PREAMBLE

The following scope of work outlines tasks to be performed during Phase 2 of the Boston Logan Airport Noise Study. Phase 1 was a collaborative process between the Logan Airport Community Advisory Committee (CAC), the Boston Technical Advisory Committee (BOS/TAC), the Federal Aviation Administration (FAA), and Massport, with support from the Project Consultant (PC) and the Independent Consultant (IC). The CAC represents 29 communities and towns within the Greater Boston area, each of which has appointed a representative to the organization. BOS/TAC contains representatives of FAA, CAC, Massport, the Air Line Pilots Association (ALPA), and airlines operating at Boston Logan Airport, and was the primary decision making body in Phase 1. Each of these parties played an important role in identifying potential measures to reduce noise impacts to communities surrounding Boston Logan International Airport (the Airport). Measures identified in Phase 1 that were determined to be feasible based on operational, safety, and technical criteria were retained for further consideration. Those measures that could be implemented without causing adverse environmental impacts were identified and may be implemented during the early stages of Phase 2 (Task 3).

Other measures identified in Phase 1 that were determined to be safe and operationally and technically feasible, but had the potential to cause adverse environmental impacts if implemented, were retained for further analysis in Phase 2. Those measures will be subjected to more detailed technical analyses to determine the significance of any environmental impacts, which will then be the subject of an environmental document to be prepared by FAA.

Because the purpose of the Boston Logan Airport Noise Study is to identify and implement measures to reduce noise impacts to communities surrounding Boston Logan International Airport (BOS), the active participation of representatives of communities most affected by noise from aircraft operating at the Airport is crucial to the success of the project. Thus, the FAA proposes to directly involve BOS/TAC and CAC, as well as the public at large, in a community dialogue process in completing three critical tasks in Phase 2:

- Task 4 – Study Area Definition,
- Task 5 – Develop Baseline Conditions and
- Task 6 – Alternatives -Identification and Evaluation

Additional resources, such as the FAA Evaluation Team that evaluated Phase 1 measures for safety and operational and technical feasibility, will be brought into the Phase 2 study process as needed.

The community dialogue process is outlined further in Task 2 – Public Coordination/ Involvement. The purpose of this process is to ensure that BOS/TAC, CAC, and the general public have the opportunity to provide input on the conduct of this noise study in the spirit of collaboration that existed in Phase 1. It will also serve to assist the CAC in reaching consensus

at key decision points during Phase 2. At the conclusion of Phase 2, the CAC and Massport will recommend a series of measures for implementation; these measures will be the subject of an environmental document to be prepared in Phase 3 that will document the potential environmental impact of the proposed measures. Based on the significance of any potential environmental impact, the FAA will either prepare an Environmental Assessment (EA) or Environmental Impact Statement (EIS). Since the significance of the potential environmental impacts of the proposed implementation measures is currently unknown, the FAA will initiate the environmental process in Phase 3. Whether an EA or EIS is ultimately prepared, FAA will commit to implementation of any approved measures in either a Finding of No Significant Impact (FONSI) or a Record of Decision (ROD).

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PHASE 2 SCOPE OF SERVICES

INTRODUCTION

The Boston Logan Airport Noise Study is in fulfillment of the requirements of the FAA's Record of Decision dated August 2, 2002. The study is being completed in three phases.

During Phase 1, 55 airspace and operational measures to potentially improve the noise environs around Boston Logan International Airport were identified. Each measure was subjected to a preliminary screening process that examined safety and operational feasibility. If a measure was found to be technically feasible and met FAA safety criteria it was subjected to a secondary screening analysis. If a measure was technically infeasible or did not meet FAA safety criteria, it was discarded from further consideration. Through this process, 18 of the 55 Phase 1 measures were ultimately discarded.

The remaining 37 measures considered in Phase 1 were examined in a secondary screening analysis to determine whether implementation would potentially cause an adverse environmental impact (as defined in FAA Orders 1050.1E[1] and 5050.4B[2]) that require disclosure and consideration in an Environmental Assessment (EA) or Environmental Impact Statement (EIS). Measures that would not cause an impact requiring disclosure and consideration in an EA or EIS, and were listed in and met the conditions of FAA Order 1050.1E to be considered as the type of action that would normally be categorically excluded, were identified as Early Implementation Measures. Of the Phase 1 measures considered, 23 were identified as Early Implementation Measures.

The remaining 14 measures deferred from Phase 1 (combined together into 12 measures) will be further evaluated in Phase 2 to determine potential impacts to communities and noise sensitive areas. The intent of these measures is to reduce noise impacts to communities surrounding Boston Logan International Airport. These 12 combined measures are:

- Measure 4 – Runway 14 Departures: develop departure procedures to increase altitudes of aircraft over land. The intent of this measure is to avoid overflights of Hull and increase altitude of aircraft at the point where their flight path crosses from the ocean to land. FAA-designed routing from Runway 14 was not available during Phase 1. Therefore, analysis for this measure is to be addressed in Phase 2.
- Measure 16 – Runway 32 Arrivals: develop approach procedure that maximizes flight over water. The intent of this measure is to minimize noise impacts to South Shore communities. FAA-designed routing to Runway 32 is not complete and is currently under review by FAA National Flight Procedures Office. Therefore, analysis for this measure is to be addressed in Phase 2.

[1] Federal Aviation Administration, Order 1050.1E, *Environmental Impacts: Policies and Procedures*, June 8, 2004.
[2] Federal Aviation Administration, Order 5050.4B, *National Environmental Policy Act (NEPA) Implementing Instructions for Airport Actions*, April 28, 2006.

- Measure 17 – Runways 27 and 33L Departures: develop departure procedures for fanning. The intent of this measure is to provide respite to close-in communities in departure areas of these runways.
- Measure 18 – All Departure Runways: apply cockpit alternatives for thrust and climb management to benefit certain nearby communities through implementation of close-in noise abatement departure procedures. The intent of this measure is to minimize noise impacts to close-in communities.
- Measure 19 – Runway 27 Departures: establish balanced use of Runways 27 and 33L for departures. The intent of this measure is to minimize noise to close-in communities.
- Measure 20 – Runway 4L Departures and 22R Arrivals: remove noise emission restriction to achieve more utilization of this runway. The intent of this measure is to develop a more equitable distribution of noise impacts.
- Measure 21 – All Departure Runways: develop fanning procedures based on route of flight. The intent of this measure is to disperse noise impacts in departure areas of runways.
- Measure 22 – Runways 4R/L and 22R: develop runway use procedure to more reasonably distribute operations between these runways in meteorological conditions with small tailwind components. The intent of this measure is to provide more equitable distribution of noise impacts from Runways 4R/L and 22R.
- Measure 23 – Runway 27 Arrivals and Runway 15 Departures: arrive on Runway 27 and depart on Runway 15 during late night hours. The intent of this measure is to minimize noise impacts on South Shore/Hull.
- Measure 24 – Runway 15R Departures: implement a preferential runway use procedure during operational (FAA) nighttime hours (midnight to 6 a.m.) that places all departures on Runway 15R, unless tailwinds exceed 11 knots or departures exceed 60 per hour. The intent of this measure is to reduce aircraft noise exposure during nighttime hours for communities in the departure area of Runway 27.
- Measure 27 – Runways 4R/4L LDA Approaches: develop offset approaches from the east and west. The intent of this measure is to minimize noise to communities under the existing approach to 4R/4L.
- Measure 28 – Runway 27 Departures: modify Runway 27 departure procedure to an initial right turn in order to direct aircraft over the Charles River basin and away from heavily populated areas. The intent of this measure is to reduce the aircraft noise exposure for the communities in the departure area of Runway 27.

Any measure found to provide more equitable distribution of noise by the communities and acceptable to the FAA for implementation during Phase 1, but also might be found to generate significant noise effects (with the potential to be mitigated) or substantial public controversy, will be carried over for inclusion in the evaluation process of Phase 2.[3] For budgetary purposes, it is assumed that 3 of the Early Implementation Measures from Phase 1 will be carried over for inclusion in the analysis process of Phase 2.

[3] In accordance with 40 CFR 1508.4, and FAA Orders 1050.1E and 5050.4B.

In addition to these 12 measures, ground noise sources, such as taxiway use patterns, including the use of the centerfield taxiway, if approved by the FAA, will be analyzed in Phase 2 to identify potential measures that could minimize ground noise impacts on surrounding communities. This task will incorporate the analyses and findings of the FAA Additional Taxiway Evaluation Report for BOS. If the centerfield taxiway is approved by FAA, it will be included as an existing condition for all future alternatives, including the future No Action Alternative. In addition, assuming that the centerfield taxiway is approved, alternatives to the centerfield taxiway that were considered in the study conducted by FAA will not be re-examined in this study.

A collective assessment of all Phase 2 measures recommended for implementation will be required to determine if the intent and goal of the program, to reduce noise impacts on communities surrounding Boston Logan International Airport, would be realized. Different combinations of Phase 2 measures may need to be analyzed to determine the set of measures that best minimizes noise impacts.

This document presents the proposed scope of services, also referred to as the work plan, for Phase 2 of the Boston Logan Airport Noise Study. The objectives of Phase 2 are to:

1. Continue collaboration between CAC, Massport, and FAA.
2. Enhance the public coordination and involvement program through public workshops and the project web site.
3. Update the GIS database, develop baseline (existing conditions) air traffic simulation (as required to determine taxiway and runway use measures for noise modeling), and aircraft noise exposure baseline to use in the analysis of potential flight track, runway usage, and ground noise measures.
4. Develop Phase 2 evaluation screening criteria and process to identify reasonable and feasible measures that will improve the noise environment for the communities surrounding Boston Logan International Airport.
5. Determine appropriate level of National Environmental Policy Act (NEPA) documentation required to consider and approve recommended actions for implementation.

A follow-on phase, Phase 3, will include an examination of Massport's PRAS to determine potential runway use goals and objectives that could minimize aircraft noise on near-by communities, and the development by FAA of either an EA or EIS documenting and considering the potential environmental impacts of the measures recommended by CAC and Massport for implementation. The PRAS evaluation and environmental documentation will occur in Phase 3 due to budgetary reasons and because the measures and projects to be evaluated in PRAS and the FAA's environmental document are still undefined. An analysis of PRAS will be conducted after other measures are better defined and a preferred alternative is identified. Phase 2 of the Boston Logan Airport Noise Study will define the measures and projects that will be used to determine the Sponsor's Proposed Action to be environmentally evaluated by FAA for implementation approval.

The proposed process to be followed in Phase 2 is depicted in **Exhibit 1.**

Insert Exhibit 1

1 PROJECT MANAGEMENT

This element addresses the overall project administration, management, and coordination of the work effort. There are four tasks in this element as defined below. The FAA will have overall responsibility for management of the project. The FAA, Massport, and BOS/TAC/CAC will continue to collaborate on project direction and alternatives development. The CAC will have overall responsibility for management of the IC.

1.1 Project Administration and Coordination

This task covers the day-to-day project administration and coordination required by the PC and IC in coordination with FAA, Massport, BOS/TAC, and CAC. For purposes of scope and budget development, it is assumed that ~~2½ years~~30 months will be needed for project administration and coordination to complete all tasks included in Phase 2.

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PC Activities:

- The PC will maintain a current project schedule on a weekly basis and provide updates on a monthly basis. The current monthly schedules will be published on the BONS Forum website.
- Coordination with the IC – the PC will coordinate with the IC via conference calls on a bi-weekly basis through Phase 2. This coordination is assumed to require four (4) hours per week to prepare for, conduct and prepare meeting notes as needed. The number of attendees will vary each week depending on the topics. Effort associated with additional meeting attendees is accounted for in the technical tasks described below. This task provides coordination and documentation support for each meeting.
- The PC will prepare and submit monthly invoices and progress reports. This task is assumed to require two (2) hours per week for subconsultant coordination, reconciliation of invoices and budgets, and completion and preparation of invoices and status reports.

IC Activities:

- Participate in bi-weekly teleconferences with the PC (one hour bi-weekly).
- Prepare monthly invoices and progress reports for delivery to the CAC management and Massport. This task is assumed to require two (2) hours monthly.
- Provide project files and records for Independent Consultant efforts for inclusion in the Administrative Record.

1.2 FAA Coordination

The PC will hold regular project management meetings with FAA, Massport, and BOS/TAC/CAC during Phase 2 to review material, discuss work progress, and respond to comments. It is anticipated that these project management meetings will be held bi-weekly.

PC Activities:

- Bi-Weekly conference calls – the PC will prepare a project activity report, which will serve as the agenda for the bi-weekly calls. This activity report will outline the current activities of the study and will be available on the project website. Following each conference call, each of which is anticipated to last approximately an hour, meeting notes will be prepared and distributed by the PC within 3 days of each bi-weekly conference call. This coordination is assumed to require no more than two PC staff members to participate in weekly calls, and one administrative member to prepare meeting notes. Effort required for this coordination is assumed to be 3 hours per meeting.
- Utilize Net meetings as directed by FAA with up to three (3) face-to-face meetings as needed.

IC Activities:

- The IC will participate in the bi-weekly conference calls held (up to two hours each) and coordinate CAC interests in the preparation of the measures to be considered in Phase 2. For budgetary purposes, three (3) separate trips to FAA offices are assumed.

1.3 Assemble and Maintain Document Record and Index

A document record will be developed that will form the basis for the FAA's Administrative Record for the subsequent environmental documentation (Phase 3). A copy of each record/document/information relating to the project that is used by the FAA in its decision making process will be kept. A database index of this material will also be developed.

