resulting in lower altitudes farther away from the airport. Whereas at a monitor under a departure path, such as Site 18 (Nahant) which is three miles closer to Logan Airport, the aircraft are climbing and are higher in altitude. The monitor in Lynn on the North shore is similar to Milton, it is further away from the airport than Milton and has a higher measured noise level. The Lynn monitor is under the arrival path to Runway 22L.
B.2	Annemarie Fagan, Milton Town Administrator	Noise	The *2011 ESPR* fails to acknowledge that Milton is an Affected Neighborhood for 27 Departures (see Table 6-12 page 6-49). Planes using the 27 RNAV are extremely disturbing as they fly at low altitudes over the southwest neighborhoods of Milton.	Runway 27 departures do pass over Milton and several other communities to the west and south of the airport. The communities in Table F 6-12 are directly under the immediate arrival or departure path.
B.3	Annemarie Fagan, Milton Town Administrator	Noise	Milton's noise burden has also been inadequately monitored. Currently only one-third of MASSPORT's noise monitors are south of Boston. Fairness and the trend toward more air traffic burden over Milton and other communities surrounding indicates that additional noise monitors in this area are required.	Massports noise monitors have been located to provide a comparison to the noise modeling and are geographically located to cover Logan Airport's major runways.
B.4	Annemarie Fagan, Milton Town Administrator	Noise	The installation of at least five additional noise monitors are installed south of Boston during the next year, including one in southwest Milton.	Please see the response to Comment B.3

Comment #	Author	Topic	Comment	Response
B.5	Annemarie Fagan, Milton Town Administrator	Noise	That next year's report include the maintenance schedules and calibration history of the noise monitors and that the noise monitor in Milton be checked for accuracy during this next year.	All of the noise monitors in Massport Noise and Operation Management System (NOMS) receive an annual field calibration based upon NIST laboratory standards. In addition, four times a day, all of the noise monitors conduct a calibration test of the measurement system that includes the microphone, pre-amplifier, and analyzer.
B.6	Annemarie Fagan, Milton Town Administrator	Noise	A correction to page Table 6-12 page 6-49 to show that Milton is an Affected Neighborhood for 27 Departures. The 27 RNAV over Milton is acknowledged in slide presentations by Massport's Flavio Leo and there should be no disagreement that Milton is affected significantly by these departures.	Please see the response to Comment B.2
B.7	Annemarie Fagan, Milton Town Administrator	Noise	A reduction of flights, and elimination of low altitude flights, between 10pm and 7am over our densely populated area, particularly as arrivals and departures over the water are possible. Although the DNL measure penalizes nighttime flights, we believe the penalty is far outweighed by incentives to save time, fuel and expenses. The increase in nighttime and early morning noise from aircraft has been particularly disturbing to our Town.	Logan has noise abatement procedures that seek to minimize overflights during the sensitive night time period and place aircraft over compatible land uses where possible (i.e. over Boston Harbor).

Comment #	Author	Topic	Comment	Response
B.8	Annemarie Fagan, Milton Town Administrator	Noise	That Massport/FAA develop and utilize a true measure of community noise burden. We understand that the current estimate has been used for several decades and that is a predicted value - with no actual measurements used to calibrate the predictive model and no quantification of prediction error. There exist more recent and more valid ways to quantify noise burden and we encourage the use of them in future reports. These measures include the two exceedance measures, the Community Noise Equivalent Level that is required in the state of California, and the Noise Pollution Level measure which accounts for the variation in noise levels.	Massport provides noise metrics based on Federal Aviation Administration (FAA) required/accepted integrated noise model. Massport also provides supplemental metrics in addition to the DNL such as Lmax. Massport also provides information from the noise monitors.
B.9	Annemarie Fagan, Milton Town Administrator	Noise	That next year's report uses the newer AEDT software and that it includes comparisons between estimates from the old and new software. Our understanding is that in FY2014 the AEDT software will replace the INM software for environmental assessments.	AEDT 2B has not been released for Airport level analysis yet. The version that has been released (AEDT 2A) is for regional and large scale air traffic analysis. Massport plans to switch to AEDT 2B when it is available as it has done historically with new releases of the Integrated Noise Model (INM). This *2012/2013 EDR* includes the new INM 7.0d release of the model for 2013.
B.10	Annemarie Fagan, Milton Town Administrator	Noise	Future reports should include standard deviations or margin of errors of all noise measurements.	Comment noted.
B.11	Annemarie Fagan, Milton Town Administrator	Noise	Given the major changes in the operation of flights into and out of Logan, the use of RNAVs, and the availability of better noise measures and software, we request that future evaluations consider a complete reevaluation of the current standard analyses and reporting to reflect current patterns and use of Logan air traffic.	Masport has taken steps to include these types of changes in their analysis so there is no reason to reevaluate the current analysis. Massport saw these changes as possible issues years ago and invested in software which models each day of radar data to accurately account for changes in flight patterns, delays, and runway use. These results are used to develop the annual contour reported in the EDR and ESPR. For example, the use of the Runway 33L RNAV beginning in June 2013 is included in the modeling for the *2012/2013 EDR* DNL contour.
B.12	Annemarie Fagan, Milton Town Administrator	Noise	That the goals specified by the Preferential Runway Advisory System (PRAS) should continue to be shown in future reports.	Comment noted.

Comment #	Author	Topic	Comment	Response
B.13	Annemarie Fagan, Milton Town Administrator	Noise	Finally, historical wind direction information from Massport should comport with Massport's runway used data from 2012, 2011 and 2010. The number one issue appears to be the extreme under use of runway 15R for arrivals when there is a southeast wind (17%).	The FAA (air traffic) assigns runway usage based on existing aircraft traffic and meteorological conditions.

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23 Parkwood Drive
Milton, MA 02186
June 4, 2013

Richard K. Sullivan, Jr., Secretary
Executive Office of Energy and Environmental Affairs
100 Cambridge Street, Suite 900
Boston, MA 02114

Regarding: Boston-Logan Airport 2011 Environmental Status and Planning Report #-3247

Dear Mr. Sullivan:

I have two comments as a resident of Milton and they are:

1) The use of runway 4R for arrivals at Logan has increased by more than 20% in 2012 versus 2010. I have not been satisfied by the treatment that I have received from Massport's Noise Abatement Office during the day or the treatment that I receive from the Operations Group after Noise Abatement has left for the day. I believe that the statistics for complaints might be affected by the poor level of discipline maintained by Massport in those groups. C-1 I am not satisfied with the explanations that I routinely receive for runway use that appear inconsistent with wind direction. I noticed that in their discussion of the Preferential Runway Advisory System (PRAS) that Massport stated that they reported the information in this report but I wondered if that information would be available in future reports. I request that this information continue to be reported in future years. I believe that PRAS offers an independent look at the operations of Massport from a noise abatement standpoint. As stated in the report, "PRAS is a set of short-term and long-term runway use goals that include the use of a computer program that recommends to FAA air traffic controllers runway configurations that will meet weather and demand requirements and provide an equitable distribution of Logan Airport's noise impacts on surrounding communities." I urge Massport to push forward in its efforts to meet those defined goals. I also ask what is keeping Massport from achieving those goals today. If Massport has other goals, those goals should be shown with PRAS goals. The benefits to the surrounding communities of the Massport goals vs the PRAS goals should be explained in detail so that the public can judge those goals. C-2
2) With the RNAV system flights now approach Logan airport via corridors in the sky. I find that the 2011 ESPR has not adapted the traditional measurements that they have always used to the new operational reality. These corridors create an environment where those who live below them are bombarded with aircraft noise and air pollution. The intense activity of aircraft in these corridors creates a heightened health risk. C-3 In my reading about the strategy that the FAA was using in creating the corridors I find that the corridors need to be combined with a land use strategy that will dedicate high over flight activity areas with land uses that would reduce the impact on humans on the ground. I believe that, going forward,

C-4 Massport should become a leader in identifying such intense noise and air pollution areas. They should acquire the land from the present owners at a price that recognizes the harm done to the owners and that compensates them for part of their loss. The land should then be re-purposed by Massport in a way that generates economic opportunity for Massport and for the communities while not harming those who work in the businesses located in repurposed portions of metro Boston.

I will appreciate answers to my concerns.

Sincerely,

Philip Johenning

Comment #	Author	Topic	Comment	Response
C.1	Philip Johenning	Noise	I have not been satisfied by the treatment that I have received from Massport's Noise Abatement Office during the day or the treatment that I receive from the Operations Group after Noise Abatement has left for the day. I believe that the statistics for complaints might be affected by the poor level of discipline maintained by Massport in those groups.	The Noise Abatement Office has made multiple return telephone calls to over 100 noise complainants who had requested a follow-up telephone call since the inception of the complaint recording system in January of 2014. These include extended return calls to Mr. Johenning.
C.2	Philip Johenning	Noise	I am not satisfied with the explanations that I routinely receive for runway use that appear inconsistent with wind direction. I noticed that in their discussion of the Preferential Runway Advisory System (PRAS) that Massport stated that they reported the information in this report but I wondered if that information would be available in future reports. I request that this information continue to be reported in future years. I believe that PRAS offers an independent look at the operations of Massport from a noise abatement standpoint. As stated in the report, "PRAS is a set of short- term and long-term runway use goals that include the use of a computer program that recommends to FAA air traffic controllers runway configurations that will meet weather and demand requirements and provide an equitable distribution of Logan Airport's noise impacts on surrounding communities." I urge Massport to push forward in its efforts to meet those defined goals. I also ask what is keeping Massport from achieving those goals today. If Massport has other goals, those goals should be shown with PRAS goals. The benefits to the surrounding communities of the Massport goals vs the PRAS goals should be explained in detail so that the public can judge those goals.	The FAA (air traffic) assigns runway usage based on existing aircraft traffic and meteorological conditions. Massport will continue to report the PRAS information until it is replaced by a new Runway use program. Phase 3 of Boston Logan Airport Noise Study (BLANS) began in 2013, to develop new runway use goals and to define a runway use program.

Comment #	Author	Topic	Comment	Response
C.3	Philip Johenning	Noise	With the RNAV system flights now approach Logan airport via corridors in the sky. I find that the 2011 ESPR has not adapted the traditional measurements that they have always used to the new operational reality. These corridors create an environment where those who live below them are bombarded with aircraft noise and air pollution. The intense activity of aircraft in these corridors creates a heightened health risk.	Please see the response to comment B.11
C.4	Philip Johenning	Noise	I believe that, going forward, Massport should become a leader in identifying such intense noise and air pollution areas. They should acquire the land from the present owners at a price that recognizes the harm done to the owners and that compensates them for part of their loss. The land should then be re-purposed by Massport in a way that generates economic opportunity for Massport and for the communities while not harming those who work in the businesses located in repurposed portions of metro Boston.	Massport has had a very successful, ongoing Residential Sound Insulation Program since 1985 and a School Sound Insulation Program since 1982. Massport has been a very active member, along with the FAA, and the Community Advisory Committee as part of the BLANS. There has been a continuing reduction in the number of people and physical area that is exposed to aviation noise that is equal to or greater than 65 DNL, which has been a long-standing goal of Massport.

Stephen H. Kaiser
191 Hamilton St.
Cambridge Mass. 02139

To : Secretary Richard Sullivan, Office of Energy and Environmental Affairs
Attention : Ann Canaday, MEPA Office

From : Stephen H. Kaiser

Comments on 2011 ESPR Report, Boston Logan EEA #3247

The 2011 ESPR is significantly larger than earlier EDR documents from past years. In size and scope, it approximates a technical handbook in terms of the depth and detail of its content. While past reviews of Massport's annual submissions to MEPA have not generated an outpouring of citizen and municipal comments, the EDR/ESPR submissions have produced their own raison d'etre both within Massport and other public agencies. The ESPN can serve as both a planning and a useful reference document. Outside agencies can access basic information as well as benefit from an illustration of data format, collection and presentation that can be used as a guide by other planners and analysts.

As Massport's effort stands today, I cannot conceive of another public agency that could create a document similar to the ESPR. In the area of transportation, the MBTA could not, nor the state highway administration. Among the environmental agencies, DEP could not, DCR could not, and MEPA itself could not. Regional planning agencies like MAPC cannot.

Among key environmental issues affecting the airport in the future (such as flooding and noise), DEP has neither the legislative authorization in place nor the regulatory authority to attempt any technical venture into flooding and noise. Ideally, regulatory agencies should be well equipped to review the work of Massport. The critic might perceive an imbalance in the way governments should function. Or we can see the situation in its most positive light, which is Massport has stepped into an environmental breach of the Commonwealth and is in a position to make an independent contribution towards providing useful information.

A UNIQUE DOCUMENT

The ESPR is a unique document. Its content is a comprehensive description of Logan Airport operations and the environmental consequences. Moreover, the data ranges from historical trends ... through current conditions .... and extends to year 2030 forecasts. There is a breadth and depth of data that is unmatched in any other public document. No plan or

MEPA report I have seen in my lifetime contains such a wide historical scope that covers from the distant past and into the future.

Such an achievement is virtually unthinkable for anyone who remembers the deeply controversial Massport of forty years ago. In the period from the 1960s and 1970s many East Boston Residents saw Massport chief executive Ed King as the closest thing they had to King George III – an unfeeling tyrant who insisted on combining harassment with contempt, while ignoring the effects of state decisions on the lives of its citizen neighbors. The tension continued into the early 1980s when Ed King became Governor and functioned in many ways with an agenda to seek retribution for any slight or defeated Massport plan in previous years.

For anyone who remembers those years, our present age is inconceivable – when Massport can be pioneering the preparation of informative environmental documents and doing do without controversy and without a harsh partisan political agenda.

SCOPING AND CONTENT

Some features of the ESPR might attract suspicion. The document is self-scoped – a controversial procedure in any MEPA situation. Massport has proposed a scope for the next report. Such an arrangement would have been unthinkable a quarter century ago when I worked at MEPA.

For this ESPR, I find self-scoping quite acceptable. Massport has accepted the concept of regular MEPA updates on environmental issues at Logan, and has vigorously explored the bounds of its content and response to public comment. In the fifteen years since the last major revision of the MEPA regulations, the concept of generic EIRs was substantially abandoned. Since that time, MEPA has received certain minimalist submissions on impacts of the state road salting program, and none on very controversial issues such as logging in state forests and at the Quabbin reservoir. Controls on off-road vehicles on state lands also remains unresolved, with no MEPA involvement.

On the opposite horizon is the follow-on by Massport from the 1994-95 Generic Impact Report for Logan, and its subsequent updates from 1996 & thereafter. I have seen no evidence that Massport was dragged kicking and screaming into continued update submissions to MEPA. Neither has Massport been a prisoner against its will in preparing the documents and submitting proposed scopes – often more comprehensive and informative than we might have anticipated. Massport appears to have made the most of the MEPA process to have it seem voluntary, creative, and responsive in many different ways.

D-1 Therefore I concur – in this instance only – with Massport's initiatives and proposed scopes, in the hope that submissions in future years will expand upon what has been been a very informative process to date. I do have certain proposals for modifications to the scope, including trimming the inclusions of computer programs in Appendix I while adding sections on energy efficiency and flooding from coastal storm surges.

Another concern to be flagged about the ESPR document is that it has been prepared by the Massport Office of *Economic* Planning and Development. Normally, official development departments tend to be severely biased by pro-construction blinders, but here again a positive view would see the words "economic" and "ecology" as coming from the same Greek word derivation, the study of household activities. If the Massport house can contain a strong awareness of issues such as noise and energy, a larger perspective on economic issues may make sense. Moreover, because the field of economics is so often identified as the "dismal science," a further identification with environmental issues may be a valuable benefit.

Another traditional criticism of Massport is that it is an "authority," and thus is a creature of minimal control by elected officials, either by the Governor or the Legislature. Criticism of redevelopment authorities and the MBTA (another Authority) has been a common complaint in years past, but Massport together with the Mass Water Resources Authority represent authorities that seem to work better today than in the past. The lack of direct electoral control has not prevented these two authorities from becoming highly responsive to citizen interests. Indeed both seem to have been more cognizant of the requirements of our state Constitution, specifically Article 7 of the Declaration of Rights that government is instituted for the common good.

This newfound trustworthiness of Massport is most significant because the Authority's primary service obligations include satisfying the needs of the airlines. The airlines could have tried to interfere in the preparation of the ESPR – seeking to spin nothing but data supportive of airline interests. I hope that Massport has been successful in providing an independent technical analysis, and so far I have seen no evidence that this is not the case.

FLOODING AND TIDAL SURGES

I note several references to concerns with climate change and the possibility of increased flooding. Last year we experienced Hurricane Sandy in New York City and along the Jersey shore. Flooding, especially in the form of tidal surges, must be considered much more closely because of the terrible damage that the flood surge did to Lower Manhattan and the great difficulty in providing accurate tidal surge forecasts. Boston was very lucky that they were able to dodge the bullet by 5 ½ hours : the brunt of the storm hit Boston at low tide. Had it been at high tide, Boston (and Logan) might have suffered through similar damage and agony as New York City.

I urge MEPA to include storm surges in the scope for the next report and review. An understanding of this issue is clearly in the best interests of Massport. Since Sandy, MWRA has begun studies of the vulnerability of its coastal sewer structures – including nearby Deer Island. It would seem obvious that there would be advantages in having Massport and MWRA work together to further the technical analysis needed for a better understanding of storm surges. Side effects (such as loss of electrical power) should be considered as well. D-2

To my knowledge, the Army Corps of Engineers has had the best knowledge of storm

D-2 cont. surge effects and the consequences for coastal lands and waterways. Their mapping would be a useful starting point, and all parties need to consider how global warming might contribute to weather changes that could result in more storms similar to Hurricane Sandy.

