

**Soundproofing 101:
A presentation to the MCAC
Environment and Health
Subcommittee**

March 18, 2019



Content

- Overview of How Logan Works
- Noise Abatement Program
- Soundproofing Regulatory Context
- Soundproofing Process
- History of the Program and Current Status
- Questions/Discussion

The FAA uses Logan runways in combinations to safely and efficiently meet demand. Depending on which sets of runways the FAA chooses different communities are overflowed



Because of Logan's urban location, Massport has developed a comprehensive noise abatement program for Logan Airport

- Noise abatement departure procedures
- Late night runway preference opposite direction operations
- Decibel restriction on R4L departures and 22R arrivals
- Unidirectional/wind restriction use R14/32
- Soundproofing Program for Homes and School
- Engine run-up restrictions
 - Limited time
 - Specific locations
- Towing requirements for certain aircraft repositioning
- Encourage use of single engine taxiing and reverse thrust
- 24/7 noise complaint line 617-561-3333
- State of the art Noise Monitoring System
- Near live flight tracking on website
 - http://www.massport.com/environment/environmental_reporting/Noise%20Abatement/overview.aspx



Noise Contours for environmental analysis and soundproofing must be created by using the FAA's Airport Environmental Data Tool (AEDT) Model

- The AEDT is an FAA Model
- Critical inputs include number of flights, aircraft types, runway use and flight tracks
- Changes to the model must be approved by the FAA (technical work supported by Volpe Center)
- Under the INM (Integrated Noise Model), Massport sought and received approvals for changes to reflect local topography (water, hills) and operations (takeoff roll adjustment)
- FAA concluded these adjusted were not appropriate for the AEDT

Soundproofing, Policy Considerations

- FAA has established a strict regulatory framework that airports are required to follow
- Under FAA regulatory policy, noise-sensitive land uses (e.g. homes) located outside the DNL 65 are not considered to be significantly impacted by airport related noise and, therefore, are not eligible for mitigation funding
- New noise model has been issued by FAA called AEDT which must be used to calculate an updated contour
- FAA does allow for some minor adjustment to the contour to control for local land use
- There are two hurdles to qualify:
 1. Residence must be within the 65 DNL, and
 2. Residence must meet pre-test criteria that determines if the home will benefit from soundproofing. The FAA has adopted an interior noise level of 45 dB of only habitable areas of a home: interior, aviation only noise with windows closed must be more than 45 dB for it to receive soundproofing and benefits of soundproofing must exceed 5db

Process for Soundproofing Homes

- Update AEDT modeling of 65 DNL Contour
- Massport adjusts model for landuse and submits to FAA for approval of adjusted 65 DNL contour
 - FAA approved contour is designated as the Noise Exposure Map for soundproofing
- MPA staff estimates number of homes and budget for grant application
- Based on expected noise grants, staff develops design and construction program
 - Construction priority based on highest impacted and other considerations such as type of housing
- MPA notifies residents to be enrolled (for design and construction)
 - Residents that are eligible but not in design/construction cycle are not contacted.
 - MPA responds to these inquiries w/ “contingent on federal funding and eligibility” caveat
- MPA completes program subject to FAA grant availability and requirement to update Noise Exposure Map

