



KING COUNTY

1200 King County Courthouse
516 Third Avenue
Seattle, WA 98104

Signature Report

October 15, 2002

Motion 11600

Proposed No. 2002-0337.3

Sponsors Phillips

1 A MOTION to adopt the King County International
2 Airport's Federal Aviation Regulation Part 150 Noise and
3 Land Use Compatibility Study; and to accept and allocate
4 federal government grants for implementing study
5 recommended program and projects.

6
7

8 WHEREAS, King County International Airport (KCIA) was designated by the
9 National Air Transportation Association as one of America's "100 Most Needed" airports
10 in January 2001 because of its strategic proximity to competitive markets nationally and
11 globally, and

12 WHEREAS, KCIA is a vital general aviation resource within the regional and
13 national airport system that enhances the productivity of King County businesses through
14 the speed and flexibility which air transportation offers in a fast-paced global economy,
15 and

16 WHEREAS, KCIA is a major employer and contributor to the regional economy,
17 with an impact in excess of \$1 billion annually. Employment attributable to KCIA

18 businesses include thousands of engineers, machinists, and other professionals who
19 contribute significantly to the state and regional economies, and

20 WHEREAS, It is essential to the well being of the entire community that aviation
21 industry operations be welcomed and supported by public policy and, at the same time,
22 that every effort is made to address the noise impacts on residents due to operations at
23 KCIA, and

24 WHEREAS, KCIA, commonly known as “Boeing Field,” serves The Boeing
25 Company and its employees as a delivery or flight test center for the 737, 747, 757, 767
26 and its newest 777 model aircraft, and is also a potential site for testing new generations
27 of aircraft, and

28 WHEREAS, KCIA aviation companies and Federal Aviation Administration are
29 researching an innovative air navigation concept called Required Navigation
30 Performance (RNP) that will significantly increase efficiency in the airways and allow
31 airplanes to more precisely fly noise abatement paths, and

32 WHEREAS, KCIA tenants will participate in the Fly Quiet Program that includes
33 pilot education and incentive programs which will improve flight performance and
34 reduce noise, and

35 WHEREAS, it is a high priority of King County to demonstrate the feasibility and
36 appropriate siting of a Ground Run-up enclosure (hush house) because of its potential to
37 enhance efficient aircraft testing while securing aviation related jobs and reducing noise
38 for residents of Georgetown and Beacon Hill, and

39 WHEREAS, KCIA, through an FAA-funded sound insulation program for homes,
40 schools, and public buildings, will reduce the effect of noise on a large number of people
41 living and working near the airport, and

42 WHEREAS, KCIA tenants have been cooperative and support the
43 recommendations as being consistent with the promotion of aviation jobs while being
44 “good neighbors to the community,” and

45 WHEREAS, in 1995 the King County council adopted Motion 9709 to request the
46 county executive to develop night noise restrictions at King County International Airport,
47 and

48 WHEREAS, in July 1997 the county council established the King County
49 International Airport roundtable advisory committee, including community members to
50 advise on the development of master plans and noise studies, and

51 WHEREAS, in October 1998 the county council adopted a noise reduction work
52 pan to guide the airport’s Federal Aviation Regulation Part 150 Noise and Land Use
53 Compatibility Study, and

54 WHEREAS, King County International Airport initiated the Part 150 in June
55 1999 and expanded the Roundtable to include local jurisdictions, Puget Sound Regional
56 Council, Sea-Tac International Airport and Federal Aviation Administration members as
57 part of a study advisory committee, and

58 WHEREAS, the study advisory committee completed its work in January 2002
59 and the county executive’s report was completed in July 2002, and

60 WHEREAS, the study and county executive’s recommendations are:

61 A. To develop combined noise contours with Sea-Tac International Airport;

62 B. The airport is to work with the appropriate federal agencies, local
63 jurisdictions, tenants, and community to implement a public instrument approach
64 procedure over Elliott Bay to avoid over-flight of residential areas;

65 C. To implement close-in departure procedures for North departures;

66 D. To investigate the viability of undertaking a Part 161 Study for Stage 2 jets;

67 E. To upgrade flight tracking and noise monitoring program (fly quiet program);

68 F. To maintain the existing curfew on nighttime engine run-ups;

69 G. To conduct a site selection and feasibility study for a ground run-up enclosure;

70 H. To establish building design/placement standards to reduce off-airport noise
71 effects from aircraft movements on the ground;

72 I. To provide for a variety of sound attenuation for single-family residential,
73 schools and public building, purchase of avigation easements and sales transaction
74 assistance in the 65 and 70 DNL contours;

75 J. To insulate schools and public buildings; and

76 K. To investigate voluntary purchase of homes with the 70 DNL using program
77 that are not available through federal programs, and

78 WHEREAS, the study advisory committee recommendations are parallel with the
79 county executive's recommendations with the exception of a capital improvement project
80 for a north field sound wall, and

81 WHEREAS, the county executive's and study advisory committee's
82 recommendations are in compliance with county council direction to develop a noise
83 reduction work plan; and

84 WHEREAS, the county council recognizes that the study's recommendations
85 predict an increase in the overall noise levels from King County International Airport
86 operations, and

87 WHEREAS, the county council supports continued efforts to reduce noise levels
88 from King County International Airport operations;

89 NOW, THEREFORE, BE IT MOVED, by the Council of King County:

90 A. The King County International Airport Federal Aviation Regulation Part 150
91 Noise and Land Use Compatibility Study, and county executive's recommendations be
92 adopted;

93 B. The King County International Airport/Boeing Field Noise Compatibility
94 Program be implemented;

95 C. The county council strongly supports the importance of protecting existing
96 jobs, creating new family-wage jobs, strengthening our economy, and seeking prosperity.
97 The county council urges that all persons implementing the recommendations of this
98 motion do so in such a way as to keep attention on the goals of protecting jobs, creating
99 jobs, strengthening our economy, and seeking prosperity; and

100 D. The airport shall develop and accept Federal grants for program
101 implementation.

102 BE IT FURTHER MOVED, that the document entitled, "SPEEA Concerns and
103 Recommendations for Part 150 Noise Study Recommendations," dated October 8, 2002,
104 be added as attachment B to the motion and referred to the Study Advisory Committee
105 for consideration and possible adoption as a minority report. The Study Advisory
106 Committee is also requested to review the concerns raised in the attachment for

Motion 11600

107 substantive issues that may result in modifications to the part 150 recommendations and
108 to report back to the county council within sixty days with the results of its review
109 including any such modifications that it recommends.
110

Motion 11600 was introduced on 7/29/2002 and passed as amended by the Metropolitan King County Council on 10/14/2002, by the following vote:

Yes: 12 - Ms. Sullivan, Ms. Edmonds, Mr. von Reichbauer, Ms. Lambert, Mr. Phillips, Mr. Pelz, Mr. McKenna, Mr. Constantine, Mr. Pullen, Mr. Gossett, Ms. Hague and Ms. Patterson
No: 0
Excused: 1 - Mr. Irons

KING COUNTY COUNCIL
KING COUNTY, WASHINGTON


Cynthia Sullivan, Chair

ATTEST:



Anne Noris, Clerk of the Council

Attachments A. King County International Airport Part 150 Noise Study Binder, B. SPEEA Concerns and Recommendations for Part 150 Noise Study Recommendations, dated October 8, 2002

**Attachment A. Available in
the Clerk's Office.**

Attachment B
Dated October 8, 2002

Society of Professional Engineering Employees in Aerospace
Concerns and Recommendations for Part 150 Noise Study Recommendations

While SPEEA leadership and members endorse the majority of the Executive's recommendations, they are strongly opposed to four recommendations. It is SPEEA's view that these recommendations are likely to have a subtle but very negative effect on The Boeing Company and give further impetus to moving family-wage jobs out of the Puget Sound area. The comments below state SPEEA's concerns and recommendations. Overall, SPEEA recommends that these items be referred back to the Study Advisory Committee (SAC) for further review, study and reconsideration, prior to Council action.

EXECUTIVE RECOMMENDATION FOUR: Implement ban on Stage 2 jets at night.

Just to clarify what is under consideration, this recommendation needs to be restated to clarify that it relates to business jets below 75,000 pounds. It should also refer to "stage two-type" technology since there is technically no classification of stage two business jet.

Comments/Observations

- A Part 161 study to attempt to implement such a restriction at Boeing Field would be expensive, costing from \$1-2 million, take a long time and have virtually no chance of succeeding.
- In the last 20 attempts to put similar bans in effect at airports in other communities, none have been approved by the FAA and one part of one study was partially implemented by court order based on a grandfathered ordinance not applicable at KCIA.
- Any such attempt will be viewed in the aviation and business community as an anti-aviation attitude and have a negative impact on future plans to attract business, particularly given the reality that Boeing is moving significant activity out of this area.
- In the very unlikely event that a 161 would be successful, only one or two flights per night would be banned.
- As the major tenant at King County International Airport (KCIA), The Boeing Company would end up providing the majority of funding for an expensive, useless study, taking valuable funding away from much needed airport improvements that benefit all aviation interests. Limited cash flow has forced the airport to bond for capital improvements in recent years, where this practice was never needed in the past.

SPEEA Recommendation: Delete Recommendation Four

EXECUTIVE RECOMMENDATION SIX: Maintain existing curfew on nighttime engine run-ups.

Comments/Observations

- Running of engines at moderate levels above idle is often required for maintenance, new airplane delivery and testing purposes. The economic impacts of restricting this activity hurts the economic competitiveness of The Boeing Company and other aviation interests. It is essential to what we do.
- King County ARFF officers have in the past issued noise citations to The Boeing Company and caused managers to issue restrictive internal procedures that limit engine run-ups and cause inefficiencies in operations.
- The Boeing Company is reluctant to admit that “voluntary restrictions” do affect flight test operations since they want to be a good neighbor and minimize community impacts. The unfortunate outcome may be to move flight test operations to a less densely populated area, depriving this region of much needed jobs.
- Noise levels of engines have dropped considerably over the last few years and are continuing to drop.
- Technology now exists to establish the amount of noise levels at any distance and direction from any site on Boeing Field for any power setting.

SPEEA Recommendation: Allow engine run-ups at night based on specific “reasonable” noise levels that have minimal community impacts. Work with KCIA to quantify “reasonable” noise levels.

EXECUTIVE RECOMMENDATION NINE A: Provide a variety of options for people living in the 65 and 70 DNL KCIA contours, including purchase of avigation (noise) easements, sound attenuation and sales transaction assistance. [This recommendation is intended to prioritize residents who are within the KCIA noise contours only for early/first implementation.]

EXECUTIVE RECOMMENDATION NINE B: Provide variety of options for people living in the 65 and 70 DNL combined KCIA/Sea-Tac contours including purchase of avigation (noise) easements, sound attenuation and sales transaction assistance. [This recommendation is intended to address residences in the combined SeaTac/KCIA noise contours after those in the KCIA contours.]

Comments/Observations

- SPEEA is in agreement to insulate for noise between 65 and 70db contours.
- A clear understanding of what the recommendation means should be broken down to address such questions as:
 - What is to be done about noise above 70DNL?
 - What is the financial exposure to the County and airport users to insulate/purchase avigation easements/provide sales assistance for residences built after 1998? These residences are specifically excluded from FAA funding for any required noise remedy, so the County is assuming an unusual obligation.
 - What is the true number of resident owners?
 - What formal surveys (anonymous, confidential and statistically valid) have been conducted to find out the true preference of the residents and owners for the various options? Many residents would like to sell out, but are afraid to say so in public meetings.

- What constitutes “neighborhood disruption”, per FAA definition?
 - What are the overall economic impacts on the County of the alternative land use options (including possible economic benefits for industrial use)?
- The costs of these actions in Georgetown will also be borne by the tenants at Boeing Field.
 - The business tenants at Boeing Field (including KCIA) are already under severe financial pressure from the effects of Federal restrictions imposed after 9/11.
 - Thousands of SPEEA members’ jobs will be affected by whatever the County recommends to the FAA for their approval. SPEEA hopes an attempt to answer these questions will be made before the County approves the recommendations.

SPEEA Recommendation: Send these two recommendations back to the SAC, airport staff and the consultant to answer the questions so that more informed recommendations can be made.

EXECUTIVE RECOMMENDATION TWO: Implement a public [published] instrument approach procedure with an Elliot Bay ground track to avoid over-flight of residential areas.

Overview/Discussion

SPEEA supports this recommendation, but would like to see it go further. The FAA is steadfastly refusing to approve a Boeing Field visual approach that approximates the SeaTac Elliot Bay visual over water, instead of over neighborhoods. The SeaTac approach has a cloud base limit of 3,100 feet, while the Boeing Field visual approach is 5000 feet. Given Seattle’s inclement weather, this means SeaTac planes can approach over water, while Boeing Field traffic is forced onto the ILS at ~2,200 feet over Magnolia. The FAA’s actions create a constant effort for SeaTac to take over Boeing Field for traffic control purposes and by doing so they want to impose restrictions on Boeing for the benefit of SeaTac. Luckily, a few years ago SPEEA was able to keep SeaTac from such a takeover, which would have been a large threat to SPEEA members jobs.

Furthermore, certified “off-the-shelf” technology (for instance, TLS) now exists that could cut the residential noise pattern of most commercial airports by up to 90 percent. There is a mention of TLS in the report. However, the FAA has been very slow to approve this technology. The national FAA expert on this system resides and works in our community. It is time that knowledgeable County airport officials hear what he has to say. Boeing has a technology that is likely the most important advancement in aviation in the past 40 years and it is certifiable if only the FAA would not be so reticent to change. An internal-to-Boeing announcement of this was made recently about technology that could achieve an Elliott Bay approach and solve noise problems at other

airports in the U.S.¹ The County needs a briefing on this. Jobs will be created in King County if the first applications of these technologies occurs at Boeing Field. This is an unusual opportunity that should not be missed.

SPEEA Recommendation: Add the following sentences to recommendation two: “County elected officials will work with their counterparts at the City of Seattle, State of Washington and Congress to send a joint letter to the FAA urging their prompt but thorough review and certification of new technologies that can provide alternative flight paths that reduce noise on residential neighborhoods. In addition, lowering of the minimums and FAA approach control procedures to accommodate Boeing Field's needs must also be addressed.”

Conclusion

There are other communities who are actively courting The Boeing Company to get family-wage jobs. The company's move to Chicago was a very strong statement that they view themselves as an international company. This also implies that they are becoming less of a Washington State, Puget Sound and King County company. Our workers compete against foreign countries to keep our jobs. As a community, King County must recognize that it too must compete to keep the facilities and the jobs.

The current environment makes it easier to take aerospace jobs out of King County, and for The Boeing Company to entertain potential “suitors”. On a daily basis, SPEEA members are aware of this. Major decisions on off-loading our work to other communities are now being made in Chicago. Bottom line, SPEEA doesn't want to see Boeing leave, and neither does the County.

¹ The Boeing Company's 737 Technology Demonstrator Wins Award: Our Demonstrator (YD501) been chosen to receive a “2002 Best of What's New Award” from Popular Science magazine in the Aviation and Space Category. Each year the publication reviews thousands of products and selects just 100 winners in 10 categories. To win, a product or technology must represent a significant step forward in its category. A statuette will commemorate the achievement, to be publicly announced in November.



**King County
International Airport**

Department of
Construction & Facilities Management

P.O. Box 80245
Seattle, WA 98108

(206) 296-7380
(206) 296-0100 TDD
(206) 296-0190 FAX

February 22, 2002

TO: Ron Sims, King County Executive

VIA: Paul Toliver, Director, Dept. of Transportation *PT*

FR: Cynthia Stewart, Airport Manager *CS*

The King County International Airport (KCIA) has been conducting a Federal Aviation Regulation Part 150 Noise and Land Use Compatibility Study since June 1999. This Study, which involved considerable public process and analysis of dozens of options for mitigation or abatement of noise generated by aircraft that use KCIA, resulted in a 12-part Noise and Land Use Compatibility Program recommendation. That proposed program is forwarded herewith for your transmittal to the King County Council for adoption.

The enclosed package includes a transmittal letter to the Council, a proposed motion, the Airport proposed Noise and Land Use Compatibility Program, the Study Advisory Committee recommendations and the consultant-generated study materials. The Airport is pleased to be recommending all but one of the Study Advisory Committee's recommendations, which in turn were nearly all consensus items.

The Airport is proud of the hard work done over the past two years by the SAC and would like to thank them profoundly for their investment of time, energy and emotion during the time they worked so professionally and respectfully together on these issues. The Airport is also proud of the groundbreaking nationally precedent-setting work done on combined noise contours to measure the cumulative effects of Sea-Tac Airport and KCIA. These combined contours are incorporated into the Study Advisory Committee's recommendations and the KCIA proposed Program.

Under the FAA Part 150 regulations, the Council will need to hold a public hearing on this program recommendation prior to adoption of it via passage of the motion. That hearing has already been tentatively scheduled for Monday, March 18, 2002, subject to timely transmittal of the program information and motion. Following Council adoption, the Airport would transmit the program to FAA for their approval. Upon FAA approval of the program, the Airport will be eligible for federal funding to support the program and will be authorized to spend Airport funds on the program elements.

If you have any questions about the Part 150 Study or these recommendations, please call me at 296-7430.

cc: Ron Brandon, Assistant County Executive
Cal Hoggard, Chief of Staff



Proposed Number XXXXX

A MOTION to adopt the King County International Airport's Federal Aviation Regulation Part 150 Noise and Land Use Compatibility Program and to authorize the King County International Airport to apply for and accept federal government grants for implementing the King County International Airport Part 150 Noise and Land Use Compatibility Program.

Whereas, in 1995 the King County Council adopted Motion 9709 to request the County Executive to develop night noise restrictions at King County International Airport (KCIA), and

Whereas, in July 1997 the County Council established the KCIA Roundtable advisory committee, including community members, to advise on the development of master plans and noise studies, and

Whereas, in October 1998 the County Council adopted a Noise Reduction Work Plan to guide the Airport's Federal Aviation Regulation Part 150 Noise and Land Use Compatibility Study (Part 150 Study), and

Whereas, KCIA initiated the Part 150 Study in June 1999 and expanded the Roundtable to include local jurisdictions, Puget Sound Regional Council, Sea-Tac International Airport, and Federal Aviation Administration members to form a Study Advisory Committee (SAC) for the Part 150 Study, and

Whereas, the SAC completed its Part 150 Study recommendations to the Airport in January 2002 and the Airport completed its recommended Noise and Land Use Compatibility Program based on the SAC recommendations in February 2002, and

Whereas, the Airport's Noise and Land Use Compatibility Program recommendations are to:

1. Develop combined noise contours with Sea-Tac International Airport;
2. Work with the appropriate federal agencies, local jurisdictions, tenants, and community to implement a public instrument approach procedure over Elliott Bay to avoid over-flight of residential areas;
3. Implement close-in departure procedures for North departures;
4. Investigate the viability of undertaking a Part 161 Study for Stage 2 jets;
5. Upgrade flight tracking and noise monitoring program (Fly Quiet Program);
6. Maintain the existing curfew on nighttime engine run-ups;
7. Conduct a site selection and feasibility study for a Ground Run-up Enclosure;
8. Establish building design and placement standards to reduce off-airport noise effects from aircraft activity on the ground;
9. Provide for a variety of sound attenuation alternatives for single family residences, including avigation easements and sales transaction assistance, in the 65 and 70 DNL contours;
10. Insulate schools and public buildings; and

11. Investigate voluntary purchase of homes with the 70 DNL using programs that are not available through federal funding, and

Whereas, the Airport recommendations are in compliance with County Council direction to develop a noise reduction work plan;

NOW, THEREFORE, BE IT MOVED, by the Council of King County,

1. The KCIA Federal Aviation Regulation Part 150 Noise and Land Use Compatibility Program is hereby adopted.
2. KCIA is hereby authorized to transmit the Part 150 Noise and Land Use Compatibility Program to the Federal Aviation Administration for approval.
3. KCIA may apply for and accept federal grants for Part 150 Noise and Land Use Compatibility Program implementation.

Attachments:

1. Part 150 Airport Recommendations
2. Part 150 SAC Recommendations Report
3. Part 150 Study Resource Notebook

County Executive's Airport Proposal

King County International Airport Federal Aviation Regulation Part 150 Noise and Land Use Compatibility Study Recommendations

Introduction

The following discussion represents the Airport's recommendations for implementation of the King County International Airport/Boeing Field Noise Compatibility Program.

During the Study Advisory Committee (SAC) review of the consultant material and gathering of input from a series of community meetings, the Airport did not take a position on any of the options considered. This approach was intended to allow the community, particularly as represented on the Study Advisory Committee, to work together to develop as much consensus as possible on these difficult problems and limited solutions.

Since most of the SAC recommendations were consensus items and all were supported by a solid majority of the SAC (there were no recommendations marked with a chasm of opinion among the SAC), the Airport is pleased to transmit all but one of those recommendations as its own.

The only recommendation made by SAC that is not contained in the Airport program proposal is the recommendation to construct a noise wall. The explanation for this decision is reflected in the discussion of the recommended Ground Run-up Enclosure later in this chapter.

Airport planning staff and management are proud of the hard work done over the past two years by the SAC and thank them profoundly for their investment of time, energy and emotion during the time they worked so professionally and respectfully on these issues together.

Noise Exposure Map Contours

The aircraft-generated noise contours used to identify areas eligible for various mitigation programs are the Future Base Case Noise Contours. These contours represent the aircraft activity forecast for the next five years and include the

assumption that the Airport Master Plan will be adopted, and the proposed runway shift implemented. Although there are several recommendations that will reduce the size of the noise contours if they are implemented, the Future Base Case contours reflect the largest number of structures eligible for noise mitigation programs, thus providing various options to the largest number of people. The following table presents the number of people, the number of residential units and other noise sensitive structures within the King County International Airport Future Base Case noise contours, that will be the Future Noise Exposure Map.

Table 1
EXISTING LAND USE WITHIN FUTURE NOISE EXPOSURE MAP CONTOURS, 2006
King County International Airport FAR Part 150 Study

Land Use	DNL 55 Contour		DNL 60 Contour		DNL 65** Contour		DNL 70** Contour		DNL 75** Contour	
Residential*	NA	Ac	NA	Ac	459	Ac	66	Ac	0	Ac
People	50,807		15,594		4,255		672		0	
House. Units	20,490		6,484		1,882		328		0	
Schools	NA		NA		1		0		0	
Historical Sites	NA		NA		2		2		0	
Fire Stations	NA		NA		2		2		1	
Com/Retail	NA	Ac	NA	Ac	186	Ac	83	Ac	2	Ac
Manufacture	NA	Ac	NA	Ac	863	Ac	322	Ac	79	Ac
Other	NA	Ac	NA	Ac	1,357	Ac	689	Ac	418	Ac
Total	17,100	Ac	6,833	Ac	2,865	Ac	1,160	Ac	499	Ac

*Based on FAA Part 150 Land Use Compatibility Guidelines, residential land uses and schools are considered compatible with sound attenuation. Cleveland School is within the Future KCIA 65 DNL noise contour.

**It should also be noted that only those non-compatible land uses within the 65 and greater DNL contours are eligible for FAA funding participation.

The total figures for each contour are cumulative. The figures for the larger contours contain the area -within all smaller contours.
 SOURCE: Aerial Photography, 2000 Census Data, Field Survey, BDC Analysis

The following recommendations are ordered in the priority established by the SAC: first make all of the feasible operational changes, to assure that operators are doing what they can to reduce noise, given the economic and regulatory environment; next, make as many airport facility changes as possible to abate noise impacts; and only then work on adjustments by residents (such as home insulation programs).

Operational Recommendations

RECOMMENDATION ONE: Develop combined noise contour with Sea-Tac Airport.

COMMENT: A combined noise contour will allow mitigation programs to be extended to residents who are impacted by both Sea-Tac Airport and KClA but who would not be eligible for mitigation programs under either airport's contours alone.

Action:

- No action required, contours have been developed.

Timeframe:

- Completed.

Cost:

- No additional cost.
-

RECOMMENDATION TWO: Implement a published instrument approach procedure with an Elliot Bay ground track to avoid over-flight of residential areas.

COMMENT: The implementation of an alternative instrumentation system for approaches from the north would enable aircraft to approach over Elliott Bay and avoid over-flights of residential areas, especially Magnolia. This would have negligible effect on the size of the 65 DNL but it would provide substantial relief from single-event flyovers to the residential areas avoided by use of the alternative instrumentation approach and would be especially effective in reducing noise intrusion during nighttime hours.

In order to accomplish this goal, utilize technology such as the offset localizer directional aid (LDA) and/or become a site for pilot program use of technology being tested by FAA.

Action:

- Meet with the FAA regarding instituting program, (LDA approach and/or KClA pilot project at a minimum)
- Formal Motion from County Council supporting program
- Utilize a Technical Committee, including pilots and FBOs, to help move program forward by supporting the efforts made with FAA.

Timeframe:

- Shall initiate the discussions and dialog with FAA concerning such an approach immediately upon submittal of the Noise Program to the FAA. Implementation of the approach will depend upon FAA developing and publishing such an approach, purchasing of

equipment, aircraft instrumentation and testing. This is not contingent upon other Recommendations.

Cost:

- No additional Cost to initiate the discussion with FAA. Purchase and implementation of ground equipment could be close to \$1 million.
 - Appropriation in place if Transponder Landing System can be used.
-

RECOMMENDATION THREE: Implement Close-in departure procedure for North departures.

COMMENT: This Recommendation would reduce the number of people within the 65 and greater DNL noise contours north of the Airport. The FAA has approved specific Close-in Noise Abatement Departure Procedures for all aircraft types over 75,000 pounds and each aircraft operator has such a procedure for their specific aircraft types. The Airport Sponsor can request that each operator utilize this particular procedure when departing north from King County International Airport. FAA has previously approved the procedures for specific aircraft types, but will require some airspace review to ensure safety.

Action:

- Prepare request for FAA Airspace review and continue dialog with the Agency to ensure timely completion of review.
- Write request letters to users to implement close-in departure procedure (voluntary) for each type of aircraft they fly. Work with the FBOs and pilots to explain the reasoning behind the request.
- Formal Motion from County Council

Timeframe:

- Can initiate immediately upon approval; approximately six months to fully implement after approval by the FAA. Airport users will have to notify pilots and modify procedure manuals.

Cost:

- No additional cost other than direct notification to users of the Airport and publication in Airman's Manuals. A Noise Abatement Brochure explaining the Recommendations will be prepared as part of the Part 150 Study implementation.

RECOMMENDATION FOUR: Implement ban on Stage 2 jets at night.

COMMENT: This Recommendation can reduce the night impacts of noise levels associated with the louder, older Stage 2 business jet aircraft. These aircraft are most intrusive during the nighttime hours, and this Recommendation would result in eliminating their use during those hours. However, the implementation of this Recommendation would require an additional study to be prepared and approved by the FAA. FAA approval of Recommendation Four would result in the required additional study being eligible for Federal funding.

Action:

- Prepare FAR Part 161 Study
- Formal Motion from County Council
- Airport select consultant, prepare scope of work, submit grant application to the FAA
- Accept Grant from the FAA or prepare Study without FAA funding

Timeframe:

- FAA funding contingent upon approval of Recommendation in the Part 150 Study, approximately 9 months from submittal of Part 150 Study to approval. Consultant selection, scope preparation and grant application submittal would take approximately six months.
- Without FAA funding, can initiate process using County funding which will require a special appropriation
- Study preparation approximately two to three years

Cost:

- Approximately \$850,000 plus \$500,000 legal fees (based on experience of Naples, Florida)
- FAA could grant 90% of Study costs, local share 10%

RECOMMENDATION FIVE: Upgrade flight tracking and noise monitoring program (Fly Quiet Program) to achieve voluntary compliance and accountability with noise program. The Fly Quiet Program will consist of several distinct features: Operator Education Program, a Pilot's Incentive Program and Advanced Technology to Improve Noise Monitoring and Reporting.

COMMENT: This Recommendation includes upgrading the existing noise monitoring system to support voluntary Fly Quiet procedures, providing accountability in evaluating the success of the Program and conducting public outreach so that improvements can be made to the recommended noise abatement programs and procedures. The Fly Quiet Program advances the existing noise

monitoring system from a reporting/investigative system into a compliance/reward monitoring system.

Flight track and other operational changes are difficult to achieve without sufficient data to analyze compliance with best flight procedures for noise abatement. Introduction of interactive flight tracking system equipment for use at community meetings and as part of an operator education program are important technological features of this Recommendation. An improved aircraft identification system is critical to track operators who do not fly the preferred procedures.

Action:

- Define program objectives and evaluation measures, timelines, equipment specifications, and potential technical services required to accomplish program objectives.
- Procure equipment and software for enhanced noise incident and flight track monitoring. This includes converting existing portable monitors and computer hardware, update software and Web capabilities.
- Analyze strategic sites for new permanent monitors that are located to validate the accuracy of noise modeling and also placed in various communities to assess accountability of noise abatement procedures.
- Utilize Technical Resource Working Group to assist refining flight procedures to compliment Fly Quiet Program.
- Engage pilots in discussion and training about best flight practices and methods to encourage pilots adopting Fly Quiet flight procedures such as increase use of Charted Visual Path, use of close-in departure procedure, avoidance of residential areas, etc.
- Obtain FAA Airspace review of voluntary procedures
- Promote incentives for pilot compliance with voluntary procedures
- Produce Fly Quiet program collateral materials and manuals for distribution to pilots and FBOs
- Publish Fly Quiet Program elements in Airman's Manual, Web site, etc.
- Use data to engage pilot involvement (ongoing).
- Conduct public outreach about Fly Quiet Program implementation to neighborhood communities.

Timeframe:

- Approximately one year to acquire equipment and become operational.
- Voluntary procedures can be implemented immediately upon approval and design of the program.
- FAA airspace review could take approximately 7 months
- Produce collateral materials and add to Web site upon development of the Program through the Technical Resource Working Group. Fly Quiet Program development could take approximately six months to accomplish using the Working Group.

- Publish Fly Quiet flight procedures in Airman's Manual, which takes approximately four months

Cost:

- Total cost would range from \$150,000 to \$400,000.
- The minimum estimate for consultant time and equipment includes: conversion of four portable monitors to permanent monitors at \$19,000 each; interactive public presentation/education software and projector at \$10,000; \$6,000 for printed operator education materials; \$24,000 for design and development of virtual pilot information materials for Web site; compatibility conversion of Sea-Tac software at \$6000; replacement of obsolete flight recorder, ancillary software and hardware, installation and training at \$20,000; development of Web pages with capacity for publication of Noise Office TAMIS reports on Web site at \$4,400.

RECOMMENDATION SIX: Maintain existing curfew on nighttime engine run-ups.

COMMENT: The Airport has an existing nighttime curfew for engine run-ups. This reduces the ground generated noise intrusion to nearby residences during critical nighttime hours. It is recommended that the curfew be maintained as it is currently written.

A minority of SAC Members has recommended the Airport use engine specifications as an alternative approach to this night curfew. Under this proposal, run-ups would be allowed by aircraft with engines whose specifications describe noise levels below a certain level. However, the Airport is not currently equipped to enforce this variable approach to a curfew. This could be investigated and reconsidered in the Airport's next Part 150 Study.

Action:

- No Action required

Timeframe:

- In place currently

Cost:

- No additional cost

Facility Recommendations

The following Recommendations are intended to reduce ground generated noise intrusion to noise sensitive uses through the appropriate and creative use of on-airport facilities or buildings.

RECOMMENDATION SEVEN: Conduct site selection and feasibility study for Ground Run-up Enclosure (GRE).

COMMENT: The SAC evaluated the noise reduction potential associated with a Ground Run-up Enclosure and determined that significant noise reduction could be achieved through the use of such a facility. The amount of reduction is dependent upon the number and type of run-ups conducted on the Airport. Because the Boeing Company provides the largest group of aircraft of the most homogeneous type, the number and type of run-ups that could be effectively mitigated varies with the specific aircraft program that the Boeing Company is undertaking. Based on the existing uses on Airport property, it is difficult to determine a feasible site for such a facility at this time. Therefore, it is recommended that a more detailed site selection and feasibility study be undertaken.

If a Ground Run-up Enclosure is sited and constructed, this facility would be more effective in mitigating noise impacts than a noise wall would; therefore, this Recommendation replaces the noise wall recommendation made by SAC.

Action:

- Draft Request for Proposals
- Hire consultant to conduct study
- Submit Grant application to FAA for funding (90%)

Timeframe:

- Approximately 9-12 months to complete the study after consultant has been selected

Cost:

- Approximately \$100,000

RECOMMENDATION EIGHT: Establish building design/placement standards to reduce off-airport noise effects from aircraft movements on the ground.

COMMENT: Proper placement and design of future landside facilities can be useful in reducing ground generated noise intrusion to adjacent residences. Proper acoustical treatment and placement of buildings can act as barriers to sound

transmission, and such considerations should be incorporated, if feasible, in future landside development.

Action:

- Develop Request for Proposals
- Hire consultant to develop building/placement standards to reduce off-airport noise
- Identify design and noise standards for new or remodeled construction

Timeframe:

- Approximately 6-9 months to complete the study after consultant selection

Cost:

- Approximately \$80,000

Land Use/Administrative Recommendations

The following Recommendations do not reduce the size of the noise contours but are intended to address the noise sensitive uses that would remain within the noise contours.

RECOMMENDATION NINE A: Provide a variety of options for people living in the 65 and 70 DNL KCIA contours, including purchase of avigation (noise) easements, sound attenuation and sales transaction assistance.

COMMENT: Even if all feasible noise abatement measures are implemented, there will still be residences within the significant noise contours associated with aircraft operations occurring at the Airport. As such, there are several land use options that can be offered to residents in an effort to reduce inside noise levels or provide some type of relief. The following options are intended to be voluntary at the option of the homeowner.

Action:

- Prepare Request for Proposals to provide technical assistance and implement the avigation easement, sound attenuation and sales transaction assistance programs
- Prepare FAA Grant application
- Hire consultant
- Create policy and procedures manual and obtain FAA approval
- Develop priority system as it applies to actual structures
- Notify eligible homeowners of options
- Implement programs

Timeframe:

- After FAA approval, program could start in 2004

Costs:

- If all eligible structures take advantage of programs, could be \$56 million for all housing units within the 65 and greater contours. If just the 70 DNL contour is attenuated, then projected costs are \$10 million (2001 dollars)
 - FAA funding eligibility of \$5 million per year
 - Budget one new (FTE) employee to manage program
-

Recommendation Nine B: Provide variety of options for people living in the 65 and 70 DNL combined KCIA/Sea-Tac contours including purchase of avigation (noise) easements, sound attenuation and sales transaction assistance.

COMMENT: The Study Committee recommended that sound attenuation of single-family residences (FAA definition of 4-plex or smaller) and schools are a shared first priority, with multi-family attenuation second. These are the same options presented for the KCIA noise contours but would be extended to include residents living in the combined contours that are not within either the KCIA or Sea-Tac individual contours. This Recommendation would provide relief to those residents that are not currently eligible under existing noise programs or existing FAA Policy. The intent of this Recommendation is to implement within the KCIA contours first and then address those noise sensitive uses within the Combined Contours. This would ensure that the residents closest to the airport, in the loudest noise contours, would be provided assistance first.

Action:

- Meet with FAA and Port of Seattle representatives to develop criteria, guidelines and standards for implementing the avigation easement, sound attenuation and sales transaction assistance programs in the combined contours
- Work with FAA and Port of Seattle representatives to design program
- Adoption of Intergovernmental Agreement between County and Port of Seattle
- Meet with FAA to determine funding ratio for such properties and which airport would be the Sponsor of the funds
- Utilize KCIA and Port of Seattle consultant services to implement and perform the combined work
- Create policy and procedures manual for implementation of the programs
- Develop a priority system addressing the loudest contours first
- Notify eligible homeowners of options
- Implement programs

Timeframe:

- After FAA approval, program could start in early 2004

Costs:

- If all eligible structures in the combined contours take advantage of program, cost could be \$67 million
- FAA funding limitations unknown, funding ratio unknown. The Port of Seattle receives FAA funding for such programs on an 80 percent/20 percent ratio, with the Port being responsible for 20 percent of the overall project cost and 80 percent being eligible for FAA participation. King County International Airport is eligible to receive such funds based on a 90 percent/10 percent ratio, with the County being responsible for 10 percent and 90 percent being eligible for FAA participation. The FAA has no policy addressing how to provide funds for homes affected by noise contours generated from two separate airports with different funding ratios. Additionally, the FAA would have to rule on which airport actually received the funds and was therefore responsible for the sound attenuation program. In addition, security issues may impact funding.

Recommendation Ten: Insulate schools and public buildings in the KCIA and combined contours. Sound attenuation of schools and single-family residences (FAA definition of 4-plex or smaller) are a shared first priority, with multi-family attenuation second after schools and single-family residences have been attenuated. Sleeping portions of fire stations are last priority.

COMMENT: This Recommendation is similar to the previous Recommendation that addressed these uses and structures within the KCIA contours only. This Recommendation applies to the combined contours. Subsequent to the completion of these programs inside the KCIA contours, then they should be extended to the combined contours. This Recommendation raises the same funding issues as the sound attenuation of residences within the combined contours.

Action:

- Meet with FAA, schools and Port of Seattle representatives to develop criteria, guidelines and standards for implementing the programs in the combined contours
- Work with FAA and Port of Seattle representatives to identify program boundaries
- Formal Resolution and Intergovernmental Agreement between County, Port of Seattle, jurisdictions and schools

- Meet with FAA to determine funding ratio for such properties and which airport would be the Sponsor of the funds
- Hire consultant or utilize experienced Port of Seattle personnel to manage and perform the work
- Create policy and procedures manual for implementation of the programs
- Develop a priority system addressing loudest contours first
- Notify jurisdictions of eligible structures
- Implement programs

Timeframe:

- After FAA approval, program could start in 2005 or 2006, after all work within the KCIA contours has been completed. This is also consistent with the timeframe that the school district has identified for its remodeling efforts.

Costs:

- If all eligible structures take advantage of program, could be \$20 million
- FAA funding limitations unknown, funding ratio unknown. The Port of Seattle receives FAA funding for such programs on an 80 percent/20 percent ratio, with the Port being responsible for 20 percent of the overall project cost and 80 percent being eligible for FAA participation. King County International Airport is eligible to receive such funds based on a 90 percent/10 percent ratio, with the County being responsible for 10 percent and 90 percent being eligible for FAA participation. The FAA has no policy addressing how to provide funds for homes affected by noise contours generated from two separate airports with different funding ratios. Additionally, the FAA would have to rule on which airport should receive the funds and hold responsibility for the sound attenuation program. Security issues could impact funding.
- If KCIA only, funding of 90% by FAA and 10% by County

Recommendation Eleven: Investigate alternatives for voluntary purchase of homes within the 70 DNL contour using programs that are not available through the federal government.

COMMENT: All of the recommended programs and procedural changes within the 65 DNL contour and greater will leave areas of residential use inside the 70 DNL contour. Given the normal requirement that homes be brought up to building codes at the time of insulating, it's possible that some of the older homes cannot be sufficiently mitigated at a typical cost to reduce the noise levels to a range compatible with residential use under FAA guidelines (i.e., attain a level of no more

that 45 dB inside the home). A mandatory purchase program applied to entire neighborhoods would require residents to leave who are not troubled by the noise level and do not wish to live in other areas of the City. A voluntary program funded by the FAA could lead to degradation of the remaining neighborhoods because FAA funding requires either maintaining the purchased site in a cleared, unused state or changing the land use, both of which lead to neighborhood deterioration. On the other hand, it was felt that some relief should be provided to those who currently reside in an area of such high noise levels, if the residents would like relief that would not lead to neighborhood deterioration.

Action:

- Prepare Request for Proposals for a consultant to evaluate possible programs to achieve an acceptable voluntary purchase program.
- Hire consultant
- Work with affected City to develop guidelines for alternative uses of land
- Create policy and procedures manual for such a program
- Develop priority system as it applies to actual structures
- Notify eligible homeowners of options
- Implement programs

Timeframe:

- Approximately 12-18 months to complete the study

Costs:

- Approximately \$50,000 for the study

FAR Part 150 Noise Exposure and Land Use Compatibility Study



King County International Airport

	Y	E	A	R	2002	2003	2004	2005	2006	2007	To
Recommendation Two New Inst. Landing System*					\$1,000,000						\$1,000,000
Recommendation Four Ban Stage 2 Jets at Night					\$500,000		\$500,000	\$300,000			\$1,300,000
Recommendation Five Noise/Fit. Track Monitor System					\$425,000						\$425,000
Recommendation Seven GRE Site Selection Study					\$100,000						\$100,000
Recommendation Eight Building Design Standards Study For Noise Reduction					\$80,000						\$80,000
Recommendation Nine-A** Homeowners Option for Sound Attenuation, Sales Assist. Or Easement Purchase, KCIA Contours (\$56M)					100,000		\$5,500,000	\$5,500,000	\$5,500,000	\$5,500,000	\$22,000,000
Recommendation Nine-B** Homeowners Option for Sound Attenuation, Sales Assist. Or Easement Purchase, Combined Contours (\$67M)					100,000		\$5,500,000	\$5,500,000	\$5,500,000	\$5,500,000	\$22,000,000
Recommendation Ten Sound Attenuate Schools/Sleeping Portions of Fire Stations							\$4,400,000		\$4,400,000		\$8,800,000
Recommendation Eleven Voluntary Home Purchase Study					\$50,000						\$50,000
Recommendation Twelve Part 150 Review/Evaluation									\$30,000		\$30,000
Total					\$100,000	\$2,155,000	\$6,000,000	\$5,800,000	\$9,900,000	\$9,930,000	\$33,930,000
<i>ICMA</i>					\$100,000	\$225,000	\$1,000,000	\$500,000	\$300,000	\$300,000	\$2,225,000
<i>FAA</i>					0	1,500,000	\$5,000,000	\$5,000,000	\$9,000,000	\$9,000,000	\$29,500,000

* FAA ANI or F&E Budget

** Either Recommendation Nine-A or Nine-B will be funded, not both.

F= Finished Program UF= Unfinished Program

The above cost estimates are for planning purposes only and at the time on the study based upon the best available data. These planning level cost estimates will be refined as the program is

FINANCIAL PLAN FOR PART 150 BUDGETING

Section 6. Noise Exposure/Impacts

- Land Use Analysis
- Existing Land Use Analysis/Combined Existing Noise Contours
- Existing Land Use Analysis/Combined Future Noise Contours

Section 7. Alternatives Development and Evaluation

- Initial Noise Abatement Alternatives
- Abatement Alternatives Evaluation and Maps
- Selected Alternatives Evaluation and Maps

Section 8. Compatibility Plan and Implementation Program

- Reserved for adopted Noise and Land Use Compatibility Program

Section 9. Consultation

- Reserved for adopted Noise and Land Use Compatibility Program

Section 10. Appendix

- Background: Ground Run-up Enclosures

King County International Airport/Boeing Field FAR Part 150 Study

Table of Contents

- **Airport Proposal and Financial Plan**
- **Study Advisory Committee Recommendations Report**
- **Preliminary Consultant's Recommendations**

Section 1. General Information

- Study Advisory Committee Membership
- KCIA Part 150 Noise Study Consultants
- FAR Part 150 Study Newsletters & Brochure

Section 2. Public Involvement Plan

Section 3. Study Advisory Committee Meeting Summaries

- Study Advisory Committee Meeting Summaries from August 9, 1999 through November 5, 2001

Section 4. Airport Inventories

- Physical Facilities
- Air Traffic Operations Activity
- Airspace/Air Traffic Control
- Current Noise Abatement Program
- Airport Environs
- Land Use Control Evaluation

Section 5. Forecasts/Noise Measurements

- Aviation Activity Demand Forecasts
- Noise Analysis
- Noise Methodology and Survey
- Flight Tracks Mitigation and Maps
- Noise Contour Modeling Results and Maps
- Existing Case (1999) Combined DNL Contour and Map
- Future Base Case (2006) DNL Contour and Map

Airport Proposal

Introduction

The following discussion represents the Airport's recommendations for implementation of the King County International Airport/Boeing Field Noise Compatibility Program.

During the Study Advisory Committee (SAC) review of the consultant material and gathering of input from a series of community meetings, the Airport did not take a position on any of the options considered. This approach was intended to allow the community, particularly as represented on the Study Advisory Committee, to work together to develop as much consensus as possible on these difficult problems and limited solutions.

Since most of the SAC recommendations were consensus items and all were supported by a solid majority of the SAC (there were no recommendations marked with a chasm of opinion among the SAC), the Airport is pleased to transmit all but one of those recommendations as its own.

The only recommendation made by SAC that is not contained in the Airport program proposal is the recommendation to construct a noise wall. The explanation for this decision is reflected in the discussion of the recommended Ground Run-up Enclosure later in this chapter.

Airport planning staff and management are proud of the hard work done over the past two years by the SAC and thank them profoundly for their investment of time, energy and emotion during the time they worked so professionally and respectfully on these issues together.

Noise Exposure Map Contours

The aircraft-generated noise contours used to identify areas eligible for various mitigation programs are the Future Base Case Noise Contours. These contours represent the aircraft activity forecast for the next five years and include the

assumption that the Airport Master Plan will be adopted, and the proposed runway shift implemented. Although there are several recommendations that will reduce the size of the noise contours if they are implemented, the Future Base Case contours reflect the largest number of structures eligible for noise mitigation programs, thus providing various options to the largest number of people. The following table presents the number of people, the number of residential units and other noise sensitive structures within the King County International Airport Future Base Case noise contours, that will be the Future Noise Exposure Map.

Table 1
EXISTING LAND USE WITHIN FUTURE NOISE EXPOSURE MAP CONTOURS, 2006
King County International Airport FAR Part 150 Study

Land Use	DNL 55 Contour		DNL 60 Contour		DNL 65** Contour		DNL 70** Contour		DNL 75** Contour	
Residential*	NA	Ac	NA	Ac	459	Ac	66	Ac	0	Ac
People	50,807		15,594		4,255		672		0	
House. Units	20,490		6,484		1,882		328		0	
Schools	NA		NA		1		0		0	
Historical Sites	NA		NA		2		2		0	
Fire Stations	NA		NA		2		2		1	
Com/Retail	NA	Ac	NA	Ac	186	Ac	83	Ac	2	Ac
Manufacture	NA	Ac	NA	Ac	863	Ac	322	Ac	79	Ac
Other	NA	Ac	NA	Ac	1,357	Ac	689	Ac	418	Ac
Total	17,100	Ac	6,833	Ac	2,865	Ac	1,160	Ac	499	Ac

*Based on FAA Part 150 Land Use Compatibility Guidelines, residential land uses and schools are considered compatible with sound attenuation. Cleveland School is within the Future KCIA 65 DNL noise contour.

**It should also be noted that only those non-compatible land uses within the 65 and greater DNL contours are eligible for FAA funding participation.

The total figures for each contour are cumulative. The figures for the larger contours contain the area -within all smaller contours.

SOURCE: Aerial Photography, 2000 Census Data, Field Survey, BDC Analysis

The following recommendations are ordered in the priority established by the SAC: first make all of the feasible operational changes, to assure that operators are doing what they can to reduce noise, given the economic and regulatory environment; next, make as many airport facility changes as possible to abate noise impacts; and only then work on adjustments by residents (such as home insulation programs).

Operational Recommendations

RECOMMENDATION ONE: Develop combined noise contour with Sea-Tac Airport.

COMMENT: A combined noise contour will allow mitigation programs to be extended to residents who are impacted by both Sea-Tac Airport and KCIA but who would not be eligible for mitigation programs under either airport's contours alone.

Action:

- No action required, contours have been developed.

Timeframe:

- Completed.

Cost:

- No additional cost.
-

RECOMMENDATION TWO: Implement a public instrument approach procedure with an Elliot Bay ground track to avoid over-flight of residential areas.

COMMENT: The implementation of an alternative instrumentation system for approaches from the north would enable aircraft to approach over Elliott Bay and avoid over-flights of residential areas, especially Magnolia. This would have negligible effect on the size of the 65 DNL but it would provide substantial relief from single-event flyovers to the residential areas avoided by use of the alternative instrumentation approach and would be especially effective in reducing noise intrusion during nighttime hours.

Because the availability of such alternatives is currently limited, KCIA proposes to become a site for pilot program use of technology being tested by FAA.

Action:

- Meet with the FAA regarding instituting program, (KCIA pilot project at a minimum)
- Formal Motion from County Council supporting program
- Utilize a Technical Committee, including pilots and FBOs, to help move program forward by supporting the efforts made with FAA.

Timeframe:

- Can initiate the discussions and dialog with FAA concerning such an approach immediately upon submittal of the Noise Program to the FAA. Implementation of the approach will depend upon FAA developing and publishing such an approach, purchasing of

equipment, aircraft instrumentation and testing. This is not contingent upon other Recommendations.

Cost:

- No additional Cost to initiate the discussion with FAA. Purchase and implementation of ground equipment could be close to \$1 million.
- Appropriation in place if Transponder Landing System can be used.

RECOMMENDATION THREE: Implement Close-in departure procedure for North departures.

COMMENT: This Recommendation would reduce the number of people within the 65 and greater DNL noise contours north of the Airport. The FAA has approved specific Close-in Noise Abatement Departure Procedures for all aircraft types over 75,000 pounds and each aircraft operator has such a procedure for their specific aircraft types. The Airport Sponsor can request that each operator utilize this particular procedure when departing north from King County International Airport. FAA has previously approved the procedures for specific aircraft types, but will require some airspace review to ensure safety.

Action:

- Prepare request for FAA Airspace review and continue dialog with the Agency to ensure timely completion of review.
- Write request letters to users to implement close-in departure procedure (voluntary) for each type of aircraft they fly. Work with the FBOs and pilots to explain the reasoning behind the request.
- Formal Motion from County Council

Timeframe:

- Can initiate immediately upon approval; approximately six months to fully implement after approval by the FAA. Airport users will have to notify pilots and modify procedure manuals.

Cost:

- No additional cost other than direct notification to users of the Airport and publication in Airman's Manuals. A Noise Abatement Brochure explaining the Recommendations will be prepared as part of the Part 150 Study implementation.

RECOMMENDATION FOUR: Implement ban on Stage 2 jets at night.

COMMENT: This Recommendation can reduce the night impacts of noise levels associated with the louder, older Stage 2 business jet aircraft. These aircraft are most intrusive during the nighttime hours, and this Recommendation would result in eliminating their use during those hours. However, the implementation of this Recommendation would require an additional study to be prepared and approved by the FAA. FAA approval of Recommendation Four would result in the required additional study being eligible for Federal funding.

Action:

- Prepare FAR Part 161 Study
- Formal Motion from County Council
- Airport select consultant, prepare scope of work, submit grant application to the FAA
- Accept Grant from the FAA or prepare Study without FAA funding

Timeframe:

- FAA funding contingent upon approval of Recommendation in the Part 150 Study, approximately 9 months from submittal of Part 150 Study to approval. Consultant selection, scope preparation and grant application submittal would take approximately six months.
- Without FAA funding, can initiate process using County funding which will require a special appropriation
- Study preparation approximately two to three years

Cost:

- Approximately \$850,000 plus \$500,000 legal fees (based on experience of Naples, Florida)
- FAA could grant 90% of Study costs, local share 10%

RECOMMENDATION FIVE: Upgrade flight tracking and noise monitoring program (Fly Quiet Program) to achieve voluntary compliance and accountability with noise program. The Fly Quiet Program will consist of several distinct features: Operator Education Program, a Pilot's Incentive Program and Advanced Technology to Improve Noise Monitoring and Reporting.

COMMENT: This Recommendation includes upgrading the existing noise monitoring system to support voluntary Fly Quiet procedures, providing accountability in evaluating the success of the Program and conducting public outreach so that improvements can be made to the recommended noise abatement programs and procedures. The Fly Quiet Program advances the existing noise monitoring system from a reporting/investigative system into a compliance/reward monitoring system.

Flight track and other operational changes are difficult to achieve without sufficient data to analyze compliance with best flight procedures for noise

abatement. Introduction of interactive flight tracking system equipment for use at community meetings and as part of an operator education program are important technological features of this Recommendation. An improved aircraft identification system is critical to track operators who do not fly the preferred procedures.

Action:

- Define program objectives and evaluation measures, timelines, equipment specifications, and potential technical services required to accomplish program objectives.
- Procure equipment and software for enhanced noise incident and flight track monitoring. This includes converting existing portable monitors and computer hardware, update software and Web capabilities.
- Analyze strategic sites for new permanent monitors that are located to validate the accuracy of noise modeling and also placed in various communities to assess accountability of noise abatement procedures.
- Utilize Technical Resource Working Group to assist refining flight procedures to compliment Fly Quiet Program.
- Engage pilots in discussion and training about best flight practices and methods to encourage pilots adopting Fly Quiet flight procedures such as increase use of Charted Visual Path, use of close-in departure procedure, avoidance of residential areas, etc.
- Obtain FAA Airspace review of voluntary procedures
- Promote incentives for pilot compliance with voluntary procedures
- Produce Fly Quiet program collateral materials and manuals for distribution to pilots and FBOs
- Publish Fly Quiet Program elements in Airman's Manual, Web site, etc.
- Use data to engage pilot involvement (ongoing).
- Conduct public outreach about Fly Quiet Program implementation to neighborhood communities.

Timeframe:

- Approximately one year to acquire equipment and become operational.
- Voluntary procedures can be implemented immediately upon approval and design of the program.
- FAA airspace review could take approximately 7 months
- Produce collateral materials and add to Web site upon development of the Program through the Technical Resource Working Group. Fly Quiet Program development could take approximately six months to accomplish using the Working Group.
- Publish Fly Quiet flight procedures in Airman's Manual, which takes approximately four months

Cost:

- Total cost would range from \$150,000 to \$400,000.
- The minimum estimate for consultant time and equipment includes: conversion of four portable monitors to permanent monitors at \$19,000 each; interactive public presentation/education software and projector at \$10,000; \$6,000 for printed operator education materials; \$24,000 for design and development of virtual pilot information materials for Web site; compatibility conversion of Sea-Tac software at \$6000; replacement of obsolete flight recorder, ancillary software and hardware, installation and training at \$20,000; development of Web pages with capacity for publication of Noise Office TAMIS reports on Web site at \$4,400.

RECOMMENDATION SIX: Maintain existing curfew on nighttime engine run-ups.

COMMENT: The Airport has an existing nighttime curfew for engine run-ups. This reduces the ground generated noise intrusion to nearby residences during critical nighttime hours. It is recommended that the curfew be maintained as it is currently written.

A minority of SAC Members has recommended the Airport use engine specifications as an alternative approach to this night curfew. Under this proposal, run-ups would be allowed by aircraft with engines whose specifications describe noise levels below a certain level. However, the Airport is not currently equipped to enforce this variable approach to a curfew. This could be investigated and reconsidered in the Airport's next Part 150 Study.

Action:

- No Action required

Timeframe:

- In place currently

Cost:

- No additional cost

Facility Recommendations

The following Recommendations are intended to reduce ground generated noise intrusion to noise sensitive uses through the appropriate and creative use of on-airport facilities or buildings.

RECOMMENDATION SEVEN: Conduct site selection and feasibility study for Ground Run-up Enclosure (GRE).

COMMENT: The SAC evaluated the noise reduction potential associated with a Ground Run-up Enclosure and determined that significant noise reduction could be achieved through the use of such a facility. The amount of reduction is dependent upon the number and type of run-ups conducted on the Airport. Because the Boeing Company provides the largest group of aircraft of the most homogeneous type, the number and type of run-ups that could be effectively mitigated varies with the specific aircraft program that the Boeing Company is undertaking. Based on the existing uses on Airport property, it is difficult to determine a feasible site for such a facility at this time. Therefore, it is recommended that a more detailed site selection and feasibility study be undertaken.

If a Ground Run-up Enclosure is sited and constructed, this facility would be more effective in mitigating noise impacts than a noise wall would; therefore, this Recommendation replaces the noise wall recommendation made by SAC.

Action:

- Draft Request for Proposals
- Hire consultant to conduct study
- Submit Grant application to FAA for funding (90%)

Timeframe:

- Approximately 9-12 months to complete the study after consultant has been selected

Cost:

- Approximately \$100,000

RECOMMENDATION EIGHT: Establish building design/placement standards to reduce off-airport noise effects from aircraft movements on the ground.

COMMENT: Proper placement and design of future landside facilities can be useful in reducing ground generated noise intrusion to adjacent residences. Proper acoustical treatment and placement of buildings can act as barriers to sound

transmission, and such considerations should be incorporated, if feasible, in future landside development.

Action:

- Develop Request for Proposals
- Hire consultant to develop building/placement standards to reduce off-airport noise
- Identify design and noise standards for new or remodeled construction

Timeframe:

- Approximately 6-9 months to complete the study after consultant selection

Cost:

- Approximately \$80,000

Land Use/Administrative Recommendations

The following Recommendations do not reduce the size of the noise contours but are intended to address the noise sensitive uses that would remain within the noise contours.

RECOMMENDATION NINE A: Provide a variety of options for people living in the 65 and 70 DNL KCIA contours, including purchase of avigation (noise) easements, sound attenuation and sales transaction assistance.

COMMENT: Even if all feasible noise abatement measures are implemented, there will still be residences within the significant noise contours associated with aircraft operations occurring at the Airport. As such, there are several land use options that can be offered to residents in an effort to reduce inside noise levels or provide some type of relief. The following options are intended to be voluntary at the option of the homeowner.

Action:

- Prepare Request for Proposals to provide technical assistance and implement the avigation easement, sound attenuation and sales transaction assistance programs
- Prepare FAA Grant application
- Hire consultant
- Create policy and procedures manual and obtain FAA approval
- Develop priority system as it applies to actual structures
- Notify eligible homeowners of options
- Implement programs

Timeframe:

- After FAA approval, program could start in 2004

Costs:

- If all eligible structures take advantage of programs, could be \$56 million for all housing units within the 65 and greater contours. If just the 70 DNL contour is attenuated, then projected costs are \$10 million (2001 dollars)
 - FAA funding eligibility of \$5 million per year
 - Budget one new (FTE) employee to manage program
-

Recommendation Nine B: Provide variety of options for people living in the 65 and 70 DNL combined KCIA/Sea-Tac contours including purchase of aviation (noise) easements, sound attenuation and sales transaction assistance.

COMMENT: The Study Committee recommended that sound attenuation of single-family residences (FAA definition of 4-plex or smaller) and schools are a shared first priority, with multi-family attenuation second. These are the same options presented for the KCIA noise contours but would be extended to include residents living in the combined contours that are not within either the KCIA or Sea-Tac individual contours. This Recommendation would provide relief to those residents that are not currently eligible under existing noise programs or existing FAA Policy. The intent of this Recommendation is to implement within the KCIA contours first and then address those noise sensitive uses within the Combined Contours. This would ensure that the residents closest to the airport, in the loudest noise contours, would be provided assistance first.

Action:

- Meet with FAA and Port of Seattle representatives to develop criteria, guidelines and standards for implementing the aviation easement, sound attenuation and sales transaction assistance programs in the combined contours
- Work with FAA and Port of Seattle representatives to design program
- Adoption of Intergovernmental Agreement between County and Port of Seattle
- Meet with FAA to determine funding ratio for such properties and which airport would be the Sponsor of the funds
- Utilize KCIA and Port of Seattle consultant services to implement and perform the combined work
- Create policy and procedures manual for implementation of the programs
- Develop a priority system addressing the loudest contours first
- Notify eligible homeowners of options

- Implement programs

Timeframe:

- After FAA approval, program could start in early 2004

Costs:

- If all eligible structures in the combined contours take advantage of program, cost could be \$67 million
- FAA funding limitations unknown, funding ratio unknown. The Port of Seattle receives FAA funding for such programs on an 80 percent/20 percent ratio, with the Port being responsible for 20 percent of the overall project cost and 80 percent being eligible for FAA participation. King County International Airport is eligible to receive such funds based on a 90 percent/10 percent ratio, with the County being responsible for 10 percent and 90 percent being eligible for FAA participation. The FAA has no policy addressing how to provide funds for homes affected by noise contours generated from two separate airports with different funding ratios. Additionally, the FAA would have to rule on which airport actually received the funds and was therefore responsible for the sound attenuation program. In addition, security issues may impact funding.

Recommendation Ten: Insulate schools and public buildings in the KCIA and combined contours. Sound attenuation of schools and single-family residences (FAA definition of 4-plex or smaller) are a shared first priority, with multi-family attenuation second after schools and single-family residences have been attenuated. Sleeping portions of fire stations are last priority.

COMMENT: This Recommendation is similar to the previous Recommendation that addressed these uses and structures within the KCIA contours only. This Recommendation applies to the combined contours. Subsequent to the completion of these programs inside the KCIA contours, then they should be extended to the combined contours. This Recommendation raises the same funding issues as the sound attenuation of residences within the combined contours.

Action:

- Meet with FAA, schools and Port of Seattle representatives to develop criteria, guidelines and standards for implementing the programs in the combined contours
- Work with FAA and Port of Seattle representatives to identify program boundaries

- Formal Resolution and Intergovernmental Agreement between County, Port of Seattle, jurisdictions and schools
- Meet with FAA to determine funding ratio for such properties and which airport would be the Sponsor of the funds
- Hire consultant or utilize experienced Port of Seattle personnel to manage and perform the work
- Create policy and procedures manual for implementation of the programs
- Develop a priority system addressing loudest contours first
- Notify jurisdictions of eligible structures
- Implement programs

Timeframe:

- After FAA approval, program could start in 2005 or 2006, after all work within the KCIA contours has been completed. This is also consistent with the timeframe that the school district has identified for its remodeling efforts.

Costs:

- If all eligible structures take advantage of program, could be \$20 million
- FAA funding limitations unknown, funding ratio unknown. The Port of Seattle receives FAA funding for such programs on an 80 percent/20 percent ratio, with the Port being responsible for 20 percent of the overall project cost and 80 percent being eligible for FAA participation. King County International Airport is eligible to receive such funds based on a 90 percent/10 percent ratio, with the County being responsible for 10 percent and 90 percent being eligible for FAA participation. The FAA has no policy addressing how to provide funds for homes affected by noise contours generated from two separate airports with different funding ratios. Additionally, the FAA would have to rule on which airport should receive the funds and hold responsibility for the sound attenuation program. Security issues could impact funding.
- If KCIA only, funding of 90% by FAA and 10% by County

Recommendation Eleven: Investigate alternatives for voluntary purchase of homes within the 70 DNL contour using programs that are not available through the federal government.

COMMENT: All of the recommended programs and procedural changes within the 65 DNL contour and greater will leave areas of residential use inside the 70 DNL contour. Given the normal requirement that homes be brought up to

building codes at the time of insulating, it's possible that some of the older homes cannot be sufficiently mitigated at a typical cost to reduce the noise levels to a range compatible with residential use under FAA guidelines (i.e., attain a level of no more than 45 dB inside the home). A mandatory purchase program applied to entire neighborhoods would require residents to leave who are not troubled by the noise level and do not wish to live in other areas of the City. A voluntary program funded by the FAA could lead to degradation of the remaining neighborhoods because FAA funding requires either maintaining the purchased site in a cleared, unused state or changing the land use, both of which lead to neighborhood deterioration. On the other hand, it was felt that some relief should be provided to those who currently reside in an area of such high noise levels, if the residents would like relief that would not lead to neighborhood deterioration.

Action:

- Prepare Request for Proposals for a consultant to evaluate possible programs to achieve an acceptable voluntary purchase program.
- Hire consultant
- Work with affected City to develop guidelines for alternative uses of land
- Create policy and procedures manual for such a program
- Develop priority system as it applies to actual structures
- Notify eligible homeowners of options
- Implement programs

Timeframe:

- Approximately 12-18 months to complete the study

Costs:

- Approximately \$50,000 for the study

FAR Part 150 Noise Exposure and Land Use Compatibility Study



King County International Airport

	Y	E	A	R	2002	2003	2004	2005	2006	2007	Tot
Recommendation Two New Inst. Landing System*					\$1,000,000						\$1,000,000
Recommendation Four Ban Stage 2 Jets at Night					\$500,000		\$500,000	\$300,000			\$1,300,000
Recommendation Five Noise/Fit. Track Monitor System					\$425,000						\$425,000
Recommendation Seven GRE Site Selection Study					\$100,000						\$100,000
Recommendation Eight Building Design Standards Study For Noise Reduction					\$80,000						\$80,000
Recommendation Nine-A ** Homeowners Option for Sound Attenuation, Sales Assist. Or Easement Purchase, KCIA Contours (\$56M)					100,000		\$5,500,000	\$5,500,000	\$5,500,000	\$5,500,000	\$22,000,000
Recommendation Nine-B ** Homeowners Option for Sound Attenuation, Sales Assist. Or Easement Purchase, Combined Contours (\$67M)					100,000		\$5,500,000	\$5,500,000	\$5,500,000	\$5,500,000	\$22,000,000
Recommendation Ten Sound Attenuate Schools/Sleeping Portions of Fire Stations									\$4,400,000	\$4,400,000	\$8,800,000
Recommendation Eleven Voluntary Home Purchase Study					\$50,000						\$50,000
Recommendation Twelve Part 150 Review/Evaluation										\$30,000	\$30,000
Total					\$100,000	\$2,255,000	\$6,000,000	\$5,800,000	\$9,900,000	\$9,930,000	\$33,980,000
FAA					\$100,000	\$2,255,000	\$5,000,000	\$5,000,000	\$9,000,000	\$9,000,000	\$29,500,000
FAA					0	1,500,000	\$5,000,000	\$5,000,000	\$9,000,000	\$9,000,000	\$29,500,000

* FAA ANI or F&E Budget
** Either Recommendation Eight or Nine will be funded, not both.

F= Finished Program UF= Unfinished Program

FINANCIAL PLAN FOR PART 150 BUDGETING

INTRODUCTION

The following is a report from the Study Advisory Committee (SAC) for the King County International Airport's FAR Part 150 Noise Remedies and Land Use Compatibility Study (Part 150 Study).