DEP may be able to help as well. Although it has had little involvement with flooding in the past, it is the state agency empowered with the task of dealing with climate change in Massachusetts.

LONG TERM NATIONAL TRENDS

I appreciate again the inclusion and update of information shown in Figure 2-13. National passenger enplanements are shown for a 41 year period, including recessions and major airline events. A straight line growth curve continues to track passenger growth over the years. How do Massport operational trends compare with national data?

D-3

NOISE EXPLANATION AND LIMITATIONS

In the past I have urged that Massport include a basic introduction to noise terminology as part of their reporting. As a former school teacher, I am very cognizant of a high prevalence of math phobia at large in society and a difficulty among the adult population in learning new concepts, especially of a technical nature. In Cambridge, we have many citizens actively complaining about noise problems, yet the moment that the discussion strays into decibels, their eyes glaze over and they are lost.

D-4 Massport's idea to provide the introduction at the very beginning of Appendix H is excellent. We need to run this text past relative noise neophytes and see whether it helps ... and if there are stumbling blocks, what they are.

D-5 The difficulty is increased by the structure of Chapter 6. Page 6-1 contains references to DNL and CNI : not until the second paragraph on page 6-2 is there a reference that *help is available* in Appendix H. It is far too late, and the neophyte reader if still alive is breathing only on fumes at this point.

I would suggest we follow a mountaineering analogy, of trying to scale Mount Everest from the Tibetan side. By following the ridge line one encounters three rock faces on the way up Everest – the first, second and third steps as they are called. For noise, the first step is the understanding of decibel. The second step is to distinguish between the various measures and shadings of decibels (dB, Lmax, SEL, DNL, TA, EPNL CNI). Just as the second step is the toughest obstacle on Mt. Everest, the distinction between the various kinds of noise measures (and their advantages and disadvantages) is Massport's greatest challenge.

The ESPR, sad to say, gets stuck on the second step. One man has been able to scale Everest's second step alone; the number of noise readers who can scale the ESPR second step can probably be measured as a dozen or two. They would probably already be experts who understood the material before they started. The complexity overwhelms.

Appendix H (like our computer manuals) desperately needs a worked out example. Suppose someone is cutting his lawn and his neighbor's window is 100 feet away .... or 200-feet .... or 300 feet. What is the measured dB? If the lawn mowing goes into the evening, how is the result changed for DNL? If the mowing noise is intermittent or varied, what does that do to TA? How do the results change for EPNL? Give the example first, then the definitions (maybe as footnotes or in a separate table). Another table telling the reader what are the advantages and disadvantages of each measurement would also be very helpful. Such a guide would also help explain why Massport used the noise metrics that it did. D-6

I would go further and propose that Appendix H should include instructions on how to calibrate and use a hand noise meter. The value of such an exercise is shown by the MBTA experience at the Ashmont station, whereby reconstruction of the station include replacement of track along a very sharp curve. Both modern and old-fashioned trains squeal on tight curves. The original track designers at Ashmont knew that, and constructed a building over the sharp curve – thus damping down the noise. The modern engineers forgot and left out the building. Naturally, the neighbors were irate and complained to the MBTA – which took no action. Only when the neighbors went to Radio Shack and bought $79 noise meters did the citizens have the right weapon to fight back. The MBTA had to yield to the technical evidence and to come up with a noise control strategy. D-7

One might suspect that there will be lawyers and political strategists at Massport who would oppose having more noise meters among the populace. I would reply that if indeed Massport has made credible progress in reducing noise levels from Logan operations, the Authority should have no fear of masses of citizens armed with Radio Shack noise meters.

Another small detail in moving towards more readable text is shown by the proven experience of books, magazines and newspapers using indented paragraphs. For some strange reason, modern letter writers and bureaucracies have taken to knocking out the indents and instead having paragraphs in rigid blocks. I note that early MEPA certificates to Massport contained no indents. However, for the past two years, the MEPA certificate has contained indented paragraphs. Good for MEPA. Massport, please follow suit. D-8

ENERGY USE AND EFFICIENCY

Massport in recent years has publicized its innovative efforts in alternative energy programs. Unfortunately, energy data in the ESPR was rather limited. Fuel use by mode appears in Tables I-11 and I12, but with some redundancy. It might have made more sense to combine the two into one consistent table (with corrections for heating oil use in 2011) and separate categories for stationary and vehicular use of diesel. D-9

A new table could provide some sort of comparison for the various travel modes around Logan – such as vehicle miles/seat-miles/passenger miles-per-gallon-equivalent of gasoline (125,000 BTU). Comparisons of compact cars, luxury cars, pickups, hybrids, all-electrics, buses (large and small) could be made on a comparable energy efficiency metric. D-10

D-11 Another table could assess the energy efficiency of air travel (based on national data) compared with other modes – auto, bus, train, and boat. It is my understanding that small two-place general aviation can achieve 25 mpg ... or 50 seat-miles per gallon.

D-12 Note that for electric cars the energy efficiency must account for the generating efficiency of electric power plants.

D-13 What is the trend in energy efficiency of buses, esp as new buses with four-stroke diesel engines? Some data indicates that bus energy efficiency had declined in the past two decades. What is Massport's experience with its own bus fleet?

D-14 Figure 2-16 shows the fuel cost per Available Seat Mile since 1993. It contains a dramatic spike in 2008, followed by a sudden sharp drop. What is the full explanation for the cause of this erratic behavior in pricing? Has anything like this been observed in the past?

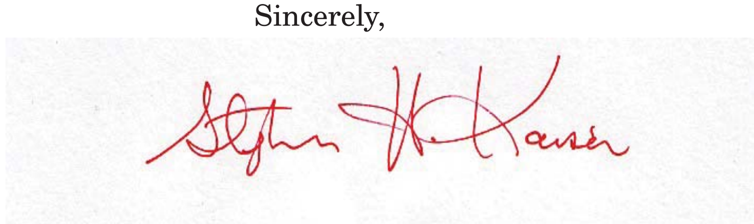
HISTORICAL REFLECTION

To close, I would like to go back to my initial thoughts about how times have changed. Many people are aware of Joe Porzio Park -- located between the airport and the neighborhood. Not too many people remember Joe Porzio. I remember him from meetings of citizen activists seeking to organize a region-wide opposition to the most galling transportation projects. Coming from Cambridge, my concern was the Inner Belt expressway. Others were opposed to I-95 in Lynn, Canton, Jamaica Plain and Back Bay, or the Inner Belt in Brookline and Roxbury. There was a special contingent from East Boston who were opposed to airport expansion at Logan .... and Ed King in particular.

Joe Porzio was one of the most vigorous leaders. Some might have though his hunchback a disability, and physically he was not a very large man, but he spoke forcefully and eloquently about what he saw as the evils of Massport under Ed King. The battle continued from the 1960s and well into the 1970s long after the Inner Belt highway had been killed by Governor Sargent. In the September 1978 governor's primary, Ed King beat Mike Dukakis in a stunning upset. East Boston voted for Ed King, and old timers said that this result simply broke Joe Porzio's heart. When he died shortly thereafter, local citizens banded together and were able to get the new Massport regime (without Ed King) to vote to name the park after Joe Porzio.

Indeed, the times do change.

Sincerely,



Stephen H. Kaiser, PhD

Comment #	Author	Topic	Comment	Response
D.1	Stephen H. Kaiser	General	Therefore I concur – in this instance only – with Massport's initiatives and proposed scopes, in the hope that submissions in future years will expand upon what has been been a very informative process to date. I do have certain proposals for modifications to the scope, including trimming the inclusions of computer programs in Appendix I while adding sections on energy efficiency and flooding from coastal storm surges.	Thank you for your comment.
D.2	Stephen H. Kaiser	Climate Change	An understanding of this issue is clearly in the best interests of Massport. Since Sandy, MWRA has begun studies of the vulnerability of its coastal sewer structures – including nearby Deer Island. It would seem obvious that there would be advantages in having Massport and MWRA work together to further the technical analysis needed for a better understanding of storm surges. Side effects (such as loss of electrical power) should be considered as well. To my knowledge, the Army Corps of Engineers has had the best knowledge of storm surge effects and the consequences for coastal lands and waterways. Their mapping would be a useful starting point, and all parties need to consider how global warming might contribute to weather changes that could result in more storms similar to Hurricane Sandy.	Massport is currently undertaking Resiliency and Sustainability studies for Massport properties. Updates on these studies are included in this *2012/2013 EDR* on in *Chapter 3, Airport Planning.*
D.3	Stephen H. Kaiser, PhD	Activity Levels	A straight line growth curve continues to track passenger growth over the years. How do Massport operational trends compare with national data?	Logan Airport passengers increased at an average annual rate of 0.7 percent from 2000 to 2013. Over the same period, total passengers for U.S. airlines at all U.S. airports increased by 0.8 percent per year.
D.4	Stephen H. Kaiser, PhD	Noise	Massport's idea to provide the introduction at the very beginning of Appendix H is excellent. We need to run this text past relative noise neophytes and see whether it helps ... and if there are stumbling blocks, what they are.	Thank you for your comment.

Comment #	Author	Topic	Comment	Response
D.5	Stephen H. Kaiser, PhD	Noise	The difficulty is increased by the structure of Chapter 6. Page 6-1 contains references to DNL and CNI : not until the second paragraph on page 6-2 is there a reference that help is available in Appendix H. It is far too late, and the neophyte reader if still alive is breathing only on fumes at this point.	Comment noted.
D.6	Stephen H. Kaiser, PhD	Noise	Appendix H (like our computer manuals) desperately needs a worked out example. Suppose someone is cutting his lawn and his neighbor's window is 100 feet away .... or 200-feet .... or 300 feet. What is the measured dB? If the lawn mowing goes into the evening, how is the result changed for DNL? If the mowing noise is intermittent or varied, what does that do to TA? How do the results change for EPNL? Give the example first, then the definitions (maybe as footnotes or in a separate table). Another table telling the reader what are the advantages and disadvantages of each measurement would also be very helpful. Such a guide would also help explain why Massport used the noise metrics that it did.	Comment Noted. Figure H-2 describes various typical sounds including aircraft and the corresponding dBA level.

Comment #	Author	Topic	Comment	Response
D.7	Stephen H. Kaiser, PhD	Noise	I would go further and propose that Appendix H should include instructions on how to calibrate and use a hand noise meter.	These reports are designed to provide information on Logan Airport and annual conditions in areas surrounding the airport. Hand held noise meters are not used as part of the analysis and therefor we do not include directions for use.
D.8	Stephen H. Kaiser, PhD	General	Another small detail in moving towards more readable text is shown by the proven experience of books, magazines and newspapers using indented paragraphs. For some strange reason, modern letter writers and bureaucracies have taken to knocking out the indents and instead having paragraphs in rigid blocks. I note that early MEPA certificates to Massport contained no indents. However, for the past two years, the MEPA certificate has contained indented paragraphs. Good for MEPA. Massport, please follow suit.	Comment noted.
D.9	Stephen H. Kaiser, PhD	Energy	Massport in recent years has publicized its innovative efforts in alternative energy programs. Unfortunately, energy data in the ESPR was rather limited. Fuel use by mode appears in Tables I-11 and I12, but with some redundancy. It might have made more sense to combine the two into one consistent table (with corrections for heating oil use in 2011) and separate categories for stationary and vehicular use of diesel.	Fuel usage in Table I-11 provides the fuel throughput, by fuel type, for estimating VOC emissions from fuel storage and handling. Table I-12 is distinct in that the fuel throughput is from stationary sources only. This table is provided seperately to be consistent with previous EDRs/ESPRs and also because Title V requires the documentation of emissons from all stationary sources at Logan. There will be some redundancy between the two tables because certain fuel types, such as Heating Oil No. 6 is used only by stationary sources. Diesel throughput in Table I-11 can be separated into stationary, vehicles, and GSE.

Comment #	Author	Topic	Comment	Response
D.10	Stephen H. Kaiser, PhD	Energy	A new table could provide some sort of comparison for the various travel modes around Logan – such as vehicle miles/seat-miles/passenger miles-per-gallon-equivalent of gasoline (125,000 BTU). Comparisons of compact cars, luxury cars, pickups, hybrids, all-electrics, buses (large and small) could be made on a comparable energy efficiency metric.	Thank you for your comment. The standard of 54.5 mpg by 2025 will improve fuel economy. This information is readily available at the National Highway Traffic Safety Administration (NHTSA) website, www. nhtsa.gov/fuel economy.
D.11	Stephen H. Kaiser, PhD	Energy	Another table could assess the energy efficiency of air travel (based on national data) compared with other modes – auto, bus, train, and boat. It is my understanding that small two-place general aviation can achieve 25 mpg ... or 50 seat-miles per gallon.	Thank you for your comment.
D.12	Stephen H. Kaiser, PhD	Energy	Note that for electric cars the energy efficiency must account for the generating efficiency of electric power plants.	Comment noted.
D.13	Stephen H. Kaiser, PhD	Energy	What is the trend in energy efficiency of buses, esp as new buses with four-stroke diesel engines? Some data indicates that bus energy efficiency had declined in the past two decades. What is Massport's experience with its own bus fleet?	Massport's bus fleet is comprised of CNG buses and Hybrid Electric-Diesel buses.
D.14	Stephen H. Kaiser, PhD	Activity Levels	Figure 2-16 shows the fuel cost per Available Seat Mile since 1993. It contains a dramatic spike in 2008, followed by a sudden sharp drop. What is the full explanation for the cause of this erratic behavior in pricing? Has anything like this been observed in the past?	The increase in fuel cost per available seat mile in 2008 was caused by the worldwide spike in the price of crude oil. The per barrel price of crude oil rose sharply from \$55 in January 2007 to \$134 in June 2008 before falling to \$39 in February 2009. The run-up in the price of oil during this period was unprecedented.

From: The Boston Harbor Association <mail@tbha.org>
Date: June 14, 2013, 4:29:17 AM GMT+07:00
To: Vivien Li <vli@tbha.org>
Subject: TBHA Draft Comment Letter on Logan Airport 2011 Environmental Status and Planning Report

TO: TBHA Board of Trustees
TBHA Harbor Use Committee

FROM: Vivien Li
The Boston Harbor Association

Enclosed is The Boston Harbor Association's draft comment letter on Logan Airport 2011 Environmental Status and Planning Report. Comments and suggestions are appreciated. Many thanks.

Secretary Richard K. Sullivan, Jr.
Executive Office of Energy and Environmental Affairs
100 Cambridge Street, Suite 900
Boston, MA 02114
ATT: MEPA Office

RE: EOEA No. 3247- 2011 Environmental Status and Planning Report

Boston-Logan International Airport, Boston

Dear Secretary Sullivan:

The Boston Harbor Association, a non-profit, public interest organization founded in 1973 by the League of Women Voters and the Boston Shipping Association to promote a clean, alive, and accessible Boston Harbor, is in receipt of the Boston-Logan International Airport 2011 Environmental Status and Planning Report. This report is submitted as required in the Secretary's Certificate on the Boston-Logan International Airport 2010 Environmental Data Report, and is to report on the status of airport operations, environmental conditions, and milestones achieved in 2011 by the Massachusetts Port Authority, the airport operator . Since 1989, Massport has been required to submit 5-year Environmental Status and Planning Reports (ESPR) and annual Environmental Data Reports discussing the cumulative effects of Logan Airport's operations and activities.

2011 saw an increase in the number of passengers and aircrafts using Logan Airport, reflecting a recovery from high fuel costs and an earlier economic recession which affected air travel. The number of passengers using Logan rose from 352,640 in 2010 to 368,990 in 2011, or a 5.4% increase. Aircraft operations grew from 352,640 in 2010 to 368,990 in 2011, or 2.1% higher. In an effort to increase efficiency and profits, the number of passengers per aircraft operation rose from an average of 77.8 passengers per aircraft operation in 2010 to 78.3 passengers in 2011 (which compares to 56.8 passengers per aircraft operation in 2000).

The Boston Harbor Association has commented over the past decade on both the 5-year Environmental Status and Planning Reports as well as the annual Environmental Data Reports. Our comments on this report and the overall process follow:

Environmental Sustainability: Massport is working towards greater sustainability in its operations and maintenance activities at Logan. The ESPR notes that in 2006, the U.S. Green Building Council gave LEED certification to the new Terminal A, making it the first LEED certified airport terminal in the world. Striving for a 20% reduction in energy consumption, as well as increased usage of renewable energy through the installation of solar panels on Terminal A, Terminal A Satellite, and Terminal B Garage, and the installation of wind turbines on Logan Office Center, are very commendable. We strongly urge Massport to continue to shift to
E-1 increased renewable energy sources beyond just 10%, and to set specific goals and targets for 2020 consistent with state policies. As an example, the Massachusetts Water Resources Authority is implementing on-going and new renewable energy programs to ensure that its Deer Island treatment facility achieves 30% renewable energy usage by 2020, consistent with Governor Deval Patrick's Executive Order 484.

We remain very supportive of Massport's efforts to lower greenhouse gas emissions through the use of warm mix asphalt for its airfield pavement; purchase of a new hybrid bus fleet; implementation of a single stream recycling program; and the installation of 13 new electric vehicle charging stations.