EXAMPLE

Noise Exposure Map and Adjustment for Land Use

Chelsea Mitigation Soundproofing Program
October 16, 2006



Boston Logan Airside Improvements Planning Project
Mitigation Contour in Chelsea

Alt. 1A, 29 million low with noise restriction on R 14/32 adjusted for land use

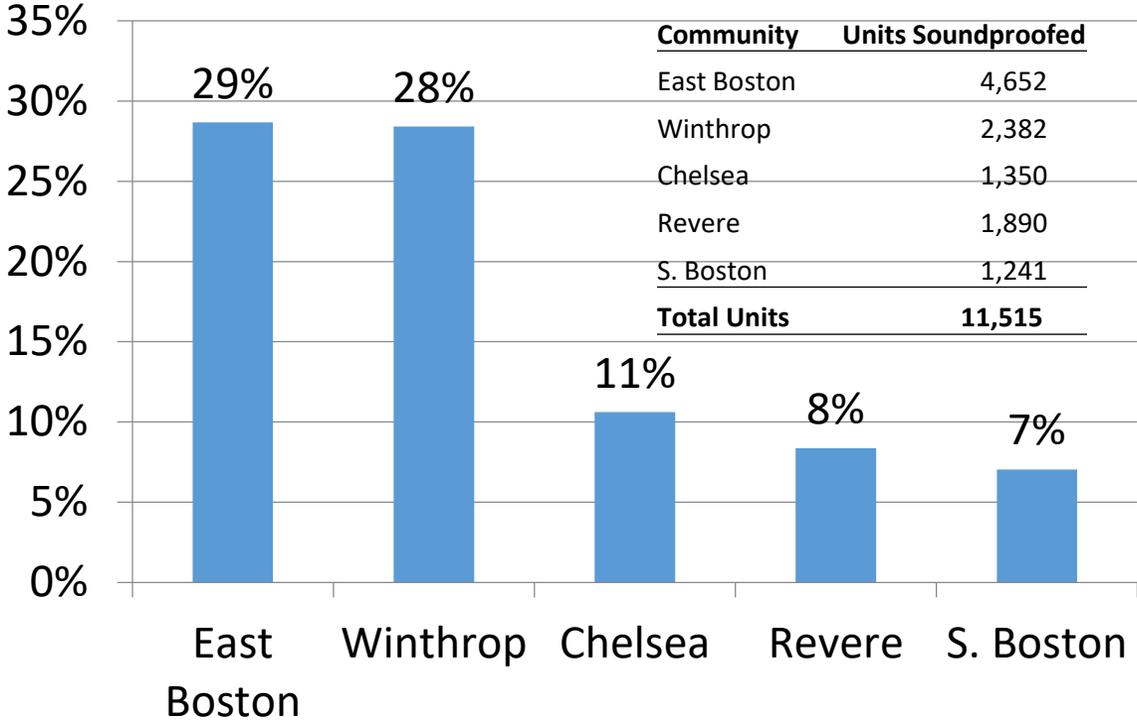


HARRIS MILLER MILLER & HANSON INC.

Begun in 1985, Massport was one of the first airports in the nation to undertake a residential and school soundproofing program

- Eligibility based on FAA criteria of 65 DNL or higher
- Over 5,400 homes or 11,500 dwelling units
- 36 schools
- Program participation rate about 90%
- Over \$170M in investment

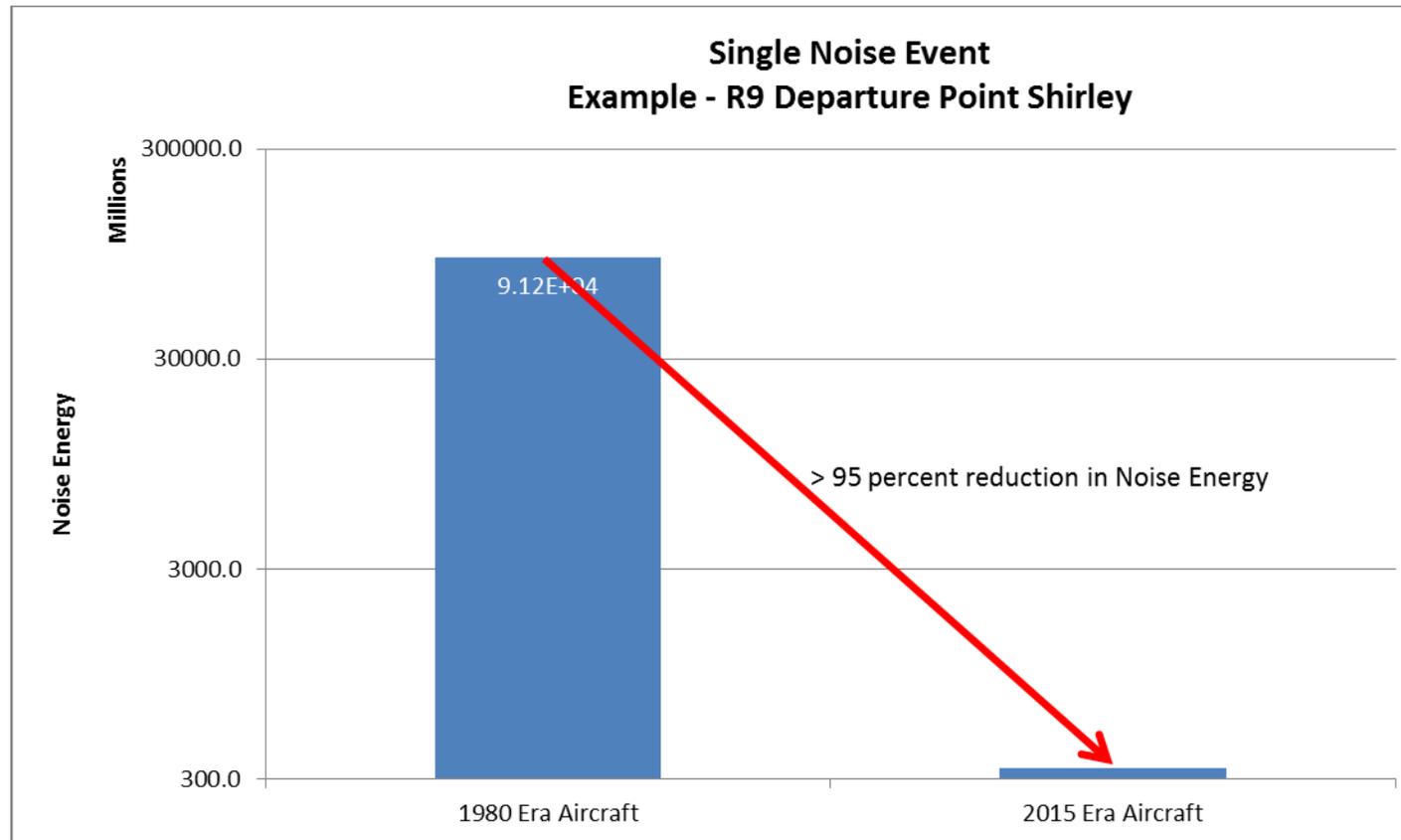
Percent of total housing units soundproofed by community