This report and these recommendations are the products of one phase in a Study that formally began approximately two years ago, in 1999, following a series of other King County and community activities over a span of more than six years.

The report documents the Part 150 Study process, including public involvement leading up to the SAC recommendations, and describes the recommendations.

These recommendations will be the foundation of a subsequent Airport recommendation for a Noise Program, which will be transmitted to the King County Executive and Council and to the Federal Aviation Administration for approval. When the King County Council considers the recommendations from this Study, a public hearing will be held.

For more information, please contact:

Cynthia Stewart, Airport Manager
7233 Perimeter Road South
Seattle, WA 98108
206-296-7380 Phone
206-296-0190 FAX
cynthia.stewart@metrokc.gov E-mail

TABLE OF CONTENTS

Study Advisory Committee Membership	Page 3
Background	4
Findings	7
Recommendations	8
I. Ban Stage 2 Aircraft Below 75,000 lbs.	8
II. Ground Run-Up Enclosure (GRE) or "Hush House"	9
III. Noise Barrier or Wall	11
IV. Maintain Existing Run-Up Restrictions	12
V. Sound Attenuate Residences in KCIA 65 DNL Contour and Above	13
VI. School Building Insulation Within Combined KCIA and Sea-Tac 65 DNL and Above Contour	17
VII. Establish Sales Transaction Program for Homeowners in KCIA 65 DNL and Above Contour	17
VIII. Purchase Avigation Easements from Homeowners in the KCIA 65 DNL and Above Contour	19
IX. Implement a Home Buyout Program for Homeowners	20
X. Fly Quiet Program	21
XI. Implement Close-in Departure Procedure for Northbound Flights	23
XII. Develop an FMS Departure Procedure Through Elliott Bay	24
XIII. Fully Implement Use of the Charted Visual Approach Through Elliott Bay	25
XIV. Develop and Implement Building Design Standards to Reduce and/or Contain Noise on the Airport	26
XV. Integration of Flight Paths with Sea-Tac	27
XVI. Use of Ground Leases to Influence Operations	27
XVII. Differential Landing Fees as an Incentive for Noise Abatement	28
XVIII. Seek Commitments from Pilots and Operators on Use of 10,000' Runway	29
XIX. Close KCIA at Night	29
XX. City Zoning Changes	30
Attachments	
A Study Process	
A2 Adopted Criteria for Selection of Alternatives	
B Schedule of Public Meetings Held	
C Preliminary Consultant's Recommendations	
D Land Use Analysis and Alternatives Evaluation	

**STUDY ADVISORY COMMITTEE
MEMBERSHIP**
Jim Combs, Chair

Andrew Anderson¹
Tukwila

Duane Anderson
At-Large Communities

Peter Anderson
Corporate Tenant

Doug Baker
United Parcel Service (tenant)

Ron Beckerdite
FAA/Sea-Tac

Larry Brown
Labor Representative

Jim Combs
Pilots' Association

Larry Crim
Renton/Rainier Valley Communities

Oliver Dallas
Boeing ATCT - FAA

Randy Eatherton
Georgetown Community

Ron Fincher
FAA

Edwin Hanson
West Seattle Community

Daniel B. Hartley
SPEEA Labor

Lynae Jacobson
Port of Seattle

Pam Linder
City of Tukwila

Cayla Morgan
FAA - Airports District Office

Rocky Piro
Puget Sound Regional Council

Georgianne Ray
Unincorporated King County

Theresa Smith
WashDOT Aeronautics Division

Lynn Tucker
Beacon Hill/Rainier Valley

Eric Tweit
City of Seattle SPO

Karen Walling
Small GA - Classic Helicopters

Rick Lentz
Boeing Company

Ed Wojcek
Magnolia/North Seattle

Former Members²:

Rosemary Unterseher
Tukwila Community (former rep)

Randy Bannecker
Indirect Business Leader (former rep)

Liz Warman
Boeing Company

¹ Andrew Anderson joined the SAC near the end of the Study and did not participate in most of the SAC recommendations.

² These members resigned from the King County International Airport Roundtable and SAC just prior to completion of the SAC recommendations and should be acknowledged as participants.

BACKGROUND

Work on the KCIA Part 150 Study began in late 1995, when the King County Council adopted Motion 9709. That motion requested the Executive to develop night noise restrictions at KCIA. At that time, there was community consternation about the diversion of certain night aircraft operations from Sea-Tac Airport to KCIA, and about the commencement of the Airport's Master Plan update process.

However, per Federal Aviation Administration regulations, no night restrictions on aircraft activity could be instituted by the Airport without first conducting a Part 150 Study resulting in a night restriction recommendation and a subsequent Part 161 Access Restriction analysis.

At around the same time that the King County Council requested night noise restrictions, a Citizens Ad Hoc Noise Advisory Committee was formed pursuant to King County Council Motion #9523, adopted on April 30, 1995. The Committee guided KCIA in the development of a noise monitoring system. Using the system, KCIA staff could respond to and analyze data from flights creating noise disturbances for residents.

In July, 1997, the County Council established the KCIA Roundtable³, an advisory committee to the Airport, to advise on the development of master plans and noise studies, among other things. The Roundtable reviewed work products developed in preparation for drafting the Airport Master Plan throughout 1997 and 1998 and developed certain Master Plan recommendations in May 1998. Among these work products were the operations forecasts needed for the Part 150 Study.

In October 1998, following their earlier approval of the Airport's proposed conceptual development plan - the preferred alternative to be used for SEPA and NEPA processes related to the Master Plan - the King County Council adopted a Noise Reduction Work Plan. This Work Plan was intended to guide the Airport's Part 150 Study and demonstrate to the community that the scope of the Study would be broad and comprehensive.

The Airport officially initiated its Federal Aviation Regulation Part 150 Noise and Land Use Compatibility Study in June 1999, after selection of the Study consultants, Barnard Dunkelberg and Company. The Study commenced with a public Open House on June 17, 1999, at which the Council-adopted Noise Work Program was discussed and other ideas for noise remedies were solicited from the public. The process used for a Part 150 Noise Remedies Study was also described for those who attended (see Study process flow chart included in this report as Attachment A).

Pursuant to FAA regulations, the Roundtable advisory committee was supplemented with additional members (city government, state government, Puget Sound Regional

³ Ordinance 12785 adopted by the King County Council on 7/07/97.

Council, Sea-Tac Airport and FAA members were added) to create a Part 150 Study Advisory Committee (SAC). The function of the SAC was to assist the Airport in guiding the Part 150 Study process and to develop recommendations reflecting the members' interests.

Subsequently, the Airport conducted a variety of SAC and public meetings. The SAC met 18 times between June 1999 and June 2001. The SAC approved the Airport's public involvement plan for the Study. In addition, SAC members regularly attended the series of public meetings held in neighborhoods and at the Airport to share information and hear the public's concerns. A list of the public meetings held is included in this report as Attachment B.

In its meetings, the SAC was briefed extensively by the consultants, Barnard Dunkelberg and Company, on the feasibility, costs, and levels of noise reduction that could be achieved by implementing each alternative being studied (Attachment D details the data provided by the consultants regarding the alternatives.) Baseline noise contours, fleet mix, residential demographics, land use patterns, air space conflicts with traffic from other airports, and other data useful in analysis and decision making, were all provided and considered in the Study. Attachment C hereto contains the report prepared by Barnard Dunkelberg and Company to support the Study. The SAC was also provided with feedback from each of the community meetings that the KCIA staff held to explain the Part 150 Study and airport noise issues to the public and to obtain their preferences and concerns.

The SAC used an interest-based decision-making process, including the use of decision standards⁴ for evaluating noise reduction options and a consensus rule that allowed a majority/minority report from the group if consensus could not be achieved after three consecutive votes. The interest-based process allowed the committee to work toward meeting as many of the diverse interests represented in the group as possible. For example, tenants and aircraft operators might have different interests than community representatives; FAA representatives might express concerns not otherwise identified by any of the other committee members; etc. The SAC also discussed their collective interest in adopting operational noise reduction strategies to be implemented by aircraft operators as the first priority, with solutions to be implemented by the affected parties, such as land use remedies and insulation programs, to be considered only after all of the operational strategies had been employed.

In its final three meetings, the SAC arrived at decisions concerning its recommendations.

As noted in the report that follows, nearly all of the recommendations from SAC were adopted by consensus, and only a few required majority/minority reports. In those cases, the majority and minority viewpoints are described.

⁴ See Attachment A2 for a list of the decision standards used by the SAC.

FINDINGS

The findings on which the SAC recommendations were based include (but are not limited to) the following:

- KCIA contributes directly and indirectly to the economic benefit of the King County region in the amount of approximately \$1.43 billion annually and 10,000 direct and indirect jobs. What is not fully included in these numbers is the considerable, unique additional value of Boeing airplane delivery activity at KCIA.⁵
- The 65 DNL and above noise contour generated by existing conditions (current KCIA operations) covers an area of 3.5 square miles and includes 1,277 housing units (55.3% owner-occupied and 44.7% rental), affecting 2,751 residents, and 1 school. (See page D.2 of Attachment D.)
- The future case 65 DNL and above contour, in 2006, *without* mitigation (i.e., if no action is taken as a result of this Study) would expand to 4.5 square miles, include 1,882 housing units, and affect 4,255 residents and 1 school. (See page D.4 of Attachment D.)⁶
- The flight paths used for approaches to and departures from KCIA are limited by the fact that KCIA air space is below air space for Sea-Tac Airport.
- The Federal Aviation Administration (FAA) regulates aircraft movement in the air and within the aircraft movement area of the Airport. Local regulations of aircraft movement and noise levels are prohibited except through procedures approved by the FAA. In addition, there are certain decisions about aircraft movement that are reserved for pilots for safety reasons and cannot be regulated by local airports.
- Technology that would provide additional precision in aircraft movement for noise reduction purposes exists but is not yet approved by FAA or is not widely available. Some methods not currently available for reducing noise may be available within the next few years.

⁵ "King County International Airport Economic Impact Study," prepared for KCIA through a contract with Pacifica Public Affairs, by William B. Beyers and Shaun McMullin, University of Washington Department of Geography, February 2000.

⁶ Demographic information was based on 2000 Census tract data and was adjusted at the request of SAC.

RECOMMENDATIONS:

The following material sets forth the SAC recommendations for the Part 150 Study. Each SAC recommendation is prefaced with information about where to look up more details about the consultants' evaluation of the proposed topic, a statement identifying what the King County Council adopted Part 150 Study work plan called for, the consultants' recommendation and abbreviated discussion of what led to the consultants' recommendation, and the SAC recommendation with a brief description of the SAC's discussion of the topic.

(cont'd next page)

I. BAN STAGE 2 AIRCRAFT BELOW 75,000 LBS
(See page I.1 of Attachment C for detailed information)

COUNCIL WORK PLAN ITEM:

Conduct part 150/161 to ban stage 2 aircraft below 75,000 lbs.

CONSULTANTS' RECOMMENDATION:

Implement (via Part 161 Study) a complete Stage 2 jet restriction at night between the hours of 10pm and 7am.

Consultant Discussion:

This restriction would include jets (primarily private business jets) under 75,000 pounds and would require completion of a Part 161 study. Implementation of this alternative would reduce the number of people within the 65 DNL and above by approximately 1,100 as compared to the Future Base Case.

Although preparing a Part 161 document is a time consuming and potentially frustrating task, there is some evidence nationally that it may be possible to ultimately succeed for an action focused on aircraft less than 75,000 pounds. No Part 161 Study has, to date, been approved by the FAA; however, a well-constructed and technically strong document may potentially be viable.

It is important to note that since this alternative would only apply to Stage 2 aircraft and not to Stage 3, no formal approval from FAA is required under the Part 161 regulation. However, experience at other airports indicates that FAA extensively reviews, questions and objects to restrictions either on Part 161 grounds, or on the basis of federal grant assurance language.

It is certain that Part 161 has not been written with the intent to be easily followed or implemented. FAA has been clear that they do not favor access restrictions, and that, on the contrary, they do not support noise restrictions that adversely affect airport/airfield capacity and efficiency.

If a voluntary nighttime agreement were to be implemented, there would be less analysis and FAA review required. However, if such a voluntary agreement were to be formally included in a user operating agreement, FAA would almost certainly consider this to be an access restriction requiring a Part 161 Study.

SAC RECOMMENDATION:

(Majority): Curfew at night for Stage II aircraft below 75,000 lb.

SAC Discussion:

Many of the community comments received by the Airport and SAC regarding aircraft noise relate to nighttime awakenings from aircraft overflights. In particular, the cargo carriers fly in the very early morning hours and awaken residents, many of whom have difficulty going back to sleep. Many residents have proposed that the airport close between 10:00 p.m. and 7:00 a.m. Closure during this period would require a Part 161 Access Restriction Study.

The SAC unanimously opposed a full nighttime closure, primarily for two reasons: first, the economic losses that could result from losing the overnight delivery capacity; and second, the difficulty of successfully completing a Part 161 Study proposing to restrict Stage 3 aircraft. All of the aircraft over 75,000 lb. currently operating at KCIA are Stage 3, and no airport in the country has succeeded in gaining FAA approval of a Stage 3 restriction through a Part 161 Study.

However, a **majority** of the SAC voted to recommend that the Airport pursue a Part 161 Access Restriction Study for closure of KCIA to Stage 2 aircraft below 75,000 lb. This type of restriction would reduce approximately 1-2 jet flights per night and might successfully meet FAA approval criteria.

A **minority** of SAC members believes that this type of Stage 2 restriction could restrict future business development opportunities at KCIA.

II. GROUND RUN-UP ENCLOSURE (GRE) OR "HUSH HOUSE"

(See page I.6 of Attachment C for detailed information)

COUNCIL WORK PLAN:

Research and design a noise containment facility, such as a "hush house," at the airport to reduce engine testing and maintenance noise for nearby residents

CONSULTANTS' RECOMMENDATION:

Initiate a Site Selection Feasibility Study for a Ground Run-up Enclosure, to address such issues as placement, actual use and projected use, and value of reduction vs. cost of GRE.

Consultant Discussion:

Aircraft maintenance run-ups are a continuing source of neighborhood irritation. However, whether construction of a GRE for an investment of \$3 to \$6 million is worthy of implementation rests on the answers to several technical and financial questions. To answer how well a GRE would work, where it could practically be located and how its benefits would compare to other possible actions, a Site Selection Feasibility Study is necessary. The scope of the Part 150 Study does not include actual site selection and feasibility analysis, rather, only the evaluation of whether such a facility might result in noise reduction.

The viability of a GRE at KCIA is dependent on locating a site that meets the following criteria at a minimum. A GRE must be:

- Accessible by aircraft via taxiway and/or apron sufficient for aircraft weight.
- Consistent with FAA safety criteria for airfield buildings. The structure must not act as an obstruction or hazard.
- Able to accommodate all or most of the aircraft types likely to be conducting run-ups at the airport.
- Oriented favorably towards the wind, so that the benefits of the facility are not counteracted by meteorological conditions.
- Designed to be effective in northwest high humidity conditions.

The cost of a GRE would be evaluated from the perspective of how many aircraft would use the facility on an annual basis, and what the resulting cost benefit would be compared to other actions the airport might take to reduce noise.

SAC RECOMMENDATION:

(Unanimous): Proceed with feasibility and siting study for construction of Noise Containment Facility.

SAC Discussion:

Noise containment facilities, or ground run-up enclosures, muffle the noise generated by engines running at high power for purposes other than takeoff, such as maintenance or repair testing. KCIA supports a diverse fleet mix, a wide range of aircraft types and sizes. Noise contours modeling the effectiveness of a noise containment facility that would be used by the Boeing Company showed a significant noise reduction benefit for residents adjacent to the north end of KCIA. A similar benefit would not exist for residents to the south, because of the placement of aircraft relative to prevailing winds, when engine run-ups are conducted.

However, the same facility might not serve well to address the noise impacts of the large number of smaller aircraft, which are the majority of KCIA users. To be effective, the baffle of the noise containment facility must be close to the engine, the source of noise. Accommodation would need to be made for small aircraft that would be separated from the walls of a noise containment facility designed for large aircraft. Additionally, a site for such a facility at the Airport is not apparent. All of the land is currently leased in long-term leases or is height restricted and cannot accommodate a structure the size of a noise containment facility.

Although the potential benefits of such a facility appeared to be clear, the design that would optimize its use has yet to be developed. In addition, some SAC members expressed concern that the noise containment facility could reduce the amount of land available to aviation businesses, thereby reducing the potential for jobs and economic benefits. However, the consensus was to proceed to determine the optimal design and site.

III. NOISE BARRIER OR WALL

(See page I.7 of Attachment C for detailed information)

COUNCIL WORK PLAN:

Study Viability of noise wall on north end of Airport.

CONSULTANTS' RECOMMENDATION:

Conduct Design Study for Construction of a Noise Barrier on the North End of the Airport..

Consultant Discussion:

Construction of a noise wall or barrier northwest of the Boeing ramp at a height of between 20 and 25 feet has the potential to reduce noise in neighborhoods directly adjoining the airport. Benefits of a barrier can be significant if the barrier is properly placed and high enough to break the line of sight between the noise source, aircraft engines, and the noise receptors, close by residences. The benefit of this alternative would be about 5 dB for the closest homes in Georgetown to about 3 dB for homes at a distance of roughly half a mile. This reduction would be for a single aircraft taxiing or idling event.

Barriers have no effect on noise from aircraft in flight, because once the aircraft leaves the ground, the noise source becomes higher than the barrier. From a practical perspective, a noise barrier analysis would involve determining the correct placement, length and height of a proposed barrier, and then reviewing those parameters to see if a wall of those proportions in that location would meet FAA safety criteria governing obstructions. Clearly large, non-frangible masses on an airport can be a danger if improperly located.

SAC RECOMMENDATION:

A wall at the north end of KCIA, creating a buffer between the Airport and the Georgetown residential community, was proposed in the Airport Master Plan. However, because this capital project would be installed for noise reasons, the Airport was advised that this project should be analyzed in the Part 150 Study prior to making a final decision about whether, and where, to construct it.

The benefits of such a wall for noise reduction are directly related to proximity of the wall and its size relative to the aircraft engines whose noise is to be reduced. Because the design that would optimize its use has yet to be developed, and some SAC members expressed concern that the noise wall could reduce the amount of land available to aviation businesses, thereby reducing the potential for jobs and economic benefits, the SAC recommended additional design and analysis of siting feasibility. It is assumed however that the wall will be constructed near or adjacent to the Boeing flight line.

IV. MAINTAIN EXISTING RUN-UP RESTRICTIONS

(See page I.11 of Attachment C for detailed information)

COUNCIL WORK PLAN:

KCIA shall maintain its nighttime run-up curfew in its Conceptual Master Plan.

CONSULTANTS' RECOMMENDATION:

Maintain Existing Run-up Restrictions.

Consultant Discussion:

The major reason for this recommendation is to preserve the benefits of the existing regulation, especially at night. At present KCIA restricts run-ups between 10 PM and 7 AM. This nighttime restriction on run-ups would be continued for the future. If in the future a Ground Run-up Enclosure were constructed at KCIA, and, as a result, the surrounding communities were shielded from run-up noise, then this nighttime restriction might be revisited.

The two locations currently identified for maintenance run-ups would continue again until such time as a GRE might be constructed.

SAC RECOMMENDATION:

(Majority): Maintain existing nighttime curfew on maintenance run-ups.

SAC Discussion:

KCIA has had a curfew on engine run-ups performed for reasons other than takeoffs between 10:00 p.m. and 7:00 a.m. for over a decade. This curfew is contained in the King County code. However, pursuant to State law, the Airport cannot regulate manufacturing activities by the Boeing Company, and therefore Boeing is not affected by the KCIA curfew. Boeing has maintained a practice of voluntary curfew and generally does not perform engine runups at night. The KCIA curfew and Boeing voluntary curfew have reduced the impacts of aircraft noise at night on surrounding residential areas. A **majority** of the SAC concurs with maintaining that curfew. A **minority** prefers that restrictions be based on noise levels generated rather than a blanket curfew, stating that there is no reason to restrict business opportunities on the Airport if the level of noise is not impacting residential areas. This minority has proposed a method of granting exceptions to the nighttime curfew via noise compliance plan submittals including engine noise profiles for those operators wishing to be exempted from the night curfew.

V. SOUND ATTENUATE RESIDENCES IN KCIA 65 DNL CONTOUR AND ABOVE

(See page I.3 of Attachment C for detailed information)

COUNCIL WORK PLAN:

Analyze a home-insulation program, including determining eligibility criteria and boundaries for communities nearer the airport and funding priorities within the contour

CONSULTANTS' RECOMMENDATION:

- 1) *Sound attenuate residences within the KCIA 65 DNL and above contour.*
- 2) *Sound attenuate residences within the combined KCIA/SEA 65 DNL and above contour.*

Consultant Discussion:

One of the most common land use mitigation measures around airports is sound attenuation of residences at high noise levels. FAA defines significant noise levels to be exposure to sound above 65 DNL. Federal money is available for residential sound attenuation, which generally involves replacement of windows and doors and occasionally other acoustic treatments, depending on the severity of the noise exposure of the residence. However, if a home currently has an inside noise level of 45 DNL or less, then that structure would not be eligible for sound attenuation.

The cost of sound attenuation for residences within the 65 DNL and above was estimated to be \$30,000 per house. There are approximately 1,955 houses expected to be in the Future Base Case 65 DNL and above contour for a total sound insulation project cost of about \$59 million.

It is important to note that in exchange for participation in an insulation program, the County would be required by State law to receive an avigation easement from the owner of the property. State law prevents a public entity from funding programs, such as insulation, unless the public agency receives something in exchange for the funding. Terms of the easement typically specify the extent of the noise impact and enable continuation of the noise at that or lower noise levels.

Individual airports approach the implementation of insulation programs differently. For example, some airports begin with houses in the highest contour levels (greatest noise exposure insulated first) and work outwards over time as funds become available. Other airports use random selection such as lotteries to choose homes for treatment. Still other airports do not

SAC RECOMMENDATION:

- 1) *(Unanimous): Implement a "Standard" Home Insulation Program within the KCIA 65 DNL and above contours (a Standard program would conform to the usual FAA program requirements of 65 DNL and higher contours, compared to the "non-Standard" referenced below that would include homes in the combined contours in addition to those in the KCIA-only contours).*
- 2) *(Unanimous): Implement a "non-Standard" Home Insulation Program within the combined KCIA & Sea-Tac 65 DNL and above contours.*
- 3) *(Unanimous) KCIA insulation programs shall incorporate Sea-Tac Airport's definition of a single-family residence as a dwelling with up to four units.*
- 4) *(Majority) Single family residences and multi family residences should be treated equally for eligibility for home insulation programs.*
(Minority) Preference for insulation should be given to single family residences. The relief should be provided to the resident (tenant and/or owner) and not to the owner, if the owner does not reside in the building.
- 5) *(Unanimous) Fire Stations where firefighters sleep shall be treated as residences, thereby making them eligible for a home insulation program.*

V. SOUND ATTENUATE RESIDENCES (cont.)

Consultants' Discussion (cont.)

conduct the insulation themselves, but either delegate it to local municipalities or to the residents themselves to choose from a pre-selected group of approved contractors. In all cases, the FAA has established certain acoustic standards that must be met upon completion of the insulation. Insulation program contractors must certify that noise levels in the homes have been reduced to and achieve no more than 45 dB noise levels inside, including a 20 dB reduction in noise levels, following insulation, in order for the homeowner to qualify for airport-sponsored insulation.

One of the unusual, perhaps unique, features of KCIA is its close proximity to Sea-Tac International Airport to the south. The two facilities are so close that their noise contours actually overlap. This Part 150 Study has taken the unusual analytical step of creating a combined contour for both airports. The purpose of this exercise is to define areas, which would not fall into either airport's individual 65 DNL and above contour, but which are exposed to 65 DNL when the noise levels from both airports are considered together.

This is an important analysis, because the two airports are orchestrated together from an air traffic standpoint; that is they are operated in tandem – both either in north or south flow. Thus, from a “real world” perspective, people on the ground are exposed to the combined noise levels of both airports simultaneously. As a result, the combined noise contour is a reflection of noise levels as they are actually experienced.

For this reason, the area within the combined KCIA/Sea-Tac 65 DNL and above contour should be eligible for federal noise attenuation funds. However, applying for federal sound insulation program funds using a combined contour would be a precedent setting action. Generally grants are given to a single airport for mitigation of its own impacts. The nature of a federal application, if this recommendation were adopted, would need to be determined. In all probability, some cooperative effort with the Port of Seattle (owner and operator of Sea-Tac) would be required.

For estimation purposes, this program would be expected to include 2,642 homes at a cost of \$30,000 each for a total of about \$79 Million.

SAC Discussion:

There will continue to be noise impacts on the community even if some of the other recommendations are implemented. Therefore, the community should be offered the opportunity to obtain home insulation to mitigate noise impacts. At an average cost of \$30,000 per home, the cost of insulating homes within the 65 DNL and above contour would be approximately \$59 million. The FAA may participate in funding this project at 90% (the Airport pays 10%), typically up to a maximum of \$5 million annually, making this program affordable for the Airport over a period of about 10 years. The SAC members assumed the FAA participation would be at this level.

Since KCIA air space overlaps with Sea-Tac Airport's airspace, some communities are heavily impacted by both airports; others are affected more by one airport than the other. In those areas where the KCIA effects alone do not result in exposure to 65 DNL or greater, but where the cumulative impacts of both airports would result in at least 65 DNL, the Committee felt that the cumulative impact should be addressed using the same standard as if either airport individually had created the impact. Thus, any home within the combined 65 DNL and above contour would qualify for residential soundproofing if this recommendation is adopted. Sea-Tac Airport has concurred with the use of this combined contour and has agreed to participate financially in insulation programs within the combined contours, subject to the order of priorities in the Sea-Tac Airport's own Part 150 Study.

The combined contour would add approximately one (1) additional square mile, including 367 housing units and 844 residents, to the KCIA 65 DNL and above contour.

A majority of SAC members agreed that single family residences and multi family residences should be treated equally for eligibility for home insulation programs. A minority felt that preference should be given to single family residences, and that relief should be provided to the resident (tenant and/or owner) and not just to the owner, if the owner does not reside in the building.

VI. SCHOOL BUILDING INSULATION WITHIN COMBINED KCIA AND SEA-TAC 65 DNL AND ABOVE CONTOUR

(See page I.4 of Attachment C for detailed information)

COUNCIL WORK PLAN:

Not addressed.

CONSULTANTS' RECOMMENDATION:

Sound attenuate schools within the combined KCIA and SEA-TAC 65 DNL and above contour.

Consultant Discussion:

Schools are eligible for Federal funding for sound attenuation, as studies have shown that excessive noise levels can impact the learning process. There are three schools (St. George's, Maple Elementary and Cleveland) within the combined KCIA and SEA-TAC 65 DNL and above contour. These buildings are not within the 65 DNL and above contour generated solely by KCIA.

Two of the schools, St. George and Cleveland, are in the existing combined contour, and the third, Maple, is in the future combined contour. The estimated cost to sound attenuate all three would be approximately \$11 Million.

SAC RECOMMENDATION:

(Unanimous): Insulate schools within the combined 65 DNL and above contours.

SAC Discussion:

Three schools (Cleveland, Maple and St. George) are located within the 65 DNL and above combined (KCIA and Sea-Tac) noise contours. FAA funding for school insulation programs is different from and in addition to home insulation programs. Noise impacts at schools can be very disruptive to the learning process. Therefore, the SAC voted to provide insulation to these qualifying schools.

Funding for schools is from FAA funding that can be directed toward schools and public buildings. There was some discussion of other public buildings that might be considered for insulation, but no recommendations were reached concerning those other buildings.

VII. ESTABLISH SALES TRANSACTION PROGRAM FOR HOMEOWNERS IN KCIA 65 DNL AND ABOVE CONTOUR

(See page I.5 of Attachment C for detailed information)

COUNCIL WORK PLAN:

Not addressed.

CONSULTANTS' RECOMMENDATION:

Establish a Sales Transaction program for residents whose homes have been insulated and residents who nevertheless wish to sell their homes within the KCIA 65 DNL and above contour.

Consultant Discussion:

Some residents within the airport environs may not wish to take advantage of the sound attenuation program and may desire to sell their homes. The Sales Assistance program is intended to provide those homeowners with an opportunity to sell their homes at fair market value.

The program would work as follows. An appraisal of the home is performed by the Airport. If the home does not sell within the average time limit for homes in the immediate area, then the selling price is reduced incrementally until the home sells. The Airport makes up the difference between the "fair market value" sales price based on the appraisal and the actual sale price. Prior to closing, an avigation easement is placed on the property.

This program has several advantages. It keeps neighborhoods intact, does not force people to sell who do not desire to; the Airport never takes title to the property; the seller receives fair market value for the home, and buyers purchase the property with full knowledge of the airport and the avigation easement.

The estimated cost of this Recommendation is not known, as it is impossible to determine how many homeowners would want to take advantage of this program. An additional consideration is that FAA funding will not be available for sales assistance programs when the assistance is offered prior to home insulation. The FAA has indicated a preference that the sound attenuation program consist of the following steps: insulate the home first, then if the owner still wants to sell, then initiate sales assistance. This would ensure that the new owner, who would not be eligible for sales assistance in the future, moves into a home that is sound attenuated and therefore less impacted by noise.

SAC RECOMMENDATION:

(Majority) Implement Sales Assistance Program in combined 65 DNL and above contour for homeowners who want to move.

(Minority) Do not Implement Sales Assistance Program in 70 DNL contour.

SAC Discussion:

A **majority** of SAC members supports providing financial assistance to homeowners within the 65 DNL and above who prefer to move away from the airport. As part of this assistance program, an avigation easement would be added to the deed of the home. Some SAC members, a **minority**, opposed this recommendation because they believed that the airport should not encourage new residents in an area where noise may significantly impact them.

VIII. PURCHASE AVIGATION EASEMENTS FROM HOMEOWNERS IN THE KCIA 65 DNL AND ABOVE CONTOUR

(See page I.5 of Attachment C for detailed information)

COUNCIL WORK PLAN:

Not addressed.

CONSULTANTS' RECOMMENDATION:

Establish an avigation easement purchase program for homeowners within the KCIA 65 DNL and above contour.

Consultant Discussion:

This recommendation is similar to the previous one, as some homeowners may not want to take advantage of the sound attenuation program, but do wish to remain in their homes. These homeowners prefer selling an avigation easement, because it would not involve contractors making changes to their homes. In these cases, King County would purchase outright an avigation (noise) easement from the homeowner

The value of such an easement would be determined through an appraisal process (usually between \$2,000 and \$4,500, according to airport-adopted policies specific to each program) paid to the homeowner. Homeowners can then use this payment as they desire; however, the easement is recorded and is attached to the title, and would, therefore, carry over to any subsequent owner of the property. Note that an avigation easement would be based on current noise levels, and if the noise levels were found to be substantially higher at a later date, other options could still be considered or implemented.

The estimated cost for this is unknown due to uncertainty about how many homeowners would want to participate in such a program and what the value of the easements may be.

SAC RECOMMENDATION:

(Majority) Implement Avigation Easement program for residences within the 65 DNL and above contour.

(Minority) Do not Implement Avigation Easement program.

(Majority) Only owner-occupied residences shall be eligible for avigation easements.

SAC Discussion:

A **majority** of SAC members support providing financial assistance to residents within the 65 DNL and above who prefer to move away from the airport. As part of this assistance program, an avigation easement would be added to the deed of the home. Some SAC members, a **minority**, opposed this recommendation because they believed that the airport should not encourage new residents in an area where noise may significantly impact them

A **majority** of SAC voiced opposition to avigation easements for non owner-occupied residences, which would accrue economic benefits to the owner but not necessarily benefit the tenants.

IX. IMPLEMENT A HOME BUYOUT PROGRAM FOR HOMEOWNERS

COUNCIL WORK PLAN:
Not addressed.

CONSULTANTS' RECOMMENDATION:
No recommendation.

SAC RECOMMENDATION:
(Majority) Do not institute a mandatory home buyout program within any DNL contour.

(Majority) The Airport should investigate alternatives for voluntary buyout of homes within the 70 DNL contour using programs that are not available through the federal government.

(Minority) Do not institute any voluntary home buyout program within any DNL contour.

SAC Discussion:

All of the programs and procedural changes recommended by SAC within the 65 DNL contour and greater will leave areas of residential use, inside the 70 DNL contour. Given FAA's requirement that homes be brought up to building codes at the time of insulating, it is possible that some of the older homes located in Georgetown can not be sufficiently mitigated at a typical cost to reduce the noise levels to a range that is compatible with residential use according to FAA guidelines (i.e., attain a level of no more than 45 dB inside the home).

SAC discussed their concerns about the impacts on the residents of that area (and adjacent contiguous neighborhood areas, recognizing that contours are ranges and that contiguous areas have nearly the same noise levels). Several SAC members were concerned that programs such as aviation easements or sales assistance will not reduce the number of residents affected by the noise; rather, the same or new residents will remain in homes that sustain a great deal of noise exposure. It was also discussed that the overall character of the Georgetown area is industrial/commercial in nature. The recent Seattle community planning process has resulted in the Georgetown community remaining designated as residential.

IX. IMPLEMENT A HOME BUYOUT PROGRAM FOR HOMEOWNERS (cont.)

SAC Discussion (cont.)

Based on this plan, the City of Seattle would have to amend the plan before the land uses could change, if change were desirable. Even with this Plan, it is recognized that residential development is inconsistent with the Federal guidelines for compatibility within the 65 or greater DNL noise contours, but neither King County nor the City of Seattle has adopted any land use compatibility standards that actually define land use compatibility within aircraft noise contours.

It was recognized by the SAC that the Georgetown residents differ widely in their perceptions of noise and their wishes for mitigation. The opinions presented to the Airport staff and consultants in public meetings ranged from not minding the current environment, to absolutely not wanting any buyout program but accepting other forms of mitigation assistance, to requesting a home buyout program. SAC members also recognized that some homes within the 70 DNL contour could be insulated to meet FAA guidelines.

The SAC discussed the pros and cons of home buyout programs within the 70 DNL contour. A mandatory program, applied to the entire neighborhood, would require residents to leave who are not troubled by the noise level and do not wish to live in other areas of the City. A voluntary program funded by FAA noise abatement funds could lead to degradation of the remaining neighborhood, because FAA funding requires maintaining the purchased site in a cleared, unused state. On the other hand, it was felt that some relief should be provided to those who currently reside in an area of such high noise level, if the residents would like relief.

No support was expressed to SAC or Airport staff by Georgetown neighborhood residents for a mandatory home buyout program. While a minority of SAC members supported a mandatory home buyout program in the 70 DNL contour because it would relieve the most affected population of noise impacts and could also make land available to aviation related businesses, a majority of SAC members rejected instituting a mandatory home buyout program within any DNL contour. A majority of SAC voiced support for investigating alternatives for a voluntary buyout of homes within the 70 DNL contour through programs that are not available through the federal government and that might allow alternative uses to be instituted within the properties bought. A minority believes that no home buyout program should be offered.

X. FLY QUIET PROGRAM

(See page I.9 of Attachment C for detailed information)

COUNCIL WORK PLAN:

Several items that could be contained in a Fly Quiet Program are recommended for review, including:

- Policy to promote flying over non-residential areas by means of monitoring flight tracks and pilot education
- Strategy to keep nighttime flights away from residential areas through monitoring of flight tracks and pilot education
- Employ data from all aspects of the noise monitoring system to identify and respond to complaints
- Use noise monitoring data to differentiate KCIA flights from those at Sea-Tac

CONSULTANTS' RECOMMENDATION:

Develop a Fly Quiet Program with Enhanced Noise and Compliance Monitoring.

Consultant Discussion:

KCIA staff has changed the character of its Complaint Response System from reaction to specific incidents to a community resource program providing regular information on a variety of noise abatement topics. Using the data gathered by the noise monitoring system, which may be supplemented from time to time by information from portable noise monitors and/or from the Sea-Tac Noise Monitoring System, KCIA would regularly report on compliance with some of the recommendations resulting from this study.

Regular quarterly reports could describe airport activity and overall trends including:

- Operations Summary
- Noise Level Report
- Adherence to flight tracks through Elliott Bay
- Use of the Charted Visual Approach
- Effective implementation of the close-in noise abatement departure procedure for north bound flights
- Special Reports such as:
 - Noise levels in a particular community or at a specific residence
 - Analysis of flight tracks over a residential area such as Magnolia or West Seattle
 - Analysis of nighttime run-up noise

SAC RECOMMENDATION:

(Unanimous): Implement Fly Quiet and Operator Education Programs.

SAC Discussion:

A variety of enhancements to the KCIA noise monitoring and flight tracking systems could be used to improve pilot education. These include the following:

- Noise Information Line to report loud and low aircraft and add online noise incident reporting feature.
- Airport advisories.
- Aircraft operating procedures (Fly Quiet).
- Deliver training about noise sensitive areas to Air Traffic Control personnel to facilitate compliance with Fly Quiet procedures.
- Encourage FAA to promote flight routes away from noise sensitive areas.
- Noise mitigation program descriptions.
- National Weather Service link.
- Responsible Operator reports.
- Custom reports of flight deviations.
- Real-time airport gate and land closure conditions.
- FAA aircraft registry link.
- Links to Airport tenants and museums.
- Public outreach updates
- Instructional program featuring Fly Quiet flight procedures.
- Interactive public presentation software system featuring flight track and noise monitoring data/analysis. Incentives program to reinforce voluntary compliance.

XI. IMPLEMENT CLOSE-IN DEPARTURE PROCEDURE FOR NORTHBOUND FLIGHTS

(See page I.6 of Attachment C for detailed information)

COUNCIL WORK PLAN:

Evaluate altering angle of climb and descent

CONSULTANTS' RECOMMENDATION:

Implement the Close-in Departure Procedure for Northern Departures.

Consultant Discussion:

Analysis of alternative noise abatement departure procedures indicates that there would be some noise reduction benefit directly north of the airport, specifically in Georgetown, if the close-in departure were adopted in the north flow condition only. When the engine power is reapplied further out, aircraft would have generally traveled on to industrial areas along the Duwamish or over Elliott Bay.

The close-in noise abatement departure would reduce single event overflight noise by about 2 to 3 dB in Georgetown for older aircraft manufactured as Stage 2 aircraft, which have been retrofitted to meet Stage 3 standards. Newer aircraft climb fast enough that they are generally higher than the 800' where the power cutback would occur when they pass over Georgetown.

In south flow conditions, the situation is reversed. There is no immediately adjacent community to the south (as Georgetown is to the north) to gain the noise reduction benefit from a power cutback. On the other hand, the reapplication of power from the close-in departure procedure would most likely occur over residential areas in and around Tukwila causing an increase in noise levels.

SAC RECOMMENDATION:

(Unanimous): Implement a "close-in" procedure for departures to the north.

SAC Discussion:

Departure procedures can be established where pilots alter the amount of thrust used for takeoff in order to reduce noise close to the Airport, either reducing power close to the airport and adding greater thrust farther out, or alternatively, optimizing thrust close to the Airport and reducing it farther away.

KCIA's location would allow a procedure for north flow takeoffs that

reduces noise close-in, in the Georgetown area, by implementing an FAA approved departure procedure that reduces noise to communities near the airport, with increased noise levels over Elliot Bay. A similar takeoff procedure would not reduce noise to the south, where there is no uninhabited area like Elliot Bay.

XII. DEVELOP AN FMS DEPARTURE PROCEDURE OVER ELLIOTT BAY

(See page I.8 of Attachment C for detailed information)

COUNCIL WORK PLAN:

Pursue GPS or similar alternatives for instrument landing over Elliott Bay.

CONSULTANTS' RECOMMENDATION:

Develop an FMS Departure Route through Elliot Bay.

Consultant Discussion:

Developing an FMS/GPS departure through Elliott Bay has the potential to direct aircraft more accurately over the center of the water thus avoiding residential areas in West Seattle and Magnolia. Analysis shows that just over 600 people within 65 DNL and above would be expected to benefit from this procedure, and many more would benefit at lower annual average noise levels. FAA approval would be necessary for this procedure to be implemented.

It is unclear how many aircraft operating at KCIA are equipped with the necessary cockpit avionics to fly an FMS departure. Newer aircraft will be GPS/FMS equipped, but the availability on other aircraft would require some research. Part of the implementation of this alternative would be to ascertain what percentage of flights operating here could take advantage of the procedure.

SAC RECOMMENDATION:

(Unanimous): The Airport should work with FAA and operators to obtain an alternative instrument approach that will allow curved approach through Elliott Bay and avoid residential areas.

SAC Discussion:

A curved or segmented instrumentation approach over Elliot Bay would allow aircraft to avoid crossing Magnolia, which is under the existing Instrument Flight Rules (IFR) approach. Although the Charted Visual Approach is available to those flying under VFR, there is currently no instrumentation approach available that would assist pilots in avoiding residential areas, notably the Magnolia neighborhood.

Although there is currently no IFR technology approved by FAA that allows a curved or segmented approach, the FAA is currently developing procedures for curved or segmented approaches using the Transponder Landing System (TLS) technology. The FAA has indicated they need approximately two more years to complete these procedures. The Airport has an appropriation to install TLS technology. Other technology, such as GPS, is likewise unavailable on a widespread basis at this time.

The SAC specifically recommended that technology that allows for more precise approach over the water be implemented as it becomes available, and that KCIA strive to be designated as a pilot site for the development of such technology and any air traffic procedures necessary to support the new approach technology, if that would aid in making such technology available sooner. The SAC further recommended that the FAA develop an FMS departure route through Elliot Bay.

XIII. FULLY IMPLEMENT USE OF THE CHARTED VISUAL APPROACH THROUGH ELLIOTT BAY

(See page I.8 of Attachment C for detailed information)

COUNCIL WORK PLAN:

- 1) Request FAA approval of charted visual flight path
- 2) Incorporate use of FAA-approved charted visual flight paths in operating agreements

CONSULTANTS' RECOMMENDATION:
Fully implement use of Chorted Visual Approach Through Elliot Bay.

Consultant Discussion:

The Chorted Visual Approach directs aircraft on a curved arrival path through Elliott Bay in south flow reducing noise levels over Queen Anne and Magnolia. Analysis indicates that this using this approach would result in about 600 fewer people within 65 DNL and above as compared to the future Base Case condition.

Being a visual procedure, it can only be used in "fair weather" conditions when pilots are able to see both the airport and other traffic. As a result, analysis assumed that the procedure might be used 50% of the time.

SAC RECOMMENDATION:
(Unanimous): Investigate FAA approval of lower weather minimums for use of Chorted Visual Flight Path.

SAC Discussion:

The Council adopted work plan promoted a charted approach path to be used by pilots in VFR (visual flight rules) conditions to avoid the Magnolia residential area. Because the FAA has already approved and published the Chorted Visual Flight Path, the SAC took no further action. However, the SAC did recommend that the Airport use its flight tracking and noise monitoring system to encourage pilots to select and use the charted visual approach path over Elliot Bay more frequently as an alternative to IFR, when conditions allow.

In addition, SAC agreed that lower weather minimums for the Chorted Visual Procedure should be investigated with FAA. The current weather minimums are 5000-foot ceiling and 4 mile visibility, much higher than that for a similar approach to Sea-Tac. Pilots have suggested that lower weather minimums could be implemented at KCIA as well, encouraging greater use of the charted visual procedure because it could be used more often.

XIV. DEVELOP AND IMPLEMENT BUILDING DESIGN STANDARDS TO REDUCE AND/OR CONTAIN NOISE ON THE AIRPORT

(See page I.11 of Attachment C for detailed information)

COUNCIL WORK PLAN:

Not addressed.

CONSULTANTS' RECOMMENDATION:

Develop and implement Building Design Standards/Placement to Reduce/Contain Noise on the airport.

Consultant Discussion:

If noise abatement is a consideration during design, certain perimeter airport buildings can act as noise barriers between aircraft operations and surrounding neighborhoods. Similar to the discussion in alternative A3, a noise barrier on the north side of the airport, buildings can act as a shield if they are properly situated, the height is sufficient, and there are no gaps through which noise can pass. This alternative would allow KCIA to develop the proper standards, so that any new construction on the airport would be designed to maximize noise abatement potential.

SAC RECOMMENDATION:

(Unanimous) Develop Building Design Standards to reduce or contain noise on Airport.

SAC Discussion:

The committee felt that if consideration is given to noise abatement principles during design, the Airport buildings themselves could serve to reduce off-airport noise.

XV. INTEGRATION OF FLIGHT PATHS WITH SEA-TAC

COUNCIL WORK PLAN:

Evaluate integration of flight paths with Sea-Tac Airport

CONSULTANTS' RECOMMENDATION:

No recommendation.

Consultant Discussion:

Flight paths are integrated. Both airports work together in either north or south flow.

SAC RECOMMENDATION:

No recommendation. Flights are already integrated.

SAC Discussion:

SAC did not pursue this option further because of FAA input that no additional integration is possible.

XVI. USE OF GROUND LEASES TO INFLUENCE OPERATIONS

(See page G.69 of Attachment D for detailed information)

COUNCIL WORK PLAN:

- 1) Incorporate use of FAA-approved charted visual flight paths in operating agreements
- 2) Incorporate noise reduction commitments by operators in long-term leases

CONSULTANTS' RECOMMENDATION:

No recommendation.

Consultant Discussion:

Pilot procedures are directed by the FAA and/or pilot choices for safety reasons. FAA uses the Part 150 Study to arrive at procedural changes that can be used to mitigate noise impacts. The Airport cannot use leases for this purpose. However, KCIA will pursue noise abatement agreements with all new tenants and lease extensions. These agreements reflect tenant intent but cannot be mandatory. Inserting specific noise abatement language in operating leases may require a Part 161 Study.

SAC RECOMMENDATION:

No recommendation.

SAC Discussion:

Pilot procedures are directed by the FAA and/or pilot choices for safety reasons. FAA uses the Part 150 process to arrive at approved noise mitigation programs. Any regulation, which amounts to a "use restriction" is subject to a Part 161 process as well. The Airport cannot unilaterally use leases as noise regulation mechanisms.

However, KCIA will pursue noise abatement agreements with all new tenants and lease extensions. These agreements reflect tenant intent but cannot be mandatory.

XVII. DIFFERENTIAL LANDING FEES AS AN INCENTIVE FOR NOISE ABATEMENT

(See page G.70 of Attachment D for detailed information)

COUNCIL WORK PLAN:

Evaluate the use of financial incentives to achieve pilots' and operators' compliance with noise abatement procedures.

CONSULTANTS' RECOMMENDATION:

No recommendation.

Consultant Discussion:

Using variable landing fees for noise abatement purposes may require a Part 161 Study. Also, need to consider whether a fee of sufficient magnitude to affect the desired changes would be consistent with existing federal policies on airport rates and charges.

SAC RECOMMENDATION:

No recommendation.

SAC Discussion:

Any use of differential fees as a noise reduction measure must be instituted through a Part 161 Access Restriction Study.

XVIII. SEEK COMMITMENTS FROM PILOTS AND OPERATORS ON USE OF 10,000' RUNWAY

COUNCIL WORK PLAN:

Seek commitments to restrict use of the proposed take-off threshold 800 feet north of the existing threshold when conditions permit, should the threshold shift be approved in the final Master Plan.

CONSULTANTS' RECOMMENDATION:
No recommendation.

SAC RECOMMENDATION:
(Unanimous) Implement procedures for limited use of runway shift, if implemented following approval of Airport Master Plan.

SAC Discussion:

The Airport Draft Master Plan proposes that use of the 880-foot shift to the 10,000-foot main runway, which is needed to sustain 10,000 feet of runway length after the runway is shortened on the south end for safety area compliance, be limited to a very small number of users. The Airport developed a set of procedures that include prior permission with special marking and lighting, so that most cases will not involve use of that added pavement. If the Master Plan is approved, these requirements will restrict the use of the runway shift area to a maximum of about 320 flights per year during major Boeing Company flight activities. Most times would see considerably less than this. If the Master Plan is not approved, the runway shift will not be constructed, and therefore use of it will not be an issue.

The SAC supported this limitation on use of the proposed runway shift.

XIX. CLOSE KCIA AT NIGHT

(See page G.9 of Attachment D for detailed information)

COUNCIL WORK PLAN:

Not addressed.

CONSULTANTS' RECOMMENDATION:

Do not institute night curfew at KCIA.

SAC RECOMMENDATION:

(Unanimous): Closure of KCIA at night is not recommended.

SAC Discussion:

The SAC unanimously opposed a full nighttime closure, primarily for two reasons: first, the economic losses that could result from losing the overnight delivery capacity; and second, the difficulty of successfully completing a Part 161 Study.

XX. CITY ZONING CHANGES

COUNCIL WORK PLAN:
Not addressed.

CONSULTANTS' RECOMMENDATION:
Not addressed.

SAC RECOMMENDATION:
(Majority): King County should work with the Cities of Tukwila and Seattle to identify what can be done to improve land use compatibility with the airport when new development occurs within the 65 and higher DNL contours.

SAC Discussion:

The SAC discussed the fact that even in the last couple of years, while noise issues have been broadly discussed, and during the Part 150 Study, there has been new housing development occurring in both the City of Seattle and the City of Tukwila in areas known to be affected by noise from KCIA operations. It was also noted that there are areas near the Duwamish in the City of Tukwila in which sewers are planned, which will increase the density in those areas. The State of Washington Growth Management Act considers airports to be essential public facilities, and there are provisions within the Act for each jurisdiction's land use plans to be reviewed for zoning and mitigation needed for residential areas affected by airports. Although noise contour information has not been readily available to the cities until this Part 150 Study was conducted, they are now available for consideration when cities make zoning and other land use decisions.

A **majority** of the SAC recommended that King County initiate discussions with each city adjacent to the boundaries of KCIA regarding how to assure that land uses in areas affected by KCIA are compatible with the airport.

A **minority** of the SAC did not recommend these discussions take place.

Preliminary Consultant's Recommendations

Introduction

The following discussion represents preliminary recommendations by Consultant Team for consideration by the Study Advisory Committee along with the reasons for their recommendation. The recommendations are presented for discussion purposes and to help formulate the Committee's Recommendations. They have been developed in response to Committee discussions over the past several meetings, but are not intended to limit Committee recommendations in any way. Other Alternatives that were discussed by the Committee are not recommended for several reasons; including feasibility, noise reduction potential, issues associated with legality, and financial considerations. It is also anticipated that implementation of these recommendations will likely take approximately five to eight years, depending upon King County and FAA funding/budgetary considerations and Federal policy.

Recommendations

Alternative A2. Implement a complete Stage 2 jet restriction at night between the hours of 10 PM and 7 AM.

Reasons for Recommendation:

If implemented, this alternative would include jets (primarily private business jets) under 75,000 pounds and would require completion of a Part 161 study. Implementation of this alternative would reduce the number of people within the 65 DNL by approximately 1,100 as compared to the Future Base Case.

Although preparing a Part 161 document is a time consuming and potentially frustrating task, there is some evidence nationally that it may be possible to ultimately succeed for an action focused on aircraft less than 75,000 pounds. No Part 161 Study has, to date, has been approved by the FAA; however, a well-constructed and technically strong document may potentially be viable.

It is important to note that since this alternative would only apply to Stage 2 aircraft and not to Stage 3, no formal approval from FAA is required under the Part 161 regulation. However, very detailed FAA reviews and objections to similar studies at other airports can offer a glimpse of what might be expected at KCIA if King County goes forward with this recommendation.

In any case, it is certain that Part 161 has not been written with the intent to be easily followed or implemented. FAA has been clear that they do not favor access restrictions, and that, on the contrary, they do not support noise restrictions that adversely affect airport/airfield capacity and efficiency.

Naples Florida has recently been attempting to adopt a somewhat similar regulation to the one recommended here. Their proposal is a full (24-hour) ban on Stage 2 aircraft. In that case, FAA has raised serious objections to the airport's proposal, and has threatened withdrawal of federal funds if the airport implements its ban.

FAA objections to the Naples proposal to date have included:

- Absence of benefit within the 65 DNL, (the Naples rule is targeted at areas within the 60 DNL)
- Lack of local land use protections against residential encroachment
- Conflicts between the proposed noise rule and FAA Grant Assurances. Grant assurances are contracts airports make with FAA in exchange for federal funds. FAA's position is that access restrictions focused on benefits beyond the 65 DNL are a violation of Grant Assurances.

The implications of FAA raising the question of Grant Assurances are several:

- Naples is the first instance where FAA has raised Grant Assurances as the primary objection to a Part 161 access restriction.
- Consistency with Grant Assurances, however that is interpreted, may be tantamount to an FAA approval power over a Stage 2 access restriction by means of a different mechanism than is outlined in the Part 161 regulations.
- If a Part 161 is recommended for KCIA, a careful review of grants and their assurances would be necessary.
- If any recommended program at KCIA can be demonstrated to benefit areas within 65 DNL, the Naples Grant Assurance objection may not apply.

According to the data prepared for this Part 150 Study, the benefits within 65 DNL of a Stage 2 restriction at night are a reduction in impact on 317 residences and approximately 1,100 people. In addition this alternative would reduce impact on approximately 84 residences and over 330 people within the 70 DNL contour.

There is a strong argument to be made regarding the purpose of such a restriction. Unlike Stage 2 aircraft over 75,000 lbs., which have been phased-out as a result of the Airport Noise and Capacity Act (ANCA), these smaller aircraft are free to operate for an unlimited period of time. The absence of any federal regulation on this point arguably leaves room for local action. And, the consultant recommendation proposes to focus the limit within nighttime hours, such that relief might be provided when residents are most easily disturbed, but does not inhibit the daily commerce of the facility.

Alternative A4. Sound attenuate residences within the KCIA 65 DNL contour.

Reasons for Recommendation:

One of the most common land use mitigation measures around airports is sound attenuation of residences at high noise levels. FAA defines significant noise levels to be exposure to sound above 65 DNL. Federal money is available for residential sound attenuation, which generally involves replacement of windows and doors and occasionally other acoustic treatments, depending on the severity of the noise exposure of the residence. However, if a home currently has an inside noise level of 45 DNL or less, then that structure would not be eligible for sound attenuation.

Individual airports approach the implementation of insulation programs differently. For example, some airports begin with houses in the highest contour levels (greatest noise exposure insulated first) and work outwards over time as funds become available. Other airports use random selection such as lotteries to choose homes for treatment. Still other airports do not conduct the insulation themselves, but either delegate it to local municipalities or to the residents themselves to choose from a pre-selected group of approved contractors. In all cases, the FAA has established certain acoustic standards which must be met upon completion of the insulation.

For estimation purposes, the cost of sound attenuation for residences within the 65 DNL was assumed to be \$30,000 per house. There are approximately 1,955 houses expected to be in the Future Base Case 65 DNL contour, so the total sound insulation project cost would be about \$59 million.

It is important to note that in exchange for participation in an insulation program, the County would be required by State law to receive an easement from the owner of the property. State law prevents a public entity from funding programs, such as insulation, unless the public agency receives something in exchange for the funding. Terms of the easement typically specify the extent of the noise impact and enable continuation of the noise at that or lower noise levels.

Alternative A4. Sound attenuate residences with the combined KCIA/SEA 65 DNL contour.

Reasons for Recommendation:

One of the unusual, perhaps unique, features of KCIA is its close proximity to Sea-Tac International Airport to the south. The two facilities are so close that their noise contours actually overlap. This Part 150 Study has taken the unusual analytical step of creating a combined contour for both airports. The purpose of this exercise is to define areas, which would not fall into either airport's individual 65 DNL contour, but which are exposed to 65 DNL when the noise levels from both airports are considered together.

This is an important analysis, because the two airports are orchestrated together from an air traffic standpoint; that is they are operated in tandem – both either in north or south flow. Thus, from a “real world” perspective, people on the ground are exposed to the combined noise levels of both airports simultaneously. As a result, the combined noise contour is a reflection of noise levels as they are actually experienced.

For this reason, the area within the combined KCIA/Sea-Tac 65 DNL contour should be eligible for federal noise attenuation funds. However, applying for federal sound insulation program funds using a combined contour would be a precedent setting action. Generally grants are given to a single airport for mitigation of its own impacts. The nature of a federal application, if this recommendation is adopted, would need to be determined. In all probability, some cooperative effort with the Port of Seattle (owner and operator of Sea-Tac) would be required.

For estimation purposes, this program would be expected to include 2,642 homes at a cost of \$30,000 each for a total of about \$79 Million.

Alternative A4. Sound attenuate schools within the combined 65 DNL contour.

Reasons for Recommendation:

Schools are eligible for Federal funding for sound attenuation as studies have shown that excessive noise levels can impact the learning process. There are three schools within the combined 65 DNL contour which are not within the 65 DNL contour generated by aircraft using Sea-Tac Airport. These are St. Georges School, Maple Elementary and Cleveland. It is estimated that the cost to sound attenuate these schools would be approximately \$11 Million.

Alternative A4. Establish a Sales Transaction program for residents wishing to sell their homes within the KCIA 65 DNL contour.

Reasons for Recommendation:

Some residents within the airport environs may not desire to take advantage of the sound attenuation program and may desire to sell their houses. The Sales Assistance program is intended to provide those residents with an opportunity to sell their homes at fair market value. The program is designed so that the homeowner puts the home on the market at fair market value. If the home does not sell within the average time limit that homes in the immediate area sell, then the selling price is reduced a certain percentage and is put on the market again. This process is continued until the home sells. The Airport makes up the difference in the original sales price and the actual sale price. Prior to closing, an avigation easement is placed on the property.

This program keeps neighborhoods intact, does not force people to sell who do not desire to sell, the Airport never takes title to the property, the seller receives fair market value for the residence, and buyers purchase the property with full knowledge of the airport and the avigation easement. It should be noted that present FAA policy is to sound attenuate the home prior to sales assistance.

The estimated cost of this Recommendation is not known, as it is impossible to determine how many homeowners would want to take advantage of this program. An additional consideration is that FAA funding will not be available for sales assistance programs when the assistance is offered prior to home insulation. The FAA has indicated a preference that the sound attenuation program consist of the following steps: insulate the home first, then if the owner still wants to sell, initiate sales assistance. This would ensure that the new owner, who would not be eligible for sales assistance in the future, moves into a home that is sound attenuated and therefore less impacted by noise.

Alternative A4. Purchase avigation (noise) easements from residents wishing to sell such easements within the KCIA 65 DNL contour.

Reasons for Recommendation:

This Recommendation is similar to the previous Recommendation, as some residents may not want to take advantage of the sound attenuation program but still may wish to remain in their homes. This program would purchase outright an avigation (noise) easement from the homeowner. The value of such an easement would be determined through the appraisal process (usually between \$2,000 and \$4,500) and paid directly to the homeowner. The homeowners can then use the payment for whatever they desire. The easement is recorded and is attached to the title. Some homeowners prefer this program because they like their homes and do not necessarily want contractors making changes to them.

The estimated cost for this is unknown because it cannot be determined at this time how many residents would want to participate and what the value of the easement may be. This is not dependent upon any other recommendation.

Alternative A8. Implement the Close-in Departure Procedure for Northern Departures.

Reasons for Recommendation:

Analysis of this alternative indicates that there would be some benefit from adopting the close-in departure in the north flow condition only. The reason for this recommendation is that the close-in communities directly north of the airport, specifically Georgetown would benefit from the power reduction. When the power is reapplied later, the aircraft generally would have traveled on to industrial areas along the Duwamish or over Elliott Bay.

In south flow conditions, however, the situation is different. There is no community as close to the airport to the south as Georgetown is to the north to gain the benefit of the noise reduction from a power cutback. On the other hand, the reapplication of power would largely occur over residential areas mostly in Tukwila.

This alternative would reduce single event overflight noise by about 2 to 3 dB in Georgetown for older manufactured as Stage 2 aircraft, which have been retrofitted to meet Stage 3 standards. Newer aircraft types climb fast enough that they are generally already higher than the 800' where the power cutback would occur when they pass over Georgetown.

Alternative A3. Initiate a Site Selection Feasibility Study for a Ground Run-up Enclosure, to address such issues as placement, actual use and projected use, and value of reduction vs. cost of GRE.

Reasons for Recommendation:

The question of whether a GRE would be a viable and valuable investment for KCIA has been discussed for some time. And, run-ups are a continuing source of neighborhood irritation. However, whether this particular recommendation is worthy of implementation rests on the answers to several technical and financial questions. So, to put the GRE issue in its full context; that is how it would work as well as how its benefits would compare to other possible actions, a Site Selection Feasibility Study is necessary.

The viability of a GRE at KCIA is dependent on locating a site, which meets the following criteria at a minimum. A GRE must be:

- Accessible by aircraft via taxiway and/or apron sufficient for aircraft weight
- Consistent with FAA safety criteria for on airfield buildings. The structure must not act as an obstruction or hazard.
- Able to accommodate all or most of the aircraft types likely to be conducting run-ups at the airport
- Oriented favorably towards the wind, so that the benefits of the facility are not counteracted by meteorological conditions
- Designed to be effective in northwest high humidity conditions.

In addition to the physical parameters necessary to design an effective GRE, the airport must identify a source of funds to finance the facility. Locating and building a GRE can cost in the range of \$3 to 6 million. This cost would be evaluated from the perspective of how many aircraft would use the facility on an annual basis, and what the resulting cost benefit would be compared to other actions the airport might take to reduce noise.

This recommendation would cause the airport to initiate a site selection study to answer these and similar questions leading to the ability to make an informed decision on the desirability of constructing a GRE.

Alternative A3. Initiate a Site Feasibility Study to Construct a Noise Barrier on the North End of Airport.

Reasons for Recommendation:

One alternative, which has the potential to reduce noise in neighborhoods directly adjoining the airport, is construction of a noise wall or barrier northwest of the Boeing ramp at a height of between 20 and 25 feet. Benefits of a barrier can be significant if the barrier is properly placed and high enough to break the line of sight between the noise source, aircraft engines, and the noise receptors, close by residences.

Barriers can reduce noise for receptors close to them, but they decrease in effectiveness with distance, so that houses far from the wall would receive a diminishing benefit. Also, barriers have no effect on noise from aircraft in flight, because once the aircraft leaves the ground, the noise source becomes higher than the barrier.

From a practical perspective, a noise barrier analysis would involve determining the correct placement, length and height of a proposed barrier, and then reviewing those parameters to see if a wall of those proportions in that location would meet FAA safety criteria governing obstructions. Clearly large, non-frangible masses on an airport can be a danger of improperly located.

The benefit of this alternative would be about 5dB for the closest homes in Georgetown to about 3 dB for homes at a distance of roughly half a mile. This reduction would be for a single aircraft taxiing or idling event.

Alternative A8 and A9. Implement technology that allows for more precise approach ground tracks over the water as it becomes available. Be a pilot site for the development of the technology and air traffic procedures necessary to support new approach technology.

Alternative A8. Develop an FMS Departure Route through Elliot Bay.

Reasons for Recommendation:

Developing an FMS/GPS departure through Elliott Bay has the potential to direct aircraft more accurately over the center of the water body thus avoiding residential areas in West Seattle and Magnolia. Analysis shows that just over 600 people would be expected to benefit from this procedure within 65 DNL, and many more would benefit at lower annual average noise levels.

For such an FMS/GPS procedure to work, several steps are necessary:

- FAA Control Tower develops and approves the procedure
- FAA assigns the procedure to departing aircraft depending on weather, air traffic volumes and other operating parameters (such as avoiding conflict with Sea-Tac traffic)
- Aircraft receiving the instruction must also be equipped with the appropriate cockpit technology
- Pilot follows the instruction.

It is unclear how many aircraft operating at KCIA are equipped with the necessary cockpit avionics, but part of the implementation of this alternative would be to ascertain what percentage of flights operating here could take advantage of the procedure. Newer aircraft will be GPS/FMS equipped, but the availability on other aircraft would require some research.

Alternative A9. Fully implement use of Charted Visual Approach Through Elliot Bay.

Reasons for Recommendation:

The Charted Visual Approach would direct aircraft on a curved arrival path through Elliott Bay on a south flow arrival. This curved approach, if implemented, could reduce noise levels over Queen Anne and Magnolia. Analysis

indicates that this alternative would result in about 600 fewer people within 65 DNL as compared to the future Base Case condition.

Being a visual procedure, this approach would only be used in "fair weather" conditions when pilots are able to see both the airport and other traffic. As a result, analysis assumed that the procedure might be used 50% of the time.

At present the FAA is in process of testing and evaluating this procedure. There can be no final recommendation until their work is complete. FAA must decide whether this approach can be implemented, and if so, under which weather conditions. For purposes of this Part 150 Study, the Charted Visual Approach offers sufficient possible benefit to merit remaining as an alternative until FAA has determined its feasibility.

Alternative A5 and A6. Develop a Fly Quiet Program with Enhanced Noise and Compliance Monitoring.

Reasons for Recommendation:

KCIA staff has indicated that it wishes to change the character of its Complaint Response System from one of reaction to specific incidents to a community resource program providing regular information on a variety of noise abatement topics. Using the data gathered by the noise monitoring system, which may be supplemented from time to time by information from portable noise monitors and/or from the Sea-Tac Noise Monitoring System, KCIA would regularly report on compliance with some of the recommendations resulting from this study.

At present complaints are treated on an individual basis with each caller receiving a post card indicating that the complaint has been received, followed by a letter outlining the results of the staff research on the individual incident.