Water Quality: Logan Airport's stormwater permit requires monthly grab samples from four outfalls, as well as a Stormwater Pollution Prevention Plan to investigate potential sources of
E-2 bacteria, including the presence of bird waste. As explained in the report, six exceedances for total suspended solids appear to be related to wet weather conditions. We ask that Massport continue its efforts to inspect and clean catch basins and manholes within the drainage area, and to require its tenants to continue to do likewise within the drainage areas.

In our December 2011 letter on the Airport's annual Environmental Data Report, The Boston Harbor Association observed that Massport had requested permission to lift the ban on snow dumping into Boston Harbor during periods of significant snow amounts. We concurred with Boston Mayor Thomas M. Menino that this would have been an unfortunate precedent, suggesting that, because of cost considerations, quasi-public entities should be allowed to put
E-3 potentially pollutant-laden and/or chemical-laden snow into Boston Harbor. The response to comment within the 2011 Environmental Status and Planning Report is very general (does not, for example, note that Massport did not dispose of snow into the Harbor in 2011) and is non-commital as to future requests. We strongly request that the project proponent find additional "snow farm" locations to store the snow and not attempt to seek future exemptions. We further

request that if the agency petitions to have the ban on snow dumping temporarily lifted, city, state, and federal regulators disapprove such a request. E-4

Climate Change and Sea Level Rise: The Boston Harbor Association sponsored the first-ever "Boston Harbor Sea-Level Rise Forum" in November 2010. Tom Kinton, Massport's Executive Director and its former Aviation Director, spoke at the Forum about possible impacts to the airport's runways and nearby road system as a result of potential future sea level rise. He noted at the time that the Green Bus Depot facility, which is at greater risk from sea level rise, was modified to elevate key infrastructure above future flood elevations.

In February 2013, TBHA issued its report, "Preparing for the Rising Tide", which calls for property owners to assess climate change vulnerability and to increase resilience to coastal flooding over time. The April 2013 Environmental Status and Planning Report does not address this issue, stating only in the response to TBHA's 2011 comment letter: "Massport is in the process of reviewing this issue and will also look at this in relationship to all ongoing and future Massport projects" (page B-32 of the ESPR). We ask that the agency be even more pro-active and incorporate climate change adaptation in all of its planning and development efforts, consistent with the goals of the Commonwealth of Massachusett's 2011 Climate Change Adaptation Report. E-5

Completion of Required Mitigation Measures and Community Benefits: Having commented on previous Boston-Logan International Airport Environmental Status and Planning Reports and annual Environmental Data Reports, we have noticed a lag time in the completion of required mitigation measures and community benefits. For example, construction of the Logan Runway Safety Areas Improvements Project commenced in June 2011 and was completed in November 2012. The 2011 Wetland Mitigation Plan for Eelgrass called for eelgrass to be transplanted from the site in 2011, which occurred as required. However, post-transplant monitoring in 2012 found negligible survival of the transplanted plants. Massport alerted the regulatory agencies, and an alternate plan was developed. Implementation of the alternate plan has been delayed due to the need for concurrence from local municipalities. The earliest that the mitigation will begin is Fall 2013, with the remainder anticipated in 2014. Given that the loss of approximately 66,600 sq. ft. of eelgrass beds at Logan Runway-End 33L occurred in 2011, we ask that the mitigation measures designed to protect and promote natural resources such as eelgrass beds be completed for this and all future airport projects within six months of the completion of a project. E-6

Chapter 3, Airport Planning, notes that construction completion of the Green Bus Deport Project occurred in September 2012. As part of the Boston Conservation Commission deliberations on this project, Massport agreed to completion of the North Service Area Buffer/ Neptune Road Buffer and the East Boston Greenway Extension. While the response to comments states that construction of the East Boston Greenway Connector will begin in the spring of 2013, no construction activity is currently evident on site. It is not clear when construction will actually begin, nor when completion of the much-anticipated Greenway Extension will occur. E-7

We strongly urge that the proponent be required to complete mitigation and community benefits in a timely fashion relative to completion of projects, e.g., completion of mitigation and community benefits no later than 6 months following completion of a Logan project and/or by the time of issuance of a certificate of occupancy, whichever occurs first. E-8

Thank you for your consideration.

Sincerely,

Vivien Li
President
The Boston Harbor Association

Comment #	Author	Topic	Comment	Response
E.1	Vivien Li, The Boston Harbor Association	Energy	We strongly urge Massport to continue to shift to increased renewable energy sources beyond just 10%, and to set specific goals and targets for 2020 consistent with state policies. As an example, the Massachusetts Water Resources Authority is implementing on-going and new renewable energy programs to ensure that its Deer Island treatment facility achieves 30% renewable energy usage by 2020, consistent with Governor Deval Patrick's Executive Order 484.	In 2008, Massport voluntarily committed to three of the Massachusetts' Governor's *Leading by Example* (LBE) energy targets. These targets are: to reduce greenhouse gas emissions by 25 percent by FY2012, by 40 percent by FY2020, and by 80 percent by 2050 (based on a 2002 baseline year); to reduce overall energy consumption of buildings (energy use per square foot) by 20 percent by FY2012 and by 35 percent by FY2020; and to procure 15 percent of annual electricity consumption from renewable sources by FY2012 and 30 percent by FY2020. Massport has far surpassed its renewable energy procurement targets through on-site generation and the purchasing of renewable energy certificates (RECs).
E.2	Vivien Li, The Boston Harbor Association	Water Quality	We ask that Massport continue its efforts to inspect and clean catch basins and manholes within the drainage area, and to require its tenants to continue to do likewise within the drainage areas.	Massport has an extensive inspection and cleaning program for catch basins and manholes.
E.3	Vivien Li, The Boston Harbor Association	Water Quality	The response to comment within the 2011 Environmental Status and Planning Report is very general (does not, for example, note that Massport did not dispose of snow into the Harbor in 2011) and is non-commital as to future requests. We strongly request that the project proponent find additional "snow farm" locations to store the snow and not attempt to seek future exemptions.	Massport makes every effort to avoid disposing snow in Boston Harbor. Massport's procedures and guidelines are outlined in the Emergency Snow Disposal Management and Inspection Environmental Standard Operating Procedure guidelines.
E.4	Vivien Li, The Boston Harbor Association	Water Quality	We further request that if the agency petitions to have the ban on snow dumping temporarily lifted, city, state, and federal regulators disapprove such a request.	Please see the response to comment E.3

Comment #	Author	Topic	Comment	Response
E.5	Vivien Li, The Boston Harbor Association	Climate Change	We ask that the agency be even more pro-active and incorporate climate change adaptation in all of its planning and development efforts, consistent with the goals of the Commonwealth of Massachusett's 2011 Climate Change Adaptation Report.	Massport is undertaking a strategic planning effort, an element of which includes an assessement of the resiliency of Massport's facilities to climate change and other threats and hazards. In addition, Massport is conducting a Disaster and Infrastructure Resiliency Planning (DIRP) study which is specifially assessing the impacts of sea level rise, hurricanes, and other extreme events on Logan Airport and the port/South Boston. The results of these studies will include recommendations to make Massport's infrastructure and facilities more resilient.
E.6	Vivien Li, The Boston Harbor Association	Mitigation	The earliest that the mitigation will begin is Fall 2013, with the remainder anticipated in 2014. Given that the loss of approximately 66,600 sq. ft. of eelgrass beds at Logan Runway-End 33L occurred in 2011, we ask that the mitigation measures designed to protect and promote natural resources such as eelgrass beds be completed for this and all future airport projects within six months of the completion of a project.	The initial eelgrass mitigation started *before* construction of the 33L RSA with the harvesting and transplanting of over 100,000 shoots of eelgrass. After failure of that initial effort, Massport has worked agressively with the regulatory agencies to identify and implement a replacement eelgrass mitigation program. The conservation mooring program is underway. We agree with the comment and will continue to implement all appropriate mitigation programs aggressively.

Comment #	Author	Topic	Comment	Response
E.7	Vivien Li, The Boston Harbor Association	Planning	Chapter 3, Airport Planning, notes that construction completion of the Green Bus Deport Project occurred in September 2012. As part of the Boston Conservation Commission deliberations on this project, Massport agreed to completion of the North Service Area Buffer/ Neptune Road Buffer and the East Boston Greenway Extension. While the response to comments states that construction of the East Boston Greenway Connector will begin in the spring of 2013, no construction activity is currently evident on site. It is not clear when construction will actually begin, nor when completion of the much-anticipated Greenway Extension will occur.	Construction of the Greenway Connector began in 2013 and was completed in July of 2014.
E.8	Vivien Li, The Boston Harbor Association	Mitigation	We strongly urge that the proponent be required to complete mitigation and community benefits in a timely fashion relative to completion of projects, e.g., completion of mitigation and community benefits no later than 6 months following completion of a Logan project and/or by the time of issuance of a certificate of occupancy, whichever occurs first.	As noted for comment E.6, we agree with this general comment and will continue to pursue all appropriate mitigation measures aggressively.

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June 7, 2013

The Honorable Richard K. Sullivan, Jr., Secretary
Executive Office of Energy and Environmental Affairs
100 Cambridge Street, Suite 900
Boston, MA 02114

Subject: EOEA #3247-Logan Airport 2011 Environmental Status and Planning Report (ESPR)

Dear Secretary Sullivan:

These comments are being transmitted by email.

I have reviewed the 2011 Environmental Status and Planning Report (ESPR), EOEA #3247 and offer the following comments and questions, with particular reference to the Noise sections (6 and H).

I might note that in the few years I have reviewed this document, there are always mistakes. Doesn't anyone review the data for accuracy? F-1

What are Massport's plans regarding the Preferential Runway Advisory System (PRAS)? Is is being replaced, reworked, or dropped? What will the FAA's responsibilities be with respect to implementing it? F-2

In Table 6-9 on page 6-43, the averages of the differences in 2010 and 2011 are both incorrect. In 2011, the actual average has increased, with four locations greater than 5 dB, with the modeled higher. F-3

How were the thresholds at the noise monitors set? It appears that thresholds are used in reporting the measured aircraft-only DNL. If the thresholds are too high, the assumed aircraft-only DNL will be too low. F-4

Massport and its consultants provided definitions of speech and sleep interference in Appendix H, and Time above (TA), in Tables 6-13 and -14. They also provided a graphic of an aircraft overflight in Appendix H. There is no discussion of the implications of, for example, 8.3 minutes per night above 65 dBA at Location 4 (Point F-5

F-5 cont. Shirley), or 105.2 minutes per day above 65 dBA at the same location. How many times are these people interrupted in the "average" day or night?

F-6 The only trouble with the use of DNL is that the public does not relate to it. It is a dose, and they are affected by individual aircraft events.

F-7 In the Flight Track Monitoring Report, procedures were given, but there are new RNAV procedures since 2009. They were not described. This makes the report incomplete.

F-8 Also in the Flight Tract Monitoring Report, pages H-46 and 47, it seems that, for 2011, there were many more flights (from all runways) under 6000 feet through the Swampscott Gate. Was this report discussed with the FAA? Did they take any action on any of the results?

F-9 Finally, complaints and complainant data are presented, and there is a statement that the staff member records why the person complained. Please provide data on what the complaints were about. For example, some may be complaining that a plane was off course, or that the aircraft were too loud. The database must have some categories. Please provide data on how many or what percentage complain about the various categories.

Thank you for giving me the opportunity to comment on this report.

Sincerely,

Nancy S. Timmerman, P.E.

cc: T. Ennis, Massport
S. Dalzell, Massport
Letter to MEPA Office/EOEA #3247--2011ESPR

Comment #	Author	Topic	Comment	Response
F.1	Nancy S. Timmerman, P.E.	General	I might note that in the few years I have reviewed this document, there are always mistakes. Doesn't anyone review the data for accuracy?	There is a quality assurance/quality control (QAQC) protocol in place to review the document for accuracy. Each technical consultant completes their own internal review of data and text to ensure accuracy. Once compiled, the entire document undergoes final QAQC checks to prevent and minimize error.
F.2	Nancy S. Timmerman, P.E.	Noise	What are Massport's plans regarding the Preferential Runway Advisory System (PRAS)? Is it being replaced, reworked, or dropped? What will the FAA's responsibilities be with respect to implementing it?	PRAS is no longer supported by the Community Advisory Committee (CAC). Phase 3 of the Boston Logan Airport Noise Study (BLANS) will work to develop a runway use program to replace PRAS. The project began in 2013 and is on-going.
F.3	Nancy S. Timmerman, P.E.	Noise	In Table 6-9 on page 6-43, the averages of the differences in 2010 and 2011 are both incorrect. In 2011, the actual average has increased, with four locations greater than 5 dB, with the modeled higher.	The averages did not include results from Sites 3, 12, and 15 so they could be compared. We agree that the 2011 modeled average of 57.1 is incorrect; it should be 56.1. The 2011 average difference of 1.8 is incorrect; it should be 2.4.
F.4	Nancy S. Timmerman, P.E.	Noise	How were the thresholds at the noise monitors set? It appears that thresholds are used in reporting the measured aircraft-only DNL. If the thresholds are too high, the assumed aircraft-only DNL will be too low.	The thresholds at the monitors were determined by Massport and the NOMS vendor when the equipment was installed.

Comment #	Author	Topic	Comment	Response
F.5	Nancy S. Timmerman, P.E.	Noise	There is no discussion of the implications of, for example, 8.3 minutes per night above 65 dBA at Location 4 (Point Shirley), or 105.2 minutes per day above 65 dBA at the same location. How many times are these people interrupted in the "average" day or night?	The number and extent of interruptions depends on the location and the type of aircraft involved. At Site 4, residents are exposed to arrivals to Runway 27, start of takeoff roll noise from Runway 27, and departures from Runway 9. The Time Above (TA) results only report the time above that level not the number of events above that level. The area around Site 4 experiences the highest time above DNL 65 in relation to the locations of the other monitors. Site 9 is in a similar location (directly off the end of Runway 22L) however the TA numbers there are much lower. At Site 4, Table H-3 shows that between all operations on Runway 27 and departures from Runway 9 there are 122,000 operations affecting that location in 2011 whereas at Site 9 all operations on Runway 22L and Runway 4R departures only equal about 45,000 operations.
F.6	Nancy S. Timmerman, P.E.	Noise	The only trouble with the use of DNL is that the public does not relate to it. It is a dose, and they are affected by individual aircraft events.	Massport understands that people are affected by individual events, however DNL is the approved metric used by the FAA for reporting noise levels in the community around an airport. Massport includes other data such as the Time Above values at the monitoring sites to aid the reader with an understanding of how they may be affected.
F.7	Nancy S. Timmerman, P.E.	Noise	In the Flight Track Monitoring Report, procedures were given, but there are new RNAV procedures since 2009. They were not described. This makes the report incomplete.	The fact that the procedures exist is discussed in the last paragraph on page H-43. However, these procedures are not described in the same way as the Runway 27 RNAV procedure is described. The new RNAV descriptions will be included in future EDRs and ESPRs.
F.8	Nancy S. Timmerman, P.E.	Noise	Also in the Flight Tract Monitoring Report, pages H-46 and 47, it seems that, for 2011, there were many more flights (from all runways) under 6000 feet through the Swampscott Gate. Was this report discussed with the FAA? Did they take any action on any of the results?	The actual number of flights below 6,000 feet dropped between 2011 and 2010 (94 in 2010 to 65 in 2011). The percentages show lower compliance due to the smaller sample size. In 2010 there were 5,400 flights passing through the Swampscott Gate and in 2011 only 649 flights. The new RNAV procedures shifted the shoreline crossing to the north.

Comment #	Author	Topic	Comment	Response
F.9	Nancy S. Timmerman, P.E.	Noise	Finally, complaints and complainant data are presented, and there is a statement that the staff member records why the person complained. Please provide data on what the complaints were about. For example, some may be complaining that a plane was off course, or that the aircraft were too loud. The database must have some categories. Please provide data on how many or what percentage complain about the various categories.	The vast majority of complaints are from callers who live within a flight path.

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From: Darryl Pomicter [mailto:dpomic@aol.com]
Sent: Friday, June 07, 2013 1:47 AM
To: Rick Sullivan; Glynn, Tom
Cc: Anne Canaday; Terry English; Sandra Kunz; Leo, Flavio; Desrosiers, Betty; Dalzell, Stewart; Ennis, Tom; Iacovino, Frank; Rob Adams; John Williams; 'Gary Banks'; 'Declan Boland'; 'Thomas Broadrick'; 'Frank Chin'; 'Frank Ciano'; 'Robert Clifford'; 'Larry Costello'; 'James Cowdell'; 'Ralph Dormitzer'; 'Jerry Falbo'; 'Alex Geourntras'; 'Judy Kennedy'; 'Sandra Kunz'; 'Will Lyman'; 'Jim MacDonald'; 'Bernice Mader'; 'Chris Marchi'; 'Terry McAteer'; 'Paul Meleedy'; 'Jillian Middleton'; 'Dick Morrison'; 'David Nagle'; 'Michael Parker'; 'Susan Rasmussen'; 'Fred Sannella'; 'Yelena Shulkina'; 'Rodney Singleton'; 'Pam Smith'; 'John Stewart'; 'William Sweeney'; 'Mona Thaler'; 'Jonathan Walzer'; 'Wig Zamore'; 'Bill Deignan'; 'Bob Driscoll'; 'Patti Fine'; 'Mary Anne Frye'; 'David Godine'; 'Ron Hardaway'; 'Micheal Lindstrom'; 'Mathew MacIver'; 'Endri Misho'; 'Joe Moccia'; 'Martin Nee'; 'Allison Stieber'; 'Alan Wright'; 'Rod Hobson'; 'Anastasia Lyman'; 'Maura Zlody'; 'Bob D'Amico'; 'Sal LaMattina'
Subject: RE: Massport Boston-Logan 2011 ESPR, EOEA #3247, April 2013

Dear Secretary Sullivan and CEO Glynn,

These comments are in response to Massport's 2011 Environmental Status and Planning Report (ESPR), April 2013. It is very important to not approve Massport's request to eliminate their 2012 Environmental Data Report (EDR) to be filed Fall 2013 (consistent with previous years) and to file a combined 2012/2013 EDR in Fall 2014. G-1 The Boston Logan Airport Noise Study with the FAA, Massport, and the Logan Airport Community Advisory Committee (CAC)—begun in 2003 as a Mitigation Measure in the 2002 FAA Record of Decision approving Airside Improvements which included the new Runway 14-32—is entering Phase 3. Phase 3 is intended to determine a new Runway Use Program (RUP) to supersede the current Preferential Runway Assignment System (PRAS) noise abatement program. The goal is to decrease noise impacts and to equitably distribute the noise effects on people below (both long-term and short-term). FAA regulations require the RUP to be led by Massport working with the CAC and with support from the FAA and then final approval by the FAA. It is critical in this very difficult process to reach agreement to have the current Logan operations information and clear history—to understand existing goals and actuals, agree on future goals, and determine implementation with monitoring and reporting to achieve the intended.