1.3.1 Document Record Database

The database will include at least the following information for the documents included in the record:

(1) Volume in which the document is located

(2) Type of document (letter, memorandum, map, working paper, etc.)

(3) Originator of the document

(4) Date of the document

(5) Subject of the document

(6) Inclusive pages of the document within the appropriate Administrative Record volume.

The database will be maintained using an FAA-approved computer database application. The database index and, to the extent possible, document record contents will be delivered to the FAA on CD-ROM. The Document Record will include all materials from Phase 1 and Phase 2 that may be pertinent to decisions made in subsequent environmental decision documents.

PC Activities:

- Develop a Document Record database and document system.

1.3.2 Documents

All documents related to production of the Boston Logan Airport Noise Study will be maintained chronologically, in volumes by category. Four (4) copies of all documents in the record and four (4) copies of the CD-ROM(s) that contain the database and documents shall be provided to the FAA. If the FAA or others need additional copies of documents or CD ROM(s), copies will be provided on a unit cost basis, as established by the PC and agreed upon by the FAA. The PC will maintain and update the Info-hub web site throughout Phase 2 and use it is a document repository. This site is an internal project site that stores key information and allows members to post and download files over the Internet.

PC Activities:

- Maintain a document record and index of all materials used or referenced in the study.
- Maintain document library as part of the project public website.
- Provide four paper and four electronic copies of the administrative record at the conclusion of the study process.

1.3.3 Electronic Files

All drawings and maps that can be incorporated into a Geographic Information System (GIS) will be transferred to Massport in a format that is compatible with MassGIS standards. The PC assumes that a majority of the inventory data to be used in the environmental analyses will use data obtained from MassGIS.

A procedure for maintaining all electronic files used for the analyses and graphic presentations to be included in subsequent environmental documents will be established. These files, in addition to the GIS files described above, will include input and output files for analytical tools such as the Integrated Noise Model (INM). The PC will ensure that the FAA is provided with complete sets of data files for each of the analyses as presented in the Phase 2 study. The data sets will be maintained throughout the course of the development of the study and only the final sets that reflect the results presented in the documents will be provided to FAA.

PC Activities:

- Maintain a record and index of all electronic data and files used or referenced in the study.
- Provide electronic copies of the data sets and files at the conclusion of Phase 2.

1.4 Work Scope Re-Assessment

At three (3) points during Phase 2, the PC will re-assess the work scope and budget to determine if any changes are required to enhance the overall effectiveness of the study effort. Work scope re-assessment will occur at the following points:

1. After approval of Communications/Engagement Protocol (Task 2.1)

2. After approval of Noise Modeling and Measurement Protocols (Task 5.3.1)

3. Prior to Analysis of Phase 2 Measures (Task 6.4 - Level 3 Screening Analysis)

PC Activities:

- The PC will prepare and provide input/suggestions on possible work scope and budget revisions in coordination with FAA, Massport, and BOS/TAC/CAC.
- The PC will revise its work plan (scope, budget, and schedule) in coordination with the IC. Duration to develop and review each re-assessment is assumed be no more than one month.

IC Activities:

- The IC will coordinate with the PC in the revision of the project work scope to accommodate unforeseen project requirements.
- The IC will subsequently revise its own work scope and budgetary allocations in accordance with the modifications made to the PC work scope and the needs of the CAC.

FAA/Massport:

- Prior to changes to the consultant contracts, the FAA in coordination with Massport must approve the changes.

2 PUBLIC COORDINATION/INVOLVEMENT

This task will focus on the dissemination and gathering of information from the general public, the CAC, and other organizations regarding the Boston Logan Airport Noise Study. This important aspect of the project will be conducted throughout the study process with increased activity associated with key milestones. The FAA will be responsible for outreach to communities represented by the CAC and for other communities within a 25-mile radius of Boston Logan Airport.

2.1 Develop Decision Process/Communications Protocol

A decision process/communications protocol will be developed at the start of Phase 2 in conjunction with the CAC. It will outline the overall outreach strategy for Phase 2 and will address specific concerns raised by CAC and BOS/TAC members, including the decision making process, and when material will ~~be~~ require decision making by the CAC and/or BOS/TAC, depending on specific tasks. The goal of the project is to make significant and widely supported changes to the noise impacts surrounding the Airport. A scope re-assessment for this task may be necessary after the protocol is developed.

This process will be designed to foster informed consent within the CAC and the wider community to reduce noise impacts of Boston Logan Airport. Essential elements of this process that will be clearly defined in this task include:

- A clearly defined set of objectives.
- Identify milestones that require decisions by the full CAC.
- A schedule of particular tasks, desired outcomes and the specific meetings and other efforts needed to accomplish those outcomes.
- Determine the kinds of material necessary to make informed decisions including the technical, political, and community benefits and tradeoffs associated with the options presented, and how far in advance of a meeting these must be made available.
- An on-line structure for communicating with each other and with technical consultants between scheduled meetings.
- A process and meeting design that allows the CAC to work through the measures and their pros and cons and make decisions about which course of action to pursue.
- An integration of the CAC decision making in conjunction with the BOS/TAC.
- A process and materials with which to engage community stakeholders and members of the public.~~, ranging from one-on-one meetings with stakeholders to on-line dialogue for hundreds of participants. These materials will be designed to help CAC members present measures and the associated pros and cons to non-technical people from the affected communities, and will provide a means for CAC members to gather useful feedback.~~

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These elements together will allow the CAC, the FAA, and Massport to engage in a purposeful, well-informed, and highly structured process that will allow for and incorporate a wide range of

perspectives, and ultimately will have the potential to make significant and widely supported changes to the noise impacts surrounding the Airport.

PC Activities:

- Prepare draft decision process/communications protocol for consideration by the FAA, Massport, and BOS/TAC/CAC.
- Facilitate a discussion among study participants regarding key outreach issues and concerns.
- Finalize decision process/communications protocol and update specific tasks as appropriate.

IC Activities:

- Cooperate with the PC in the preparation of the draft decision process/communications protocol.
- Consult with CAC membership regarding optional approaches to key outreach issues and concerns.
- Peer review PC efforts in preparation of decision process/communications protocol and communicate results to CAC.

2.2 CAC Coordination

This task covers the consultants' coordination and assistance to the CAC in addition to the bi-weekly meetings discussed in Task 1.2.

PC Activities:

- Up to ~~eight~~ five (~~8~~5) periodic meetings and/or teleconferences with the CAC to discuss project issues or attend CAC meetings. For budgetary purposes, ~~five~~ three (~~5~~3) separate trips are assumed for this task over the course of Phase 2. This coordination is assumed to require twelve (12) hours per meeting to prepare for, attend, conduct, and prepare meeting notes as needed.
- ~~Meet or teleconference up to 8 times during the course of the project, with small focus groups of the CAC membership and other public representatives to focus on specific areas of interest where greater understanding of the information is desired. For example, such focus groups of the CAC and other public representatives may include those members with intense interest in the noise modeling process, residents under the 27 departure path, residents in communities near the airport most interested in ground noise dispersion and mitigation, etc. For budgeting purposes, it is intended that any travel for these focus group meetings will occur during any travel that occurs for quarterly CAC meetings (assume five meetings and three teleconferences).~~
- The PC will provide the project lead, ~~an independent facilitator,~~ air traffic expert, and noise expert at all meetings, and a procedure design expert as necessary. Effort associated with additional meeting attendees is accounted for in the technical tasks described below.

IC Activities:

- Meet with the CAC on the evening prior to every BOS/TAC meeting in Boston to assist in their understanding of the materials under consideration. This coordination

assumes 16 hours of meeting and preparation by three IC team members for each CAC meeting. For budgetary purposes assume 10 meetings.

- Gather quarterly in meetings or teleconferences with the general CAC membership to discuss project issues and status. This coordination assumes the participation of one to three members of the IC team at each meeting. The IC will be responsible for the location and rental of up to five commercial meeting spaces during the course of the project. (Assume five meetings and three teleconferences for budgetary purposes).
- Meet or teleconference up to 8 times during the course of the project, as directed by CAC, with small focus groups of the CAC membership and other public representatives to focus on specific areas of interest where greater understanding of the information is desired. For example, such focus groups of the CAC and other public representatives may include those members with intense interest in the noise modeling process, residents under the 27 departure path, residents in communities near the airport most interested in ground noise dispersion and mitigation, etc. The CAC coordination will include discussion and review of the current PRAS (Preferential Runway Advisory System). This review will seek to develop a strategy for addressing the PRAS including but not limited to support for developing a new PRAS and broad understanding of goals and metrics (e.g. relevancy of annual runway use goals, short term persistence use of runways). The IC will develop a short, summary memorandum reviewing the discussion and suggested CAC approach. For budgeting purposes, it is intended that any travel for these focus group meetings will occur during any travel that occurs for quarterly CAC meetings (assume five meetings and three teleconferences).
- Conduct periodic teleconference consultations with CAC to discuss project related issues (assume one hour weekly by IC project manager).
- Notices/agendas should be sent electronically via e-mail distribution lists.

2.3 BOS/TAC/CAC Meetings

This task covers all primary meetings of the BOS/TAC/CAC. Sub-committee meetings (should they be held) will be covered under specific technical tasks described later in the work scope. It is anticipated that the BOS/TAC/CAC will meet up to ~~10~~ 7 times over the anticipated ~~2½ year~~30 month timeframe for Phase 2. It is assumed that day meetings will be held at the Massport or Volpe conference facilities. Evening meetings will be held as needed (up to 4 meetings) and will be scheduled for no more than four hours. All evening meetings will be facilitated as directed by FAA.

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PC Activities:

- The PC will prepare a draft agenda for review by the BOS/TAC/CAC for each meeting and incorporate comments as appropriate. Presentation or discussion material will be prepared as part of separate technical tasks for specific issues that will be discussed at each meeting.
- The PC will provide meeting design and facilitation for an effective meeting.
- Following each meeting the PC will prepare and distribute draft meeting notes that capture the primary issues discussed and proposed follow-up actions. These notes are not intended to be minutes of every issue discussed or specific comments made by

members of the BOS/TAC/CAC. The meeting notes will be distributed to the BOS/TAC/CAC and IC for review and comment.

- The PC will provide the project lead, ~~an independent facilitator,~~ air traffic expert, and noise expert at all meetings, and a procedure design expert as necessary. Effort associated with additional meeting attendees is accounted for in the technical tasks described below.

IC Activities:

- The IC will participate in each BOS/TAC/CAC meeting to assist the CAC in understanding the issues discussed and to provide peer review of technical presentations made by the PC during the meetings.
- IC will review PC meeting notes.

2.4 ~~Public Workshops~~Elected Representative Meetings

~~Public workshops~~Elected Representative meetings will be held at two points during the Phase 2 process. The first ~~workshop~~ meeting will be held to present the findings of Phase 1, describe the intent and goals of Phase 2, and present the measures to be examined in Phase 2. ~~Public i~~Input on Phase 2 measures and areas of concern will be solicited during this ~~workshop~~meeting. The purpose of this ~~workshop~~ meeting is to ~~allow the public~~provide elected officials an update on the project and give them an opportunity to comment on the measures proposed to be analyzed and to identify any additional measures to be examined. Second, the intent is to provide them enough information so that they can adequately address questions from their constituents.

The second ~~workshop~~ meeting would be held at the conclusion of the Phase 2 technical analyses to present findings and gain ~~public input~~their feedback on the measures to be recommended for implementation and eventual assessment in the FAA's environmental document.

The public workshops will be held in ~~four~~ one (4~~1~~) location~~s~~, ~~one each in north shore, south shore, Metro Boston, and west communities~~ as suggested by the CAC and approved by the FAA.

PC Activities:

- Coordinate with the CAC and BOS/TAC regarding the schedule and location for conducting the ~~workshops~~meetings.
- Provide logistical support for setting up the ~~workshops~~meetings, including reserving meeting space, equipment, and supplies.
- Working from material prepared in the technical process and~~,~~ prepare a draft PowerPoint presentation and handout~~., presentation boards, and a page for the public web site announcing the public workshop and topics to be presented~~.
- ~~Assist FAA in the preparation of briefings to public officials at appropriate milestones.~~
- ~~Assist FAA in preparing press releases (up to two) and publish in at least two major daily publications and ten local papers.~~
- Incorporate BOS/TAC/CAC comments.
- Provide up to ~~seven~~ two professional staff for the meetings. Assume attendance by the project manager~~,~~ and appropriate technical lead, and two~~technical lead, air traffic lead, RNAV lead, noise lead,~~ and two consultants for sign-in table and meeting organization support.

- Comments received during the ~~public workshops~~meetings will be reviewed and cataloged. The PC will summarize the comments received.

IC Activities:

- Review and comment on the behalf of CAC on materials prepared for BOS/TAC/CAC review for each ~~workshop~~meeting.
- Provide appropriate staff (up to two) to participate in ~~workshops~~ the meeting on behalf of the CAC. Assume attendance by the Project Manager and one technical lead. ~~It is not anticipated that IC staff will provide manpower for workshop stations, but rather will circulate to understand public comment and provide peer review to PC material.~~
- Prepare and coordinate IC and CAC comments regarding presentations of material made at each ~~workshop~~meeting.

2.5 Web-Based Periodic Community Updates

This task will be used to provide the public with periodic updates regarding the study. Information will be similar to materials provided to the BOS/TAC and CAC during the Study but will be tailored for the public website. There will be information updates throughout Phase 2. The web site will be reviewed monthly to determine if additional material should be posted. Results of Phase 1, appropriate public information, and other material deemed appropriate will be posted to the site. All material posted on project web sites will be compliant with Section 508 of the Rehabilitation Act of 1973, as amended. Notices will be sent to public libraries in the study area with instructions, so that the public can access the website on publicly available web-accessible computers.