The proposed method would be to supplement these individual responses with regular quarterly reports describing the nature of activity at the airport as well as overall trends. Examples of such reports might be:

Operations Summary containing:

- Number of total flights
- Number of night flights
- Percentage scheduled vs. unscheduled flights
- Percentage jet vs. non jet flights

Noise Level Report containing:

- Noise Levels at each of the four monitors
- Trend reports compared to previous quarter and previous year when sufficient data is available
- Identification of the five or ten noisiest flights over the period

Fly Quiet Reports tracking:

- Adherence to flight tracks through Elliott Bay
- Use of the Charted Visual Approach
- Effective implementation of the close in noise abatement departure procedure for north bound flights

Special Reports as needed such as:

- Noise levels in a particular community or at a specific residence
- Analysis of flight tracks over a residential area such as Magnolia or West Seattle
- Analysis of nighttime run-up noise

Developing a Fly Quiet Program

The value of Fly Quiet at KCIA is that it offers the airport the ability to measure, compare, in some cases affect, and reward pilot performance in executing the new noise abatement procedures that may result from this study. Using noise and flight track data from the noise monitoring system, some new software and a little new equipment, airport staff would be able to identify all KCIA flights by means of the N Number, or aircraft registration. FAA keeps a database of all N Numbers including information on who owns and operates each aircraft. By this method, KCIA staff would be able to clearly see which operators are already “Quiet Flyers” and who may require additional training or information. Using this data, airport staff would be able to meet regularly with Fixed Base Operators and pilots to provide additional noise abatement training and reinforce the Fly Quiet procedures and methods.

The specific details concerning how flights and pilots are rated would be determined once the study is complete and a Fly Quiet program is formally adopted. But, the likelihood is that quantities of noise and flight track data would be analyzed to determine both the best and worst performers in each Fly Quiet category (e.g. adherence to flight tracks, close-in departure procedure, etc.). Clearly emphasis would be on aircraft operators either based at KCIA or using the airport regularly, as that is where repetitive data would be available. Also, there may be an effort to categorize large transport category aircraft and smaller aircraft separately, as their operating characteristics and flight procedures differ considerably.

A Fly Quiet program would offer airport staff and community residents the data and the opportunity to evaluate how effectively noise abatement programs are being implemented. In addition, Fly Quiet creates an positive interactive relationship between the airport, its Fixed Based Operators, airlines and pilots. Fly Quiet is a framework within which all these parties can review past performance and compare their successes with those of others. Most importantly,

Fly Quiet offers the airport the ability to reward the best performers through incentives, positive publicity, and similar activities.

Quarterly Noise Abatement Reports would be published by the airport and distributed through newsletters, the airport web page and at regular SAC and Roundtable meetings. Fly Quiet Reports would be distributed even more broadly. By means of press releases, KCIA would announce the Quiet Flyer awards for the year, so that operators who achieve this distinction would be properly rewarded with favorable publicity. An annual Quiet Flyer Award ceremony would be scheduled and publicized where a dignitary would confer the honor on the recipients with appropriate fanfare. Additionally, winners may receive some tangible prize such as a gift certificate to a local area business.

Alternative A10. Develop and implement Building Design Standards/Placement to Reduce/Contain Noise on the airport.

Reasons for Recommendation:

If noise abatement is a consideration during design, certain perimeter airport buildings can act as noise barriers between aircraft operations and surrounding neighborhoods. Similar to the discussion in alternative A3, a noise barrier on the north side of the airport, buildings can act as a shield if they are properly situated, the height is sufficient, and there are no gaps through which noise can pass. This alternative would allow KCIA to develop the proper standards, so that any new construction on the airport would be designed to maximize noise abatement potential.

Alternative A3. Maintain Existing Run-up Restrictions.

Reasons for Recommendation

The major reason for this recommendation is to preserve the benefits of the existing regulation, especially at night. At present KCIA restricts run-ups between 10 PM and 7 AM. This nighttime restriction on run-ups would be continued for the future. If in the future a Ground Run-up Enclosure were constructed at KCIA, and, as a result, the surrounding communities were shielded from run-up noise, then this nighttime restriction might be revisited.

The two locations currently identified for maintenance run-ups would continue again until such time as a GRE might be constructed.

STUDY ADVISORY COMMITTEE MEMBERSHIP

Jim Combs, Chair

Andrew Anderson¹
Tukwila

Duane Anderson
At-Large Communities

Peter Anderson
Corporate Tenant

Doug Baker
United Parcel Service (tenant)

Ron Beckerdite
FAA/Sea-Tac

Larry Brown
Labor Representative

Jim Combs
Pilots' Association

Larry Crim
Renton/Rainier Valley Communities

Oliver Dallas
Boeing ATCT - FAA

Randy Eatherton
Georgetown Community

Ron Fincher
FAA

Edwin Hanson
West Seattle Community

Daniel B. Hartley
SPEEA Labor

Lynae Jacobson
Port of Seattle

Pam Linder
City of Tukwila

Cayla Morgan
FAA - Airports District Office

Rocky Piro
Puget Sound Regional Council

Georgianne Ray
Unincorporated King County

Theresa Smith
WashDOT Aeronautics Division

Lynn Tucker
Beacon Hill/Rainier Valley

Eric Tweit
City of Seattle SPO

Karen Walling
Small GA - Classic Helicopters

Rick Lentz
Boeing Company

Ed Wojeck
Magnolia/North Seattle

Former Members²:

Rosemary Unterseher
Tukwila Community (former rep)

Randy Bannecker
Indirect Business Leader (former rep)

Liz Warman
Boeing Company

¹ Andrew Anderson joined the SAC near the end of the Study and did not participate in most of the SAC recommendations.

² These members resigned from the King County International Airport Roundtable and SAC just prior to completion of the SAC recommendations and should be acknowledged as participants.

**KCIA Part 150 Noise Study
Consultants Preparing the Study**

Ryk Dunkelberg
BARNARD DUNKELBERG & COMPANY, Inc.
1616 East 15th Street, Tulsa, Oklahoma 74120
918/585-8844 FAX 918/585-8857
E-Mail: ryk@bd-c.com

Paul Dunholter
BCS INTERNATIONAL, Inc.
3151 Airway Ave., Building I-2, Costa Mesa, California 92626
714/540-3120 FAX 714/540-3156
E-Mail: phdaen@aol.com

TRIANGLE ASSOCIATES, Inc.
255 Colman Building, 811 First Avenue, Seattle, Washington 98104
206/583-0655 FAX 206/382-0669
E-Mail: jhowell@triangleassociates.com

SYNERGY CONSULTANTS, Inc.
4742 42nd Ave. SW, Suite 9, Seattle, Washington, 98116
206/933-9752 FAX 206/933-9759
E-Mail: vigilantel@msn.com

CLAIRE BARRETT & ASSOCIATES, Inc.
675 Massachusetts Ave., Cambridge, Massachusetts, 02139
617/492-4996 FAX 617/354-0840
E-Mail: clabarrett@aol.com

Purpose of the Study

The FAR Part 150 Programs are a growth of the Airport Safety and Noise Abatement Act of 1979. It establishes a single system of measuring noise, identifying noise exposure determining compatible land use and establishing a unified plan to reduce the number of people affected by noise. The King County International Airport Program has been designed to accomplish these objectives as well as to address the different concerns of interested citizens, land owners, local and regional governmental bodies and airport users.

Maintaining a healthy airport environment is a challenge which the airport and the public must accept. This program offers an excellent opportunity to achieve both a wide range of long-range objectives for airport operators and area compatibility.

This program presents a timely opportunity to prevent problems addressing existing issues, improve communication between the airport and interested parties and assess airport and community development directions. This study is intended to accomplish the following:

- Identify viable noise abatement measures and mitigation programs*
- Establish priorities of such programs*
- Establish appropriate development guidelines and compatible land use patterns within the airport's environs.*

These recommendations for these guidelines and programs will be based on a thorough analysis of many factors, including the various jurisdictional entities and community leaders involved, and thoughts and concerns from the citizens of the area.

The King County International Airport FAR Part 150 Study has several more elements normally associated with a traditional FAR Part 150 Study. In an effort to identify alternate noise levels and associated concerns beyond the traditionally identified noise contours, this Study will identify aircraft generated noise contours out to the 55 Day-Night Noise Level (DNL). In addition, the Study will evaluate:

- the feasibility of a Ground Run-Up Enclosure (GRE)*
- the feasibility of sound attenuating residential structures beyond the 65 DNL contour*
- the use of supplementary noise metrics to help define noise levels*
- and the preliminary evaluation of a Part 151 (Access Restrictions) Study.*

The Study will also evaluate the overlap of noise contours generated by aircraft at both King County International Airport and Sea-Tac Airport.

It is important that a program be established to allow appropriate airport development to occur. While, at the same time, promoting compatible development of the surrounding area. The Program will identify the options available to achieve these goals and objectives, and the final plan will result in a realistic and achievable set of recommendations, plans and programs.

The Process and Schedule

A recommended compatibility plan and noise abatement plan will be developed following a comprehensive analysis of King County International Airport and the surrounding areas. It will take into consideration both existing and protected conditions. The Part 150 Program is based on a five year projected planning horizon.

The study's goals to accurately assess the noise levels generated by aircraft and determine the effect in order to utilize reasonable viable noise abatement measures and to promote methods to effectively guide development in the areas found appropriate for growth in the vicinity of the airport. This determination will be based on:

- technical data*
- aircraft operational characteristics*
- an analysis of community response*
- a comprehensive review of current land uses and trends, and*
- the suggestions, recommendations and ideas from the community.*

Specific techniques to be used in the study will include flight track observations, aircraft noise monitoring, noise contour modeling, land use planning and development controls, communications programs and documentation. These will be explained over the course of the Study. The costs of any recommendations will be considered in light of limited fiscal participation and airport priorities.

Study recommendations will outline a program that considers both continuing existing noise measures and funding such noise measures, along with any new measures that are appropriate.

FAR Part 150
Study Introduction

INTERNATIONAL AIRPORT/Boeing Field



INTERNATIONAL AIRPORT/
Boeing Field

King County
International Airport/
Boeing Field
Seattle, Washington

- ▶ Baird Dunkelberg & Company
- BCS International
- Synergy Consultants
- Claire Barrett & Associates
- Triangle Associates

Location Map  not to scale



King County

INTERNATIONAL AIRPORT/Boeing Field

FAR Part 150 Study

Newsletter

King County
International
Airport/Boeing
Field
PO Box 80245
Seattle, WA
98108
(206) 296-7380

Project Update

Over the past year, the focus of the KCIA/Boeing Field noise study has been to identify current and future noise levels and to provide information about the types of solutions that exist to reduce noise. In addition, a set of Sea-Tac/KCIA combined noise contours has been developed. Since the last newsletter, the Study Advisory Committee has met several times and airport staff participated in a round of community meetings to present what was learned and to gather ideas for solutions and priorities. The Study is now moving into its most crucial phase: the analysis and evaluation of alternatives to mitigate or reduce noise specific to King County International Airport/Boeing Field.

Preliminary Noise Reduction Alternatives

To reduce noise levels on and around the airport, the consultant team has identified an initial set of feasible alternatives for evaluation. In addition to alternatives required by federal regulation, the set includes alternatives contained in the County Work Plan and those suggested by citizens. With input from the Study Advisory Committee and members of the public, the preliminary alternatives listed below will be further refined and combined. Additional alternatives may also be suggested.

Access Restriction Based on Certificated Noise Levels: a restriction on all Stage 2 aircraft at the airport except exempt aircraft such as military, emergency, and government. This would require an additional study (Part 161).

November 2000

Complete or Partial Curfew: a nighttime restriction on Stage 2 operations. This, also, would require a Part 161 study.

Noise Barriers/Ground Run-Up Enclosure: construction of noise barriers along the perimeter of the airport and an enclosed facility for maintenance testing of engines on the ground.

Sound Insulation or Property Buy-Outs: sound attenuation (insulation) for noise sensitive uses that could include residences, schools, churches, and hospitals within the 65 and 60 DNL noise contours. The feasibility of land acquisition will also be evaluated.

Noise and Compliance Monitoring Program: programs that measure noise levels and compliance with noise abatement programs that are being developed at the airport. These may include noise monitoring and voluntary compliance with preferred flight procedures (Fly Quiet Program).

Noise Complaint/Citizen Liaison Program and Other Administrative Actions: continua-

tion of the Noise Complaint Hotline system already in place at the airport.

Land Use Controls: consideration of aircraft noise levels, flight patterns, siting of noise sensitive facilities, and requirements for sound attenuation in new structures during development of land use plans or review of other development activities.

Noise Study

In an effort to address noise impacts of the King County International Airport/Boeing Field, KCIA initiated a Federal Aviation Regulation Part 150 Noise and Land Use Compatibility Study in June 1999 to investigate potential solutions. Part of the Study includes evaluating specific elements identified in the Noise Reduction Work Plan adopted by the County Council in October 1998. The study will take about two years and, when complete, will identify specific actions to address airport noise.

King County
Executive

Ron Sims

King County
Council

Maggi Fimia
District 1

Cynthia Sullivan
District 2

Louise Miller
District 3

Larry Phillips
District 4

Dwight Pelz
District 5

Rob McKenna
District 6

Pete von Reichbauer
District 7

Greg Nickels
District 8

Kent Pullen
District 9

Larry Gosset
District 10

Jane Hague
District 11

David Irons
District 12

Chris Vance
District 13



King County International Airport is owned by the taxpayers of King County and is managed by King County Department of Construction and Facilities Management Airport Division.

You Are Invited!

Noise Remedy Study Open House Thursday, January 18, 2001 5:00-8:00 PM

Terminal Building - Conference Center Lobby
King County International Airport
7299 Perimeter Road
Seattle

Citizens are invited to learn about the KCIA Noise Study at an Open House. This meeting will focus on:

- Combined Noise Contours: Current and Projected Impacts
- Potential Noise Reduction Alternatives
- Criteria for Reviewing Alternatives

During the Open House, you will have an opportunity to view maps of the noise contours, flight tracks, and other graphics and talk informally with project team members. You are encouraged to attend, ask questions, and make comments.

FAR Part 150 Noise Remedy Study

King County International Airport/
Boeing Field
PO Box 80245
Seattle, WA 98108

For more information concerning the details and progress of the study, or to be placed on the study mailing list, please contact:

Mr. John Current
King County International Airport
PO Box 80245
Seattle, WA 98108
john.current@metrokc.gov
(206) 205-8357
or visit:
www.metrokc.gov/airport

Printed on
recycled paper

Bulk Rate
U.S. Postage
PAID
Seattle, WA
Permit No. 1046

Meeting Alert: Open House on January 18th. See details above.

Departure Thrust Outback: procedures for pilots to reduce noise during departure.

Noise Abatement Procedures (Flight Track Changes): implementation of new flight tracks for the airport including the Bay Visual Approach, use of Flight Management Systems for departure, West Seattle flight track for small planes, southern departure variations, minimal population variations, and possible altitude evaluation.

Other Administrative Actions: actions on the part of the Airport such as a Fly Quiet Program, use of ground leases to encourage use of quiet aircraft, educational programs for operators, and continuation of a committee to monitor and discuss noise issues.

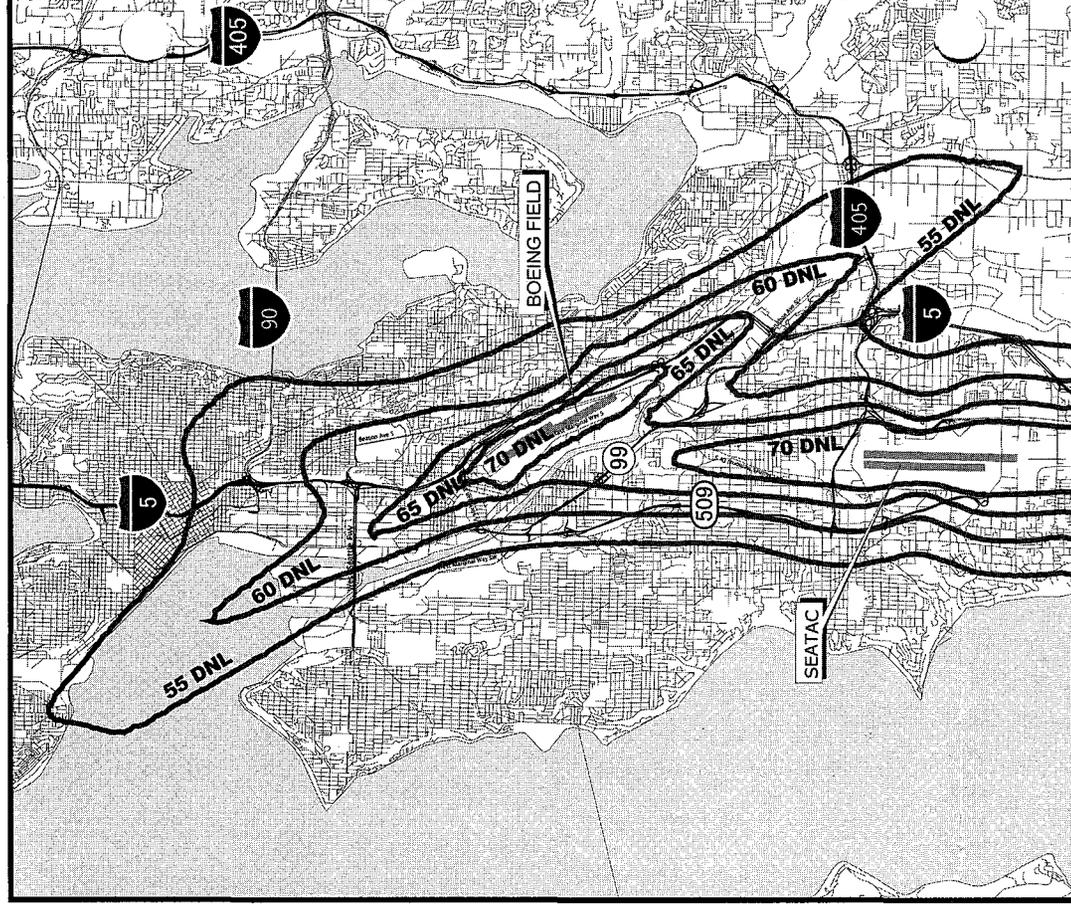
Alternatives that will affect the size and placement of the noise contours will be computer modeled to measure resulting noise reduction and changes in the affected population. Cost and regulatory implications will also be identified.

Evaluation of Alternatives

At its September 11, 2000 meeting, the Study Advisory Committee identified preliminary criteria, or standards, with which to evaluate the alternatives. Each of the alternatives will be analyzed in light of these standards.

First Level Criteria

- Fair: Reduces noise, rather than shifts noise, unless both neighborhoods agree
- Fair: Considers people who may be personally hurt by changes that could occur
- Considers economic impacts
- Is safe
- Responsible to those already present at KCIA
- Maintains jobs at KCIA
- Recovers jobs at KCIA
- Considers environmental impacts
- Maintains or improves regional airspace capacity
- Maintains or improves potential airfield capacity
- Safeguards interstate commerce from undue interference
- Treats all types of users equitably
- Contributes to economic viability of the Puget Sound Region



Combined Noise Contours

The above Noise Exposure Map of contours shows the day/night noise level (DNL) combined for both King County International Airport/Boeing Field and Sea-Tac International Airport. DNL is an annual average of the noise measured over a 24-hour period that accounts for the number of events per day, the time of day in which they occur, and the loudness of the event and includes a penalty for flights at night. The project team has combined these in recognition of the fact that some communities experience combined noise levels higher than those levels generated by just one airport's operations. There is agreement between the two airports that these impacts will also be considered in the Study.

- Reduces noise
- Pioneers community-friendly technologies
- Maintains American competitiveness
- Is forward looking

The following criteria will be analyzed but not used to rule out any alternatives until the end of the evaluation process. This will allow for consideration of innovative or creative ideas.

- Financially affordable within County and Federal budgets

- Legal
- Realistic implementation timeline
- Simple to administer
- Simple to implement

In preparation for comparing and preferred noise reduction alternative Committee members received training decision making. This training will members identify which alternative variety of interests represented on

Next Steps

In November, the Study Advisory applying the criteria to the noise Airport staff will participate in a community meetings to present and to receive additional suggestions

Based on this analysis and feedback recommendations, known as a Noise Council approval. If the County Council program, both the Noise Exposure Map Compatibility Program will be submitted to the King County Aviation Administration for approval

How You Can Be Involved

Attend public meetings
Periodic open houses provide an about the Study and what is proposed your suggestions and concerns. They will take place Thursday, January in the Terminal Building Conference the airport. All are invited.

In addition, throughout the Study participating in community meetings surrounding the airport to provide to residents and gather comments for notices on the airport website airport and in local newspapers, to find out when the next meetings are currently scheduled from through January 2001.

Read informational material

In addition to public meetings, communicate with communities ter, mailing lists, bulletins to community newsletters, and regular advertising articles in local newspapers

Visit the airport website or local Reports, meeting summaries, and

King County
Executive
Ron Sims

King County
Council
Maggi Fimia
District 1

Cynthia Sullivan
District 2

Louise Millet
District 3

Larry Phillips
District 4

Dwight Pelz
District 5

Rob McKenna
District 6

Pete von Reichbauer
District 7

Greg Nickels
District 8

Kent Pullen
District 9

Larry Gosset
District 10

Jane Hague
District 11

David Irons
District 12

Chris Vance
District 13



King County International Airport is owned by the taxpayers of King County and is managed by King County Department of Construction and Facilities Management Airport Division.

You Are Invited!

Noise Remedy Study Open House Thursday, January 18, 2001 5:00-8:00 PM

Terminal Building - Conference Center Lobby
King County International Airport
7299 Perimeter Road
Seattle

Citizens are invited to learn about the KCIA Noise Study at an Open House. This meeting will focus on:

- Combined Noise Contours: Current and Projected Impacts
- Potential Noise Reduction Alternatives
- Criteria for Reviewing Alternatives

During the Open House, you will have an opportunity to view maps of the noise contours, flight tracks, and other graphics and talk informally with project team members. You are encouraged to attend, ask questions, and make comments.

FAR Part 150 Noise Remedy Study

King County International Airport/
Boeing Field
PO Box 80245
Seattle, WA 98108

For more information concerning the details and progress of the study, or to be placed on the study mailing list, please contact:

Mr. John Current
King County International Airport
PO Box 80245
Seattle, WA 98108
john.current@metrokc.gov
(206) 205-8357
or visit:
www.metrokc.gov/airport

Printed on
recycled paper

Bulk Rate
U.S. Postage
PAID
Seattle, WA
Permit No. 1046

Newsletter

King County
International
Airport/Boeing
Field
PO Box 80245
Seattle, WA
98108
(206) 296-7380



Project
Over the past several years, Boeing Field has been the focus of current and future information. The information exists to reduce noise. The Tacoma/KCIA noise study is being developed. The King County Airport staff and community meetings and to gather input. The study phase: the alternatives to mitigate noise at King County Field.

Preliminary Alternatives
To reduce noise at the airport, the initial set of alternatives is being developed. In addition to regulation, the alternatives suggested by the public, the study alternatives below will be refined and Additional Alternatives may also be

Access Restrictions on Certification Levels: a restriction on Stage 2 aircraft operations at the airport exceeds aircraft such as emergency, etc. This is an additional restriction (161).

Meeting Alert: Open House on January 18th. See details above.

King County International Airport/Boeing Field Part 150 Noise and Land Use Compatibility Public Involvement Plan

INTRODUCTION

As directed by the King County Council, the King County International Airport (KCIA)/Boeing Field is conducting a FAR Part 150 Noise and Land Use Compatibility Study in order to identify sources of existing aircraft noise and make recommendations to deal with existing and potential aircraft noise. Since KCIA/Boeing Field is an increasingly important community and regional facility and the surrounding land is developed, the study is intended to establish guidelines for the development of both airport programs and compatible land use patterns and relationships. These recommendations will be based on aircraft operational characteristics and land use patterns.

Goals and Objectives

There is great interest in reducing airport noise impacts to the surrounding communities and businesses while maintaining economic benefits derived from the airport. Therefore, public involvement is a key component of the Noise Study. The main goals of the public involvement program are to create public awareness of the study and its purpose, to involve the public in identifying recommendations to reduce noise, and to gain public understanding, acceptance, and support for the final recommendations. Part of the public involvement plan will be to provide a strategy that builds community trust in the process and provides channels and methods to communicate citizen concerns and opinions about the project. A second part is to be responsive to community input and be clear about the public and County's role in the process.

Specific objectives include:

- Increase citizen awareness of the Noise Study and the regulatory framework within which the study is conducted. Make sure the public understands what can and what can not be accomplished by the study.
- Inform organized groups and the public about the study process and opportunities for public involvement.
- Educate the public about the possible alternatives proposed to reduce noise.
- Offer opportunities for public comment on the alternatives and recommendations during the draft and final phases.
- Offer an opportunity for interested federal, state, regional, and local agencies to comment on the alternatives and recommendations.
- Provide a summary of concerns expressed by the public and by agencies to the project team.
- Invite public support for King County's recommendations.

The public involvement plan is based on interviews with members of the Study Advisory Committee who represent communities, businesses, employees, and agencies affected by the airport. (See Appendix A, KCIA/Boeing Field Part 150 Noise Study Summary of Interview

Issues and Concerns.) Those interviewed were asked to define key issues and concerns for the project, how people obtain information about airport issues, who would be interested in the project, and what approaches might work best for communicating with them. In addition, prior to the project start, the airport management had committed to conduct additional public outreach around the Noise Study that has been incorporated into this document.

The public involvement plan includes a variety of approaches to inform the public, gather ideas, and obtain citizen opinion on the KCIA Noise Study: community briefings, open houses/public meetings, a public hearing, news releases, project notebooks, and newsletters. A Study Advisory Committee has been established to review the study elements, explore and challenge the study assumptions, and ask hard questions prior to consultant and staff presentations of the information at the public meetings for general comment. The goal is to have better information and plans for public review prior to a recommendation to and a decision by the County Executive and Council.

The public involvement plan is meant to be a working document. Over the course of the study, some techniques may prove more effective than others, or new ideas may be generated at the community or public meetings. Of course, all options are subject to funding availability. Incorporated into the public involvement process will be a review after each key decision point of the effectiveness of the public involvement plan approach in meeting its goals and objectives.

THE STUDY ADVISORY COMMITTEE

A Part 150 Study Advisory Committee of interested parties has been established to review the development of the plan. The purpose of the Study Advisory Committee is to provide a broad and balanced range of perspectives on the Part 150 Noise Study. The Committee will provide a forum for open dialogue in which to express the broad range of interests and points of view, explore and challenge the study assumptions, evaluate alternatives, help identify impacts and coordination of choices, and provide a base for testing responses to proposed solutions.

The role of the Committee will be to work with the consultant team during the course of the study, review findings and recommendations from the study effort, provide input, and review and comment on the study elements. Decision-making will be the responsibility of King County with input from the Committee (which includes the Airport Roundtable) and the general public.

The Committee will help assure that the planning process is open, responsive to public concerns and technically sound. Members are encouraged to express all points-of-view and perspectives on issues and alternatives and to seek to identify areas of agreement as well as reasons for differing points of view on the Part 150 Noise Study.

The Committee consists of 23 members:

- All 16 members of the Airport Roundtable. The Airport Roundtable was established by the King County Council in June 1997 to advise and make recommendations to the airport management, county executive and county council on the airport budget, programs, regulations, master plans and noise reduction strategies and other related matters.. The Roundtable operates by consensus. The 16 regular voting members include:
 - Eight representatives of communities directly affected by the airport, including one each from Georgetown, Magnolia/North Seattle, Tukwila, Renton/Kent/South King County, Beacon Hill/Rainier Valley, West Seattle, Unincorporated King County, and one at-large.

- Four airport tenant representatives including one each from the cargo operation, small general aviation, corporate tenants, and the Boeing Company.
- One representative from a pilots association
- One representative from a commercial enterprise which is an off-site user or off-site provider of airport related services;
- Two labor representatives
- A representative from the Puget Sound Regional Council
- A representative from the Aeronautics Division of the WA State Dept. of Transportation
- A representative from FAA planning staff
- A representative from FAA Air Traffic Control staff
- Representatives from the governments of the two affected jurisdictions, Seattle and Tukwila.
- A representative from SeaTac Airport

Members of the Roundtable were appointed by the King County Executive and confirmed by the Council. The governmental units selected their own representatives.

Observers

Observers are welcome at all committee meetings but will not be seated at the table or participate in the discussions. A time will be set aside in the agenda of each meeting for comments or questions from observers.

Meeting Times and Location

The Committee will meet about eight times during the study in one of the airport conference rooms. Meetings generally will be scheduled on the same date as a regularly scheduled Roundtable meeting, the second Monday of the month.

Meetings

The Study Advisory Committee will meet to review and discuss issues and material before it is presented at community briefings or larger public meetings prior to key planning and/or decision points. The purpose of the group is to incorporate the interests and concerns of the KCIA community and others in the development of the Noise Study. It will assist the County/project team by providing review and comment on study elements including the review of existing conditions, noise monitoring procedures and models, existing and future noise contours, the identification and evaluation of noise compatibility and land use alternatives, and recommendations as they emerge.

Members will be encouraged to express all points of view and perspectives and issues and alternatives and to seek to identify areas of agreement as well as reasons for differing points of view on the development of alternatives and recommendations. The project team will receive and use feedback from the committee as a resource to them in developing the plan.

This process will take at least eight working sessions, each requiring staff preparation and response time, and each requiring committee members to do some reading and preparation outside the meetings. The project team is committed to listening and responding to the comments and information from the Study Advisory Committee.

The tentative purpose of each meeting is listed below. If the material can not be adequately covered in one meeting, a follow-up meeting will be scheduled.

- Meeting One: Kick-Off
- Meeting Two: Groundrules/Committee Operation
- Meeting Three: Inventory of Existing Conditions
- Meeting Four: Noise Analysis: Monitoring Data and Preliminary Noise Exposure Maps
- Meeting Five: Noise Impact Analysis; Finalize Noise Contours
- Meeting Six: Noise Compatibility Alternatives
- Meeting Seven: Land Use Alternatives
- Meeting Eight: Noise Compatibility Plan: Recommendations

Meeting Summaries

A meeting summary will be prepared after each meeting. The purpose of the summary is not to provide meeting minutes, but rather to record comments and questions raised by members of the committee. In this way, a record of discussion items is kept that can be referenced in the course of the project. Answers to questions raised may be included in italics or clarified in a subsequent meeting.

Roles and Responsibilities

King County Airport

- Form the Study Advisory Committee.
- Make meeting arrangements.
- Attend each committee meeting and present information and answer questions as required.
- Complete all advance mailings to committee members prior to each meeting.
- Post meeting date and agenda on website prior to the meeting.
- Participate in a planning session for each meeting.
- Provide needed supplies for meetings.
- Post working papers and meeting summaries provided to committee members on the airport website.

Barnard Dunkelberg

- Develop concept, agenda, and content of each meeting with Triangle Associates.
- Participate in planning session for each meeting.
- Prepare handouts, background and display materials for committee meetings.
- Present technical information at committee meetings.
- Facilitate committee meetings.

Triangle Associates

- Provide advice and materials on committee organization, ground rules, and format.
- With Barnard Dunkelberg, develop concepts for agendas, format, and content of meetings and participate in the refinement of these concepts with King County.
- Prepare a summary of each meeting and advise project team members on follow-up activities based on the content of each meeting.
- Provide meeting summary to Airport staff for website posting.

PUBLIC INFORMATION MATERIALS/NEWSLETTERS

Introductory/Summary Brochures

Early in the project, an introductory brochure will be developed to describe the study, its purpose, its intent, its goals, its direction and usage, general schedule and the reasons for its accomplishment. Similar brochures will be produced at the end of the project to document the general recommendations of the FAR Part 150 program. In addition, a Noise Abatement Brochure specific to Boeing Field for inclusion in the Jeppesen Manual for all pilots using the airport will be prepared.

Project Newsletter

A project newsletter will inform the public about the project and describe opportunities for public involvement. Generally, the newsletter will be prepared prior to the public meetings to provide background on the meetings. Up to four issues of a project newsletter will be produced during the study process. The newsletter will complement the informational and summary brochures. Anticipated newsletter topics are:

- Newsletter 1: Noise Impacts: Final Noise Contours, public meeting notice, public involvement
- Newsletter 2: Preliminary Alternatives and meeting notice
- Newsletter 3: Preliminary Recommendation, meeting notice
- Newsletter 4: Draft Recommendations, Hearing notice

Newsletter Updates

In addition to the project newsletters, news updates about the study process may be included in the regular airport newsletters, the KCIA noise newsletter *Noise Update*, which is distributed monthly to those who contact the airport with noise issues, and the quarterly *Skywriter*. In addition, news releases about upcoming meetings will be sent to county council members and other newsletters that have indicated an interest in receiving updates.

King County Airport Website

All working papers, newsletters, meeting announcements, meeting summaries and other materials as appropriate, will be available for review and downloading in a PDF format from the King County airport website. Because personal computers are increasingly common or available in public libraries, the website becomes a logical place with a minimal amount of effort to make materials available for review and downloading as well as advertising both meeting notices.

Project Notebooks

For those less comfortable with computer technology, all brochures, newsletters, working papers, meeting announcements, and other materials as appropriate, will be placed in the project notebooks. Project notebooks will be available for public review at 16 locations: the Airport Administration office; local Seattle Public Libraries, including Beacon Hill, Columbia, High Point, Holly Park, Magnolia, Rainier Beach, Southwest and West Seattle; King County Libraries, including Burien, Boulevard Park, Foster, Skyway, Tukwila and White Center; and the Renton Public Library.

Publicity Materials

Prior to the public meetings and hearing, press releases, newsletter announcements, letters to elected officials, and agenda announcements will be prepared and mailed to announce the meetings and/or hearing to the public. Newspaper ads will be placed in the Seattle Times, Post-Intelligencer and other local papers. (See Appendix B, Media List for a comprehensive list of media contacts for news releases and newsletter announcements.)

Roles and Responsibilities

King County Airport

- Review and approve all public information materials prior to printing.
- Mail newsletters, press releases, letters to elected officials, and agenda announcements.
- Post public information materials and meeting notices on the airport website.
- Approve locations and distribute project notebooks.
- Mail materials for project notebooks to additional locations as desired.
- If viable, update a recorded message on meeting dates and study progress.

Barnard Dunkelberg

- Prepare introductory and summary brochures.
- Review and approve newsletter content, provide maps and other graphics.
- Provide working papers and other materials for posting on the website.

Triangle Associates

- Review introductory and summary brochures.
- Draft press releases, letters to elected officials, and agenda announcements for public meetings and hearings.
- With Claire Barrett, draft, prepare, and print newsletters.
- Draft newsletter updates for County distribution.
- Provide all materials developed for posting on website.

BRIEFINGS/TARGETED MEETINGS

Briefings and meetings targeted to specific communities, interest groups, and councils provide a forum for the airport to present its goals and approach in conducting the noise study and some of the findings along the way. Moreover, airport staff can develop a relationship with these parties and hear their perspectives on the airport. Each meeting should start with a review of the purpose of the study and what it can and cannot achieve, the timeline for study, and where it is in the process.

Airport staff will arrange and facilitate the briefings and targeted meetings. The consultant team will assist at one round of the meetings. Meeting topics are anticipated to be as follows:

Meeting One: Introduction to the Study Process and Noise Monitoring Locations

The purpose of the first meeting was to introduce the purpose and methodology of the Part 150 Noise Study and to solicit suggestions for where noise monitors should be placed and any other suggestions about the process or possible noise remedies.

Timing: A series of meetings were held during the Fall of 1999.

Meeting Two: Preliminary Noise Contours

The purpose of this meeting is to introduce the data collected by the consultant about existing noise at the airport and what noise would look like in the future if no noise abatement were to occur. Explanations of the contours, what they mean, and how they will be used will be provided. Participants will be asked to identify what options they would like to have analyzed in the study for possible noise remedies. Comments received from these meetings will be provided to the consultant team and Study Advisory Committee prior to their preparation of the final noise contours and public open house.

Timing: Winter 2000

Meeting Three: Preliminary Noise Abatement Alternatives

The purpose of this meeting is to introduce the preliminary noise abatement alternatives resulting from analysis of the noise remedy options. Explanations of the remedies considered for each area and preliminary conclusions about each option will be provided. Participants will be asked to identify additional questions that need to be answered as well as provide any feedback on which alternatives are preferred.

Timing: Summer 2000

Community/Neighborhood Meetings

Additional community meetings will be held periodically in each of the eight areas represented by a Roundtable community member. The purpose of these meetings is to develop a relationship between the airport and the various communities and to allow community members to provide their specific perspectives to key elements of the noise study. The airport staff will work with the Community representative of each area to identify appropriate times, locations and publicity methods for each meeting. In general, meetings will be advertised on the airport website, in community newspapers, and via direct mailings to appropriate zip codes on the airport mailing list of those who have made noise complaints or indicated interest in airport issues.

Airport Tenant and Operator Meetings

Similar to the community meetings, airport staff will provide airport tenants and operators with information about the noise study and the opportunity to informally comment on the project at the regularly scheduled tenant and operator meetings. Meeting topics and timing will be the same as the community meetings.

Briefings

Community briefings get elected officials and key community groups into the information loop early so that there are no "surprises," so they can better coordinated their planning and accurately inform their own constituents. Airport staff will offer to make presentations to the Tukwila and Seattle City Councils and community councils in areas affected by aircraft using KCIA. Editorial briefings on the project background and process may also be appropriate during the study process. Because of the political interest in the future of the airport and sources of funding for noise abatement, county, state, and federal elected officials should also be briefed.

Cable TV/Video Community Briefing

Clearly presented information on what a Part 150 Study is designed to do, and what it is not designed to do, is needed in the community. To provide this education, the airport could videotape a presentation/question and answer session that provides the information needed in the community. Members of the Study Advisory Committee could participate by asking questions

that they think their communities may have. Copies of this video could then be made available at local libraries and/or at the Airport so that residents could view it at their convenience. If feasible, this video could be made available for viewing on public access television; scheduled dates and times to view the video could be shared with community councils so they could publicize it to their members.

Advance preparation for this videotaping would include notifying Study Advisory Committee members that this topic is to be the focus of the meeting, so they can bring appropriate questions to the meeting. The consultant would be responsible for providing clear responses to Committee members' questions. Additionally, the consultant would be responsible for developing and having effective presentation graphics at the meeting.

If the format proves successful, additional videos could be prepared prior to key decision points to circulate around the community.

The actual implementation of this task depends on available budget and whether a videographer is available on County staff.

Roles and Responsibilities

King County Airport

- Identify dates, times, and locations for community meetings, tenant and community briefings.
- Work with the appropriate Roundtable member to coordinate above.
- Invite community members to attend meetings through notices in community papers, direct mail, posting on website, and other means as identified.
- Contact community organizations, city and community councils about briefing opportunities.
- Present information on the Study to community members, airport tenants, and others identified.
- Collect comments from meetings and summarize for project team and Study Advisory Committee.
- Provide a videographer to record a Study Advisory Committee Meeting on a Part 150 Study and make copies of the video for circulation at local libraries and the Airport; investigate having this video run on public access TV.

Barnard Dunkelberg

- Develop agenda, attend and present at one round of community meetings.
- Provide technical support (handouts, presentation materials) to airport staff in preparation for meetings and briefings, video taping.
- Prepare visuals and a presentation on what a Part 150 Study is designed to do and what it is not designed to do for videotaping at a Study Advisory Committee meeting.

Triangle Associates

- Provide meeting support (agenda preparation, planning meeting, suggested presentation materials) and summary of issues for one round of community meetings.
- Assist with planning for videotaping of a Study Advisory Committee meeting.

OPEN HOUSES/PUBLIC MEETINGS AND HEARING

Open Houses will be held at key decision points in the process to inform the public about the project and obtain their comments. In contrast to the community meetings, which are targeted to specific communities, the open houses are an opportunity for all communities and interested citizens to meet together and learn and comment on the project. Meetings will be held either at the airport or a location nearby. The project consultant team will be available to answer questions and present information.

The open house portion of the meetings provides an opportunity for the public to see displays about the project, visit with project staff, learn about the study process, and generally prepare for the commenting opportunity. The open house will be immediately followed by a brief presentation about the project with opportunity for questions and answers and comments. The meeting to discuss alternatives could be designed in a workshop format where the public is divided into small, facilitated discussion groups and then reconvened into the large group to summarize what was discussed. Depending on the project needs, opportunity may be provided for formal comments. Ready-to-use comment sheets will be provided at the meetings for the public to submit at the meeting or mail to the County.

Public Meeting One: Introduction to the Study Process

The first public open house was held July 17, 1999. The purpose of this first meeting was to introduce the purpose and methodology of the Part 150 Noise Study and to solicit suggestions for where noise monitors should be placed and any other suggestions about the process or possible noise remedies.

Public Meeting Two: Noise Analysis Results

The purpose of this public meeting will be to present the results of the noise monitoring and analysis based on 1999 data. The existing noise contours will be presented along with projections for what noise would look like in the next five years without any noise remedies in place. Participants will be asked to comment on the data and identify possible alternatives for noise solutions. The anticipated timing of this meeting will be Spring, 2000.

Public Meeting Three: Noise Abatement Alternatives

At this meeting, the project team will present the alternative strategies identified to reduce noise from the airport. The advantages and disadvantages of each, the potential for funding, and other information about the different alternatives will be provided for public review. The public will be asked to comment on the various alternatives, identify which alternatives they prefer or any additional ideas that should be considered. The project team will take this information back to the Study Advisory Committee as they look at specific recommendations for creating the Noise Compatibility Plan.

Expected Timing: Summer, 2000

Public Meeting Four: Preliminary Recommendations

Depending on the recommendations selected and the difficulty in implementation, a fourth public meeting may be scheduled prior to the formal hearing on the final recommendations. The purpose of this meeting would be to garner comment on the preliminary recommendations and

whether the public supports the proposed plan. This would allow for making changes to the plan before going through the public hearing process.

Expected Timing: Winter 2000

Public Hearing

Once the plan is finalized, a formal public hearing will be held to receive public comment on the recommendations. The public hearing process provides an opportunity for the public at large to provide their comments on the plan prior to County Council and Executive approval. Prior to the hearing, an open house will be scheduled so the public can become familiar with the recommendations. After a brief presentation, the public will be able to comment verbally or in writing. A court reporter may transcribe verbal comments. The formal comment period will close about two weeks after the hearing.

Expected Timing: Spring, 2001

Roles and Responsibilities

King County Airport

- Review and approve meeting concept, agenda, format, displays, and materials and finalize dates for all open house/meetings and hearing.
- Attend planning session and dry run of meeting presentations.
- Present information and answer questions at open houses/meetings.
- Provide court reporter to record comments at the public hearing.

Barnard Dunkelberg

- Plan meeting concept, agenda, format, displays, and materials for all open house/meetings.
- Attend planning session and dry run of meeting presentations.
- Prepare displays, presentation, and informational materials for all open houses/meetings/hearing.
- Present information and answer questions at open houses/meetings.

Triangle Associates

- Provide advice on meeting concept, agenda, format, displays, and materials.
- Conduct a planning session and dry run of meeting presentation.
- Provide meeting support for sign in.
- Facilitate public meetings.
- Provide meeting agendas and comment sheets.
- Prepare meeting summary.

Appendix A

KCIA/Boeing Field Part 150 Noise Study Summary of Interview Issues and Concerns

Background

As part of the initiation of the Part 150 Process for King County International Airport (Boeing Field), Triangle Associates was authorized to conduct a series of interviews with members of the Study Advisory Committee. After developing a set of interview questions, Triangle conducted 23 interviews between September and December 1999.

Those interviewed were told that a summary of the results of the interviews would be provided to staff and the consultant team but that no names would be associated with any comments. This report briefly summarizes the overall themes that emerged from the study as well as the specific issues, concerns, and suggestions that were identified.

Overall Themes

- Desire across the spectrum to find common ground that will enable Boeing Field to remain a vibrant economic hub for the area and yet maintain acceptable quality of life for those who live and work at or near the airport and/or under its flight paths.
- Desire for a credible study that provides accurate information presented clearly for residents and all interested parties to readily understand.
- Request for a robust public information and public involvement effort so that interested parties will be aware of and can participate in the process. This approach will create confidence in the results.
- Suggestion that the process include education on 1) what the Part 150 Study is, and is not, intended to accomplish; 2) the rules pilots have to follow in approaching and departing airports, including the flexibility they have relative to flight tracks; 3) the relationship and implications of the respective Boeing Field and Sea-Tac air spaces; 4) the capacity of Puget Sound to absorb more over-water flights; and 5) the noise implications for other communities of revising current flight tracks.

The issues, concerns, and suggestions identified in the interviews are grouped into two main categories: comments that relate to the Part 150 Study and comments that relate to Boeing Field operations and impacts:

Part 150 Process Comments

- Participant Goals for the Part 150 Process
- Overall Process Suggestions/Concerns
- Suggestions for Technical Work
- Suggestions for Public Information
- Suggested Groups to Keep Informed

Comments about King County Airport Operations and Impacts

- Perceived Sources of Noise at KCIA/Boeing Field
- Other Concerns about Current KCIA/Boeing Field Operations
- Concerns about Anticipated/Planned Changes to KCIA Operations
- Suggestions for Improvements to KCIA/Boeing Field Operations
- Economic Issues and Concerns
- Other Issues/Concerns

Participant Goals for the Part 150 Process

Reduction of noise with continued operations

- Cut noise at Boeing Field without cutting operations
- Resolve the conflict between noise and the operation of the airport, so Boeing Field remains economically strong
- Keep the airport open and viable and make the area livable at the same time by having the Airport, County and FAA do everything possible to mitigate the noise impact, including changes to flight tracks, infrastructure improvements, voluntary take-off and landing procedures, insulation of homes – with limited disruption of flights
- As much as possible make the airport and its function and operations compatible with surrounding neighborhoods
- From whole region perspective: how to reduce noise impacts to the community to the greatest degree possible without destroying the economic benefit that Boeing brings to the region.
- Recognizing and balancing the unseen or non-obvious economic benefits the airport brings to total community against the negative impacts on a few communities.
- Create solid, empirical data that we can use to develop a long-range plan for the airport that would include the interests of the business and residential communities.

Operations can continue and airport remains flexible to respond to changing demands

- That we come out of this with no operating restrictions; can operate 24/7.
- A functioning airport that can respond to demand appropriately—with flexibility to respond to unforeseen demand. Greatest concern is the extent to which concessions are made that may get in the way of future flexibility for the future.

Desire for satisfaction with the overall process that results in a fair, do-able plan

- We're advocates for aviation but want sense of balance –respect, walking in each other's shoes.
- People to feel that as much will have been achieved as was realistically possible
- That the members of the Advisory Committee and Roundtable and the community groups believe that their issues and concerns were heard and fairly considered and evaluated. That even if didn't get way, issues were fairly considered.
- At the end of the process, for the community to feel as though they learned more about what business takes place at Boeing Field and that they were a part of and had input into the final decision on land uses at the airport.
- Concrete measurable changes made to operating procedures of businesses at Boeing Field to be respectful of the human needs of the people here on the Hill and to be good neighbors.
- That we have a record of approval for a noise compatibility program and approved noise exposure maps.
- That citizens feel a valid attempt was made to come up with real solutions.

- That the process extends into the Part 161 process.
- Success will be an accurate and fair assessment of the situation and a doable plan, a practical plan for mitigating the noise and other environmental effects caused by KCIA.
- Hope that something can be worked out so people close in have been heard and that we can provide relief.
- Would like to see that the community or people with noise issues, that they have some level of satisfaction that there are remedies out there and that things worked for them.
- Have impacted homes to be part of a mitigation plan or bought out at reasonable, fair market value.

Improved relations between the airport and the community

- Establish a stronger working relationship between the airport, FAA, and the community.
- Give information so people work better with the airport
- Want the airport to be perceived as a better neighbor, that has listened to our concerns and actually decreased noise.
- Appreciate the cooperation among the airport staff and management, County Council and interested parties—desire to make some positive gains with the community.
- Concern about relationship between the community members and airport staff—airport staff needs to be honest with the communities.

Reduced noise

- To decrease the noise—flat out reduction of noise.
- Would like to see situation where final solution is not just an economic class solution where we solve the problems for the wealthy communities—fair to everyone.
- Decrease the impact noise has on our community by decreasing the noise, not by decreasing the community.
- Be on cutting edge of solving problems regarding noise.
- Noise will actually be decreased as a result of the study.
- Basically, to reduce the amount of noise and/or environmental degradation caused by the airport and reduce the number of people that it affects.
- How to minimize negative impacts of noise on those communities.
- Provide solutions that reflect the diversity of people and that some people are more sensitive to noise than others.

Study results to be based on accurate factual information that is clearly presented

- Very high quality, empirical data and defensible and explainable technical work; the information needs to be really good, transparent to the community. The public needs to understand it.
- Accurate information about the noise contours.
- Accurate and truthful info—don't skirt around the issues. Give un-sugar-coated information.
- Complete and understandable information.
- The County has to be honest that this is an airport, it's not a quiet zone. It will be noisy.

Safety and efficiency of operations is maintained

- Making sure safety and efficiency are not compromised.
- Who pays for it and how is this County resource most efficiently run—how much does it cost the taxpayer—how much revenue does it generate—maximum generation of revenues and most efficient revenues.

Zoning concerns

- Neighborhood plan reinforces our desire to be a residential community with affordable housing. There's resistance to zone us out of existence.

- Desire to keep in mind that Boeing Field is and always has been an airport; it is not time to change its use.
- Changing zoning will not change the existing noise levels.

Overall Process Suggestions/Concerns

Role of the consultant team

- The airport should allow the consultant to run the show, build rapport and believability with the community. Learn from Sea-Tac: let the consultant address the issues and build credibility.
- Have experienced consultant from the team at community meetings who can talk about noise, to answer questions.
- Provide expert advice through the Part 150 Process: “Have experts give us ideas; don’t expect us to solve the problem.”
- Be open to any wild idea that the public asks—don’t dismiss them out-of-hand.
- Be as responsive as possible as process evolves and recommendations are put together.

Education about Part 150 needed

- Provide an extensive orientation by the FAA so people understand what the limitations are and what Part 150 is supposed to do. Create a better understanding of what is possible.
- Best thing we can do is get out to the people and let them understand the rules, what we can do, what we can’t do.
- Provide seminars that people who are not part of the study can attend, as educational opportunities on how airports work, what happens when an airplane takes off and flies away; what a Part 150 study is, its goals, and restrictions we operate under. Also, explain what it means if a change is made, that other communities may be affected.
- Need information ahead of time to be able to get opinions about technical issues from Boeing’s technical staff
- Community representatives need adequate time to review materials in their spare time.
- Need to be clear about the difference between the Part 150 and the Master Plan processes; potential for confusion about the separate studies and how they overlap.

Concerns about the Advisory Committee

- Concern that Committee is not evenly balanced between community needs and economic development; seems weighted toward commercial/business interests.
- **Involvement has been reduced to a few representatives – “reduces the voice of many of the communities to a whisper.”**

Community outreach essential for success

- Communicate information to everyone in the community.
- Make sure people do not feel left out of the process – really reach out and listen.
- Must reach out to non-English speaking residents who, culturally, are unlikely to speak out.
- Going to neighborhoods will help in the long run; it lets the communities know that the airport does care.
- Make sure public is welcome at all meetings, and allow public comment.
- Airport staff should get out into the community themselves.
- Healthier to work with existing groups. You’ll need their buy-off in the end because they see themselves as representing areas that have vested interested.
- Suggestion: As folks come back with comments, create a matrix showing how original language was amended. When one person disagrees with an approach, note it, in a way that

is positive (even if the language doesn't change). This makes people feel they have been heard and documented in a positive way. Don't stomp on efforts of people.

- Ensure that everyone feels that they have been heard—both the community people and airport. That people are open to both sides.
- Don't talk down to people who are affected by noise or make it seem as if they have a problem.
- Make sure the public feels welcome to ask questions and learn about airport issues.

Timeliness

- Stay on schedule.
- Don't schedule meetings and then change the time and/or location at the last minute.

Suggestions for Technical Work

Identify noise sources through monitoring

- Identify and segregate out Sea-Tac generated noise; don't penalize Boeing Field for it.
- Noise monitoring to separate Sea-Tac and Boeing Field noise. It should help the region define areas affected by both airports and may be eligible to be mitigated: Georgetown, Queen Anne, Magnolia; also sideline communities — like West Seattle, Beacon Hill, Tukwila—areas outside the noise contours but still impacted because of topography.
- Exclude military-generated noise because Boeing Field has no control over it.
- Segregate Boeing Field noise from Sea-Tac noise from train-generated noise.
- Trains and freeways should be considered in the noise footprint.

Options to be considered

- Transponder Landing System—committed to look at this within Part 150. Will get the planes over the bay earlier. Needs to be considered in the noise study—may throw noise into West Seattle.
- Address Elliott Bay's capacity for air traffic realistically.

On the ground concerns/suggestions

- Hush house—now calling them ground run-up enclosures. Little bit nervous to see how that develops. Doing one in Portland-haven't been able to determine how successful they are for the money that they cost.

Land use issues

- What happens with land use planning for Boeing Field in terms of reflecting growth management considerations relative to compatibility and appropriate types of uses around the airport?
- Multi-modal issues: need for connections, ground transportation—how do we ensure the proper connection—transportation system
- Leases and whether businesses are operating according to authorized use.

Study assumptions

- How you deal with forecasting and analysis related to cargo given the fact it could double tomorrow or be gone? How do you handle the noise?
- Sleeper issues: what if a commercial passenger service or additional cargo carriers want to come to Boeing Field because of overcrowding at Sea-Tac?
- Forecasts of cargo traffic are low given internet mail order business in Seattle.

Financial questions

- One of the existing revenue generating mechanisms is from a Passenger Facility Charge that is not available at Boeing Field. What will be the funding for mitigation?

Provide accurate information

- By giving people the data/facts, they can make their own decisions.
- Balance the marketing pitch with good data.
- Provide visual aids to the SAC and the community groups that are specific to the airport we are talking about—overlay with surrounding geography in place. Don't use generic map or sample airport. Maps need to be detailed enough that I can find my house and key landmarks.

Communications suggestions

- Clarity on the role and function of the study is important so folks don't expect it to be something that it's not.
- Encourage people to become clear about what their own needs are and others needs are and then better communicate with each other.
- Publish a written summary report and make it available to stakeholders and take it to meetings.
- Encourage clear communication.
- Make sure adequate notice for meetings—set meeting date for next meeting at the meeting.

Comments about the role of the FAA

- Regional Office of FAA can't speak for the agency as a whole; need buy-off at the federal level or have no commitment.

Other issues

- Air quality study
- Environmental justice

Suggested Ground Rules for the SAC

- Never go outside to the media without saying it first to the committee.
- Check dates on other meetings already scheduled in the community before scheduling meetings for this project – to avoid creating conflicts for interested citizens.

Suggestions for Public Information

Printed media

- Use Boeing's internal publications: SPEEA Spotlight weekly publication – goes to 30,000, The Aeromachinist (monthly); announcements via weekly newsletter to employees that reaches 84,000.
- Monthly mailer from the Airport to include what is being done about noise
- Inform labor unions, chambers of commerce, the WA State Labor council, UPS Teamsters and ask them to spread the word
- Local newspapers: West Seattle Herald, Magnolia News, Highline Times and Tukwila's city newsletter -- the "Hazelnut" that goes to all citizens and businesses.
- Add a rubber stamp on envelopes sent out by the airport: "Tell a friend."
- Direct mailings, fliers, newsletters sent out on a regular basis to reach those who don't come to meetings
- Get local newspaper to do a long, significant piece to get credible information into the hands of people. This would be a more trustworthy source than if airport were to provide it.
- Do some brochures, give examples, facts and figures; talk about the frequency of things and back it up with sound monitoring information; give people a chance to see whether it is increasing.
- Offer presentations or newsletter copy for existing publications. Need to explain why they should care first.

- Consider using outreach techniques that will bridge language and cultural barriers that currently exist in some communities impacted by the airport and its noise

Electronic media

- Special shows on TV; Local public access cable TV
- Radio; talk shows; interviews on the radio
- Websites
- Hotlines that people who have concerns and questions can call.

Other

- Signs on buses
- Large-scale sign boards placed on prominent corners to announce community meetings
- Consider having a plane fly over with a banner announcing a meeting

Suggestions for Public Involvement

Public meetings

- Hold community meetings, even if the turnout is low, at key milestones; bring lots of visual aids and statistics that are meaningful to residents. Statistics of averaging aren't meaningful to residents—single events are the problem.
- When decision points are close, set up briefings to chambers of commerce, local governments, and committees.
- Time meetings for the convenience of the community, such as evenings.

Community councils

- Have staff from King Co. airport put on their work agenda to visit community council groups on a rotating basis during their regular meeting times (2-3 times a year); this would give a presence of someone from the airport who could answer questions.
- Use the community councils; ask to be on their agendas.

Other groups

- Tap into the public schools to the fullest degree possible: ... a captive audience -- groups of people affected day to day. Reach the schools/school districts, PTAs, including the community colleges.
- Schedule tenant meetings.
- Plug the people who are on existing groups into the committee; get them involved in finding solutions. Where you feel there isn't adequate representation, find other venues where people have representation. For example, Sound Transit has a public review task force for getting input from the minority community. Where there are other things set up to deal with those issues, although marginal to Boeing Field, use them.

Suggested Groups to Keep Informed

- Seattle Council on Airport Affairs (SCAA) and Regional Commission on Airport Affairs (RCAA): suggestion to keep them involved every step of the way because they do a good job at getting information out to the interested parties.
- Duwamish Coalition; Duwamish Improvement Club
- King County Councilmembers, especially Larry Phillips who represents the Magnolia district—very vocal about airport issues due to flight pattern and Greg Nickels who represents West Seattle and is afraid noise will be pushed to West Seattle.
- King County Labor Council
- Georgetown: Crime Prevention and Community Council has a monthly newsletter and website—Georgetown Gazetteer

- Friends of Discovery Park
- North Beacon Hill Community Council
- West Hill Community Council
- Filipino Community Association
- Samoan Community Association
- Tukwila City Council
- Tukwila School District
- Brad Wollen, General Manager at Flight Center
- Economic Development Councils
- Seattle/King County Chambers of Commerce (Jan Underwood)
- Business organizations, such as Rotary
- King County Economic Development Council
- Freight Mobility Roundtable (customers, rail, shipping, airplane, buses, government officials)
- WA Trucking Association
- WA Transportation Alliance
- Association of Washington Businesses
- Tenants assoc. group: Friends of King County Airport.
- Dwight Pelz, (rep. 2 comm. Groups-Georgetown, Beacon Hill)
- CTED committee-Mike Alvine-staff person-most knowledgeable about airport issues
- Schools/School Districts
- Community Colleges
- Foster Improvement Club—Foster High school area; they have a newsletter in early January and would be happy to include information about the Boeing study in the newsletter.
- Sunwood Condominium Association--President has not been elected yet, but contact Mary Westhoff (she is likely to be the next president)
- South Ryan Way Hill Association (Tom Weber)
- Chambers of Commerce County wide —BIRV, Eastside chamber, Bellevue, Redmond, Kirkland.
- Services on the airport that are using King County field—UPS communicating with its customers.
- Contact the top ten clients of UPS, Weyerhaeuser, Galvin, Flightcraft -- folks who assume that the airport will continue as is.
- Transportation Policy Board—body of elected officials -- good mix of central, suburban cities in the region are reflected on 25-27 member board. Also have ex-officio members from the environmental community, business, industry, community groups. Its primary charge is to oversee the maintenance of the Regional Transportation Plan. Oversee funding decisions for fed funding opportunities, T21 legislation.
- FAST corridor group: group of public works staff, planners, industry and business concerned with freight movement in the region; streamline freight movement in region as well as through freight (destination elsewhere.)
- Growth Management Policy Board-GM implications of noise study. Law was changed in 1996, requires cities like Seattle, Tukwila to take action to discourage new and incompatible uses around the airport.

Perceived Sources of Noise at KCIA/Boeing Field

In the air

- Night-time/early morning cargo flights (arriving and departing), with noise exacerbated by weather conditions: (“10% of the operations and 80% of the noise;” they cause citizens “to leap out of bed at night.”)
- Commuter planes flying outside of established corridors.
- Aircraft that approach over land rather than over water.
- Noisy general aviation aircraft doing flyovers over communities.
- Low elevation of the Boeing Field air space that requires low-flying aircraft, relative to Sea-Tac jets.
- Planes that don’t follow tower courtesy procedures.
- Aircraft that are not true stage 3 (hush kitted).
- Helicopters that fly too low and over unpredictable routes, including medical evacuations.
- Military aircraft that are exempt from noise standards, including Blue Angels that come in for servicing.
- Russian aircraft
- Sea-Tac Airport air traffic

On the ground or other

- Engine tests (on the ground), run ups, especially at night or in the early mornings
- Adjacent freeway traffic and trains/train yards
- Aircraft noise impacts on outdoor activities that can’t be mitigated
- Multiple sources of noise in some communities like Allentown: airport, Burlington Northern, firing range

Other Concerns about Current KCIA/Boeing Field Operations

- Health related concerns – asthma, birth defects, lung problems -- due to jet fuel
- Air quality
- Cyanide facility just off one end of the runway
- Concerns about Boeing engine aircraft testing—emissions as well as noise.
- Flights of older aircraft that spew out brown smoke.

Concerns about Anticipated/Planned Changes to KCIA/Boeing Field Operations

- Increased cargo traffic that will cause yet more noise because some of the old hush kits are noisy
- Changing flight tracks that will shift airport noise from Magnolia to West Seattle which already has serious noise problems from Sea-Tac Airport
- Lack of openness on the helicopter operation expansion and on the runway relocation

Suggestions for Improvements to KCIA/Boeing Field Operations

Changes to night-time operations

- Establish noise curfews at night (not excluding emergency or medical flights or planes that fall under a threshold).
- Eliminate nighttime flights (person interviewed recognized this was not feasible).

Changes to flight tracks

- Reroute smaller aviation traffic over the water instead of over land.
- Change flight tracks to stay away from populated areas.
- Evaluate the use of the transponder system as strategy to reduce noise.

- Consider joint use of Sea-Tac and Boeing Field towers at night to allow Boeing traffic to fly at higher elevations; for example, if Sea-Tac and Boeing could integrate flight patterns, Boeing Field aircraft could take off at a steeper angle and get out of the area faster.

On the ground measures

- Consider building hush houses or noise reduction facilities.
- Reduce noise in area through architectural approaches (slanted rather than vertical walls that absorb energy).

Economic Issues and Concerns

- Concern that assembly jobs in Renton could be lost if Boeing Field operations were to be curtailed.
- Concerns about impacts to jobs and the local economy if Boeing operations were to leave the area: "Boeing generates more dollars into the economy than Sea-Tac Airport."

Other Issues/Concerns

- Impacts of increased overall traffic when Sea-Tac's third runway opens.
- Preference for Boeing Field to be under control of the County, without City interference.
- Preference for City of Seattle to be involved as proponent for the communities.
- Status of steam plant
- Impact of Sound Transit/RTA—noise or justice issue—who gets impacted
- Some communities already impacted by other sources of noise—Sea-Tac, Burlington Northern.
- General observation that as transportation and movement get worse in this area, there will be increasing dependence on air freight.
- Deadline is rapidly approaching when aircraft need to be compliant with federal [noise] standards.

KING COUNTY INTERNATIONAL AIRPORT
PART 150 STUDY ADVISORY COMMITTEE

August 9, 1999

MEETING NOTES

Members Present:

- | | |
|--|---|
| √ Doug Baker, <i>Cargo Tenant</i> | √ Randy Eatherton, <i>Georgetown community</i> |
| √ Randy Banneker, <i>Indirect Business</i> | √ Frank Figg, <i>Boeing</i> |
| √ Peter Anderson, <i>Corporate Tenant</i> | Dan Hartley, <i>Labor</i> |
| Larry Brown, <i>Labor</i> | √ Cathy Mooney, <i>West Seattle community</i> |
| √ Jim Combs, <i>Pilots Assn.</i> | √ Georgianne Ray, <i>Uninc county community</i> |
| √ Larry Crim, <i>Renton/Kent</i> | √ Lynn Tucker, <i>Beacon Hill community</i> |
| √ Duane Anderson, <i>At-Large Community</i> | √ Rosemary Unterseher, <i>Tukwila community</i> |
| Ed Wojeck <i>Magnolia/
North Seattle community</i> | √ Karen Walling, <i>Small GA Tenant</i> |
| √ Ron Seymour, <i>Sea-Tac Airport</i> | √ Cayla Morgan, <i>FAA Ex-Officio Member</i> |
| √ Eric Tweit, <i>City of Seattle</i> | √ Theresa Smith, <i>WSDOT Aviation</i> |
| √ Cynthia Stewart, <i>Airport Manager</i> | √ Clare Impett, <i>Airport Staff</i> |
| √ Pat Olds, <i>Airport Staff</i> | John Current, <i>Airport Staff</i> |
| √ Larry Burris, <i>Airport Staff</i> | |

Others Present:

Bob Barnard Mark McFarland Mike Rees William Keithan

The Part 150 Study process will take approximately two years because KCIA has a unique set of challenges and the King County Council has placed additional expectations that were developed as part of last year's Noise Reduction Work Plan. The goal is to provide possible ways to reduce noise itself, not just the number of people affected. The consultants will first do an inventory of existing conditions and develop noise contours. They will begin with noise monitoring around KCIA, which will then be used to calibrate the INM noise model used to develop the noise contours. Unlike the airport's ongoing noise monitoring, they will not be monitoring to establish how loud the noise levels overall are, but rather to establish accurate noise levels for different types of aircraft. This will be compared against the standard data in the model and any necessary corrections made, so that the modeled results will most closely represent actual conditions at KCIA..

KCIA staff and the consultants will work on study milestones simultaneously and update the study group, as information is available. Staff will hold public meetings in addition to those

planned by the consultants and will provide community newspapers with information. The web site will be updated in conjunction with a newsletter.

A request was made that a timeline of mileposts be circulated to committee members.

In 1995, noise complaints at the airport increased from about 15-20 to 400 after Alaska Airlines started flying its Stage 2 cargo planes into KCIA resulting in creation of the Noise Office and telephone hotline. Complaints reached 8,500 in 1998. Approximately 50% of those can be traced to cargo operations with 25-30% unidentified. The new tracking system should make identification more precise.

The consultants will be monitoring noise for the next few months to make sure their model is accurate and the planes they include in it are from Boeing Field and not Sea-Tac. The two noise contours will be different because of the difference in fleet mixes and the two contours will be compared. This will be the first time this has been done.