Massport's reporting of the existing PRAS goals, actuals and variances is fragmented,
inconsistent, incomplete, and unclear/misleading. The short-term Dwell and Persistence goals
are reported separate from the long-term Runway End Use goals. The variances from the PRAS
goals are not reported, neither by absolute amount nor by relative percentage. With additional
G-2 analysis, it is clear that existing PRAS goals have never been achieved, since initial
implementation in 1983 through enhancement implementation in 1993 and further revision
implementation in 1996—with no change in Goals (and with no active use of the computer
system component by the FAA since 2004. Variances have continuously been as much as (and
G-3 some more than) a factor of 2 for Runway Use, 3 for Dwell, and 4 for Persistence. Since the
opening of the new Runway 14-32 in 2006, increasing flexibility of Runway Use by the FAA for
operations, variances from PRAS goals and inequitable distribution of operations have
G-4 increased (with total operations remaining substantially decreased from earlier levels).
Operations by the six Runway Ends—totaling Arrivals and Departures as endured from below—
are now ~35%, ~32%, ~10%, ~10%, ~10%, and <5%.

Simplistically the long-term and continuous gross failure to achieve the agreed PRAS goals is
the result of insufficient implementation by the FAA, insufficient reporting by Massport, and
insufficient review and oversight by MEPA. If you look, you can easily see indefensible poor
reporting by Massport and indefensible non-implementation by the FAA. My March 24, 2013
and March 21, 2013 emails to Massport (below) detail the problems and the needs; and my
G-5 November 10, 2012 email copied to Massport (included in Appendix B of the 2011 ESPR, with
no action) raised the issue, shortcoming and need. Massport could and should have addressed
these problems, shortcomings, and needs before issuing their 2011 ESPR, but chose not to.
Now they wish to further avoid the facts, which will cripple the future. You should not approve
their request.

Massport requesting MEPA approval to eliminate the annual EDR is indicative of their disregard
G-6 for their environmental impacts, their agreements and responsibilities, their inequitable impacts
on neighboring Communities. The new Logan Runway Use Program will not be agreed and
implemented before 2015. Reporting of the current PRAS will continue into 2015 with the 2015

EDR not issued until Fall 2016—which should also begin the new RUP reporting. The EDRs and ESPRs should help monitor, report, refine, and enforce for compliance to achieve the agreed. The current incomplete and insufficient PRAS reporting should not be allowed to continue; the standard should be raised now, as soon as possible. Massport's reason for the delayed information: "allow Massport to analyze trends as the economy continues to rebound" is at least disingenuous. Massport quite typically blames negative actuals on the weather, construction, or other short-term excuse (including "Pilot Discretion" to absolve the most egregious violations); and Massport advises wait, delay, and look at after next year.

G-6 con't.

The recent public controversy over the FAA's new Runway 33L RNAV Departure at Logan emphasizes the important need for current, detailed, and understandable information—to aid the participants and to respond to misunderstanding, inequitable self-interest, and manipulation. (It seems widespread complaints were led by a Milton resident, despite Milton getting no noise increase and slightly more equitable distribution of noise impacts across Milton—but slightly more over her house in west Milton, with east Milton still 10 times more noise.)

I hope for your responsive support to improve our future for our common good.

Sincerely,

Darryl Pomicter

136 Myrtle St

Boston, MA 02114-4447

email: dpomic@aol.com

cell: (617) 755-0151

home: (617) 227-1153

PS While I have been the Beacon Hill Representative on the Logan CAC since 1995, including active on technical subcommittees with Massport and the FAA, these comments are my own (not representing the Logan CAC or the Beacon Hill Civic Association).

From: Darryl Pomicter [mailto:dpomic@aol.com]
Sent: Sunday, 24 March, 2013 20:59
To: 'Dalzell, Stewart'; 'Leo, Flavio'; 'Desrosiers, Betty'; 'Glynn, Tom'; 'anne.canaday@state.ma.us'; 'rick.sullivan@massmail.state.ma.us'
Cc: 'Terry.English@faa.gov'; 'Sandra Kunz'; 'jerry falbo'; 'wig zamore'; 'declan boland'; 'ralph dormitzer'; 'chris marchi'; 'John Williams'; 'Rob Adams'; 'Ennis, Tom'; 'Iacovino, Frank'; 'bill deignan'; 'nancy.timmerman@alum.mit.edu'
Subject: RE: Massport Logan 2011 ESPR--FW: Logan Preferential Runway Advisory System and BLANS Phase 3 Runway Use Program

Dear Stewart,

Thank you for your quick response. I don't think you've considered my comments and the corrections requested sufficiently—actually compared with your current. You reason why you don't want to; not why you shouldn't or can't. You are ignoring that your Massport reporting of the PRAS noise abatement program is very seriously incomplete, inaccurate, and insufficient. Do you agree that the PRAS noise abatement program results fail to achieve the long-term Runway End Use and short-term Dwell and Persistence goals—by as much as (and even more than) a factor of 2 for Runway End Use, 3 for Dwell, and 4 for Persistence? That results are
G-7 worse since the new Runway 14-32? And, great failure has been continuous since the 1983 beginning? And, that you are not reporting that clearly, showing and acknowledging the degree of failure? You wish to defer until the intended replacement is agreed (and implemented), which means continuing the current incorrect and insufficient through the 2011 ESPR and the following 2012, 2013, and 2014 EDRs—which seems not thought through, and certainly wrong.

Inadequate Massport reporting of FAA performance, with MEPA oversight review, has enabled PRAS failure to continue so long and so severely. With review, I believe any reasonable person would conclude that some improvement is necessary now. Improved Massport PRAS noise abatement program reporting now, in addition to being appropriate for this long-lived ESPR and the following EDRs, will inform and empower the commencing development of a new Runway Use Program to replace PRAS. That is to be led by Massport, and the requested reporting of the current PRAS noise abatement program is needed from Massport in any case—for a clear understanding of the current goals and the history of failure to achieve, to allow the replacement to be developed, agreed, and implemented to achieve the intended. A reasonable working relationship between Massport and neighboring Communities cannot be built without more reasonable consideration, based on facts, particularly after the lack of it for so long. I hope the new Massport Executive will make a more considered decision, for our common good. G-8

The accepted Massport schedule for the 2011 ESPR (deferred from 2009) is Spring 2013 (the prior 2004 ESPR is dated May 25, 2006). That is plenty of time to correct the PRAS reporting as requested. MEPA directed Massport, for this 2011 ESPR: "In addition to responding to noise tracking and abatement efforts, Massport should consult directly with individual commenters where appropriate." "I encourage Massport to continue with more detailed analysis in the 2011 ESPR. I strongly advise Massport to consider and address the comments received that have raised noise related concerns. The comments from the City of Cambridge, as well as from individuals have raised a number of concerns and suggestions related to noise that Massport should address into the 2011 ESPR." "In particular, Massport should provide a thorough examination of issues raised regarding individual noise monitoring locations, noise measurement and modeling, noise abatement, and air quality issues." G-9

I am very aware that the Noise Study mitigation for the new Logan runway is beginning Phases 3—to development a new Runway Use Program to supersede the long-failed PRAS program—I am an active participant. Preparing for those efforts is what prompted my request to you in November 2012 and the further detail now for proper PRAS reporting. Further details to you were delayed by protracted efforts convincing the FAA and Massport that a BLANS Phase 3 is required for a new Runway Use Program to supersede PRAS, not a suddenly redefined Post-Phase 2 to consider only a Phase 1 specific wish list. I've commented to Flavio Leo at several BLANS meetings that Massport PRAS reporting in the ESPR & EDR for MEPA should be refined, preparing for the new Runway Use Program and Ground Measures Program, the new Logan Airport Noise Abatement Program.

We are now at a point to begin anew, with a new Runway Use Program to supersede PRAS. It is a great opportunity for all to determine, agree, and achieve an equitable distribution of Logan noise impacts. Please don't doom it to continued failure. It cannot be successful just starting from where we are, when the current agreement has failed so completely and continuously, for so long. The past agreed intentions and results need to be better understood. And, then fresh thinking is required to reach a new agreement—and to implement it to achieve the agreed equitable distribution consistently. Flavio and I have agreed that we should start thinking big, overall, including considering the removal or change of each and every restriction to achieve an equitable distribution of noise impacts. Please make some additional effort now, recognizing
G-10 the past failure to report and failure to achieve—to start the next phase clearly and positively, and enable it to succeed.

Sincerely,

Darryl

Darryl Pomicter

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PS "In preparing the ESPR we have carefully reviewed your comments on the 2010 EDR submitted in December 2011 and integrated your suggestions where appropriate." What's not appropriate: to show on the maps the BOS VOR beacon location from where the reported DME distances are measured (two miles across Logan from Communities); to show on the maps the Boston Communities and surrounding Cities boundaries and names (so people can recognize and reconcile the impact on them); to note clearly that the noise reported is from a computer simulation model program (calibrated with actual noise measurements), and not including any helicopters or any airplanes not departing or arriving Logan (which as much as double the reported modeled noise in the most affected areas); and/or to show passengers for Cape Air also: the fifth Dominant Passenger Carrier at Logan, with >10% Operations, <1% Passengers, <1/10 Average Passengers per Flight, (not a Principal Revenue Payer for Landing Fees or for Terminal Rents and Fees—and notorious for low flying and non-compliant noise intrusion)? Including prior year comment letters in the following year Appendix with a perfunctory response comment—but No Change on anything ever—is insufficient. G-11

PPS The Chapter 6 Noise Abatement, Regulatory Framework reference to "FAA Order 5196, Airport Compliance Requirements" Chapter 4, Section 4-8f seems to be incorrect—no such document can be found. The correct reference seems to be FAA Order 5190.6, Airport Compliance Manual. The referenced Chapter 4 section does not exist; it seems it should be: Chapter 13, Airport Noise and Access Restrictions, 13.2.b: The authorities and responsibilities of the parties may be summarized as follows: G-12

(1). The federal government has the authority and responsibility to control aircraft noise by the regulation of source emissions, by flight operational procedures, and by management of the air traffic control system and navigable airspace in ways that minimize noise impact on residential areas, consistent with the highest standards of safety and efficiency. The federal government also provides financial and technical assistance to airport proprietors for noise reduction planning and abatement activities and, working with the private sector, conducts continuing research into noise abatement technology.

(2). Airport sponsors are primarily responsible for planning and implementing action designed to reduce the effect of noise on residents of the surrounding area. Such actions include optimal site location, improvements in airport design, noise abatement ground procedures, land acquisition, and restrictions on airport use that do not unjustly discriminate against any user, impede the federal interest in safety and management of the air navigation system, or unreasonably interfere with interstate or foreign commerce.

From: Dalzell, Stewart [mailto:SDalzell@massport.com]
Sent: Friday, 22 March, 2013 15:19
To: Darryl Pomicter; Leo, Flavio; Iacovino, Frank; anne.canaday@state.ma.us
Cc: Glynn, Tom; rick.sullivan@massmail.state.ma.us; Terry.English@faa.gov; 'Sandra Kunz'; 'jerry falbo'; 'wig zamore'; 'declan boland'; 'ralph dormitzer'; chris marchi; 'John Williams'; 'Rob Adams'; Desrosiers, Betty; Ennis, Tom
Subject: RE: Massport Logan 2011 ESPR--FW: Logan Preferential Runway Advisory System and BLANS Phase 3 Runway Use Program

Good Afternoon Darryl –

I received your comments last night and wanted to promptly respond. We are just now finalizing the 2011 ESPR for filing with MEPA. In preparing the ESPR we have carefully reviewed your comments on the 2010 EDR submitted in December 2011 and integrated your suggestions where appropriate. As MEPA has required in the past, your full set of comments are in the 2011 ESPR appendix as are Massport's detailed responses to your individual comments.

Regarding your additional comments on the Preferential Runway Advisory System (PRAS) noise abatement program, as you may be aware, the Community Advisory Committee (CAC), FAA and Massport will soon commence a review of Logan runway use and seek to develop new runway utilization goals. Once those goals have been finalized, future EDRs and ESPRs will follow the guidance of the new runway use goals and reporting needs.

We look forward to your comments on the upcoming ESPR. Once we have confirmed a date for our annual MEPA EDR/ ESPR meeting here at Logan, we will notify you and the CAC Chair of the time and date.

Sincerely,

Stewart

From: Darryl Pomicter [mailto:dpomic@aol.com]
Sent: Thursday, March 21, 2013 8:46 PM
To: Dalzell, Stewart; Leo, Flavio; Iacovino, Frank; anne.canaday@state.ma.us
Cc: Glynn, Tom; rick.sullivan@massmail.state.ma.us; Terry.English@faa.gov; 'Sandra Kunz'; 'jerry falbo'; 'wig zamore'; 'declan boland'; 'ralph dormitzer'; chris marchi; 'John Williams'; 'Rob Adams'
Subject: Massport Logan 2011 ESPR--FW: Logan Preferential Runway Advisory System and BLANS Phase 3 Runway Use Program

Hello Stewart,

In the several-years delayed and now being prepared 2011 Environmental Status and Planning Report (ESPR) for Massport's Logan Airport, it is very important to report more completely, accurately, and clearly in Noise Abatement on the Preferential Runway Advisory System noise abatement program. Further review of Massport's last Logan EDR, 2010 Environmental Data Report, EOEA #3247, October 2011 in current BLANS efforts has found the reporting on PRAS G-13

G-13 con't. to be disjointed, incomplete, inaccurate, unclear, and even misleading. Overall, not showing, avoiding the continuous failure to achieve the agreed goals over the entire period of the program since 1983 (including an enhancement after 10 years and a revision after a few more, with the same goals maintained, and continued miserable failure on all goals by as much as a factor of 2 and more). G-14 Also, the PRAS performance has deteriorated since the opening of the new Runway 14-32 in late 2006—despite increased operating flexibility with the new runway and total operations remaining substantially decreased from earlier levels. None of this can be seen in the Massport reporting. Massport's insufficient, incomplete and unclear reporting has enabled the gross PRAS failure to continue so long—not really acknowledged with responsibility for improvement.

G-15 Improved PRAS reporting now in this more expansive, detailed, and longer-lasting 2011 ESPR is very important. We are entering Phase 3 of the Noise Abatement Study and Review of Preferential Runway Advisory System, Mitigation Measure 6 in the 2002 Airside Improvements FAA Record of Decision approving the new Runway 14-32. Massport has also committed, as part of its MEPA Section 61 Findings, to work with the CAC to update the existing PRAS program. At this point, with the continued gross failure of PRAS, BLANS Phase 3 is intended to include development of a new Runway Use Program to supersede PRAS. It is very important to more clearly see and understand the present and past program failure, to improve the replacement and future implementation to achieve the intended results. Phase 3 is intended to also organize the new Runway Use Program managed by the FAA with a new Ground Measures Program managed by Massport into a Logan Airport Noise Abatement Program (similar to peer airports). G-16 The referenced Logan Airport Noise Abatement Rules and Regulations codified in Massachusetts regulations 740 CMR 24 should then be updated. Also, Massport is organizing a Noise Abatement Committee, including members from the CAC, to facilitate noise abatement communications and efforts after the Noise Study, with the new Runway Use Program and Ground Measures Program. The MEPA annual EDRs and five-year ESPRs should become increasingly valuable to help monitor, report, refine, and enforce for compliance to achieve the intended results.

My March 21, 2013 email further below provides further details on PRAS history, goals, and failure. (The attached Revised Preferential Runway System (PRAS) Summary, FTA-TM-529-1, March 1997 is a good, concise and clear summary of PRAS.) My specific requests for the 2011 ESPR reporting of PRAS are:

G-17

1. <u>Report Preferential Runway Advisory System PRAS goals completely and accurately—including as a noise abatement program.</u>
    a. PRAS is an agreed "on-going noise abatement program" (now to be superseded by a new Runway Use Program), with the general objective: "Reduce the annual average total noise impact from Logan operations on the population residing in affected communities without significantly increasing the impact on any populated area within the day-night sound level (Ldn) contour of 65dB".
    b. PRAS incudes runway use goals, with the conclusion/basic goal: "Provide an equitable distribution of noise impact over the long-term annually, as well as short-term relief from excessive operations".
        i. Long-Term Goals
            - Reduce the annual average total noise impact from Logan operations on the population residing in affected communities, without significantly increasing the impact on any populated area within the day-night sound level (Ldn) contour of 65dB; and
            - Maximize the use of runway 15R for over water departures and 33L for over water arrivals.