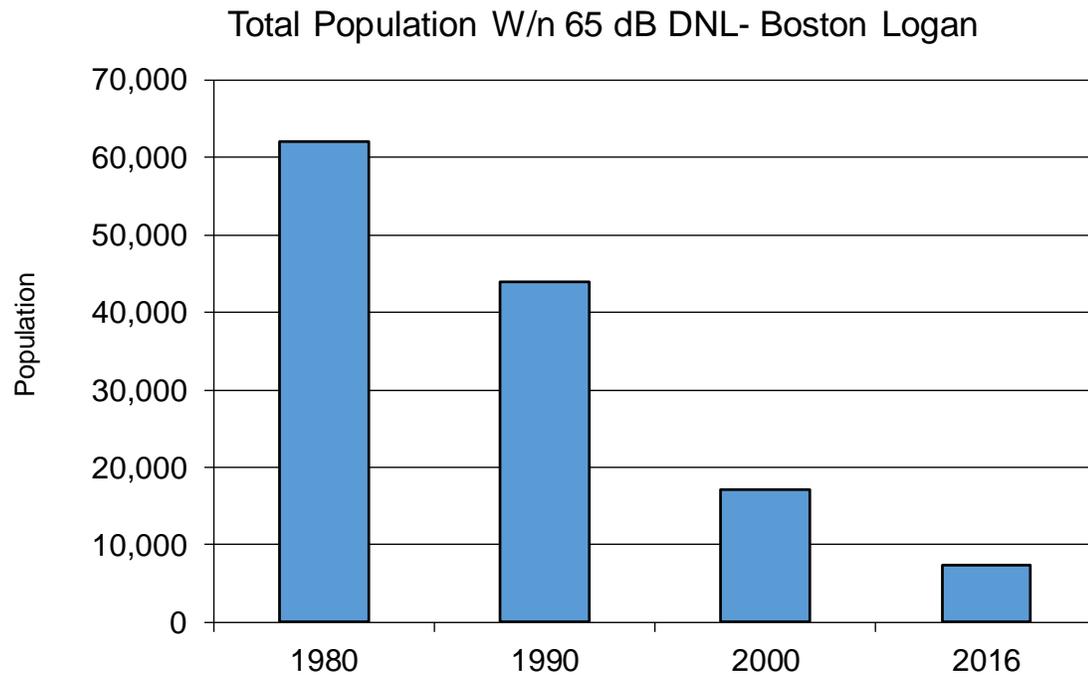
Source: 2010 Census and Massport

Due to the phase-out of older aircraft and new engine technology noise has been reduced significantly since the 1980s