The consultants will use monitors other than those that KCIA has in place. Suggestions for study monitor locations will be accepted until the end of August.

The study committee stakeholders include representatives of city governments, Puget Sound Regional Council, FAA, Washington State Aeronautics Commission and is not a subcommittee of the Roundtable. Roundtable deals with other issues and has a separate meeting. The meetings for both will be held on the same day to avoid more than one meeting per month. Roundtable By-laws and Ground Rules were distributed to the committee and future plans call for interest-based training for use in resolutions of conflicts.

The next meeting will be on September 13 at 4:00. There will probably not be SAC meetings every month because the study process is slow.

KING COUNTY INTERNATIONAL AIRPORT
PART 150 STUDY ADVISORY COMMITTEE

September 13, 1999

MEETING NOTES

Members Present:

- | | |
|--|---|
| ✓ Doug Baker, <i>Cargo Tenant</i> | ✓ Randy Eatherton, <i>Georgetown community</i> |
| ✓ Randy Banneker, <i>Indirect Business</i> | ✓ Frank Figg, <i>Boeing</i> |
| ✓ Peter Anderson, <i>Corporate Tenant</i> | ✓ Dan Hartley, <i>Labor</i> |
| ✓ Larry Brown, <i>Labor</i> | Cathy Mooney, <i>West Seattle community</i> |
| ✓ Jim Combs, <i>Pilots Assn.</i> | ✓ Georgianne Ray, <i>Uninc county community</i> |
| ✓ Larry Crim, <i>Renton/Kent</i> | ✓ Lynn Tucker, <i>Beacon Hill community</i> |
| ✓ Duane Anderson, <i>At-Large Community</i> | ✓ Rosemary Unterseher, <i>Tukwila community</i> |
| ✓ Ed Wojeck <i>Magnolia/
North Seattle community</i> | ✓ Karen Walling, <i>Small GA Tenant</i> |
| Ron Seymour, <i>Sea-Tac Airport</i> | ✓ Cayla Morgan, <i>FAA Ex-Officio Member</i> |
| ✓ Eric Tweit, <i>City of Seattle</i> | Theresa Smith, <i>WSDOT Aviation</i> |
| ✓ Steve Mullet, <i>City of Tukwila</i> | ✓ Suzanne Alexander, <i>FAA</i> |
| | Rocky Piro, <i>PSRC</i> |
| ✓ Cynthia Stewart, <i>Airport Manager</i> | ✓ Clare Impett, <i>Airport Staff</i> |
| ✓ Pat Olds, <i>Airport Staff</i> | ✓ John Current, <i>Airport Staff</i> |
| ✓ Larry Burris, <i>Airport Staff</i> | ✓ Randy Payne, <i>Airport Staff</i> |

Others Present:

Bob Barnard Mark McFarland William Keithan Jennifer Hewell Dick Potter
Mike Alvine Helen Chatalas

Cynthia Stewart introduced Jennifer Hewell and Ryk Dunkelberg from Barnard Dunkelberg and Associates, the consulting firm working on the Part 150 and Airport Master Plan. Jennifer will contact the Study Advisory Committee (SAC) members individually to discuss ideas for a public outreach program in conjunction with the study process.

Ryk distributed a draft copy of proposed ground rules for the SAC to review and finalize at the next meeting. He then opened discussion of whether there was a need for a chair for the committee. He has conducted studies both with a chair and without and pointed out that a committee with no chair would put more responsibility on the consultants and Airport staff. A chair brings leadership to the group and can help to keep discussions focused.

It has been the intent to have Roundtable oversee the Part 150 process. Since Roundtable is the body to make recommendations on issues, ideas generated by SAC should be reviewed by Roundtable.

Cynthia wants to make certain the integrity of the process is preserved and that issues are brought to the table in a timely manner.



The group decided that the Roundtable Chair will also chair the SAC.

The consulting staff will be monitoring noise levels in surrounding communities between now and Thanksgiving and will not be announcing their presence in advance. Their findings will be presented within the context of the Integrated Noise Model. The INM consists of assumptions developed to reflect how an airplane acts. The assumptions can be adjusted to better fit the monitoring data. Some planes are not in the model.

The consultants are accepting names of people who want monitors on their property. There will be a news article notifying the public about the monitoring project.

There were no public comments.



Part 150 Study Advisory Committee
November 8, 1999
Meeting Summary

The third meeting of the King County International Airport (KCIA) Part 150 Study Advisory Committee (SAC) was held on November 8, 1999 at a Boeing Field Conference Room.

Meeting Purpose

- To present Working Paper 1: Inventory

In Attendance

- | | |
|--|--|
| ✓ Doug Baker, <i>Cargo Tenant</i> | ✓ Randy Eatherton, <i>Georgetown community</i> |
| ✓ Randy Banneker, <i>Indirect Business</i> | ✓ Frank Figg, <i>Boeing</i> |
| ✓ Peter Anderson, <i>Corporate Tenant</i> | ✓ Dan Hartley, <i>Labor</i> |
| Larry Brown, <i>Labor</i> | ✓ Cathy Mooney, <i>West Seattle community</i> |
| ✓ Jim Combs, <i>Pilots Assn.</i> | Georgianne Ray, <i>Uninc county community</i> |
| Larry Crim, <i>Renton/Kent</i> | Lynn Tucker, <i>Beacon Hill community</i> |
| Duane Anderson, <i>At-Large Community</i> | Rosemary Unterseher, <i>Tukwila community</i> |
| Ed Wojeck <i>Magnolia/</i> | ✓ Karen Walling, <i>Small GA Tenant</i> |
| <i>North Seattle community</i> | Cayla Morgan, <i>FAA Ex-Officio Member</i> |
| ✓ Ron Seymour, <i>Sea-Tac Airport</i> | ✓ Theresa Smith, <i>WSDOT Aviation</i> |
| ✓ Eric Tweit, <i>City of Seattle</i> | Suzanne Alexander, <i>FAA</i> |
| Steve Mullet, <i>City of Tukwila</i> | ✓ Rocky Piro, <i>PSRC</i> |
| ✓ Cynthia Stewart, <i>Airport Manager</i> | ✓ Clare Impett, <i>Airport Staff</i> |
| ✓ Pat Olds, <i>Airport Staff</i> | ✓ John Current, <i>Airport Staff</i> |
| ✓ Larry Burris, <i>Airport Staff</i> | Randy Payne, <i>Airport Staff</i> |

Others Present:

- | | |
|----------------|-----------------|
| Ryk Dunkelberg | Mark McFarland |
| Oliver Dallas | Jennifer Howell |
| Helen Chatalas | Herbert King |
| Ralph Bufano | Steve Kiehl |

Meeting Highlights

Jim Combs, Committee Chair, called the meeting to order at 4:10 p.m. He turned the meeting over to Cynthia Stewart, Airport Manager, who introduced Ralph Bufano, from the Museum of Flight and Oliver Dallas, the new BF1 tower manager for the Federal

Aviation Administration (FAA) to make presentations. They could not attend the Airport Roundtable later in the afternoon, so gave their presentations to the full SAC.

Ralph Bufano gave a presentation on the proposed expansion of the Museum of Flight. The Museum of Flight has been planning an expansion for a number of years but has been unable to grow due to space issues related to the Boeing Company and other airport uses. Recently, the Boeing Company has agreed to donate land to the museum. In addition, the museum has been negotiating for a collection of fighters. The museum is creating a master plan that includes an educational vision, a budget and a plan for a 250,000 square-foot addition with new exhibits. The design under development proposes a gallery that acts as a bridge across Marginal Way. The museum would pay the expense to move two hangars and create a wing for military aircraft and a hangar for operating aircraft (new to the museum). The goal is to have it open and operating by December 17, 2003—the 100th anniversary of flight. The anticipated cost is \$80-100 million. The master plan will be completed by 6/20/2000. The museum would like to be the foremost educational air and space museum in the world with a goal of 100,000 children going through educational programs a year. After the presentation, the Committee asked a few questions about the process. This issue will come before the Airport Roundtable again when the Airport Master Plan is approved and the issues related to airport property need resolution.

Oliver Dallas, the new FAA Air Traffic Control Tower Manager, presented his overview of the airport control tower with assistance from Herbert King, operations manager from the Tower. The presentation included the FAA Air Traffic Mission, purpose of air traffic control, types of flight rules, airspace, Seattle Hub concept, Boeing operations, and traffic count. Questions and comments on the presentation are summarized below.

Ryk Dunkelberg, Barnard Dunkelberg Company, distributed Working Paper #1, Inventory, to Committee members and observers. He gave a brief presentation on what was in the paper including information on existing flight tracks and land use—existing zoning, existing land uses, existing comprehensive plans, and the preliminary study boundary (as a starting point based on existing noise contours for the Master Plan). He asked Committee members to review the paper and send comments in writing to Clare Impett, airport staff, by January 10, 2000. He also noted that noise monitoring would occur between now and December 25, 1999 and asked committee members to alert community members, but not call the police or airport. He emphasized that the airport is not included in the monitoring process to preserve objectivity.

The meeting adjourned at 5:15 p.m.

Comments/Questions from the Advisory Committee

A summary of comments and questions raised at the meeting follows. The purpose of this summary is to track comments and questions to be considered in the study process.

Answers by the technical consultant and airport staff are in *italics*.

Questions/Comments on Tower Manager's Presentation

- Approximately what distance from the end of the runway does the aircraft need to maintain 3 miles of separation?

- Comment: the cooperative effort between Sea-Tac and KCIA in air traffic procedures is a positive step.
- Does Sea-Tac Airport have more control over airspace than any other airport and can one tower have more power than another? The airspace does not belong to Sea-Tac.

Comments/Questions on Working Paper 1: Inventory

- Comment: under current law, zoning has to conform to land use plans but that existing land use may be grandfathered in.
- Comment: there are concerns that residential development, schools and churches be included in the noise study.
- Does the comprehensive plan map in the working paper show a residential plan/urban village for South Park?
- How were the terms positive, negative, and neutral on page derived?
- Who is the controlling authority in special district areas and are there any unincorporated areas within a ¼ mile of the airport?
- Comment: page A-26 only applies to King County, not to Seattle or Tukwila, and that the County can't zone for local jurisdiction areas; King County zoning code only applies to unincorporated areas—Skyway, for example.
- Does the sound attenuation ordinance apply only to Sea-Tac Airport? *It's in the code, but only applies to Sea-Tac. It provides an example of something to consider for KCIA.*

Comments/Questions on Noise Monitoring

- How will the noise monitoring be conducted?
Both permanent noise stations at specific locations and a mobile noise monitoring van will be used. The readings will be based on north flow and south flow.
- Has the consultant notified the police about the monitoring?
The police were not informed; the monitoring team wants to avoid any possibility of the airport being informed of the process thereby giving perception that flight tracks might be altered.



Part 150 Study Advisory Committee
January 10, 2000
Meeting Summary

The fourth meeting of the King County International Airport (KCIA) Part 150 Study Advisory Committee (SAC) was held on January 10, 2000.

Meeting Purpose

- Present Part 150 Working Paper #2 – Preliminary Noise Contours
- Discuss Next Steps
- Present Draft Public Involvement Plan
- Share Community Meeting Schedule for January

In Attendance:

- | | |
|--|---|
| ✓ Doug Baker, <i>Cargo Tenant</i> | ✓ Randy Eatherton, <i>Georgetown community</i> |
| ✓ Randy Banneker, <i>Indirect Business</i> | ✓ Frank Figg, <i>Boeing</i> |
| ✓ Peter Anderson, <i>Corporate Tenant</i> | ✓ Dan Hartley, <i>Labor</i> |
| ✓ Larry Brown, <i>Labor</i> | ✓ Cathy Mooney, <i>West Seattle community</i> |
| ✓ Jim Combs, <i>Pilots Assn.</i> | Georgianne Ray, <i>Uninc county community</i> |
| ✓ Larry Crim, <i>Renton/Kent</i> | ✓ Lynn Tucker, <i>Beacon Hill community</i> |
| ✓ Duane Anderson, <i>At-Large Community</i> | ✓ Rosemary Unterseher, <i>Tukwila community</i> |
| ✓ Ed Wojeck <i>Magnolia/
North Seattle community</i> | ✓ Karen Walling, <i>Small GA Tenant</i> |
| ✓ Ron Seymour, <i>Sea-Tac Airport</i> | ✓ Cayla Morgan, <i>FAA Ex-Officio Member</i> |
| ✓ Eric Tweit, <i>City of Seattle</i> | ✓ Theresa Smith, <i>WSDOT Aviation</i> |
| Steve Mullet, <i>City of Tukwila</i> | ✓ Suzanne Alexander, <i>FAA</i> |
| | Rocky Piro, <i>PSRC</i> |
| ✓ Cynthia Stewart, <i>Airport Manager</i> | ✓ Clare Impett, <i>Airport Staff</i> |
| ✓ Pat Olds, <i>Airport Staff</i> | ✓ John Current, <i>Airport Staff</i> |
| ✓ Larry Burris, <i>Airport Staff</i> | |

Others Present:

Ryk Dunkelberg Mark McFarland
Jennifer Howell Paul Dunholter

Meeting Highlights

Jim Combs, Chair of the Study Advisory Committee (SAC), called the meeting to order at 4:10 p.m. He informed the group that a recording system was set up to make sure that the Airport has an accurate history of the meetings. Cayla Morgan asked that earlier meeting notes be corrected

to show that she was present at the previous two meetings. One SAC member asked for clarification about whether these meetings are public, which was confirmed. Jim turned the meeting over to Cynthia Stewart, Airport Manager, who introduced Ryk Dunkelberg, Barnard Dunkelberg Company.

Ryk Dunkelberg reviewed the purpose of the meeting and stated that the SAC would go through an analysis of the preliminary noise contours. He explained that the noise data in the 1999 preliminary contours is from December 1998-November 1999, rather than calendar year 1999, so that the contours could be produced in time for the SAC meeting. The final noise contours will cover January-December 1999, but should not look significantly different than the preliminary version. He introduced Paul Dunholter of BridgeNet International.

Paul went through Working Paper Two, first giving a briefing on the characteristics of sound. Sound is measured in decibels (dB). The frequency and duration of noise affect people. Propagation, or the movement of the noise, is affected by factors such as frequency, temperature, humidity, terrain, ground attenuation, and shielding by buildings. Not all sound frequencies are heard equally -- humans perceive mid-range frequencies better than low-range. The A-weighting scale is designed to match what the human ear hears. A C-weighted scale includes more low frequency noise. When the low frequency is the dominant source, the study may look at C-weighted frequency.

Paul explained some of the terminology in the working paper. For example, the Lmax metric shows the highest decibel level during an aircraft overflight. The Single Event or Sound Exposure Level (SEL) is higher than the Lmax by about 10 dB since it compresses noise over time. These metrics don't take into account how often noise occurs or what the cumulative effect is, so another metric, LEQ (equivalent noise level), takes all the noise on an energy basis and combines it. Decibels are on a logarithmic scale and weighted towards the highest value. Two readings of 100 dB and 50 dB will average a reading of 97 dB. Another metric, Day Night Level (DNL), is similar to LEQ, but adds a 10 dB penalty to nighttime noise readings to account for the higher intrusion factor at night.

He discussed the health effects of noise, noting that the common impacts are:

- Hearing loss (not usually an issue for community noise)
- Communication interference. How loud is it necessary to talk over noise? If noise is over 65 dB, there will be some communication interference; at 75 dB voices must be raised.
- Annoyance. There is a chart showing the relationship between DNL and percent of the population that will be annoyed. The chart may underestimate annoyance at General Aviation airports since it was developed for commercial airports.
- Sleep interference.

The Shultz chart, contained in this study, depicts study data indicating that people don't awaken as readily from noise events while tested in their homes as they do under laboratory conditions.

Paul explained how the noise monitoring data for KCIA was collected and what the preliminary results demonstrated. He noted that the airport has six portable noise monitors; the consultant also located six semi-permanent sites for a one month period, and several short temporary sites set up for a couple of hours at a time in fill-in locations. The measurement data includes acoustic information, flight tracks (radar), noise complaint data, weather data to correlate with flights (are planes coming in under the clouds, etc.), and aircraft operational data. This included aircraft

activity levels, fleet mix, time of day, stage length (departure profiles-purpose of flight, how long it takes to get up), runway use, flight paths, flight path utilization.

He noted that at the next meeting, the team will have completed the analysis of the data and final contours based on noise monitoring and flight information.

Jennifer Howell, Triangle Associates, presented the draft Public Involvement Plan with a list of contacts and organizations generated through interviews with SAC members. She asked that the SAC members review the list to be sure it included all the groups/individuals that should be on the project mailing list. Committee members were interested in the possibility of creating a question and answer video about the project.

Clare Impett ended the meeting at 6:00 p.m. with information about the January community meetings.

Comments/Questions from the Advisory Committee

Below is a summary of comments and questions raised at the meeting to be considered in the study process. Answers by the technical consultant and airport staff are in *italics*.

Noise Contours

- Do the noise contours cover KCIA only?
The preliminary contours show KCIA information only. Other contours will be generated which show combined contours for Sea-Tac and KCIA.
- Since the data from Sea-Tac is from 1998, how will this be reconciled?
The data from Sea-Tac isn't expected to be very different in 1999 than 1998.
- Will the data collected be reviewed to validate the noise model?
Yes, it will be done for next SAC meeting.
- When using the acronym SEL, does it refer to Sound Exposure Level or Single Event Noise Levels, and what is the difference?

Effects of Noise

- At what SEL level does noise interfere with or block regular speech?
Approximately 95 dB
- The noise level at Holly Park is sometimes 85dB or higher at times during the day. Would this affect hearing loss?
Most likely not. OSHA studies show that hearing loss comes from prolonged and continuous exposure, for a minimum of eight hours, to 85 dB or higher.

Presentation of Data

- One of the graphs shows that only 18 out of 100 people would be awakened by noise levels as loud as something like a scream inside their house. *Studies show that it's not the source of the noise that affects people as much as the type of noise—people are sensitive to certain noises and not to others, which will vary for each person. The chart includes work done at Heathrow in London, Denver International, and varied airforce bases. It does not imply that nighttime noise is not an issue/problem, but is trying to show what the research shows.*
- The chart/data does not seem to demonstrate how difficult it is to get to sleep or get back to sleep after being awakened.

Correct

- Since there may be concern with statistics generated and level of confidence in the graphs shown, graphics should show the standard deviation—to indicate the level of confidence and how correct the information is.
- What is the baseline level for noise data set for?
- Would like to see the data that was collected.
- It would be helpful if the Single Event charts were all the same scale and also show Magnolia on the chart.
- There are two scales of interest—a larger geographical area showing where noise complaints are generated, and closer to the airport so addresses can be located. It should have conformity so the differences between the charts can be overlaid.
- Why doesn't the working paper show any land use or current zoning overlay?
The will be shown in future materials.
- Make sure that areas of prime concern are on the map and that they include Skyway and Renton.
- Suggestion to have two different scales, a large scale and a detailed scale.
- Will the maps show the existing runway or proposed runway alignment?

Both

Noise Monitoring

- What does the system at KCIA measure—A or C weighted data.
A weighted only. C is not usual in equipment.
- Comment and request that C weighted data be available.
- Can the average skew the result if there are one or a few operations that are really noisy?
Specific events that are particularly problematic or account for the greatest impacts should be able to be identified.
- Will the model identify specific noise events?
Yes
- Is the Events Per Day Chart real data that shows noise levels in the 90 dB range at midnight?
- Comment: Airborne flies out of KCIA with DC-8's at night.
- If there is one night operation in an hour and it happens to be an airforce bomber, but only a single event, does it push the whole hour up? Is it averaged over the whole hour—is this divided by 60 minutes?
Based on the energy level, not a mathematical average—one event can dramatically raise the DNL.
- Concern that a single event may wake people up, but because of the time factor, the data wouldn't show that level of noise.
Usually the data shows repeatability—that you will have events that wake people up.
- How does Sea-Tac's airspace being above KCIA affect the noise model?

Aircraft Activity

- What is used to track data for small planes? Comment: we don't have good data on small planes, i.e., single engine or twin.
- Comment: operations by category show 1998-1999 data and that this may change.
If there is a change, it would likely show a drop in the number of small planes due to bad weather this spring. Cargo is consistent.
- What are the assumptions being made about small aircraft?
- Is Airborne going to replace its noisy aircraft with Airbus?
- What are the differences in the aircraft and their engines and are they Stage 2 or 3?

- Is noise-reducing technology available for business jets since all these aircraft are lower in weight than required to comply with the Aircraft Act of 1990?
- Comment: January 1, 2000 was supposed to mark the phase out of stage 2 aircraft. What provision has been made to make sure that this is true?
There may be waivers for some if economic hardship can be demonstrated. In general, no waivers are provided except for empty aircraft going to be hush kitted or salvaged.
- Is certification for Stage 2 aircraft expired to make sure it would be in effect?
Cayla Morgan, FAA, will answer that question and get back to the committee.
- Comment: military aircraft aren't required to be Stage 3.

Flight Tracks

- What is the difference in Stage 3 impacts on arrival vs. departure?
Quieter for departure but not really for arrival in Stage 3
- Why does the 2006 projection show impact on water for departures?
Because it shows more south flow.

Neighborhood Planning

- Concern with airport's role in neighborhood planning and that the airport should be sensitive to the perceptions of the public regarding intergovernmental territory claims. Concern that the community felt that the contour overlays were used to not support neighborhood planning.
- Is it appropriate for one governmental body to make comments at a city meeting about the neighborhood plan using this contour data?
The official County position was presented in a letter reviewed by Executive Ron Sims indicating that the noise contour data was not available at the time the neighborhood plan was being developed. The city should be aware that the Georgetown area is inside the 65 contour and that according to FAA, this is considered incompatible with residential development. Airport's intent was to provide information and facts about the situation as this study is going on.
- Concern that information is incomplete regarding available mitigation to preserve residential areas.
- Comment: the intent in raising this issue is to communicate what is heard from the community.

Public Involvement

- Comment that a staged video would be a good idea.
- Will the community meetings cover both KCIA and Sea-Tac Noise Studies?
No, just KCIA.



Part 150 Study Advisory Committee
March 13, 2000
Meeting Summary

The fifth meeting of the King County International Airport (KCIA) Part 150 Study Advisory Committee was held on September 13, 1999.

Meeting Purpose

Present the following:

- Noise Contours
- Five-year Base Case Noise Contours
- King County Airport and Sea-Tac Combined Noise Contours
- Part 150 Open House, April 5, 5-8:00 PM

In Attendance:

- | | |
|--|---|
| √ Doug Baker, <i>Cargo Tenant</i> | √ Randy Eatherton, <i>Georgetown community</i> |
| √ Randy Banneker, <i>Indirect Business</i> | Frank Figg, <i>Boeing</i> |
| √ Peter Anderson, <i>Corporate Tenant</i> | √ Dan Hartley, <i>Labor</i> |
| Larry Brown, <i>Labor</i> | Cathy Mooney, <i>West Seattle community</i> |
| √ Jim Combs, <i>Pilots Assn.</i> | Georgianne Ray, <i>Uninc county community</i> |
| √ Larry Crim, <i>Renton/Kent</i> | Lynn Tucker, <i>Beacon Hill community</i> |
| Duane Anderson, <i>At-Large Community</i> | √ Rosemary Unterseher, <i>Tukwila community</i> |
| √ Ed Wojeck <i>Magnolia/</i> | √ Karen Walling, <i>Small GA Tenant</i> |
| <i>North Seattle community</i> | √ Cayla Morgan, <i>FAA Ex-Officio Member</i> |
| √ Ron Seymour, <i>Port of Seattle</i> | √ Eric Tweit |
| √ Cynthia Stewart, <i>Airport Manager</i> | √ Clare Impett, <i>Airport Staff</i> |
| √ Pat Olds, <i>Airport Staff</i> | √ John Current, <i>Airport Staff</i> |
| Larry Burris, <i>Airport Staff</i> | √ Randy Payne, <i>Airport Staff</i> |

Others Present:

Paul Dunholter	Eric Tweit
Ryk Dunkelberg	Stephen Joo
Jennifer Howell	Leonard Kolb
William Keithan	Steve Griffin
Arthur Miller	Oliver Dallas

Jim Combs called the meeting to order at 4:05 p.m. Airport Manager Cynthia Stewart asked everyone to introduce themselves and then turned the meeting over to Ryk Dunkelberg, Barnard Dunkelberg and Company. Ryk described the last meeting and explained that the SAC had looked at the preliminary noise contours. He noted that the consulting team now had a full year's worth of operational data and could present 1999 Existing Noise Contours and Future Contours for 2006 as well as the existing contours combined for Sea-Tac Airport and KCIA. He noted that the Future 2006 Noise Contour is an effort to predict what the noise would be like at the airport if no changes were made at the airport except for an increase in operations. The Part 150 process as defined by FAA requires 65, 70, and 75 Day Night Noise Level (DNL) contours. The maps also show the 60 and 55 DNL contours at the request of the County. It is important to note that the documents turned into the FAA, the official contours, will not show the 60 and 55 contours.

Paul Dunholter, from BridgeNet International, gave a presentation on how the contours were developed using a combination of operational data, noise monitoring, flight tracks, weather, noise complaints, and other data. Much of the data presented will be included as part of the next working paper that will be distributed prior to the May meeting. For the Future Contours, the data is based on the forecast operations by category of aircraft from the master plan. The important thing to note is the number of cargo and corporate jets. The mix of jets is assumed to be the same as what it is now. This is a conservative guess since it should be quieter in 5 years due to the phasing to new generation, quieter aircraft. The contours shown may actually be bigger than what may occur. He expects that realistically there will be a quieter mix of fleet, but the contour does not show that. All the other assumptions stay the same. At this point, it is difficult to know what this mix will be for corporate jets. It cannot be assumed that they will all be phased out because some of the jets are under 75,000 lbs. and not subject to the stage 3 requirements; therefore, it is better to assume worst case.

The Combined KCIA and Sea-Tac Airport contours are the result of adding the sum of the two noise contours together to show the louder noise energy that results from combining noise from both airports. (Note this is shown not as direct addition but is the combined noise energy from each airport.) The contour is based on 1998 data from Sea-Tac and 1999 data from KCIA.

Ryk Dunkelberg briefly discussed the population and housing units within each contour. He noted that this information was based on 1998 data from the Puget Sound Regional Council (PSRC), the most recent that he could find. He also noted the housing data from PSRC used the assumption of 2.4 persons per household.

For the next SAC meeting, the project team will finalize the noise analysis data and start the discussion about feasible noise abatement alternatives. The team will present a wide range of alternatives to start the discussion. Three major categories will be evaluated: land use, facilities, and operational alternatives.

Most of the questions and comments from the SAC on the presentation concerned clarification about how the data for the noise contours was derived. In addition, SAC members had questions on the population estimates and how they were determined.

At the end of the presentation, Jennifer Howell and Clare Impett discussed the planned Open House on April 5, 2000 and how the airport was publicizing the event. Clare commented that the newsletter would be mailed to the airport mailing list, and flyers would go to all who had

attended the community meetings, called the noise hotline, or otherwise expressed interest in noise issues on the airport. Newspaper ads will go in community newspapers. Notices also would be sent to the media list compiled by Triangle Associates, including newsletters or other publications recommended by SAC members. SAC members received flyers to distribute as well as a copy of the newsletter.

Jim Combs opened the meeting to questions and comments from the public in attendance. Additional questions were asked about the noise contours. One family mentioned that they were unfamiliar with the purpose of the study and asked if it was possible to site the airport at another location away from people who are impacted by noise. Cynthia Stewart suggested that she meet with this family to provide them background on the project as well as hear their concerns.

The meeting adjourned about 5 p.m.

Comments/Questions from the Advisory Committee

A summary of comments and questions raised at the meeting follows. The purpose of this summary is to track comments and questions to be considered in the study process. Answers by the technical consultant and airport staff are in *italics*.

Noise Monitoring

- Would the community be able to look at the flight track information and correlate it with the noise data collected by the airport monitors, thereby identifying what aircraft caused the noise?
Right now the airport system does show the type of aircraft. It can show the track and can approximate what time and what level the noise is. The airport would be happy to share what we have.
- Does the data show which were the loudest events and what kind of aircraft made the noise?
The monitoring done by the consultant showed how loud each plane is at each site—which ones generate the most noise. For example, at the site in Tukwila, Lear 25 is the loudest jet operating at the site. Hush kitted aircraft are louder than re-engined.
- At what elevation was the temporary microphone located and how was it impacted by trees and buildings?
The temporary monitoring was done at an open area. The airport's monitors are on 20-foot poles and they are new enough to be free of trees. They are likely to also get noise from other sources other than aircraft, such as trucks, etc.

Noise Contours

- How are the different contours used in the Existing 1999 Noise Contour?
The 65 DNL contour is the primary one according to land use criteria. This is mostly along the runway because it is dominated by large aircraft.
- Is the hook on the 75 DNL contour created by run ups from Boeing?
Yes.
- What level of confidence does the consultant have in the 55 DNL contour?
Accuracy at a street level is not ideal. But it is probably as accurate as the 65 DNL noise contour.
- Would a measurement of 55 DNL at the base of the bluff in Magnolia be exaggerated at the higher elevation?

Elevation is in the model. The difference of 200 feet does not have that much impact on the noise level measured. The relative difference in distance from the aircraft is not large.

- How are night flights determined?

The time of the flight is based on when they land or depart.

- Do future contours assume that the runway is shifted and what would the contours look like if the runway is changed?

The future contours assume the runway is as it is now. If the runway shift occurs, the use of the shifted pavement will be negligible, so it is better to use the existing layout.

Other Questions/Comments

- Will there be a separate FAA environmental review of the runway extension?

Yes.

- Are corporate jets excluded from a Part 161 noise restriction?

Corporate jets under 75,000 lbs. are only exempted from the change from stage 2 to stage 3 requirement. The only aircraft exempt from the Part 161 requirements are military flights.

Combined Contour between KCIA and Sea-Tac Airport

- Is it possible to color code the combined contours map to show which airport is the dominant factor in the contour?

Use of different colors could be used for each airport, but that would eliminate intermingling. The two contours are based on different models, so are slightly different. This has never been done before for two airports.

- Comment: it would appear that a 3rd runway at Sea-Tac would have an impact on KCIA in 2006 as well.

Sea-Tac's contour will be dropping by 2006.

- Comment: two runways will create a wider contour, especially over Georgetown.

- Does the Sea-Tac Part 150 Study envision the 3rd runway?

No, because the 3rd runway is beyond the 5-year planning period for the Part 150 Study. The information is being considered, but is not the basis of the study.

Land Use and Population Data

- Where did the consultant get the land use information since there is a residential area along Homer and South Marcus Street not indicated on the map? The city should have this information.

- Comment: the residential area on the map listed in 65-70 DNL contour does not account for people living there.

The numbers on the maps should be considered instead of the colors because the information is generalized. When block data is used, the contour generalizes the information.

- Is it possible to see the population impacts for the combined contours?

Yes, generalized population impacts can be provided.

- Is any assumption made for houses being built or demolished?

No, only existing houses are used.

- Comment: there are usually 4 people per house in Georgetown.

- Is the 2.45 number per house used by King County accurate or is there another number used by Seattle? Comment: the population may have changed for those houses.

The other choice for collecting the data would be to use 1990 census data.

- Comment: new houses are being built all the time.

Eventually, an aerial photo will be used to provide an actual house count inside the 65 DNL contour.

Questions and Comments From the Public

- Why does the existing noise contour curve on the south end as expected, but is a 90 degree angle on the north end? Does the noise stop that way?
There are more departures to the south and arrivals from the north. At the north end, where it is more dominated by arrivals, the width of that noise effect is narrower. When it is dominated by departures, the contour is wider and fatter.
- Is this the dominant noise contour?
The contour shows the annual summation for the year, so the noise that's the loudest tends to drive or shape that contour.
- How is ambient noise shown and can an ambient noise contour be displayed?
The ambient noise levels at each of the noise monitoring sites are shown in the working paper. It is not possible to generate an ambient contour within the scope of this project, but the measurement results do show the ambient noise levels in many communities around the airport.
- In considering mitigation of noise impacts, will any measures be recommended for commercial and industrial areas or just for residences?
Mitigation in terms of noise insulation for commercial or industrial areas is not as high a priority as for residences or other noise sensitive uses. Generally, it would only occur in areas that are in the high noise contours (75 DNL or higher). However, the Part 150 Study will address mitigation measures to reduce the overall noise levels at the airport in general, which would also reduce noise levels in commercial and industrial areas.
- Is a change to land use designation a solution?
It might be, but only for future land uses. Other techniques to reduce noise in general will be considered at this time.
- Comment: people have lived in the area since 1929 and have been asked to accommodate roads, noise, and other impacts. Could the County consider relocating the airport to an area where people don't live and not allow people to live there in the future?



**Part 150 Study Advisory Committee
May 8, 2000
Meeting Summary**

The sixth meeting of the King County International Airport (KCIA) Part 150 Study Advisory Committee was held on May 8, 2000.

The meeting purpose was to present the following:

1. Initial Noise Abatement Alternatives - Ryk Dunkelberg
2. Noise Abatement Alternatives Evaluation

In Attendance:

- | | |
|--|---|
| ✓ Doug Baker, <i>Cargo Tenant</i> | ✓ Randy Eatherton, <i>Georgetown community</i> |
| ✓ Randy Banneker, <i>Indirect Business</i> | Frank Figg, <i>Boeing</i> |
| Peter Anderson, <i>Corporate Tenant</i> | ✓ Dan Hartley, <i>Labor</i> |
| ✓ Larry Brown, <i>Labor</i> | ✓ Cathy Mooney, <i>West Seattle community</i> |
| ✓ Jim Combs, <i>Pilots Assn.</i> | Georgianne Ray, <i>Uninc county community</i> |
| ✓ Larry Crim, <i>Renton/Kent</i> | ✓ Lynn Tucker, <i>Beacon Hill community</i> |
| ✓ Duane Anderson, <i>At-Large Community</i> | ✓ Rosemary Unterseher, <i>Tukwila community</i> |
| ✓ Ed Wojeck <i>Magnolia/
North Seattle community</i> | ✓ Karen Walling, <i>Small GA Tenant</i> |
| ✓ Robert Kikillens, <i>Port of Seattle</i> | ✓ Cayla Morgan, <i>FAA Ex-Officio Member</i> |
| ✓ Suzanne Alexander, <i>FAA</i> | ✓ Eric Tweit |
| | ✓ Theresa Smith, <i>WSDOT</i> |
| ✓ Cynthia Stewart, <i>Airport Manager</i> | ✓ John Current, <i>Airport Staff</i> |
| ✓ Pat Olds, <i>Airport Staff</i> | ✓ Larry Burris, <i>Airport Staff</i> |
| ✓ Karla Nemeth | |

Others Present:

Ryk Dunkelberg	Mark McFarland
Jennifer Howell	Bob Barnard
William Keithan	Fred Rapaport

Jim Combs called the meeting the order at 4:10 p.m. and turned it over to Ryk Dunkelberg, who reviewed the SAC process and where we are and what has been accomplished thus far.

- Conducted noise monitoring
- Generated a noise contour and a future noise contour
- Generated a combined Sea-Tac/KCIA noise contour

- Held a series of community meetings
- Held two open houses
- Developed an inventory chapter

He noted that tonight the SAC would review preliminary noise alternatives that will be evaluated for the study and hoped to solicit additional ideas from SAC members. This is the most important part of the study—identifying and evaluating various alternatives and that it takes some time to be thorough. He explained what the regulations state in terms of who has the authority and responsibility for various potential alternatives. For example, the Federal government has the authority and responsibility to control aircraft noise sources and manage air traffic in a way to minimize noise impacts, while local government has responsibility for land use planning and zoning that encourage land use compatible with airport operations. He then reviewed the options available to the airport proprietor, alternatives available to state and local jurisdictions, and those dependent on implementation by the federal government. These are all described in Working Paper 4.

The project team looked at the comments from the community meetings, open houses, and County workplan and prepared a matrix demonstrating what Part 150 alternative correlates with community suggestions and County Workplan Strategies. The project team is asking the SAC and members of the public to review these alternatives and suggest any additional alternatives that should be studied. At this point, the team is looking at a combination of ten alternatives for extensive study and evaluation. This includes Part 161 restrictions. An example of this would be to limit or restrict Stage 2 aircraft under 75,000 lbs. These are exempted from the 1990 phase out of Stage 2 aircraft but the concept could be included under a Part 161 study. This may be a viable alternative. Examples of alternatives are:

- Make sure any new sensitive use developments have noise attenuation in construction.
- Look at departure thrust cutback.
- Analyze whether different procedures can reduce impacts on people.
- Institute noise abatement procedures such as different approaches, use of Elliot Bay, etc.

Dunkelberg noted that all the alternatives heard thus far at public meetings fit in the matrix—community suggestions as well as what was requested in the County workplan. He invited questions and comments on the information presented and requested suggestions for additional alternatives. SAC members had several questions and suggestions related to what types of alternatives could be considered, for example, if the County could privatize the airport or request that certain flights be redirected to different airports. Comments and questions are listed below with answers in *italic*. The SAC generated a list of ideas to consider which is also described below.

There were no public comments.

SAC members were requested to email or call John Current with any additional suggestions for alternatives within two weeks. They also were reminded to pick up the revised Working Paper on noise, a copy of the process schedule, and a copy of highlights from the previous meeting's PowerPoint presentation.

The meeting adjourned at 5:05 p.m.

Alternatives

- Is it feasible, within existing regulations, to change the flight mix at the airport and eliminate planes over 75,000 (except Boeing)?
No it's not— it's a blatant violation of FAA regulations to make changes to flight mixes. The airport sponsor can't limit who comes to the airport --it can only try to regulate noise by going through a Part 161 study. Any type of access restriction would require additional work. KCIA plans to evaluate some type of Part 161 restriction as part of the study. It would also be discriminatory to prohibit everyone but Boeing.
- Comment: good to know that the Part 161 is still on the table.
- Is the FAA listening and willing to make changes to the regulations?
KCIA can ask the FAA to work within the existing regulatory framework.
- Some time ago, the consultant said the reason the FAA has the deciding voice in airport matters is that it has money invested in the airport. Could the County make a decision not to accept any FAA money in the future and pay back past FAA funds? Could local communities take back ownership and decisionmaking at the airport?
Even if this was a strictly private airport, once an aircraft left the ground, it is under the jurisdiction of the FAA. If it was a private airport, the County could have more control of certain things, but not all.
- If the airport became private and restricted the length of the runway so that certain aircraft couldn't take off, would this be a practical solution to some of our challenges?
It would be up to the County to make that decision.
- Suggestion: Include this scenario as an alternative: Repay the FAA to relieve the airport of all federal obligations. Shorten the runway.
- Is there something about perpetuity in the agreement to accept FAA funds?
The soonest that could be accomplished would be within a 20-year timeframe—when an airport accepts a grant, it is subject to 20 years of federal regulations. Discrimination and land acquisition are in perpetuity. It is very difficult to be released from those grant obligations, especially if there is a demonstrated demand for air traffic. FAA would have to release the land back to King County. It can't be done within the Part 150 five-year timeframe but it might be evaluated over time.
- If the residents of King County filed an initiative to take back the airport, would the FAA have to negotiate with King County?
The airport serves needs beyond just King County; this is a more difficult issue than is immediately apparent.
- Are the transponder landing systems on the list of alternatives?
This should be listed under the County workplan.
- Are the alternatives restricted to the King County Airport or can the study address transferring air traffic to other airports?
A Part 150 study is designed to look at noise associated with one particular airport. In addition, King County can't force pilots to use other airports; the decision is up to the pilots.

Environmental Justice

- Is there a discrimination issue related to people who are subject to noise because they can't afford to live anywhere else and should this be considered in this study?
It would need to be a disproportionate impact, such as caused by a flight track change, on a disadvantaged population. Environmental justice issues would be covered in the implementation of the Part 150, not in the study itself.

- Comment: The SAC needs a better description of where environmental justice fits into the process.

Evaluation Criteria

- Comment: The goal should be to minimize the number of people affected by airport noise. The Bay Visual Approach has higher density areas. The study should consider the total number of people who are affected when evaluating a change to flight tracks.
- Would noise impacts be increased to a smaller number of people to minimize the total number of people affected?
- Suggestion: Add this as evaluation criteria to help choose between alternatives and to discuss the number of people vis-à-vis the level of noise.
- Comment: This ties in with the split east turn debates that are part of the Sea-Tac Part 150—trying to share the noise and the impacts to the cost of living in a city. City neighborhoods have been absorbing noise that has increased by 400 percent over time. Attempts have been made to lower noise impacts in one area by 20 percent and spread them to other less-impacted areas.
- Comment: KCIA needs to concentrate on noise abatement alternatives that won't cause conflict between neighborhoods.

Process

- Request for clarification on the mechanism for the Study Advisory Committee to agree on recommended alternatives.
The process will be the same as that used by the Roundtable.

Other

- Why wasn't an EIS required when airfreight was introduced in 1992? Was the change significant enough to trigger an EIS?
A Federal EIS is only required when there is a Federal action that results in some type of impacts. No federal action was involved when airfreight was accommodated at the airport in 1992. The operators made a decision to utilize King County International Airport. It was not an FAA decision.



Part 150 Study Advisory Committee
September 11, 2000
Meeting Summary

The seventh meeting of the King County International Airport (KCIA) Part 150 Study Advisory Committee was held on September 11, 2000.

Meeting Purpose

- Development of Criteria for Selection of Alternatives
- Preparation for Interest-based Training on September 18

In Attendance:

- | | |
|---|---|
| Doug Baker, <i>Cargo Tenant</i> | Randy Eatherton, <i>Georgetown community</i> |
| Randy Banneker, <i>Indirect Business</i> | √ Liz Warman, <i>Boeing</i> |
| √ Peter Anderson, <i>Corporate Tenant</i> | √ Dan Hartley, <i>Labor</i> |
| Larry Brown, <i>Labor</i> | Vacant, <i>West Seattle community</i> |
| √ Jim Combs, <i>Pilots Assn.</i> | Georgianne Ray, <i>Uninc county community</i> |
| √ Larry Crim, <i>Renton/Kent</i> | Lynn Tucker, <i>Beacon Hill community</i> |
| √ Duane Anderson, <i>At-Large Community</i> | √ Rosemary Unterseher, <i>Tukwila community</i> |
| Ed Wojeck <i>Magnolia/</i> | √ Karen Walling, <i>Small GA Tenant</i> |
| <i>North Seattle community</i> | √ Cayla Morgan, <i>FAA Ex-Officio Member</i> |
| √ Suzanne Alexander, <i>FAA</i> | √ Eric Tweit, <i>City of Seattle</i> |
| √ Oliver Dallas, <i>FAA</i> | √ Ron Seymour, <i>Port of Seattle</i> |
| Rocky Piro, <i>PSRC</i> | Pam Linder, <i>City of Tukwila</i> |
| Theresa Smith, <i>WashDOT</i> | |
| √ Cynthia Stewart, <i>Airport Manager</i> | √ Larry Burris, <i>Airport Staff</i> |
| √ Pat Olds, <i>Airport Staff</i> | √ John Current, <i>Airport Staff</i> |
| √ Karla Nemeth, <i>Airport Staff</i> | |

Others Present:

- | | | | |
|----------------|----------------|----------------|-----------------|
| Mark McFarland | Eric Tweit | Bob Barnard | Paul Dunholter |
| Ryk Dunkelberg | Mary Vigilante | Claire Barrett | Jennifer Howell |

Chair Jim Combs called the meeting to order at 4:10 p.m. The purpose of the meeting was to develop criteria for the evaluation of alternatives. Airport Manager Cynthia Stewart presented information on the purpose of developing criteria in advance and explained that SAC members were invited to a training session on September 18, 2000 on interest-based decision making. Bill Lincoln, Conflict Resolution Institute, who had trained Roundtable members last year, will conduct the training for SAC on September 18. Information on this was sent with the agenda for tonight's meeting and those not able to attend will be mailed the training material.

The SAC members brainstormed a list of criteria, went through the list to make sure the statements were clear and understandable, stated in a positive manner, and all could agree to the list. Certain criteria were identified to be applied at the end of the process to maintain good or creative ideas early on. These included financial, legal, and timeframe for and ease of implementation considerations. In addition, FAA was asked to include the criteria they would use when reviewing the recommendations. SAC members also agreed that changes to the criteria later in the process would require a consensus. Because several SAC members were absent, the group agreed to wait until the next meeting to prioritize the list of criteria.

The list of criteria generated by the SAC members is attached to this summary. The comments and questions from the SAC discussion on the criteria are provided below. Answers to questions are in *italic*.

Cost

- Financially, can we afford it?
- Comment: that because, or if, the County is willing to spend money beyond what the FAA is willing to, there may be some opportunity to do things not normally possible.
- Alternatives should be something realistic financially within parameters of County and Federal budgets.
- Is the SAC going to give a budget to County Council or will there be a set amount of funds for the process.

The SAC will make a list of recommendations that will be costed out. The SAC will prioritize them and recommend a method of implementation. The County Council will make the final decisions.

Legal

- Is it legal?
- Laws can be changed.
- This should not be a barrier to coming up with solutions. Ultimately, laws can be changed nationally through a Part 150 process. Good ideas should not be rejected just because they don't fit the current system.

Implementation

- How quickly can an alternative be implemented?
- If the alternative is outside current FAA requirements, it may take too long to implement.
- Suggestion to keep it simple—the more detailed, the more difficult it is in terms of administration and implementation.

Fairness

- Concern that discussions have centered on not moving noise to other communities. That may be its own criteria. The goal is a reduction in noise—not a shift of noise.
- Alternatives should consider fairness for those people who may be personally hurt by changes that could occur. For example, things that need to be done to accomplish the best use of this airport should minimize damage to communities.

Consider Economic Impact

- Economic impact should be taken into consideration. This does not mean total elimination of economic impacts, but that effects need to be weighed.

Safety

- Number one item.

Maintain jobs

- A fair process should be responsible to those already present and invested on the field.
- Job maintenance on the field; maintain the jobs that are here.
- Job recovery on the field.

Contributes to Economic viability of the Puget Sound Region.

Noise reduction.

Pioneer community-friendly technologies.

American competitiveness.

- Many activities undertaken at KCLIA are different and innovative and should continue in order to protect American competitiveness.
- What if a competitor builds a quieter airplane? Will acceptance of these criteria limit the process when the goal is noise reduction?
- If a competitor builds quieter planes, American companies would develop the same technology.
- How will we apply this standard?

Forward looking.

Considers environmental impact.

Standards from the FAA (The FAA representative was asked to identify criteria that FAA considered necessary for acceptance of a noise reduction alternative.)

- Safety
- Efficiency—make sure there wouldn't be a negative capacity impact—will look hard at that.
- No undue burden placed on interstate commerce.
- What is considered an "undue burden."
Any regulatory action that causes an unreasonable interference with interstate commerce is an undue burden. For instance, nighttime restrictions could burden interstate commerce.
- Can't be discriminatory to one use over another or to restrict type of aircraft. To receive grant assurances, King County signed an agreement to be anti-discriminatory. It is considered discriminatory if it is regulatory; voluntary compliance is acceptable.
- Is the negative impact on capacity based on existing or potential capacity?
Both existing and future capacity will be considered and neither may be negatively impacted.
- Flight tracks need to be safe.

- Efficiency is the number two consideration. If the capacity of the airspace of this area is negatively impacted, it would create a problem.
- If flight track changes are involved, they must not shift noise from one neighborhood to another unless both neighborhoods agree and all other criteria (safe, efficient, etc) are met.

Comments on the criteria selected

- Criteria should not be eliminated because they don't fit every standard.
- Legal, financial, and timeframe criteria should not be applied until the other criteria are reviewed.
- It is acceptable for airport staff and/or the consultant to point out obstacles but solutions should be discussed by the group.
- The criteria should be presented as positive statements rather than negative statements.
- Rephrase FAA suggestions to
 - Maintain or improve airfield capacity
 - Safeguard interstate commerce from undue interference
 - Treat all types of users equitably
- FAA does not have a vote on the alternatives since its role is advisory, but FAA members did not see anything missing from the list.
- Suggestion that, given the number of absent members, the criteria should be summarized and reviewed by the committee at the next meeting.
- What is the purpose of prioritizing the criteria?
This would assist in deciding which items are finally accepted.
- What process should be used to change criteria in the middle of the study? This became an issue during the Sea-Tac Part 150 Study.
The group would like to see a consensus—100 percent to change criteria.

Other Comments/Questions

Part 161 Study

- What is the status of the Naples, Florida Part 161 Study recommending that Stage 2 corporate jets be banned?
FAA sent it back asking them to redo it.

Combined Sea-Tac and KCIA/Boeing Field Contours

- Would residences outside the 65 DNL for each airport, but inside the 60DNL under the combined contours be eligible for benefits? Also, how will the consultant count these people?
After remedies are developed, the contours will be considered.
- Request that the consultant find the number of people affected within the combined contours today and include solutions for the people who are in areas over 60 DNL for both airports.

Ryk Dunkelberg, Barnard Dunkelberg & Company, gave a brief update on the progress of the study. At the next SAC meeting, he will present an initial set of noise reduction alternatives with some preliminary analysis. The information will be provided in matrix format and will include information for the 75, 65, and 55 DNL contours. He noted that 65 DNL is the threshold used for FAA review and the consultant team will do a more detailed land use analysis for both the 65

and 75 DNL. They also will provide information about the number of people and houses within the 55 DNL. They will provide data on the reduction of DNL provided by each alternative as appropriate. The data will be for DNL levels at KCIA/Boeing Field only. When an alternative is selected for further analysis, the consultant will see how it impacts the combined KCIA/Sea-Tac contours.

Jim Combs asked the Port of Seattle representative to discuss the letter the Port sent to the FAA about using the Duwamish Corridor for Sea-Tac north flow departures. Ron Seymour, Port of Seattle, described the request by Sea-Tac to analyze the Duwamish Corridor for departures and explained that the FAA has 90 days to review this. He also said that this is not a new flight track since aircraft already use this in some cases. It is not clear whether this would change the noise contours for Sea-Tac.

There were no further questions or comments from either SAC members or members of the public.

The meeting was adjourned.

**King County International Airport/Boeing Field
PART 150 NOISE STUDY
Adopted Criteria for Selection of Alternatives**

At its September 11, 2000 meeting, the Study Advisory Committee identified preliminary criteria, or standards, with which to evaluate the alternatives presented. Each of the alternatives will be analyzed in light of these standards.

First Level Criteria

- Fair: Reduction in noise, not a shift of noise unless both neighborhoods agree.
- Fair: Accounts for those people who may be personally hurt by changes that could occur.
- Considers economic impacts.
- Safe
- Responsible to those already on KCIA
- Maintains jobs at KCIA
- Recovers jobs at KCIA
- Considers environmental impacts
- Maintains or improves regional airspace capacity
- Maintains or improves potential airfield capacity
- Safeguards interstate commerce from undue interference
- Treats all types of users equitably
- Contributes to economic viability of the Puget Sound Region.
- Reduces noise.
- Pioneers community-friendly technologies.
- Maintains American competitiveness.
- Forward looking.

Criteria to be analyzed but not applied to rule out any alternative until the end of the evaluation process. This will allow for consideration of innovative or creative ideas.

- Financially affordable within County and Federal budgets
- Legal
- Realistic implementation time
- Simple to administer
- Simple to implement



**Part 150 Study Advisory Committee
October 16, 2000
Meeting Summary**

The eighth meeting of the King County International Airport (KCIA) Part 150 Study Advisory Committee was held on October 16, 2000.

- | | |
|--|---|
| √ Doug Baker, <i>Cargo Tenant</i> | √ Randy Eatherton, <i>Georgetown Community</i> |
| √ Randy Banneker, <i>Indirect Business</i> | √ Liz Warman, <i>Boeing</i> |
| √ Peter Anderson, <i>Corporate Tenant</i> | √ Dan Hartley, <i>Labor</i> |
| √ Larry Brown, <i>Labor</i> | Vacant, <i>West Seattle Community</i> |
| √ Jim Combs, <i>Pilots Assn.</i> | Georgianne Ray, <i>Uninc County Community</i> |
| Larry Crim, <i>Renton/Kent</i> | Lynn Tucker, <i>Beacon Hill Community</i> |
| √ Duane Anderson, <i>At-Large Community</i> | √ Rosemary Unterseher, <i>Tukwila Community</i> |
| √ Ed Wojeck <i>Magnolia/
North Seattle Community</i> | √ Karen Walling, <i>Small GA Tenant</i> |
| √ Suzanne Alexander, <i>FAA</i> | Cayla Morgan, <i>FAA Ex-Officio Member</i> |
| √ Oliver Dallas, <i>FAA</i> | √ Eric Tweit, <i>City of Seattle</i> |
| Rocky Piro, <i>PSRC</i> | √ Ron Seymour, <i>Port of Seattle</i> |
| √ Theresa Smith, <i>WashDOT</i> | √ Pam Linder, <i>City of Tukwila</i> |
| √ Cynthia Stewart, <i>Airport Manager</i> | √ Randy Payne, <i>Airport Staff</i> |
| √ Pat Olds, <i>Airport Staff</i> | √ John Current, <i>Airport Staff</i> |
| √ Karla Nemeth, <i>Airport Staff</i> | |

Others Present:

Ryk Dunkelberg	Bob Barnard	Bill Keithan
Paul Dunholter	Jennifer Howell	Noel Treat

Jim Combs, Study Advisory Committee Chair, called the meeting to order at 4:10 p.m. After a round of introductions, he turned the meeting over to Ryk Dunkelberg, of Barnard Dunkelberg & Company, who then described the materials that were handed out at the meeting.

Working Paper 4: Land Use Analysis deals with the evaluation of land uses within both the existing (1999) and future (2006) noise contours. This paper also includes a map of the combined Sea-Tac International Airport and King County International Airport/Boeing Field (KCIA) existing noise contours with a table illustrating how many additional people and housing units that are not affected by noise from each airport individually are affected as a result of the combined exposure as demonstrated in the combined contours.

Draft Working Paper 5: Abatement Alternatives Evaluation describes an analysis of some of the various alternatives potentially available for noise abatement. These include alternatives usually considered in a Part 150 Study, those suggested by the public in community meetings, open houses, or in personal communication, and those directed for evaluation in the County Work Plan. This paper categorizes the alternatives according to the type of alternative it represents and presents how noise may change with each alternative. (An earlier paper had organized alternatives according to the jurisdiction that would control their implementation.) The project team anticipates that additional alternatives may be recommended or combinations of alternatives will arise during the evaluation process.

Decision Criteria/Alternatives Comparison Matrix. This was a preliminary assessment of how the alternatives described in the working paper would match the evaluation criteria generated at the last SAC meeting. This will be discussed at the next SAC meeting.

After some discussion of the combined contours and the need to doublecheck and clarify the information on Table D3 of Working Paper Four on the combined noise contours, Paul Dunholter, BCS International, presented the information in the Abatement Alternatives Evaluation paper that was possible to model via computer. This is an initial evaluation; more alternatives will be evaluated in subsequent sections of the Working Paper and will be prepared for the next meeting. Much of this was providing background and contour maps that are included in the paper.

For each modeled alternative presented here, he showed a graphic of how the contour would change if that alternative were implemented. He also showed a "Time Above" noise contour for each modeled alternative. He explained that the contour showing minutes above—time above—was a good indicator of how often one hears airplanes. Time above 65 decibels represents speech interference. As an example, the 65 dBA is about the level of normal speech communication. Aircraft noise above 65 dBA would indicate lower level speech interference. At that level, it would be necessary to raise one's voice but not stop talking. The Time Above Contours show the number of minutes that this would happen: 5, 15, 30, and 60 minutes per day. On looking at the contours, members of the advisory committee asked that the "base case," existing contours also be shown so it would be easier to compare the affect of the alternative. It was also suggested that the contour graphics and tables be labeled clearly so people could understand them. (For example, the Time Above contours were labeled TA instead of being spelling out in words. Alternatives are labeled by numbers instead of names.)

Following are the comments and questions that the presentation of the combined noise contours and the noise abatement alternatives generated in discussion. Answers to questions are in *italics*. Brief background information is provided to better understand the comments and questions. These are fully described in the working papers. The consultant team requested that SAC members review the reports and let them know within two weeks if additional scenarios should be evaluated, what information was useful, and what should be dropped. The next SAC meeting will be November 13.

Comments and Questions on the Combined Noise Contours (Working Paper 4)

- Why are the numbers higher in the DNL 65 than in the DNL 60 contour?
Table D2 is cumulative. Table D3 represents additional people within each contour. They are already counted.
- Comment: Table D3 is confusing and needs to be clarified.
- Comment: aircraft from Sea-Tac Airport are causing noise for people in the vicinity of KCIA and Sea-Tac should share financial responsibility for some noise solutions.
- How many people who are in 65 DNL noise contour for one airport actually would be in the 70 DNL contour for both?
If someone at Sea Tac were in a 64 DNL contour for Sea Tac and a 64 DNL for KCIA, they'd be in 67 DNL for both airports.
- Comment: it would be helpful to have a copy of Sea-Tac's contours. It would be helpful to see the effect of both if you saw them individually.
- Comment: it looks like South Park is a new area affected by the combined contours, as it is not affected by the KCIA contours independently.

Comments and Questions on Draft Noise Abatement Alternatives (Draft Working Paper 5)

Alternative 1: Total Restriction of Stage 2 Operations

The first alternative Paul Dunholter demonstrated was how the noise contour would change if Stage 2 restrictions were implemented. He noted that this alternative results in a reduction of the noise contour at the south end of the airport, but that it was not that big a change since a number of aircraft using the airport are equally loud or louder such as hush kitted Stage 3 aircraft.

- Does this just demonstrate Stage 2 aircraft that are at the airport?
No, it includes everyone using the airport except the military.
- Comment: single noise events, particularly at night, are what affect the north end and have generated participation in this study by north end residents. There seem to be a large number of Lear Jets flying.
- Would this protect against new planes coming in that create noise?
Currently there is nothing to restrict aircraft from operating at the airport.
- Can some Single Event levels be added into the analysis?
Landing noise isn't so different between Stage 2 and Stage 3 aircraft. Therefore, the Single Event or DNL noise levels north of the airport do not show much change in noise. The higher noise reductions occur to the south.
- Is there a way to tell the purpose of the Lear Jets and corporate jets for coming to the airport; i.e., is it an executive or someone carrying a heart for Harborview?
There is a record of planes coming in over the past year that is coded to some degree by flight number or tail number. This information, the mission of the aircraft, would be analyzed in a Part 161 study. However, the tail number of the aircraft helps identify the types of business that the aircraft is used for --such as a cargo flight, corporate flight or medical flight.
- Can cargo flights be identified?
- Comment: Lear 25's are a great cargo plane.
- Comment: airport staff is not aware of cargo companies flying Learns at KCIA.

- Request to see the base case contours to compare the base case with the alternative contour.
These will be distributed.
- What is the island in the contour northeast of airport?
Touch and go pattern results in an island. Aircraft in the pattern do not fly a specific path so the island may be a fact of the model rather than an actual island.
- Request to re-label the contours with the exact title so people can understand what they are looking at.
- Is the data available to show the time above and DNL noise contours for the combined airports?
This could not be shown for every alternative because of the cost and time involved, but the combined contours will be shown after the future conditions at KCIA are determined.
- Are the results all based on future contours?
Yes.
- Are there any plans to do a combined future contour?
Yes, but it will be a mitigated combined contour, not just future.

Alternative 2: Restriction on Stage 2 Aircraft at Night

The next alternative is similar but the restriction is just at nighttime. This doesn't show a lot of change in noise, but it might be used to protect against future noise coming in.

Alternative 9: Noise Abatement Procedure (Flight Track Changes)

This alternative includes the use of the Charted Visual approach for operations. The approach through Elliott Bay has not been used very much to date. This has been modeled using this approach fifty percent of the time because it is difficult to use under certain conditions. Figure G4b shows the affect if this approach were used all hours and Figure G5b shows how it would look if the approach were used just at night. At night, there would be a significant improvement in the DNL because of the nighttime noise reduction. Nighttime noise has a higher penalty than daytime noise. The result for nighttime only is almost the same as a 24-hour approach.

- Comment: the approach has only been on the books for a couple of months because FAA asked the Airport not to disseminate it prior to the most recent publication.
- Comment: this alternative would alleviate some of the noise at the north end of Seattle. Glad to see this as a possibility.
This would pull off about half the arrival noise in Magnolia; the noise would be in Elliott Bay.
- Comment: this would be less likely to be used with a visual approach.
This may cause more noise in West Seattle—if flights can be kept over Elliott Bay, the noise will be reduced. If they fly all over, there may be some areas with an increase in noise.
- Does the nighttime restriction alternative assume that during the day the other approach would be used, but during the night pilots would use the Charted Visual Approach?
Yes.
- Comment: if weather isn't a factor, it is easier to pull off this type of approach.
On south flow days about two thirds of the time, this is true.
- Can planes be directed to fly over Elliott Bay instead of flying straight?
Smaller planes are more likely to do this. Bigger aircraft are more difficult to maneuver, therefore, they are less likely to be able to use the procedure here.

- Comment: Magnolia is affected more by smaller aircraft than by corporate. It's the single engine aircraft that are departing and flying low.
- Comment: another alternative that should be looked at is to have aircraft that need to fly low longer stay over Elliott Bay versus those that climb right away.
- Does the flight track data show two-thirds going straight?
Yes.
- Is this for every type of aircraft or just jets?
Everything.
- Has the consultant looked at the Elliott Bay and Duwamish flight tracks and how the Sea-Tac Airport noise study would affect neighborhoods around KCIA/Boeing Field? Where would the noise be shifted?
The impacts aren't known yet, because FAA has not yet completed its evaluation.
- If Sea-Tac and Boeing Field are both trying to use the same airspace, will there be a battle between the airports over who can send planes there?
- Comment: there already is a battle for airspace.
- Comment from FAA: they are working furiously to study alternatives for Part 150 at Sea Tac. They are looking at the feasibility of moving any of the flights that depart northbound and turn east through Elliott Bay instead. They will look at safety, efficiency, etc., and give the information to the Port of Seattle. Once the Port gets the information, they will analyze the data.
- Is there the same kind of difficulty selecting specific types of aircraft? In other words, can we direct just the MD-80 aircraft to fly a certain route?
It is not possible to move a class of aircraft to the Elliott Bay track. What would occur is a relocation of a destination. FAA would look at the flight tracks and destinations of aircraft going to a specific location, not type of aircraft. For example, for flights going to LAX, they would look at groups of aircraft to move by destination, not by type of plane.
- Comment: the only way all the MD 80 aircraft can be directed is if they have the same destination.
The potential change in the flight paths at Sea-Tac would direct more aircraft away from the East turn and toward Elliott Bay. The aircraft that may be moved would be aircraft to a particular destination, not a specific type of aircraft.
- Will the noise analysis look at the mix of flights after the flight track is determined? Is this a done deal?
Yes, on the noise analysis. Sea-Tac would do this as part of their study.
- Comment from FAA: it is not a done deal – they are still studying.
- Will the Sea-Tac study fill up Elliott Bay air space and preempt use by KCIA?
- Comment from FAA: they will study all airspace issues as part of the picture. Since KCIA is already using the area, they will not move all of KCIA out of the area. The whole picture will be studied.
- What percent of the planes use the north flow?
North flow days occur approximately one-third of the time. When the airport is in north flow conditions, virtually all of the aircraft are in north flow.
- Would using a Global Positioning System (GPS) approach as an alternative to a visual approach be feasible?
It is still a couple of years out before everyone has the equipment to use GPS, but it will be studied as an alternative.

Fly Quiet Contour.

A fly-quiet program would implement procedures at the airport to make existing planes as quiet as possible. While the Charted Visual and Elliott Bay approach together reduce the north end of the contours by quite a bit, they don't improve the south end.

Contour Evaluation

Each modeled alternative was evaluated and compared not only to each other, but to base case future noise contours. To show the change in noise levels in the different communities around the airport for each of the modeled alternatives, the consultant team conducted Representative Receptor Analysis. The consultant team would like recommendations for additional locations. Right now, for the existing monitoring sites, the analysis shows the existing noise level, future noise level without mitigation, and projected noise level if that alternative is implemented. The terms used are defined on pages G2 and G3.

- Request for words instead of numbers (A1, A2, etc.) on the tables so people can understand what the alternatives are.
- Are these alternatives ones that were selected because the FAA wouldn't object to them? *These are things that the FAA may not totally favor, but have some possibility of implementation. For example, ban of planes at night may be impossible to implement.*
- Comment: the noise levels of these alternatives show only 1-decibel reduction of noise in Georgetown.
Other alternatives will have to be studied for Georgetown.
- What would the difference be in Georgetown between a Stage 2 and Stage 3 aircraft? *The difference between a hush-kitted 707 and a Stage 3 jet makes a tremendous difference in how the house rattles. Tens of decibel differences have been indicated in the noise reports.*
- Request to see the impact modeled for different types of scenarios, for example if a variety of flights/aircraft were curtailed, even if not feasible or legal.
- Comment: had understood that closing the airport at night was an option and also banning all hush-kitted aircraft.
- Comment: the alternatives presented do not decrease noise for my neighborhood.
- Will a chart be presented with results that would indicate that nighttime Stage 2 level aircraft are banned or that the airport would be closed entirely at night?
Yes, noise contours will be presented that represent a Stage 2 ban at night and a total Stage 2 ban. Doing something at night does reduce noise, especially further from the airport.
- Request: would like to see how important night is, how important hush kits, etc. are in ranking the reduction of noise.
- Comment: the community hopes that a Part 161 study will be done, and that the foundation for that would be done under the Part 150 study.
- Comment: Table G6 - the numbers don't make sense when looking at the Tukwila sites; the change between two Tukwila sites that are 8 blocks apart is significantly different.
- Why are the numbers at sites S4 and A7 in Georgetown so far apart (SEL events), yet in Table G5 these are pretty much the same?
- Would it be helpful if the numbers were ordered by neighborhood rather than by site number?
- Comment: clarification of the amount of time the monitor was in a location is needed.
These are all modeled, not based on actual data.