PC Activities:

- Develop website materials, additional pages, necessary graphics and reports.
- Provide site production and progress reviews.
- Enhance web site functionality.
- Provide monthly website updates.
- Coordinate with IC.

IC Activities:

- Review and comment on website materials.
- Coordinate CAC comments.

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~~**2.6Web Dialogues**~~

~~This task will be used to provide the opportunity for dialogue among the BOS/TAC members, CAC, and/or general public on specific project issues during Phase 2. Each dialogue will be professionally facilitated and will focus on a specific issue and designed to maximize understanding among study participants and input into the process. The specific subjects and timing of these dialogues will be established as part of Task 2.1, Develop Communications/ Outreach Protocol. For cost estimating purpose, it is assumed that six dialogues will be held for two week durations.~~

~~**PC Activities (for each dialogue):**~~

- ~~Develop dialogue design and materials.~~
- ~~Facilitate online dialogues.~~
- ~~Provide summary findings.~~

~~**IC Activities:**~~

- ~~Participate in web-dialogue as appropriate.~~

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~~2.7~~2.6 Media Outreach

In addition to the outreach described above, the PC will prepare and disseminate material to the media and through other outreach mechanisms to maximize the overall public outreach for this program. Press releases will be prepared and sent to the various major and local media (print, radio, and television) within the study area at the beginning of this study, and at up to three key milestones during Phase 2. These press releases will be concise and written in plain English, so that people can understand them. Similar material will be sent to state and federal elected officials in the study area. This task will be further defined as part of Task 2.1, Develop Communications/Outreach Protocol.

PC Activities:

- Prepare mailing list of media and elected officials for distribution of project material.
- Develop materials for distribution.
- Distribute material.
- Conduct periodic follow-up with five to ten recipients to ensure that the material is being delivered and to collect feedback.

IC Activities:

- Coordinate review with CAC membership familiar with specific issues covered in the press releases for public sensitivities.
- Peer review PC efforts on media distribution and follow up.

3 PHASE 1 IMPLEMENTATION

After conclusion of the Phase 1 analysis, the recommended early implementation measures (those that are categorically excluded from additional environmental evaluation) will be implemented. While the Phase 1 measures analysis predicted the impacts of the proposed measures, actual results will not be known until the measures proceed through the FAA process and are implemented. Under an adaptive management model, two additional steps will be conducted to ensure that the intended result(s) actually occur, as described below. For purposes of this scope, it is assumed that PC services for this task would be available for up to a 24-month period following the conclusion of Phase 1. It is assumed that conventional procedures that overlay the RNAV procedures will be implemented in advance of the FAA's approval of the RNAV procedures.

3.1 Implementation Monitoring Assistance

Prior to implementation of the early implementation measures, the PC and IC will aid, when requested, the FAA in procedure development. ~~In addition, the PC/IC will assist BOS/TAC/CAC in determining the monitoring metrics and reports required to determine if the early implementation measures are being implemented as planned, and assess actual data to determine if the intended results of the measures are being achieved. Massport has an aircraft operations and noise monitoring system in place that is currently being upgraded and enhanced. This system may be used to monitor implementation of the approved actions and may be supplemented with additional measurements to assess noise levels at locations beyond the area covered by Massport's monitoring system.~~

PC Activities:

- ~~Assist BOS/TAC/CAC in determining the metrics and reports needed to monitor the implementation of the approved actions.~~
- Attend meetings as necessary during the implementation process; assume attendance at ~~quarterly~~ four meetings ~~for up to 2 years~~.
- Assist in reviewing proposed adjustments, if any are proposed by FAA during procedure development.
- Provide background information to FAA as needed regarding RNAV designs developed in Phase 1.

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IC Activities:

- ~~Assist the BOS/TAC/CAC in determining the metrics and reports needed to monitor the implementation of approved actions.~~
- Attend meetings as appropriate during the implementation process.
- Coordinate with the PC to assist the FAA in reviewing proposed adjustments.
- Communicate proposed adjustments to the CAC and coordinate public comment regarding adjustments to procedures for which environmental approval has been provided.

3.2 Post-Implementation Assessment

The IC, with some PC review, will assist CAC in determining the monitoring metrics and reports required to determine if the early implementation measures are being implemented as planned, and assess actual data to determine if the intended results of the measures are being achieved. Massport has an aircraft operations and noise monitoring system in place that is currently being upgraded and enhanced. This system may be used to monitor implementation of the approved actions and may be supplemented with additional measurements to assess noise levels at locations beyond the area covered by Massport's monitoring system.

After the early implementation measures have been implemented, the PC and IC will ~~analyze~~ review the results of the monitoring and compliance reports generated by Massport and by supplemental monitoring, if any, to determine whether the intended results of the approved actions are being achieved. If the intended results are not being achieved, the ~~PC and~~ IC, with PC review, will analyze the procedures and develop recommendations to BOS/TAC/CAC for possible adjustments to the procedures that would achieve the intended results.

PC Activities:

- ~~Analyze~~ Review IC recommendations for metrics and means to evaluate use and pattern of implemented procedures.
- Review results of ~~Massport monitoring~~ IC assessments to determine if intended results are being achieved.
- ~~Recommend adjustments to procedures if intended results are not being achieved.~~

IC Activities:

- Assist the CAC in determining the metrics and reports needed to monitor the implementation of approved actions and coordinate with Massport.
- Coordinate with ~~the PC~~Massport to ~~analyze~~ calculate and review the results of the flight track monitoring data provided from Massport ~~and supplemental sources to determine if desired results are achieved~~.
- Identify procedures that may require further enhancements and provide recommendations to BOS/TAC/CAC.
- ~~Coordinate with the PC to recommend adjustments to procedures if intended results are not being achieved.~~

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4 STUDY AREA DEFINITION

~~A~~ The study area for the project ~~will be~~ defined in Phase 1 will be used in Phase 2.~~and used in the development of baseline conditions and to determine potential impacts over a specified geographic area. Study areas will be defined for the noise analysis, environmental justice analysis, and the cumulative effects analysis.~~ For purposes of this study, the study area will be defined as the area within a 25-mile lateral radius of the BOS TRACON radar. Guidance contained in FAA Order 1050.1E, states that noise impacts should be determined from the ground to 10,000 feet AGL for aircraft departures and from the ground to 7,000 feet AGL for aircraft arrivals. However, in order to be consistent with Phase 1 evaluations, the study area will incorporate BOS arrivals and departures up to 15,000 feet AGL.

~~**PC Activities:**~~

- ~~Confirm study area definition with FAA.~~

~~**IC Activities:**~~

- ~~Review study area definition.~~

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5 DEVELOP BASELINE CONDITIONS

Baseline noise exposure and land use conditions at and around Boston Logan International Airport will be updated, documented, and modeled to provide a basis against which the noise abatement measures can be compared. The information gathered during Phase 1 of the study will need to be updated or verified to reflect a baseline year of 2005. This task also includes the development of a recent baseline for aircraft noise and air traffic/airfield operations. Baseline results will have to be reviewed and updated to include implementation of Phase 1 measures.

5.1 GIS Database

Existing data and map sources will be used to refine and supplement the GIS database developed during Phase 1 of the study. All GIS data will be obtained from the Massachusetts Geographic Information System (MassGIS). This scope of work does not include any field surveys.

5.1.1 Update/Verify Land Use Base Map

The land use base map developed and utilized in Phase 1 will be updated from MassGIS data. The land use map will be used to identify noise sensitive areas surrounding the airport.

PC Activities:

- Obtain land use data for the study area from MassGIS.
- Identify noise sensitive areas surrounding the airport.

IC Activities:

- Review periodic modifications by PC to land use data for the study area from MassGIS.

5.1.2 Update/Verify Socioeconomic Data

Socioeconomic data for the study area will be reviewed to determine if more recent data is available from MassGIS. If updated socioeconomic data is available, it will be incorporated into the GIS database for the project. The socioeconomic data will be used to determine potential impacts to residents, minority populations, and low-income populations from the noise abatement measures.

PC Activities:

- Update project GIS database for the study area if more recent socioeconomic data from MassGIS is available.

IC Activities:

- Review updates to project GIS database for the study area prepared by PC.

5.1.3 Update/Verify Natural & Cultural Resources Data

Natural and cultural resources data for the study area will be reviewed to determine if more recent data is available from MassGIS. If updated data is available, it will be incorporated into the GIS database for the project. The natural and cultural resources data will be used to

determine potential impacts to Department of Transportation (DOT) Act Section 4(f)/303(c) and historic properties from the noise abatement measures. In addition, coordination with federal, state, and local resource agencies will be conducted to determine if other eligible DOT Section 4(f)/303(c) properties exist within the study area and determine existing and future uses of the DOT Section 4(f)/303(c) and historic properties.

PC Activities:

- Update project GIS database for the study area if more recent natural and cultural resources data from MassGIS is available.
- Coordinate with federal, state, and local resource agencies to determine existing and planned uses of DOT Section 4(f)/303(c) and historic properties.

IC Activities:

- Review updates of project GIS database for the study area prepared by PC.

5.2 Fast-time Air Traffic Simulation

Fast-time air traffic simulation will provide input data for noise modeling of ground movement and determination of aircraft departure and arrival profiles. The air traffic information will also be used to determine baseline operational metrics associated with capacity and delay. The Total Airspace and Airport Modeler (TAAM) will be used to simulate air traffic at Boston Logan International Airport. TAAM has been effectively used in support of recent Final Environmental Impact Statements at Chicago O'Hare International Airport and Philadelphia International Airport and for the Draft Environmental Impact Statement on the New York, New Jersey, and Philadelphia Metropolitan Airspace Redesign Project.

Any existing TAAM and/or ground movement simulations of Boston Logan International Airport and data contained within those simulations will be utilized to the extent possible.

5.2.1 Model Verification

The purpose of model verification is to ensure that the simulation reasonably reflects the actual operation of the airfield/airspace system as characterized by key operating statistics. The verification involves an iterative process of (1) comparing model outputs to actual measured data, (2) visually verifying that the model is routing traffic appropriately, (3) making refinements to the model inputs, and (4) rerunning the model until the outputs approximate the measured data and operational characteristics. Inputs to the model would be coordinated with the noise modeling team and FAA Air Traffic Control (ATC) personnel. Results of the model calibration would be reviewed and approved by FAA before utilizing the model to analyze potential future measures.

Two conditions would be modeled and correlated. One would be the configuration most frequently used in Visual Meteorological Conditions (VMC). A date when this configuration was operating will be identified; operational and schedule data from that date will be collected and then input into the model. Results will be compared with the actual operating statistics for that date and the model will be adjusted accordingly.

The other condition would be a configuration in Instrument Meteorological Conditions (IMC). A date when this configuration was operating will be identified; operational and schedule data from that date will be collected and then input into the model. Results will be compared with the actual operating statistics for that date and the model will be adjusted accordingly.

PC Activities:

- Develop two-modeled configurations, one for VMC and one for IMC, for specific dates; test, compare, and calibrate model.
- Coordinate calibration results with IC.

IC Activities:

- Review TAAM model input and results of the calibration.
- Coordinate with CAC.

5.2.2 Development of Baseline Schedule

A baseline schedule will need to be developed for use in the modeling efforts. The PC will obtain the most recent operational data for the base year (2005). Using these and passenger airline schedules found within the Official Airline Guide (OAG), the PC will develop a baseline schedule representing an average day during the peak month (PMAD) of 2005. The schedule will include information on air service provider, flights (i.e. arrival, departure, or touch-and-go), fleet mix, operator type (i.e. air cargo carrier, passenger air carrier, general aviation, or military), origin-destination pair, and time of operation in adequate detail for use within the simulation and noise analysis.

To aid in the modeling effort, arriving and departing aircraft will be matched and assigned to specific gates.

PC Activities:

- Develop baseline schedule and match aircraft to specific gates.
- Coordinate schedule with IC.

IC Activities:

- Review baseline flight schedule.
- Coordinate with CAC.

5.2.3 Baseline Modeling

Representative Boston Logan International runway operating configurations are depicted in **Exhibit 5.1**. These representative configurations will be simulated using TAAM. These simulations will produce the following:

- Demand and delay curves to determine the current and future capacity of Boston Logan International Airport when operating under the various runway configurations.

Insert Exhibit 5-1

- Operational data produced from the schedules of aviation activity processed by the simulation. This data shall include but not be limited to, out-off/on-in (aircraft pushback from gate to departure from runway/aircraft touchdown on runway to arrival at gate) times at Boston Logan International Airport, departure or arrival airspace routes, aircraft type and arrival or departure runway assignment.
- Global Flight Data Record (GFDR) files that will provide data including but not limited to:
    - Airspeed
    - Heading
    - Altitude
    - Track across ground
- Data on taxiway utilization including, but not limited to, aircraft type, taxiway link (location) and total travel time on the taxiway link for use in ground noise modeling.

PC Activities:

- Model baseline conditions for six operating configurations and develop an annualized condition for baseline.
- Coordinate simulation results with IC.

IC Activities:

- Coordinate with PC on the development of simulation models.
- Review baseline simulation input and results.
- Coordinate with CAC.

5.3 Baseline Noise

Baseline noise modeling will be required to establish average annual day existing conditions at Boston Logan International Airport. A baseline year of 2005 will be developed and modeled, which will serve as the baseline for assessing potential noise abatement measures in Phase 2. Baseline results will have to be reviewed and updated to include implementation of Phase 1 measures.