        To quantify the long-term noise goals, the committee reached a consensus in annual runway end use percentages in terms of equivalent jet operations. Equivalent operations include all daytime (7 am to 10 pm) jet flights, plus nighttime (10 pm to 7 am) jet operations multiplied by a factor of ten. This is consistent with the methodology for computing Ldn, in which 10dB are added to nighttime operations.

        ii. Short-Term Goals
            - Provide relief from excessive *dwell* (duration of continuous operations during each day between the hours of 7 am and midnight); Dwell: 6 hours' use between the hours of 7am and midnight in any day.
            - Provide relief from excessive *persistence* (prolonged utilization of a given runway during the hours of 7 am and midnight in a period

of three consecutive days. Persistence: 23 hours' use between the hours of 7 am and midnight in three consecutive days.

In contrast to the annual goals which count the number of equivalent operations on a runway, dwell and persistence are measured by the number of hours that a given area is subjected to aircraft overflights.

c. PRAS includes a computer and associated software program and data bases component (provided and maintained by Massport) "to assist in the FAA's decision making in selecting the runways to be used" ("in a manner consistent with the goals of said noise abatement program").

G-18 The 2010 EDR PRAS summaries don't mention "noise abatement program", the general objective, the conclusion/basic goal, or the specific long-term goals (with runway end use percentages being the quantization). There are significant differences from the PRAS documents received, particularly adding the limiting word "jet" with Dwell and Persistence (excluding the ~15% turboprop and piston prop); and increasing the Dwell limit from 6 to 7 hours (of 17 hours daytime).

G-19 2. Report PRAS together. The 2010 EDR reports Dwell and Persistence short term goals in a separate Supplemental Metrics section, after many other topics—26 pages after PRAS with introduction and Compliance (only) Runway End Use.

G-20 3. Report Runway End Use equivalent easily comparable with actual operations. The 2010 EDR reports Runway Use actual and PRAS equivalent two pages later, with year and runway axes reversed, departures and arrivals reversed in order, runways in different orders, parallel runways separate in only one, no subtotals or totals, and different periods (Use for 6 years (of 20 years in the Appendix) and Effective Use for only 2 years). They are directly related results, but effectively uncomparable.

G-21 4. Report Historical Period. With new Runway 14-32 since 2006, operations peaked in 1998, Revised PRAS installed 1996, Enhanced PRAS installed 1993, and PRAS installed 1983, wind and weather varying (and blamed) year-to-year, and the continuous gross failure on all goals throughout—and in developing the new, superseding Runway Use Program—the entire period since 1983 would be a valuable history now. Ongoing, 20 years should be minimum—the same as actual Runway Use Table H-12, Modeled Operations Tables H-9 & H-11, and Cumulative Noise Index Table H-13. (Operations and Passengers Table E-1 are 30 years.) The 2010 EDR 6 years Dwell and Persistence short term goals are insufficient, and only 2 years Use by Runway Ends is useless—always excused by "weather". G-21 con't.

5. Report PRAS actuals easily comparable to all goals. The 2010 EDR reports Dwell Exceedance in annual hours with no comparison to the goal in maximum daytime hours during each day (actual exceedances averaged by day are more than double the goal). Persistence Exceedance is reported in annual hours with no comparison to the goal in maximum daytime hours during three consecutive days (actual exceedances averaged by week are more than triple the goal). G-22
6. Report by both Table and Figure, Bar Chart/Graph. Tables and graphs (including bar and pie charts) present data information differently. Graphs are visual and display relationships, scale and trends more easily and quickly. Tables are more verbal and allow more and greater detail (and ease further calculations and analysis). (Most people are more comfortable with one over the other.) The 2010 EDR uses only a Table for Runway End Use and only a Figure bar chart for Dwell and for Exceedance. The 1997 Figure 2 History of Logan Compliance with Annual PRAS Goals (below and in attached) is a very informing bar chart view of 1984-1995 Use by Runway End between 12 years and continually failing to achieve goals, varying substantially absolute and relative. G-23
7. Report variance from goals by both absolute and relative. Absolute amount of variance and relative (%) amount of variance are two very different standard, useful views of analysis. Variances from goal, absolute and relative are both relevant and both should be shown. (Variances between years are much less relevant and often misleading cherry-picking, obscuring the reality.) G-24
    a. The 2010 EDR Table 6-5 Runway End Use shows use and goals, but no variance absolute amounts or relative percentages. The copy misleadingly states a percentage change between years which is an absolute amount, while ignoring the goal and the much, much greater relative percentages ("a large increase over 2009 from 7.7 percent to 24.1 percent (a 16.4 percent increase)"—without noting the 8.4% goal or the variance swinging from absolute 0.7% less than the 8.4% goal, relatively 8% low, to absolute 15.7% higher than the 8.4% goal, relatively 187% high (and 2010 24.1% absolute 16.4% higher than 2009 7.7% is relative 213% increase)! G-25
    b. Figure 6-17 Dwell Exceedance by Runway End does not show the goal, and reports annual hours while the goal is maximum daytime hours in a day—leaving variance to the short-term relief goal unknown, other than big (the calculated G-26

G-26 con't.

daily average for the larger results are more is more than double the goal). The annual number of days of exceedance, by range of exceedance in a day—showing the variances from the daily goal by days and annually—would be relevant.

G-27

c. Figure 6-18 Persistence Exceedance by Runway End does not show the goal and reports annual hours while the goal is maximum daytime hours in three consecutive days—leaving variance to the short-term relief goal unknown, but big (the calculated weekly average for the larger are more than triple the goal for three days). The annual number of three consecutive days periods, by range of exceedance in a period—showing the variances from the three-consecutive-days period goal by periods and annually would be relevant.

G-28

8. Report by Runway End: Departures, Arrivals, and Total. Departures and Arrivals are both into the wind, in the same direction—at the opposite ends of a Runway. Departures from a Runway are over a totally different area and Communities than Arrivals to that Runway—around the opposite end, miles away. Report for all goals by Runway End with Departures and Arrivals in opposite directions—over the same Communities! (Not by runway direction with Departures and Arrivals in the same direction from the opposite ends of the runway—over different areas and Communities.) Also total Arrival and Departures at each Runway End to total impact over the same Communities below, (which will average variance between Arrivals and Departures separately). The 2010 EDR has Runway End Use Arrivals and Departures organized by same direction over different Communities at opposite ends (with no subtotals or total). Dwell and Persistence Exceedance are shown for Arrivals and Departures totaled for 3 of the 6 Runway Ends, with Departures and Arrivals separate for the other ends—for inconsistent comparisons. PRAS designates these combinations, but also totaling for the other runway ends would provide consistent relevant comparisons. (And showing the division between Departures and Arrivals for the three ends already totaled would provide consistent relevant comparisons.) (For example, Runway 22 Departures-4 Arrivals total almost as much Dwell Exceedance as the two worst Runway Ends and relatively less (but still very bad and third place) Persistence Exceedance.)

G-29

9. Report Dwell and Persistence for all aircraft—including turboprop and piston prop operations, not limited to jets. From the PRAS documents received: "In contrast to the annual goals which count the number of equivalent operations on a runway, dwell and persistence are measured by the number of hours that a given area is subjected to

aircraft overflights." [It is understandable that PRAS consensus would quantify the long-term goals for an equitable distribution of noise by using Runway End Use percentage goals for jets only—the FAA focus when selecting runways (intending to fit the non-jets out-of-the-way)—to encourage FAA use of the computer system component to assist in selecting runways. While maintaining the short-term relief from excessive operations goals for all aircraft. Turboprop and piston prop operations (~15% of total) are notorious for flying low over Communities (not in compliance with FAA regulations) with relatively longer duration noise intrusion (approaching, passing, and receding). (All airplanes are in the Noise Model and in the radar data base.) The 2010 EDR adds the limiting word "jet" and reports Dwell and Persistence for only jets. The 2010 EDR also changes "6 hours'" to "seven hours" for Dwell. G-30

As the Representative from Beacon Hill on the Logan Airport Community Advisory Committee since 1995 and an active Representative throughout the Noise Study since 2003 (including on the BOS/TAC technical subcommittee since Phase 2 and on the pre-BLANS Airside Review Committee), I have found the EDR and ESPR to be increasingly useful documents. I have G-31 complimented you and team on good graphic design, very dense, but generally coherent and consistent (particularly compared to some Massport consultants' products over the years). This significant omission and deficiency of content has only become glaringly apparent in recent months with additional specific use. The deficiencies in PRAS reporting of abysmal results began to be more apparent to me late last year, and I requested improvements in the presentation of PRAS results in my November 10, 2013 email Logan Departures and Arrivals—by Runway End & PRAS (to the BLANS group with copy to you) concluding: "I request Massport include this Runway End utilization view with totals in their annual EDR, starting with their 5-year 2011 Environmental Status and Planning Report (delayed from 2009, for delivery in 2013). It should be included for both the actual use and the effective use for PRAS, which includes 10X nighttime. For Massport and the FAA, I think it is very important to manage and report clearly the total activity (turbojet, turboprop, and piston prop) by Runway End use (actual and effective)—including as part of revamping, updating, reassessing, superseding PRAS as G-32 provided in the ROD—to more clearly see the absolute and relative effects over time on Communities, and to more equitably decrease and distribute them."

Thank you very much for your positive, helpful and useful efforts.

Sincerely,

Darryl

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PS This request is consistent with my comments at the MEPA consultation session at Massport on November 16, 2011 and December 9, 2011 email to Anne Canaday. MEPA, with copy to you, Massport Logan 2010 EDR, EOEA #3247, including (which hopefully you are implementing in the 2011 ESPR):

1. Massport's ESPR and EDR should be improved based on the BONS and BLANS Noise Abatement Study now being completed as a cooperative effort of the FAA, Massport, and the Logan CAC in mitigation for the Logan Airside Improvements Planning Project, EOEA #10458. Next year's "big picture" format ESPR is very appropriate to incorporate from the long Noise Abatement Study, as it is completing—to ensure ongoing monitoring, reporting and enforcement for compliance as agreed. Many of the comments below reflect learnings from that study.
2. Massport's 2010 EDR is a dense and complicated document, overall graphically well done and consistent. However, it needs improvements to allow and ease comprehension and use:

a. Maps need the BOSTON VORTAC from which flight distances are measured, and Logan perimeter shown (including from the most basic, Figure 6-4). Dimensions are frequently to 0.1 mile, with more than 2 miles across Logan and the BOS VOR radio beacon at the southeast side (before the Runway 27 and 33L thresholds). Three miles from Logan DME may be less than a 1 mile from Logan perimeter. Tables such as 6-8 & 6-9 include “Distance from Logan Airport” which seems to be DME rather than perimeter, but it is not clear from where.
b. Maps need Boston Communities and surrounding Cities names and boundaries—to ease correlation and improve understanding by people from below.
c. The Noise Model description and all modeled noise levels graphics (including Tables 6-6, 6-7, 6-9 & 6-13 and Figures 6-13—6-15 and Tables H-7 & H-13) need to note clearly that the noise model, is calibrated with actual measurements, but is not actual measurements. Model noise levels need to note that the model and results do not include local VFR plane and helicopter flights, controlled by the Logan Tower, but not arriving or departing Logan. And, based on field measurements, they have been estimated to possibly double (+3dB) the noise model levels for the most affected communities. The small percentages of Logan departures and arrivals which are not modeled directly from radar data should be detailed—general across categories or specific sub-categories (6-8—6-9, H-2 & H-11)?
d. Passengers, Operations, and Passengers/Operation should be shown for all airlines, including Cape Air—for which operations and passengers are currently not shown, even though it is a “Dominant Passenger Carrier” (Figure 2-5, Table 6-11, and Appendix E). Passengers/Operation should receive more detail and focus as a basic measure of efficient use of Massport and FAA facilities, noise, and emissions.

The MEPA 2010 EDR Certificate, December 16, 2011 supported my comments—and also supports the current request—including:

“The majority of comments received on the 2010 EDR focus on noise related issues, including measurement of noise, modeling of noise contours, and noise abatement, and emission reduction issues. In addition to responding to noise tracking and abatement efforts, Massport should consult directly with individual commenters where appropriate."

"The information in this [Noise] chapter is very informative and I encourage Massport to continue with more detailed analysis in the 2011 ESPR. I strongly advise Massport to consider and address the comments received that have raised noise related concerns. The comments from the City of Cambridge, as well as from individuals have raised a number of concerns and suggestions related to noise that Massport should address into the 2011 ESPR."

And closing: "In particular, Massport should provide a thorough examination of issues raised regarding individual noise monitoring locations, noise measurement and modeling, noise abatement, and air quality issues."

From: Darryl Pomicter [mailto:dpomic@aol.com] **Sent:** Thursday, 21 March, 2013 17:52
To: 'Sandra Kunz'; 'jerry falbo'; 'declan boland'; 'wig zamore'; 'GARY BANKS'; 'heroamongus@gmail.com'; 'frankiecboy@aol.com'; 'costello larry'; 'D'Amico, Bob'; 'edevo@comcast.net'; 'ralph dormitzer'; 'alex.geourntas@cityofboston.gov'; 'jkennedy@curry.edu'; 'Lyman Will'; 'Jimmacdonald2003@aol.com'; 'bernicemader1@comcast.net'; 'rmaguire@norwoodma.gov'; chris marchi (marchi.family@verizon.net); 'Terry McAteer'; 'Paul Meleedy'; 'jillianmiddleton@verizon.net'; 'morrison dick'; 'Bosred8@yahoo.com'; 'parker, michael'; 'srasmussen@cambridgema.gov'; 'lzaltsman@yahoo.com'; 'rodneysing@gmail.com'; 'smith pam'; 'John Stewart'; 'william sweeney'; 'mona thaler'; 'JONATHAN WALZER'; 'Robert.W.Clifford@Delta.com'; 'jon@daleyandwitten.com'; 'bill deignan'; 'beeparld@cs.com'; 'patti fine'; 'Ron Hardaway'; 'mmcpherson@aol.com'; 'drg@godine.com'; 'info@godine.com'; 'mlindstrom@cityofmelrose.org'; 'mathewmaciver@gmail.com'; 'emisho@gmail.com'; 'joemoccia@comcast.net'; 'martin.nee@cushwake.com'; 'allistieb@comcast.net'; 'alan wright'; 'rod.hobson@verizon.net'; 'anastasia@whitethroat.com'; 'maura.zlody@cityofboston.gov'
Cc: 'Flavio Leo'; 'Frank Lacovino'; 'Terry.English@faa.gov'; 'BOS PMT'
Subject: Logan Preferential Runway Advisory System and BLANS Phase 3 Runway Use Program

Folks,

As we enter Phase 3 of the Logan Noise Abatement Study, to determine a new Runway Use Program to replace the Preferential Runway Advisory System, I think it's important to better understand PRAS. What it was intended to achieve, how it defined the problem and solution, and how and why it has never succeeded, failed miserably and continuously since 1983.

The email further below from last May 8 included an attachment: PRAS Historic Docs.pdf (6MB). The 58 pages is scans of 5 documents: 1982, 1989, 1992, 1995, and 1997. (Confusingly, the documents are out of chronological order in the scans: 1982, 1992, 1989, 1997, and 1995—and missing a key referenced 1982 document.)

1. <u>FAA New England Region Operational Agreement for Preferential Runway Advisory System to serve Boston-Logan International Airport, L-2300, October 18,1982.</u>
   WHEREAS, the Operator has developed a Preferential Runway Advisory System (PRAS) in accordance with FAA guidance regarding participation by airport operators and the public which it wishes the Government to use in the assignment of runways in a manner consistent with the goals of said noise abatement program at Logan International Airport; and

   WHEREAS, a personal computer in the FAA TRACON room is a component of the PRAS;

   FIRST: The Operator shall provide a personal computer and install a data terminal which the operator deems will be capable of data entry and display for the purpose of implementing said Preferential Runway Advisory System in the TRACON room at location approved by the FAA.

   THIRD: The Government shall use the data provided through the PRAS to assist the Government's decision making in selecting the runways to be used for aircraft landing and departing Logan International Airport.

2. <u>Enhanced Preferential Runway Assignment System (ENPRAS), Phase I System Design, FTR-TR-462-1, July 1989.</u>
   The current PRAS at Logan represents the culmination of efforts that began in 1959 to develop a preferential runway system for the airport. Earlier "systems" consisted of a

simple list of priorities for runway use, developed intuitively and giving highest priority to operations over water and the lowest priority to operations over populated land areas. The general *objective* of PRAS that was agreed upon was: "Reduce the annual average total noise impact from Logan operations on the population residing in affected communities without significantly increasing the impact in any populated area within the day-night sound level (L_{DN}) contour of 65 dB.[1]" [1]KEE, Massport: Phase II Preferential Runway Study for Logan International Airport, Report 82-80, November 1982.

3. FAA Boston Tower and Massachusetts Port Authority Memorandum of Agreement, L-5668, 8/14/92.

   The System will be designed such that the following selected digital radar data will be transferred to a computer mass storage device supplied by the Massachusetts Port Authority at no cost to the FAA:

   A. Flight Track data for Logan International Airport and other local airports within 20 nautical miles of lat. 42°20'55"N., long. 71°00'22"W. The upper tracking threshold shall be 15,000 feet above sea level.
   B. Flight Track data for all in-flight activity described in Paragraph A above, 24 hours a day, 7 days a week for Commercial and General Aviation aircraft. Data shall not include military operations, aircraft incidents, or any other information deemed sensitive at the sole discretion of the FAA.
   C. Flight Track data will be restricted to aircraft assigned to beacon codes allocated to Boston Tower in accordance with FAA Order 7110.66A:

4. Modifications to Logan's Preferential Runway Advisory System, FTA-TP-857r, January 5, 1995.
5. Revised Preferential Runway Advisory System (PRAS), FTA-TM-529-1, March 1997.