- Comment: from Magnolia's perspective, Table G4 looks fine. From Georgetown's perspective, it shows a significant increase in numbers. Is this based on increased traffic at the airport? Are there things that could be done near the airport that would reduce noise?
Yes, the increased numbers are due to growth. Haven't modeled hush house or things that affect in-close noise. So far less difficult things to implement have been studied.
- Will alternatives that provide solutions to in-close noise be examined?
It is harder to find solutions to deal with in-close noise. The Fly Quiet program can be used. Also, the operations that make the most noise can be identified and possible solutions can be studied.
- Comment: it would appear that Tukwila and Beacon Hill, have the same problem—a 50 percent increase in noise.
Tukwila has a lot of the same problems that Georgetown has in reverse.
- Comment: in three main areas, Tukwila, Beacon Hill, and Georgetown, there are huge discrepancies in the monitors. The numbers need to be checked.
- Are helicopters included?
No, helicopter tracks are not included, only small aircraft.
- Comment: this doesn't show small aircraft coming from east or west.
The ones that circle around the airport don't show up in the contour. The number of operations are too small to affect the contour. In addition, the aircraft are higher.

Sound Attenuation

One of the alternatives being evaluated is sound attenuation within the 65 and 60-dnl contours. Page G8 shows the number of homes and cost of sound attenuation. The consultant team used Sea-Tac Airport's insulation program costs as comparable costs. These are shown for both existing and future noise levels. When a recommendation is made on what alternatives to implement and what size contour to use for sound attenuation, the consultant team will show a mitigated contour (based on all recommended alternatives combined) and then recalculate cost of sound attenuation and number of homes.

- Is sound attenuation a feasible alternative? Will it really make a difference?
Sometimes when the house is not to code, the cost of sound attenuation includes the cost of bringing the house up to code; this may make it unfeasible from a cost perspective. Each house has to be analyzed.
- What has Sea-Tac Airport spent?
8,500 homes have been modified at a cost of \$250 million to insulate within the 65 DNL contour. This cost more than \$18,000 per home, especially at noisier areas.
- Does that include only insulation, or windows also?
It includes a complete package: insulation, doors, windows, adding wallboard on the inside.
- It is most likely that a significant number of homes around KCIA will need to be brought up to code because they are in older neighborhoods. What kinds of code problems exist?
Electrical, wiring, plumbing. Most community building codes require that when you renovate a home, you bring the whole building up to code. It may cost more to bring the house up to code than to sound attenuate.
- Comment: older homes have plaster and are more difficult to remodel.
- Many of the homes in Tukwila were built in 1920's. Will they be required to come up to code?

Usually it's a requirement of the FAA for funding.

- Comment: the city can waive the code, which allows insulation without bringing the home to code compliance. This has happened around Sea-Tac airport.
- At what point would home acquisition be considered?
The group (SAC) would recommend when it's appropriate. There are times when it is appropriate to purchase homes within the 65 or greater DNL. FAA policy is that homes in the higher DNL get priority (75 DNL and above).
- Comment: one would need to look at feasibility of whether the home can be insulated. It may be a decision of the homeowner.

The meeting adjourned at 6 PM.



**Part 150 Study Advisory Committee
November 13, 2000
Meeting Summary**

The ninth meeting of the King County International Airport (KCIA) Part 150 Study Advisory Committee was held on November 13, 2000.

In Attendance:

- | | |
|--|---|
| Doug Baker, <i>Cargo Tenant</i> | √ Randy Eatherton, <i>Georgetown Community</i> |
| Randy Banneker, <i>Indirect Business</i> | √ Liz Warman, <i>Boeing</i> |
| √ Peter Anderson, <i>Corporate Tenant</i> | √ Dan Hartley, <i>Labor</i> |
| Larry Brown, <i>Labor</i> | √ Edwin Hanson, <i>West Seattle Community</i> |
| √ Jim Combs, <i>Pilots Assn.</i> | Georgianne Ray, <i>Uninc County Community</i> |
| √ Larry Crim, <i>Renton/Kent</i> | √ Lynn Tucker, <i>Beacon Hill Community</i> |
| Duane Anderson, <i>At-Large Community</i> | √ Rosemary Unterseher, <i>Tukwila Community</i> |
| √ Ed Wojeck <i>Magnolia/
North Seattle Community</i> | √ Karen Walling, <i>Small GA Tenant</i> |
| Suzanne Alexander, <i>FAA</i> | Cayla Morgan, <i>FAA Ex-Officio Member</i> |
| Oliver Dallas, <i>FAA</i> | √ Eric Tweit, <i>City of Seattle</i> |
| Rocky Piro, <i>PSRC</i> | Ron Seymour, <i>Port of Seattle</i> |
| Theresa Smith, <i>WashDOT</i> | √ Pam Linder, <i>City of Tukwila</i> |
| √ Cynthia Stewart, <i>Airport Manager</i> | √ Randy Payne, <i>Airport Staff</i> |
| √ Pat Olds, <i>Airport Staff</i> | √ John Current, <i>Airport Staff</i> |

Others Present:

Ryk Dunkelberg	Bob Barnard	Claire Barrett
Ted Lindberg	Jennifer Howell	

Jim Combs, Study Advisory Committee Chair, called the meeting to order at 4:15 p.m. Ed Hansen, the new community representative for West Seattle, was welcomed to the Committee. The meeting was then turned over to Ryk Dunkelberg, of Barnard Dunkelberg & Company, Claire Barrett of Claire Barrett and Associates, and Ted Lindberg of BCS International.

Claire Barrett gave a presentation on "The Next Stage in Noise Abatement Policy." The Airports Council International, an association of commercial airports, is proposing new initiatives on making airports quieter through the introduction of Stage 4 aircraft and the phasing out of all hush-kitted Stage 2 aircraft within 5 years. Of particular interest to the Committee was the information that hush-kitted aircraft are among the noisiest Stage 3 aircraft, generally within 5 decibels or less of allowable Stage 3 standards, and that the noise levels between a Stage 2

aircraft and a re-certified Stage 3 version of the same plane are similar. The information was presented so SAC members could hear some of the issues and policy proposals that are being proposed at the International Civil Aviation Organization (ICAO), to the FAA and Congress. New noise regulations are expected to be adopted by ICAO in 2001.

Claire Barrett presented information on the use of leases and user fees as possible noise abatement alternatives. She commented that these approaches have only been tried at a few U.S. airports. The theory is that charging a higher fee for noisier aircraft would provide an incentive for operators to select quieter aircraft. This action would need to be consistent with federal regulations regarding airport rates and charges and FAR Part 161, since it would almost certainly be considered an access restriction. The key factor to consider is whether the variable fee charged by the airport is big enough to make a difference to the operator. Setting that amount would require some economic analysis, but given the hourly operating costs of most aircraft, it would probably be \$1,000 or more.

The concern in using leases as a noise abatement alternative is that the effect may not be direct enough. It is hard to figure out a price differential based on cost per foot. Also leases are of differing lengths making difficult to implement, particularly for operators with long term leases, due to discrimination issues.

Landing fees might provide a more logical and direct approach for reducing noise, although these fees also have a number of complications. The airport would need to be clear about what its goal is - quieter at night, quieter all the time, or some other specific objective? For purposes of this working paper, the consultant looked at making KCIA quieter at night. Like all U.S. airports, KCIA charges a price per 1000 lbs. of landed weight for all commercial operations. However, as the name implies, landing fees only apply to landings, not departures. To make a difference at night, the airport would need to have an operations fee (landing or departure), perhaps between midnight and 6 a.m., of \$1000. To evaluate the effectiveness of such a fee would require a more detailed analysis of each nighttime operator and what alternatives are available to them. For example, could they reschedule the flight, or change the type of aircraft? Claire asked hypothetically if a fee would change the operation of cargo operators. It was her opinion that it probably would not because cargo operators depend on night flights to conduct their business, but as a SAC member suggested, they might substitute a quieter aircraft type. After discussion of this alternative, Claire turned the meeting over to Ryk Dunkelberg.

Ryk Dunkelberg presented some additional DNL and Time Above Contours that SAC members had requested at the last meeting. These included contours that showed no hush-kitted Stage 2 aircraft at night and a complete ban (day and night) of any Stage 2 aircraft whether hush-kitted or not. The contours showing the nighttime ban shifted the operations to the daytime; the total number of operations remained constant. He noted that this does create smaller contours but the change is not as significant as the restriction of Stage 2 and hush-kitted Stage 2 aircraft. Also, Ryk mentioned that there are tables that show updated LEQ's, Time Above, and SEL's in the back of the packet. The map of the combined Sea-Tac and KICA noise contours was redrawn so it is easier to understand which contours represent Sea-Tac activity, which are from KCIA, and which from both.

The Study Advisory Committee then watched a short video on a Ground Run-Up Enclosure (GRE) in use at O'Hare Airport in Chicago, the only GRE in operation in the US. Ted Lindberg of BSC International gave a presentation on the feasibility of such a facility at KCIA. One of the

elements in the county workplan is some sort of hush house or ground run up enclosure to quiet ground noise. A GRE is generally a three-sided, open-air facility. A hush house typically is a fully-enclosed facility, usually for military aircraft. Generally, a hush house is impractical for commercial aircraft because of the need to control airflow in and out where engines are close together. It would be extremely expensive to create an enclosed facility for the needs of commercial aircraft.

The consultant team talked to the Boeing Company for a list of the different types of run ups they do and for what purposes, and included them in the working paper. Ryk Dunkelberg noted that there may be some discrepancy between what Boeing says and what the public perception is. The project team also will consult with Boeing to make sure it is correct.

The Study Advisory Committee and the project team reviewed the project schedule, process, and meeting time and agreed to try a 5 PM start time for the December meeting. A request to receive materials prior to the meeting was also made. The meeting adjourned at 6:45 p.m.

Listed below are the comments and questions raised by the advisory committee members. The text may have been reworded for clarity for those not in attendance. Answers, when provided by the project team, are in *italics*.

Comments and Questions on “The Next Stage in Noise Abatement Policy”

- What was the point of the presentation by Claire Barrett on Airports Council International?
The airport staff thought it would be interesting to the SAC to understand what other groups are doing and to have a context that Stage 4 is being considered along with the possibility of phasing out hush-kitted aircraft. KCIA is not a member of the association. Claire is a member of the Consulting Team with specific expertise in this issue.
- What is the Airports Council International – North America stand on aircraft under 75,000 lbs.?
The association is dominated by big airports where these planes aren't a major problem. Sea-Tac Airport is unusual that it has those types of aircraft.
- The biggest growth in aircraft is regional aircraft that lets people fly directly to their location. Seventy percent of the passengers are served by 40 percent of the flights. There may be a tremendous increase in the number of smaller regional flights that will cause an increase in noise.
The new regional jets are very quiet. The number of passengers per aircraft is an important point in considering capacity of an airport.
- It would seem that hush-kitted cargo jets are almost as noisy as non-hush-kitted jets and the tradeoff has not been as successful as hoped. This will have an adverse affect on Boeing and Sea-Tac airports.
- Is there an appropriate time for the SAC to have a voice in this?
The time to send comments is now; it may actually be too late to present to the U.S. position. Send comments to Jane Garvy, administrator of the FAA.
- Are other organizations lobbying about this?
League of Cities, National Municipal League, and possibly one more. American Association of Airport Executives may also be looking at this.

Comments and Questions on the Use of Leases and Fees for Noise Abatement

- Cargo companies admit they have the capacity to change the aircraft that fly into KCIA. They already have these aircraft in their fleet.

This gets back to whether the objective is to eliminate night flights or change the mix of the fleet. A change in aircraft type might be achievable but probably not the flight times.

- UPS has to fly in and out of KCIA in 10 minutes to meet the requirements of the St. Louis office. Charging them a fee might not make a significant difference.
- Can landing fees be increased and bonuses given to quieter companies? Who sets the fees? *Airports set the fees. Note that Palm Beach Airport does this already, but they initiated the policy before a Part 161 Study was required.*
- What would be involved in using this policy? Would federal grant money have to returned to FAA?

If KCIA tried to implement a bonus system and it was determined that a Part 161 study was needed, the FAA would probably request that the process be stopped or risk losing funding. KCIA would have to repay the money for any federal grants. However, an Airport can change the landing fee.

- Can money from landing fees be used to pay for airport improvements such as a hush house? *Yes, money can no longer be "banked"; it must be spent on improvements.*
- Would this allow improvements for any DNL? *This is unclear but the money can be used to do a study. However, you can't use 60 DNL as a reason for creating an access restriction.*
- If the Part 161 reasoning is solid, would the FAA approve flight restrictions as a result? *The FAA has not approved restrictions so far.*
- Would this have to be approved by regional FAA office? *Yes, but some offices send it to Washington DC.*
- Who pays the landing fee now? *Only commercial operations pay: cargo, charter aircraft, but not test flight. The King County Council can pass an ordinance regulating fees, but it would need to be feasible.*

Comments and Questions about DNL and Time Above Noise Contours

- Concerns about shifting noisier flights and planes to the daytime hours. Residents like to sit outside in the daytime and can't do it. *Figure G1c and G1d show only manufactured stage 3 for all size aircraft flying at KCIA; no hush kits or louder aircraft. This addresses this issue.*
- What are the assumptions—what would stop flying? *G2s, G3s, DC 8s, 727s hush-kitted, DC 9s hush-kitted, Hawkers and Falcons. The list of aircraft is in an earlier working paper.*
- Why is there such a difference in the Time Above chart versus the DNL chart? It would be good to see the difference between nighttime and daytime. *The packet contains tables with new alternatives. Time Above doesn't change that much because it is still the annual average. The number of annual operations is the same. There is a penalty for nighttime flying so if the nighttime noise is shifted to the daytime, the DNL changes but the noise still exists in the daytime. So, the Time Above doesn't change that much. Also DNL is logarithmic and Time Above isn't.*
- Why doesn't the Time Above reflect the reduction in hush kits? *The mathematical formula is different. The average time of the noise is still there.*
- Is a Part 161 Study required to implement a ban on hush-kits? *Yes. For a restriction on Stage 2 aircraft, an agreed-upon methodology requires cost/benefit noise analysis and ordinance. This does not require FAA approval. For a Stage 2 hush-kitted restriction, a cost/benefit analysis must be completed. This would require FAA approval. This is a second hurdle that has to be passed.*

- Stage 2 hush-kits that meet Stage 3 standards reflect a business philosophy. Why can't hush-kits be quieter than required? The Stage 2 hush-kits barely meet the Stage 3 standard and the difference is noticeable.
- The point is not about being hush-kitted, but whether an aircraft meets a noise standard. Aircraft are designed to just meet the minimum standard.
- Not only are hush-kitted planes designed to draw the line at minimum, but the average of the noise level is the standard rather than the maximum noise level. Arrivals are noisier than departures and the average of the two is used to determine the standard noise level. This is not what was originally implied by the standard.

Comments and Questions about Ground Run Up Enclosures

- Is there only one facility in U.S.? Are other areas considering them and as they use them, will the costs come down?
Portland is constructing one that should be operational by this summer and Detroit is considering one also.
- We don't have berming around the airport. Maybe adding baffles around the airport would help areas like Georgetown.
Paul Dunholter, BSC International, has modeled a GRE, but probably not at a location where it could go.
- This looks like a big facility, is there room at the airport for one of these?
A siting study has not been done or determined.
- A ban on nighttime activity may be the only option that shows a significant decrease in impacts for Georgetown. It's interesting to confirm that run up operations spread 85 DNL in the Georgetown neighborhood; but it's unfortunate that this model still shows of 70-80 DNL. Is there nothing that can be done for Georgetown?
The model shows what the difference would be with or without a GRE. The location is not determined.
- This doesn't address the air quality impacts when those engines are running.
This doesn't look at air quality. What this shows, depending on atmospheric conditions, wind, etc., is that such a facility can make a difference, but it does depend on the type of run up, length of run ups. The problem may be finding a location for such a facility.
- Do GRE facilities elsewhere in the world have roofs and would that affect noise or air quality?
The problem with a roof or fully enclosed facility is there is no place for exhaust to escape. Palm Springs does have a partial roof, but only for propeller planes.
- What about noise cancellation technology? Has this gone anywhere besides a novelty demonstration project?
It is still in the development phase. If it's not done correctly, the noise can be doubled.
- What about the exterior designs of the buildings around the airport? Can anything be done for noise mitigation?
It depends on how close and high the building is. The biggest impact is low frequency noise and it is the hardest to control. A 30-foot wall that is not close will not be as effective as something close to the source of noise.
- Some people still hear the run ups and the noise. The chart vindicates this.
- Request to use 60 DNL for the mitigation and see what the difference is.
Yes.
- People have complained about run ups at night but Boeing does not do run ups at night.

- At 10:30-11:30 p.m. on a recent night, residents heard a short, loud noise that started and stopped abruptly. It was not an aircraft departure, but was very loud, almost a military jet. *The project team did not monitor any nighttime run ups when they did monitoring. If it did not take off or land, it would be difficult to identify what it was.*
- Anecdotaly, small corporate jets sometimes sit on the runway and "scream". What is there to stop anyone from taxiing over and running the engines on the runway? Is there ground control at all hours?
Yes. Also, the airport has an area for run-ups. Please call the noise hotline when a nighttime run up occurs between 10 p.m. and 7 a.m. so it can be identified.
- Are GRE facilities paid for with public money?
AIP (Airport Improvement Program) and local funds will fund the one in Oakland County. It is not known where the funding for the one in Portland is coming from. The city of Chicago built the one at O'Hare.
- *Airplanes pay significant taxes which is where the AIP get funds.*
- Some small planes do run ups over by Boeing and Boeing gets blamed. Also, military flights may come in at night for security reasons, and Russian aircraft come in occasionally.
- Because size is a problem, what is known about trim fit suppressor.
Not much is known at this time. Westinghouse tried to create such a machine, but it was not very effective. The most effective solutions are closest to the source of noise.
- Which way would you point a GRE, given the surrounding houses?
It would not be effective if it is perpendicular to the wind. At KCIA, it would need to point north/south. For the greatest operational efficiency, the opening would be to the south, and engines run would point to the noise. If you rotate it one way or another, engines will stall out. Airflow is very important consideration.
- Since most planes' engines point towards surrounding neighborhoods, baffling might be better. But wouldn't that create a big cone of noise for people in Skyway?
No, baffling is designed to absorb noise, not reflect noise.

Questions and Comments about the Part 150 Study Process and Schedule

- Request to receive materials before the meeting so the SAC members can review them prior to the meeting and come prepared with questions.
- When will all of the Working Papers and other handouts be incorporated into one document to share with communities?
- What's next on the schedule and will there be a December meeting?
There are 10-15 alternatives to look at and the matrix to go through to evaluate the alternatives. This work should be continued in December to be ready for the Open House in January. After that, the SAC will need to decide which alternatives are feasible and which to combine in a final mitigated noise contour. At the same time, discussion will take place concerning land use issues to create a map that reflects the results. Existing and future noise contours are final documents; everything else is modeled "what ifs?"
- Request for a document containing all the alternatives to share with the community? When will this document be available?
When there is agreement on the alternatives, there will be a final document.



Part 150 Study Advisory Committee
December 11, 2000
Meeting Summary

The tenth meeting of the King County International Airport (KCIA) Part 150 Study Advisory Committee was held on December 11, 2000.

- | | |
|---|---|
| √ Doug Baker, <i>Cargo Tenant</i> | √ Randy Eatherton, <i>Georgetown Community</i> |
| Randy Banneker, <i>Indirect Business</i> | Liz Warman, <i>Boeing</i> |
| Peter Anderson, <i>Corporate Tenant</i> | √ Dan Hartley, <i>Labor</i> |
| Larry Brown, <i>Labor</i> | √ Ed Hanson, <i>West Seattle Community</i> |
| √ Jim Combs, <i>Pilots Assn.</i> | Georgianne Ray, <i>Uninc County Community</i> |
| √ Larry Crim, <i>Renton/Kent</i> | √ Lynn Tucker, <i>Beacon Hill Community</i> |
| Duane Anderson, <i>At-Large Community</i> | √ Rosemary Unterseher, <i>Tukwila Community</i> |
| √ Ed Wojeck <i>Magnolia/</i> | √ Karen Walling, <i>Small GA Tenant</i> |
| <i>North Seattle Community</i> | √ Cayla Morgan, <i>FAA Ex-Officio Member</i> |
| √ Tom Davidson, <i>FAA</i> | √ Eric Tweit, <i>City of Seattle</i> |
| Oliver Dallas, <i>FAA</i> | √ Ron Seymour, <i>Port of Seattle</i> |
| Rocky Piro, <i>PSRC</i> | √ Pam Linder, <i>City of Tukwila</i> |
| Theresa Smith, <i>WashDOT</i> | |
| √ Cynthia Stewart, <i>Airport Manager</i> | √ Randy Payne, <i>Airport Staff</i> |
| √ Pat Olds, <i>Airport Staff</i> | √ John Current, <i>Airport Staff</i> |

Others Present:

Ryk Dunkelberg	Bob Barnard	Bill Keithan
Paul Dunholter	Jennifer Howell	Claire Barrett

The tenth meeting of the King County International Airport (KCIA) Part 150 Study Advisory Committee was held on December 11, 2000. The purpose of the meeting was to:

- Answer questions about Ground Run-Up Enclosures
- Present additional feasible alternatives in Working Papers
- Present background on the FAA Grant Assurances
- Identify new alternatives
- Review Decision Criteria/Alternatives Comparison matrix

Jim Combs opened the meeting shortly after 5 PM and turned the meeting over to the project consultant, Ryk Dunkelberg, Barnard Dunkelberg & Company. Ryk reviewed what was discussed at the last meeting and introduced Paul Dunholter, of BCS International, to give a brief presentation on different types of Ground Run-Up Enclosures (GRE) ranging from three-sided with doors to two-sided with a roof. Paul provided background on some of the design

issues related to these facilities including blast wall design, acoustic panel design, aerodynamic design, door design, meteorology, lighting, and footing. He noted that these facilities reduce noise generally by 10-15 decibels but don't eliminate noise entirely. Several facilities have been built in Europe but due to aerodynamic problems can only be used as little as 50 percent of the time. New designs such as the one in Chicago at O'Hare can be used 80 percent of the time depending on weather conditions. Portland is building a facility that should open in six months. This should provide a better indicator of the success of a GRE in King County because of the similar weather and topography. After discussion of GRE facilities by SAC members, Paul presented contours related to additional flight procedures including distant and close-in departure procedures, normal and delayed flap deployment, and use of Global Positioning Satellite (GPS) and Flight Management Systems (FMS).

Mary Vigilante, Synergy Consultants, Inc., presented what FAA's requirements are under the Grant Assurances and answered questions about what issues need to be considered if closing the airport were considered as an alternative. She noted that in addition to reimbursing the FAA for all federal grants received over the years, closure would have a large economic impact on the region. KCIA generates about 11,000 jobs and contributes about \$1.5 billion to the economy. Ed Wojeck requested that if partial analysis of this alternative is provided, then the entire analysis should be included. He identified the financial benefits of alternative uses of the airport as information that should be included. SAC members reiterated that it was not their goal to close the airport, but rather to reduce the noise impacts on the community, especially at night.

Ryk Dunkelberg requested that SAC members identify alternatives not already presented in the working paper. The following list was generated:

- Investigate use of a transponder landing system
- Require pilots use the full runway length for departures (both directions) – (this might be part of Fly Quiet Program)
- Request that pilots not put gear down or initiate flaps until necessary, especially over Magnolia. – also part of Fly Quiet Program
- Do south flow analysis for north flow issues discussed at this meeting (departure climb profiles, GPS/FMS departures)
- Eliminate Vashon Island visual procedure – if it exists.
- Add mention of restriction on operations in hushkits to last item – Using Financial Incentives to Achieve Noise Reduction.
- Consider architectural or building designs that reduces noise
- Consider natural features such as trees, plantings, and berms that would reduce noise

Ryk led SAC members through the exercise of applying the decision criteria developed previously to two of the alternatives. His purpose was to show what issues or questions might arise when applying the criteria to different types of alternatives. Through this process, committee members agreed to further define the two criteria related to noise reduction. *Fair, reduction, not a shift of noise* was reworded to be *Fair, not a shift of noise* to clarify that this was about fairness in not reducing noise in one community by shifting it to another community. The criteria *Reduces noise* was clarified to mean exactly that, a measurable decrease in noise. After working through two alternatives as examples, a Ground Run-Up Enclosure and a Noise Insulation Program, Ryk requested that committee members each do the same with all the alternatives prior to the next meeting. He recommended that as members work through this process, they review the contours and Tables G2 through G6 in the working paper that show

changes in noise levels for representative receptor locations for DNL, nighttime Leq, Time Above, Lmax, and SEL. He noted that the committee will identify which alternatives to study further and prioritize. He also stated that committee members would receive an updated Noise Abatement Alternatives Working Paper at the next meeting that would replace all former drafts.

The meeting ended at 8 PM. The next meeting is scheduled for January 8, 2000 from 5-8 PM.

Listed below are the comments and questions raised by the advisory committee members. The text may have been reworded for clarity for those not in attendance. Answers, when provided by the project team, are in *italics*.

Comments and Questions about Ground Run-Up Enclosures

- How would a ground run-up enclosure work with the topography here?
That would be one of the challenges of the design.
- Why are most run-ups done at night?
Because that's when the aircraft are on the ground.
- What was the price on the O'Hare facility?
About 2.5 million dollars, not counting ramp and apron costs.
- Have people in Chicago been happy with the facility?
Yes. Portland is building one now that will be the same design as Chicago's but of higher quality. It will be interesting to see how it works in the northwest. Meteorological conditions may have an impact on the facility.
- How would it work with the topography of Beacon Hill?
It would require a higher wall. Downwind from the Georgetown area from the south could be a problem. The intakes would point to the south and when the noise comes down, it might be farther away creating a noise shadow.
- Where would the facility go?
It is hard to say what space is available. The facility would need to meet FAA design and obstruction criteria, which severely limits the options for development.
- Is a GRE a realistic option?
The Portland facility may provide a better idea as to feasibility in the Northwest.
- Isn't the Portland facility more expensive than O'Hare, more like 5-6 million dollars?
Yes, due to siting issues the cost has been higher. The actual facility is about \$3 million.
- The contours presented at the last meeting showed a reduction in noise with the use of a GRE. What were the assumptions for this?
There is about a 15 dB reduction. The farther away, the less the reduction. Nature eliminates the higher frequencies; for low frequencies, there is less noise farther away. There is about a 10 dB reduction a mile away. For aircraft assumptions, the Boeing flightline was studied—results can be varied since Boeing may do special on any of its aircraft. Corporate jets also conduct run-ups.
- How many run-ups occur at KCIA in a month?
In the neighborhood of 10 a month, depending on the month.
- What type of aircraft?
Mostly Boeing 757s and 737s.
- Theoretically, could the GRE pay for itself?
At large commercial airports this sort of cost would usually be factored into the landing fee. At KCIA, which is primarily a general aviation airport, this would be more difficult.
- Would Boeing be willing to work in a partnership with the airfield to build this facility?

- Comment that Boeing already pays a federal tax of 2.9 cents per gallon to pay for noise facilities. If the federal government collects that tax, KCIA should get something back.
- If a GRE is built, how would that impact the Boeing flightline?
It might allow the company to operate more hours per day.
- The question isn't run-ups, it's noise; an increase in run-ups without an increase in noise would be beneficial
- Is there also an average time for run-ups?
The report shows different types of run-ups, broken down by types.
- The communities might face more run-ups in the middle of the night in exchange for a GRE.
This is not necessarily the true. By and large, Boeing has no need to do nighttime run-ups; the company doesn't have the staffing for this. When there is an intensive testing process, the company would take the aircraft to another field like Moses Lake. When there is a plane that won't fly, a test run-up might be done for safety reasons. A run-up might also be done if there is a maintenance problem on a new engine. This does not happen very often—probably once a month.
- A GRE can be part of federal AIP funding.
- FAA comment: Unless there is a lift on the cap of money available, the SAC would have to decide where this is on the priority list of funding. FAA can give the airport a maximum of \$5 million a year, \$3 million of which is for public buildings. Sea-Tac receives this now.

Comments and Questions on Alternative 8: Departure Thrust Cutback

SEL Noise Contour Close In Procedure and SEL Noise Contours Distant Procedure

Airlines are allowed to have two procedures for departure of aircraft, close-in and distant. Both have been modeled. For Close-In Procedures, the noise reduction is about 3 decibels for smaller, narrow-bodied aircraft.

- Based on personal visual and acoustic observation, residents have noted that similar aircraft fly over neighborhoods at higher elevations than others. At what part of the runway do they start their acceleration? Does this assume that they use the full length of the runway?
The model assumes that aircraft use the full length of the runway and are commercial size. For general aviation, how much of the runway is used depends on pilot preference.
- How does the airspace for Sea-Tac affect the difference in elevation? Aircraft may be staying lower to accommodate Sea-Tac takeoff.
- The short runway may create a different situation than the long runway. Do they have midfield departures on the long runway?
Yes, some planes don't need the whole runway.
- Can we request all aircraft to use the whole runway for take off as an alternative?
This may fit into the Fly Quiet program.

Comments and Questions about SEL Noise Contours Normal Approach or Delayed Flaps Approach

This relates to delaying deployment of flaps until the plane is over Elliott Bay. This is difficult to model because it relies partly on pilot technique, partly on Air Traffic Control direction.

- Would it require changing operating procedures to make this change?
The operators could be requested to make this change.
- Request: Model this approach for a Southern Approach.
Can be done.

- Comment: There is a distinctive difference when pilots decide not to deploy flaps until later. Can they be encouraged to deploy flaps after they are over water? When gear goes down, noise goes up.
There is about a 2 dB noise reduction.
- When there is a change in noise level, it is more noticeable.
- It's not always the pilot's choice as to when to deploy flaps; ATC may direct air speed.
- Comment: Consideration should be given to communities at the south end of the airport by studying north flow.
- Comment: when the operating procedures were first published, there was good communication with operators who became conscious of the needs of the community.
- How do we re-stimulate the meeting/discussion of 2 years ago? How do we bring positive attention to the pilots?
- Unless there are dire circumstances, pilots can be instructed not to drop gear until they have reached NOLA. Some pilots from other countries have different way of flying.

Comments and Questions about Flight Management System

- For Sea-Tac Airport, it has been a big issue regarding the use of FMS to shift traffic. What should KCIA know about this and the impacts?
KCIA should have information on who is likely to have FMS and what the impacts would be.
- Does the FAA have plans to phase out Instrument Landing System (ILS)?
Yes, the FAA is moving to GPS and away from using ILS's.

Comments and Questions on the Grant Assurances

- If KCIA was closed and another airport was created in its place in a different part of state, would the grant monies be transferred?
No, King County would be responsible for its grant assurances.
- There has been no request to close the Airport, only to restrict nighttime use.
- If the airport were to be closed, wouldn't the land be worth a lot of money? If this were an option, opportunity costs for other uses would need to be considered.
- What's involved in closing the airport?
Only one airport in the US has been closed when there was not a substitute airport. About 6 have been closed because new airports replaced them. FAA would not approve closure of a public use airport if a user requests that it be kept open.

Comments and Questions on Additional Alternatives

- Would like to look at a transponder landing system.
- Full runway departures—to start at the beginning of the runway.
- Make the Fly Quiet Program mandatory or add some teeth to it so pilots follow the Fly Quiet
- South departures for flap deployment.
- The use of full runway for both northern and southern departures.
- What would the contour be like if all were required to depart from north end of airport?
You won't see a significant change from the mid-field to end in the model (may be a difference, but not demonstrated in model).
- FAA comment: if can't see a quantifiable change in the contour, may not be FAA approved.
- Architectural design or building design that would reduce noise around the airport.
- Environment tends to absorb some noise—are there any trees that could be planted that would reduce noise or some other natural berm that would hold the noise in place?
- Two tiers of fees for noisier aircraft.

Vashon Departure

- Eliminating the Vashon departure.
- Talking to FAA about the Vashon departure. It's not a published VFR departure.
- Request to get copy of document that describes this departure.
- Comment: the northerly Vashon departure is a problem in Georgetown area and for the helicopter problem. Departures veer yards West Seattle instead of going up the I-5 corridor so aircraft cross mid-field area over residential areas.
- Comment: planes that have the same horsepower may have different horsepower, which is why they fly lower.
- What is the purpose of moving the Vashon departure 10 blocks north?
It's a safety issue related to departures and arrivals. VFR requirements are pilot controlled—see and be seen. The actual fly route can not be set. Alternative is to eliminate the Vashon route, not just move it 10 blocks.
- Alternative—ask the tower not to tell pilots to use Vashon route.



**Part 150 Study Advisory Committee
January 8, 2001
Meeting Summary**

The eleventh meeting of the King County International Airport (KCIA) Part 150 Study Advisory Committee was held on January 8, 2001.

- | | |
|---|---|
| √ Doug Baker, <i>Cargo Tenant</i> | √ Randy Eatherton, <i>Georgetown Community</i> |
| √ Randy Banneker, <i>Indirect Business</i> | √ Liz Warman, <i>Boeing</i> |
| √ Peter Anderson, <i>Corporate Tenant</i> | √ Dan Hartley, <i>Labor</i> |
| √ Larry Brown, <i>Labor</i> | √ Ed Hanson, <i>West Seattle Community</i> |
| √ Jim Combs, <i>Pilots Assn.</i> | √ Georgianne Ray, <i>Uninc County Community</i> |
| √ Larry Crim, <i>Renton/Kent</i> | √ Lynn Tucker, <i>Beacon Hill Community</i> |
| √ Duane Anderson, <i>At-Large Community</i> | √ Rosemary Unterseher, <i>Tukwila Community</i> |
| √ Ed Wojcek, <i>Magnolia/
North Seattle Community</i> | √ Karen Walling, <i>Small GA Tenant</i> |
| √ Ron Fincher, <i>FAA</i> | √ Cayla Morgan, <i>FAA Ex-Officio Member</i> |
| √ Oliver Dallas, <i>FAA</i> | √ Eric Tweit, <i>City of Seattle</i> |
| √ Rocky Piro, <i>PSRC</i> | √ Ron Seymour, <i>Port of Seattle</i> |
| √ Theresa Smith, <i>WashDOT</i> | √ Pam Linder, <i>City of Tukwila</i> |
| √ Cynthia Stewart, <i>Airport Manager</i> | √ Randy Payne, <i>Airport Staff</i> |
| √ Pat Olds, <i>Airport Staff</i> | √ John Current, <i>Airport Staff</i> |

Others Present:

Ryk Dunkelberg Bill Keithan
Jennifer Howell

Jim Combs opened the meeting at 5:10 PM. He introduced a new member, Ron Fincher, as the interim representative for FAA. He then turned the meeting over to Ryk Dunkelberg of Barnard Dunkelberg & Company.

Ryk noted that all of the alternatives have been combined into one document, Abatement Alternatives Evaluation (noted as G). He commented that the only information that remains to be added concerns the Transponder Landing Systems (TLS). TLS is still new enough that the FAA has to develop operating procedures for its use and that could take a long time. The TLS may not be a viable alternative in the short term because of this timeframe.

Ryk asked the committee when it would like to address land use alternatives such as property acquisition and sound attenuation. Generally, land use alternatives are considered when a mitigated contour has been identified. The committee suggested that the mitigated noise contours and strategies to further reduce noise be identified. Land use solutions could then be assigned to the contours as appropriate.

Committee members worked through the alternative was ranked positive, negative, ranking, the section was left blank or not 8:00 PM. The committee will continue re 2001 at 4 PM. Committee members were 2001.

Listed below are the comments and quest has been reworded for clarity for those no team, are in *italics*.

Comments and Questions on Tra

- Comment that the Transponder Landi alternative might not be totally accur Pullman, WA is in its final stages. It The procedures are virtually the same
- Suggestion: Analyze the TLS technol now and revisit it again when it is ava

Comments and Questions on Lan

- What process is used to discuss or an *Agreement on what the contours look*
- Until the contour is identified, it is di *If the contour can be reduced and its impacts and costs associated with ab*
- Care should be taken to acknowledge impacted contour.
- Both impacted residential and busine on the SAC. If the people process is concerns that definition of a solution
- Suggestion: to show the contoured im noise impact would be, and look at ac *Discussions of land use issues someti property when the noise contour's de number of people and land uses with*
- Would it be helpful to have a defined identifying or selecting contours? So can we identify them? *In discussing land use issues, acquisi implementing solutions can be consid could be considered, within the 75 D*
- Can we address these issues now? *We are looking at more contours and*

rix of alternatives and decision criteria. Each neutral. When consensus could not be reached on a ith a question mark. The meeting was adjourned at wing the matrix at the next meeting on February 12, hinded of the Part 150 Open House on January 18,

raised by the advisory committee members. The text attendance. Answers, when provided by the project

onder Landing System

system only being considered as a long-term The certification of the first system in the US in been tested and approved and is almost operational. for an Instrument Landing System approach. and Instrument Landing Systems in a general way for le.

Use Issues

the land use issues? *is necessary in order to quantify cost, etc.* It to know what groups of people will be impacted. *is known, there will be a better sense of the types of ent.* ple who may be affected but aren't in an officially people as well as airport-related interests are represented rated from the contour definition process, there are nt be predetermined. is of solutions, create a contour that shows what the onal things that can be done to reduce the noise. *create concerns about the impacts and value of ion is not yet known. Solutions can be created after the e defined contour are known.* eframe specifying how much time will be spent things will be the same regardless of what is done— *and sound attenuation, contours to be used for l. For example, within the 65 DNL, sound attenuation acquisition could be an option.* *rnatives than usually used in a Part 150 study.*

Comments and Questions Generated while Filling Out the Matrix of Alternatives and Criteria

General comments/questions on criteria and/or alternatives

- Suggestion that the reference numbers for the alternatives used in the working paper be included with the text on the matrix.
- Clarification of the definition of **fair**: accounts for people who may be personally hurt.
- Comment on the criteria of **shifting noise**: need to focus on this airport, not impacts of other airports.
- What does **pioneers community friendly technology** mean? There are firms with experience at KCIA, so opportunities for new ideas and approaches should not be overlooked in the criteria.
- The criteria **forward looking** may be too ambiguous.
- There may be some confusion because some of these alternatives are subsets of broader categories—not clear about the rationale for the listing.

This was an attempt to bring as many suggestions from community meetings as possible to the committee.

Pursue Restriction of Stage 2 Aircraft under \$75,000

- This accounts for people who may be personally hurt; it focuses on people on the ground, not the operators.
- Question about **maintains jobs** criteria—wouldn't Stage 2 aircraft be replaced with other aircraft? If so, this would be neutral.
- Won't this cause business jet owners to move to Paine Field or Arlington?
- Aircraft owners who want to upgrade to more expensive aircraft might take their business elsewhere if we ban them.
- Older aircraft require more maintenance; FBOs provide a lot of parts and labor for airplane maintenance. If older aircraft are banned, maintenance businesses might be affected. The choice is between paying more for new aircraft or more for maintenance. Most of the aircraft on the airport are stage 3—80-90 percent.
- Understanding of **no interstate commerce burden**; it is really no "undue burden."
- **Forward looking**. Comment: this isn't forward looking—been doing this for years at other airports, and creates negative economic impact.
- This might be called forward looking because it's the future of what's going to happen.

Allow True Stage 3 Only—No Hush Kits

- Regarding **maintains jobs at the airport** criterion: this is negative because the main manufacturer of hush kits is on the airport.
- If noise reduction is forward looking, the alternatives are forward looking.

Pursue night time restrictions

- **Maintains or improves regional airspace capacity**: negative because aircraft have less time to operate at KCIA
- **Maintains or improves regional airspace capacity**: positive because they can just go elsewhere.
- **Maintains or improves regional airspace capacity**: neutral because it can go either way. Some people may go somewhere else but it shouldn't impact numbers of airplanes. If they have to fly at night, they will go somewhere else.
- **No undue burden on interstate commerce**: the very reason we'd have this go through a Part 161 is because of the impact on interstate commerce.
- Does not **treat all users equitably** because pilots need so many night landings to stay certified.

- This could prevent some users, who fly
- Some military operations require 24-h
- Agreement that **treats all users equita**
- This alternative can be forward looking businesses; the result is neutral.
- Maintains American competitiveness: products in a timely manner.

Nighttime engine run-up curfew

- **Economic impact:** does it change any
- It's a negative economic impact on the (No agreement)
- **Responsible to those already on KC** criteria.
- Commercial aircraft can do run ups fo
- **Reduces noise impact:** curfew ahead

Limiting daytime maintenance and run

- Concern that people, who are here dur outside.
- Time of day may make a difference:
- **Safe:** could be an issue if limited time didn't think this would be a problem.
- Not a burden to interstate commerce.

Noise containment facility

- **Economic impacts:** would this be po
- **Maintains or improves airport capa**
- The hush house should have more pos

Build a noise wall

- **Safe:** negative because planes may dr
The master plan proposes a wall that end of the runway. We would not incl
- Need to assume that it will be designe
- **Maintains or improves airport capa**
- Why does it maintain competitiveness place to have business.

Prohibits ground testing (of engines) at

- Doesn't have an interstate commerce
- Might there be less environmental im are not going on? *Air pollution not a*
- Note that testing of newer engines inv noise level, not engine testing. Less t

Examine a nonstandard home insulatio

- Economic impact is neutral because a stated, implement a nonstandard hom

specific times, from flying when they need to. access.

is a negative.

from the perspective of residents but negative to

ative because businesses may need materials and

g to maintain what's already here?

ing Company because it delays projects and testing.

no decision due to same argument for all job related

emergency, just not maintenance.

ists so noise level will be maintained not reduced.

s to certain times.

the day, may want it to be quieter while they are

ses testing of several planes at the same time. FAA
tral.

e?

: negative because it takes up space.

es than just reducing run up time opportunities.

inding gear on a noise wall.

*the edge of the airport next to Georgetown, not at the
a wall at the end of the runway.*

a safe manner.

: negative because it may take up additional space.

making the airport a better neighbor, makes it a better

ht

len--positive.

at night when other activities that create air pollution
or in this study.

es new technologies and is quieter. Need to address
5 percent of ground noise is engine testing.

rogram

ative states "examine" rather than "implement." If it
ulation program, it would have an economic impact.

Develop combined KCIA/Sea-Tac noise contours

- Suggestion to eliminate this as an alternative because it is a planning tool, not an alternative. It has little effect on noise impact unless it is used.
- Suggestion to commit to using it; change the wording to use it as an alternative.
- Should the Sea-Tac contour be combined with KCIA mitigated contour for use as a planning tool? *Once the two mitigated contours are developed, KCIA and Sea-Tac can discuss sharing costs of alleviating noise impacts. An issue of affordability will come up at some point. Combined contours are a way to analyze all of the impacts; they are not an alternative.*

Install noise/vibration methodology

- Not a remedy but a monitoring tool for enforcement. Monitoring suggestions can be combined to implement an enforcement program. These are usually part of the Fly Quiet program.
- Suggestion to combine the install noise/vibration monitoring systems, locate monitors to identify C-weighted monitoring noise, impacts and flight tracks, and monitoring compliance with program as part of Fly Quiet and administrative implementation program.

Pursuing flight paths to reduce noise in residential areas

- How is this not shifting noise? *Move flight tracks over industrial areas or water i.e., nonresidential areas, so it is positive by not shifting noise from one residential area to another.*
- When noise is shifted, isn't someone somewhere, affected? There are residences in industrial area also.
- If the flight path is shifted vertically, will reduce noise.
- Is this alternative too broad to be meaningful for discussion on shifting noise?

Minimize flight over populated areas

- If you shift flights over the water, it would reduce noise. *This is unknown until the flight tracks are identified.*

Alter the angle of climb and descent

- This alternative relates to the operational characteristics of the airplane.
- Can this be approached differently because there is cargo rather than passengers on aircraft? *The two procedures are not very different.*
- Need to have more information.

Promote Fly Quiet over residential area

- KCIA is committed to implementing a Fly Quiet Program but it needs definition first.
- Much of the Fly Quiet Program is voluntary. Can enforcement elements be added to it? *If some aircraft are deviating from the norm, they can be identified and asked to explain their actions.*

Integrating flight tracks with Sea-Tac.

- Sea Tac has requested use of the Duwamish corridor and until FAA responds to the request, KCIA will not take action on this alternative. This may be raised at the next Sea-Tac public hearing.
- FAA: the departures are already separated between Sea-Tac and Boeing Field. On rare occasions, when a very heavy jet takes off from Sea-Tac, flights from KCIA need to be at or below 3000 feet in order to maintain separation.

- This alternative would not help to get leaving KCIA has more to do with the
- We understand that it's an inverted wedge too. At night, Sea-Tac has fewer flights and faster at night?
- What about the air capacity of Elliott Bay as an issue?

Use of charted visual approach

- Comment that we have the noise contours on these.
- Concern that this may create a major impact on West Seattle. Decision to wait to have more data on charted visual approach before reviewing this criterion.
- Need agreement to share monitor with West Seattle and Hamilton.

Eliminate Vashon Arrival/Departure route

- **Responsive to those on KCIA:** negative because cargo flights that use this track will have a longer journey.
- Some people use this route, why should everyone be required to?
- It forces additional cost for some people already flying here.
- **Shifting noise to other people:** cutting the route would cause noise to be shifted elsewhere, most likely to different residential areas.
- Comment: it has a positive noise impact because it will shift noise away from residential areas.
- Safety aspect: most of the aircraft using this track are smaller and going over less populated areas. The area is predictable and away from big jets. Keeps them away from everything else. If you eliminate this route, it will cause a safety issue because these aircraft will be coming to KCIA any way they can.
- This is an issue because people don't fly this departure properly—not flying in the right area or flying too low.
- FAA: Flight Standards Division is looking at moving this 10 blocks north, but confusion as to what is happening.
- If Sea-Tac moves their flights west with the construction of the third runway, will there be space for a Vashon departure?
- Comment that a significant number of people who take the departure fly very sloppily, and fly right over residential communities.
- Whether they take this departure or not, aircraft are still going to turn over the communities.
- Only way to avoid that is to put them on a specific pathway or put a restriction on the pathway.

planes higher faster. The height of the departures of aircraft than any ceiling. The wedge of airspace and would like to consider arrivals. Could KCIA allow cargo aircraft to take off higher?

as interest grows in using this approach, will this be

on these. Decision to wait to have more data on charted visual approach before reviewing this criterion. West Seattle and Hamilton.

because cargo flights that use this track will have a

everyone be required to? already flying here.

the route would cause noise to be shifted elsewhere, because it will shift noise away from residential areas. This track are smaller and going over less populated areas. Keeps them away from everything else. safety issue because these aircraft will be coming to

this departure properly—not flying in the right area or

g at moving this 10 blocks north, but confusion as to

the construction of the third runway, will there be space

people who take the departure fly very sloppily, and fly

aircraft are still going to turn over the communities.

specific pathway or put a restriction on the pathway.



Part 150 Study Advisory Committee
February 12, 2001
Meeting Summary

The twelfth meeting of the King County International Airport (KCIA) Part 150 Study Advisory Committee was held on February 12, 2001.

- | | |
|---|--|
| √ Doug Baker, <i>Cargo Tenant</i> | √ Randy Eatherton, <i>Georgetown Community</i> |
| Randy Banneker, <i>Indirect Business</i> | Liz Warman, <i>Boeing</i> |
| Peter Anderson, <i>Corporate Tenant</i> | Dan Hartley, <i>Labor</i> |
| √ Larry Brown, <i>Labor</i> | √ Edwin Hanson, <i>West Seattle Community</i> |
| √ Jim Combs, <i>Pilots Assn.</i> | Georgianne Ray, <i>Uninc County Community</i> |
| √ Larry Crim, <i>Renton/Kent</i> | √ Lynn Tucker, <i>Beacon Hill Community</i> |
| √ Duane Anderson, <i>At-Large Community</i> | Rosemary Unterseher, <i>Tukwila Community</i> |
| √ Ed Wojeck <i>Magnolia/</i> | √ Karen Walling, <i>Small GA Tenant</i> |
| <i>North Seattle Community</i> | √ Cayla Morgan, <i>FAA Ex-Officio Member</i> |
| Ron Fincher, <i>FAA</i> | √ Eric Tweit, <i>City of Seattle</i> |
| √ Oliver Dallas, <i>FAA</i> | √ Ron Seymour, <i>Port of Seattle</i> |
| Rocky Piro, <i>PSRC</i> | √ Pam Linder, <i>City of Tukwila</i> |
| √ Theresa Smith, <i>WashDOT</i> | √ Rick Lentz, <i>Boeing Flight Services</i> |
| √ Cynthia Stewart, <i>Airport Manager</i> | Randy Payne, <i>Airport Staff</i> |
| √ Pat Olds, <i>Airport Staff</i> | √ John Current, <i>Airport Staff</i> |

Others Present:

Claire Barrett	Chris Good	Jennifer Howell
Paul Dunholter	Jennifer Howell	Richard Beckerman

Purpose of Meeting

- Confirm that previous work on matrix remains unchanged
- Continue work on matrix alternatives not yet reviewed
- Decide on preliminary list of alternatives to carry forward for further analysis
- Review what further analysis of an alternative entails

Jim Combs called the meeting to order at 4:10 p.m. After reviewing the agenda, Jim asked the SAC to verify information on the most recent matrix and confirm the numbers listed on it. There were no changes. The SAC members reviewed the remaining alternatives. Jim had made some preliminary assignments of scores and discussed the rationale he used. After discussion, the committee members either agreed, changed them, or noted no agreement. During discussion of how to select the alternatives to study further, some members felt that the criteria were heavily weighted towards airport aviation interests rather than community interests. The did not want to

see alternatives that would make a signi-
because they did not "score" high enough
positive, -1 for negative, or 0 for neutral
was given no score or the equivalent of
that ranked high required action off airport
ranked low required action on the airport
move forward:

- 1) Move forward with the alternative
rest of the alternatives to identify
- 2) Move forward with the alternative
with those alternatives that were
(generally ranking lowest).
- 3) Weight the different criteria to a
criteria.
- 4) Divide the criteria into two sections
rescore.

The committee agreed to the second choice
committee consensus and those considered
agreed that trying to develop a mathematical
and that further discussion on ranking the
alternatives to pursue are as follows:

Alternatives that everyone agrees should

- Noise containment facility
- Noise wall
- FAA noise insulation program
- Nonstandard insulation program
- Home buy out program
- Policies to fly over nonresidential areas
- Minimization of flights over populated areas
- Use of a charted visual approach.
- Implementation of building design standards

Alternatives identified worth pursuing

- Pursue restrictions of stage 2 aircraft under 75,000 lbs.
- Limit daytime maintenance runups at certain times
- Prohibit runups at night
- Allow true stage 3 aircraft only - no h kits
- Investigate the use of ground leases to effect fleet noise levels
- Pursue restriction on flights before/certain times.

Claire Barrett of Claire Barrett and Associates
briefly reviewed what further consultation
the handout titled Selected Alternatives
Sound Attenuation and Residential Pursued
the types of information that would be provided.
KCIA 65 DNL Contour, information was
implementation time, administration, and

at difference to the residential community eliminated
in the criteria. (All criteria were ranked either 1 for
the committee could not agree on how to rank it, it
Another observation was made that the alternatives
such as sound insulation, and the alternatives that
four different approaches were suggested on how to

that had committee consensus and further discuss the
which additional ones to consider.

that had committee consensus (ranking highest) and
considered important to the residential communities

at the scores according to the importance of specific

community-based and aviation business-based and

to move forward with the alternatives that had
important to the residential communities. Members
of a weighting formula would take months of discussion
would not move the process forward. The list of

to be pursued:

areas

standards

Beneficial to community

under 75,000 lbs.

at certain times

h kits

to effect fleet noise levels

at certain times.

ates and Paul Dunholter of BridgeNet International
analysis of alternatives would entail. Claire reviewed
evaluation, to demonstrate the approach. Residential
the alternatives were selected as examples. She noted
provided. For example, for Home Insulation within the
provided on legality, financial feasibility, realistic
implementation. Committee members were asked to

review the examples and let John Current know by February 23, 2001 if any further questions should be answered or more information provided.

Cynthia Stewart, airport manager, closed the meeting by thanking the committee members for their hard work in going through this process and continuing to talk to each other and discuss concerns and differences.

The meeting adjourned at 6:45 p.m. The next meeting will be March 12, 2001 at 4 p.m.

Listed below are the comments and questions raised by the advisory committee members. The text may have been reworded for clarity for those not in attendance. Answers, when provided by the project team, are in *italics*.

Comments and Questions on the Ranking of Alternatives

Make policies promoting flying over non-residential areas.

Safety

- Concern: if air traffic is compacted into a smaller area, it might have an impact on safety.
- FAA comment: there are safety standards that must be followed and safety is the highest priority. However, there may be an impact on airport capacity if planes are spaced out. This may have negative economic impacts.
- Concern: if a flight path is developed that requires pilots to stay within a narrow corridor, they may be distracted looking for visual references.
- Technology may be available that can help with this.
- This procedure would only apply to instrument flight only.

Shifting noise

- Comment: this alternative is not specific to flight paths and shifting flights over the Duwamish or Elliott Bay may have an impact on other neighborhoods because there aren't many unpopulated areas. May depend on the specific flight path.
- This is about promoting a policy not actually shifting paths.
- This would concern communities farther out from the airport than Georgetown.
- If this alternative is left blank, what will happen to it? Will there be an impact on the total relative score?
- There was no agreement on this criteria by the group.
- What incentive is there to get pilots to observe Fly Quiet procedures?

- **Economic Vitality**
- Shifting noise away from residential areas may improve property values. That would make it a positive.
- Is the issue vitality in terms of residential value or in terms of improving commercial activity?
Could be both.
- Neutral or positive? Most agreed that it should stay neutral rather than positive.

Alter the angle of climb and descent

This alternative was split into two separate alternatives: alter the angle of climb and alter the angle of descent.

Reduces noise:

- There is no way to avoid noise. If it is reduced in one place, it will be increased somewhere else.
- Not necessarily, since once a plane is at a higher altitude, it may not make much difference. *There is a reduction of noise close in and an increase farther out but the increase has less impact than the reduction close in.*
- This alternative is listed as positive.
- People impacted farther out may not be getting any noise at all right now. This would make it negative for those. *There is generally a change of 6 dB for the doubling of distance.*
- Reducing noise impact—SAC couldn't agree on making it positive or negative.
- Suggest that altering the angle of descent and climb is forward looking—all agree.
- All agree that both are community friendly.

Keep nighttime flights away from residential areas

- How is this different from the alternative “pursuing flight paths to reduce noise in residential areas?” *This alternative just occurs at nighttime as opposed to all the time.*
- How would this be done? *More monitoring of noise at night—fly quiet, FMS approaches may be more viable at night with less activity going on.*
- Profiled descent may be more feasible at night than during the daytime.
- Disagree that it's negative to those already in business at the airport. This alternative was changed to neutral.
- Maintains competitiveness is neutral.

Charted Visual Approach

- Make sure people understand that this is for arrival not departure.
- Concern about the use of GPS or similar for Elliott Bay approach because of pilot error, etc. Need further analysis on these.
- When is the technology going to be there to make this happen?
- As equipment is put in place, this becomes more feasible.

Increase the minimum altitude over West Seattle

- Comment that this affects airspace very quickly.
- General aviation pilots are more comfortable flying too low than risking hitting the upper level of allowable airspace. There are severe penalties from FAA for flying into the wrong airspace, including possible loss of licenses.
- Make forward looking positive.

Move Vashon Departure 10 blocks north

- What distance is this?
- Proposed to be north or south of reservoir. The goal is to separate inbound and outbound traffic by 10 blocks. Attempts have been made to address this change outside the Part 150 Study because it is a safety issue but they have been unsuccessful.
- FAA concerns have been with aircraft that were descending too early. A pilot using a VFR approach cannot be forced to go anywhere specific as long as he is flying at the right elevation.
- Can recommendations be made to the pilots? What impact would this have?

- Why is this in the study if it's a safety issue? *It's an issue because FAA is suggesting impact on the community who will be affected.*
- FAA: thought that noise impacts might be improved.
- If a plane goes north a couple of miles, it has the capability to go higher and reduce noise.
- Cynthia Stewart asked if this would be something that the SAC would support if the FAA moves on it.
- Is the question moving it north or moving it south? *Moving it north.*
- Need more data before evaluation can be completed.
- Note that Vashon departures and arrivals are for light aircraft only, not jets. The space is too tight for jets.
- Concern: it would be moving noise from one place to another.
- Eliminate Vashon arrival/departure criteria because committee didn't agree on it.
- Since the Vashon route is near the 1,100-foot floor is, can you raise it to 1,400-foot floor?
- No private pilot will fly at the level of the 1,100-foot floor of the airspace of the planes above. Maybe increasing the floor will let the GA pilots increase their height.
- FAA: not sure how you could officially raise the floor. Need to protect the area for Sea-Tac.
- Note that 3rd runway will affect this. Will be conversations about this in the future.

Ground leases

- Does this impact jobs?
- Won't those jobs be replaced by other jobs? Someone with a different operation?
- What is being limited?
- This would require going through a 161 process.
- This is a Council issue, not within the purview to use the lease this way. A description of the elements to be used in the leases needs to be developed. What would the impacts be?
- Would a lease be denied because the operation is too noisy?
- Reduces noise and community friendly? Would be positive.
- It might not be positive if jobs are lost.
- Uses financial incentives
- Loss of a lease could create an Intermodal Commerce burden. It would be hard to know impacts without a specific proposal.
- Concern about where those incentives come from.
- Treats all users equitably—can argue that it gives everyone the same choice, but would be negative for those who already have equipment.
- All have the opportunity to improve for aircraft already—why is this negative? *They haven't yet. Haven't defined the scope of the recommendation.*

Implement building design standards

- If the building reflects noise, would it reduce/contain noise.
- Don't know enough about the technology to bounce it out somewhere else? to make a judgement about the alternative.

Alternatives Selection Process

- Question and concern on how the range of the alternatives are shown on the chart.

...tor?
...and it's outside the study. However, it will have an opportunity to discuss it within the Part 150.

...e improved.
...has the capability to go higher and reduce noise.
...something that the SAC would support if the FAA

...g it at all?

...completed.
...are for light aircraft only, not jets. The space is too

...one place to another.
...alternative because committee didn't agree on

...the 1,100-foot floor and very near where the 1,800-foot floor?

...e floor of the airspace of the planes above. Maybe pilots increase their height.

...raise the floor. Need to protect the area for Sea-Tac.
...oach. Will be conversations about this in the future.

...ers? Someone with a different operation?

...161 process.

...port purview to use the lease this way. A description of the elements to be used in the leases needs to be developed. What would the

...eration is too noisy?

...would be positive.

...Commerce burden. It would be hard to know

...ome from.

...it gives everyone the same choice, but would be equipment.

...r aircraft already—why is this negative?

...ope of the recommendation.

...t reduce/contain noise.

...ounce it out somewhere else?

...to make a judgement about the alternative.

...g of the alternatives are shown on the chart.

- The ones that show the most reduction of noise are ranked so low there is concern that they will not be considered. Would the two alternatives that would reduce noise the most be taken off the table because they are ranked so low?
- Comment: use of the matrix as it stands now is not necessarily the way the alternatives should be ranked.
- When the committee does not come to agreement on a criterion, it is ranked zero and this skews the ranking.
- The current ranking just concerns total score and runs them in numeric order. If two alternatives score the same, they receive equal ranking and the next number is skipped.
- How does that address the concern that this matrix is heavily weighted in terms of aviation interests and an aviation business could take an alternative off the table without giving the residential representatives a chance to review it? Want to be sure that alternatives get through the Part 161 process.
- Question: should a weight be assigned to each of the criteria to get a fairer ranking?
- Does the consensus process allow one person to veto a good alternative?
- Suggestion: committee members have more confidence that if they could identify areas of agreement, they can work through the more difficult choices. Airport staff can still recommend measures that the committee doesn't.
- Comment that more criteria cover topics that affect the people on the field than off the field. There may be a need to consolidate the residential concerns versus business concerns and rate them equally.
- Comment that business representatives don't just represent people who work on the field but also people who live in the communities. While jobs are important, they also must live here.
- All agree to identify which alternatives everyone agrees on and which ones to discuss more.
- Comment: that if lower ranked alternatives are pursued it might eliminate the need for the ones ranked higher. For example, if night flights were eliminated, there may not be a need for a noise wall or hush house.
- Need to step back from objective analysis and further consider the alternatives that are most important to the community.
- Further analysis just clarifies the pros and cons and costs and benefits. Does not mean adoption.

Further Analysis of Alternatives

- Is there a presupposed amount of money available for this type of program?
- *FAA: over 5-year period, 40 million dollars maximum may be available.*
- There needs to be further definition of "making people whole." What is meant by a buyout program: single occupancy homes, etc.
- Comment: seeing these numbers puts a different light on how to look at this process. If the alternatives are viewed in terms of revenue to the airport, they look different.
- Houses in Georgetown or Beacon Hill may be worth \$285,000. There may be things that are more beneficial than trying to insulate or buy out homes.
- Will the public have access to the assumptions on the data as the conclusions are released?
- Comment: would like to see how Sea-Tac or some other airport communities did this.
The point of this effort is to show the analysis; the implementation model may be different. We'd present different approaches.
- It would be an interesting exercise for the ones who work here to ask each individual group on the airport how they would cut noise by 5 percent. There may be some good suggestions.



**Part 150 Study Advisory Committee
March 12, 2001
Meeting Summary**

The thirteenth meeting of the King County International Airport (KCIA) Part 150 Study Advisory Committee was held on March 12, 2001.

- | | |
|---|---|
| √ Doug Baker, <i>Cargo Tenant</i> | √ Randy Eatherton, <i>Georgetown Community</i> |
| √ Randy Banneker, <i>Indirect Business</i> | √ Liz Warman, <i>Boeing</i> |
| √ Peter Anderson, <i>Corporate Tenant</i> | √ Dan Hartley, <i>Labor</i> |
| √ Larry Brown, <i>Labor</i> | √ Edwin Hanson, <i>West Seattle Community</i> |
| √ Jim Combs, <i>Pilots Assn.</i> | √ Georgianne Ray, <i>Uninc County Community</i> |
| √ Larry Crim, <i>Renton/Kent</i> | √ Lynn Tucker, <i>Beacon Hill Community</i> |
| √ Duane Anderson, <i>At-Large Community</i> | √ Rosemary Unterseher, <i>Tukwila Community</i> |
| √ Ed Wojcek, <i>Magnolia/
North Seattle Community</i> | √ Karen Walling, <i>Small GA Tenant</i> |
| √ Ron Beckerdite, <i>FAA</i> | √ Cayla Morgan, <i>FAA Ex-Officio Member</i> |
| √ Oliver Dallas, <i>FAA</i> | √ Eric Tweit, <i>City of Seattle</i> |
| √ Rocky Piro, <i>PSRC</i> | √ Ron Seymour, <i>Port of Seattle</i> |
| √ Theresa Smith, <i>WashDOT</i> | √ Pam Linder, <i>City of Tukwila</i> |
-
- | | |
|---|---------------------------------------|
| √ Cynthia Stewart, <i>Airport Manager</i> | √ Sharyn Parker, <i>Airport Staff</i> |
| √ Pat Olds, <i>Airport Staff</i> | √ John Current, <i>Airport Staff</i> |

Others Present:

Ryk Dunkelberg	Paul Dunholter	Jennifer Howell	
Mike Alvine	Robert Ormsby	Peter Bro	William Keithan

Purpose of meeting:

- Review new alternatives
- Discussion of alternatives

Jim Combs, Committee chair, called the meeting to order at 4:05 p.m. He turned the meeting over to Ryk Dunkelberg, Barnard Dunkelberg and Company, who reviewed the new handouts and topics of discussion: Selected Alternatives Evaluation and two new contours showing the alternative on the angle of approach at 3 degrees and 3.5 degrees. Paul Dunholter, BridgeNet International, presented single event noise contours that illustrated the difference in noise between the two approach angles. The noise contours showed a reduction of single event noise of 2-3 dB over Magnolia. He noted that, according to the model, there are two factors that affect the noise levels on the ground under the 3.5 degree approach. One is that the aircraft is higher. The second is that the thrust of the plane is at a reduced power setting. Both factors result in lower noise levels. He commented that this is only a model and real operation may be different. He noted that it is easier to be quieter at night because air traffic is less, allowing the aircraft to glide into the airport. Committee members with expertise on new approach instrument

technology commented that this is a feasible alternative. Items needing further clarification include FAA approval, coordination with Sea-Tac Airport, and a possible increase in close-in noise. Representatives of FAA agreed to search the process for changing the angle of approach. The committee agreed to consider this as an alternative.

The next topic of discussion was land use alternatives, specifically sound attenuation and property purchase. Information presented shows cost of attenuation that does not include upgrades to code. Ryk commented that these might allow sound attenuation without requiring code compliance. The cities of Seattle and Tukwila are the ones most affected.

The SAC ranked various noise sensitive uses for sound attenuation; the number one priority being residential development (no disturbance between types) and long-term care facilities starting in the loudest contour and moving outward. A parallel track would be to attenuate schools, hospitals and religious facilities that order, starting with the loudest contour. The contour to be used is the largest combination (KCIA and Sea-Tac).

There were no public comments. The meeting ended at 6: 10 p.m.

Listed below are the comments and questions raised by the advisory committee members. Those not in attendance. Answers, when provided by the project team, are in *italics*.