The intent of this task is to develop a baseline noise study that describes the existing noise environment within the constraints of the latest-available industry research, data, and accepted noise and aircraft performance modeling tools available. The baseline will be developed with the goal of providing an analysis tool that captures the effects of real-world flight conditions (e.g., departure hold-downs and extended downwind approaches, among others) for an average annual condition at the Airport. The FAA's Integrated Noise Model (INM) 6.2 will be used to model all aircraft noise.

Development of the baseline noise model will require customizing certain INM input parameters to model both the horizontal and vertical components of the aircraft flows in and out of the Airport. The INM inputs will be developed to best simulate the average annual day three-dimensional flight trajectories and the performance characteristics of the aircraft experienced at the Airport. This will provide a comprehensive model of the average annual day existing noise environment, and will allow for a detailed analysis of the effects of each measure.

5.3.1 Prepare Noise Modeling and Measurement Protocols

The PC will prepare a protocol for developing the baseline noise model for Boston Logan International Airport and for conducting the noise analysis. The protocol will be developed and submitted to FAA for review and any required approvals of software, input adjustments, or models, prior to conducting the noise modeling effort. During the development process, input and feedback from FAA Airports, FAA ATO, FAA Office of Environment & Energy (AEE), Massport and CAC will be sought. The protocol will address:

- Collection and consolidation of radar data into representative backbone and dispersed flight tracks.
- Collection and consolidation of radar data into representative climb and descent profiles along primary departure and approach corridors.
- Dispersion of operations among backbone and dispersed flight tracks.
- Noise modeling of flight and ground-based activity.
- Supplemental/alternative noise metrics.

The IC will develop a protocol for noise measurements, including metrics, site selection, durations of measurement and intended operational conditions to be measured. In addition, IC will conduct comparative measurements with a selection of Massport's permanent noise monitors in order to establish an acceptable error factor that will be factored in when comparing modeled levels.

The protocols will identify any proposed measures that may need approval from FAA AEE. Protocols for both efforts will discuss verification, validation, and sensitivity assessments for application to modeling efforts. Quality assurance/quality control techniques, including statistical tests of the significance of input/results will be incorporated.

A draft working paper will be prepared for submission to the FAA's AEE to seek any approvals required if the use of previously-unproven models or proposed modifications to the INM noise modeling databases is proposed.

Opportunities for public involvement in the development of the protocols will be provided through two meetings (one meeting and one net meeting) with a focus group of the CAC and other interested parties. Upon completion of the draft protocol working paper, the results will be presented to the CAC for review and comment.

PC Activities:

- Develop ~~overall~~ noise modeling ~~and measurement~~ protocol with input from BOS/TAC, FAA Airports, FAA ATO, FAA AEE, Massport, CAC, and IC.
- Identify noise modeling procedures that may require FAA AEE approval.
- Prepare documentation for submission to FAA AEE for approval of use of any non-standard INM profile datasets as well as screening tools.
- Review noise measurement protocols developed by ~~PC~~IC.
- Coordinate protocols with BOS/TAC/CAC, FAA, and IC.

- Finalize noise modeling and measurement protocol document based on input from FAA, Massport, CAC, and IC.
- Conduct scope re-assessment for noise analysis, if necessary.

IC Activities:

- Confer with the PC in the selection of appropriate approaches to modification of INM input files from standard input.
- Peer review any proposed usage of non-INM modeling and recommend appropriate modifications to protocol to assist the FAA AEE approval decision, if required.
- Peer review the PC's documentation for submission to the FAA AEE, if required for any and all approvals required prior to noise modeling.
- Prepare noise measurement protocols for side-by-side measurements at up to 12 of Massport's permanent noise monitoring stations for periods of several hours.
- Prepare noise measurement protocol for independent measurements with portable equipment at up to 6 sites located at distances beyond the coverage area of the Massport permanent noise monitoring system.
- Develop protocol to obtain and correlate radar data from FAA or Massport systems to measured noise events collected at permanent and independent portable measurement sites.
- Prepare a protocol document describing the noise measurement program selection of sites, measurement periods, desired operations for measurement, and intended utility for the PC in the validation of INM-modeled noise levels.

5.3.2 Noise Modeling Input and Methodology

5.3.2.1 Radar Data Collection/Verification

The PC will obtain a 12-month (CY 2005) radar data sample from Massport's airport noise monitoring system, which collects and archives the FAA BOS TRACON radar data. Within a 25-mile radius of the BOS TRACON radar, all radar data for aircraft operating in and out of the study area will be collected. The PC will analyze the data using Wyle's radar analysis software package, Noise Data and Display System (NDADS)[4]. NDADS is an interactive tool for creating flight tracks and flight profiles for further INM analysis. It reads a sample of air traffic control radar data and displays it in a manner that allows the operator to analyze the data statistically and mathematically create representative tracks and profiles. NDADS will also allow the PC to conduct statistical analyses of airport operations by aircraft type, operation type, runway assignment, and time of day. The IC will be provided an overview and working demonstration of the software during analysis of the radar data, either at the PC's offices in Arlington, Virginia, or via a web interface. Further details are given below which relate to the work effort for each main INM input element.

PC Activities:

- Obtain 12 months of radar data from Massport's airport noise monitoring system and incorporate into preprocessing software.

[4] Per discussions between FAA ATO and FAA AEE, the NDADS tool can be used with no restrictions and without AEE approval.

- Purge incomplete days from radar data.
- Coordinate results with IC.

IC Activities:

- Coordinate with PC to review evaluation software and radar data for later analysis.
- Conduct peer review on PC's analysis of radar data.

5.3.2.2 Aircraft Operations, Fleet Mix, and Runway Use

The PC will rely on the results of the radar data analysis to derive statistical operational distributions and daily operations by aircraft type, operation type, runway assignments, and time of day. All flight operations data collected from the noise monitoring system will be used in the baseline noise modeling. ~~The PC will review aircraft type input errors and correct as necessary. The PC will verify runway use assignments as reported by Massport's airport noise monitoring system.~~PC assumes that the flight datasets are complete, and will not require further runway assignments or null value replacement. If data records have no corresponding operations data, the PC will purge them from the database. Additional information will also be added for each recorded flight, if the database does not have all of the required information. This information includes:

- Aircraft category
- User category
- Aircraft origin and destination
- Runway configuration in use
- Arrival fix
- Departure fix

This information will be necessary in order for the PC to process and identify the appropriate radar tracks that will serve as the basis for INM flight track calculations.

PC Activities:

- Obtain 12 months of flight header data that includes arrivals, departures, and origin/destination data and merge with radar data (e.g., ETMS or SDAT STARS data).
- ~~Examine database and correct errors~~Merge additional information required for analysis.
- Coordinate results with IC.

IC Activities:

- Review PC evaluations.

5.3.2.3 Analysis of Radar Flight Trajectories

The intent of this task is to sub-divide the composite set of radar trajectories into small operational bundles. A bundle refers to a grouping of radar flight trajectories that have the following common characteristics (listed in order of importance):

1. Arrival or departure
2. Runway use
3. Aircraft type
4. Flow direction
5. Similar aircraft climb and acceleration characteristics and descent profiles.

The PC will develop INM ground tracks to best capture the aircraft flows and dispersion characteristics for both arrival and departure streams. The PC will produce flight tracks for the six BOS runway configurations and the annual average day configuration. The six common operating conditions will be developed by first sub-dividing the radar trajectories within the 365 days of radar data into the six common operating configurations. This will be accomplished by incorporating the configuration used for each hour as logged by the BOS Tower and collected by Massport. A configuration code will be assigned to each unique flight. Once sub-divided, each configuration subset will be further sub-divided into operational bundles, where the appropriate INM ground tracks and profiles will be developed for each operating configuration. Baseline noise will be calculated for each of the six operating configurations, as well as for the annual average day configuration, as described in the following sections.

The INM ground tracks and the associated operations assigned to the tracks will be determined statistically using the 12 months of radar data for 2005. The overall goal is to use NDADS to best simulate a representative horizontal dispersion of aircraft along each of the arrival and departure flows for BOS. This will involve bundling the operations according to various aircraft categories, which may include: Heavy Jet-Air Carrier, Large Jet-Air Carrier, Regional Jet-Air Carrier/Air Taxi, Business Jet-General Aviation, Propeller-Air Taxi, and Propeller-General Aviation. Each bundle will be created using a "gate" in NDADS; a gate is a representation of a window in space through which the aircraft flight tracks pass.

Within each aircraft category, radar tracks will be bundled according to runway. For each runway, the bundle will be further subdivided by visual inspection. Different components of each flow will be grouped, including variations near the runways (such as varying turn radii that result from air traffic decision-making in the sequencing of arriving and departing aircraft) and variations farther from the airfield (such as departures splitting off to different navigation fixes). This exercise will create more bundles of tracks, with each individual bundle representing a smaller number of radar trajectories.

For every bundle of radar tracks, representative average (backbone) flight tracks will be developed. In addition, the altitude ~~and speed~~ profiles will be plotted for each ~~aircraft type~~aircraft category for each radar track bundle~~, along with the standard INM profiles~~. Profiles for a given aircraft category may vary between different runways, and may also vary on the same runway, depending on the ground track. ~~For profiles requiring additional analyses, NDADS may be used to develop statistical vertical gate penetration information, such as altitude, speed, etc. This statistical profile data may be utilized and compared with criteria to determine the validity~~

~~of the INM standard profiles. Where required, b~~Bundles will be further sub-divided to account for vertical dispersion characteristics ~~not readily~~ identified by ~~simply~~ viewing the radar data. This will be accomplished via the statistical vertical gate analysis stated above. ~~Tracks~~ Ground tracks for each bundle will be modeled using the ground track dispersion feature of INM. Profile development is discussed in Task 5.3.2.5.

PC Activities:

- Group radar tracks by aircraft category, runway, operation mode, traffic flows, and profiles, subdividing them into appropriate bundles.
- ~~Conduct additional profile performance analysis to identify further requirements to sub-divide radar profile bundles for each route.~~
- Coordinate results with IC.

IC Activities:

- Peer review PC's work in developing radar tracks assumptions and results/by aircraft category and runway, subdividing them into bundles, and developing representative average flight tracks for each bundle.
- Coordinate results with PC and CAC.

5.3.2.4 INM Flight Track Calculation

The PC will further utilize the NDADS software to create ground tracks from each bundle of radar tracks. Each saved bundle will be handled separately. The bundle will be loaded into NDADS, and a series of closely-spaced gates will be drawn across the bundle of tracks, beginning at the runways and ending at the end of the radar tracks. NDADS will be used to compute the mean and standard deviation of ground tracks developed for each bundle at each gate. The user will then interactively draw a series of straight and curved vector segments through the one-standard-deviation indicator at each gate. In this manner a statistically meaningful "nominal" ground track is created. NDADS will save the nominal ground track and all of the statistical data computed at each gate.

Each nominal ground track will be converted to a point track and loaded into INM as the backbone flight track. NDADS statistical data will be used to specify the sub-track spacing and distribution in INM. The INM dispersion modeling will include all operations within the bundle and across the full width of the gate.

PC Activities:

- For each bundle, create a nominal ground track and convert them to point tracks for INM.
- For each bundle, calculate the horizontal dispersion and model it within INM.
- Perform statistical analyses for quality assurance (QA)/quality control (QC).
- Coordinate results with IC.

IC Activities:

- Review PC's backbone and dispersed flight track definitions for INM with NDADS by application of a comparable methodology for flight track definition used to prepare

data for use in the FAA NIRS model. A random sampling of PC-developed tracks will be evaluated to determine the statistical validity of the proposed backbone and dispersed flight tracks.

- Coordinate results with PC and CAC.

5.3.2.5 INM Flight Profile Development

A flight profile defines the distance, altitude, speed, and thrust settings at many locations along a modeled flight path. The INM contains "standard" departure and approach profiles for every aircraft type in the INM database. The "standard" profiles have been developed to ensure valid three-dimensional flight trajectories that correlate well with actual speeds and thrust settings for each aircraft. In addition, the user may define "custom" flight profiles; however, the user must first determine the correct inputs for the INM, based on actual aircraft operations, and receive FAA AEE approval to use the customized data before applying them to INM modeling.

The first step in the process is to conduct an analysis of the radar flight trajectories (refer to Section 5.3.2.3) to determine – based on the effects of how aircraft are actually flown and how the air traffic flows in and out of the Airport are controlled. ~~– where it is appropriate to assign the standard INM profiles for departures and arrivals and where it is not. To accomplish this, the PC will compare a statistically significant number of actual flight profiles with the standard INM flight profiles. The comparison will include a calculation of both the~~Using the bundled tracks, which were also bundled based on significant altitude profile characteristics, PC will calculate an average altitude ~~and speed~~ profile~~s. for each aircraft type operating within each identified bundle.~~ The average flight profiles will be based on the average values of all trajectories within each bundle, specific to ~~each aircraft type~~an aircraft category, that occur within each bundle. The PC has developed several utilities to help automate portions of this process.

Where possible, t~~T~~he PC will develop evaluation criteria, with input and review by the IC, to determine the appropriateness of using standard profiles in the baseline model in lieu of calculating a customized profile for identified bundles. Criteria may include ~~multiple match points for special instances (pending AEE approval) (for example, where there are hold downs due to crossing traffic or where analysis of proposed measures will require profile modifications including level flight on approach and thrust on turns in downwind approaches)~~unrestricted climb procedures. Wherever appropriate the standard INM profiles will be utilized. However, the PC anticipates that some operations cannot be suitably modeled using standard INM profiles and will require development of custom flight profiles.