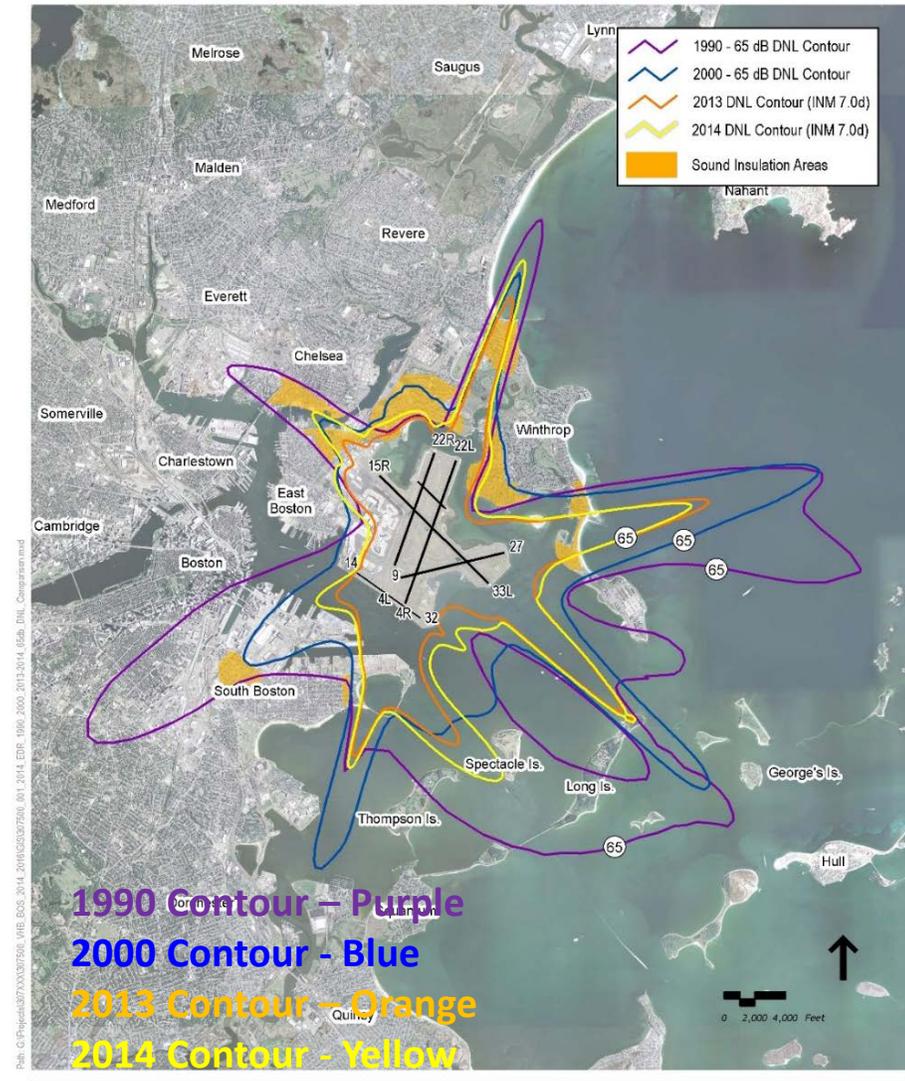
In the 1980s a typical aircraft at Logan was the B727-200. Today a typical aircraft is the A320 or B737-8. Point Shirley is located in Winthrop.



As a result, the population within Logan's 65 dB DNL contour has dropped over the long term



Note. 2016 reflects new FAA model (AEDT). Required by FAA for all environmental filings and soundproofing.



Comparison of Historical and Current 65 dB DNL Contours - 1990, 2000, 2013, and 2014

About 3,300 housing units reside within the latest (2016) 65 DNL Contour. Since many homes have already been soundproofed, only a limited subset are eligible today...

Next Steps

- ESPR Filing (Summer 2019)
- FAA Approval of Contour with adjustments
- Identify homeowners that qualify based on FAA approved contour
- Notify and proceed with program