Comments and Questions on the Alternative of the Angle of Approach

- New technology instruments can handle multiple glide slopes.
- If a higher glide slope is implemented, will coordination with Sea-Tac Airport be necessary?
There may be air traffic issues.
- How steep can the slope be?
A slope of 3.5 is the steepest used by an aircraft has to speed up too fast. A 4-degree slope was also modeled, the maximum you might expect. The results were not much different. The difference in noise level between 3 and 3.5 is pretty good. Implementation of the steeper slope would require approval from FAA and experience at other airports has shown that FAA is not comfortable with a slope greater than 3 degrees.
- Can this work with existing equipment? Could the Instrument Landing System (ILS) be adjusted to make it work?
The ILS is needed for certain aircraft but use of other types of approach systems would be necessary for this process.
- Would a new glide slope and equalizer be required?
No. Transponder landing system (TLS) could be used.
- The TLS development is behind schedule, especially for the curved approach, because the procedures are not written yet.
- TLS has been used already; the issue is more political at FAA. The local FAA administrator in Washington DC is that FAA has already spent considerable money on GPS.
- What does this look like on the Sound? *It would be equivalent; it just wasn't deleted.*
- Can FAA provide some idea of what the process would be to implement a 3.5 slope? *It would be necessary to start the process because additional spacing might be required that would have an impact on Sea-Tac. It would take some*

alternative. Items needing further clarification include FAA approval, coordination with Sea-Tac Airport, and a possible increase in close-in noise. Representatives of FAA agreed to search the process for changing the angle of approach. The committee agreed to consider this as an alternative.

The next topic of discussion was land use alternatives, specifically sound attenuation and property purchase. Information presented shows cost of attenuation that does not include upgrades to code. Ryk commented that these might allow sound attenuation without requiring code compliance. The cities of Seattle and Tukwila are the ones most affected.

The SAC ranked various noise sensitive uses for sound attenuation; the number one priority being residential development (no disturbance between types) and long-term care facilities starting in the loudest contour and moving outward. A parallel track would be to attenuate schools, hospitals and religious facilities that order, starting with the loudest contour. The contour to be used is the largest combination (KCIA and Sea-Tac).

There were no public comments. The meeting ended at 6: 10 p.m.

Listed below are the comments and questions raised by the advisory committee members. Those not in attendance. Answers, when provided by the project team, are in *italics*.

Comments and Questions on the Alternative of the Angle of Approach

- New technology instruments can handle multiple glide slopes.
- If a higher glide slope is implemented, will coordination with Sea-Tac Airport be necessary?
There may be air traffic issues.
- How steep can the slope be?
A slope of 3.5 is the steepest used by an aircraft has to speed up too fast. A 4-degree slope was also modeled, the maximum you might expect. The results were not much different. The difference in noise level between 3 and 3.5 is pretty good. Implementation of the steeper slope would require approval from FAA and experience at other airports has shown that FAA is not comfortable with a slope greater than 3 degrees.
- Can this work with existing equipment? Could the Instrument Landing System (ILS) be adjusted to make it work?
The ILS is needed for certain aircraft but use of other types of approach systems would be necessary for this process.
- Would a new glide slope and equalizer be required?
No. Transponder landing system (TLS) could be used.
- The TLS development is behind schedule, especially for the curved approach, because the procedures are not written yet.
- TLS has been used already; the issue is more political at FAA. The local FAA administrator in Washington DC is that FAA has already spent considerable money on GPS.
- What does this look like on the Sound? *It would be equivalent; it just wasn't deleted.*
- Can FAA provide some idea of what the process would be to implement a 3.5 slope? *It would be necessary to start the process because additional spacing might be required that would have an impact on Sea-Tac. It would take some*

coordination with users because not all pilots may want or be able to fly the 3.5 degree approach. FAA committed to finding out more about this.

- Since the SeaTac outer marker is on this field, how will this affect the airport?
According to FAA, because the airports are only 4 miles apart, they basically operate as one airport.
- Isn't the approach well out of the way of Sea-Tac?
- The 1000-foot separation between aircraft would be reduced. It is logical to increase to a 3.5 slope at both ends of the airport. Is there a reason why it wouldn't be done at the south end?
No, but it only affects further out noise.
- Suggestion: intercept the glide slope and stay within the current elevation. Request for FAA to check into this.
- If the cargo jets have to come in heavier and higher, will there be more close-in noise? This issue needs clarification prior to making it a recommendation.
- Aircraft are not landing faster. The only reason for more power use is if the landing is faster. Georgetown and Tukwila would not hear more noise. Ground noise would not change. However, if more flaps are deployed, there could be more noise w/wind going over flaps.
Model has limited abilities. By raising the slope, the thrust is lower. Aircraft manufacturers need to be contacted to see how it affects flight. The model does not account for this so it is hard to quantify.
- Where does the flap setting change?
- *On the approach level; it's not the movement of the flap, it's that they are lower. Lower flaps create more noise.*
At 3.5, it might create more flap noise over the whole glide slope. Because the altitude over Georgetown is the same, it might create more noise for Georgetown but less for Magnolia.
- Comment: the noise level would not necessarily be louder with the flaps changed. The flaps are set at full or one notch off of full at every landing. Would not necessarily be noisier.
- With less power, engines make less noise.
- What generates more noise—engine or airframe?
Engines generate more noise except in really new aircraft.

Comments and Questions on Land Use Alternatives

Purchase of Properties within Specific Contours

- Sound attenuation does not solve the noise problem for outside residential uses. Suggest a purchase plan where to buy property, sell it as industrial, and make some of the money back.
Traditionally, FAA has required that land be cleared after purchase with noise funds.
- Is it acceptable to receive money for sound attenuation and still have residential use?
Yes, if it's used for sound attenuation only, not property purchases.
- Isn't it possible that isolated property purchases can create "pockmarks" in the neighborhood and result in a non-viable community?
- There will be thresholds; for instance, if the number of occupied residences is reduced, it may cause the loss of a viable grade school, making the community itself no longer viable.
- Can the land be rezoned so it's worth more as industrial or commercial than residential? Has this been done anywhere? Could other funds be used for purchase of close-in properties, leaving more funds for sound attenuation further out.
- Is it possible to use another source of money to do this and by-pass the FAA? This would allow it to be used for other residential uses or be rezoned if appropriate. The challenge would be creation of a mixed-use neighborhood.

- As an alternative, KCIA could guarantee the difference between the sale price of the property and its market value. If the property were resold, it would be encumbered to protect the difference. The problem with this approach is that it is expensive.
- There are multi-generations of people who own properties bought out or razed to the ground. They would prefer nighttime operation restrictions so the most serious impacts are minimized.
- Did Sea-Tac have trouble finding comparable housing during its buy-out process?
- *No.*
- What are the chances of getting more funds from FAA for buyouts and attenuation?
- *FAA provides \$5 million a year.*
- Should property purchase remain an alternative?
- *It should remain an alternative but the decision should not be made by the SAC alone; the affected communities for their input.*
- Is there any city owned property that could be traded or transferred so people could stay in the community?

Sound Attenuation Residences

- If houses involved in the sound attenuation process were to be exempted from code compliance, there could be problems in a safety aspect.
- What was the cost of attenuation at Sea-Tac Airport?
- *\$15,000 to more than some houses worth.*
- Is the Georgetown community amenable to sound attenuation, understanding that the historical nature of some of the buildings needs to be addressed?
- *Conversations are starting now that there are some concrete alternatives to work with. There needs to be consistency within the noise contour; the same guidelines must apply to all jurisdictions within a certain community.*
- What have people in Tukwila been saying?
- *People have had positive conversations about sound attenuation but not many have shown an interest in buyouts. Nighttime restrictions are an opinion varies.*
- Boeing gets calls from citizens looking for funds for sound attenuation.
- Are dollars available for sound attenuation?
- *FAA will likely recommend buyout for properties close in and sound attenuation further out. This provides a solution where the community doesn't want to move out of the neighborhood.*
- There is still a problem with noise outdoors. There are concerns that it will be noisier outside, and possibly inside, in 5 years because of the expected increase of operations over time.
- The advantage of sound attenuation is that it allows residents to stay in their homes.
- Any program should be based on the combined contours to include all affected residents.
- Some airports only sound attenuate single family homes (includes up to quadplex). Some will do only owner-occupied multifamily units. The issue of single vs. multifamily unit is cost. Need to be consistent. Request: that examples of different strategies for multifamily vs. single family homes be presented to the SAC.
- Would there be value in having contours mapped by block because of the mix of residential uses within the community?
- How is the difference between owner-occupied and rented facilities prioritized?
- One perspective is that the renters are transient or can rent someplace else. Another perspective is that a nonowner occupied multifamily home is a business.

the fair market value of the home and make up the property and its market value. If the property were sold to new owners from filing for damages due to noise. They do not want to move people out of the noise contour in Georgetown who want to remain there. They do not want to be razed to the ground. They would prefer nighttime operation restrictions so the most serious impacts are minimized.

What are the chances of getting more funds from FAA for buyouts and attenuation?

Should property purchase remain an alternative? *It should remain an alternative but the decision should not be made by the SAC alone; the affected communities for their input.*

Is there any city owned property that could be traded or transferred so people could stay in the community?

on process were to be exempted from code compliance, there could be problems in a safety aspect.

Sea-Tac Airport?

worth.

Is the Georgetown community amenable to sound attenuation, understanding that the historical nature of some of the buildings needs to be addressed?

Conversations are starting now that there are some concrete alternatives to work with.

There needs to be consistency within the noise contour; the same guidelines must apply to all jurisdictions within a certain community.

What?

People have had positive conversations about sound attenuation but not many have shown an interest in buyouts. Nighttime restrictions are an opinion varies.

Boeing gets calls from citizens looking for funds for sound attenuation.

Are dollars available for sound attenuation?

FAA will likely recommend buyout for properties close in and sound attenuation further out. This provides a solution where the community doesn't want to move out of the neighborhood.

There is still a problem with noise outdoors. There are concerns that it will be noisier outside, and possibly inside, in 5 years because of the expected increase of operations over time.

The advantage of sound attenuation is that it allows residents to stay in their homes.

Any program should be based on the combined contours to include all affected residents.

Some airports only sound attenuate single family homes (includes up to quadplex). Some will do only owner-occupied multifamily units. The issue of single vs. multifamily unit is cost. Need to be consistent. Request: that examples of different strategies for multifamily vs. single family homes be presented to the SAC.

Would there be value in having contours mapped by block because of the mix of residential uses within the community?

How is the difference between owner-occupied and rented facilities prioritized?

One perspective is that the renters are transient or can rent someplace else. Another perspective is that a nonowner occupied multifamily home is a business.

- Concern that a low-income area will be created where people are not treated equitably.
- Are communities or financial entities being protected?
Buildings with tenants as well as owners should be considered as long as they are residential housing units. Should not discriminate between owner and renter.
- Should the limited available funds be prioritized by use or block by block?
- Owner-occupied should be considered first if all residences can't be done at once.
- Recommendation: work block by block regardless of ownership to avoid discrimination.
Can implement contour by contour.
- Are there alternative revenue sources that could leverage the dollars such as tax breaks, incentives, etc.?
Not now. Some airports have used the length of residence as a priority.
- There is a possibility that after sound attenuation is done, a landlord could increase the rent. Is there a way to prevent this?
It would be difficult to do. It would most likely be a local or state issue.
- Is any information available on how much property taxes have changed due to sound attenuation?
Not known. Generally the value of the home increases by the cost of the insulation.
- **PRIORITY:** Sound attenuate noisiest areas first; residences first, and move out to the lower noise level contours.
- Are nursing homes residential units? What about fire stations with sleeping quarters? Should residences and sleeping quarters be considered differently?
Yes. Fire station is a sleeping quarter, not residential unit. Nursing home would be considered public facilities by FAA.

Public Facilities: Schools, Hospitals, Religious Facilities, Nursing Homes

- What about schools, hospitals, religious facilities, nursing homes, with public assembly spaces?
They are considered public facilities, not residential, and the FAA treats them differently with funding from a different source. A different, but concurrent, program would be set up for these.
- Concern about schools-noise can still be a problem in the summer when windows are open.
FAA would decide whether to include air-conditioning in sound attenuation funding.
- What is the difference between public and private schools? What about daycare or preschool?
Generally, FAA will fund rooms where class instruction takes place but not other activities..
- Where do hospitals and religious facilities fall? Are there any hospitals in the contour?
Not known at this time. It will be researched.
- Suggestion: that KCIA follow the priorities set by Sea-Tac in its Part 150 Study.
- FAA has the final word on where and how money is spent.
- Churches are non-profit facilities, is there a way to distinguish between this and businesses.
- Sea-Tac Airport worked only with schools, not churches
- There are two churches in the 65-70 contour that would like to be considered.
- Suggestion: identify the facilities in the contours and then revisit the issue.
- It's important that everyone see how complicated this is. Does the committee agree with use of the unmitigated (largest) combined contour for this analysis?
- Will that involve using averaged out noise contours (DNL) or Single Event Levels (SEL)?
FAA will only consider DNL levels. SEL's can be used to prioritize within DNL contours.
Question for next meeting: how will single events and frequency of events be handled?
- Are there standards for different sound attenuation levels for inside and outside?

Yes, FAA requires maximum inside noise

level of 45 DNL.

Community Involvement in Purchase of

- It would be helpful to get more clarification from communities as to what they want. Community meetings like those held in the past are a good way to reach people. If meetings are set up, the maps need to be bigger so people can see which area was really affected and to comment on.
- There have to be some options in place before a mitigated contour can be defined.
- During Sea-Tac Airport's P150 Study, consultants with experience with buy-out programs at other airports were invited to meetings to answer questions.
- The Port of Seattle representative said they could help find people to answer these questions.
- Concern that Part 161 decisions are a further out. May not have enough information in the timeframe for the Part 150.
- Suggestion: look at where the most noise comes from, and then look at the contours.
- *It is KCIA's decision which contour to use to determine mitigation boundaries. Sea-Tac has used large contours. An unmitigated contour can be used to set sound attenuation boundaries and a mitigated contour can be used for other issues.*
- Has there been an open house to talk about the alternatives? No
- Communities have been told there will be specific SAC recommendations at the next round of public meetings. Will they receive any detailed recommendations or a broad overview of some viable alternatives?
- What does the airport think is affordable? ?
- *Uncertain what is available for noise mitigation until earthquake cost is figured out.*
- Asking one set of questions to every community may not be appropriate. Fragmentation of response may be based on distance from the airport.
- Is it really true that there are no residential homes in the 75 DNL?
- Yes.
- What time is needed to get feedback from communities? n communities?
- *Could go specifically to certain communities on a faster timeframe.*
- SAC needs to hear feedback from communities before making specific recommendations.
- Is it feasible to get feedback within 2 months?
- Can we get experts or reps from other airports to come to the meeting?
- Yes

Sound Attenuation Decisions

on from communities as to what they want. Community meetings like those held in the past are a good way to reach people. If meetings are set up, the maps need to be bigger so people can see which area was really affected and to comment on.

There have to be some options in place before a mitigated contour can be defined.

During Sea-Tac Airport's P150 Study, consultants with experience with buy-out programs at other airports were invited to meetings to answer questions.

The Port of Seattle representative said they could help find people to answer these questions.

Concern that Part 161 decisions are a further out. May not have enough information in the timeframe for the Part 150.

Suggestion: look at where the most noise comes from, and then look at the contours.

It is KCIA's decision which contour to use to determine mitigation boundaries. Sea-Tac has used large contours. An unmitigated contour can be used to set sound attenuation boundaries and a mitigated contour can be used for other issues.

Has there been an open house to talk about the alternatives? No

Communities have been told there will be specific SAC recommendations at the next round of public meetings. Will they receive any detailed recommendations or a broad overview of some viable alternatives?

What does the airport think is affordable? ?

Uncertain what is available for noise mitigation until earthquake cost is figured out.

Asking one set of questions to every community may not be appropriate. Fragmentation of response may be based on distance from the airport.

Is it really true that there are no residential homes in the 75 DNL?

Yes.

What time is needed to get feedback from communities? n communities?

Could go specifically to certain communities on a faster timeframe.

SAC needs to hear feedback from communities before making specific recommendations.

Is it feasible to get feedback within 2 months?

Can we get experts or reps from other airports to come to the meeting?

Part 150 Study April 9, 2001 Meeting Summary

The fourteenth meeting of the King County International Airport (KCIA) Part 150 Study Advisory Committee was held on April 9, 2001.

Members Present (✓):

- | | |
|--|--|
| ✓ Duane Anderson, <i>At-Large Community</i> | ✓ Cayla Morgan, <i>FAA Ex-Officio Member</i> |
| ✓ Peter Anderson, <i>Corporate Tenant</i> | Rocky Piro, <i>PSRC</i> |
| ✓ Doug Baker, <i>Cargo Tenant</i> | Theresa Smith, <i>WashDOT</i> |
| ✓ Ron Beckerdite, <i>FAA</i> | ✓ Lynn Tucker, <i>Beacon Hill Community</i> |
| ✓ Larry Brown, <i>Labor</i> | ✓ Eric Tweit, <i>City of Seattle</i> |
| ✓ Jim Combs, <i>Pilots Association</i> | Karen Walling, <i>Small GA Tenant</i> |
| ✓ Larry Crim, <i>Renton/Kent</i> | ✓ Liz Warman, <i>Boeing</i> |
| ✓ Oliver Dallas, <i>FAA</i> | ✓ Ed Wojeck, <i>Magnolia/North Seattle</i> |
| ✓ Randy Eatherton, <i>Georgetown Community</i> | |
| Ron Fincher, <i>Sea-Tac Airport</i> | |
| ✓ Edwin Hanson, <i>West Seattle Community</i> | Ryk Dunkelberg, <i>Barnard Dunkelberg</i> |
| ✓ Dan Hartley, <i>Labor</i> | Jennifer Howell, <i>Triangle Associates</i> |
| ✓ Lynae Jacobson, <i>Port of Seattle</i> | |
| ✓ Pam Linder, <i>City of Tukwila</i> | |

Purpose of meeting:

- Presentation of Consultant's Recommendations
- Discussion on alternatives to identify preliminary recommendations

Jim Combs opened the meeting at 4:10 PM. Lynae Jacobson, who is taking over from Ron Seymour to represent the Port of Seattle, and Ron Becherdite, who took over for Suzanne Alexander, who previously represented regional Air Traffic Control, were introduced. Jim noted that the first item on the agenda was to review the process for the Study Advisory Committee to come to agreement on recommendations for the alternatives. The goal is to have final recommendations by the June 11 meeting. Airport staff are holding community meetings in April and May and an open house on June 6 prior to the June SAC meeting. The consultant can give some recommendations from their perspective to bring to the communities as an initial set of recommendations.

Jim posed the question to the committee whether members were comfortable with that schedule and if anyone had particular things to bring to the community meetings. Committee members requested more information on Part 161 and how that fits into the

process, concern regarding taking too much time, and a desire to hear from the community before finalizing their decisions. In addition, SAC members would like to know more specifically what is possible within the timeframe of the study, how much the recommendations will cost, and how much money is available, so it is apparent what actually will happen. Also suggested was to have detailed maps within specific contours so community members could identify where their homes fit within the contours.

In regards to which contours to base recommendations on, SAC members reached an agreement that they did not want to slow down the process. Using the combined KCIA/Sea-Tac Contour is the first combined recommendation using the KCIA 65 DNL contour, but because FAA has not used a combined contour before, it was agreed that recommendations using the KCIA 65 DNL contour would also be submitted as a starting point. The representative from the FAA concurred with this idea, noting that FAA would approve the KCIA 65 DNL contour and was open to the idea of the larger, combined contour, but it would be important not to slow down the process.

Ryk Dunkelberg, Barnard Dunkelberg and Company, then reviewed the consultant's recommendations with the committee. He noted that these preliminary recommendations are meant to be a starting point for discussion; these recommendations are alternatives the consultant considers to be achievable and feasible alternatives. The Committee discussed each of these, noting which ones they agreed with as a preliminary recommendation, and which needed further discussion and feedback from the community. The initial round of recommendations included:

- Sound Attenuation
- Close-in Departure Procedure for Northern Departures
- Site Selection Feasibility Study for a Ground Run-up Enclosure
- Noise Barrier on the North End of Airport
- Implement Technology that allows for more precise approach and departure ground tracks
- Develop an FMS Departure Route above Elliott Bay
- Develop a Fly Quiet Program with Enhanced Noise and Compliance Monitoring
- Develop and Implement Building Design Standards
- Maintain Existing Run-up Restrictions

The following need more discussion and/or feedback.

- Stage 2 Curfew at night
- Sales Assistance
- Home Buy Outs
- Charted Visual Approach above Elliott Bay

For alternatives that affect community members, such as Sales Assistance and Home Buyouts, the Committee specifically would like to hear from the community before making a recommendation. John C. [Name] distributed a preliminary schedule for the community meetings. Cynthia Stev [Name] the Airport Manager, said that the airport staff would keep track of the comments and provide them to the SAC. Several of the meetings,

ong for this study, recognition that this process community about the recommendations before SAC members would like to know more timeframe of the study, how much the much money is available, so it is apparent what as to have detailed maps within specific contours where their homes fit within the contours.

ommendations on, SAC members reached w down the process. Using the combined ity, but because FAA has not used a combined amendations using the KCIA 65 DNL contour oint. The representative from the FAA concurred approve the KCIA 65 DNL contour and was open our, but it would be important not to slow down

nd Company, then reviewed the consultant's He noted that these preliminary recommendations sion; these recommendations are alternatives the id feasible alternatives. The Committee discussed eered with as a preliminary recommendation, and feedback from the community. The initial round

- Northern Departures
- a Ground Run-up Enclosure
- Airport
- for more precise approach and departure ground
- above Elliott Bay
- Enhance Noise and Compliance Monitoring
- Design Standards
- ons

d/or feedback.

ott Bay

members, such as Sales Assistance and Home would like to hear from the community before nt distributed a preliminary schedule for the Airport Manager, said that the airport staff would them to the SAC. Several of the meetings,

including Georgetown and Beacon Hill, are scheduled prior to the next advisory committee meeting.

Cynthia Stewart and Sharyn Parker, a new airport staff member working on the Noise Program, reviewed a handout regarding the impacts on West Seattle of Increased Charted Visual Use, Alternative A 9. Some advisory committee members expressed concern over the lack of data. No decision was made on this alternative until more data and/or feedback from the community is received. It was suggested to bring this issue up at the West Seattle and Magnolia community meetings.

At the next meeting, the SAC will review any additional recommendations they want on the table as well as the Stage 2 curfew recommendation. The airport and committee members will also start hearing feedback from communities.

There were no public comments.

Listed below are the comments and questions raised by the advisory committee members. The text may have been reworded for clarity for those not in attendance. Answers, when provided by the project team, are in *italics*.

Comments and questions on the Part 150 Process

- Request for more information on what are Part 161 recommendations and what do we get into for Part 150 and what for Part 161.
- Concern that the SAC is taking too long to get to answers. When competing in this arena with so many people's jobs dependent on it, we have an obligation to be reasonable and get on with it. Want to get things moving.
- Do we have the information we need to make recommendations?
- Having never been through this process, can't suggest we go faster, but maybe we can.
- Comfortable with the process because of the community meetings. Know what they're going to look for and that community members will be concerned with buyouts. Ready for community meetings.
- Do you feel like we have enough info to share with the communities?
- Nice to see preliminary consultant recommendations around which discussion could occur and dollar figures around that list and something about how long it would take to get any relief.
- Would like to know what is possible over what period of time, what is it going to cost, and how much money is available each year so we know what can happen.
- Would like to see mitigated noise contour/map per residence so people can identify where they are, what impact do I receive from the airport, and how it fits in with what's recommended.
- Where is my business or home located –in what contour?
- That is an aggressive schedule if we don't have a mitigated contour (FAA) Will we get this for the next meeting?

The mitigated contour depends on what we agree on for recommendations. If the SAC agrees to these recommendations, we can create a mitigated contour and then

combine it with Sea-Tac Airport will be smaller than the "do not slightly smaller. OK to use unmitigated contour for recommendations.

- With the combined contours, do that mean it will be up to KCIA to find the funding that assume that Sea-Tac will share with the

We suggest that we have recommendations for both just KCIA and the combined program within the 65 contour, rather than wait for combined contour approval from FAA. That way action can happen while FAA makes decision on the combined contour.

- As long as it's clear that the recommendation that we have is the preferred and that the noncombined contour is an alternative. We need both sets of recommendations so they both go through the process or whole package may get bogged down.

- Is this Sea-Tac's 1998 contour a better KCIA unmitigated contour? Yes.

- Any disagreement about using combined contours? (None expressed.)

- What did we decide about Single Level (SEL) vs. the averages contours?

The SEL contours are for information only, as the DNL contours will have to be used to define program boundaries and eligibility for funding.

- If it takes us longer to get to a decision by using the combined, I don't want to wait around when we can get going with the KCIA alone. Would like to see commitment to do something. Want progress going on 65.

- General agreement that we don't slow down the process. Want to move ahead at least do KCIA combined contour if we can get timely approval.

- Concern whether we lose opportunity to get the combined by taking the quicker, simpler out.

- May be a matter of scheduling which neighborhood you start with?

- Will we keep lobbying to get the combined approved?

- Yes, just don't want to wait. Need to be very careful of the language of how we word this.

- Comment that it took over a year to get a monitor and start sharing information on what was happening (Hamilton). It took a long time to get radar flight tracks from Sea-Tac. I wouldn't be optimistic about getting combined.

- Can we look at two concurrent tracks and not lose sight of the goal?

- Comment from FAA: understand that you would like to see the largest contour possible. Of course, we'd appreciate the smaller contour and office seems supportive of the track so don't lose sight of this goal, but don't slow down remedies.

Comments and Questions on the

or a combined contour. The mitigated contour "contour, so the mitigated contour will be unmitigated contour for recommendations.

that mean it will be up to KCIA to find the funding that assume that Sea-Tac will share with the

recommendations for both just KCIA and the combined program within the 65 contour, rather than wait for FAA. That way action can happen while FAA makes decision on the combined contour.

recommendation that we have is the preferred and that alternative.

so they both go through the process or whole

the KCIA unmitigated contour?

combined contours?

Single Level (SEL) vs. the averages contours?

information only, as the DNL contours will have to be used to define program boundaries and eligibility for funding.

decision by using the combined, I don't want to wait around when we can get going with the KCIA alone. Would like to see commitment to do something on 65.

slow down the process. Want to move ahead at least do KCIA combined contour if we can get timely approval.

opportunity to get the combined by taking the quicker,

which neighborhood you start with?

combined approved?

need to be very careful of the language of how we word this.

get a monitor and start sharing information on what was happening (Hamilton). It took a long time to get radar flight tracks from Sea-Tac. I wouldn't be optimistic about getting combined.

two tracks and not lose sight of the goal?

that you would like to see the largest contour possible. Of course, we'd appreciate the smaller contour and office seems supportive of the track so don't lose sight of this goal, but don't

sultant's Recommendations

Alternative A2: Implement a complete Stage 2 jet restriction at night.

This would require a Part 161 study. It would reduce loud nighttime noise although would not reduce contour by much because there aren't a whole lot of these jets already.

- How many night flights exist now?
One or two a night, majority not including medical emergency flights (these can't be restricted).
- What about aircraft under 75,000 lbs. hushkitted?
Aircraft under 75,000 lbs. are included in Part 161 for analysis but not included in the law restriction.
- Does that imply that if you hushkit something under 75,000 lbs., it becomes Stage 3?
Yes.
- What's the definition of government aircraft?
All military planes and they are exempt anyway.
- Did you say the restriction does not require FAA approval?
It requires FAA approval of the FAA Part 161 process, and the methodology, but not the actual ordinance. With a Stage 3 restriction, the FAA must approve the ordinance. FAA has two separate paths for approval.
- Has anyone successfully implemented a Part 161?
None. It's a methodology question. Tried to do it in Naples, FL but it got hung up.
- Is this a valid recommendation?
Yes, you wouldn't be the first doing this, but the third. In Naples, no one lives inside the 65 DNL contour and that's one of the problems—no recognized noise problem. Also, Naples did not look at nonrestrictive alternatives and you are doing this. It is reasonable to recommend.
- Are we talking about noise or certified aircraft? We talked about sharper angle of descent. If a person bought one of these types of jets, he should be able to fly it under the rules he bought it for. Don't want to be anti-aviation. Do not want to do this for planes less than 75,000 lbs. Stage 2, 3, and upcoming stage 4 requirements do not reflect.
1.3 corporate jets would be affected under this restriction. Assumption that these would leave and be replaced by Stage 3 aircraft.
- In the past, lack of planning related to unbridled growth in this area. For example, if Boeing left, would it be replaced by a firm with Stage 2 aircraft? Residential community has been blindsided in the past. Whether 1 or 10 now, we're looking at the future and concern that additional aircraft could come in.
- You didn't mention Van Nuys. Recommendation there. Should be a federal issue, not a local discrimination issue.
- Not a lot of Stage 2 aircraft on the airport. Concerned about local discrimination. If they can come to Sea-Tac, they are still using the airspace and making noise. Should be able to come here. Would like to see the same standard everywhere.
- Local control was removed in 1990 from rules, so anything can be flown anytime, anywhere no matter what the noise is. That's what happened earlier. How is a local jurisdiction ever going to be able to protect itself from the federal government caving into corporate interests?

- Disturbing that if it's only 1.3 ai be left with: get better doors and looked at all the choices, that we
- Will look at things 3 times to try on it.
Would like to see a Stage 2 restr encourage people to talk to their this.

Alternative A4: Sound Attenuatio

- How long will this take?
Five to 8 years or 12-16 (with ju much money King County and th This would be for all residential
- The timeframe is too long; 16 ye this.
- What is the planning period of a impacts mitigated in 16 years.
- How long did it take Sea-Tac?
- Been about 16 years so far; start increased to 100 homes a month that everyone knew that eventua smaller area and get more done, eventually something would be
- A lot of it was done with passen caps on the funds from FAA.
- Is the 65 DNL a reasonable cont which would be a whole lot mor
- Going back to the timeline of 12 so we can show something to th Start with 70 DNL and keep mo
We can prioritize the approach contour first. This is FAA's fun
- Just start at the noisiest contour
- Wouldn't it be better to buy out attenuate like they did at Sea-Ta
- Want to hear from the communi

Alternative A4: Sales Assistance

- Isn't it FAA's policy when they weed grown lot will take its plac
Yes, however, the FAA does not
- FAA Comment: we are looking
- Doesn't this alternative say that

ft and we can't recommend it, that we're going to odows and fly nice. Will be sad when we have d up with these.

I get recommendation/consensus. Keep working on at night as one recommendation and constituents. Airport staff will talk to tenants about

AA funds of 5 million/year). Depends on how ort of Seattle will give for the combined contours. ts in the contours.

is outside my realm of future for dealing with

t 150—5 years? Five years of planning for noise

n 1985 and did about 30 homes/month. Then w slowed down to 30 /month. The benefit was hey would get some relief. You can look at a ise a larger area and let everyone know that e.

facility tax and also it was done before there were

for sound insulation as opposed to the 60 DNL, pensive and harder to fund?

years, can we look at a smaller DNL—70 DNL mmunity that something will happen over time? ; towards the 65 DNL

it would be recommended to start with the loudest priority

and move out.

ome in the 70 DNL contour than to sound

efore making a recommendation.

a property that they raze it to the ground and a

ually purchase the property, the Airport does

ie idea of reuse of property for a compatible use.

just assisting with the sale of the property?

Yes: guarantees the fair market value of the property. The seller gets the fund, the county makes up the difference, and the new owner gets the house knowing the situation.

- Concern that will be told what our homes are worth.
- Concern that this committee won't consider any recommendation that actually reduces the generation of noise.
- What value do we gain if the price of the home is reduced until someone who can afford it purchases it and then the noise increases over time? We need to get noise down so families can live where there is space.
- Over time, seen a package of noise reductions that decrease noise in homes, by aircraft, etc.
- This is an airport; it's going to have aircraft operations that may make some noise. Need to help people.
- At what point do we stop the cycle of selling homes to someone who can tolerate it and then when it gets too noisy, sell the home to someone else?
We want to avoid creating neighborhoods that are gutted—sales assistance helps do that.
- Can you repeat the sales assistance? If someone buys the home, can they get help with sales when they want to sell?
Only way it would happen only if an extraordinary increase in noise. Part of the purchase agreement would be an easement.
- The threat in the future is it may allow more people and businesses to move closer to the airport. The size of contour is important. This is why Sea-Tac used a large contour 20 years ago. Need to put in comprehensive plan.
- Concern that aircraft may get quieter but the number of operations may increase so noise will increase.
- Is this a discrete area that this applies to—is it 10 residences or what? Maybe some areas that should be eliminated or made into commercial. Not familiar with the area right next to the airport. How many homes are we talking about?
Just in the KCIA 70 contour: 351 housing units, 868 people. Inside 75 DNL is all airport property—zero residences.
- Maybe some County maintenance program that would take care of empty lots or neighbors could use.
- Don't want to bring this up (purchase) until hear from the community meetings.
- What people are trying to do is to get a handle on the contour and what it includes. Helps frame what the future can be if we ask these questions.
1955 housing units, 4075 people inside 65 DNL contour
- How many live to the north (Georgetown) vs. Allentown (south) in the 70 contour?
Guess most live in north Georgetown.
- Concern that buyout would decimate Georgetown.
- Concern that may not have a viable community.
- Can everyone agree to wait for community meetings before discussing buy out further?
- How does the Georgetown community decide what they do? What happens? Who decides? Does the majority decide?

- Airport staff will keep track of c
- As long as you have individuals, the power.
Find out preferences: what do p sound attenuation. SAC can wre see what they are thinking—do c to aid your decision.
- Observation about Sea-Tac airpo Had to sell. Was condemnation
- FAA: Voluntary buyout is not e mandatory buyout are. Needs to condemn. Don't want to degrade rezoned it commercial and was
- Would like to contain noise to th earmuffs on it.

Alternative A8: Close In Departu

The corporate and cargo aircraft ho those closer to the airport than thos probably not Allentown. Same depa sideline to direct departure path and

- Any downside to including Sou *Would have to take a look; may*
- Everyone agrees to A8: Implem Departures. Assumes a straight
- Will this prevent them from turn *No, only the departure part.*
- Who does this apply to?
Mostly corporate aircraft and c
- What's the enforcement method *FAA will help you enforce it. Pu*
- Seems like some UPS aircraft d *Probably true.*
- Can more be required of pilots?
Three departure procedures: Tv noise with a close in community required but not part of an ordi particular procedure.
In Orange County, get altitude d don't believe it's FAA 's respon Understanding.
- Important to get message out th

Alternative A3: Initiate a Site sele

- Why don't recommend building

ents; Committee members can also get feedback. 't force the majority vote on the individual. Not

e prefer: voluntary buyout, sales assistance, with the issues. Then go to the community and pose a buy out, is it mixed? Use that information

program, homeowners didn't have a choice. cess.

le for federal funding. Sales assistance and ommitment that local jurisdiction would neighborhood by patchy buyout. City of Boise to do it that way.

report as much as possible rather than put

rocedure

i procedure for departing. This would benefit rther away. Would benefit Georgetown but e going to the South wouldn't benefit because t as close as Georgetown to the airport.

departures in this recommendation? ease noise farther south.

Close in Departure Procedure for Northern departure. over Elliott Bay?

jets.

ty?

flight procedures manual and everyone does it. already and some don't.

standardize departure procedures. One reduces e with a far out or distant community. Generally, e. Airport can request that operators use a

reduce power but it reduces noise. Does help, but ility to enforce. Can be part of Memorandum of

is works.

n feasibility study for a GRE.

RE?

The facility needs to be sited. We don't feel comfortable saying that there are enough run ups to require this type of facility. Very few run ups actually happen. Before spending a couple million dollars on such a facility, need more data that this is needed.

- Boeing provided the number of run ups and it's not as high as people perceive or expect.
- There are a few corporate run ups as well.
- Can put a muffler on wheels behind run up to handle corporate jet technology and 737. Need to take advantage of this technology.
- How was an engine run up defined? Just maintenance and testing?
Not included for general run ups before take off—just maintenance, testing,
- Note a few years ago when 777 was getting underway, a huge number of tests were done but since then cut down dramatically.
- If the near Mach 1 cruiser is assembled here, and tested here, a GRE might be of value in the future.
- Everyone agreed to proceed with site selection study.

Alternative A3: Construct a noise barrier

- Would this be a barrier or would it deflect noise to Beacon Hill because it's higher?
Still under study.
- Wouldn't like to see something that would interfere with the flight path.
- Where would it be?
Closest to the community that design criteria allow: can't impede airspace, etc.
- If it's closer to the runway, will it absorb noise rather than deflect it?
Needs to be designed.

Alternative A8 and A9: Implement technology that allows for more precise approach ground tracks as it becomes available

- Should we combine this into departure and arrival technology?
- All agreed to add departure.

Alternative A8: Develop an FMS Departure Route.

- Concern that we have too many aircraft going through Elliott Bay and may be limitation.
- One reason why they can't use FMS departure at Sea Tac is that it slows down departure –is that true?
- FAA comment: True. No FMS departures now at Sea-Tac. They are extremely precise and accurate but not every plane will fly it the same. Wind is a variable.
- To require FMS requires more than one waypoint. May not have the technology to do this right now. Need to recognize this up front.
- Over the last week saw Duwamish Departure being used, and even though (FAA) is saying doing it one way, you can see airplanes clear across the sky. It's impractical to say that all aircraft will go across one spot. Planes flying everywhere to get them across the water may impact West Seattle. May help some, but lots fly right over West Seattle.

- Basic agreement but concern that shore and along West Seattle will get more and more noise by the more noise you will get.

Alternative A9: Charted Visual Approach

- Went for a long time without Hamilton Viewpoint monitoring site data, so a lot of concern that it's too limited data to be valid. *It is a smaller sample.*
- The amount of noise complaints because Magnolia is more organized with complaints or react the way *The data is inconclusive, but can't say much as expected. Trying to show more activity in summer months.*
- The data does not reflect that the communities are heavily loaded with quieter aircraft not the cause the ILS approach goes over Magnolia.
- Concerns: small data set, airport noisier aircraft, skews result. An area considered West Seattle neighborhoods, and these people noise at least as long as Georgetown. This whole area broken up and large land area with several neighborhoods, and these people don't know whom to call to complain.
- Would like to see first quarter of this year before implementing. Is contentious issue in West Seattle. Should do more before approving it.
- Go ahead and find out what people think about this.
- How will we proceed further with a charted visual approach? If we can't proceed because part of the community is not organized, how do we address this? Can we send something out to the people of West Seattle? How can we track complaints without a noise officer?
- Noise dealing with is inbound aircraft heading. Don't have arrivals coming from the north as much as in the spring and the winter.
- Remains a preliminary consultation with the community.
- Make an issue about this at the community meetings in West Seattle and Magnolia. Main concern is lack of data. Do we have a decent comparison without data from Hamilton View point?
- Need the data to see if it is a problem with West Seattle.
- Is there existing data that we can use from Sea-Tac?

Alternative A10: Develop and implement building design standards

- Will buildings will cost more?
- OK for now.
- Make sure cities reflect in their building code that airport is here and require noise attenuation. Suggest recommendations on that governments update their building and land use codes to reflect airport presence.

and travels over water. People who live along the shore and along West Seattle will be impacted. Sound is terrain following. People get more and more noise by the more planes you fly over Elliott Bay, the more noise you will get.

Approach

on Viewpoint monitoring site data, so a lot of concern that it's too limited data to be valid. *we receive in comparison to Magnolia is skewed. West Seattle not organized in any way to deal with complaints. The communities are not organized. It is out that West Seattle is not as impacted as we did try to do analysis. Been difficult.*

The data is inconclusive, but can't say much as expected. Trying to show more activity in summer months.

The communities are heavily loaded with quieter aircraft not the cause the ILS approach goes over Magnolia. noise at least as long as Georgetown. This whole area broken up and large land area with several neighborhoods, and these people don't know whom to call to complain.

More before approving it. Is contentious issue in West Seattle. Should do more before approving it.

Think about this.

Charted visual approach? If we can't proceed because part of the community is not organized, how do we address this? Can we send something out to the people of West Seattle? How can we track complaints without a noise officer?

Noise dealing with is inbound aircraft heading. Don't have arrivals coming from the north as much as in the spring and the winter.

Remains a preliminary consultation with the community.

Make an issue about this at the community meetings in West Seattle and Magnolia. Main concern is lack of data. Do we have a decent comparison without data from Hamilton View point?

Need the data to see if it is a problem with West Seattle.

Is there existing data that we can use from Sea-Tac?

Implement building design standards

building code that airport is here and require noise attenuation. Suggest recommendations on that governments update their building and land use codes to reflect airport presence.

Additional Issues/Other Comments

- Are we missing anything?
- Point out difficulties with the figures for public facilities shown in map. There are at least 6 churches in Georgetown. Catholic Church, Korean church, etc.
Intent was not to show every church.
- Mostly what we talked about was schools, community centers, etc. not churches. Consultant needs to update chart.
- Important to show accuracy.

**Part 150 Study Advisory Committee
May 14, 2001
Meeting Summary**

The fifteenth meeting of the King County International Airport (KCIA) Part 150 Study Advisory Committee was held on May 14, 2001.

Members Present (✓):

- | | |
|---|---|
| ✓ Duane Anderson, <i>At-Large Community</i> | Cayla Morgan, <i>FAA Ex-Officio Member</i> |
| Peter Anderson, <i>Corporate Tenant</i> | Rocky Piro, <i>PSRC</i> |
| Doug Baker, <i>Cargo Tenant</i> | Theresa Smith, <i>WashDOT</i> |
| Ron Beckerdite, <i>FAA</i> | ✓ Lynn Tucker, <i>Beacon Hill Community</i> |
| Larry Brown, <i>Labor</i> | ✓ Eric Tweit, <i>City of Seattle</i> |
| ✓ Jim Combs, <i>Pilots Association</i> | Karen Walling, <i>Small GA Tenant</i> |
| ✓ Larry Crim, <i>Renton/Kent</i> | ✓ Liz Warman, <i>Boeing</i> |
| Oliver Dallas, <i>FAA</i> | ✓ Ed Wojeck, <i>Magnolia/North Seattle</i> |
| Randy Eatherton, <i>Georgetown Community</i> | |
| Ron Fincher, <i>Sea-Tac Airport</i> | |
| ✓ Edwin Hanson, <i>West Seattle Community</i> | ✓ Ryk Dunkelberg, <i>Barnard Dunkelberg</i> |
| ✓ Dan Hartley, <i>Labor</i> | ✓ Jennifer Howell, <i>Triangle Associates</i> |
| ✓ Lynae Jacobson, <i>Port of Seattle</i> | |
| ✓ Pam Linder, <i>City of Tukwila</i> | |

Others Present:

Scott Boone, *Georgetown resident*
Lily Leach, *Georgetown resident*

Purpose of meeting:

- Report on Community Meetings
- Further discussion on alternatives to identify preliminary recommendations

Chairperson Jim Combs opened the meeting at 4:15 p.m. He noted that Rosemary Unterseher, Tukwila community representative, and Randy Bannecker, indirect business leader, have resigned from the committee. He also noted that the April meeting summary indicated that Ron Seymour from the Port of Seattle was present instead of his replacement, Lynae Jacobson, who was in attendance.

John Current, Project Manager, gave a report on the community meetings held in Beacon Hill, Georgetown, and West Seattle. Several SAC members attended the meetings and they as well as Ryk Dunkelberg, Barnard Dunkelberg & Company who attended the

Georgetown and Beacon Hill meetings as well. In general, communities further out. West Seattle was concerned with sound attenuation, Georgetown about home

Georgetown had operational and land use concerns towards home purchase. Most preferences expressed that the airport had a hidden agenda. Questions were asked and answered regarding how to sound attenuate homes. An attenuation contractor at the meeting. Some discussion revolved around whether if homes sound attenuated under this purchase homes in the future? Generally sound attenuated.

The focus at the Beacon Hill meeting was on sound attenuation and who would be eligible. Concern was expressed that some of the noise is from Sea-Tac Airport and that this would not be addressed through a program except through the combined contour. At the North Beacon Hill and Holly Park meetings, a low level frustration was expressed due to the concern that things will take so long and may not be the desired results. Some were interested in seeing airport closure. Some were interested in seeing airport closure shifted from KCIA to Sea-Tac Airport. At the Holly Park meeting, about a third of the group was due to concern that participation was pointless because of both the lengthy process and that the FAA will be the decision makers. Concern existed that King County and the FAA are pointing fingers at each other and nothing is getting done. People don't like sound attenuation because they want to be able to enjoy outside, not get packaged in a box. They would prefer seeing a solution that addresses the source of the noise rather than Band-Aid. In North Beacon Hill, a small contingency wanted to see airport closed. In South Beacon Hill, people want to see changes made at the airport to minimize noise: nighttime curfew, restrictions on planes.

John Current presented the packet of information distributed at the community meetings as well as the written summaries of community meetings held so far. He drew attention to the questionnaire soliciting community feedback about alternatives under consideration, and added that staff will tabulate the results of this questionnaire after the remaining community meetings and Open House.

Through the discussion of the outcomes of the community meetings came the suggestion that a task force or committee be formed to deal with noise and other issues related to all King County airports: KCIA/Boeing Field, Sea-Tac, Renton, and Auburn. Also suggested was to create an office to help homeowners with suggestions on how to improve their homes if they want to do it themselves. This might include recommendations for appropriate home insulation, windows, etc.

were invited to provide their perspectives on the issues closer in were more concerned than those further out. West Seattle was concerned with overflights, Beacon Hill with Sound attenuation, Georgetown about home purchase.

se concerns. Hardly any discussion was favorable towards sound attenuation as an option. Concern was expressed that the airport had a hidden agenda to buyout Georgetown. Informative discussions about sound attenuation, sales assistance, and concern about structural structures with wood clad windows. The sound attenuation contractor at the meeting stated that these types of windows were available. Some discussion revolved around whether if homes sound attenuated under this purchase homes in the future? Generally, FAA doesn't purchase homes that are already sound attenuated.

was on sound attenuation and who would be eligible. Concern was expressed that some of the noise is from Sea-Tac Airport and that this would not be addressed through a program except through the combined contour. At the North Beacon Hill and Holly Park meetings, a low level frustration was expressed due to the concern that things will take so long and may not be the desired results. Some were interested in seeing airport closure.

Someone was concerned about air cargo being shifted from KCIA to Sea-Tac Airport and would shift noise to different area. At the Holly Park meeting, about a third of the group was due to concern that participation was pointless because of both the lengthy process and that the FAA will be the decision makers. Concern existed that King County and the FAA are pointing fingers at each other and nothing is getting done. People don't like sound attenuation because they want to be able to enjoy outside, not get packaged in a box. They would prefer seeing a solution that addresses the source of the noise rather than Band-Aid. In North Beacon Hill, a small contingency wanted to see airport closed. In South Beacon Hill, people want to see changes made at the airport to minimize noise: nighttime curfew, restrictions on planes.

formation distributed at the community meetings as well as the written summaries of community meetings held so far. He drew attention to the questionnaire soliciting community feedback about alternatives under consideration, and added that staff will tabulate the results of this questionnaire after the remaining community meetings and Open House.

of the community meetings came the suggestion that a task force or committee be formed to deal with noise and other issues related to all King County airports: KCIA/Boeing Field, Sea-Tac, Renton, and Auburn. Also suggested was to create an office to help homeowners with suggestions on how to improve their homes if they want to do it themselves. This might include recommendations for appropriate home insulation, windows, etc.

The committee then discussed the issue of nonstandard sound insulation—including homes that are in the 60 DNL or dealing with noise from loud single events. Some members expressed concern that the Port of Seattle/Sea-Tac Airport would not help fund sound attenuation for a 60 DNL (nonstandard) contour and also, that this would divert funds from the higher contours. Others expressed desire to keep this contour on the table so some action will happen. The possibility of including this as a carryover recommendation to be dealt with when the 65 DNL work was done was discussed and language for that will be presented at the next meeting. Regarding how to deal with Single Event Noise Levels (SEL), the SAC agreed to include this as part of the Fly Quiet program through monitoring and feedback.

The committee also discussed the pros and cons of mandatory and voluntary buy out of homes as well as sales assistance and how to deal with tenants. No final agreement was reached and the committee will relook at the issue at the next meeting.

The meeting was then opened for public comment and two people expressed concern and opposition to home buy out. Ryk Dunkelberg closed the meeting with a summary of issues/recommendations to address at the June 11, 2001 meeting:

- Recommendation to create a position to inform people on sound reduction construction methods throughout King County.
- Recommendation to treat renter and owner occupied structures the same regardless of the land use issues.
- Recommendation to a set of carryover recommendations to remind us that after the 65 DNL contour is addressed, move onto the 60 DNL.

Listed below are the comments and questions raised by the advisory committee members. The text may have been reworded for clarity for those not in attendance. Answers, when provided by the project team, are in *italics*.

Comments and Questions on Issues Raised at the Community Meetings

- How was it received (at the community meetings) that it would take 12-15 years for sound attenuation to happen?
Not mentioned because committee hasn't finalized recommendation on contour. They discussed the timeline for getting the Part 150 finalized
- Suggestion that the timeline should be addressed at Tukwila meeting.
- Concern that this will take a long time to get started.
Sound attenuation should start 12-18 months after the SAC finishes its work. One of the issues is finding bonded contractors capable of doing this work. Since this was done for Sea Tac, there are experienced people here who can get started.
- Need to think about whether need to go through a historic 106 process. If the house is designated as a historic property, needs to go through the 106 process.
Need to consult; if it's historic through state process, doesn't need to go through this process.

- At the Georgetown meeting, the purchase, and some of the tenant landlord wants to sell or take ad related to landlord tenant issues. *Need to prepare policy manual that may make someone move to*
- At the Georgetown meeting, Cy honest and straightforward, ever couple of people came up after t out and that mostly those oppos aviation attitude that many peop Concern that have interest in job that KCI A makes to the econo
- Attended South Beacon Hill Co any airport discussion and were Some came to subsequent meeti
- South Beacon Hill gets most of
- About 50-50. We get equal vol
- Want to reiterate the comment c concerns at the West Seattle me Vashon departure also discusse discuss overflights over West Se
- Good idea that we are talking al up to the problem as well. Glad Important to talk about combine from each airport.
- Noise complaints from West Hi aircraft is so much less than fro People not noticing because you positive not negative. Plenty of
- No meeting has been held in M stretch 8's. May have a number deal with economic reality of ai manufacturing? Concern that B hand, some of the community se the noise. Most of noise from ai
- Much of the noise is from air an

Task Force for King County Airp

- Suggestion for creation of a gro Add that as a recommendation f noise issues for Boeing Field an KCIA, Sea-Tac, Renton, and Ar
- Any way to look at Paine Field utilized?

stion came up about the different types of ad questions about what their rights are if the age of this program? Need to develop policy

ow to deal with this and also with hardship cases top.

a, John and Ryk did an excellent job and were ough I didn't agree with everything that was said. A meeting and said that they were interested in buy ere at the meeting. Concern about the anti- ave, especially with Boeing moving out of here. nd concern that people minimize the contribution f the area.

unity Council meeting where folks hadn't been in rested in getting more background information. on Thursday.

oise from Sea-Tac or KCIA?

from both, but more noise overall from Sea Tac. e openness, etc. on the part of the staff. Most of the g were about overflights from Sea Tac. The aybe need a joint Sea Tac and KCIA committee to e.

combined noise contours, and Sea-Tac should face ee people from South Park at Georgetown meeting. oise or total noise and then allocate responsibility

ve dropped substantially. Noise from the new der planes, has made an incredible difference. n't notice what's not there. Want to focus on ative comments.

lia yet. A positive is that Airborne no longer runs people who will say close the airport but doesn't t. Can we split out air cargo from air g stance is that all aviation is good. On the other ll as negative, but need to look at who is making go.

ances, which are excluded from what we are doing.

o discuss all four public airports in King County. ne 150 process to create a task force to deal with create a task group to deal with noise issues from n, all publicly owned King Co airports.

McCord Airports to look at how they can be better

King County can only deal with King County airports—no jurisdiction over airports outside the county. Would need to look at state or Puget Sound regional council to discuss more regional issues.

- These task groups would deal with noise of airports all close together.
- The Paine Field Community Council listens to citizen and business and had same discussion around noise. Has similar activities to this group.

Non-Standard Sound Attenuation

- Would like to focus on non standard (60 DNL) sound insulation and do we want to recommend it.
- One of the most comment requests is that we look at Single Event Levels (SEL) rather than just DNL. Is this feasible to look at?
Problem is that FAA does not fund SEL at all. Hard to develop standards. The sound insulation programs/contractors are focused on DNL.
- If the insulation is focused on DNL and a jet that is 115 decibels goes by, the insulation will not do anything, right?
The goal of sound insulation is to get an inside level of 45 dB. The sound insulation will reduce the inside noise levels regardless of whether it is measured by DNL or SEL.
- Comment that for Sea-Tac, they did a test based on how loud it was inside and outside (pre and posttests of noise), became confident of the success of what we were doing.
- Did you have any anecdotal evidence of what happens for a SEL event of 112 after the home has been insulated?
Usually trying to insulate to bring overall noise level down. Will be some reduction.
- What is the goal to have higher standards, change the contours?
Will be geographic. This raises a lot of issues. Each aircraft has a different SEL. Which SEL do you use? Usually use 85 dB because this level disturbs sleep. What do you do to bring down a home to 45 dB? Also, SEL follows one flight track. How do you account for changes of flight track over time? DNL averages flight tracks over time.
- It may be more reasonable to look at problem areas over time.
- Who would be in favor of a 60 DNL?
- The Port of Seattle uses 65 DNL and may not be willing to support program at 60 DNL.
- What happens when the goal of insulation is to bring down home to 45-decibel level and you have a 100 dB event? If the sound attenuation is only going to improve by 40 dB, you still have 60-dB problem.
- The SEL is an issue related to frequency --if it happens once a week, this is different than 4 times a day. How do we deal with the person who has the problem one time per night? How do we decide?
- Look at the community noise complaints: how many times a night do you get a complaint from different communities. I don't think we should bite off more than we can chew; concern that Sea Tac won't fund 60 DNL. Would like us to do 65 DNL correctly first rather than to the 60 DNL and possibly reduce the amount of work that might happen at the 65 DNL
- Concern that we don't know if we can use combined contour and that we have to wait for the FAA to approve it.

- Committee has agreed to pursue *That is why the consultant record and then can move on the combi*
- If you have a 20 dB reduction, you say that there are a lot more noise are governmental flights; for example are noisy. Government wants the 110 to 90 dB won't make much us to get something done where
- Let's delay recommendation of program underway. Do people
- Prefer to have 60 DNL. Can have approval from King County and unacceptable for residences or for Would like the 65 DNL to be pre take that long for government e is too loud. We've got to get the logical limit of how we are going other side of the street are still getting the planes quieter.
- Agree that 65 DNL should be on Council that 60 is a problem and this.
- Concern that will take 15 years go through this process twice. Council aren't going to tackle the 60 DN
- Concern about the message we problem outside of 65 DNL, will have to insulate these homes because will need to be insulated in the
- Could say new home construction
- Why can't we promise that we is on the homeowners.
- What if the SAC recommends that noncompatible?
- Concern that raise expectations combined recommendation for change for land use construction
- Generally home will have 20-dB of the contours already are at 45 from FAA. May be a problem.
- Concerned about expectations and *Two to three airports in the county these eligible because the cities residential use. This has some n Another alternative is to make a*

combined; maybe the County will fund if FAA won't. *ndation included pursuing both—start the KCIA*

Can the SEL be reduced by 29 dB? Would probably ELs from KCIA than from Sea-Tac. Many of these le, Russian airplanes are allowed to land and they to happen to be supportive. Cutting the SEL from erence and we can't do anything about this. I want e is precedence to make things happen.

60 DNL for sound insulation until we get the 65 DNL e?

Equal approach. It will take a long time to get FAA to start looking at 60 DNL noise level as King County to consider putting forth the money. ing County to consider putting forth the money. sed but also start the work on the 60 DNL. Could es to prepare for and start thinking that the 60 level ll rolling. What if we decide that Beacon Ave is the contour a neighborhood, but the people on the ng the noise? The focus should ultimately be

Priority. Also think we should send message to it we should start thinking about the dealing with

deal with just the 65 DNL and that we will need to r concern about raising expectations and that we or 10-15 years.

sending to the community. If we say there isn't a l the building going on, people will say we don't e we're in the 60 DNL. Concern that new homes re.

needs to meet stricter standards.

't have quieter aircraft in 10-15 years? The burden

Can the FAA change their standards to 60 DNL as being

the public. Can we come up with some sort of 60 DNL combined for sound insulation and then make actices?

reduction already. Some of the homes on the border inside. Homes are too quiet inside to get funding

What huge task just to deal with 65 DNL.

use the 60 DNL contour. The FAA considered designated the 60 DNL as non-compatible with fications related to property value and other issues. low up recommendation as part of the record so

that 10 years later that says after addressed the 65 DNL, need to address the 60. This doesn't become part of the recommendation.

- Recommendation to ask cities to change designation to 60 DNL.
The downside is that may impact the value of the home, similar to being in a floodplain. Drops the value of the home within that contour. That's why only 2-3 airports have done this: near LA and also Cleveland (in the past 6 mos.), and Dulles.
- What if we just ask the County to adopt this?
- Seattle is a charter City. Has equal standing with County.
- Don't understand why this reduces property values? Wouldn't it make it more attractive if quieter?
Usually it's the property owners that raise this issue.
- Not hearing widespread support for providing for the 60 DNL now but support to have 60 DNL as a carryover recommendation. Will look at wording at next meeting and make final recommendation.
- One other concern with the 60 DNL —when using the combined contour and go to the 60DNL, concern that this will be a huge area and will take a really long time to complete.
- Are we interested in an insulation program for SELs?
- Would like to see monitoring and feedback program to somehow abate the SEL problems as part of the Fly Quiet program.

Office for Home Improvements

- I'm a homeowner with a 60-65 dB noise level in older home that had single-paned windows. It is hard to get information from the airport or anyone else on what to do that will improve my home if I want to do something myself for both noise and heat. Since I added new windows, I've gone from 50 complaints a year to 2-3. Can we come up with an office that can help people with how to upgrade your home to deal with noise? The problems are generally with the older homes that need to be retrofitted.
- Is the group in favor of creating an office to advise homeowners on how to make their homes more compatible with airport noise?
- I think it's a good suggestion. I would like to see a map so people can see what contour they are in and need to know if it is a 15-year timeframe before they can get assistance. Need to know that if they want it to be quiet, they may need to do it themselves.
- My house was built in 1900. My home has no insulation in the walls—have about 5 dB of insulation. Many older homes need help.
- All agreed that an office that can advise people on how to improve homes is a good idea.

Home Buy Out and Sales Assistance

- Feedback was that most of the comments at the community meeting were opposed to home buyout but a few interested off the record. Most opposed to mandatory buy out but some interest in voluntary.
- Support was expressed for sales assistance. No mandatory or voluntary buy out but only sales assistance. Will this go on deed?

- It may not make sense to sound sensibly, ought to buy them.
- Think they should be only own live there. Use sales assistance
- In terms of our priorities, we ne out doesn't make sense if comm sales assistance and sound atten
- It doesn't make sense to insulat *Used \$180,000 as an average p*
- What did the Port of Seattle do *A few homes that were special limit to a home.*
- You do not make a judgement of home?
- Did you ever have a case where *Don't know.*
- Given the variety of prices of h Beacon Hill are worth less not of neighborhood. I don't want another area because that's a co the property, but the quality of location. *With home buyout, need to plac May be hard in this area to find*
- All you have to do is go south of community. It has cut commu Buyout program has done noth course and a prison. Would be something useful such as comm Separates the community.
- Look at Georgetown, you could is not there. Sales assistance se
- Seattle has been remiss about th and then after the 94 study and rezoned it residential, probably zoning. Need to make people w people. FAA has the funding ar reflect the values.
- I would recommend the sales a option to stay or leave. If FAA considering a sales assistance p tenable? Looking for another c *For the sales assistance progr with full knowledge of the situa*
- I can understand that it works v reduce the noise.

nuate some residences. If you can't insulate them occupied for buy out. If not rentable, no one would maybe can't rent it as a residential property any more. o defer to the communities' desires. Mandatory buy ties are not supportive. Two priorities would be on. y homes in the 70 DNL. Costs too much money: *for home in that contour.*

s—historic homes with lots of windows. Not a cost

worth of home on whether you should attenuate the a spent more than a home was worth?

s within Seattle, now learned that the homes in use of proximity to airport but because of the nature eone telling me to move into a smaller home in arable price. It's not just the value of the home on rome. Would like to see equitable home in another

omeowner is safe, sanitary and comparable housing. nothing comparable.

ea-Tac Airport to see what buy out has done to the s in half and refurbishment has been minimal. o address this area of reuse except to create a golf h better if those areas can be converted to ial rather than leaving it to sit there and look ugly.

vert to commercial but community support for that most feasible for those who want to get out.

oning of the area. Rezoned to commercial properties i rezoned it back to residential. If they had not ild be mostly commercial now. Need to look at e, but it's not a financial sacrifice on behalf of these eed to spend it every year. I think the City should

ance to help people in the 60 DNL to give them the s 60 DNL is unacceptable for home, why are we am that still puts people in areas that are not m.

he buyer is getting a below fair market value price and with an avigation easement.

sound insulation, but a piece of paper doesn't

People who buy homes with an aviation easement usually aren't bothered by the noise or prefer the lower price.

- Who pays the six percent sales tax?
Don't know. The airport may pay closing costs.
- Can people buy the house from themselves, i.e. get paid for the noise?
Airport can purchase aviation easement instead. Separate program.
- Can we take off the table mandatory buyout?
- Want to leave it on the table.
Remember recommendation must be by noise contour not by neighborhood. However, if mandatory buyout is totally disruptive to a neighborhood, you can make an exception. For example, if an entire neighborhood would be ruined if we just purchased inside the 70 contour, it is usually acceptable to go out to a physical boundary so that certain small portions of neighborhoods remain intact.
- Is there mandatory buyout for the third runway for Sea Tac?
- Believe it was mandatory.
This was a different set of circumstances.
- Do we have any agreement on owner occupied and tenant occupied?
- Don't think we can differentiate.
- If there are tenants involved, is there money to move those tenants?
Yes.
- If there are tenants in a building, can be expensive to relocate.
- Feel we can't discriminate between owner occupied and tenant occupied.
- Talked to someone that rented an apartment and with the relocation assistance was able to afford a house.
- Didn't Sea-Tac did sound attenuate homes and then purchase them?
This happened with the new third runway. Done under environmental mitigation rather than through a Part 150. Can be confusing when Part 150 and environmental mitigation program going on at same time.

Public Comment

Home Buy Out Issue

- Family has owned property in Georgetown since 1904. Do not want to be bought out. Do not force people to sell against their will. Lots of people in Georgetown who want to live out their lives in this area. Can't afford to live in area. Was assured that home buyout wasn't on the table. Now concerned.
- Never complained about noise. Need to put more of a price on a home than a house.

**Part 150 Study Advisory Committee
June 11, 2001
Meeting Summary**

The sixteenth meeting of the King County International Airport (KCIA) Part 150 Study Advisory Committee was held on June 11, 2001.

Members Present (√):

- | | |
|--|--|
| √ Duane Anderson, <i>At-Large Community</i> | √ Pam Linder, <i>City of Tukwila</i> |
| √ Peter Anderson, <i>Corporate Tenant</i> | √ Cayla Morgan, <i>FAA Ex-Officio Member</i> |
| Doug Baker, <i>Cargo Tenant</i> | Rocky Piro, <i>PSRC</i> |
| Ron Beckerdite, <i>FAA</i> | √ Georgianne Ray, <i>Unincorporated King Co.</i> |
| Larry Brown, <i>Labor</i> | √ Theresa Smith, <i>WashDOT</i> |
| √ Jim Combs, <i>Pilots Association</i> | √ Lynn Tucker, <i>Beacon Hill Community</i> |
| √ Larry Crim, <i>Renton/Kent</i> | √ Eric Tweit, <i>City of Seattle</i> |
| Oliver Dallas, <i>FAA</i> | √ Karen Walling, <i>Small GA Tenant</i> |
| √ Randy Eatherton, <i>Georgetown Community</i> | √ Liz Warman, <i>Boeing</i> |
| Ron Fincher, <i>Sea-Tac Airport</i> | Ed Wojeck, <i>Magnolia/North Seattle</i> |
| Edwin Hanson, <i>West Seattle Community</i> | Vacant, <i>Indirect Business Leader</i> |
| √ Dan Hartley, <i>Labor</i> | Vacant, <i>Tukwila Community</i> |
| √ Lynae Jacobson, <i>Port of Seattle</i> | |

Others Present

Ryk Dunkelberg, *Barnard Dunkelberg*
Jennifer Howell, *Triangle Associates*
Claire Barrett, *Claire Barrett & Associates*
Cynthia Stewart, *Airport Manager*
John Current, *Airport Staff*
Sharyn Parker, *Airport Staff*
Bill Keithan
Cheryl Bidwell
Stephen Kiehl
Scott Boone, *Georgetown resident*
Lily Leach, *Georgetown resident*

Purpose of meeting:

- Report on Community Meetings
- Further discussion on alternatives to identify preliminary recommendations

Chairperson Jim Combs opened the meeting and first brought up the schedule and asked the committee to consider how they want to proceed if the SAC doesn't come to consensus on some points. He asked the committee to consider whether members need

additional information to help make a decision or if they just are unable to reach an agreement. He also proposed that the next meeting be rescheduled from July 9 to July 16 because of the proximity to the 4th July holiday and the All Star game. He suggested that the committee meet July 16, skip August and reconvene in September. Cynthia Stewart requested that the SAC consider the meeting in August if they needed additional time to make recommendations so the process would not be held up too long.

John Current then reported on the additional community meetings that the airport staff sponsored in Magnolia, Skyway, and Allentown. In Magnolia, 18 people attended. The focus of the discussion was on airport restrictions, increased use of the Charted Visual, and options for different approaches to departures.

Six people attended the Skyway meeting. Their concerns were consistent with previous meetings: that flights in the night and also that flight patterns have changed in the past 2-3 years. Cynthia Stewart, airport manager, requested the airport staff research flight path patterns to see the basis for this concern. Flight tracks don't show any major change at this point. Noise may result from turboprop traffic avoiding Sea-Tac Airport departures because there is lots of variation where they land but this is not a recent change.