   PRAS Goals and Compliance

   The goals for the automated PRAS at Logan were established by the advisory committee to the development of the original computerized development in 1980-1983. The advisory committee was composed of representatives from Massport, the FAA, airlines, and 12 neighboring communities. It concluded that the PRAS should provide an equitable distribution of aircraft noise over the long-term (i.e. annually), as well as short-term relief from excessive operations over certain neighborhoods.

   Long-Term Goals

The PRAS advisory committee agreed that the long-term goals should:

- Reduce the annual average total noise impact from Logan operations on the population residing in affected communities, without significantly increasing the impact on any populated area within the day-night sound level (Ldn) contour of 65dB; and
- Maximize the use of runway 15R for over water departures and 33L for over water arrivals.

<u>To quantify the long-term noise goals, the committee reached a consensus in annual runway end use percentages in terms of equivalent jet operations.</u> Equivalent operations include all daytime (7 am to 10 pm) jet flights, plus nighttime (10 pm to 7 am) jet operations multiplied by a factor of ten. This is consistent with the methodology for computing Ldn, in which 10dB are added to nighttime operations. [Figure 2 History of Logan Compliance with Annual PRAS Goals (below) shows the continuous gross failure 1984-1995, continued to date, through Enhance PRAS and Revised PRAS.]

Short-Term Goals

Due to the random variation of wind, weather and demand conditions throughout the year, it is unlikely that the actual runway end use will exactly equal the specified goals. Since typical operations for an hour will contribute less than 0.01% toward the annual goals, the PRAS could recommend using the same runway(s) for extended periods in order to bring the actual utilization closer to the annual goals. Similarly, a persistent wind direction could otherwise result in PRAS recommending the same runway(s) for several days in a row. In order to provide some temporary relief to affected neighborhoods in such situations, the PRAS committee established two short-term goals for the system in addition to the annual goals:

- Provide relief from excessive *dwell* (duration of continuous operations during each day between the hours of 7 am and midnight); Dwell: 6 hours' use between the hours of 7am and midnight in any day. <u>[Massport 2010 EDR changes "(duration of continuous operations…)" and "6 hours' use" to "seven hours of operations over a given area".]</u>
- Provide relief from excessive *persistence* (prolonged utilization of a given runway during the hours of 7 am and midnight in a period of three consecutive days. Persistence: 23 hours' use between the hours of 7 am and midnight in three

consecutive days). [Massport 2010 EDR changes "(prolonged utilization of a given runway…)" to "operations over an area".]

In contrast to the annual goals which count the number of equivalent operations on a runway, dwell and persistence are measured by the number of hours that a given area is subjected to aircraft overflights. [Massport 2010 EDR adds the limiting word "jet", excluding turboprop and piston prop operations.]

The October 1982 document listed above details responsibilities. The November 1982 document, referenced for the general objective and "annual goals, as well as dwell and persistence criteria are quantified and adopted" was not included, and should be made available—particularly to help reconcile current Massport reporting all goals limited to only jets. The March 1997 document, last chronologically is a good summary (9-pages). I am attaching it as a separate, more manageable file and encourage your review. The history is from initial Logan preferential runway procedures in 1968, through PRAS initial installation in 1983, Enhanced PRAS installed in 1993, and Revised PRAS installed in 1996. I think this document and the others should be available individually on the BLANS website, particularly as we enter Phase 3 for a new Runway Use Program to replace PRAS—and on the Massport Noise Abatement website. I'm asking Sandra to forward this request to Terry English and to Flavio Leo.

First, PRAS is an agreed "on-going noise abatement program" (now to be superseded by a new Runway Use Program), with the general objective: "Reduce the annual average total noise impact from Logan operations on the population residing in affected communities without significantly increasing the impact in any populated area within the day-night sound level (LDN) contour of 65 dB." Second, the PRAS incudes runway use goals, with the conclusion/basic goal: "Provide an equitable distribution of noise impact over the long-term annually, as well as short-term relief from excessive operations over certain neighborhoods." And, third the PRAS includes a computer and associated software program and data bases component (provided and maintained by Massport) "to assist in the FAA's decision making in selecting the runways to be used" ("in a manner consistent with the goals of said noise abatement program"). The specifics of the computer system component, including the degree to which the FAA uses the advisory information, may affect FAA ease or ability; but FAA responsibilities to implement the noise abatement program, to achieve the program runway use goals remain. FAA shall: "Provide for the reduction of aviation noise impact to the extent feasible, consistent with safety and the needs of the national air transportation system."

Massport reports on PRAS in their annual EDR to MEPA: Logan Airport 2010 Environmental Data Report (2010 EDR), October 2011 - EOEA #3247 Chapter 6 Noise Abatement and Appendix H, initially: "Developed in 1982 and enhanced in 1990 and subsequent years, the Preferential Runway Advisory System (PRAS) is a set of short-term and long-term runway use goals that includes the use of a computer program that recommends to FAA air traffic controllers, runway configurations that will meet weather and demand requirements and provide an equitable distribution of the Airport's noise impacts on surrounding communities. The two primary goals of the PRAS goals are to distribute noise in on an annual basis, and to provide short-term relief from continuous operations over the same neighborhoods at the ends of the runways."

The Massport description and results reported are inaccurate and incomplete. PRAS is a noise abatement program, with a general objective and a conclusion/basic goal, with two long-term goals and two short-term goals; and that all should be stated clearly. The reported Runway End Use percentage goals—for jets only and with night operations multiplied by a factor of 10 for equivalent—is a consensus quantification of the two long-term goals, to reduce the annual average total noise impact and maximize over water use; and they should be stated explicitly. The PRAS Dwell and Persistence short-term goals are not reported with PRAS and PRAS Compliance; but inexplicably in a separate Supplemental Metrics section after many other topics and several dozen pages. They are reported only for jets, not including turboprops and piston props (~15% of total), but PRAS documents received limit only the long-term goals Runway End Use quantification to equivalent jet operations. (Also, Dwell is reported as seven hours, but PRAS documents received state 6 hours.) Runway End Use is only tabled and for only two years, with the goals. Dwell and Persistence are only graphically charted and for only six years, without the goals.

Most importantly, the failure to achieve the agreed PRAS long-term and short-term goals is shown only indirectly and not acknowledged—even spinning variances as benefits. Variance from goal is not calculated, neither absolute variance amount nor relative variance percentage. The copy misleadingly states a single percentage change between years which is an absolute amount, while ignoring that the relative percentages are much, much greater ("a large increase over 2009 from 7.7 percent to 24.1 percent (a 16.4 percent increase)"—without noting the 8.4% goal or the variance swinging from absolute 0.7% less than the 8.4% goal, relatively 8% low, to absolute 15.7% higher than the 8.4% goal, relatively 187% high (and 2010 24.1% absolute 16.4% higher than 2009 7.7% is relative 213% increase)! The copy misleadingly states: "Higher levels of dwell or persistence for over water areas represent a benefit"—incorrectly creating a new and different goal, ignoring the short-term relief goals for the population below and beside. Variances from goal, absolute and relative are relevant and should be calculated and shown (but variances between two years are much less relevant, weather influenced and often cherry-picked, obscuring reality).

A little further analysis—which Massport avoids:

A. Table 6-5 Effective Jet Aircraft Runway [End] Use in Comparison to PRAS Goals, page 6-21, shows Runway End Use percentages for goals and actuals for only 2009 and 2010. It does not calculate the difference in actual and goal—not in absolute amount nor relative percentage variance. For example, Runway 22 L/R Arrivals has a 6.5% effective use PRAS goal and 22.0% actual 2010 and 21.7% 2009. The uncalculated absolute amount differences from goal of 14.5% in 2010 and 14.2% in 2009 are serious; the uncalculated relative percentages of variances of 228% in 2010 and 234% in 2009 are damning. (There is no graphic Figure, like the 1997 bar chart below which concisely shows actual versus goal with variance, over the initial 12 years period.)
B. Figure 6-17 Comparison of Annual Hours of Dwell Exceedance by Runway End, 2005 to 2010 [Jets], page 6-47, shows Dwell Exceedance by Runway End in annual hours. [In the 1997 Revised PRAS Summary, the short-term goals, dwell and persistence are

“aircraft”, not “jet aircraft” excluding turboprops and piston props.] It does not reference to the goal of maximum 7 hours between 7 am and midnight in any day—not in absolute hours per day difference, nor relative percentage variance, nor days annually. [In the 1997 Revised PRAS Summary, dwell is 6 hours', not seven hours.] For example, the annual Dwell Exceedances for Runway 22L/R Arrivals with Runway 4 L/R Departures and for Runway 27 Arrivals with Runway 9 Departures are each as much as 2,500 Annual Hours. That averages almost 50 hours per week, more than 7 hours per day (with five busier weekdays)—it seems to be much more than double the 6-7 hours maximum (during the 17 hours daytime) in any day goal! And, turboprops and piston props increases the Exceedance variance.

C. Figure 6-18 Comparison of Annual Hours of Persistence Exceedance by Runway End, 2005 to 2010 [Jets], but PRAS Goal seems to include turboprops and piston props], page 6-47, shows Persistence Exceedance by Runway End in annual hours. [In the 1997 Revised PRAS Summary, the short-term goals, dwell and persistence are “aircraft”, not “jet aircraft” excluding turboprops and piston props.] It does not reference to the goal of maximum 23 hours' use between the hours of 7 am and midnight in three consecutive days—not in absolute hours per period difference nor relative percentage variance, nor periods annually. For example, the annual Persistence Exceedances for Runway 22L/R Arrivals with Runway 4 L/R Departures and for Runway 27 Arrivals with Runway 9 Departures are each as much as 4,500 Annual Hours. That averages almost 90 hours per week (with five busier weekdays)—it seems much more than triple the 23 hours (during the 51 hours daytime) in three consecutive days goal! And, turboprops and piston props increases the Exceedance variance.

PRAS has failed because of FAA gross failure to achieve the agreed goals—continuously substantially missing agreed Runway End Use goals by as much as a factor of 2 (100% high-50% low), and with Dwell Exceedance averaging as much as double the agreed 6-7 hours per day and Persistence Exceedance averaging as much as triple the agreed 23 hours in three days! With the FAA ceasing to use the computer system component for assistance since 2004, Massport continues to report actual results. Since the opening of Runway 14-32 in late 2006, variances from PRAS Goals have increased—despite increased operating flexibility with the additional runway and total flight operations continued significantly decreased from earlier levels (below 400,000 since 2002, comparable to the 80s, after peaking above 500,000 in 1998). The gross failure to achieve each and every agreed goal—continuously over the entire program period since 1983, through an enhancement and a revision (with no change in goals), and with significant shifts in runways and their use—is insufficient implementation by the FAA, with insufficient reporting by Massport and insufficient review and oversight by MEPA.

The PRAS general objective and conclusion/basic goal remain valid and consistent with the more recent CAC basic goal:

- PRAS General Objective: "Reduce the annual average total noise impact from Logan operations on the population residing in affected communities without significantly increasing the impact in any populated area within the day-night sound level (Ldn) contour of 65 dB."
- PRAS Conclusion/Basic Goal: "Provide an equitable distribution of aircraft noise over the long-term (i.e. annually), as well as short-term relief from excessive operations over certain neighborhoods."
- CAC Basic Goal: "Safely reduce the aircraft flight and ground noise exposure from the BOS-related operations[1]/ on as many residents of communities in the Boston area as practicable. [1]/ BOS related operations are those which takeoff, land at Boston Logan, or are controlled by the air traffic controllers located at the Boston Air Traffic Control Tower."

The PRAS long-term goals, to Reduce the annual average Total Noise Impact and Maximize Over Water Use, and the quantification of them with Runway End Use percentages (as a straightforward, easy to use, quick to report, and easy to understand operating measure) remain valid. The PRAS short-term goals of Dwell daily and Persistence in consecutive days (by Runway End) remain valid. But, the PRAS inclusion of equivalent, with nighttime (10 pm to 7 am) jet operations multiplied by a factor of 10, in Runway End Use percentages adds great confusion. It can't be reconciled with actual. While similar to adding 10dB noise to nighttime operations when calculating DNL/L_{DN}, it is confusingly not the same. It is with respect to operations in addition to the actual normally reported (actual and effective actual), rather than noise with not otherwise normally reported (only DNL/ $L_{DN)}$). (It seems also intended for short-term relief from excessive operations, which Dwell and Persistence address.) The Runway End Use percentages should be revised to achieve an equitable distribution of noise impact—total population has increased with increases and decreases in Communities, runways and controls have increased, and planes are now quieter on average. Equivalent operations and only jets do not seem appropriate to continue. Population-Weighting—(Operations x Operation Noise) x Population—and Noise-Level-Weighting—(Operations x Operation Noise) x Population x Noise-Level Factor—should be used to more accurately balance the Runway End Use percentages to achieve an equitable distribution of noise impacts, the basic goal—as well as to evaluate actual results. Departures and Arrivals should also be summed at all six Runway Ends (currently with Dwell and Persistence (only) totaled, only for 3 Runway Ends)—to be closer to total noise impact (and to average variances). Turboprop and piston propeller planes, included in the Noise Model, should be included in the Runway End Use percentages. Helicopters—not included in PRAS or in the Noise Model, but estimated to as much as double noise (3dB DNL/L_{DN}) for the most affected communities—should be considered, certainly footnoted.

The question is not what the CAC wants, which is clearly decreased noise impacts, including equitable distribution of noise impacts; but what can and will the FAA achieve. PRAS has failed because the FAA has not achieved the agreed goals—continuously failing grossly on Runway End Use, Dwell, and Persistence—even worse than earlier since the new Runway 14-32. “The computer system didn’t fit their process.” and “Too complicated.” are insufficient to explain or excuse their gross and continued failure to implement It seems experienced guessing could do better. Perhaps, if Massport monitored and reported actuals versus goals with variances monthly? Why did the FAA agree to the PRAS goals and fail so miserably? And, then maintain the same goals with Enhanced PRAS ten years later and continue to fail miserably? And, then continue to maintain the same goals with Revised PRAS several years later and continue to fail miserably?

I think the FAA’s gross failure to achieve the agreed PRAS goals, continued over 30 years, and the FAA’s destruction of our proposals over the past 10 years in BLANS Phase 1 and particularly in Phase 2 (with overly-narrow interpretation and overly-biased determination) emphasize the need for the Phase 3 new Runway Use Program development process to start with their advice and recommendations to achieve the basic goal. Starting with another wish list of specifics from us seems a sure path to frustration and failure. If we are to hope for results, the FAA and Massport must consider overall, recommend, advise, and commit to implement for compliance to achieve the agreed. Without any restrictions, what do they recommend to reduce noise impact, including an equitable distribution of noise impact? And, what restrictions and what implementation are appropriate to achieve consistently?

Sincerely,

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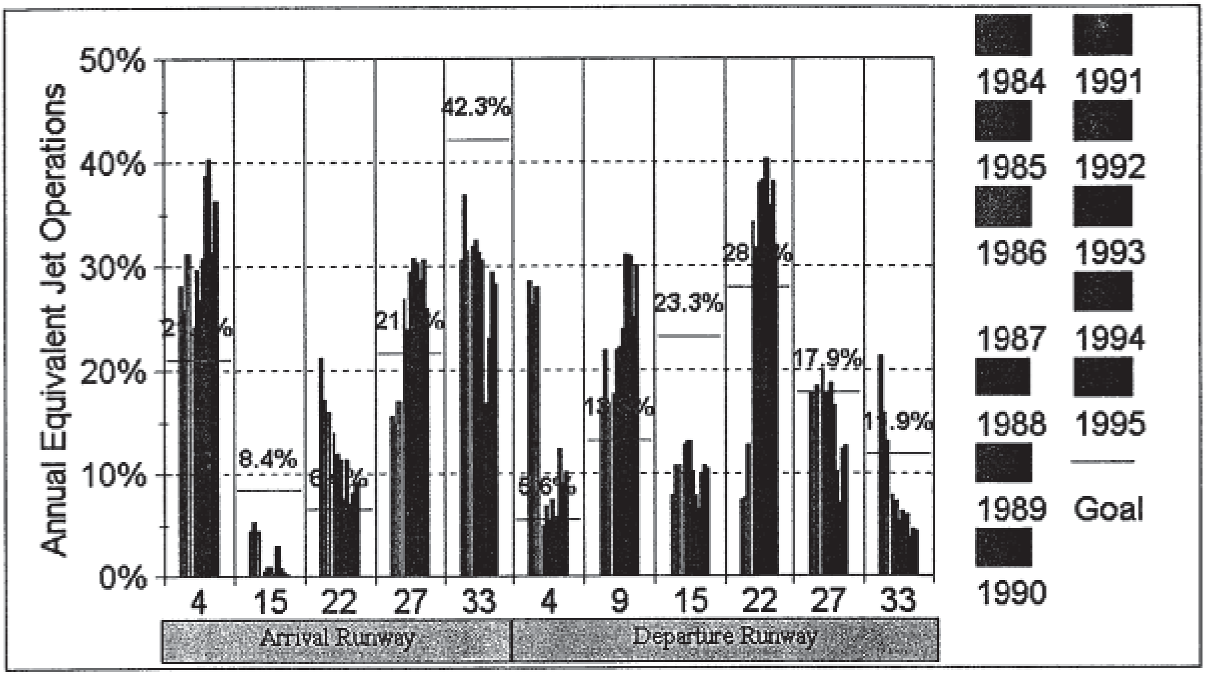

Figure 2. History of Logan Compliance with Annual PRAS Goals.