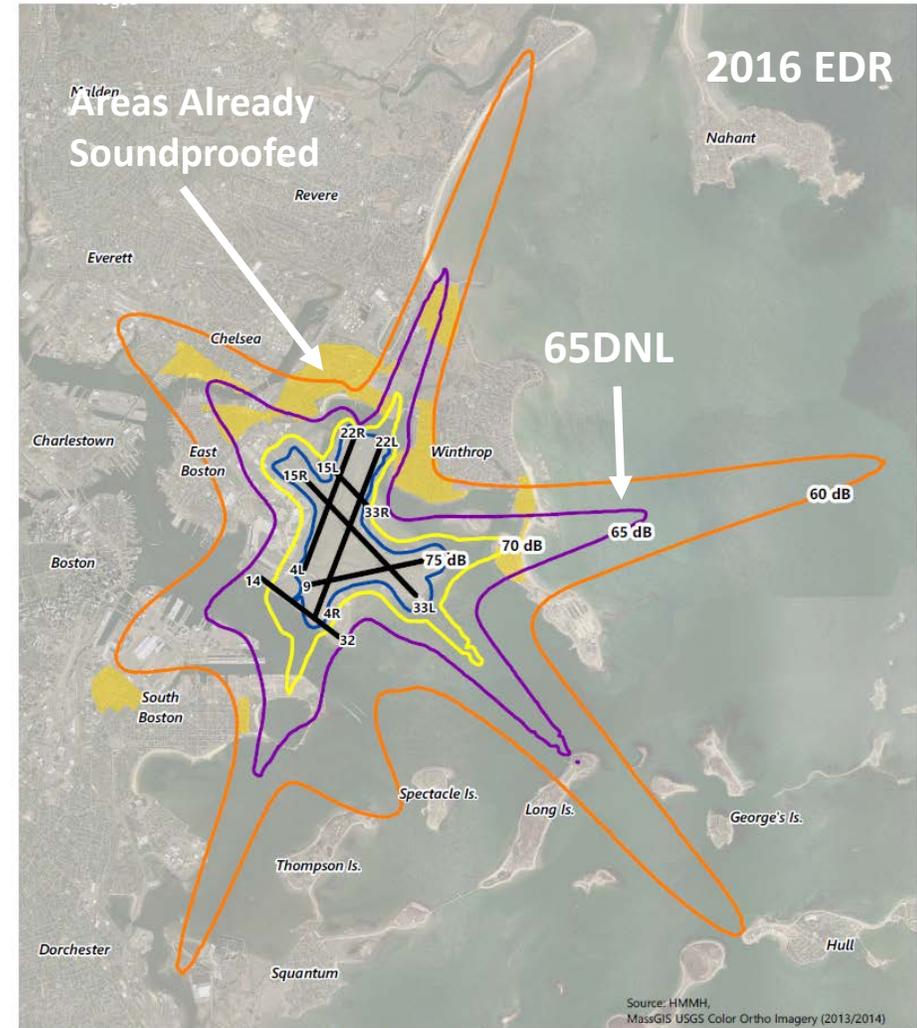
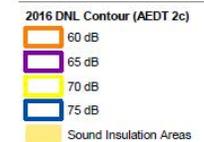


FIGURE 6-13 60-75 DNL Contours for 2016 Operations Using AEDT 2c

2016 Environmental Data Report



History of Program and Soundproofing Process



Figure 5.1

LOGAN INTERNATIONAL AIRPORT

Annual Average L_{DN} Contours
for 1976 Operations
65, 70, 75 and 80 dB

**1976 Boston Logan
DNL Contour**

Scale

1" = 5333'