Allentown had a full house with 51 persons in attendance. A major concern for this community is that it is right under the approach at the south end of the airport and the 65 DNL contour goes right through the community—some alternatives would benefit some of these homes, others not at all. Pinder, SAC member at the meeting, added that it was a good meeting and that she heard several people saying they want to keep the neighborhood intact. She raised the issue that it was not clear whether aviation rights were sold separately without sound continuation and that some confusion existed about what required aviation rights and that it would be covered. She noted that clarification on this alternative would be helpful to citizens and SAC members.

John pointed out the tabulation of the questionnaire handed out at the meetings. The tabulation was not meant to be conclusive, but rather to give the flavor of the response at the meetings. He noted that people were asked why would we say no to any of these. The point was raised whether people really understood the ramifications of all the alternatives.

Ryk Dunkelberg, Barnard Dunkelberg & Company summarized the comments from the open house on June 6. He observed that people were generally in favor of the alternatives, except for the home purchase program. People would like the noise to go away; want to use outside as well as inside.

Jim Combs then opened the meeting to public comment so that those in attendance could give their feedback prior to the committee formulating its recommendations. The public voiced opposition to mandatory home purchase due to the historic attachment to the area as well as the difficulty of finding equivalent housing elsewhere in Seattle.

The committee proceeded to review the alternatives to determine which they could reach consensus on, which needed more information and which would require a majority and a minority report. The committee agreed on the overall concept of the following recommendations realizing that specific details still need to be worked out.

- Feasibility and Site Study for a Noise Containment Facility (Ground Run Up Enclosure)
- Development of a FAA Approved Home Insulation Program
- Altering the Angle of Climb and Descent via Close-In Departure
- Continue to identify ways to minimize flights over populated areas using technology (GPS, FMS); Use of GPS or similar for Elliott Bay approach
- Increase Use of Charted Visual Approach
- Use Combined KCIA/Sea-Tac Noise Contours
- Promote Fly Quiet over residential areas
- Monitor compliance with program
- Offer incentives to pilots who fly quietly; promote Bay Visual to pilots

All agreed to drop the following:

- Include vibration monitoring in monitoring program.

The remaining alternatives generated discussion and requests for more information or an agreement that the committee would prepare a majority and a minority recommendation. For those alternatives requiring a Part 161 Study, members agreed to look at them again at the following meeting.

- Restriction on aircraft including restriction of Stage 2 Aircraft under 75,000 Pounds at Night, 24-hour Ban on Stage 2 Aircraft, nighttime curfews, or restrictions on flights before or after certain times.
SAC members could not agree on implementing restrictions on aircraft. However, the airport operators have been discussing voluntary options for nighttime use. More information about this will be provided at the next meeting. These would require a Part 161 and will be reviewed again at the next meeting.
- Build a Noise Wall on North End and Others as Appropriate.
More information on this alternative was requested.
- Maintain Nighttime Engine Run-up Curfew.
More information on what this is and the definition of run up will be presented at the next meeting. The issue raised was whether this should be based on the noise level or the operation.
- Integrate Flight Paths with Sea-Tac.
It was suggested to invite FAA air traffic staff to discuss this at the next SAC meeting.
- Increase the Minimum Altitude Over West Seattle.
More information on specific altitude requirements will be presented at the next meeting.
- Look At Home Buyout Program that's Sufficiently Funded & Keeps People Whole.

Generally, committee members were interested in the sales assistance program. A majority and minority recommendation on this option is most likely.

The SAC requested more information on what integration of flight paths with Sea-Tac would mean. For the purpose of the requirements are now and whether this is feasible was requested. Does FAA enforce the current requirements now? Some confusion resulted from the fact that the list of alternatives summarized on the questionnaire was based on suggestions from the community and was not the list of alternatives that the SAC had already discussed and changed.

Committee members and airport staff discussed the proposal under consideration by FAA regarding moving the Vashon departure 10 miles north. Apparently, FAA itself is not in agreement over whether to do this. The committee is looking at this only because it is a noise issue and the committee should consider it. Committee members all agreed that this noise impact it would have on other communities.

Regarding a Non-Standard Home Isolation Program (60 DNL Contour), the general consensus on this alternative was that this is favorable option but an unrealistic idea for funding, but it should be considered for the future.

Listed below are the comments and questions raised by the advisory committee members. Items have been organized by topic and may have been reworded for clarity for those not in attendance. Answers, when provided by the project team, are in *italics*.

Sound Attenuation

- When you get sound attenuation improvements outside the home, can you also get funds to do some improvements outside the home? *When you get funds for sound attenuation, you must give an aviation easement in return.*
- Comment that this is not clear; at the packet, not clear what this is for.
- Regarding the use of the combined contour for sound insulation, the Port of Seattle's participation in this would depend on what contour was used. Concern that people who would have higher priority sound insulation from Sea-Tac Airport might not get funded while someone in the combined would. Concern related to funding not combined would.
- How much time would it take to sound insulate the 65 noise contour=15 years? *Would depend on funding. May be time or less time if county would also fund. We have 5 million a year from FAA*

Stage 2 restriction

- Noted that one noisy aircraft has been sold. Support for voluntary restriction at night is gaining support in light of the fact that mandatory is being considered.

- Concern about voluntary is that the situation could change in the future.
- Against mandatory but ok with voluntary. Feel that it's an issue that will be taken care of by attrition. Also, don't know what kind of emergency that might force someone to come in at night.
- What would the operators do if there were mandatory restriction?
- Would relocate departure to another airport. Only 1-2 a night, but still disruptive.
- Wouldn't a mandatory restriction of this require a Part 161?
Yes.
- How many flights a week fall under this category.
An average about 2/night. Some nights there could be 10 and then nothing for a week.

Feasibility study for noise containment facility

All agreed.

Noise Wall

- Do not agree with this alternative.

Integrate flight paths with Sea-Tac

- This means just continue with what they are doing now?
- Does this mean that KCIA can fly at different levels than the separation now required?
- Constraint you are talking about is vertical not horizontal.
- Would like to know more about what integration means. Concern that Sea-Tac may try and force their way over KCIA. Need more info on this alternative.
- Because so much of the noise that is generated is dependent on planes staying below Sea-Tac flight paths, a lot of noise could be lessened if the planes were allowed higher flight paths. Given the FAA position on the movement of planes up for Sea-Tac, can we make a recommendation to Sea-Tac towards looking at what they can do? Look at what's going on comparing leaving Denver vs. Sea-Tac.
This relates to distant versus close in departure. In Denver, you don't have any houses within the 60 DN. The houses are far away. They try to reduce noise far away by getting up higher. What you are asking for may increase noise levels in Georgetown and Beacon Hill.
- Get air traffic folks to talk about that at next meeting.

Increase Altitude over West Seattle

- Isn't the altitude determined now by Sea Tac? Would like to think about it more.
- Need to know the specifics about altitude to make a decision.
- Get better FAA enforcement of minimum altitude.

Move Vashon departure 10 blocks north.

- Need more info: the issue relates to safety.
- If we're moving it related to flight safety, will have impact on noise. FAA is proposing this; we are making a recommendation.
- One part of FAA is proposing it; another part is against it. Not resolved yet.

- It surprises me that Georgetown is noisier in Georgetown. Concerned
- Comment that this isn't representative but more an indication of what the people who showed up voted for.
- Sound like great ideas; people respond
- How can we have an opinion if we don't know what the alternative is?
- Not sure it would help anyone. A test done by FAA was not feasible b/c landmark was not right. Airport staff would not recommend this.
- Should we delete this as a recommendation? It may not get approved by the FAA; it doesn't offer a solution to the noise problem.
- Don't want to move it because of community noise reasons: everyone agreed with this point.

Pursue different flight paths in and out of KCIA.

- What does this mean?
This was one of the original ideas in the County workplan. We looked at it early on, but it is already tied with Sea-Tac and already optimizing the flight tracks. Best we can do is encourage greater use of new technology. The list we are looking at is different than what we looked at last month, which was the consultant's recommendation where some of these options were consolidated. This is the cause of some of the confusion.

Pursue additional restrictions on flights before or after certain times

- Is this more restrictive than what we have now?
- Would require a 161.
- Problem that it is too general a requirement.

Pursue Nighttime curfews: total closure of airport at night:

- Majority opposed; minority in favor.
- Would like to support it, but don't think FAA would allow us to do it.
- More info –would like to see a 161 on this and try. Then may change mind.
- Haven't done real economic analysis is to make decision. Doesn't seem possible. We haven't discussed what the real impacts would be. Where would the air cargo go? What are the impacts?
- When is night?
Defined as 10 pm to 7 a.m.
- Could we come up with a compromise, maybe midnight to 5 a.m.?
Look at a variety of alternatives. Can consider different curfews, etc. Look at a variety of options. Only thing I can guarantee you is that if we do put a restriction on Stage 3 aircraft, would not be approved by FAA.
- Could the users of the airport voluntarily do that—put restrictions on their use?
- Yes, if you can get them to agree.
- Do all of them come all through the night or at certain times?
- Concern about anti-aviation sentiment in area. People are scared about losing jobs.

ted in favor of this, because it would make it at all the comments are skewed.
ive but more an indication of what the people who
not understand what the alternative is.
a safety issue?
o, test done by FAA was not feasible b/c landmark
not recommend this.
ndation? It may not get approved by the FAA; it
problem.
ommunity noise reasons: everyone agreed with

out of KCIA.

in the County workplan. We looked at it early on, and already optimizing the flight tracks. Best we can do is encourage greater use of new technology. The list we are looking at is different than what we looked at last month, which was the consultant's recommendation where some of these options were consolidated. This is the cause of some of the confusion.

hts before or after certain times

e have now?
ement.

ew of airport at night:

r.
think FAA would allow us to do it.
161 on this and try. Then may change mind.
is to make decision. Doesn't seem possible. We
acts would be. Where would the air cargo go?
ise, maybe midnight to 5 a.m.?
a variety of alternatives. Can consider different
uls, etc. Look at a variety of options. Only thing I
o put a restriction on Stage 3 aircraft, would not
tarily do that—put restrictions on their use?
night or at certain times?
ent in area. People are scared about losing jobs.

- Is there a 3 or 4 hour period where someone doesn't need to land or depart voluntarily?
- We didn't agree on the stage 2 restriction at night, but operators are discussing voluntary option. More info at next meeting.

Examine a nonstandard home insulation program.

- It might be wonderful but it could be setting expectations at a level that is unrealistic.
- Weren't we going to look at exact language of our recommendation? (Yes)
- There won't be money for this.
- Want it off the list as unrealistic.
- Would like to see it still as a future option to be considered. Are there other funding sources that could be considered?
- Didn't the 60 DNL come out of the County Council workplan?
Yes. But looking for study and recommendations from SAC.
- Would people be in favor of a statement in the report that this is favorable option but an unrealistic idea for funding, but it should be considered in the future? Everyone agreed this was a good idea.

Maintain Existing Nighttime Engine Run Up Curfew

- Would prefer that it be focused on noise, not whether it's run up.
Run up is a procedure.
 - Work on different levels of noise, run up so people have information to make decision. People think that run up means full throttle and lots of noise.
 - Give people a proper definition to make decision.
- (Liz and John Current will get more info).

Look at home buyout program that's sufficiently funded and keeps people whole.

- What does this mean?
- Put people in equivalent/comparable homes.
- Do we want to support a home buyout program at all?
- The disagreement (at the open house) was around mandatory not voluntary?
Discussion concerning both and the effect that a voluntary program would have on a community.
- Would like to see sales assistance program. Strongly in favor of this only. That keeps people whole.
- Don't have agreement to do buyout program. Do you want to add a sales assistance program on the end of the list?
- Can we just change this to voluntary sales assistance?
- Opposition to mandatory buyout.
- Opposition to voluntary buyout.
- Voluntary sales assistance program: we have opposition to this.
- How much support do we have for a mandatory program depending on the dB level?
- (Only 2 persons in favor.)
- Is there anything that will get anyone to change his or her mind on that?

- I could change my mind on it if of it. But if anyone has any doubt without the people affected.
- Let's agree that we will have a Buyout would be for 65/70 DNL
- How many homes in 70 DNL
- 158 homes.
- Is there something that you can do we can do something that doesn't *Never seen it.*

Agreed: have majority and minority

Offer incentives to pilots who fly

- What kind of incentives?
Part of the overall Fly Quiet program; incentive could be pat on the back, names published, some report, free hat annual award event? Not a monetary award.
- All in agreement to this.

Vibration Monitoring

- Don't understand what this is.
Some people are concerned about vibration as well as noise. Would like to see a C-weighted scale, different type of noise measurement.
- Concern that not standard monitoring, and may be expensive.
- Other concern is that may not have remedy for this type of problem.

Additional Alternatives

- Would like to see 24-hour Stage restriction also considered. (Opposition)
- What about offering financial assistance to those who have noisy planes to buy quieter planes. Wouldn't it be cheaper to buy the planes than homes? If we can't make it quiet for kids into the next century, do we not do anything?

Avigation Easements

- Intrigued by the possibility of buying out airspace instead of homes. Buying rights to their airspace not the houses.
- Avigation easements; usually pay for insulation or sales assistance program.
- Decided it wasn't a respectable one time payment. Doesn't seem respectful of people who put up with noise. Concern that you would have sold off your rights and airport may not be considerate of people in the future.
- Considered a pay off, not a solution, especially to people who have seen noise increase dramatically over past 10 years.
- As an owner or landlord, I could take the money from avigation and not put it in their house.
- The solution is in getting the flight paths higher, reducing the source of noise, not a Band-Aid. The problem is that we don't address the noise at the source.

everyone in a neighborhood was completely in favor do not want to force anyone. Cannot get there

majority and minority position on mandatory buyout.

that allows people to stay and as there is attrition, destroy the neighborhood.

port.

et and promote bay visual

um; incentive could be pat on the back, names annual award event? Not a monetary award.

vibration as well as noise. Would like to see a C-weighted scale, different type of noise measurement.

ing, and may be expensive.

remedy for this type of problem.

restriction also considered. (Opposition) assistance to those who have noisy planes to buy cheaper to buy the planes than homes? If we can't make it quiet for kids into the next century, do we not do anything?

ing out airspace instead of homes. Buying rights to

of insulation or sales assistance program.

for people b/c would be a 3000 or 4000 dollar respectful of people who put up with noise. Concern that rights and airport may not be considerate of people

, especially to people who have seen noise 10 years.

take the money from avigation and not put it in their

paths higher, reducing the source of noise, not a Band-Aid. The problem is that we don't address the noise at the source.

- Possibly create a right of way of airspace with easements. What about those people in the corridor who haven't sold. They would be left—sold out by their neighbors and yet impacted.
- For the most part aviation easements are part of a sound insulation package.
- Someone commented that if Georgetown was zoned commercial, wouldn't have this problem at all.
- 100 years ago they bought the mineral rights to my home and when I bought this house, I knew that. That's the same situation we are in here with air rights. The person can take the money paid for those rights and buy something. When you buy a home in Georgetown, you will know that aircraft are flying above. We aren't worried about the guy who comes in the future; he will know what he's buying. We're trying to help the current residents.
- What happens if they buy the house, they know what they are buying, and then the noise changes in 10 years, they can't do anything about it.
- Aviation easement is based on noise level agreed upon. If significant change, aviation easement would not be valid.
- We had people who bought homes who didn't realize the noise from the airport. They don't do the research. Would be a "buyer beware" situation. People would know.
- Is there a threshold where the easement is no longer valid?
WA State legislature changed the law so that easements have a limited value. Can't tie people into an easement forever. Not valid. Only valid as long as there is not a significant change in noise.
- May be tied to a DNL level.
- Aviation easement is shown as separate option from noise insulation.
- No consensus: If noise is a problem, we shouldn't subject others to it for money.

Voluntary sales assistance

- Does this imply an aviation easement back to the airport?
Sound insulation would, but sales assistance not necessarily.
- Does this mean the noise can be unlimited?
Only thing we can ask for is a limited aviation easement. If there is a significant increase in noise, then the easement would no longer be applicable.
- Do not see aviation easement as required with sales assistance?
Structure still there, new person will have to agree to aviation easement.
- Are we conning or blackmailing people into giving up their rights for some money?
There are some people living in the contour who are not bothered by the noise. Some people like to get the money, b/c not bothered by noise.
- Is it possible to use this as an option in a given contour?
- There are people who are in the contour and are bothered b/c it has changed dramatically, but stay b/c of historic attachment to home.
- They may not want to move and may not want insulation b/c of health reasons.
- Would like to see the amount of funds available for aviation to be adequate to compensate. Something with teeth.
- We are talking about noise. We're trying to solve the problem, need to deal with the future as well? It may not be a problem for some now, but what about the next person in the house?

- Still don't see the logic of saying your home, and then let someone else buy the home.
- If residence works for them at a certain age, but no longer works for them, you've given people a choice.
- Logic of situation. What happens if you live in a flood plain? If it's a detriment you don't want to subject them to a situation that isn't healthy.
- Process is about providing options. We can tell people what to do but give them options as to what they want to do.
- Concern that I don't see this program ever quitting. People will sell houses to each other and keep on going.
- Appears to me there are people who would prefer to see all the homes bought out rather than solve problems. What are the solutions and options here?
- Can't we give some on one side and some on the other? What is the point of this exercise if we can't make any recommendations?
- What I hear is the desire to separate people from aircraft and still maintain the rights of people who want to fly and those who want to live where they want to live. Need to keep working on it and won't separate people and aircraft entirely apart.
- The real solution starts with the source of the noise, not just fixing homes. Would get more unified and have more support if can focus on that rather than talk about buy out or buy off.

Regardless of what we do, there will always be aircraft noise and always be people living in the 65 or greater contours. If we can agree on this assumption, we need to look at options and opportunities to reduce noise at people's homes. We have to assume that people will be living in the contours. We have to address noise levels that we need to address.

- If you sell your home with salesperson, does it only work once for the original sale?

Yes. You can only do it once.

- I would like more info -to see a better map with contours.
 - Needs to be at 65 or greater DNL
 - What percentage of the homeowners take advantage of this type of program?
- Usually 2-10 percent.*
- 1300 homes in the 65 or greater contours. Typical amount might be 130 homes.
 - Concern that it isn't effective.

Airport never buys the house. It allows people who want to move to move out. Will bring to next meeting and see if can get more agreement.

- Can we put on the table for discussion when the home changes hands? How do we work on comprehensive plans for neighborhoods; what about attrition rate and what time?
- Concern about what this does to communities that are affected by noise if all the voluntary options are exhausted. If we are not going to mandate the acquisition of homes, it seems that we are obligated to offer voluntary options. Can't say you're off the table, voluntary needs to be on the table.
- What do we do about the communities with noise if all the voluntary options are exhausted? If we are not going to mandate the acquisition of homes, it seems that we are obligated to offer voluntary options. Can't say you're off the table, voluntary needs to be on the table.

we have a noise problem, but we'll cut the price of the house so that someone else can buy the home.

you live in a flood plain? If it's a detriment you don't want to subject them to a situation that isn't healthy.

to the people who live there now. I don't think we can tell people what to do but give them options as to what they want to do.

Program ever quitting. People will sell houses to each other and keep on going.

Appears to me there are people who would prefer to see all the homes bought out rather than solve problems. What are the solutions and options here?

Can't we give some on one side and some on the other? What is the point of this exercise if we can't make any recommendations?

What I hear is the desire to separate people from aircraft and still maintain the rights of people who want to fly and those who want to live where they want to live. Need to keep working on it and won't separate people and aircraft entirely apart.

The real solution starts with the source of the noise, not just fixing homes. Would get more unified and have more support if can focus on that rather than talk about buy out or buy off.

Regardless of what we do, there will always be aircraft noise and always be people living in the 65 or greater contours. If we can agree on this assumption, we need to look at options and opportunities to reduce noise at people's homes. We have to assume that people will be living in the contours. We have to address noise levels that we need to address.

If you sell your home with salesperson, does it only work once for the original sale?

Yes. You can only do it once.

I would like more info -to see a better map with contours.

Needs to be at 65 or greater DNL

What percentage of the homeowners take advantage of this type of program?

Usually 2-10 percent.

1300 homes in the 65 or greater contours. Typical amount might be 130 homes.

Concern that it isn't effective.

Airport never buys the house. It allows people who want to move to move out. Will bring to next meeting and see if can get more agreement.

Can we put on the table for discussion when the home changes hands? How do we work on comprehensive plans for neighborhoods; what about attrition rate and what time?

Concern about what this does to communities that are affected by noise if all the voluntary options are exhausted. If we are not going to mandate the acquisition of homes, it seems that we are obligated to offer voluntary options. Can't say you're off the table, voluntary needs to be on the table.

What do we do about the communities with noise if all the voluntary options are exhausted? If we are not going to mandate the acquisition of homes, it seems that we are obligated to offer voluntary options. Can't say you're off the table, voluntary needs to be on the table.

- In order to keep neighborhoods intact, can't have voluntary buy out. Just sales assistance, insulation.
- Concern is related to real high noise levels, not 60 DNL, because we agreed we'd address these areas (high noise) first. Looking at anything above 65 DNL as something that can bother people.
- I want to help people and address the noise.

Voluntary Buy Out.

- Anyone in favor of voluntary buyout?
- Would be in favor of it depending on the dB level.
- Do you still have the situation where the neighborhood would deteriorate?
Yes.
- Three in favor of voluntary buyout. Will have majority and minority report.

Air Quality Monitoring

- Anything to do with air quality monitoring?
- Not part of Part 150 study, will be addressed in Roundtable meeting.

Additional Information

- Would like to see a map big enough to see where the streets are with some kind of a dB level on it.

Public Comment

- Request from long-term resident of Georgetown that the SAC not recommend mandatory home buyout. Retired, living in home that was owned by generations of family, home built in 1904 and have lived in the home for 97 years, and do not want to be forced to leave. Also looked at housing market and believe would be lucky to get a house half the size for twice as much elsewhere in Seattle. Normal attrition will take care of Georgetown.

**King County International Airport/Boeing Field
Part 150 Study Advisory Committee
July 16, 2001
Meeting Summary**

The seventeenth meeting of the King County International Airport (KCIA) Part 150 Study Advisory Committee was held on July 16, 2001.

Members Present (√):

- | | |
|--|--|
| √ Duane Anderson, <i>At-Large Community</i> | √ Pam Linder, <i>City of Tukwila</i> |
| Peter Anderson, <i>Corporate Tenant</i> | √ Cayla Morgan, <i>FAA Ex-Officio Member</i> |
| Doug Baker, <i>Cargo Tenant</i> | Rocky Piro, <i>PSRC</i> |
| √ Ron Beckerdite, <i>FAA</i> | Georgianne Ray, <i>Unincorporated King Co.</i> |
| √ Larry Brown, <i>Labor</i> | Theresa Smith, <i>WashDOT</i> |
| √ Jim Combs, <i>Pilots Association</i> | √ Lynn Tucker, <i>Beacon Hill Community</i> |
| √ Larry Crim, <i>Renton/Kent</i> | √ Eric Tweit, <i>City of Seattle</i> |
| √ Oliver Dallas, <i>FAA</i> | √ Karen Walling, <i>Small GA Tenant</i> |
| √ Randy Eatherton, <i>Georgetown Community</i> | √ Liz Warman, <i>Boeing</i> |
| Ron Fincher, <i>Sea-Tac Airport</i> | √ Ed Wojeck, <i>Magnolia/North Seattle</i> |
| √ Edwin Hanson, <i>West Seattle Community</i> | Vacant, <i>Indirect Business Leader</i> |
| √ Dan Hartley, <i>Labor</i> | Vacant, <i>Tukwila Community</i> |
| √ Lynae Jacobson, <i>Port of Seattle</i> | |

Others Present

Ryk Dunkelberg, *Barnard Dunkelberg*
Jennifer Howell, *Triangle Associates*
Cynthia Stewart, *Airport Manager*
John Current, *Airport Staff*
Sharyn Parker, *Airport Staff*
Marnie McGrath, *Airport Staff*
Scott Boone, *Georgetown resident*

Purpose of meeting:

- Further discussion of alternatives to identify preliminary recommendations

Jim Combs called the meeting to order at 4:20 PM and opened the meeting to public comment. One citizen reiterated his remarks from the June meeting that he was opposed to nonvoluntary buyout of homes. The meeting then turned to discussion of the Preliminary Consultant's Recommendations, other recommendations not included in those, and finally, the list created through community meetings. The focus was on alternatives where no consensus or decision had yet been reached. Jim proposed that the

group check for consensus on the o reached, that a minority report be d

Consultant's Recommendations

First using the chart of SAC alterna reviewed each of the alternatives th was Alternative A2, implementing report in favor and a minority report. The SAC then unanimously agreed schools within the 65 or greater DN Sales Transaction assistance. Those impacts of such assistance, they mi similar for purchase of avigation ea

SAC members discussed the conce possible location. After some unce beneficial, the SAC members unan feasibility study be conducted. SA forward on building standards to re unanimously supported at the last n

Alternative A3 on maintaining exis on whether this should be a comple standard based on noise since not a difficulty of enforcing or monitorin to this alternative.

Recommendations Not Included

SAC members then discussed the a recommendations – increasing the additional restrictions on flights be ban on Stage 2 aircraft. After much representative, the SAC determined noise issue as a safety and visual is appropriately dealt with by Roundt to the FAA requesting that the exis Regarding the additional restriction this was covered by Alternative A2 opposed a 24-hour restriction on St getting approval for such a restricti feasible. One suggestion was to wo pursue the nighttime restriction. Be members would like both alternativ opposing and a minority report in f

anding issues, and where no agreement could be oped.

s recommended by the Consultant, SAC members were still outstanding. The first issue addressed striction on Stage 2 jets at night. Both a majority posed will be prepared on this recommendation. ecommend the sound attenuation of the four Most SAC members were also in favor of offering posed said that if they had more information on the reconsider their opposition. The voting was ents with the majority approving this.

f a noise wall and were provided with a map of its nty about whether a noise wall would be usly agreed to recommend that a site selection embers also discussed the importance of moving e and contain noise—Alternative A10—which was ing.

run-up restrictions generated lengthy discussion an at night or changed to reflect a performance n-ups may generate noise. Recognizing the performance standard, all but one member agreed

the Consultant's List

atives not included in the consultant's minimum altitude over West Seattle, pursuing or after certain times, and imposing a complete cussion among members and the FAA t the situation in West Seattle was not so much a The group decided that this issue was more , and recommended that Roundtable draft a letter minimum altitude be enforced more strongly. i flights at certain times, the committee agreed that d agreed to dismiss this. Last, the majority 2 aircraft. Concerns included the difficulty of nd a belief that a nighttime restriction was more he alternative that if this was not approved, then to alternatives will require a Part 161 study and some o be included in the study. A majority report of this alternative will be prepared.

List of Alternatives Generated at Community Meetings

The committee then went over the list of alternatives that had been generated at community meetings and subsequently used to guide discussion during the June meeting. This list had generated confusion because the wording was less specific than the consultant's recommendations and alternatives that the committee had discussed over the past six months. SAC members discussed several of these including integrating flights with Sea-Tac airport, and realized that these were covered by alternatives already discussed. However, the discussion on flight paths and technology led to the modification of Alternative A8-9 on implementing new technology to specifically discuss "over the water." The committee also discussed the issue of home buyout and sales transaction assistance and how to "keep people whole." More information on how fair market value is determined and how this process works was requested.

Next Steps

Committee members were instructed to provide information on their position, especially for minority reports, to airport staff by mid-July. A draft report will be distributed by September 1 for discussion at the September 10 meeting. Ryk Dunkelberg, the consultant, reiterated that he would change the wording for Alternative A3 to be "conduct a site feasibility study for a noise barrier on the north end of the airport" and to include the words "over the water" to Alternative A8 and A9: Implement technology that allows for more precise approach ground tracks *over the water* as it becomes available.

The meeting then adjourned.

Listed below are the comments and questions raised by the advisory committee members. The text may have been reworded for clarity for those not in attendance. Answers, when provided by the project team or FAA, are in *italics*.

Comments/Questions on Process

- Would there be a distinction on the level of minority report—if one or more identified?
- What difference does it make?
- Shows difference in level of support.

Alternative A2: Implement a Stage 2 jet restriction at night

In favor 6, opposed 4.

- Those opposed were asked to send their rationale to Cynthia for inclusion in a draft minority report.
- Was the problem with the times?
FAA defined night as 10 PM to 7 AM
- How many flights is this?
2-3 per night on average, includes corporate jets under 75,000 lbs. Jets bigger than this are already banned by new regulations.
- Does this exclude military and emergency flights?
Yes.

- Process question: can the consultant pull together the majority report and explain why it's a good idea?
This is already written up in the Consultant's Recommendations as well as the Working Paper on Noise Alternatives Evaluation.
- Not sure that it affects Boeing operations, but we need to check. If it's a problem, we'll find out and inform Cynthia what the issue is.

Sound attenuate schools

- How many schools are there?
Four.

In favor: all agreed.

Establish a Sales Assistance Program

In favor: 9-10, opposed: 2.

- My mind could change if I could see a compelling case. Would like to see a report on the impact on this, but haven't had it yet.

Purchase aviation easement

In favor 7, opposed: 2

Noise Barrier:

- What does north end mean? *What is the current concept? North end of the Boeing flightline.*
- Who chose this spot as effective? *Wall that would do any good, because of existing buildings and runway use.*
- This doesn't affect ILS? *Will need to look at airspace and FAA will have to look at the proposal.*
- Will the wall be 30 feet above the ground? *concrete? Yes. The exact height and location will need to be finalized in the design process.*
- Is this where Boeing does most of its run-ups? *Is run-ups?*
- Do we need to look at numbers of run-ups? *of run-ups in the past few years. This will have to be designed, materials etc.*
- Could this be built before a runway enclosure could be built? *Yes.*
- Is this strictly for Boeing's use? *noise from Boeing on the community.*
- Want to know who would be able to use that area – is it strictly a Boeing area? *The purpose of the wall is to block noise whatever its source.*
- Will this help reduce the plume of noise—side loads? The bump on the map? *noise—side loads? The bump on the map? Some related noise. This will only help ground eliminate that noise. Only thing that would be a Ground Run-up Enclosure.*

- There's not space for that there?
No, we'd need to do a study.
- This is the first meeting where the size and location of the noise wall was identified. I'd want to run this by the noise people I work with whether this is the right location or that this is where noise is generated. Don't want to waste money or raise expectations if not a good idea.
- Can the wall be used by other firms?
- It's Boeing's property on the airport.
- Everyone is talking about this wall as if it's something that can be used. It's not a place you go to intentionally make noise. It's a way to separate noise from Georgetown.
- Shouldn't the noise wall be perpendicular to make a difference?
- We need more information on this before we can make a decision.
- Can we have it as a measure that would ask for further study?
- We'd like to do this only if it is effective. If not, I don't want a wall just so we can say we put a wall in. If it would decrease the noise, I would be in favor. Assume that FAA would study to make sure safe and reasonable.
- Suggestion: change the language to say "if appropriate."
- Or if it reduces noise in Georgetown and doesn't displace it.
- What about saying conduct a feasibility study for a noise wall?
- What happens if the study says it makes sense, would it happen?
If it is going to be funded without FAA funds, can do it. With FAA funds, most likely would have to amend the study to say to you want to do this.

Everyone agreed to revise the language to similar to wording of GRE recommendation.

Building Standards

- Comment re: 777 non-competitive lease. Have been holding meetings for 4 years, asking to design buildings that would reduce noise, and nothing has actually been done. New buildings have been built and none of these ideas have ever been identified.
- Isn't this Alternative A10?
- Yes. But nothing has happened in 4 years.
- Comment: we want the standards sooner than later.

Maintain existing run-up restrictions: 7 in favor, 1 opposed.

- Would change my vote to "in favor" if we made the restrictions performance based rather than procedure based. Current restrictions say where and when even if no noise is generated.
- Suggest that we base the restriction on a noise restriction criterion. For example, if you don't create a certain amount of noise in certain areas, okay 24 hours a day. Would need to be quiet at night. Some aircraft don't make noise, others do. Problem is the noise, not the run-up.
- Is the only restriction at night?
Yes.

- A proper definition is needed. Can we figure out a definition of a run-up that is acceptable?
- My understanding is that run-ups create noise.
- How would you define the standard and enforce it?
- Would the difference be high powered vs. low powered?
- Could you say what percent of the noise is from run-ups?
- No, run-up of 777 would not make noise, but Lear Jet, would make noise.
- Concern that some can hear a background of noise and not be disturbed, while others are more sensitive. That characteristic may be different for every type of aircraft. Would be hard to define?
- Can you do it by decibels? Choose some objective level of noise? *We will look at the existing definition of run-up and see if this will help.*
- Can you have someone measure it?
- Since this already is an existing regulation, has anyone been doing it and lived with it, or is it just a proposal? *Existing regulation is that you cannot turn the engine on unless you are taxiing or going somewhere.*
- What happens quite rarely is that you turn the engine on and then don't. Whatever we do now, we have problems where people don't. *Which is the reason this came up?*
- Within the realm of technology, can you have staff and then measure the noise?
- Concern that this is a regression proposal that makes sense to the communities.
- The FAA tower does not want to force a noise standard for run-ups at night.

Alternatives Not Included in the Consultant's Recommendations.

Minimum altitude over West Seattle

- Would support this assuming it's feasible. *FAA: aircraft currently need to be 1600 feet due to Sea-Tac traffic.*
- In talking to people who currently fly this route, they admit to flying lower than the minimum altitude and possibly increase it. Need to enforce the existing limit.
- Pilots cheat because get in more noise by flying in Sea-Tac airspace than by flying over the park.
- At a park in West Seattle, I had an opportunity to look at both Sea-Tac traffic and KCIA traffic. Those homes around the park are impacted the most. Is it only the KCIA turn that way or for flights out of Sea-Tac too? *FAA: use the mileage point as a marker.*
- Noise impacts for those houses could be reduced if planes were not so low. Consider it an enforcement problem. Would have to be a tight turn for a jet out of Sea-Tac.
- Space is protected due to noise abatement restrictions for turbo jets.

ve figure out a definition of a run-up that is acceptable?

My understanding is that run-ups create noise.

How would you define the standard and enforce it?

Would the difference be high powered vs. low powered?

Could you say what percent of the noise is from run-ups?

No, run-up of 777 would not make noise, but Lear Jet, would make noise.

Concern that some can hear a background of noise and not be disturbed, while others are more sensitive. That characteristic may be different for every type of aircraft. Would be hard to define?

Can you do it by decibels? Choose some objective level of noise? *We will look at the existing definition of run-up and see if this will help.*

Can you have someone measure it?

Since this already is an existing regulation, has anyone been doing it and lived with it, or is it just a proposal? *Existing regulation is that you cannot turn the engine on unless you are taxiing or going somewhere.*

What happens quite rarely is that you turn the engine on and then don't. Whatever we do now, we have problems where people don't. *Which is the reason this came up?*

Within the realm of technology, can you have staff and then measure the noise?

Concern that this is a regression proposal that makes sense to the communities.

The FAA tower does not want to force a noise standard for run-ups at night.

Consultant's Recommendations.

Would support this assuming it's feasible. *FAA: aircraft currently need to be 1600 feet above sea level. Need to be below 1600 feet due to Sea-Tac traffic.*

In talking to people who currently fly this route, they admit to flying lower than the minimum altitude and possibly increase it. Need to enforce the existing limit.

Pilots cheat because get in more noise by flying in Sea-Tac airspace than by flying over the park.

At a park in West Seattle, I had an opportunity to look at both Sea-Tac traffic and KCIA traffic. Those homes around the park are impacted the most. Is it only the KCIA turn that way or for flights out of Sea-Tac too? *FAA: use the mileage point as a marker.*

Noise impacts for those houses could be reduced if planes were not so low. Consider it an enforcement problem. Would have to be a tight turn for a jet out of Sea-Tac.

Space is protected due to noise abatement restrictions for turbo jets.

- There are no jet aircraft allowed to make that departure, just turbo prop. People are more concerned about the height of the aircraft for safety reasons.
- Is it feasible to raise the minimum height?
FAA: Most airports have pattern altitude. Not sure how determined for KCIA.
- What is the separation requirement? – *answer is unclear*
- Why not ask for traffic to go over Elliott Bay and go around Alki?
- This is a southern departure problem.
- It's considered a west departure, and it's been around for years.
- Would it be a hardship to go around West Seattle?
- The problem is not the noise. Look at north monitors, etc. it's not this type of aircraft that are creating the noise, it's the fact that the aircraft are so low. Often it's lower than 500 feet.
- Agree it is startling to see aircraft that low. And what about property values?
- People are disturbed more by the presence of the aircraft and the height than the noise. I've got neighbors more disturbed by the noise of the little planes than by the DC-8's. If we can agree that people are disturbed by variety of factors, if there's no problem with increasing the altitude and we have an enforcement problem, why not agree to this?
- This is a Part 150 study and this is about noise. If it doesn't affect the noise impact, why move on this? May not be a noise issue for the community but something else.
- If the SAC Member representing that community thinks it is not a noise issue, though I personally would, we need to respect that person's role as representative.
- Is there any way to enforce the existing minimum altitude over West Seattle?
- Can the airport send a letter to the FAA now, not related to the Part 150 study, but addressing this issue now?
- Cynthia: we can do this, have done it already, but would be helpful to have the committee recommend this.
- Cannot be addressed as part of 150 Study because not enforceable as a noise issue, especially if inside the 65 DNL.
- There are people who see this as a noise issue in the community.
- Nothing wrong with asking people to abide by the regulations. Suggest we make this part of the Roundtable meeting.

Pursue additional restrictions on flights before or after certain times.

- Is this a veiled way of recommending we pursue a Part 161 study? Is the consultant actually not recommending a Part 161 study? This is confusing.
No. This is covered by Alternative A2—a restriction of Stage 2 aircraft at night.
- If we say yes to A2, and no to this, does one cancel the other?
Alternative A2 is more specific.
- Don't agree that the two need to be related.

All agreed that this alternative was covered elsewhere.

24 hour Stage 2 restrictions

4 in favor, 7 opposed.

- This is being tried in Naples Florida, but Alternative A2 was less restrictive because we want A2 to succeed.
- Is it an either/or situation?
If this is the direction the SAC wants to go, would suggest that you word it like this: If a 24 hour Stage 2 restriction is not approved, then request a restriction on night only as an alternative.
- Would like people to see it as a challenge rather than people saying you didn't even ask. *This is much more difficult to get approved—less feasible.*
- Comment if go for Part 161, will take 3-5 years. As a committee representative, feel that we need to go through the procedure. I'd like it now, but it's going to take so long anyway, not an unreasonable request to study it now so that decision is made.
- If I had to choose between a time-based implementation of a night-time restriction on high level noise versus never being able to implement a 24 hour restriction, I would rather see us propose the night-time restriction.
- Why not ask for both?
- Naples is one bad example of a Part 161 Study application. There were 3-4 other examples before Naples. With Stage 2 coming, there's still no plan to eliminate Stage 2. Hard to know what to do when it will be such a difficult fight. It may be more reasonable to get a night-time restriction. The 24-hour battle may be too hard to win.
The way things are looking right now, if a Part 161 is approved, it would most likely be approved where there is least amount of impact to aviation. This would be a Stage 2 restriction at night. FAA also has precedent setting and difficult to approve. Note that Naples has no homes within 65 DNL.
- Because we have so many homes close to the airport, maybe able to make this happen.
- Seemed like overnight, someone's business plan changed, and Alaska arrived with their Stage 2 jets over 75,000 lbs and nothing could be done about it. Currently, there is nothing to protect us from someone proposing a short-hop air cargo service with Stage 2 Lear Jets. It probably won't flop, but someone could legally propose this. Just want to protect the community and ameliorate.
- It would be great for jobs creation if we banned Stage 2 craft, then would have to buy more new aircraft.

Alternative A8:

- Concerned with arrivals as opposed to departures. Alternative A8—says departures but concerned with arrivals. Can we be reworded to include arrivals?
FMS only deals with departures not arrivals.
- Is there technology that we can use for arrivals?
GPS. Look at Alternative A 9.

Alternative A8 and A9 Implementation Technology:

- Can we stop Single Events at night over Magnolia?
Could it happen over water rather than over

but it's not seen as feasible. The hope was that and more reasonable. Willing to oppose this,

to go, would suggest that you word it like this: If not approved, then request a restriction on night

able goal and that it's unrealistic rather than

proved—less feasible.

3-5 years. As a committee representative, feel procedure. I'd like it now, but it's going to take so request to study it now so that decision is made.

implementation of a night-time restriction on high to implement a 24 hour restriction, I would rather tion.

161 Study application. There were 3-4 other e 4 coming, there's still no plan to eliminate Stage will be such a difficult fight. It may be more tion. The 24-hour battle may be too hard to win.
Now, if a Part 161 is approved, it would most likely amount of impact to aviation. This would be a Stage ing at most benefits to most people—24-hour precedent setting and difficult to approve. Note n 65 DNL.

is close to the airport, maybe able to make this

business plan changed, and Alaska arrived with d nothing could be done about it. Currently, there e proposing a short-hop air cargo service with flop, but someone could legally propose this. Just ameliorate.

banned Stage 2 craft, then would have to buy

to departures. Alternative A8—says departures s be reworded to include arrivals?

not arrivals.

for arrivals?

Implementation Technology:

Could it happen over water rather than over

- Recommend a curved approach to KCIA from the north?
- What impact would this have on West Seattle?
- Is this use of GPS or similar for Elliott Bay approach?
FAA stated that at this time, technology was not available to implement this type of procedure at this airport at this time. Discussion on accuracy of this. That was how we modified it to state that would recommend implement technology that allows for more precise approach ground tracks... This allows us not to saddle the committee with a specific type of technology, but that we would implement this when it came on line.
- Sounds good.
- Can add “over water” into language. This melds all the language about all different types of technology.
- Add departure to the alternative?
- Concern that the departure would increase noise. People living in Alki would be impacted.
- Would you rather have the noise concentrated over a single area or spread it out? Would like it to go over the bay but would like it spread out.
- Will add over the water but not departures to A8-A9.

Integrate Flight Paths with Sea-Tac.

- What do we mean by integrate? Are they already integrated?
FAA: Yes they already are integrated.
- Is there a possibility of integrating with Sea-Tac flights on aircraft departing if they are horizontal and vertical? Could they be integrated to a further extent than they are?
FAA: yes, but not the most efficient or the easiest way to do this. Would need to make sure there isn't a Sea-Tac departure within the same timeframe as KCIA. To keep aircraft flowing off of both airports, can not do this.
- Could you just do this at night when there is less traffic?
FAA: the only time that an aircraft is held below 2000 feet is if there is a problem with Sea-Tac.
- If the pilot doesn't request it, will you clear the KCIA flight?
FAA: will not tell the aircraft to level off, if not a problem, will climb them up.
- When Alaska was flying out of the airport at night, this was a problem. With Alaska gone, not a problem. But if were to happen again, would like to avoid this problem.
- What would the noise impact be? If you are a closer in community, will Sea-Tac departure mask the noise of the turbo prop? Understand that this map is concrete in air, if you ask someone to lift this, it is nearly impossible. How can you integrate this and lessen the noise? Tough to know what voting on.
- Do we want to drop this because we don't have enough info or may be too difficult to implement?
- Don't know what the impact would be. Not a problem now, but what about the future?
FAA: Unless you have some sort of procedure, you won't find an aircraft that will climb, level off, then climb; it needs to keep climbing.

- Different flight paths in and out
- A8-9 address this.

Home Buyout that is sufficiently f

- Does sales assistance deal with
- How do you deal with comparat
This is all statutorily defined for
- How is fair market value defined
where they might move. How v
Will help you sell the house. Will
- Sales assistance will not meet the
voluntary buyout program, which
people
- Support sales assistance only, be
viability.
- That's why we eliminated volunt
ruin the community.
- We were concerned about chang
people to stay in a community if
FAA: if it comes out of airport f
out of other airport expenses.
- If used County general fund, no
income housing for people and
- If we would buy the houses bec
into the community?
- Why is this different from sales
- Concern about social justice, pu
others to move out of.
- Concern that we have not adequ
if they want to go and get equiv
- The determining of fair market
to pull a fast one over the comm
can trust that someone will look
whole mean?
- Not talking about buyout.
- No: talking about sales assistanc
would look like now.
- Comment in our resolution that
when there is an action. Keep p
- Can we get info on the appraisel
We can find out how it was done
guidelines for setting the price o

KCIA: a request from the public.

led and keeps people whole.

values to keep people whole?
out.
Within the community or the equivalent elsewhere
this help me relocate?
t help you relocate.
needs of everyone in the community. Maybe the
will help with relocation assistance, will help some
se home buyout will affect the community
buyout because would demolish the house and
the complexion of the neighborhood and forcing
ferent.
s, could be a problem because may take money
port funds, if that could be used to provide low
e a need.
of a problem, why would we put people back
stance?
g poor people in an area that we've subsidized
y explored ways to get people out of their houses
t home.
e is a big topic of public interest. If anyone tries
y, will organize to protect interest. Hopefully we
his concept in a fair way. What does "keep people
eing "fair." We don't know what this program
particulars of a specific action are developed
le whole is a goal.
ocess and what it will be?
Sea-Tac. Understand that there is a set of
home.

**King County International Airport/Boeing Field
Part 150 Study Advisory Committee
October 15, 2001
Meeting Summary**

The eighteenth meeting of the King County International Airport (KCIA) Part 150 Study Advisory Committee was held on October 15, 2001.

Members Present (√):

- | | |
|--|--|
| Andrew Anderson, <i>Tukwila Community</i> | √ Lynae Jacobson, <i>Port of Seattle</i> |
| √ Duane Anderson, <i>At-Large Community</i> | √ Richard Lentz, <i>Boeing</i> |
| Peter Anderson, <i>Corporate Tenant</i> | √ Pam Linder, <i>City of Tukwila</i> |
| √ Doug Baker, <i>Cargo Tenant</i> | √ Cayla Morgan, <i>FAA Ex-Officio Member</i> |
| Ron Beckerdite, <i>FAA</i> | Rocky Piro, <i>PSRC</i> |
| Larry Brown, <i>Labor</i> | √ Georgianne Ray, <i>Unincorporated King Co.</i> |
| √ Jim Combs, <i>Pilots Association</i> | Theresa Smith, <i>WashDOT</i> |
| Larry Crim, <i>Renton/Kent</i> | √ Lynn Tucker, <i>Beacon Hill Community</i> |
| √ Oliver Dallas, <i>FAA</i> | √ Eric Tweit, <i>City of Seattle</i> |
| √ Randy Eatherton, <i>Georgetown Community</i> | Karen Walling, <i>Small GA Tenant</i> |
| Ron Fincher, <i>Sea-Tac Airport</i> | √ Ed Wojeck, <i>Magnolia/North Seattle</i> |
| Edwin Hanson, <i>West Seattle Community</i> | Vacant, <i>Indirect Business Leader</i> |
| √ Dan Hartley, <i>Labor</i> | |

Others Present

Ryk Dunkelberg, *Barnard Dunkelberg Company*
Jennifer Howell, *Triangle Associates*
Claire Barrett, *Claire Barrett and Associates*
Cynthia Stewart, *Airport Manager*
Gary Molyneaux, *Airport Staff*
Marnie McGrath, *Airport Staff*
Sharyn Parker, *Airport Staff*
Scott Boone, *Georgetown resident*
Richard White, *Boeing-Government Relations*

Purpose of meeting:

- Review of draft recommendations report

At 4:15 PM, only four Roundtable members were present and 4 Study Advisory Committee members and 1 ex officio member. Those present discussed the options of

how to handle the lack of quorum. quorum arrived later in the meeting

The committee focused on issues that were first suggested was for the purpose of being referenced with the consultant's recommendations. Committee members requested clarification on the description of the noise wall location and the ground run up enclosure. In addition, members agreed that it would be appropriate for FAA to look at a lower weather minimum for Charted Visual Path. Committee members also reviewed, as requested by Councilmember Philip, the concept of using leases and landing fees to mitigate noise impacts. The challenge of implementing such a program without discrimination was acknowledged. However, if a Part 161 was planned, this concept could be included in the study. Whether this is a viable or legal option was left unclear. It was requested that the alternative to develop and implement building design standards to reduce/contain noise on the airport be included in the recommendations and that city building codes should be reviewed. These will be further discussed at the next meeting.

The main focus of the meeting was discussion related to noise remedies within the 65 and 70 DNL. The committee requested that wherever the report states 65 DNL to revise it to "65 or greater DNL." Sound insulation of public buildings and what this covered was discussed and a request made to identify specific public buildings for the next meeting. Mandatory and voluntary home buyout in the 65 and 70 DNL were discussed and agreed to be added to the report to reflect that all but one member was opposed to mandatory buyout and that a majority were opposed, and minority in favor, of voluntary buyout. Also to be included is an option that would look at voluntary buyout through other sources of funding to allow more flexibility. The committee agreed to prioritize the types of mitigation programs at the next meeting and to determine how to handle owner occupied versus rental buildings. (Types and by contour.)

The next meeting will be on November 5, 2001 with the purpose of finalizing the recommendations of the Study Advisory Committee.

Listed below are the comments and questions raised by the advisory committee members. The text may have been reworded for clarity for those not in attendance. Answers, when provided by the project team, are in italics.

Issues That Need Clarification or Discussion

Sound Insulation of Homes

- Would like clarification about owner vs. tenant, also multifamily.
- Concern that some homes may be insulated well—do not want to insulate a home if it makes more sense to build a new home. Need some sort of standard for cost.
- Within a 65 dB combined contour needs to be clear.

group held some informal discussions until a quorum arrived later in the meeting

they felt needed clarification or further discussion. clarity, that the report recommendations be cross-referenced with the consultant's recommendations. Committee members requested clarification on the description of the noise wall location and the ground run up enclosure. In addition, members agreed that it would be appropriate for FAA to look at a lower weather minimum for Charted Visual Path. Committee members also reviewed, as requested by Councilmember Philip, the concept of using leases and landing fees to mitigate noise impacts. The challenge of implementing such a program without discrimination was acknowledged. However, if a Part 161 was planned, this concept could be included in the study. Whether this is a viable or legal option was left unclear. It was requested that the alternative to develop and implement building design standards to reduce/contain noise on the airport be included in the recommendations and that city building codes should be reviewed. These will be further discussed at the next meeting.

discussion related to noise remedies within the 65 and 70 DNL. The committee requested that wherever the report states 65 DNL to revise it to "65 or greater DNL." Sound insulation of public buildings and what this covered was discussed and a request made to identify specific public buildings for the next meeting. Mandatory and voluntary home buyout in the 65 and 70 DNL were discussed and agreed to be added to the report to reflect that all but one member was opposed to mandatory buyout and that a majority were opposed, and minority in favor, of voluntary buyout. Also to be included is an option that would look at voluntary buyout through other sources of funding to allow more flexibility. The committee agreed to prioritize the types of mitigation programs at the next meeting and to determine how to handle owner occupied versus rental buildings. (Types and by contour.)

November 5, 2001 with the purpose of finalizing the recommendations of the Study Advisory Committee.

questions raised by the advisory committee members. The text may have been reworded for clarity for those not in attendance. Answers, when provided by the project team, are in italics.

Discussion

- owner vs. tenant, also multifamily.
- be insulated well—do not want to insulate a home if it makes more sense to build a new home. Need some sort of standard for cost.
- Within a 65 dB combined contour needs to be clear.

Charted Visual Path

- Item 6-7 on page 8 regarding charted visual path, might want to recommend lowering the weather minimums—is it possible to use these more of the time? Right now a 5000-ft ceiling which is high considering that 2,000-3,000 would be more usable if the weather minimization is reduced.

Insulation of Public Buildings

- Standard Home insulation program (page 7) re: insulation of nonresidential buildings. Wondered about schools.
- Schools in different section.
- What about other facilities besides schools?
- What about City Hall space in Georgetown—would this qualify for funding for insulation? There may be issues b/c a historic building.
Yes, it would be eligible.
- Question whether it just says schools, does it preclude other public buildings?
Need to call out what the public buildings are with real addresses of specific buildings as required by FAA.
- Other public buildings: rank them according to priorities.
- Treat fire stations where firemen sleep as residences.
- Bring the priority list from Sea-Tac and number of buildings to the meeting.

Noise Wall

- The Noise Wall-- under the impression that this would be at the north end of the airfield. Would like further clarification on the location of the wall.

Format of Report

- These two pieces should be blended together more—SAC recommendations and the consultant's recommendation b/c they don't match up clearly.
Yes, these are different b/c the committee changed them.
- Would like to see a comparison of SAC recommendation w/consultants so it is clear whether the consultant recommended it. Maybe use the same numbering system.
- Would like to look at one issue with all the info at one time—SAC, consultant, and then airport staff.
- Original intent to have it reference the info in the notebooks.
- Was able to share the info with (Tukwila) city council and they found it confusing.

Noise Containment Facility

- Noise Containment facility: explanation under it—don't remember talking about the feasibility of small aircraft. Need more info or analysis?
Comment regarding the benefits to the small aircraft is not the same as for large aircraft.

Building Design/Codes

- Buildings on airports can be de
recommendation regarding buil
built and no one ever looks at th
This is in the consultant's recor
Cities of Tukwila and Seattle sh

Leases and Landing Fees

- No. 10: where Larry Philips ask
recommendation.
Bottom line is that it's our opin
have Part 161 study.
- Will there be something back to
again? Clear this is a Part 161 i
- We're already talking about a P
Part 161 study already being pr
Cynthia Stewart: She briefed co
can be done without a Part 161
to it, which is not likely to happ
recommendation? What would
you change the lease?
- At this point, what would the a
Part of this relates to grant ass
Some things can be done under
- Don't we have to make specific
You can say that you would exp
the airport. (check on this). E
- If you were to have a different
them to do. Would need the Pa
say you would charge \$10 for e
For example, to recommend ch
land at the airport.
FAA: You could say conduct a
will not rule on this until enter
the impacts would be. Wouldn
- This would send clear message
idea.
FAA: would have to check with
of the grant assurance. Also to
considered discrimination.

Avigation Easements and Sales T

- P 14: Avigation Easements and
written is a little vague.
- Strike avigation easements opti

Engine Run Ups

ed to reduce noise. Don't see a strong
; codes reflecting this. New buildings are being
Why can't this happen? Needs to be added in.
ndation.
d review building codes.

relook at this. Don't remember why we had no
that if try to use leases or landing fees, need to

ouncilmember Philips that the SAC looked at them
according to the FAA.

161; can say that these would also be included in a
sed.

il on this; Councilmember Philips thinks that this
which is true if it is voluntary and all tenants agree
Do you want the airport to pursue this as a
leases be used for? Even if included, how would

rt ask all the tenants to sign on to?
ices, so can't do it because of federal regulations.
t 161.

ommendations related to the Part 161 study?
using leases and landing fees to control noise at
recommendation should be separate.

nding fee, need to tell the airport what you wanted
1 to say whether this was feasible. For example,
y decibel of noise over X.

ng Stage 2 airplanes 3 times as much as Stage 3 to

t 161 to explore differential landing rates. FAA
1. A 161 would evaluate different fees and what
ve to define at the outset.

ouncil and FAA that we think that this is a good

al, even though a 161 issue, it may be a violation
from a compliance standpoint, because would be

saction

es Transaction. Need this to be clearer. What's

rom rental properties.

- Engine Runups: Felt that this should be performance based, not based on specific noise levels.
- No. 17: Concern that one dissension can stop us from maintaining the status quo. We are talking about maintaining the status quo.
- Just because one person disagrees, will this stop this from happening?
No, if can't reach consensus, can have majority and minority reports.

Noise Remedy for 70 DNL and 65 DNL-Home Buyout

- Are we going to address 70 DNL separately from anything else?
- Right now 65 means 65 DNL. There are different rules at airport for 70 DNL; we haven't discussed how we will address these areas. We talk about 60 DNL separately from 65 DNL.
- The only fair thing in the 70 DNL is to offer a home buyout program; we haven't addressed this. We are ignoring things where the noise is the worst.
- FAA: we did prioritize based on the contours, there is a higher priority for funding in the 70 DNL.
- No. 22, Thinks that this addresses the issue if we add the words "65 DNL and above." We did not want a mandatory buyout and would like this addressed clearly.
- Would like to comment that no one in Georgetown supports a mandatory buyout. Would like basic interest in this issue now discussed.
- Concern that we have never addressed this issue ever about noise within this contour.
- These need to be put on the table. Have not discussed this. Concern that people will continue to complain about noise because the committee wouldn't take a stand on this issue. Know that today that because people didn't address these issues, people will suffer. Need to make tough decisions. Would like to discuss this.
- My recollection is that we discussed these issues, we heard your viewpoints and we as a committee decided not to support buyout within the 70 DNL. We could change the report to reflect a minority report for 70 DNL.
- I also recollect that we discussed this and agreed to have an avigation easement that does reflect this.
- New to process but not clear whether sales assistance is a program that merely helps an owner sell the property to another residential owner or is a voluntary buyout to help the person get out of a noisy situation.
See page I-5, A.4. Describes this.
- My observation that there is no buyout program recommended at all?
Yes.
- Concerned that this doesn't solve problem.
- Concerned that changed groundrules. Not clear here. Would like to have language clarified. Don't recollect that we ever agreed to specific language on 65 DNL and 70 DNL. Want to see it clearly spelled out.
- Table somewhere that says residential is allowed in 70 DNL as long as some mitigation applied which I interpreted to mean sound insulation. Feel that cannot chop a community to bits based on noise contour and feel that there is no support for that. We also learned that whether voluntary or mandatory, if buy out is funded, it

make sense. Concern that can fall into traps where problem isn't solved, don't want to force people to do what they don't want to do, but concerned how to solve this.

- Does anyone have any ideas on how to deal with this? Don't we just trade one family for another?
- Am of two minds about this. How do you deal with this wonderfully diverse community that is Georgetown? People who have lived there live with the knowledge that they are near an airport and industrial community. Why should the federal government support people who knew what they were getting into? Why should one person be moved because he/she got into the process early on? I hope to live here the rest of my life and that sound insulation will allow me to sleep at night. That aircraft of the future will be quieter. There is a future that will be quieter.
- I would add a third element of people, where the house is appraised at \$175,000 and sells for \$130,000 and gets the money and that someone else gets to buy the home and become a homeowner. Would rather put up with the noise and have their own home.
- I'm afraid that those people will be banging at the table in the future and complaining about the noise. That when we differentiate between 65 and 70, it's preferential and that when we distinguish between 60 and 65, we get nothing. If we're going to make a split at that point, why can't we make a split at other point—have a stepped approach.
- If we're going to talk about 65 DNL and above, it needs to say it. Need to be much clearer about what we are talking about it.
- The decision is difficult and we don't like the choices.
- What are our next steps? Do we discuss this further or do we make a choice?
- The same concerns keep being raised. We are not learning anything new, making any progress. Same majority and minority opinions.
- Need to include home buyout in the report and then report on the majority and minority report.
- Can't we explore the option outside the box and look outside of FAA for funding?
- Concern that County does not have to follow laws if use County funding that would make people whole.
- Suggestion: Include home buyout program as element in report and then report committee's recommendation.
- Anyone support mandatory home buyout program in 70 DNL? (One vote)
- Voluntary buyout in 70 DNL: more folks supportive. (FAA note: FAA does not pay displacement/relocation funds in a voluntary buyout program.)
- Concern that if list buyout program (even listing it as rejected by SAC) that the County will take this as a decision matrix that allows them to use this to support a buyout program.
- We do this on other items; we're not accommodating all the needs of the members of the committee if we refuse to list this.
- Under Item 22: suggest majority recommends 65 DNL and above because we want to maintain the integrity of the neighborhood. Would prefer not to have listed buyout in the report.
- Feel that we need to give people options or choice. Home buyout gives them a choice

- Concerned about keeping neighborhood whole. Lots of industrial moving into Georgetown; it's already become not whole because of other reasons than the airport. Not helping people move out if they want to.
- Maybe we should have a meeting of all the people in the 70 DNL and spell out all the fine print and see where they all stand. We can't make decisions for those people.
- Heart of Georgetown is zoned residential; part that is becoming industrial is not zoned residential.
- At the community meetings, many people said they wanted to stay.
- At Georgetown some people would have had a voluntary buyout program. In Tukwila, it was more common that people did not want a buyout program.
- Include it on the list—with the pros and cons of what we discussed.
- Add new item to the list, Item 2 that says Home Buyout program in 70 dB.
- Majority recommendation against mandatory home buyout. Minority opinion in favor.
- Majority recommendation against voluntary buyout, minority opinion slightly larger.
- Third, majority said investigate alternative that does not include FAA funding.
- Request to include this in report on the aviation easement.
- Where do we discuss the economic aspects of the situation? Nowhere do we discuss this.
- How does this fit into the Part 150 program should reflect the

Rentals and Owner Occupied Property

- Should we treat rentals separately from owner occupied property? *There is precedent to help rentals the same way as owner occupied property.*
- Clarify that at Sea-Tac that this is single family to fourplex, not apartment buildings.
- Single family rental should be treated differently because helping landlord.
- Encouraging landlord to buy up high cost property and benefit. (minority opinion).
- Maybe could add requirement about rent.
- Is there any way to make this work?
- If I was a landlord and the only way to get the benefit is to live in the house, many would.
- *Single family up to 4-plex all considered the same.*
- What about larger than 4-plexes? There are some in Georgetown.
- No reason to distinguish between person living in a home from one living in an apt.
- Proceed with sound insulation on both home owner occupied and tenant occupied building but will put requirements about the rent. Any economic benefit should not go to the landlord.

hood whole. Lots of industrial moving into Georgetown; it's already become not whole because of other reasons than the airport. Not helping people move out if they want to.

of all the people in the 70 DNL and spell out all the fine print and see where they all stand. We can't make decisions for those people.

Heart of Georgetown is zoned residential; part that is becoming industrial is not zoned residential.

At the community meetings, many people said they wanted to stay.

At Georgetown some people would have had a voluntary buyout program. In Tukwila, it was more common that people did not want a buyout program.

Include it on the list—with the pros and cons of what we discussed.

Add new item to the list, Item 2 that says Home Buyout program in 70 dB.

Majority recommendation against mandatory home buyout. Minority opinion in favor.

Majority recommendation against voluntary buyout, minority opinion slightly larger.

Third, majority said investigate alternative that does not include FAA funding.

Request to include this in report on the aviation easement.

Where do we discuss the economic aspects of the situation? Nowhere do we discuss this.

How does this fit into the Part 150 program should reflect the

Rentals and Owner Occupied Property

Should we treat rentals separately from owner occupied property? *There is precedent to help rentals the same way as owner occupied property.*

Clarify that at Sea-Tac that this is single family to fourplex, not apartment buildings.

Single family rental should be treated differently because helping landlord.

Encouraging landlord to buy up high cost property and benefit. (minority opinion).

Maybe could add requirement about rent.

Is there any way to make this work?

If I was a landlord and the only way to get the benefit is to live in the house, many would.

Single family up to 4-plex all considered the same.

What about larger than 4-plexes? There are some in Georgetown.

No reason to distinguish between person living in a home from one living in an apt.

Proceed with sound insulation on both home owner occupied and tenant occupied building but will put requirements about the rent. Any economic benefit should not go to the landlord.

**King County International Airport/Boeing Field
Part 150 Study Advisory Committee
November 5, 2001
Meeting Summary**

The nineteenth meeting of the King County International Airport (KCIA) Part 150 Study Advisory Committee was held on November 5, 2001.

Members Present (√):

- | | |
|--|--|
| √ Andrew Anderson, <i>Tukwila Community</i> | √ Lynae Jacobson, <i>Port of Seattle</i> |
| √ Duane Anderson, <i>At-Large Community</i> | √ Richard Lentz, <i>Boeing</i> |
| Peter Anderson, <i>Corporate Tenant</i> | √ Pam Linder, <i>City of Tukwila</i> |
| √ Doug Baker, <i>Cargo Tenant</i> | √ Cayla Morgan, <i>FAA Ex-Officio Member</i> |
| Ron Beckerdite, <i>FAA</i> | Rocky Piro, <i>PSRC</i> |
| Larry Brown, <i>Labor</i> | Georgianne Ray, <i>Unincorporated King Co.</i> |
| √ Jim Combs, <i>Pilots Association</i> | √ Theresa Smith, <i>WashDOT</i> |
| Larry Crim, <i>Renton/Kent</i> | √ Lynn Tucker, <i>Beacon Hill Community</i> |
| √ Oliver Dallas, <i>FAA</i> | √ Eric Tweit, <i>City of Seattle</i> |
| √ Randy Eatherton, <i>Georgetown Community</i> | √ Karen Walling, <i>Small GA Tenant</i> |
| Ron Fincher, <i>Sea-Tac Airport</i> | √ Ed Wojeck, <i>Magnolia/North Seattle</i> |
| Edwin Hanson, <i>West Seattle Community</i> | Vacant, <i>Indirect Business Leader</i> |
| √ Dan Hartley, <i>Labor</i> | |

Others Present

Ryk Dunkelberg, *Barnard Dunkelberg Company*
Jennifer Howell, *Triangle Associates*
Cynthia Stewart, *Airport Manager*
Gary Molyneaux, *Airport Staff*
Marnie McGrath, *Airport Staff*
Sharyn Parker, *Airport Staff*
Scott Boone, *Georgetown resident*
J. William Keithan, *Magnolia SCAA*
Richard White, *Boeing Company Government Relations*
Pat Proulx, *Sea-Tac Acquisitions Office*
Jazzi Richardson, *Sea-Tac Noise Remedy Manager*

Purpose of meeting:

- Briefing on Sea-Tac Airport's experience with sales assistance and acquisition programs
- Review of draft recommendations report

- Discussion on next steps

Jim Combs, SAC Chair, called the agenda was public comment. One recommendation report. First, he was doubtful that the homes of people something less controversial than "he requested that the committee consider the homeowner could choose the type of comments.