If customized flight profiles are needed, the PC proposes to use the FAA's Noise Integrated Routing System (NIRS 6.1) Flight Segment Generator (FSG) model using existing INM version 6.1 procedure step profile data. The FSG is an FAA-approved process that allows for the development of approved customized flight profiles for each INM aircraft type. The average profile calculated via the bundled radar data will be inputted into FSG. FSG will utilize the available INM procedure steps for each unique aircraft and construct a customized profile along the average profile. The end result is a customized profile for a specific aircraft type that operates along the average profile path. ~~If the customized flight profiles generated by the NIRS FSG model prove inadequate, other techniques may be proposed that include the use of custom procedure steps in INM (procedure step data that is not available in INM), modifying standard~~

~~profile points (by extending existing segments between profile points), or developing new profile points using various aircraft performance modeling techniques. The exact manner of techniques used will depend greatly on the availability of data needed to conduct the analysis. Wherever possible, procedure step data available in INM will be utilized.~~ For INM aircraft that do not have procedure step data, the PC, with IC input, will determine ~~if another~~the appropriate INM aircraft substitution~~can be used as a substitution~~ that will provide similar acoustical results. ~~If a substitution is not available, the PC will utilize readily available data to develop customized procedure step data. Another option, if data is available, is to develop customized profile point datasets.~~ Some substitutions~~Any technique that is proposed to generate customized flight profiles must~~may need to be pre-approved by FAA AEE. The calculated profiles will then be converted to INM input format in order to conduct noise calculations.

PC Activities:

- Obtain FAA AEE approval for customized profile development process.
- ~~Develop/identify~~Calculate average ~~INM~~ flight profiles for each flight trajectory bundle by aircraft category~~aircraft type on each identified flight trajectory bundle~~.
- ~~Identify specific operations where weight data and exact equipment usage is needed from FAA/Massport for custom flight operation modeling in accordance with the Noise Modeling and Measurement Protocol developed in Task 5.3.1~~Calculate INM procedure step profiles via NIRS FSG.
- Convert FSG results into INM input
- Coordinate results with IC and BOS/TAC/CAC.

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IC Activities:

- Cooperate with the PC in the development of an FAA/AEE approved methodology to generate user-defined profiles, if necessary, to accommodate BOS-specific variations from INM default climb and descent profiles.
- Peer review PC-developed INM flight profiles for each aircraft type on each INM flight track.
- Coordinate review findings with PC, CAC, and BOS/TAC.

5.3.2.6 INM Input File Development

Data will be formatted for input into version 6.2 of FAA's Integrated Noise Model (INM). A database will be compiled which includes the number of day and night operations for every combination of aircraft type, operation type, flight profile, stage length, runway, and track name, for each of the six air traffic configurations and the annual average operational condition. The database will be compiled based on the results of the radar analysis detailed above in Task 5.3.2.1.

Wyle's Dicerno™ software will be used to conduct supplemental metric analyses.[5] Input for Dicerno™ will rely on the INM baseline conditions. The IC will be provided with INM database files. The CAC will be provided an overview and working demonstration of the software during analysis of the radar data, either at the PC's offices in Arlington, Virginia, or via a web interface.

[5] The use of Dicerno™ for developing input files for INM and to produce data associated with the Number of Events Above (NA) does not require FAA AEE approval per discussions between FAA ATO and FAA.

IC will be provided with input and output of interest that is identified after the demonstration for each scenario that is analyzed.

PC Activities:

- Create INM input files.
- Provide a full copy of all INM directories and cases and Dicerno™ output to the IC for review.
- Setup Dicerno study and input.
- Coordinate results with IC and BOS/TAC/CAC.

IC Activities:

- Peer review all aspects of the PC's INM input and output files.
- Coordinate review results with PC, CAC, and BOS/TAC.

5.3.2.7 Noise Measurements

A supplemental noise measurement program to provide a comparison between modeled INM levels and those measured in the field will be conducted. The intention of this task is to determine if the INM modeled noise levels provide a reasonable representation of the sample measurements at specific locations, with the understanding that the INM input and output represent an average annual day condition and are not directly linked to the specific operations that occurred during the measurement period. The measurement data will assist in verifying that the input generated in previous tasks provides a reasonable representation of typical operational patterns within the study area.

This task includes both remote and side-by-side (with permanent monitors) monitoring. The remote measurements are intended to provide supplemental data to validate INM input developed in the INM modeling process for areas beyond three miles from the Airport. Where noise measurements significantly deviate from modeled noise levels, anomalies to the data will first be sought in the measurement data, and if not discovered, the operational and location input to the INM (developed in Tasks 5.3.2.3 through 5.3.2.5) will be checked to assure that modeling assumptions and distributions are reasonable and statistically correct before proceeding to alternative modeling. The technical criteria and limitations associated with this analysis will be determined via the noise protocol developed in Task 5.3.1. The PC and IC, based upon the noise protocol, will jointly determine the appropriate adjustments, if necessary, based upon comparative results. Adjustments will be made by the PC and will be limited to the inputs developed in Tasks 5.3.2.3 through 5.3.2.5. This may involve radar track bundling verification for a specific set of flight tracks and/or representative profiles and/or number of sub-tracks associated with each representative INM track. Any adjustments made will require INM recalculation. This effort is assumed as part of Tasks 5.3.2.3 through 5.3.2.5 related to input development iterations and adjustments.

Up to six supplemental field sites will be selected to ascertain aircraft noise levels at locations under current flight paths, but beyond the capture area of the current noise monitoring equipment. Noise measurement methodology and locations will be determined during the development of the noise protocol. At each site, measurements will be collected for five consecutive 24-hour days. Each supplemental measurement site will be attended for five 8-hour

daytime periods during which aircraft overflight events will be logged by an observer. Noise level data will be collected in A-weighted 1-second intervals.

Also, in order to assess differences between permanent monitor and INM values, side-by-side measurements will be conducted at no more than 12 existing permanent monitoring sites for periods of four hours each. Sites selected for this task will be distributed throughout the area and selected to represent both within and outside three (3) miles from the Airport. Locations will be determined during development of the noise protocol. This analysis will provide a comparison with the range of aircraft single event noise levels registered by the Airport's noise monitoring system. The information gathered from this assessment will provide a better understanding of modeled and measured differences. The means in which the comparison will be conducted will be consistent with the protocol developed in Task 5.3.1. If measured level variance does not account for the differences between measured and modeled values, INM inputs that are candidates for adjustment as identified in the noise protocol will be reviewed. The adjustment limitations associated with the remote sites are the same for the side-by-side measurement comparisons.

Massport will provide noise measurement data collected at permanent monitoring sites for the same periods as supplemental and side-by-side measurements are conducted. In addition, all settings associated with the selected permanent monitors will be provided. Electronic time stamped radar data with flight numbers will be provided by Massport from its noise and operations monitoring system for the supplemental and side-by-side measurement period.

Results will be documented for delivery to the CAC and PC.

PC Activities:

- Review proposed locations and protocol for supplemental and side-by-side noise measurement sites (see Task 5.3.1).
- Review preliminary noise measurement results.
- Coordinate findings regarding noise measurement results with IC and CAC.
- Review final noise measurement program documentation and results.
- Determine, in conjunction with the IC and in conformance with the Noise Modeling and Measurement Protocol developed in Task 5.3.1, if any adjustments to the baseline noise model input (flight track locations, operation distributions, profile assignments) are warranted. Adjustment efforts will be conducted under the appropriate task(s).

IC Activities:

- Conduct supplemental noise measurement program in accordance with the protocol developed under Task 5.3.1.
- Conduct comparative analysis between radar data and measured noise levels to determine correlated aircraft noise source information.
- Determine confirmed potential anomalies associated with permanent sites.
- Develop draft measurement report and provide to CAC and PC for review.
- Document preliminary results and suggestions for delivery to PC for use in INM input file development, as appropriate.

- Upon completion of Task 5.3.2 and 5.3.3, compare measured noise levels with modeled noise level results.
- Coordinate review of final results with PC and CAC.

5.3.3 INM DNL 75, 70, 65, and 60 dB Contours

Noise contours will be generated using Version 6.2 of INM at DNL values of 75, 70, 65, and 60 dB, and overlaid on local vicinity maps. DNL values below 60 dB will use grid point analysis and Dicerno™, if approved for the purpose. The contour grid will be 50 nautical miles wide and 50 nautical miles high, centered on the airfield. This will ensure a large enough area to cover the entire radar coverage area and all surrounding communities. The grid spacing will be 500 feet.

PC Activities:

- Generate DNL 75, 70, 65, and 60 dB noise contours.
- Provide all INM output files to the IC for review.
- Coordinate results with IC and BOS/TAC/CAC.

IC Activities:

- Review computed DNL 75, 70, 65, and 60 dB noise contours for consistency with input assumptions and files.
- Coordinate findings with PC, CAC, and BOS/TAC.

5.3.4 Alternative Noise Metrics

The PC will run the INM and generate appropriate noise metrics, analyses, graphics, and maps, with input and oversight from the IC and BOS/TAC/CAC. The alternative noise metrics identified thus far in meetings held during Phase 1 include (the referenced metrics are defined below): (1) Number of Events Above (NA) and Time Above (TA) analyses above a series of thresholds (to be determined) and presented in tabular format; (2) DNL color gradient maps as well as selected grid points within the study area; (3) NA and TA maps for selected grid points and thresholds; (4) flight corridor maps overlaying radar data on INM flight tracks for various aircraft groupings (e.g., heavy jets and RJs); (5) DL and NL analysis; (6) Lmax values at selected grid points; (7) SEL (and corresponding Sound Exposure, E) values at selected grid points; and (8) aircraft altitude at selected grid points. The use of supplemental noise metrics will be detailed in the noise protocol and will be used to more clearly identify the potential benefits and adverse impacts of each measure evaluated in Phase 2.

Maximum A-Weighted Sound Level, Lmax

A common metric that is used to help in describing a single aircraft noise event is the Maximum Sound Level, or Lmax, which is measured in decibels (dB). For the purposes of describing community or environmental noise, A-weighting is assumed unless otherwise indicated. The Lmax metric is described technically as the highest A-weighted integrated sound level that is measured during a single event in which the sound level values vary with time (e.g., an aircraft over-flight). During an aircraft over-flight, the noise level starts at the ambient or background noise level, rises to the maximum level as the aircraft flies closest to the observer, and returns to the background level as the aircraft recedes into the distance. Lmax indicates the maximum

sound level occurring for a fraction of a second. In simplest terms, Lmax is the highest sound level measured during a single noise event and describes the maximum level of a noise event, but does not take into account its duration. In other words, an event with a relatively low Lmax but a longer duration can be just as intrusive as a short duration event with a higher Lmax.

Sound Exposure Level, SEL

SEL is a composite metric that represents both the duration and magnitude (or amplitude) of a time-varying noise event. Two good examples are an aircraft over-flight and a passing truck. The sound levels of individual time-varying events have several main characteristics – the time when the sound level exceeds the lower threshold level, rising to a maximum noise level (Lmax) during the aircraft flyover, then the time during which the sound level decreases to the lower threshold level.

SEL is a logarithmic measure of the total acoustic energy that occurs during the noise event. Mathematically, it is defined as the total acoustic energy of an event from background to background (typically computed from 10 to 20 dB from the event peak), but "normalized" to a one-second time period. The single value represents the level of a constant sound that, in one second, would generate the same acoustic energy as the actual time-varying noise event. In effect, the SEL metric "squeezes" the energy of the entire noise event into one second.

Sound Exposure, E

E (in linear units of Pa^2-s) is simply a measure of the total acoustic energy of the entire noise event. Use of this measure will require FAA AEE approval.

Equivalent Sound Level, Leq

The equivalent sound level (Leq) is the most straightforward and flexible time-averaged metric used to describe aircraft noise. It is useful because it enables analysts and planners to evaluate the cumulative effects of a number of noise events on people. The time-averaged sound level is dominated by the louder levels that occur during the averaging period. As a simple example, consider a sound level which is 100 dB and lasts for 30 seconds, followed by a sound level of 50 dB which also lasts for 30 seconds. The time-average sound level over the total 60-second period is 97 dB, not 75 dB.

In essence, Leq represents the average sound level of all events occurring over a specified period of time. The time period is denoted in hours in parentheses. For example Leq(1), Leq(8), and Leq(24) represent the average noise energy over a 1-hour, 8-hour, and 24-hour time period, respectively. For analysis of daytime noise impacts, Leq(16) or Daytime Average Sound Level (DL or LD) is often used, while for analysis of nighttime noise exposure, Leq(8) or Nighttime Average Sound Level (NL or LN), may be used. For analysis of noise impacts at schools, Leq(7) might be used, corresponding to the typical 7-hour school day.

Time Above a Specified Level (TA)

Time-Above a specified level, usually described by the symbol TAL(X), is a measure of the total time or percentage of time that the A-weighted aircraft noise level exceeds a defined sound level threshold (L) over the desired time period (X). TA values can be calculated for a full 24-hour annual average day, the 15-hour daytime and 9-hour nighttime periods, a school day, or any

other time period of interest, provided there is enough operational data to define that time period of interest. The time period (X) is usually defined in terms of minutes. As an example, TA65(60) calculated over a 24-hour day describes an area (or single point of interest) where an Lmax of 65 dB is exceeded for 60 minutes over a 24-hour annual average day. TA information will be developed and reported for a range of noise levels.