NORTH

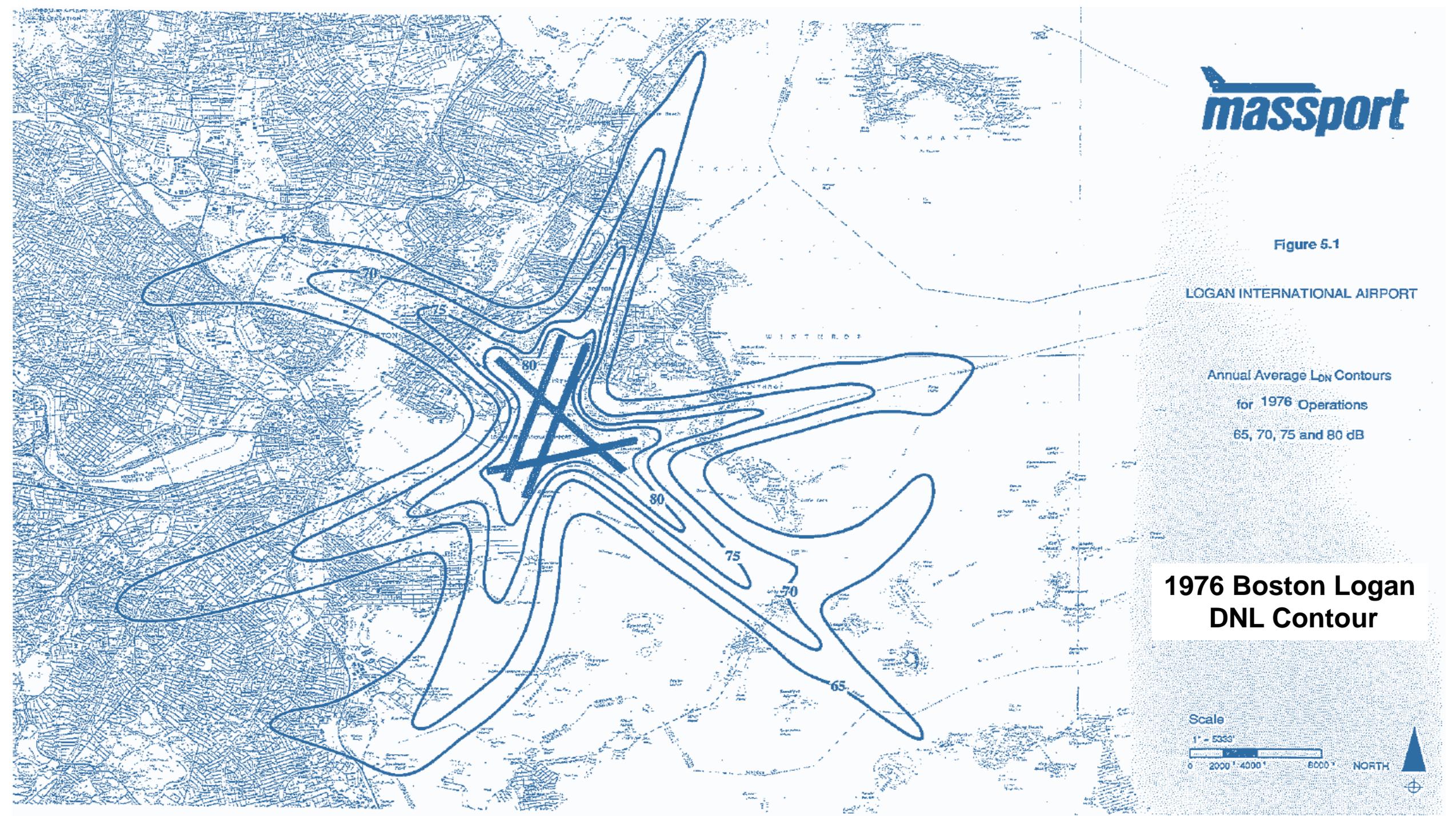




Figure 5.3

LOGAN INTERNATIONAL AIRPORT

Annual Average L_{dn} Contours
for 1985 Operations
65, 70, 75 and 80 dB

**1985 Boston Logan
DNL Contour**

Scale

1" = 5000'



NORTH



Residential Sound and Insulation Program

- The Program's goal is to reduce noise in the primary living spaces of your home by installing Noise Reduction improvements that may include door and window upgrades, as well as additional treatments that include an optional "Room of Preference" (ROP).
- Work undertaken through the Mitigation Soundproofing Program is limited to improvements which reduce interior noise levels in the home. Structural repairs, maintenance items, rehabilitation work and weatherization needs which are not directly related to noise reduction are not part of this program.



Program Purpose: Eliminating Noise Paths

- Sound follows the path of least resistance.
- The most critical areas in sound insulating a home are penetrations in the home's exterior surfaces such as doors, windows and roof vents.
- Sound Insulation refers to acoustical treatments which reduce noise inside the home. Although certain types of building structures already provide better sound insulation than others (ex.: brick structures provide a better noise buffer than wood frame construction), both types of structures benefit after the installation of the sound insulation treatments at the "noise paths" described above.



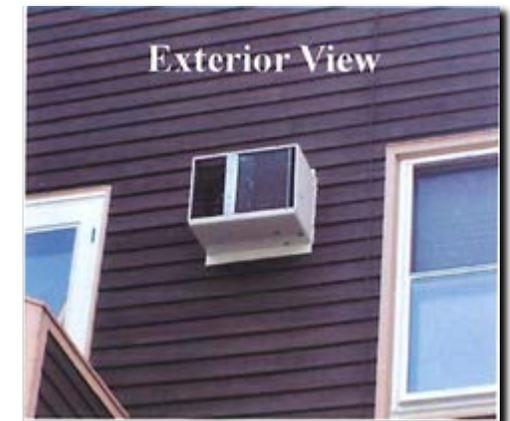
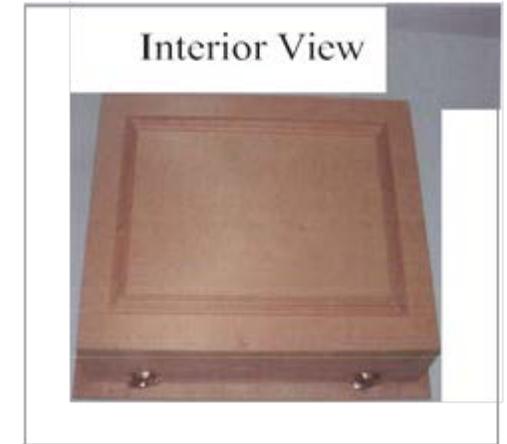
The Basics of Sound Insulation