From: Sandra Kunz [mailto:skunz@verizon.net]
Sent: Tuesday, 08 May, 2012 15:27
To: GARY BANKS; declan boland; costello larry; D'Amico, Bob; ralph dormitzer; Sandra Kunz; Terry McAteer; morrison dick; pomicter darryl; smith pam; John Stewart; mona thaler; thaler mona; thaler mona; JONATHAN WALZER; leo white; wig zamore; bill deignan; Ron Hardaway; Lyman Will; alan wright; william sweeney; patti fine; jerry falbo; BOB DRISCOLL
Subject: VOTE ON PRAS (PREFERENTIAL RUNWAY ADVISORY SYSTEM)

To All:

As part of the Noise Study, the CAC membership must vote as to the future of PRAS (PREFERENTIAL RUNWAY ADVISORY SYSTEM). The membership has not supported PRAS, because, quite simply, the system has not worked.

Attached is the following document: PRAS Historic Agreement Dated October 18, 1982.

In a separate e-mail will be the PRAS Presentation made by Jon Woodward on 5/2010.

Please review the attached document as well as the one to follow separately. **E-mail your vote to all CAC members by Monday, May 21, 2012 as to whether or not you wish to continue with PRAS as indicated below:**

NO – I DO NOT WISH TO CONTINUE WITH PRAS

YES – I WISH TO CONTINUE WITH PRAS

Once the votes have been tallied, I'll report the final outcome to the membership.

Regards,

Sandra

Comment #	Author	Topic	Comment	Response
G.1	Darryl Pomicter	General	It is very important to not approve Massport's request to eliminate their 2012 Environmental Data Report (EDR) to be filed Fall 2013 (consistent with previous years) and to file a combined 2012/2013 EDR in Fall 2014.	Comment noted. Massport published a 2012 web update which is currently available on their website. Full data analyses for 2012 and 2013 will be filed in fall 2014.
G.2	Darryl Pomicter	Noise	Massport's reporting of the existing PRAS goals, actuals and variances is fragmented, inconsistent, incomplete, and unclear/misleading. The short-term Dwell and Persistence goals are reported separate from the long-term Runway End Use goals. The variances from the PRAS goals are not reported, neither by absolute amount nor by relative percentage. With additional analysis, it is clear that existing PRAS goals have never been achieved, since initial implementation in 1983 through enhancement implementation in 1993 and further revision implementation in 1996—with no change in Goals (and with no active use of the computer system component by the FAA since 2004.	The PRAS runway end goals were set by the PRAS Advisory Committee and are reported in Table 6-5. The main section of the report focuses on information used in the development of the noise contours and the understanding of the results. The annual effective use provides insight into the relationship between day and night operations on a runway end. The CNI, TA results, and Dwell and Persistance charts are in the Supplemental Metrics section.
G.3	Darryl Pomicter	Noise	Variances have continuously been as much as (and some more than) a factor of 2 for Runway Use, 3 for Dwell, and 4 for Persistence.	The EDR reports the use of the runways in relation to the goals. The FAA decides how the runways are used each day based on weather, capacity and safety.
G.4	Darryl Pomicter	Noise	Since the opening of the new Runway 14-32 in 2006, increasing flexibility of Runway Use by the FAA for operations, variances from PRAS goals and inequitable distribution of operations have increased (with total operations remaining substantially decreased from earlier levels). Operations by the six Runway Ends—totaling Arrivals and Departures as endured from below— are now ~35%, ~32%, ~10%, ~10%, ~10%, and <5%	Massport is working with Phase 3 of the BLANS project to review Logan Airport runway use and to develop a new runway use program to replace PRAS. Once those goals have been finalized, future EDRs and ESPRs will follow the guidance of the new runway use goals and reporting needs. Until that is implemented, Massport will continue to report on PRAS.

Comment #	Author	Topic	Comment	Response
G.5	Darryl Pomicter	Noise	Simplistically the long-term and continuous gross failure to achieve the agreed PRAS goals is the result of insufficient implementation by the FAA, insufficient reporting by Massport, and insufficient review and oversight by MEPA. If you look, you can easily see indefensible poor reporting by Massport and indefensible non-implementation by the FAA. My March 24, 2013 and March 21, 2013 emails to Massport (below) detail the problems and the needs; and my November 10, 2012 email copied to Massport (included in Appendix B of the 2011 ESPR, with no action) raised the issue, shortcoming and need. Massport could and should have addressed these problems, shortcomings, and needs before issuing their 2011 ESPR, but chose not to. Now they wish to further avoid the facts, which will cripple the future. You should not approve their request.	Please see the response to Comment G.4
G.6	Darryl Pomicter	MEPA	Massport requesting MEPA approval to eliminate the annual EDR is indicative of their disregard for their environmental impacts, their agreements and responsibilities, their inequitable impacts on neighboring Communities. The new Logan Runway Use Program will not be agreed and implemented before 2015. Reporting of the current PRAS will continue into 2015 with the 2015 EDR not issued until Fall 2016—which should also begin the new RUP reporting. The EDRs and ESPRs should help monitor, report, refine, and enforce for compliance to achieve the agreed. The current incomplete and insufficient PRAS reporting should not be allowed to continue; the standard should be raised now, as soon as possible. Massport's reason for the delayed information: "allow Massport to analyze trends as the economy continues to rebound" is at least disingenuous. Massport quite typically blames negative actuals on the weather, construction, or other short-term excuse (including "Pilot Discretion" to absolve the most egregious violations); and Massport advises wait, delay, and look at after next year.	The Logan EDR and ESPR are based on an analysis year. The data must be gathered, analyzed, and compiled into a comprehensive document that meets the Secretary's Scope and is understandable to the general public. The issuance of an EDR or ESPR is typically on a yearly basis.

Comment #	Author	Topic	Comment	Response
G.7	Darryl Pomicter	Noise	You are ignoring that your Massport reporting of the PRAS noise abatement program is very seriously incomplete, inaccurate, and insufficient. Do you agree that the PRAS noise abatement program results fail to achieve the long-term Runway End Use and short-term Dwell and Persistence goals—by as much as (and even more than) a factor of 2 for Runway End Use, 3 for Dwell, and 4 for Persistence? That results are worse since the new Runway 14-32? And, great failure has been continuous since the 1983 beginning? And, that you are not reporting that clearly, showing and acknowledging the degree of failure? You wish to defer until the intended replacement is agreed (and implemented), which means continuing the current incorrect and insufficient through the 2011 ESPR and the following 2012, 2013, and 2014 EDRs—which seems not thought through, and certainly wrong.	The Community Advisory Committee (CAC) has voted not to support PRAS. Logan's overflight noise study is currently reviewing a new runway use plan for Logan. Massport provides PRAS data to be consistent with previous reports until a new methodology is developed through the BLANS.
G.8	Darryl Pomicter	Noise	Improved Massport PRAS noise abatement program reporting now, in addition to being appropriate for this long-lived ESPR and the following EDRs, will inform and empower the commencing development of a new Runway Use Program to replace PRAS.	Please see the response to comment G.7

Comment #	Author	Topic	Comment	Response
G.9	Darryl Pomicter	MEPA	The accepted Massport schedule for the 2011 ESPR (deferred from 2009) is Spring 2013 (the prior 2004 ESPR is dated May 25, 2006). That is plenty of time to correct the PRAS reporting as requested. MEPA directed Massport, for this 2011 ESPR: "In addition to responding to noise tracking and abatement efforts, Massport should consult directly with individual commenters where appropriate." "I encourage Massport to continue with more detailed analysis in the 2011 ESPR. I strongly advise Massport to consider and address the comments received that have raised noise related concerns. The comments from the City of Cambridge, as well as from individuals have raised a number of concerns and suggestions related to noise that Massport should address into the 2011 ESPR." "In particular, Massport should provide a thorough examination of issues raised regarding individual noise monitoring locations, noise measurement and modeling, noise abatement, and air quality issues."	Massport responds to comments on the EDRs and ESPRs through this response to comment section of the document. Where appropriate, additional responsive information is included elsewhere within the document. The EDRs and ESPRs are comprehensive documents that provide information to the public as well as environmental regulatory agencies.
G.10	Darryl Pomicter	General	Please make some additional effort now, recognizing the past failure to report and failure to achieve—to start the next phase clearly and positively, and enable it to succeed.	Please see the response to comment G.10

Comment #	Author	Topic	Comment	Response
G.11	Darryl Pomicter	Noise	PS "In preparing the ESPR we have carefully reviewed your comments on the 2010 EDR submitted in December 2011 and integrated your suggestions where appropriate." What's not appropriate: to show on the maps the BOS VOR beacon location from where the reported DME distances are measured (two miles across Logan from Communities); to show on the maps the Boston Communities and surrounding Cities boundaries and names (so people can recognize and reconcile the impact on them); to note clearly that the noise reported is from a computer simulation model program (calibrated with actual noise measurements), and not including any helicopters or any airplanes not departing or arriving Logan (which as much as double the reported modeled noise in the most affected areas); and/or to show passengers for Cape Air also: the fifth Dominant Passenger Carrier at Logan, with >10% Operations, <1% Passengers, <1/10 Average Passengers per Flight, (not a Principal Revenue Payer for Landing Fees or for Terminal Rents and Fees—and notorious for low flying and non-compliant noise intrusion)? Including prior year comment letters in the following year Appendix with a perfunctory response comment—but No Change on anything ever—is insufficient.	The Airport Reference Point was added to Figure 6-16 based on prior comments asking Massport to identify the points from which the distances listed in Tables 6-8, 6-9 and 6-13 were measured. This figure immediately precedes the first table (6-8). A footnote was added to each table listing the location from where the distances were measured. The only place DME is discussed is in the Flight Track Monitoring Report. The term "DME" is defined on page H-43. The location of the VOR is described in the text. Additional town names were added to the graphics based on prior comments. Pages 6-8 and 6-9 descibe the modeling process. The results are modeled from the FAA's INM model. The model is not calibrated with noise measurements from the Massport monitors as that is not consistent with FAA's INM model. It is clear from the modeling discussions that the model takes into account all arrivals and departures from Logan Airport and does not include flights from other airports. Cape Air flights are included in all of the modeling.

Comment #	Author	Topic	Comment	Response
G.12	Darryl Pomicter	Noise	PPS The Chapter 6 Noise Abatement, Regulatory Framework reference to "FAA Order 5196, Airport Compliance Requirements" Chapter 4, Section 4-8f seems to be incorrect—no such document can be found. The correct reference seems to be FAA Order 5190.6, Airport Compliance Manual. The referenced Chapter 4 section does not exist; it seems it should be: Chapter 13, Airport Noise and Access Restrictions, 13.2.b: The authorities and responsibilities of the parties may be summarized as follows.	That was a typographical error. The FAA Order should have been FAA Order 5190.6A which was in effect from 1989 through Sept 2009. This was then replaced by FAA Order 5190.6B "Airport Compliance Manual", 13.14.a: Proposals to restrict operations by Stage 3 aircraft must (1) be agreed upon by the airport and all users at the airport or (2) satisfy procedural requirements similar to proposals to restrict Stage 2 operations and be approved by FAA. To be approved, restrictions must meet the following six statutory criteria: 1) The proposed restriction is reasonable, nonarbitrary, and nondiscriminatory. 2) The proposed restriction does not create an undue burden on interstate or foreign commerce. 3) The proposed restriction maintains safe and efficient use of the navigable airspace. 4) The proposed restriction does not conflict with any existing federal statute or regulation. 5) The applicant has provided adequate opportunity for public comment on the proposed restriction. 6) The proposed restriction does not create an undue burden on the national aviation system.
G.13	Darryl Pomicter	Noise	In the several-years delayed and now being prepared 2011 Environmental Status and Planning Report (ESPR) for Massport's Logan Airport, it is very important to report more completely, accurately, and clearly in Noise Abatement on the Preferential Runway Advisory System noise abatement program. Further review of Massport's last Logan EDR, 2010 Environmental Data Report, EOEA #3247, October 2011 in current BLANS efforts has found the reporting on PRAS to be disjointed, incomplete, inaccurate, unclear, and even misleading.	Please see the response to Comment G.4

Comment #	Author	Topic	Comment	Response
G.14	Darryl Pomicter	Noise	Overall, not showing, avoiding the continuous failure to achieve the agreed goals over the entire period of the program since 1983 (including an enhancement after 10 years and a revision after a few more, with the same goals maintained, and continued miserable failure on all goals by as much as a factor of 2 and more). Also, the PRAS performance has deteriorated since the opening of the new Runway 14-32 in late 2006—despite increased operating flexibility with the new runway and total operations remaining substantially decreased from earlier levels. None of this can be seen in the Massport reporting. Massport's insufficient, incomplete and unclear reporting has enabled the gross PRAS failure to continue so long—not really acknowledged with responsibility for improvement.	Massport Provides PRAS data to be consistent with previous reports until a new methodology is developed through the BLANS.
G.15	Darryl Pomicter	Noise	Improved PRAS reporting now in this more expansive, detailed, and longer-lasting 2011 ESPR is very important.	Please see the response to comment G.7
G.16	Darryl Pomicter	Noise	The referenced Logan Airport Noise Abatement Rules and Regulations codified in Massachusetts regulations 740 CMR 24 should then be updated.	Comment Noted.
G.17	Darryl Pomicter	Noise	My specific requests for the 2011 ESPR reporting of PRAS are: 1. Report Preferential Runway Advisory System PRAS goals completely and accurately—including as a noise abatement program.	This information was presented on pages 6-22, 6-23, table 6-5, and pages 6-49 and 6-50.
G.18	Darryl Pomicter	Noise	The 2010 EDR PRAS summaries don't mention "noise abatement program", the general objective, the conclusion/basic goal, or the specific long-term goals (with runway end use percentages being the quantization). There are significant differences from the PRAS documents received, particularly adding the limiting word "jet" with Dwell and Persistence (excluding the ~15% turboprop and piston prop); and increasing the Dwell limit from 6 to 7 hours (of 17 hours daytime).	Please see the response to Comment G.4

Comment #	Author	Topic	Comment	Response
G.19	Darryl Pomicter	Noise	2. Report PRAS together. The 2010 EDR reports Dwell and Persistence short term goals in a separate Supplemental Metrics section, after many other topics—26 pages after PRAS with introduction and Compliance (only) Runway End Use.	Please see the response to Comment G.4
G.20	Darryl Pomicter	Noise	3. Report Runway End Use equivalent easily comparable with actual operations. The 2010 EDR reports Runway Use actual and PRAS equivalent two pages later, with year and runway axes reversed, departures and arrivals reversed in order, runways in different orders, parallel runways separate in only one, no subtotals or totals, and different periods (Use for 6 years (of 20 years in the Appendix) and Effective Use for only 2 years). They are directly related results, but effectively uncomparable.	Please see the response to Comment G.4
G.21	Darryl Pomicter	Noise	4. Report Historical Period. With new Runway 14-32 since 2006, operations peaked in 1998, Revised PRAS installed 1996, Enhanced PRAS installed 1993, and PRAS installed 1983, wind and weather varying (and blamed) year-to-year, and the continuous gross failure on all goals throughout—and in developing the new, superseding Runway Use Program—the entire period since 1983 would be a valuable history now. Ongoing, 20 years should be minimum—the same as actual Runway Use Table H-12, Modeled Operations Tables H-9 & H-11, and Cumulative Noise Index Table H-13. (Operations and Passengers Table E-1 are 30 years.) The 2010 EDR 6 years Dwell and Persistence short term goals are insufficient, and only 2 years Use by Runway Ends is useless— always excused by “weather”.	Please see the response to Comment G.4

Comment #	Author	Topic	Comment	Response
G.22	Darryl Pomicter	Noise	5. Report PRAS actuals easily comparable to all goals. The 2010 EDR reports Dwell Exceedance in annual hours with no comparison to the goal in maximum daytime hours during each day (actual exceedances averaged by day are more than double the goal). Persistence Exceedance is reported in annual hours with no comparison to the goal in maximum daytime hours during three consecutive days (actual exceedances averaged by week are more than triple the goal).	Please see the response to Comment G.4
G.23	Darryl Pomicter	Noise	6. Report by both Table and Figure, Bar Chart/Graph. Tables and graphs (including bar and pie charts) present data information differently. Graphs are visual and display relationships, scale and trends more easily and quickly. Tables are more verbal and allow more and greater detail (and ease further calculations and analysis). (Most people are more comfortable with one over the other.) The 2010 EDR uses only a Table for Runway End Use and only a Figure bar chart for Dwell and for Exceedance. The 1997 Figure 2 History of Logan Compliance with Annual PRAS Goals (below and in attached) is a very informing bar chart view of 1984-1995 Use by Runway End between 12 years and continually failing to achieve goals, varying substantially absolute and relative.	Comment noted.
G.24	Darryl Pomicter	Noise	7. Report variance from goals by both absolute and relative. Absolute amount of variance and relative (%) amount of variance are two very different standard, useful views of analysis. Variances from goal, absolute and relative are both relevant and both should be shown. (Variances between years are much less relevant and often misleading cherry-picking, obscuring the reality.)	Please see the response to Comment G.4