Number-of-Events Above a Specified Level (NA)

Number-of-Events Above, usually symbolized by NAL(X), is a noise metric that calculates the total number of aircraft events (X) that exceeds a certain sound level threshold (L) during a specified period of time. The sound level threshold can be defined using either the SEL or Lmax metric, and the period of time can be an average 24-hour day, daytime, nighttime, school day, etc., depending on the nature and application of the NA analysis. NA information will be developed and reported for a range of noise levels.

Slant Range Distance/Altitude

Slant Range distance/altitude may also be calculated for expected areas of interest that are consistent with what was evaluated in Phase 1. For budgetary purposes, it is assumed that Slant Range/altitude values will be calculated at no more than 5 grid points.

The PC will use Wyle's Dicerno™ software to compute the Number-of-Events Above (NA)[6] and other supplemental metrics for the defined cases. If supplemental metrics are proposed for the purpose of screening measures, FAA AEE approval will be obtained prior to use.

PC Activities:

- Generate noise metrics, analyses, graphics, and maps in coordination with the IC and BOS/TAC/CAC.
- Provide all INM output files for supplemental metric evaluation to IC for review.
- Coordinate results with IC and BOS/TAC/CAC.

IC Activities:

- Review PC-developed supplemental noise metrics, analyses, graphics, and maps for consistency with INM input assumptions and files.
- Coordinate findings with PC, CAC, and BOS/TAC.

5.3.5 Identify Population and Noise Sensitive Area Impacts

The PC will identify the population and noise-sensitive area impacts, as defined by FAA Order 1050.1E Paragraph 11 (8), within the DNL 75, 70, 65, and 60 dB noise contours. This task will quantify noise exposure in terms of population, households, and land use, as well as identifying minority and low-income populations, Section 4(f) properties, and historic sites. Tables will be developed to summarize the noise exposure estimates for the baseline noise model.

For examination of potential noise impacts due to changes in flight tracks, air traffic allocation, and other measures, grid point maps will be developed showing baseline noise exposure within the 25-mile radius area surrounding the radar located on the BOS airfield. The grid point maps will, at a minimum, identify political jurisdictional boundaries, existing water features, and shoreline.

PC Activities:

- Identify and document population, households, and noise sensitive land uses affected by aircraft noise within the defined study area.
- Coordinate results with IC and BOS/TAC/CAC.

IC Activities:

- Peer review the PC's evaluations of population, households, and noise sensitive land uses affected by aircraft noise within the defined study area.
- Coordinate results with PC, CAC, and BOS/TAC.

[6] FAA AEE has approved the use of Dicerno for NA calculations.

5.3.6 Ground/Taxiway Noise

Ground noise sources, such as taxiway use patterns, including the use of the centerfield taxiway, if approved by the FAA, will be analyzed in Phase 2 to identify potential measures that could minimize ground noise impacts on surrounding communities. Results from previously completed studies will be incorporated into the review. This task will incorporate and will utilize the same methodology and modeling to analyze any additional ground noise measures identified. As appropriate, that information will be incorporated into the No Action Alternative for future conditions. The FAA will consult with CAC in identifying key concerns related to ground noise at the Airport and to identify potential measures that were not previously examined by FAA. However, alternatives previously examined by the FAA in the centerfield taxiway study, will not be re-examined in this study. Any required engine run-up noise calculations will be modeled using INM.

For any additional ground noise measures, not previously examined by FAA, baseline noise information will be required. Information developed in support of the existing study will be used as input into the ground noise evaluation. For any new measures identified, appropriate taxiway routes used in the noise modeling will be provided via the baseline TAAM analysis, since there are no known sources of data that collect and archive historic taxiway movement data for the Airport. The only taxiway routes to be modeled will be those that are widely used for each of the six major air traffic configurations and those specific to any new measures not previously studied by FAA. TAAM output results will also be used to provide aircraft queuing (aircraft departures waiting to depart or arrivals waiting to cross active runways) time estimates for these measures.

PC Activities:

- Collect all necessary SoundPlan[7] aircraft databases utilized by FAA in previous taxiway studies conducted at BOS.
- Setup SoundPlan parameters.
- Develop baseline ground/taxiway noise model using sources identified above.
- Coordinate results with IC and BOS/TAC/CAC.

IC Activities:

- Peer review baseline ground/taxiway noise modeling prepared by PC.
- Coordinate review findings with PC, CAC, and BOS/TAC.

[7] Based on the previous use of SoundPlan for the centerfield taxiway study, as well as other EIS documents, the PC will seek FAA AEE approval to use SoundPlan.

6 ALTERNATIVES IDENTIFICATION & EVALUATION

Additional measures that have the potential to reduce noise impacts on noise sensitive areas and the communities surrounding Boston Logan International Airport, including those associated with ground noise will be identified and evaluated in Phase 2, along with the 12 measures recommended for further evaluation in Phase 1, Phase 1 measures moved to Phase 2, and others that may be added during the public outreach process. These measures will be evaluated and subjected to a screening process to be used by BOS/TAC/CAC to ensure they meet the purpose and need of the project. The intent of this task is to provide pertinent information to BOS/TAC and CAC members who will ultimately accept and recommend to Massport a set of measures that will move forward in the FAA's environmental document (to be completed in Phase 3).

6.1 Identify Measures

The purpose of this task is to identify the measures to be evaluated and define them sufficiently such that they can be submitted through a Level 1 screening analysis described in Task 6.2.

6.1.1 Measures Recommended for Evaluation from Phase 1

Information about the 12 measures identified in Phase 1 to be further evaluated in Phase 2 (identified and described in the introduction section of this document) will be reviewed in preparation for analysis. Information not available from FAA for proposed procedures in Phase 1, but needed for Phase 2 analysis will be obtained and reviewed.

PC Activities:

- Collect, review, and document any additional operational information from FAA on measures from Phase 1 for evaluation during Phase 2. For budgetary purposes, it is assumed that 15 measures will be carried over from Phase 1 (12 identified as Phase 2 measures, plus 3 Phase 1 early implementation measures that need further environmental evaluation).
- Produce general concept illustrations that provide the general intent of each measure (including flight tracks and altitude and velocity profiles, when applicable). Illustrations will depict generalized corridors and compatible land use. Illustration base maps will include community boundaries, shoreline location, and Airport runways at a minimum.
- Coordinate information with IC.

IC Activities:

- Coordinate with PC in the preparation of concept illustrations for each measure.
- Review documentation on measures.
- Coordinate with CAC.

6.1.2 Ground Noise Measures

The PC will meet with BOS/TAC/CAC to discuss and identify additional ground noise measures that were not examined in the current FAA study[8] and have the potential to reduce ground noise impacts. Criteria will be established to be used in developing measures, which may be similar to the criteria used in the FAA study. The data derived from the baseline simulation analysis on taxiway utilization and runway use will be used as one basis for identifying potential additional measures.

If the centerfield taxiway is approved for implementation, it will be included as an existing condition for the future No Action Alternative. Any measures examined in the centerfield taxiway study, but not implemented, will not be re-evaluated in this study.

PC Activities:

- Identify the primary contributors to ground noise impacts.[9]
- Identify options that have the potential to reduce ground noise impacts.[10]
- Coordinate with IC on potential ground noise abatement measures. For budgetary purposes, it is assumed that up to 5 ground noise measures will be identified.
- Present the findings at a meeting with BOS/TAC and CAC for their consideration.

IC Activities:

- Coordinate with CAC on potential ground noise abatement needs.
- Coordinate with the PC to identify and evaluate potential ground noise abatement measures.
- Peer review all noise distribution results developed through use of FAA and non-FAA models.
- Participate in BOS/TAC/CAC meetings and presentations.

6.1.3 Other Measures

Additional measures may be identified during the public involvement process. If this occurs, the PC will develop sufficient information for each of them for evaluation and comparison with the other measures being considered. For budgetary purposes, evaluation of up to 10 additional measures is provided for in this study.

PC Activities:

- Develop information on the potential measures.
- Present potential measures at a meeting with BOS/TAC and the CAC for consideration.

IC Activities:

- Coordination with CAC on additional measures.

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[8] Harris Miller Miller and Hanson, Logan International Airport Additional Taxiway Evaluation Report, May 2006.
[9] This scope assumes that taxi movement noise remains a major concern to surrounding communities based on information provided in the Logan Airside Final EIS.
[10] Only alternatives not examined by FAA in their centerfield taxiway analysis at BOS will be evaluated.

- Provide peer review of PC technical assessments.

6.2 Level 1 Screening Analysis

The evaluation of measures will focus on their ability to reduce noise impacts on noise sensitive areas and communities surrounding Boston Logan International Airport without negatively impacting the FAA's organizational goals and stated mission[11], and can be successfully accomplished within a reasonable period of time, taking into account environmental, social, economic, and technological factors. Similar to the Phase 1 work, a three-level screening process will be conducted. The first level screening would eliminate measures that diminish safety or present substantial operational hurdles (e.g., technical feasibility, exceeds air traffic facility capabilities, requires airspace redesign[12]). The PC will hold two web-based meetings with BOS/TAC/CAC during the Level 1 screening analysis process to first discuss how the measures will be analyzed, and second, present preliminary findings of the analysis. The PC will coordinate with the IC and present the findings of the Level 1 screening analysis at a meeting with BOS/TAC/CAC.

PC Activities:

- In coordination with FAA, identify and define safety and operational criteria to be utilized.
- Conduct and document a qualitative evaluation analysis based on safety and operational criteria. For budgetary purposes, it is assumed that up to 25 measures will be evaluated.
- Identify and document measures eliminated from further consideration.
- Identify and document measures retained for further consideration.
- Coordinate analysis with IC.
- Present findings at a meeting with BOS/TAC/CAC and the IC for their consideration. The PC will recommend (based on the Level 1 screening analysis) and BOS/TAC/CAC will approve measures that should be retained for further consideration.

IC Activities:

- Coordinate with PC to define evaluative criteria.
- Peer review PC evaluations and documentation of results.
- Coordinate with CAC to provide feedback from web-based meetings to PC.
- Participate in BOS/TAC/CAC meetings and presentations.

[11] FAA has defined organizational goals, which include increased safety and providing greater capacity in the airspace system to meet projected demand in an environmentally sound manner. FAA's stated mission is to provide the safest, most efficient aerospace system in the world (http://www.faa.gov/about/mission/).

[12] The TRACON boundary includes the airspace within approximately 30 nautical miles of Boston Logan International Airport. Changes outside the TRACON airspace boundary are considered to be an airspace redesign element. While this Study will not consider airspace changes outside the TRACON airspace boundary, it may consider changes of air traffic control sector boundaries that lie within the TRACON airspace if such a change does not require a change to BOS Air Traffic Control Center sectors or boundaries.

6.3 Level 2 Screening Analysis

The purpose of the Level 2 screening analysis is to better define the Level 1 measures, determine which measures will meet operational criteria, and identify the measures that should be modeled for their noise reduction potential. Measures retained for consideration from the Level 1 screening analysis will be evaluated to assess the potential of each measure to meet the objectives of the study, namely the ability to provide noticeable reductions in aircraft noise levels on noise sensitive areas and communities within the study area of evaluation.[13] Each measure carried over from the Level 1 screening analysis will be refined to determine potential procedures, flight tracks, and viability. Criteria would be developed, defined and agreed upon in conjunction with BOS/TAC/CAC to determine the benefit or impact of each measure on noise exposure upon noise-sensitive land uses.

6.3.1 Refine Measures

Each of the measures retained as reasonable and feasible through the Level 1 screening analysis will be analyzed and refined to identify more specific operational procedure definitions required for implementation. This information will be necessary in order to adequately assess the viability of each measure.

PC Activities:

- Refine measures for Level 2 screening analysis. For budgetary purposes, it is assumed that up to 18 measures will be evaluated in the Level 2 screening analysis.
- Coordinate refinements with BOS/TAC/CAC and IC.

IC Activities:

- Coordinate with the PC in refining operational definitions of proposed procedures.
- Coordinate with CAC and BOS/TAC regarding procedure intent and detail.

6.3.2 Screening Analysis

The Level 2 screening process will focus on these criteria:

- **Operational Issues** – Utilizing the refined definitions of the measures, FAA personnel will perform a detailed analysis of the measures and identify any that may significantly compromise their organizational goals and stated mission. This analysis will be coordinated with the IC and documented.

- **Noise Reduction Potential** – Flight procedure measures will be qualitatively reviewed for the potential of providing a noticeable reduction[14] in aircraft noise levels. In addition, the consultant team will review each measure for potential adverse impacts to other communities. Using the refined air traffic measure definitions, the

[13] "Noticeable" is defined as a level of change that addresses both the perspective of residents that experience aircraft overflights (through the measurement of overflight frequency) and/or a 3 dBA or greater reduction in aircraft single-event noise levels.

[14] "Noticeable" is defined as a level of change that addresses both the perspective of residents that experience aircraft overflights (through the measurement of overflight frequency) and/or a 3 dBA or greater reduction in aircraft single-event noise levels.