- **Windows:** Typical treatment consists of replacing existing loosely fitted windows with new tight-fitting, energy efficient, double glazed vinyl or wood windows with combination storm windows. Treatment also includes acoustical caulking and the removal of weights from cavities (where existing) in order to add additional insulation.
- **Doors:** Similar to windows, doors can also be noise paths into your home. Existing loosely fitted doors, leading into primary living spaces, may be replaced with new tighter-fitting solid core wood doors. If deemed necessary, storm doors may also be added or replaced.
- **Ceilings:** Where existing ceilings fail to provide an adequate noise barrier. A new ceiling may be added.
- **Treatment Decisions:** Determination of whether treatment is acoustically necessary at your doors, windows and ceilings will be based on acoustical measurements and/or the architect evaluation of existing conditions.



Basic Sound Insulation Treatments

- **Through-wall Air Conditioner Sleeve and Cover:** In a room of your choice, a wall air conditioner sleeve and sound insulating cover can be installed. The homeowner is responsible for providing the "through-wall" air conditioner. One new sleeve and cover is allowed per dwelling unit.
- Where through-wall air conditioners already exist, new interior sound insulating covers will be provided.
- Certain buildings of masonry construction (brick) may not be eligible for through-wall treatments.



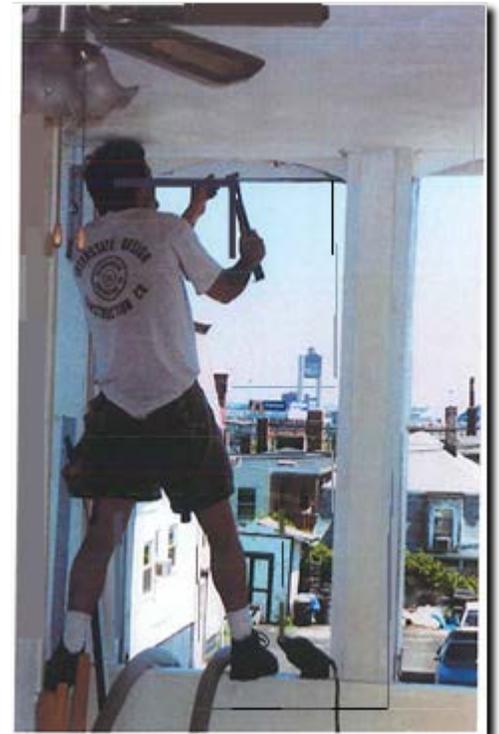
Room of Preference

- As an extra measure of Sound Insulation, the program offers the option of Room of Preference (ROP) treatment for one room in each dwelling unit. This treatment significantly reduces noise by as much as 80%.
- ROP treatment is achieved by treating the exterior walls and possibly the ceiling. Wall treatment includes building a secondary wall that will project five inches inside of any exterior walls in the room.
- Because of the additional wall, typical treatment also includes the installation of a secondary window resulting in two prime windows with one storm window.
- Existing radiators, baseboards and electrical outlets, etc., will be relocated by the contractor. However, the home owner will be responsible for making any corrections required to meet code standard, such as additional electrical outlets or structural repairs.