Comment #	Author	Topic	Comment	Response
G.25	Darryl Pomicter	Noise	a. The 2010 EDR Table 6-5 Runway End Use shows use and goals, but no variance absolute amounts or relative percentages. The copy misleadingly states a percentage change between years which is an absolute amount, while ignoring the goal and the much, much greater relative percentages ("a large increase over 2009 from 7.7 percent to 24.1 percent (a 16.4 percent increase)"—without noting the 8.4% goal or the variance swinging from absolute 0.7% less than the 8.4% goal, relatively 8% low, to absolute 15.7% higher than the 8.4% goal, relatively 187% high (and 2010 24.1% absolute 16.4% higher than 2009 7.7% is relative 213% increase)!	Comment noted.
G.26	Darryl Pomicter	Noise	b. Figure 6-17 Dwell Exceedance by Runway End does not show the goal, and reports annual hours while the goal is maximum daytime hours in a day—leaving variance to the short-term relief goal unknown, other than big (the calculated daily average for the larger results are more is more than double the goal). The annual number of days of exceedance, by range of exceedance in a day— showing the variances from the daily goal by days and annually—would be relevant.	Please see the response to Comment G.4
G.27	Darryl Pomicter	Noise	c. Figure 6-18 Persistence Exceedance by Runway End does not show the goal and reports annual hours while the goal is maximum daytime hours in three consecutive days—leaving variance to the short-term relief goal unknown, but big (the calculated weekly average for the larger are more than triple the goal for three days). The annual number of three consecutive days periods, by range of exceedance in a period—showing the variances from the three-consecutive-days period goal by periods and annually would be relevant.	Please see the response to Comment G.4

Comment #	Author	Topic	Comment	Response
G.28	Darryl Pomicter	Noise	8. Report by Runway End: Departures, Arrivals, and Total. Departures and Arrivals are both into the wind, in the same direction—at the opposite ends of a Runway. Departures from a Runway are over a totally different area and Communities than Arrivals to that Runway—around the opposite end, miles away. Report for all goals by Runway End with Departures and Arrivals in opposite directions—over the same Communities!	Please see the response to Comment G.4
G.29	Darryl Pomicter	Noise	9. Report Dwell and Persistence for all aircraft—including turboprop and piston prop operations, not limited to jets.	Please see the response to Comment G.4
G.30	Darryl Pomicter	Noise	The 2010 EDR adds the limiting word "jet" and reports Dwell and Persistence for only jets. The 2010 EDR also changes "6 hours'" to "seven hours" for Dwell.	Please see the response to Comment G.4
G.31	Darryl Pomicter	General	I have found the EDR and ESPR to be increasingly useful documents.	Comment noted.
G.32	Darryl Pomicter	Noise	It should be included for both the actual use and the effective use for PRAS, which includes 10X nighttime. For Massport and the FAA, I think it is very important to manage and report clearly the total activity (turbojet, turboprop, and piston prop) by Runway End use (actual and effective)—including as part of revamping, updating, reassessing, superseding PRAS as provided in the ROD—to more clearly see the absolute and relative effects over time on Communities, and to more equitably decrease and distribute them."	Most of the Tables in *Chapter 6, Noise Abatement* report jet-only activity as Jet activity drives the shape of the noise contours. Non-jet runway use is included in Appendix H (Table H-2). Table H-3 also reports numbers of operations and percentages for all operations (jet and non-jet) at Logan Airport. These tables do not include effective use as that is only applicable to the PRAS goals.

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Proposed Scope for the *2014 EDR*

PROJECT NAME: *Logan Airport 2014 Environmental Data Report*

PROJECT LOCATION: East Boston, Massachusetts

EOEA NUMBER: 3247

PROJECT PROPONENT: Massachusetts Port Authority (Massport)

Massport respectfully submits this proposed scope for the *Logan Airport 2014 Environmental Data Report (EDR)* for public review and comment. This *2014 EDR* would follow the *2012/2013 Environmental Data Report,* which was filed in December 2014. An update on 2012 conditions at Logan Airport was published on Massport's website in May of 2013. Massport will continue to evaluate the cumulative impacts associated with Logan Airport activities through preparation of an Environmental Status and Planning Report (ESPR) approximately every five years with data updates annually through the EDRs. Massport will continue to provide interim updates on key environmental topics on the Massport website (http://www.massport.com/environment).

Purpose of the *Logan Airport 2014 EDR*

The *2014 EDR* will provide an update on conditions at Logan Airport for calendar year 2014. The EDR will continue to serve as a background/context against which projects at Logan Airport can be evaluated. It also will report on the cumulative effects of Logan Airport operations and activities, compared to previous years, as appropriate.

The EDR complements the project-specific Environmental Notification Forms (ENFs) and, if necessary, Environmental Impacts Reports (EIRs) to help focus the review processes and to ensure that segmented project review does not occur in the context of Massachusetts Environmental Policy Act (MEPA) review of projects at Logan Airport.

Contents of the *2014 EDR*

Generally, the *2014 EDR* will follow the format of the *2012/2013 EDR*, presenting an overview of the role of Logan Airport in the regional planning context. The *2014 EDR* will report on 2014 passenger and aircraft operation activity levels. This will be followed by a status report on Massport's proposed planning initiatives and projects and mitigation. In this way, Massport will provide necessary background information to allow the reviewer to understand the environmental policies and planning which form the context of the environmental reporting, technical studies, and environmental mitigation initiatives at Logan Airport.

The technical studies in the *2014 EDR* will include reporting on and analysis of key indicators of airport activity levels, the regional transportation system, ground access, noise, air quality, environmental management, and project mitigation tracking. Sustainability initiatives are included throughout the document. Each chapter's contents are described below.

1. Introduction/Executive Summary

This chapter of the *2014 EDR* will include:

- Overview of Logan Airport and place it in its environmental, geographic, and regulatory context
- Overview of the EDR/ESPR cycle
- Summary of passenger activity levels and operations
- Description of the analysis framework for the environmental reporting and technical studies to be conducted
- Overview of the Logan Airport planning initiatives and projects
- Overview of sustainability initiatives at Logan Airport
- Description of the organization of the *2014 EDR*

2. Activity Levels

A primary purpose of this chapter will be to report on airport activity levels for 2014, including:

- Aircraft operations, including fleet mix and scheduled airline services at Logan Airport
- Passenger activity levels
- Cargo and mail volumes
- Compare 2014 aircraft operations, cargo/mail operations, and passenger activity levels to 2013 activity levels
- Report on national aviation trends in 2014 and compare to trends at Logan Airport

3. Airport Planning

Massport continues to assess planning strategies for improving Logan Airport's operations and services in a safe, secure, more efficient, and environmentally sensitive manner. As owner and operator of Logan Airport, Massport also must accommodate and guide tenant development. This chapter will describe the status of planning initiatives for the following areas:

- Terminal Area
- Airside Area
- Service and Cargo Areas
- Roadways and Airport Parking
- Airport Buffers and Landscaping

An update on long-range planning activities, including an update on the ongoing strategic planning effort that Massport is currently undertaking and an update on the Parking Plan will be documented. The chapter will report on the status of public works projects implemented within the boundaries of Logan Airport. The chapter will also report on the status and effectiveness of the ground access related changes including roadway and parking projects, which consolidate and direct airport-related traffic to centralized locations and minimize airport-related traffic on external streets in adjacent neighborhoods. Massport will also report on the status of the Sustainability Management Plan elements and its implementation.

4. Regional Transportation

The *2014 EDR* will describe Logan Airport's role in the region's intermodal transportation system by reporting on the following:

Regional Airports

- 2014 regional airport operations, passenger activity levels, and schedule data within an historical context
- Status of plans and new improvements as provided by the regional airport authorities
- Ground access improvements to the regional airports
- The role that Worcester Regional Airport and Hanscom Field play in the regional aviation system and Massport's efforts to promote these airports

Regional Transportation System

- Massport's role in managing regional transportation facilities.
- Massport's cooperation with other transportation agencies to promote efficient regional highway and transit operations
- Report on metropolitan and regional rail initiatives and ridership

5. Ground Access to and from Logan Airport

The chapter will report on 2014 conditions and provide a comparison to those of 2013 for the following:

- Detailed description of compliance with Logan Airport Parking Freeze
- High occupancy vehicle (HOV) ridership (including Blue Line, Silver Line, Scheduled, Unscheduled, Water Transportation, and Logan Express)
- Logan Airport Employee Transportation Management Association (Logan TMA) services
- Logan Airport gateway volumes
- On-airport traffic volumes
- On-airport vehicle miles traveled (VMT)
- Parking demand and management (including rates and duration statistics)
- Status of long-range ground access management strategy planning and additional information on the Long-Term Parking Management Plan

This chapter will also present a discussion of the following topics:

- Massport's cooperation with other transportation agencies to increase transit ridership to and from Logan Airport via the Blue Line and Silver Line
- Report on Logan Express usage and efforts to increase capacity and usage
- Report on water transportation to and from Logan Airport
- Report on results of ongoing ground access studies, as relevant

6. Noise Abatement

This chapter will provide an overview of the environmental regulatory framework affecting aircraft noise, the changes in aircraft noise, and the updates in noise modeling. The chapter will report on 2014 conditions and compare those conditions to those of 2013 for the following:

- Fleet Mix, including Stage II, Recertified (Hushkitted) Stage III, newly manufactured Stage III, and qualifying Stage IV aircraft
- Nighttime operations
- Runway utilization (report on aircraft and airline adherence with runway utilization goals)
- Preferential runway advisory system (PRAS) tracking
- Flight tracks

The chapter will report on 2014 conditions and compare those to 2013 conditions for the following noise indicators:

- Using the Federal Aviation Administration's (FAA) most current version of the Integrated Noise Model (INM), and RealContours™ and RealProfiles™, produce an accurate set of Day-Night Sound Level (DNL) noise contours. Adjustments made to account for over-water sound propagation and the propagation of sound to areas of higher terrain will be reported
- Update on FAA's combined air quality and noise modeling tool (Aviation Environmental Design Tool - AEDT)
- Noise-impacted population
- Measured versus modeled noise values, including reasons for differences and any improvements attributable to the use of RealContours™ and RealProfiles™
- Cumulative Noise Index (CNI)
- Times-Above for 65, 75, and 85 dBA threshold values/Dwell and Persistence of noise levels
- Flight track monitoring noise quarterly reports

The chapter will also report on noise abatement efforts, results from Boston Logan Airport Noise Study (BLANS) study, and provide a status update on the new noise and operations monitoring system.

7. Air Quality/Emissions Reductions

This chapter will begin with an overview of the environmental regulatory framework affecting aircraft emissions, changes in aircraft emissions, and the changes in air quality modeling. The chapter will provide discussion on progress on the national and international levels to decrease air emissions to provide context for this chapter. The chapter will also discuss analysis methodologies and assumptions and report on 2014 conditions using the most recent versions of the Emissions Dispersion Modeling System (EDMS) and the EPA required motor vehicle emissions modeling tool (MOtor Vehicle Emission Simulator (MOVES[1]). The chapter will include:

- Emissions inventory for carbon monoxide (CO)
- Emissions inventory for oxides of nitrogen (NO_x)
- Emissions inventory for volatile organic compounds (VOCs)
- Emissions inventory for particulate matter (PM)

1 MOVES replaces the previous model for deriving on-road mobile source emissions, MOBILE6.2; MassDEP directed that MOVES should be used for the EDR analysis for consistency with the SIP and DEP's methodologies.

- Nitrogen dioxide (NO_2) monitoring
- NO_x emissions by airline

This chapter will also report on the following ongoing air quality efforts for 2014:

- Air Quality Initiative (AQI) Tracking
- Massport's and tenant's alternative fuel vehicle programs
- The status of Logan Airport air quality studies undertaken by Massport or others, as available

This chapter will include an inventory of greenhouse gas (GHG) emissions from Logan Airport in 2014. GHG emissions will be quantified for aircraft, ground service equipment (GSE), motor vehicles and stationary sources using emission factors and methodologies outlined in the Greenhouse Gas Emissions Policy and Protocol issued by EEA and the Transportation Research Board's *Guidebook on Preparing Airport Greenhouse Gas Emissions Inventories* (Airport Cooperative Research Program (ACRP) Report 11, Project 02-06). The results of the 2014 GHG emissions inventory will be compared to the 2013 results.

This chapter will also include an update on Massport's efforts to encourage the use of single engine taxiing under safe conditions.

8. Water Quality/Environmental Compliance and Management

This chapter will report on the 2014 status of:

- National Pollutant Discharge Elimination System (NPDES) Permit and monitoring results for Logan Airport's outfalls and the Fire Training Facility
- Jet fuel usage and spills
- Massachusetts Contingency Plan (MCP) Activities
- Tank management
- Update on the environmental management plan
- Fuel spill prevention

The chapter will also present a discussion of the following topics:

- Future stormwater management improvements (if any)
- Future MCP and tank management activities

9. Project Mitigation Tracking

This chapter will report on the status of mitigation commitments for specific Massport and tenant projects at Logan Airport that have undergone MEPA review and other commitments and have commenced construction. The status of mitigation commitments made in the Section 61 Findings for the following projects will be reported:

- West Garage/Central Garage (EOEA 9790)
- International Gateway (EOEA 9791)
- Logan Airside Improvements Planning Project (EOEA 10458)
- Terminal A Replacement Project (EOEA 12096)
- Southwest Service Area Redevelopment Program/Rental Car Center (EOEA 14137)
- Logan Runway Safety Area Improvements Project (EOEA 14442)

This chapter will update the status of Massport's mitigation commitments and also will identify projects for which mitigation is complete.

Appendices

MEPA Documentation

These appendices will include a copy of the Secretary's Certificate and comment letters received on the *2012/2013 EDR*. Individual responses to items raised in the Secretary's Certificate on the *2012/2013 EDR* and comments in reviewers' letters will be provided. A distribution list for the *2014 EDR* (indicating those receiving documents or CDs) will be provided. The document will also contain copies of any MEPA Certificates or documentation issued for projects at Logan Airport in 2014.

Supporting Technical Documentation

Supporting technical appendices will be provided as necessary.

D

Distribution

This *2012/2013 Environmental Data Report (EDR)* has been distributed to federal, state, and city agencies and to parties listed in this appendix. The list includes those entities that the Massachusetts Environmental Policy Act (MEPA) requires as part of the review of the document, representatives of governmental agencies, commenters on the *2011 Environmental Status and Planning Report (ESPR)*, and community groups concerned with airport activities.

The *2012/2013 EDR* is also available on Massport's website at www.massport.com and electronically on compact disc (CD). Limited CD or printed copies of the *2012/2013 EDR* may be requested from Lisa Carisella, Massport, Suite 200S, Logan Office Center, One Harborside Drive, East Boston, MA 02128, telephone (617) 568-3507, e-mail: lcarisella@massport.com. Printed and electronic copies of this report are available for review at the following public libraries:

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[P,C] Annemarie Fagan Milton Town Administrator 525 Canton Avenue Milton, MA 02186	[P,C] Philip Johenning 23 Parkwood Drive Milton, MA 02186	[P,C] Nancy S. Timmerman, P.E. Consultant in Acoustics and Noise Control 25 Upton Street Boston, MA 02118
[P,C] Vivien Li, President The Boston Harbor Association 374 Congress Street, Suite 307 Boston, MA 02210	[P,C] Stephen H. Kaiser 191 Hamilton Street Cambridge, MA 02139	[P,C] Darryl Pomicter 136 Myrtle Street Boston, MA 02114-4447

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[C] U.S. Representative William Keating Two Court Street Plymouth, MA 02360	[C] U.S. Representative John Tierney 17 Peabody Square Peabody, MA 01960	[C] U.S. Senator Elizabeth Warren 2400 J.F. Kennedy Federal Building Room 409 Boston, MA 02203
[C] U.S. Representative Katherine Clark Five High Street, Suite 101 Medford, MA 02155	[C] U.S. Representative James McGovern 12 East Worcester Street, Suite 1 Worcester, MA 01604	[C] U.S. Senator Edward J. Markey 975 J.F. Kennedy Federal Building Boston, MA 02203
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C Sal LaMattina
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C Frank Baker
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Quincy, MA 02169

- **City of Revere**

[C] Dan Rizzo, Mayor
Revere City Hall
281 Broadway
Revere, MA 02151

[C] Ashley Melnik, City Clerk
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Revere, MA 02151

- **Town of Winthrop**

[C] James McKenna
Town Manager
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[C] Richard Dimes, Chair
Winthrop Planning Board
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■ Town of Lincoln		
C Timothy Higgins Town Administrator 16 Lincoln Road Lincoln, MA 01773	C Peter Braun Board of Selectmen, Chair 16 Lincoln Road Lincoln, MA 01773	C D. Noah Eckhouse Board of Selectmen 16 Lincoln Road Lincoln, MA 01773
C Renel Fredericksen Board of Selectmen 16 Lincoln Road Lincoln, MA 01773		
■ Town of Hull		
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■ City of Cambridge		
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C Planning Board
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Community Groups and Interested Parties

- **Citizens Advisory Committee (CAC)**

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[C] Robyn Ochs
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- **East Boston Community**

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[C] John Kelly
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[C] Fran Carbone
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[C] Mary Berninger
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[C] Ron Hardaway
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[C] Gloribell Mota
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[C] Joe Ruggerio
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[C] Debra Cave
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[C] Maryellen Welch
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[C] Camilo Hernandez
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[C] Margaret Farmer
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- **Revere Community**

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[C] Joseph James
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