PC will modify the targeted baseline route to look like the expected corridors and utilize Dicerno[TM15] to estimate the potential reductions and increases. Criteria to consider are the following:

- Introduction of noise from civil large jet airplanes (i.e. greater than 75,000 lbs.) that involve changes to departure routes or tracks within the defined study area.
- Introduction of civil large jet airplanes over residential areas that are not currently exposed to noise from civil large jet airplanes. Examine the lateral distance between existing routes or tracks and the proposed route or track at specific aircraft altitudes (if the procedure calls for a change in altitude profile) to determine the potential for reductions or increases in noise impacts.
- Changes in aircraft altitudes and/or numbers of daily operations of civil large jet airplanes on an existing route or track to determine the potential for reductions or increases in noise impacts if the measure calls for a change in procedure altitude profiles.
- Change in number of departures and arrivals by civil large jet airplanes at specific aircraft altitudes over different types (Quiet Suburb, Normal Suburb, Urban, and Noisy Urban[16]) of residential communities to determine the potential for reductions or increases in noise impacts.
- Ground noise measures will be evaluated primarily based on changes in distance between the source and receivers (residences located nearest to the Airport). Via preliminary operational estimates, taxiway use frequency may also provide some indication of potential benefits. However, the PC recommends that ground noise measures that are operationally feasible should be subjected to the quantitative analysis performed during the Level 3 screening analysis unless the qualitative analysis clearly indicates no potential benefit. The degree of noise reduction potential for these measures will be difficult to assess with any certainty during the second tier analysis.
- Those measures that are determined to cause adverse impacts and involve no benefits or do not provide a noticeable reduction will be identified. This analysis will be coordinated with the IC and documented for review by the BOS/TAC/CAC. These analyses are informational. The information will be provided to BOS/TAC/CAC, who will assess the information and determine for each measure whether to discard or retain it for the Level 3 screening analysis.

[15] The proposed use of Dicerno for this task will require FAA AEE approval.

[16] Residential community classifications (Quiet Suburb, Normal Suburb, Urban, and Noisy Urban) were extracted from EPA Report No. 550/9-74-004, *Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety*. Ambient noise levels for these community types range from 50 dB for a Quiet Suburb, in 5 dB increments, to 65 dB for a Noisy Urban community. In the FAA's Air Traffic Noise Screening manual, the descriptions of the residential communities are intentionally brief and broad for the purpose of applying the screening procedure nationwide. Local knowledge of residential communities is very important in categorizing the affected communities. This may be established via the noise measurement task described in Task 4.

The PC will hold two web-based meetings with BOS/TAC/CAC during the Level 2 screening analysis process to discuss how the measures will be analyzed and present preliminary findings of the analysis. The PC will coordinate with the IC and present the final analytical findings of the Level 2 screening analysis at a meeting with BOS/TAC/CAC.

PC Activities:

- In coordination with FAA identify and define criteria to be utilized.
- Conduct and document a qualitative analysis based on criteria agreed upon by BOS/TAC/CAC. For budgetary purposes, it is assumed that up to 18 measures will be evaluated during the Level 2 screening analysis.
- Identify and document measures eliminated from further consideration.
- Identify and document measures retained for further consideration.
- Coordinate with the IC.
- Present preliminary findings at a meeting with BOS/TAC/CAC and the IC. The PC will solicit feedback from BOS/TAC/CAC and the IC on the preliminary findings.
- Present final findings at a meeting with BOS/TAC/CAC and the IC. The PC will recommend (based on the Level 2 screening analysis) and BOS/TAC/CAC will approve measures that should be retained for further consideration.
- At the direction of FAA provide documentation that includes details that describe methodology, results, and conclusions associated with each measure.

IC Activities:

- Coordinate with PC to identify and define criteria.
- Coordinate with PC to review analytical results and documentation.
- Coordinate with CAC regarding advisability of keeping/discarding measures.
- Participate in BOS/TAC/CAC meetings and presentations.

6.4 Level 3 Screening Analysis

Measures retained for consideration from the Level 2 screening analysis will be evaluated in a Level 3 screening analysis that will quantitatively examine the ability of the measures to meet the objectives of the study, namely reduce noise impacts on noise sensitive facilities and residential areas within communities surrounding the Airport. Analyses will be conducted on each measure retained from the Level 2 screening analysis, followed by a cumulative analysis or analyses of the measures that BOS/TAC/CAC identifies for potential implementation. For budgetary purposes, it is assumed that up to 12 measures will be evaluated during the Level 3 screening analysis.

The quantitative analysis will require a multi-step process, as described below.

6.4.1 Forecasting and Flight Schedule

A forecast and flight schedule for the future year (2010) will be developed as an input into the simulation modeling required for the Level 3 screening analysis, and eventually the environmental impact analysis. The PC will use the PMAD baseline schedule (developed in Task 5) and growth rates in operations as published within the FAA's most recent Terminal Area

Forecast (TAF) for Boston Logan International Airport or other FAA-accepted forecasts for the Airport, to create schedules for 2010 and one future out-year. Air carrier operations provided within the TAF will be separated into operating type (i.e. passenger air carrier and air cargo) based on recent trends at the Airport. Fleet mix projections will be based on recent trends at the Airport and national projections provided by individual carriers and/or aircraft manufacturers. Future year peaking assumptions will be based on recent trends at the Airport.

To aid in the modeling effort, arriving and departing aircraft will be matched and assigned to specific gates based on their origins or destinations. The schedule-building process will be coordinated between the PC and the IC and documented for BOS/TAC/CAC review and acceptance.

PC Activities:

- Develop and document forecasts and flight schedule for 2010 and one future out-year.
- Coordinate forecasts and flight schedule with the IC.
- Coordinate with BOS/TAC/CAC.

IC Activities:

- Peer review PC forecast and flight schedule analysis.
- Coordinate with CAC to describe/explain findings.

6.4.2 Operational Modeling

Fast-time air traffic simulation (TAAM) analysis would be conducted for the future year (2010) and one future out-year. The future baseline (No Action) alternatives will include the following assumptions:

- Increased number of operations as determined by the forecasting completed in Task 6.4.1.
- Different aircraft fleet mix as determined by the flight schedule completed in Task 6.4.1.
- Incorporation of Phase 1 measures that are or will be implemented between current and 2010 time frames.
- Addition of Runway 14-32 in accordance with the Record of Decision.[17]
- Incorporation of the centerfield taxiway (if approved by the FAA).

TAAM modeling will then be conducted on measures with operational impacts retained for consideration from the Level 2 screening analysis. The TAAM simulation will provide input data for noise modeling of ground movements and determination of aircraft departure and arrival profiles. Demand and delay results would be compared to the baseline results produced from Task 5.2.2 to assess the impact of the measure on airfield capacity. Simulation data containing but not limited to out-off/on-in (aircraft pushback from gate to departure from runway / aircraft touchdown on runway to arrival at gate) times at Boston Logan International Airport, departure or arrival routes, aircraft type, and arrival or departure runway would be produced for input to

[17] *Record of Decision, Airside Improvements Planning Project, Logan International Airport, Boston, Massachusetts,* FAA, August 2, 2002.

the noise modeling. Global Flight Data Record (GFDR) files generated by TAAM and containing aircraft profile data including airspeed, heading, altitude, and track across the ground for each aircraft operation modeled will be used as inputs into INM. This data will be used for ground noise modeling to assess the effects of different taxiway utilizations, including but not limited to aircraft type, taxiway link (location), and total travel time on the taxiway link. Results and output of the TAAM modeling will be used as the basis for the INM modeling but will be supplemented and verified through the use of other source information including FAA air traffic control personnel input.

Results will be compared to the baseline simulation conducted in Task 5 and the future No Action Alternatives to determine potential benefits or impacts of each measure. The output metrics from this modeling will be used as inputs into the noise modeling. This analysis will be coordinated with the IC. For budgetary purposes it is assumed that the measures being analyzed will only require twelve (12) TAAM runs (one configuration for each of the 12 measures assumed for this task). Each of the twelve TAAM runs will be modeled at three demand levels to determine potential operational impacts.

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PC Activities:

- Twelve TAAM air traffic simulation runs (one configuration for each of the 12 measures assumed for this task) will be conducted at 3 demand levels.
- Conduct an analysis to quantify annualized operational metrics associated with each measure.
- Assess and document the impact of each measure on airfield capacity and delay.
- Coordinate results with BOS/TAC/CAC and IC.

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IC Activities:

- Coordinate with PC on the development of simulation assumptions.
- Peer review simulation input, results, and documentation.

6.4.3 Noise Modeling

Noise modeling for the future No Action Alternative, which assumes the implementation of "early implementation" Phase 1 measures accepted for implementation and results of the centerfield taxiway study that have been adopted will be performed. Noise modeling will also be conducted for each measure that successfully meets Level 2 screening criteria, under No Action conditions. The future No Action and alternative scenarios would be compared to determine if a measure would alleviate noise impacts or introduce noise impacts in other areas. Noise impact evaluations would consider INM, grid-point analysis, and alternative noise metrics identified in the noise protocol for use in the baseline noise modeling. This analysis will be coordinated with the IC.

6.4.3.1 INM Input Development

The modeling effort that will be required to determine the potential impact of the future 2010 No Action Alternative and the selected measures will be dependent on the complexity of the measures. This measure may have to be adjusted based on implemented Phase 1 measures that may alter the baseline. For example, the modeling must predict the acoustic impact of moving flight tracks from one geographic location to another, moving operations from one runway to

another, or changing flight approach and/or departure profiles, and, in some cases, a combination of the above. In order to discern the acoustic impact of these measures on the surrounding communities, the level of analysis must be commensurate with the level of detail in the measures. The noise impact in a given community is dependent on the quantity and location of the aircraft operations as well as the aircraft altitude, speed, and thrust setting. Greater detail associated with the proposed work efforts will be provided after a scope re-assessment is conducted, as described in Task 1.3. The work efforts described below are general in nature and provide the expected methodologies and framework to be utilized.

6.4.3.1.1 2010 No Action Alternative

The first step will be to develop the INM inputs for the 2010 No Action Alternative. The PC will re-assess the existing baseline noise model (developed in detail under Task 5) and determine the changes needed to update that case to model the airport operations projected for 2010.

Outputs from the TAAM simulations will be used as inputs into the INM future scenarios. Because TAAM uses a peak month average day (PMAD) schedule and FAA requires that an annual average day (AAD) schedule be used for INM, the PMAD schedule from TAAM will need to be modified to reflect an AAD schedule. Operational data and aircraft fleet mix will be derived from the 2010 No Action Alternative simulation model results. The TAAM outputs will be normalized from peak month average day to annual average day for use in INM. Most of these changes will be carried out by editing the INM input database files except for the profile data needed for the measures implemented after Phase 1.

The 2010 No Action Alternative will represent the existing conditions, updated to reflect future 2010 operating levels and fleet mix, including the addition of Runway 14-32, addition of the centerfield taxiway (if approved), and the Phase 1 measures that will be implemented. The following components of the existing baseline noise model developed under Task 5 will be included:

- Physical location of flight tracks.
- Approach and departure profiles.
- Percentage distribution of categories of aircraft (i.e., air carrier, regional jet, and propeller) among the defined runways, tracks, and profiles (assumes flight destination/origin will remain the same as existing conditions).
- Percentage of nighttime operations unless TAAM evaluations of Task 6.4.2 indicate a shift to nighttime shoulder hours.
- Runway layout and usage, with the addition of new Runway 14-32.
- Taxiway use with the addition of access to new Runway 14-32 (approved Airside EIS improvements).

The 2010 No Action Alternative inputs and outputs will be compared to the existing baseline noise model to identify any potential data anomalies and identify that differences are accurately depicted. The No Action Alternative inputs will be coordinated with the IC. Next, the 2010 No Action Alternative noise model will be used to compare the impacts of the measures.

PC Activities:

- Develop INM inputs for the 2010 No Action Alternative.
- Compare 2010 INM inputs and outputs with Baseline noise model; make corrections to 2010 INM inputs, if needed.
- Coordinate results with BOS/TAC/CAC and IC.

IC Activities:

- Peer review PC's INM input and output assumptions and input files for the 2010 No Action Alternative.
- Coordinate results with CAC.

6.4.3.1.2 Measures

As described in Task 6.4.2, TAAM air traffic simulation analysis will be completed for each measure that has an operational impact. The output data from the TAAM will be used as ~~the primary~~ a source to generate the necessary INM inputs along with 2010 No Action INM input variables. The TAAM outputs will be normalized from peak month average day to annual average day for use in INM, as discussed in Task 6.4.3.1.1.

There are several types of noise abatement procedures outlined in the recommended measures from Phase 1, with varying levels of noise-modeling complexity. The types of procedures include:

- Creating new flight tracks and profiles and shifting operations from existing tracks to the new tracks.
- Moving and editing an existing flight track.
- Creating additional departure flight tracks to model "fanning" of operations over an area, and distributing operations among these fanned tracks.
- Changing the amount of operations on a given runway.
- Shifting operations to different runways.
- Relocating nighttime operations to different runways.

Additional measures identified during the Phase 2 process, including ground noise measures will also be modeled. Any variables that are shared between the No Action Alternative and other measures will be incorporated in the alternative INM data set. New assumptions will be supported by the TAAM simulation output (for operational measures) and FAA air traffic control input. Key data variables and assumptions will be coordinated with the IC. This method will be applied for each measure that has been retained from the Level 2 screening process.

Changing the distribution of operations among runways and existing tracks will involve a certain level of complexity. However, these measures would work within the confines of the existing airport configuration. Therefore the only changes needed to the No Action Alternative would be recalculating the numbers of operations and then editing the INM database files.

Measures that include changes to the airport configuration, such as moving and creating flight tracks and profiles, will introduce more complexity to the analysis. The physical tracks (GFDR output from TAAM will provide the flight track backbone) would need to be created in the INM.