Steps for Homeowners

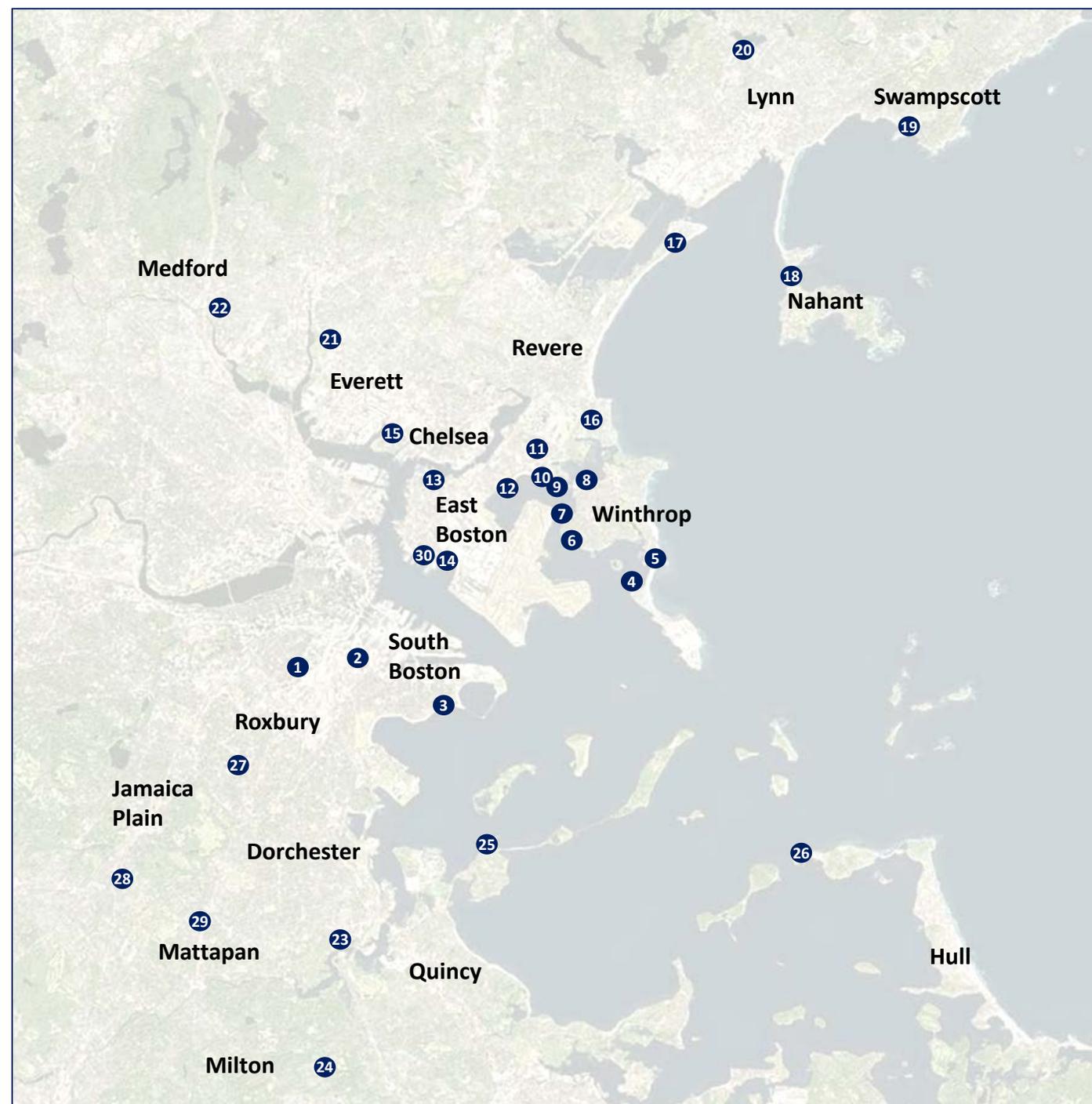
1. Homeowner receives application
2. Assessment Visit - Recommendations & Selections. Architect must have access to all floors.
3. Sub-consultant visits - Acoustical, Mechanical, Structural, and others if applicable
4. Homeowner Pre-work completion period (if applicable)
5. Final Design - Home Owner Agreement signed
6. Contractor Bid, Award & Construction Scheduling
7. Contactor Pre-walks - field measuring/order products. Contractor must have access to all floors, please notify tenants in advance.
8. Construction - Contractor must have access to all floors
9. Acoustical Post-Testing
10. Warranty Issued



NOISE MONITORING TERMINALS (NMTs)

NOISE MONITORING TERMINAL LOCATIONS

1. Andrews Street, South End
2. B and Bolton, South Boston
3. Day Blvd. near Farragut, South Boston
4. Bayview and Grand View, Winthrop
5. Harborview and Faunbar, Winthrop
6. Somerset near Johnson, Winthrop
7. Loring Road near Court, Winthrop
8. Morton and Amelia, Winthrop
9. Bayswater near Annavoy, East Boston
10. Bayswater near Shawsheen, East Boston
11. Selma and Orient, East Boston
12. East Boston Yacht Club
13. East Boston High School
14. Jeffries Point Yacht Club, East Boston
15. Admiral's Hill, Chelsea
16. Bradstreet and Sales, Revere
17. Carey Circle, Revere
18. U.S.C.G. Recreational Facility, Nahant
19. Smith Lane, Swampscott
20. Pond and Towns Court, Lynn
21. Tremont near Prescott, Everett
22. Magoun near Thatcher, Medford
23. Myrtlebank near Hilltop, Dorchester
24. Cunningham Park near Fullers, Milton
25. Squaw Rock Park, Quincy
26. Hull High School near Channel St., Hull
27. Boston Latin Academy, Roxbury
28. Southbourne Road, Jamaica Plain
29. Lewenburg School, Mattapan
30. Piers Park, East Boston



Questions\Discussion