Next, the appropriate operations would be placed on these tracks. In addition, the expected climb and descent performance flight profiles for these tracks will be output from TAAM and reviewed with FAA air traffic control personnel, before being modeled in INM. These profiles may be different than the profiles modeled in the No Action and Baseline INM cases, and would therefore need to be analyzed and developed using the FSG methodology identified in Task 6.4.3.1.3. Any differences from the No Action and Baseline profiles would be clearly described and explained. For budgetary purposes, it is assumed that up to 12 measures will be modeled.

PC Activities:

- Normalize TAAM outputs from peak month average day to annual average day.
- ~~Modify~~ Utilize TAAM outputs and ATC input to provide acceptable INM inputs for each operational measure, to include data such as flight profiles (unless addressed in Task 6.4.3.1.3) and flight tracks, as required.
- Compare 2010 INM inputs for each measure modeled with No Action Alternative inputs; make corrections to 2010 INM inputs, if needed.
- Coordinate results with BOS/TAC/CAC and IC.

IC Activities:

- Peer review PC modifications of TAAM output data to INM input standards.
- Coordinate results with CAC.

6.4.3.1.3 Flight Profiles for Measures

Some measures may require editing of the No Action Alternative approach and departure profiles. Profiles used in either the Baseline or No Action Alternative will include some standard INM profiles and some custom-defined profiles (as described in Section 5.3.2.5). Both standard and custom profiles may have to be edited in any or all of the measures in order to adequately determine the average annual acoustic impacts for each measure. For example, a departure profile modeled in the No Action Alternative may have a hold down segment included due to traffic located above the specific flight track. An alternative case may have a replacement flight track that does not pass under the same traffic, and therefore the hold down segment may potentially be shortened, changed to a different altitude, or eliminated. These changes ~~would~~ may depend on aircraft ~~type~~category, and the runway and track utilized.

As described in Section 6.4.2, the TAAM operational modeling will ~~utilize the Global Flight Data Record (GFDR) files that~~ supply aircraft track and profile data ~~including airspeed, heading, altitude, and ground track location~~. A combination of ATC input and t~~T~~he radar data used to construct the Baseline (inherited in the No Action Alternative) flight tracks and profiles will be used as a basis to determine the appropriate distribution of profiles ~~defined by TAAM~~associated with a specific measure. ~~This step is necessary to verify that TAAM profiles reflect realistic expectations and identify key differences that will support later analyses.~~

~~Whenever possible,~~ INM procedure steps will be used to model the flight profile. ~~For certain INM provided aircraft, procedure step profiles may not be available. If an appropriate INM aircraft substitution is available, it will be used. If not, a customized profile dataset will be developed. For those operations where detailed profile performance analyses are required, as detailed in Section 5.3.2.5, the output will be a new series of procedure steps or a series of profile~~

~~points (including velocity and thrust setting) for INM.~~ Flight profile development will follow the same procedures and methodology as described in Task 5.3.2.5, including receiving FAA AEE approval to use any customized data before applying it in INM. ~~Both types of profile definitions will be added to the INM input deck for the appropriate operations. The PC will utilize available information to take into account the performance of the aircraft when modeling customized flight profiles to ensure that the proper noise source characteristics are used to model the noise environment.~~ If necessary~~ data is not readily available~~, the PC will coordinate with the IC to determine ~~if there is a reasonable substitution using an available customized aircraft dataset~~the use of aircraft substitutions not identified in Task 5.3.2.5.

PC Activities:

- Obtain FAA AEE approval of profiles or profiling process, if necessary~~, before developing user-designed profiles to reflect local reality~~.
- Develop or m~~M~~odify approach and departure flight profiles for measures, if/as needed.
- Convert FSG results into INM input format.
- Coordinate results with BOS/TAC/CAC and IC.

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IC Activities:

- Peer review the PC's work in the modification of approach and departure flight profiles for measures, if needed.
- Coordinate results with the CAC.

6.4.3.2 INM Analysis

The PC will run the INM and generate the appropriate noise metrics, analyses, graphics, and maps, with input and oversight from the IC and BOS/TAC/CAC (an initial set of analysis tools was presented during Phase 1, which to the extent practicable, will be held consistent for Phase 2 analyses). Toolsets and metrics applied for each measure will be detailed in the noise protocol. Examples include: (1) Number of Events Above (NA) and Time Above (TA) analyses above a series of thresholds (to be determined) and presented in tabular format; (2) DNL color gradient maps; (3) NA and TA maps for selected grid points and thresholds; (4) flight corridor maps overlaying radar data on INM flight tracks for various aircraft groupings (e.g., heavy jets and RJs); (5) Daytime Level (DL) and Nighttime Level (NL) analysis; (6) Lmax values at selected grid points; (7) Case SEL (and corresponding Sound Exposure, E) values at selected grid points; and (8) distributed range of aircraft altitudes at selected grid points (location of interest - point of closest approach analysis). Appropriate metrics for each measure will be determined. Grid points and analysis tools will be selected to allow BOS/TAC/CAC members a better understanding of the benefits and adverse impacts of the measure. As necessary, supplemental metrics that require post-processing of INM data or the generation of additional data will be completed.[18] Preliminary results will be discussed with the IC. Population and housing counts will be completed within the DNL contours as well as any other demographic analysis required for environmental justice review. In addition, indications of potential environmental justice

[18] Tools to be used in this step will be detailed in the noise protocol developed in Task 5; any approvals required by FAA AEE will be obtained prior to use.

impacts or constructive use of DOT Section 4(f)/303(c) properties or historic properties will be identified.

The analysis will be conducted on a dual-track basis. The environmental effects of each measure will first be presented on an individual basis, allowing the BOS/TAC/CAC to better understand the implications of going forward with an individual procedure. BOS/TAC/CAC will assess the information and determine for each measure whether to discard or retain for further analysis. Measure-specific considerations will be identified during the scope re-assessment, which occurs prior to Level 3 screening. In addition, to properly assess the combined effect of the individual measures, a combined analysis of all measures in a single noise analysis will be conducted (refer to Task 6.4.4 below).

PC Activities:

- Coordinate with IC on the development of assumptions and results.
- Conduct noise modeling for each measure using the latest available version of the INM.
- Assess and document potential impact of each measure in terms of noise exposure to population and sensitive land uses.
- Identify potential environmental justice issues.
- Identify potential impacts to DOT Section 4(f)/303(c) properties or historic properties.
- Coordinate results with BOS/TAC/CAC.

IC Activities:

- Coordinate with PC on the development of assumptions and results.
- Peer review all noise model input and output files prepared by the PC for every case evaluated.
- Coordinate with CAC to describe input and output results.
- Participate in BOS/TAC/CAC meetings and presentations.

6.4.4 Preferred Alternative Development

Criteria will be developed, defined, and agreed upon in conjunction with BOS/TAC/CAC to determine the benefit or impact of the measures when considered individually, as a whole, or in subsets/groupings. ~~Simulation modeling will be conducted to calculate metrics associated with operational and user impact, which will be made available to BOS/TAC/CAC members for their use in identifying measures to be recommended for implementation.~~ Noise modeling will be conducted and compared to the baseline and future No Action noise results to determine the effect of combining the measures retained through all of the previous screening analyses together, or the effect of combining some of the measures into subsets or groups. This analysis is required to determine if implementation of all of the recommended measures together would effectively alleviate noise impacts or introduce new noise impacts in other areas. This evaluation will also include Phase 1 measures that were implemented. For purposes of scope development, it is assumed that two (2) combined alternative scenarios will be modeled.

A comparative analysis of the alternatives indicating both positive and negative impacts on airport operations, noise conditions, population, sensitive land uses, environmental justice issues,

DOT Section 4(f)/303(c) properties, and historic properties will be developed, both for the individual measures and for the combined alternative scenarios. This information will be presented in both tabular and graphic format for review by BOS/TAC/CAC and the IC.
The PC will hold two web-based meetings with BOS/TAC/CAC during the Level 3 screening analysis process to discuss how the alternatives will be analyzed and present preliminary findings of the analysis. The PC will present the final findings of the Level 3 screening analysis to BOS/TAC/CAC. BOS/TAC/CAC will assess the information and recommend a package of measures as the Proposed Action for implementation.

PC Activities:

- Identify and define criteria to be utilized in coordination with FAA and BOS/TAC/CAC.
- Coordinate with IC on the analysis of alternatives.
- Conduct and document an alternatives evaluation analysis based on criteria agreed upon by FAA and BOS/TAC/CAC.
- ~~Conduct simulation modeling of combined measures.~~
- Conduct noise modeling of combined measures.
- Conduct an environmental justice analysis of combined measures.
- Conduct a DOT Section 4(f)/303(c) impact analysis of combined measures.
- Conduct a historic properties impact analysis of combined measures.
- Identify and document alternatives eliminated from further consideration.
- Identify and document alternatives retained for further consideration.
- Hold 2 web-based meetings with BOS/TAC/CAC to discuss process and present preliminary findings.
- Present final findings to BOS/TAC/CAC for recommendation to Massport.

IC Activities:

- Coordinate with PC on the selection of measures for inclusion within combined scenarios.
- Peer review the PC's analysis and documentation of combined alternative scenarios.
- Coordinate with CAC.
- Participate in BOS/TAC/CAC meetings and presentations.

7. SCOPE OF SERVICES – PHASE 3

7.1 PRAS Objectives

The PC working with the IC will facilitate and support when necessary a strategy discussion involving the FAA, Massport, and the CAC on the Preferential Runway Advisory System (PRAS). If necessary, this will include a development of a scope of technical work on developing a new PRAS for further study in Phase 3. If the FAA, Massport, and CAC decide not to proceed with PRAS, then the PC will produce a short summary memorandum reviewing the discussion and decision points.

PC Activities:

- Attend one separate meeting with the FAA, Massport, and CAC to facilitate discussion on PRAS.
- Prepare draft memorandum summarizing the PRAS discussion and decisions on whether PRAS should be continued, and if so, FAA, Massport, and CAC's objectives for a revised PRAS.
- Participate in one teleconference with FAA, Massport, BOS/TAC/CAC, and IC to review comments on the draft memorandum and finalize any discussions/decisions on PRAS.
- Finalize memorandum after receipt of comments from FAA, Massport, CAC, and IC.

IC Activities:

- Participate in meeting with the FAA, Massport, CAC, and PC on PRAS discussion.
- Review draft memorandum summarizing the PRAS discussion and decisions.
- Participate in teleconference to review draft memorandum and finalize any discussions/decisions on PRAS.
- Review final memorandum on PRAS.

7.2 Develop Phase 3 Scope of Services

Based on Phase 2 study findings and the outcome of the PRAS discussion in Task 7.1, prepare a draft scope of services for Phase 3. Phase 3 may include an examination of Massport's PRAS to determine potential runway use goals and objectives that could minimize aircraft noise on near-by communities, and will include the development by FAA of either an EA or EIS documenting and considering the potential environmental impacts of the measures recommended by CAC and Massport for implementation.

The Phase 2 study findings will define the measures and projects to be evaluated in the FAA's environmental document.

PC Activities:

- Meet with the FAA and BOS/TAC/CAC to establish framework for scoping Phase 3.
- Participate in scoping meeting with the FAA and BOS/TAC/CAC.
- Prepare draft scope, budget and schedule for Phase 3 in collaboration with the FAA and IC.

- Meet with the FAA and BOS/TAC/CAC to review the proposed Phase 3 work plan.
- Revise work plan, as necessary.

IC Activities:

- Participate in scoping meeting with the FAA, BOS/TAC/CAC, and PC.
- Prepare draft scope, and budget for Phase 3 IC activities in collaboration with the FAA, PC, and CAC.
- Meet with the FAA and BOS/TAC/CAC to review the proposed Phase 3 work plan.
- Revise work plan, as necessary.

List of Abbreviations

AAD	Annual Average Day
AEE	FAA Office of Environment & Energy
AGL	Above-Ground Level
ALPA	Air Line Pilots Association
ATC	Air Traffic Control
ATCT	Airport Traffic Control Tower
ATO	FAA Air Traffic
BOS	Boston Logan International Airport
BOS/TAC	Boston Technical Advisory Committee
CAC	Logan Airport Community Advisory Committee
C.F.R.	Code of Federal Regulations
CY	Calendar Year
dB	Decibel
DEIS	Draft Environmental Impact Statement
DL	Daytime Average Sound Level
DNL	Day-Night Level
DOT	Department of Transportation
E	Sound Exposure
EA	Environmental Assessment
EIS	Environmental Impact Statement
FAA	Federal Aviation Administration
FEIS	Final Environmental Impact Statement
FMS	Flight Management System
FONSI	Finding of No Significant Impact
FSG	Flight Segment Generator
GFDR	Global Flight Data Record
GIS	Geographic Information Systems
IC	Independent Consultant
IMC	Instrument Meteorological Conditions
INM	Integrated Noise Model
LDA	Localizer Directional Aid
Leq	Equivalent Sound Level
LTO	Landing and Takeoff
Lmax	Maximum Sound Level

MassGIS	Massachusetts Geographic Information Systems
NA	Number of Events Above
NDADS	Noise Data and Display System
NEPA	National Environmental Policy Act
NIRS	Noise Integrated Routing System
NL	Nighttime Average Sound Level
OAG	Official Airline Guide
PC	Project Consultant
PMAD	Peak Month Average Day
PRAS	Preferential Runway Advisory System
QA	Quality Assurance
QC	Quality Control
RJ	Regional Jet
RNAV	Area Navigation
ROD	Record of Decision
SEL	Sound Exposure Level
TA	Time Above
TAAM	Total Airspace and Airport Modeler
TAF	Terminal Area Forecast
TRACON	Terminal Radar Approach Control Facility
U.S.C.	United States Code
VMC	Visual Meteorological Conditions