The committee discussed the wording of the report, and Cynthia Stewart, Airport Manager, apologized to the committee noting that it did not get the review and refinement it should have because she was out sick all the previous week. She asked that the committee focus on whether the recommendations adequately reflect the agreement of the SAC.

Jim Combs asked the committee to review all the issues included, were they all necessary and should any other items be included. Ryk Dunkelberg, Barnard Dunkelberg & Company, told the committee that the noise contours would change due to the proposed runway shift. He reminded them that when the noise contours were first developed, SAC was advised that the master plan included a recommendation about shifting the runway. However, not knowing what FAA's decision would be, the noise contours were based on the existing runway configuration. The airport is close to completing a draft EIS document including the runway shift and the project team will need to re-run the noise contours based on the new configuration. This likely will change the placement of the noise contour lines and the number of homes in the contour, however, it will not create a policy change. Dunkelberg also reminded the committee that when the recommendations are finalized and presented to FAA, they must be based on the closest physical boundaries to the contours – property lines, street centerlines, etc. - not exactly on the contour lines as shown on the maps.

Cayla Morgan then provided FAA's perspective on sales assistance and commented that the FAA would like the KCIA program to be consistent with Sea-Tac Airport's because of the overlapping contours. Sea-Tac Airport's program does not extend their sales assistance to the 65 DNL because of the cost differences between two programs. She noted, however, that the FAA could live with the program because they are different airports. The FAA would like the committee to note that homes need to meet all of the FAA criteria to be eligible for sound attenuation (i.e. that if a home already has an inside noise level of 45 DNL or less, then it will not be insulated even if it is within the 65 or higher DNL).

The FAA would like the sound attenuation program to consist of the following steps: The FAA would like the sound attenuation program to consist of the following steps: if a home still wants to sell, then initiate sales assistance. This would ensure that the new owner who would not be eligible for sales assistance in the future, moves into a home that is sound attenuated and therefore less impacted by

ing to order at 4:10 PM. The first item on the agenda was public comment. One member of the public had comments on the draft recommendation report. First, he stated that the wording on page 19 stating that it was doubtful that the homes of people living in the 70 DNL could be mitigated to something less controversial than "he requested that the committee consider the homeowner could choose the type of mitigation preferred. There were no more public

of the report, and Cynthia Stewart, Airport Manager, apologized to the committee noting that it did not get the review and refinement it should have because she was out sick all the previous week. She asked that the committee focus on whether the recommendations adequately reflect the agreement of the SAC.

Jim Combs asked the committee to review all the issues included, were they all necessary and should any other items be included. Ryk Dunkelberg, Barnard Dunkelberg & Company, told the committee that the noise contours would change due to the proposed runway shift. He reminded them that when the noise contours were first developed, SAC was advised that the master plan included a recommendation about shifting the runway. However, not knowing what FAA's decision would be, the noise contours were based on the existing runway configuration. The airport is close to completing a draft EIS document including the runway shift and the project team will need to re-run the noise contours based on the new configuration. This likely will change the placement of the noise contour lines and the number of homes in the contour, however, it will not create a policy change. Dunkelberg also reminded the committee that when the recommendations are finalized and presented to FAA, they must be based on the closest physical boundaries to the contours – property lines, street centerlines, etc. - not exactly on the contour lines as shown on the maps.

Cayla Morgan then provided FAA's perspective on sales assistance and commented that the FAA would like the KCIA program to be consistent with Sea-Tac Airport's because of the overlapping contours. Sea-Tac Airport's program does not extend their sales assistance to the 65 DNL because of the cost differences between two programs. She noted, however, that the FAA could live with the program because they are different airports. The FAA would like the committee to note that homes need to meet all of the FAA criteria to be eligible for sound attenuation (i.e. that if a home already has an inside noise level of 45 DNL or less, then it will not be insulated even if it is within the 65 or higher DNL).

The FAA would like the sound attenuation program to consist of the following steps: if a home still wants to sell, then initiate sales assistance. This would ensure that the new owner who would not be eligible for sales assistance in the future, moves into a home that is sound attenuated and therefore less impacted by

noise. Later in the meeting, SAC members discussed whether to modify their recommendation to require sound attenuation first before extending sales transaction assistance. Generally, the committee was uncomfortable making this significant a change and requested that the consultant note FAA's comment under the discussion of the consultant's recommendation.

The meeting then segued into a presentation from Jazzi Richardson, Sea-Tac Noise Remedy Program Manager, and Pat Proulx, Sea-Tac Acquisitions Office.

Ms. Richardson noted that Sea-Tac Airport implemented its noise program in 1985 and has been insulating homes since 1987. The program insulates single-family residences within the 65 DNL boundaries. Approximately 7000 homes are located in the 65 to 75 DNL contour. Another 3000 homes above the 75 DNL are eligible for insulation as well as Sales Assistance. Sea-Tac Airport's policy is to insulate eligible homes first, and if the homeowner is not satisfied with achieved noise reductions, then the homeowner is eligible to apply for sales assistance. Initially, due to low demand, there was no waiting period required after the house was insulated to initiate sales assistance. However, because the sales program ended January 1, 2001, there is currently a residual waiting list to participate. Sea-Tac Airport has another program for properties located adjacent to airport property where the homeowner can request a buyout without having the home insulated first. The Special Purchase Option (SPO) program takes about 3 months. The airport buys the home from the owner, insulates it, and then places back on the market.

Jazzi described Sea-Tac's transaction program as a marketing program. The property is appraised by a Port-contract Appraisal Firm and the homeowner is guaranteed 90 percent of market value (10 percent represents the real estate commission and closing cost). Once a homeowner agrees to participate, the home is placed on the market for 60 days at 100% of the appraised value. If it does not sell, the selling price is then reduced to 95 percent of the appraised value. If not sold, it is reduced to 90% of the appraised value for another Sixty days. If property hasn't sold by the 240th day, the Port will initiate the process to cash the owner out. Once purchased from the owner, the Port will continue to market the property until sold. The Port stopped this program due to a lack of interest. As the program became proficient at insulating the homes (up to 100 a month), the program terminated because out of 3000 eligible properties, to date only 380 homeowners took advantage of the program.

Pat Proulx then described how the acquisition program has worked at Sea-Tac Airport. Properties are acquired as required by the Federal law; the Port makes an offer of fair market value as determined by a similar home in a comparable, less-noise impacted neighborhood through an appraisal process. There are no seller costs involved, and the Port makes up the difference between what the seller sells the house for and the cost of a new, comparable home. The difference between sales assistance program and the Acquisition Program is that in transaction assistance, a property's not eligible for Relocation Benefits. Relocation Benefits include: No sellers costs, Purchase Price Differentials, Closing Costs on the Replacement Dwelling, Interest Differentials, and moving costs (fixed or commercial). This program is separate from the Transaction

Assistance and sound attenuation program was mandatory for certain

Committee members had many questions about market value is determined and how it is included in the questions and comments

The committee then addressed the issue of building standards. The recommendation to develop and implement building standards around the airport was included in the latest version of the recommendations report (revision 14). The issue of building standards and the fact that this is under the jurisdiction of the cities, Seattle and Tukwila, was discussed. A majority of SAC members agreed that Seattle, Tukwila, the County and the State should review the Growth Management Act that discusses land use compatibility and make sure that the planning documents are consistent with that statute. Members rejected a motion to put a cap on the number of residential units within the noise-impacted contours.

The committee reviewed the steps for completing their recommendation report. A majority of members were ready to finalize the report, subject to final edits, without scheduling another meeting. Some members preferred to meet again before adopting the report. All agreed to a compromise where each member would send comments to airport staff by November 19. The report would then be revised and sent back out to the committee. Two weeks after distribution of the revised report, committee members would respond if the report were acceptable or not. If any points remain in dispute, the committee would meet again to discuss only those disputed points. Once the SAC Recommendations are finalized, the airport manager will submit the airport recommendations including budget information to the County Council along with the SAC and consultant's recommendations. Cynthia Stewart noted that the Council was unlikely to review the recommendations until March due to the orientation process for new members and the Council's focus on organization in January and February 2002.

The final topic of the meeting was to recommend priorities for the sound attenuation program. The committee agreed to the following priority list:

- Make schools and residential buildings a number one priority, since they are financed out of different funds.
- Multifamily as the number two priority.
- Fire stations as the number three priority.
- Other public buildings as the number four priority.

The meeting adjourned at 7 PM. Cynthia Stewart thanked all the committee members for their hard work and willingness to work together.

Listed below are the comments and questions raised by the advisory committee members. The text may have been reworded for clarity for those not in attendance. Answers, when provided by the project team, are included.

ams for homes within a particular contour. This is a number one priority, since they are financed out of different funds.

ns about Sea-Tac's program such as how fair it is to deal with homes that don't meet code. These are the number two, three, and four priorities.

e of building standards. The recommendation to develop and implement building standards to reduce and/or contain noise on the airport was included in the latest version of the recommendations report (revision 14). The issue of building standards and the fact that this is under the jurisdiction of the cities, Seattle and Tukwila, was discussed. A majority of SAC members agreed that Seattle, Tukwila, the County and the State should review the Growth Management Act that discusses land use compatibility and make sure that the planning documents are consistent with that statute. Members rejected a motion to put a cap on the number of residential units within the noise-impacted contours.

ompleting their recommendation report. A majority of members were ready to finalize the report, subject to final edits, without scheduling another meeting. Some members preferred to meet again before adopting the report. All agreed to a compromise where each member would send comments to airport staff by November 19. The report would then be revised and sent back out to the committee. Two weeks after distribution of the revised report, committee members would respond if the report were acceptable or not. If any points remain in dispute, the committee would meet again to discuss only those disputed points. Once the SAC Recommendations are finalized, the airport manager will submit the airport recommendations including budget information to the County Council along with the SAC and consultant's recommendations. Cynthia Stewart noted that the Council was unlikely to review the recommendations until March due to the orientation process for new members and the Council's focus on organization in January and February 2002.

commend priorities for the sound attenuation program. The committee agreed to the following priority list:

- Make schools and residential buildings a number one priority, since they are financed out of different funds.
- Multifamily as the number two priority.
- Fire stations as the number three priority.
- Other public buildings as the number four priority.

nia Stewart thanked all the committee members for their hard work and willingness to work together.

estions raised by the advisory committee members. The text may have been reworded for clarity for those not in attendance. Answers, when provided by the project team, are included.

Comments on the July 16 and October 15 Meeting Summaries

- Not sure that the summary demonstrates the tenor of the meeting.
Please give the comments and we can check the tapes.

Comments on Runway Shift and Change in Contours

- Possible that the environmental impact statement may show that shift should not occur, and that the runway should be shorter. Would not like to see the runway length built into the Noise process when this is not finalized. Hope that shift will not occur.
- Can't base program on runway shift until approved, but also need to be able to look at the new contour. Can we run both?
Can offer both as long as consistent to FAA.
- The current view is that it may be possible to implement restrictions that serve to mitigate the runway's physical presence. Concern that pilots will use the longer runway. Will it be built and restricted or built and unrestricted?
Master plan is 20-year document; noise contour is 5-year document and the EIS will address these concerns.
- Concern that pavement is easier to build.
- Boeing will operate in 9700 feet except the 10 percent time when need 10,000 feet of runway.
- Some people will see this as a way as slipping through the runway extension by adding it into the contours.

Comments on Sales Transaction Assistance Program

- FAA: Office has been having some discussion in past few hours about sales transaction assistance program. Would like to have program consistent with Sea-Tac Airport because of proximity of airports. Sea-Tac chose not to go to 65 DNL because of cost. FAA can live with difference between programs because different airports. Office is tracking number of people can assist. Would like committee to include a statement that if a home presently achieves an inside noise level of 45 DNL or less then it would not be eligible for sound attenuation, regardless of the noise contour. If would qualify for sound attenuation, would like the program to entail insulating the home first, then initiating sales assistance. That way, the person who moves into the home, moves into a home that is sound attenuated (important since it wouldn't be eligible for sales assistance in the future.)
- Where would the funds for sound insulation come from?
FAA
- Requiring insulation of home before initiating sales assistance would serve the person who moves into the home after the sales assistance has been provided to the previous owner and subject to the avigation easement in place. Doesn't feel right for the new owner to be ineligible for sound attenuation.
- Does allow the person who moves in who may not really know what living in a 65 or 70 DNL to have relief. Would be fairer.
- FAA: It might be dicier to decide how we treat the combined contour because the two airports have to agree on how to treat these people. The two airports will have to

agree. The combined contour in terms of the specifics, it may not

- All that said, these airports are combined contour. Can't have terms of operations, and not the
- FAA: may not know until submit these; may take 180 days. We to be on board.

FAA suggests that sales assistance has a history of this. It becomes part of the

- Can someone explain if I were buyout vs. sales assistance? How long does assistance take 95 days to a year?
- Rest of the community may be affected by voluntary buyout versus sales assistance.
- Want to understand how long it takes.

Questions and Comments on Sea-Tac Programs

Answers provided by Sea-Tac Airport Staff

- Property continued to be marketed under residential use? *Yes.*
- Sea-Tac Airport has people living within its 70 DNL? *Yes; 3000 people.*
- Does your office consider the 70 DNL as residential? *Yes.*
- For the west side acquisition. Was it within its 70 DNL? *Upper 70's*
- Some of the homes bought were removed as homes? *At 80 DNL—where the 75 DNL contour falls today, those homes were removed and demolished.*

Ryk Dunkelberg noted that the program was based on forecasted contours using physical boundaries developed years ago, but the contours have changed. What was the DNL?

- In all cases, the purchase was voluntary? *Yes, except where properties were demolished.*
- How do you determine the purchase price? *Appraisers look at similar properties in neighborhoods not near the airport.*
- Comment that this program does not apply to our program. However, have a friend who moved as a result of the Sea-Tac process and was happy with the results. How does the homeowner receive relocation assistance? *In a home relocation program. Sales transaction assistance, no relocation assistance provided.*
- What about houses that go on the market at a time, so the market value is tanked. *Only a few houses can get on the market at a time, so the market isn't flooded. After first or second wave of*

grand new thing for FAA, breaking ground. In terms of the specifics, it may not like a standard contour.

ed as one, think we have a good shot at using the combined contour. Can't have terms of operations, and not the combined contour. When will you know?

FAA: may not know until submit these; may take 180 days. We to be on board. FAA takes its own time to review the plan to take it seriously, but the two sponsors need

be contingent on sound attenuation first. There is a history of this. It becomes part of your policy manual on how you do this.

Can someone explain if I were homeowner, why would I elect to have an optional buyout versus sales assistance? How long does it take for each of these? Does sales assistance take 95 days to a year?

Rest of the community may be affected by voluntary buyout versus sales assistance. How long does it take for each of these? Does sales assistance take 95 days to a year?

Sea-Tac's Transaction Assistance and Acquisition Programs

Staff

Answers provided by Sea-Tac Airport Staff

Property continued to be marketed under residential use? Yes.

Sea-Tac Airport has people living within its 70 DNL? Yes; 3000 people.

Does your office consider the 70 DNL as residential? Yes.

For the west side acquisition. Was it within its 70 DNL? Upper 70's

Some of the homes bought were removed as homes? At 80 DNL—where the 75 DNL contour falls today, those homes were removed and demolished.

Ryk Dunkelberg noted that the program was based on forecasted contours using physical boundaries developed years ago, but the contours have changed. What was the DNL?

In all cases, the purchase was voluntary? Yes, except where properties were demolished.

How do you determine the purchase price? Appraisers look at similar properties in neighborhoods not near the airport.

Comment that this program does not apply to our program. However, have a friend who moved as a result of the Sea-Tac process and was happy with the results. How does the homeowner receive relocation assistance? In a home relocation program. Sales transaction assistance, no relocation assistance provided.

What about houses that go on the market at a time, so the market value is tanked. Only a few houses can get on the market at a time, so the market isn't flooded. After first or second wave of

Rest of the community may be affected by voluntary buyout versus sales assistance. How long does it take for each of these? Does sales assistance take 95 days to a year?

Want to understand how long it takes.

Answers provided by Sea-Tac Airport Staff

We've never had more than 20 houses on the market at a time. Every time a home came in, sold so quickly, the average time in disposing of a property was first 120 days. We didn't ever have a flood on the market. Program area is so large and spread apart, does not impact real estate value.

- Are circumstances the same—only 2000 homes max in Georgetown and N. Beacon Hill? The people allowed to put their home on the market are the values automatically lowered?

Houses are appraised not on the noise-based neighborhood, but a comparable neighborhood outside the noise area. Also, appraisers not allowed to use tainted data. If sales affected by special circumstances, are not used for comparables.

- What happens to a family that lives in the neighborhood and for some reason they are suffering and need to move to a 5-bedroom house? Can you say that people can buy a comparable 5-bedroom house in another area?

Transaction assistance: we have no responsibility to relocate the family.

- Concern that can't help the family that has need. In addition to not receiving relocation assistance, they also must pay the 10 percent.

Most of the properties when we started this program were worth less. When realize the equity that they have in their homes, more willing to move. Gives more flexibility.

- If you appraise the value of the home in a non-noisy neighborhood, will you get higher value? Can you find a neighborhood in Seattle that is comparable?

Appraisers are constantly making adjustments based on the details of the home. Once the appraisal is provided to homeowner, s/he can challenge the appraisal or accept it. If the homeowner wants to challenge the value, s/he finds own appraiser to look for comparable. Then all staff gets together and discusses the differences with homeowner and appraiser. In end, the two appraisers will identify if they will conflict. Then the airport will determine the fair market value. Usually find a price in the middle.

- Is this how it works? If a family has a 5-bedroom house in Georgetown, looks elsewhere in Seattle and determines that house is \$375,000, then house goes on the market for that amount. Then the price is dropped over time and at the end of the time period, homeowner gets 90 percent of appraised value regardless of what the house finally sells for. At the 240th day, Port then buys the property.

If it doesn't sell, once the homeowner is out of the house, the Port then markets the home aggressively. Real estate agents are aware of the program. Some purchasers wait until the Port drops the price. Agent tells the buyer of the possibility. Gives the homeowner some options, also can get letter from Port to use to buy another home.

- How is the appraised value determined?

Usually by looking at comparable sales and then features of home (bathrooms, garage, etc.) and assumes that not involved in other government program.

- How can you find a comparable neighborhood for Georgetown and Beacon Hill? The comps need to be something that the family can use.

Reminder; this is a voluntary program; homeowner can say I don't want to participate. Appraiser not allowed to include insulation package; if sell on own, can use it.

- How many participated in program?

380 out of 3000 participated in to 2800 that the sales assistance submitted requests for assistance want to implement this program about it when doing insulation

- Don't think Pat's presence in view of this is a mandatory buyout important that this be brought up at a fair hearing.
- Is there a limitation on the kind of homes that can be purchased? For sales assistance, can use Area Special purchase programs. So for the mandatory buyout, how is it different? Because using Port funds, can it be used for other purposes?
- For the mandatory buyout, how is it appraised—fair market value or appraised same way—fair market value impacted.
- How do you identify designated areas? Pick a contour and designate that area to be torn down.
- Given the drop in the economy, what could happen: could get more homes on the market. Can only get fair market value about 10-20 homes at a time.
- Pat was saying only enough homes to be purchased when the market is declining everywhere, that's why it's important.
- If 100 homes in mandatory buyout program, and value dropping, the first 10 people to get the most, the last 10 people to get the least.
- Won't it fairly keep the value of homes that are purchased?
- Would also apply to sales assistance program. Appraised at the fair market value.
- Concern that keeping people in homes that are not healthy for people.
- What about homes that may not be healthy for people? If a lender requires repairs, the Port will require that they be fixed. If any requirements, need to be fixed.
- What about houses that were built before 1906 and even have a new roof, replumbed and rewired but grandfathered for code reasons (windows, etc.). In addition to maintenance requirements, what about windows? Must meet code for lowering sash and window changes to bring things up to code. Must meet code in bedrooms. At least one window must meet code in bedrooms.
- For those homes with mandatory buyout, receive 100 percent, the ones with sound insulation improvements.
- If house doesn't meet code, does the homeowner have to meet code? Up to seller and buyer.

program (less than 15 percent). The Port sent notices about the program was ending. Out of these, 170 then

It is important to communicate. If you decide you are in the insulation process, important to tell people they understand their options.

because an undercurrent that really wants to come out of this program. In fairness, even though this is unspoken, that people understand that we have given this a

funds that are used on your program?

Also for voluntary purchase, using Port funds for funding is port funding and some FAA funding. homes as residential.

es it work for valuation purposes?

value in similar neighborhood, non-noise

acquisition area?

anything within that contour will be purchased and

houses coming on the market, best thing that can be done is to sell them now.

the time of the property selling. Can only have

to do a certain number of homes at a time. If comparables are declining.

program, and value dropping, the first 10 people to get the most, the last 10 people to get the least.

me?

e.

at the time they are appraised.

neighborhoods that may not be healthy for people.

able to be insulated?

Port will also require that. If the house is not worth the investment, need to be fixed. Before we purchase a home, if any requirements, need to be fixed.

in 1906 and even have a new roof, replumbed and rewired but grandfathered for code reasons (windows, etc.). In addition to maintenance requirements, what about windows?

window changes to bring things up to code. Must meet code in bedrooms. At least one window must meet code in bedrooms.

purchase, receive 100 percent, the ones with sound insulation improvements.

the homeowner have to meet code?

- Before a home is insulated, need to get structural investigation to make sure that home can handle the weight of insulation.
Of 10,000 homes eligible, have insulated 8700 homes. Not a lot of houses that can't be insulated.
- Money source for mandatory?
80 percent is received from FAA for buyout.

Comments and Questions about Building Standards and Development

- Are building standards included in the report?
Included.
- Why has the city of Seattle continued to issue building permits without requiring meeting noise standards under 1996 law protecting airports from incompatible land use?
- Not sure if the city has the noise contours to look at.
- Law applies to amending comp plan and development regulations, not specific developments.
- Look at parcels in city; recommend light industrial. Law applies to new development only, not to existing land use.
- Would apply to vacant land that's residential. State has recommendations. How do you strike a balance between airport and livability? Need to let people know moving into area that is noise impacted. May recommend less density.
- When look at law, desire is to push cities and counties to discourage residential use, when look at future contours, see number of homes increasing. Concern that increasing residential development in contours. Committee should push the County and City to explain why they are not looking at this.
- Tukwila is dealing with Growth Management and supposed to increase density. The City has property in Allentown and Duwamish. Area will be sewerred and building will occur. We have to have more density and yet will need to build in 65 DNL. In between a rock and a hard place.
- Ask Seattle, King County, Tukwila, and State to look at how this law and Growth Management Act impacts development around the airport. Easy to get over our heads quickly.
- Don't know that we should support construction of new homes in 65 DNL and higher. New homes being developed.
- What issues are omitted from the report: if building zoning is missing from the report, need to postpone completion of the report. Question for the group, is this an issue, you want in the report or should it be passed to Roundtable.
- State has 2002 report to update.
- Can we add in the suggestion that this be looked at in the next year as a recommendation?
- Do we want this to be a specific recommendation as a result of the discussion?
- We can't tell Tukwila that they need to change comp plan, but can request that jurisdictions should look at this and figure how to address the incompatibility of the development around the airport.

- We already have buyout in the (with residential use. Would this incompatible with residential use
- Would only apply to new residence
- Would this apply to development come under this?
- Motion is to have the appropriate
- Why I'm here is to look at land the city level, not the county.
- We've had this law since 1996 these new homes aren't being insulated.
- Suggest that recommendation be
- **Recommendation: that Seattle law (Growth Management Agreement except for two.**
- Motion that we limit the number to be kept as the same (capped)
- I am happy where I am in the 6 to live there.

Comments on the Report Format

- A little confusing about implementation associated with the minority view. *Text provides general discussion*
- Very pleased to see the format; review.
- Format implies that discussion recommendation.
- If you disagree with format, face Nov 19. Not policy issue.
- Comment about wording of Recommendation Approach--the issue is not just
- Don't remember when it was discussed. *This was a poor wording choice*
- Concern that document has language could be considered inflammatory
- How do we know if there is no *Staff will clarify language.*
- At Sea-Tac, noise at 75 DNL and we insulate to make compatible. *There will be homes in 70 DNL. Not to say all or none, but that*

or 70 DNL that is not automatically incompatible dermine that assumption and say that it is

development, not existing development. zoning? Would an undeveloped property then

jurisdictions look at this?

. Minimum we should do. The decision is made at

local governments aren't following this law, and ated. The City should be responsible for cost of

of increasing development in these areas.

Tukwila, the County and State should look at '96 about compatibility with airport. All in

residential units in the contours considered unsafe *to support for that recommendation.*

70 DNL and don't want to limit others who may want

Revisions, and Wording

ing the home buyout program; all that text

together, can see the points. Should be easier to

er SAC recommendation relates to the

or data, please put them in writing to Cynthia by

recommendation 13, about using the Charted Visual ability.

ed that the mitigation was doubtful.

our part.

ge that I don't recall being used and language that suddenly appears.

port in Georgetown for mandatory buyout (p. 20)?

bove, we acquire and demolish. At 75 and lower,

it can't be mitigated to meet the FAA guidelines.

possible that homes exist that can't be mitigated.

- Why are we seeing this language now? Where did this language coming from? Is there some under the table dealings that resulted in this language. Concern that this will raise community concern and find this sentence offensive.
I apologize for language; let's just fix it. No study going on.
- Would like statement that with sufficient mitigation, that people can live within 65 and 70 DNL.
- Would it be appropriate to say what would happen to those properties that can't be mitigated?
Will drop sentence that some homes may not be able to be mitigated. Will clarify sentence about Georgetown to reflect community meetings.
- Concern that should include something about mitigation.
Staff will send something by email and try and get language correct.

All agreed that airport staff will email changes and people will comment until language is at a point that all agree.

- Title of Recommendation 12 doesn't agree with actual recommendation. The title talks about departure and FMS.
Original title was initial recommendation and then it was expanded to include additional items.
- On Recommendation 7, sales transaction, clarify fair market value definition to include that comparable is in a neighbor not affected by noise.
- Provide language to Cynthia that adds in clarification.
- In Section 5, second paragraph, where it says receive easement from owner, shouldn't it say avigation easement?
- Comment on Findings on page 7: suggest that we remove the words "subsidiary to" [airspace for Sea-Tac Airport].

Wording of Sales Assistance Program and relationship with sound attenuation

- Sales Assistance program doesn't talk about sound attenuation. Based on what we heard tonight, do we want to say, first sound insulate the home and then allow people to use the sales transaction if they still want it?
- Do people agree? As a prerequisite to sales assistance, sound attenuation must be used first?
- Why should a person who knows they need to sell, have to wait to go through this?
- At Sea-Tac, people generally were happy when insulation happened. Also, it ensures that new owners will have home sound attenuation.
- Concern that will take way too long before home will be insulated. Person will be living in the home regardless of who it is.
- Sea-Tac took 16 years for 10,000 homes. KCIA doesn't have that many?
- Is there a way to make both programs work in tandem?
- How do you implement or prioritize such a program?
- Concern that this is a shift in recommendations that hasn't been in front of the community. Can see both sides of the question, tend to agree to insulate first since person needs to leave. Not comfortable with changing recommendation without public review.

- Only a few hundred people can live in areas that considered a problem. People are more sensitive to noise than others.
- Do we want to make change to that?
- Review of next steps: committee approves report; airport staff then can make its own recommendations. Do we want to stay same and let airport staff make change?
- Are there other nuts and bolts that need to be refined later on, maybe should say that specifics may be determined later.
- Add paragraph that notes how SAC does its program, add the topic into the report without making recommendations. Add into Consultant's recommendation?

I can add this into the consultant's recommendation that FAA made this comment.

- If you want to insulate or sell, do you have to wait the same amount of time?
- The policy question is are we going to require insulation first? If your neighborhood is 15 years out for sound insulation...
- Concern that may be making recommendations that FAA will toss out? Can we decide?
- Is this a requirement for FAA?

Comments and Questions on Finalizing the Recommendations Report

- Have about 20, 23 comments of final approval. Would like to see whole report rewritten before this meeting. What should we do?
- *Did not receive comments prior to this meeting.*
- Would like to wrap it up tonight.
- At what point will we see the whole thing?
- I can live with the document that we have. We will make comments on ideas we discussed tonight. If we have more comments, and then need to discuss, process will never end. Need to put in trust that Cynthia can finish.

Two wanted another meeting; many wanted to wrap it up tonight.

- Concern that changes that are not important enough to people that policy changes submitted by email. Wording are still here.
- Would like to do further edits and approvals electronically. Get comments to Cynthia by Nov 19, then airport makes a decision. New version will go out to you, two weeks after committee receives report. Will tell her if it is acceptable or not. If acceptable to a majority, we will hold meeting.
- Please underline any changes to document so can note changes in a glance.
- What will happen if conflicting comments?
- *May come out with new sentence that reflects everybody's comment.*
- You can submit comments at public hearing? Can we have a public hearing?
- *Public hearing will be on the information. Recommendation from the airport, not the comments on this report.*
- Would like to suggest that if we have additional meeting, only the issues that are topic of disagreement will be on agenda.
- How long before getting airport recommendation after SAC report is finalized?
Not set at this time.

ve there anymore but many who are happy living
At beginning of study, consultant noted that some
han others.

t?
approves report; airport staff then can make its own
to stay same and let airport staff make change?
need to be refined later on, maybe should say that

Tac does its program, add the topic into the report
o allows to be added in. Add into Consultant's

recommendation that FAA made this comment.

t you have to wait the same amount of time?
to require insulation first? If your neighborhood
...

recommendation that FAA will toss out?
n we decide?

Finalizing the Recommendations Report

is. Would like to see whole report rewritten before

this meeting. What should we do?

the thing?

we have. We will make comments on ideas we
comments, and then need to discuss, process will
Cynthia can finish.

Many wanted to wrap it up tonight.

policy changes submitted by email. Wording
are still here.

approvals electronically. Get comments to Cynthia
sion. New version will go out to you, two weeks

will tell her if it is acceptable or not. If acceptable
ceptable to a majority, we will hold meeting.

document so can note changes in a glance.

comments?

that reflects everybody's comment.

public hearing?

Recommendation from the airport, not

we additional meeting, only the issues that are topic

recommendation after SAC report is finalized?

Comments and Questions on Priorities for Noise Insulation

- Need to set priorities on how to address insulation.
- In front of you, Sea-Tac's recommendations on priorities for insulation.
Note FAA's priorities are to fund the loudest contour first. Number of schools in contour: 3: two public and 1 private.
- Assume in same noise contour, what order do we do noise insulation?
- At Sea-Tac, decided not to make distinction between renter and homeowner.
- Would like public buildings in Georgetown last.
- Schools: should be lower priority than areas where people sleep. Should be handled by public entities to ensure safe area for students.
- Students are required to be in school, have no choice; may reduce their educational experience if don't noise insulation.
- If we agree that biggest problem at KCIA is nighttime flights, would agree that schools should be lower priority.

Most operations are during day, loudest flights at night.

- Schools different source of funds.
- **Make schools and residential both number one since out of different funds.**
- **Multifamily as two.**
- **Fire stations as three**
- **Other public buildings four.**

To my knowledge, only public building is Old Georgetown City Hall. Sleeping portion of fire stations considered residential; other public buildings are from the same pot as schools.

- Dental clinic in Georgetown city hall.
- Not an overnight facility.
- Only nursing home already insulated by Sea-Tac.

General order agreed to by all.

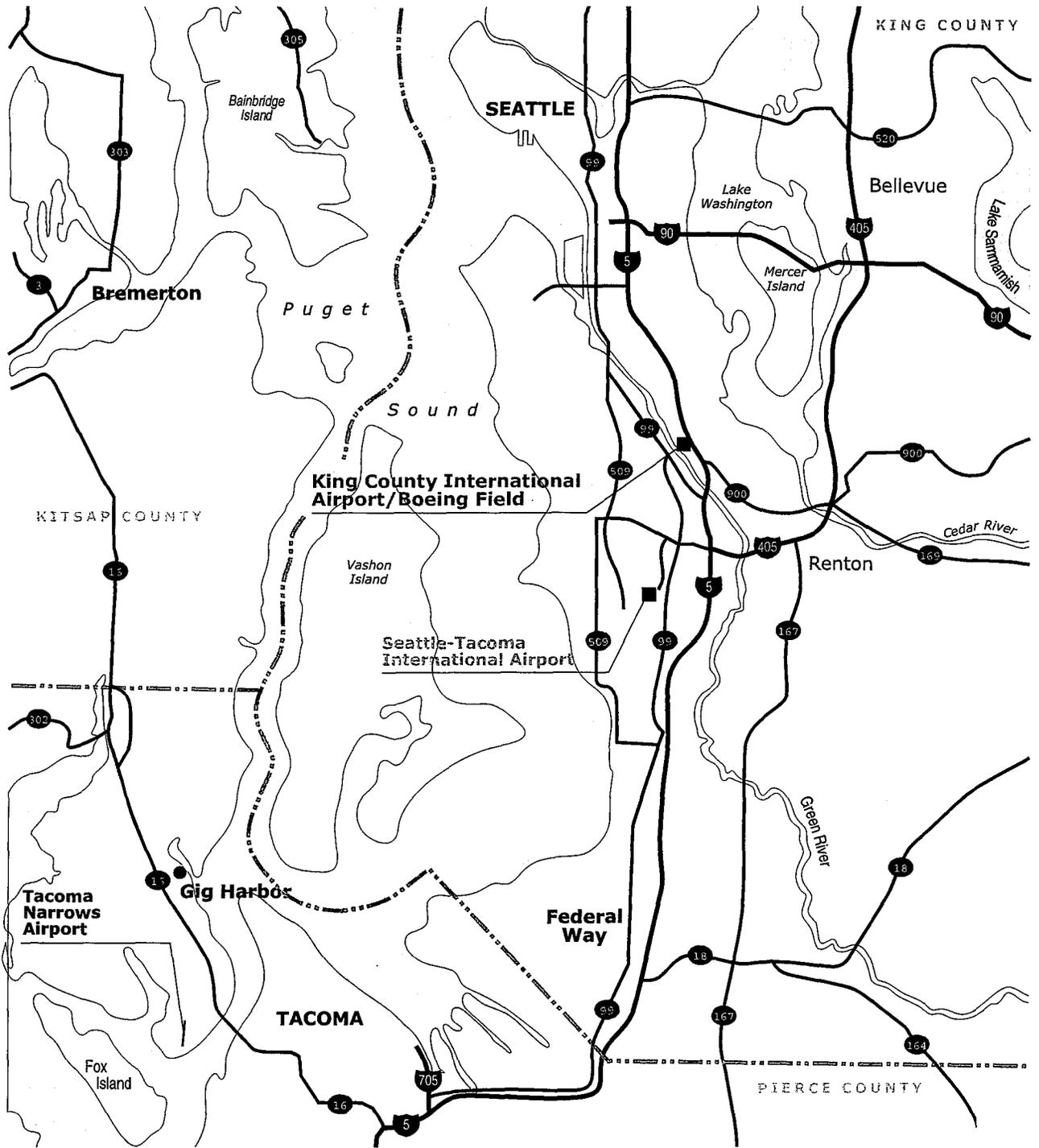
Inventory

Introduction

King County International Airport/Boeing Field (KCIA) is a primary reliever airport for Seattle-Tacoma International Airport, as well as a diversionary airport for commercial service operations at Sea-Tac during periods of poor weather. It is located within King County, and the City of Seattle adjacent to the City of Tukwila. The Airport is approximately five miles south of downtown Seattle. In 1999, the Airport was served by two airlines, West Isle Air and Helijet Airways. In addition to the general aviation aircraft, the Airport also serves cargo, military and aerospace aircraft. The Boeing Company is located on the west side of the airport and conducts a variety of activities at facilities on and near the Airport. These include engineering, administration, flight test and aircraft delivery. The primary use of the facilities at KCIA by The Boeing Company is for flight test and customer delivery. They also maintain the world's fleet of AWACS (Airborne Warning and Control System) aircraft at the Airport. In terms of operations, the Airport is one of the busier airports in the United States. The generalized airport location is illustrated on Figure A1, *AIRPORT LOCATION MAP*.

King County International Airport is owned and operated by King County, which is composed of a thirteen member governing body, the King County Council, and a County Executive. The Council is elected by districts to direct County policy. The Airport Manager is responsible for the day-to-day operations of the Airport. The Airport has a full-time professional staff to assist the Manager in running the airport on a daily basis. The County has land use authority over portions the Airport. The area surrounding the Airport is within the jurisdiction of the Cities of Seattle and Tukwila.

The Airport is in the process of completing the Airport Master Plan. The major element of the Master Plan is the recommendation to shift the main runway (Runway 13L/31R) approximately 800 feet to the north in order to meet FAA dimensional requirements on the southern end of the runway. In addition to the Airport Master Plan, the King County Council approved a Noise Reduction Work Plan for the Airport, in October 1998. The purpose of this Work Plan was to identify noise abatement/mitigation issues to be addressed either as part of this FAR Part 150 Study or as separate issues outside of this Study. A copy of the Work Plan is contained in the Appendix. The Work Plan directed that the Airport consider many issues beyond the scope of a traditional FAR Part 150 Study, including the development of DNL noise contours beyond the 65 DNL contour, evaluation of a run-up enclosure and the evaluation of combined noise contours with Seattle-Tacoma International Airport.



N Not to Scale

Figure A1 Airport Location Map

King County
INTERNATIONAL AIRPORT Boeing Field
PROJECT 2004-01

Airport Physical Facilities

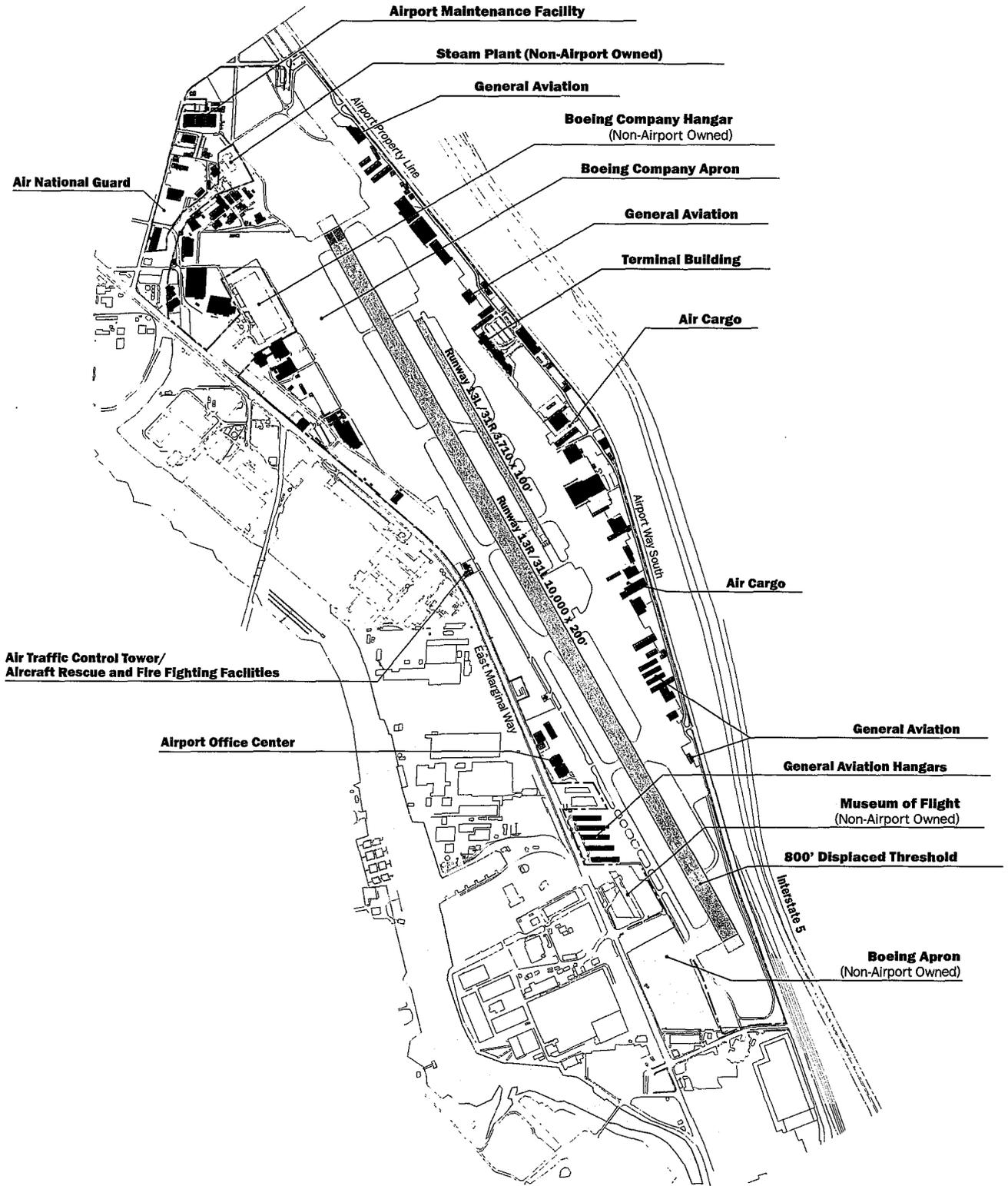
The Airport currently consists of two parallel runways, Runway 13L/31R and Runway 13R/31L. Runway 13R/31L is the longest runway, 10,000 feet in length and 200 feet in width. The southern landing threshold has been displaced 800 feet to accommodate an instrument landing system. The runway is equipped with High Intensity Runway lights, an Instrument Landing System (ILS) on both runway ends, Precision Approach Path Indicator (PAPI) lights serve Runway 13R, while Runway 13L has Visual Approach Slope Indicator (VASI) light, which are being upgraded to PAPIs.

Runway 13L/31R is the secondary runway at the airport and is 3,710 feet in length and 100 feet in width. The runway's northern threshold (Runway 13L is displaced 240 feet and the runway's southern threshold (Runway 31R) is displaced 365 feet. It is equipped with Medium Intensity Runway lights and VASI lights serving both runway ends.

Both runways have full parallel taxiways systems. The parallel taxiway is located on the west side of the main runway and on the east side of the secondary runway. Various connector taxiways connect the parallel taxiway to the runway and the landside development areas. Most ancillary landside facilities are located on the east side of the Airport, with the passenger terminal complex located approximately in the center of the Airport east of Runway 13L/31R. Existing cargo, general aviation and other support facilities are located on both sides of the terminal complex. Washington State Department of Aeronautics and the Museum of Flight are located on the west side of the airport, along with The Boeing Company and some general aviation hangars.

Perimeter Road provides automobile access to and from all facilities on the east side of the airport. Perimeter Road is connected to Airport Way South through four separate entrances: north, main, Portland Street, and south. In addition to businesses having direct access onto Ellis Avenue South, the northwest portion of airport property is provided access via South Warsaw Street, South Myrtle Street and South Willis Street. On the west side of the airport, individual airport tenants are accessed directly off of East Marginal Way South.

These areas are graphically presented in Figure A2, *SCHEMATIC AIRPORT LAYOUT PLAN*.



Not to Scale

Figure A2 Existing Airport Layout

INTERNATIONAL AIRPORT Boeing Field
1995

Air Traffic Operations Activity

King County International Airport has maintained a high level of operations over the past several years. As shown in the following table, overall operations (an operation is either a take-off or a landing) have fluctuated from approximately 426,000 in 1990 to approximately 345,000 in 1998. As can be seen, a significant increase in air taxi (commuter) operations occurred throughout the period with an accompanying increase in air carrier operations in 1997 and 1998. The air carrier operations are defined as aircraft types and are associated with The Boeing Company and cargo operations. There are no air carrier aircraft operations in scheduled passenger service.

Table A1
SUMMARY OF HISTORICAL OPERATIONS, 1990-1999
King County International Airport FAR Part 150 Study

Year	Air Carrier	Air Taxi	General Aviation	Military	Total
1990	5,691	18,726	396,778	4,352	425,548
1991	6,176	21,373	338,047	3,686	369,282
1992	5,918	28,017	376,324	4,082	414,341
1993	4,701	30,873	320,322	2,939	358,835
1994	5,452	35,564	375,826	3,273	422,804
1995	8,336	38,655	307,660	2,615	357,266
1996	8,877	40,727	287,522	2,195	339,321
1997	10,709	46,803	311,313	2,243	371,068
1998	11,659	44,299	286,933	2,269	345,160
1999*	9,221	38,426	231,656	1,191	281,286

* As of October, 1999

Source: Airport Activity Reports

In terms of overall operations, general aviation aircraft represent the largest number of operations, with air taxi being the next highest. Air carrier operations account for less than five percent of the overall operations. Military operations account for less than one percent of all the operations.

In terms of passenger enplanements, since 1990 there have been minimal passenger enplanements at the airport, less than 10,000 per year with only

2,300 enplaning in 1998. All enplanements are associated with air taxi operations carried out by turboprop and rotorcraft aircraft. There are two such operations on the airport, West Isle Air and Helijet Airways. West Isle Air operates turboprop aircraft and Helijet Airways operates rotorcraft. West Isle Air flies to the San Juan Islands and Helijet Airways flies to Victoria and Vancouver.

The air carrier operations are associated, for the most part, with The Boeing Company, and their manufacturing and associated aircraft services. Air cargo operators also fly air carrier designated aircraft, although for cargo purposes. The military operations are also associated with The Boeing Company's aircraft services.

Airspace/Air Traffic Control

The Federal Aviation Administration is responsible for the safe and efficient use of the national air space. This airspace is divided into three specific types; enroute, terminal and tower. When an aircraft departs an airport it is located in the airspace being handled by air traffic controllers working in an air traffic control tower. When the aircraft is approximately one mile away from the Airport, the aircraft is handed off to controllers working the Terminal Radar Approach Control Facility (TRACON). These controllers are responsible for the airspace extending out twenty-five to thirty miles from the Airport in all directions. The aircraft then enters the third type of airspace and becomes the responsibility of enroute controllers working in an Air Route Traffic Control Center (ARTCC). The enroute controllers retain control until the aircraft nears its intended destination. The process is then reversed for landings. For aircraft operating at Sea-Tac Airport, the controlling facilities responsible for the terminal and tower airspace are located in the main terminal building.

There are several airports located in the Seattle area and under the control of Seattle TRACON. Although Sea-Tac accounts for a significant percentage of all area aircraft operations, the cumulative number of aircraft operations at the other airports, including KCIA, also adds a significant workload for controllers in the Seattle TRACON. There are also other general aviation airports without operational control towers or published instrument procedures that contribute to the total number of area wide aircraft operations. While aircraft using these other general aviation airports operate under visual flight rules (VFR), they utilize the terminal airspace and aircraft using KCIA must be separated from them. Seattle TRACON provides full arrival and departure services for King County International Airport/Boeing Field airport, as well as for Sea-Tac, Gray Army Air Field,

McChord Air Force Base, Olympia Airport, Renton Municipal, Tacoma Narrows, Bremerton National Airport and Shelton/Sanderson Field.

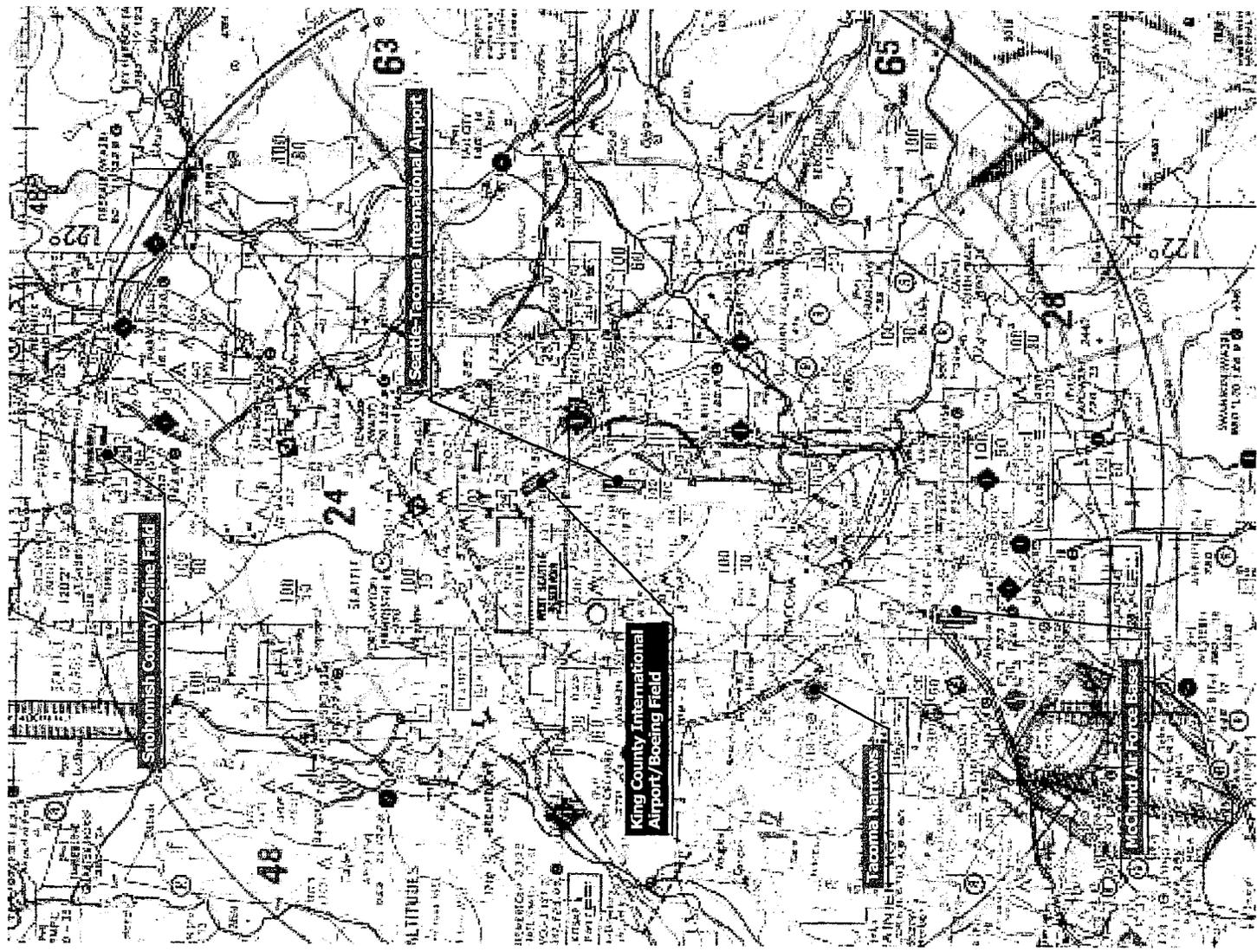
BFI has a twenty-four hour, continuously operating Air Traffic Control Tower (ATCT) that has an associated Class D Airspace area. Aircraft that operate within Class D Airspace must be in contact, at all times, with the tower controllers, especially to receive approval for take-offs and landings. Standard ATAs are designated to include all airspace within five miles of the Airport from the surface of the ground up to (but not including) 3,000 feet. Because of the close proximity to other airports in the area, especially Sea-Tac, the King County International Airport ATA is not completely circular. Airspace operational activities are explained in greater detail in the following paragraphs.

Air Space Configuration King County International Airport is located within the Seattle-Tacoma Terminal area airspace as shown in Figure A3. This airspace has been delegated to the Sea-Tac TRACON facility by the Seattle ARTCC or Center. The Center provides Air Traffic Control (ATC) services to aircraft between terminal areas. The Seattle TRACON provides approach/departure control services within its delegated airspace. Eight of the busiest airports within the Seattle TRACON's airspace have Air Traffic Control Towers (ATCT) or "towers". These towers provide control within the TRACON's airspace. Airports that have control towers are listed below:

Boeing Field/King County International
Gray Army Air Field
McChord Air Force Base
Olympia Airport
Renton Municipal
Seattle-Tacoma International
Tacoma Narrows

The Center and TRACON provide control primarily to aircraft operating under instrument flight rules (IFR). In addition, TRACON provides control or service to aircraft operating under visual flight rules (VFR) within the Seattle Class B Airspace, (Formerly TCA). An ATC clearance and control is mandatory for VFR aircraft operating within Class B airspace. The Seattle Class B Airspace Area is depicted on Figure A3.

Published instrument approach procedures exist for eight airports within the Seattle TRACON airspace as listed in Table A3.



Not to Scale

Figure A3 Airspace/NAVAIDS Summary

INTERNATIONAL AIRPORT/Boeing Field
McCord Air Force Base

Table A3 differentiates between precision and non-precision approaches. A precision approach, by definition, provides electronic vertical guidance to the pilot as well as horizontal (azimuth) guidance. A non-precision approach provides horizontal guidance only. Generally the azimuth guidance for a precision approach is more precise. For an Instrument Landing System (ILS) approach procedure, a localizer transmitter provides the azimuth guidance and a glide slope transmitter provides the vertical guidance.

Table A3
PUBLISHED IFR APPROACH PROCEDURES
King County International Airport FAR Part 150 Study

Airport Name	Runway	Procedure
King County Int./Boeing Field	13R	ILS (CAT I)
	31L	ILS (CAT I)
Bremerton National	1	NDB
	19	ILS (CAT I)
Gray Army Field	15	ILS, NDB
	33	VOR, NDB
McChord Air Force Base	34	ILS, HI-TACAN
	16	ILS, TACAN
Olympia	17	ILS (CAT I)
	34	VOR/DME
	To airport	VOR-A
Renton Municipal	15	NDB
Seattle-Tacoma International	16R	ILS (CAT IIIB), NDB
	34L	ILS (CAT I)
	34R	ILS (CAT I), NDB
	16L/R	VOR
	34L/R	VOR
Shelton/Sanderson Field	To airport	NDB-A
Tacoma Narrows	17	ILS (CAT I)
	35	NDB

Abbreviations: DME-Distance Measuring Equipment; ILS-Instrument Landing System; LOC BC-Localizer Back Course; NDB-Nondirectional (radio) Beacon; TACAN-Tactical Air Navigation; VOR-Very High Frequency Omnidirectional Range.

Air Space Usage

All aircraft flights are governed by either visual flight rules (VFR) or instrument flight rules (IFR). Definitions are contained in FAR Part 91 and summarized below. The basic difference between VFR and IFR is that the pilot maintains spatial orientation of an aircraft by reference to the earth's surface for VFR and by reference to aircraft instruments for IFR. Under IFR rules, the pilot can operate in poor visibility conditions when operating in controlled airspace. Flight under VFR rules requires good visibility and maintenance of specified distances from clouds.

The Seattle Terminal Airspace area includes nine IFR airports and approximately thirty VFR airports. Two of the IFR airports are military, McCord AFB and Gray AAF and ten of the VFR airports are private or restricted and generally not available to the public.

IFR Operations

Air carrier and many turbojet general aviation and military aircraft operating to or from the Airport under IFR, are reassigned coded flight routes and procedures referred to as Departure Procedure (DPs) and Standard Arrival Routes (STARs). These DP and STAR routes are depicted on Figure A4 for north flow and on Figure A5 for south flow. These figures also depict arrival and departure gates. Navigation of IFR aircraft within the Seattle TRACON airspace is generally provided by radar vectors to achieve efficient sequencing, spacing, and separation between aircraft. Therefore, actual aircraft flight tracks, particularly closer in to the Airport, will not conform exactly with the gates, DPs, and STARs depicted.

In general, however, IFR arrival aircraft are cleared to the Airport by the Seattle Center via these STARs while descending from enroute altitudes. These aircraft arrivals are "handed off" via radar from the Seattle Center to the Seattle TRACON at various entry points referred to as "gates". In other words, there are established arrival routes that aircraft utilize and the pilots are in contact with different controllers as they approach the Airport.

In April, 1990 the Federal Aviation Administration standardized the air traffic patterns for jet aircraft flying in and out of BFI. The new air traffic plan referred to as the "4-Post Plan", changed the arrival and departure procedures used by the air traffic controllers to transfer the aircraft from the enroute to the terminal environment. The FAA determined that safety and efficiency could be improved if the procedures used to route air traffic to the terminal airspace area

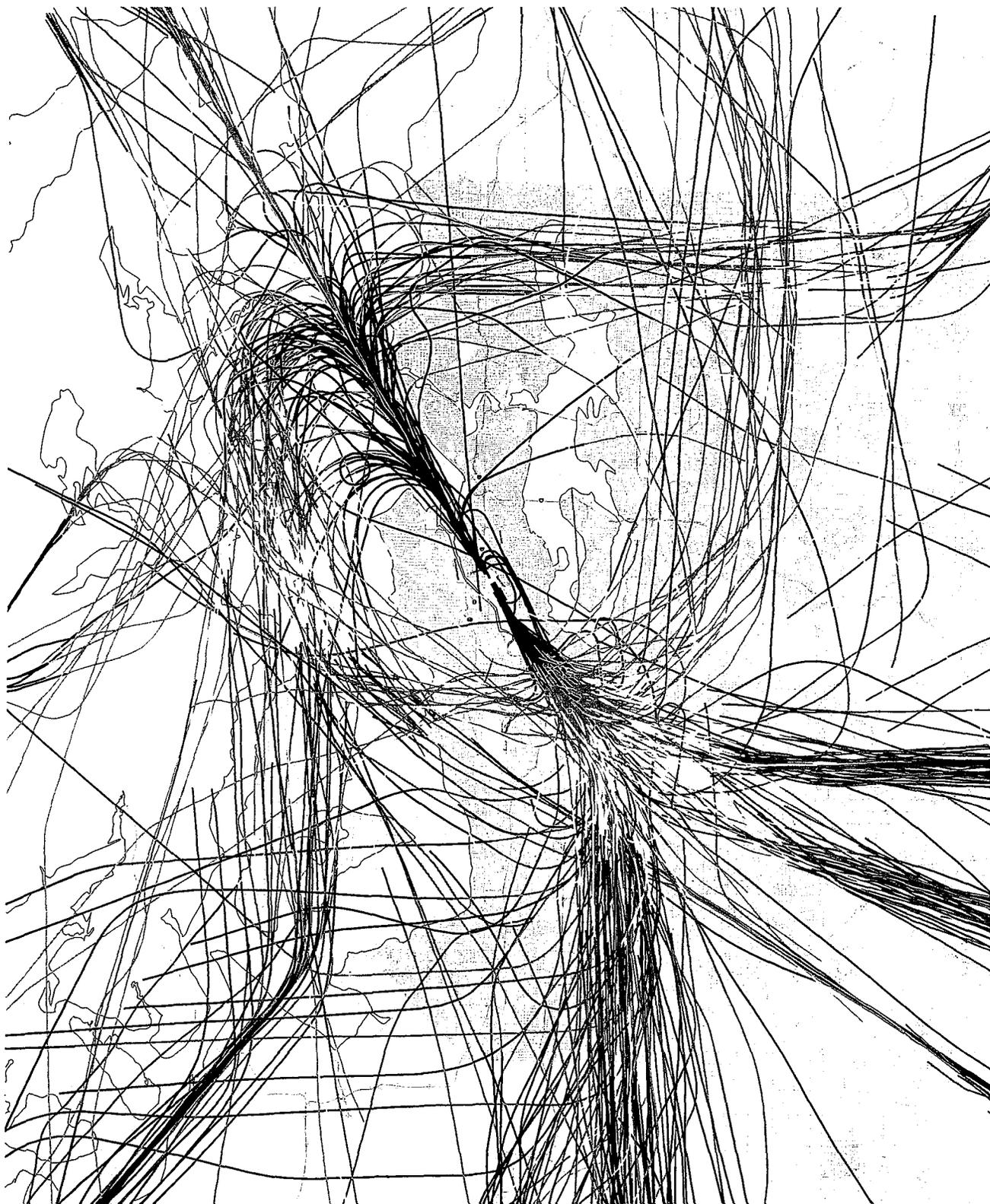
were designed to be the same regardless of the direction of traffic flow. Depending on the city of origin, aircraft enter the terminal airspace from one of the four "posts", or corners of the terminal airspace area. These procedures helped to alleviate difficulties associated with having two different sets of patterns that were wind dependent.

The TRACON assumes responsibility for guiding the arrival aircraft to the final approach course at the destination airport and separating it from other aircraft. Lower performance aircraft, and some commuter/air taxi aircraft, operate at lower altitudes below or clear of the jet aircraft routes. The lower performance aircraft are "laced" into the arrival routes closer in to the Airport to minimize the effects of the speed differentials.

When arrival aircraft are in the vicinity of their destination airport they are given descent instructions by TRACON. When the aircraft is approximately 10 nautical miles from the airport, they are given approach approval and at between 5 and 7 miles out, TRACON instructs the pilot to contact the destination airport's tower.

Similarly, departing IFR aircraft are guided by the Seattle TRACON through its delegated airspace and separated from other aircraft. Shortly after departure aircraft are airborne, the tower clears the aircraft to contact the TRACON for departure control. The TRACON then directs departing aircraft toward the departure gates. Similar to arrivals, most departing low performance aircraft are turned immediately after take-off to separate them from the jet departure stream and are kept at lower altitudes. As soon as departing aircraft either pass the departure gate or climb out of the TRACON airspace, they are transferred to ARTCC for enroute control.

Unless visual or divergence separation is applied, TRACON provides all IFR aircraft with a radar separation of at least three nautical miles longitudinally or 1,000 feet of vertical separation throughout their terminal airspace. Additional longitudinal separation to avoid wake turbulence is provided for various combinations of aircraft sizes. The minimum longitudinal separation in terminal airspace is listed below:

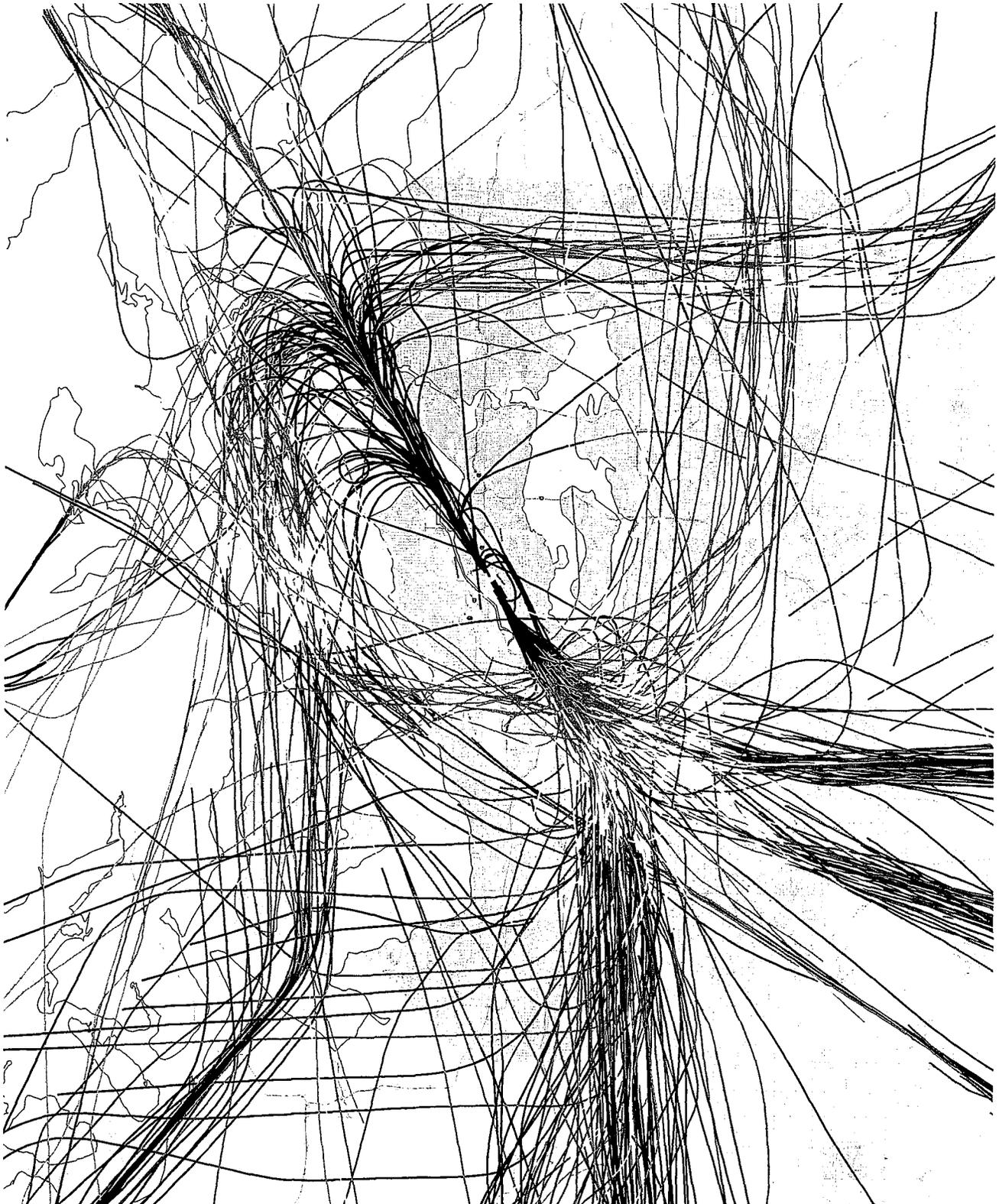


Scale 1"=15,000'

Figure A4 North Flow Radar Flight Tracks

- ∨ 0-2000 AGL
- ∨ 2000 - 4000 AGL
- ∨ 4000 - 6000 AGL
- ∨ 6000 - 8000 AGL
- ∨ 8000 - 10000
- ∨ >10,000 AGL

King County
INTERNATIONAL AIRPORT/Boeing Field
FAR Part 150 Study



Scale 1"=15,000'

Figure A5 South Flow Radar Flight Tracks

-  0-2000 AGL
-  2000 - 4000 AGL
-  4000 - 6000 AGL
-  6000 - 8000 AGL
-  8000 - 10000
-  >10,000 AGL

King County
INTERNATIONAL AIRPORT/Boeing Field
FAR Part 150 Study

In general, however, IFR arrival aircraft are cleared to the Airport by the Seattle Center via these STARs while descending from enroute altitudes. These aircraft arrivals are "handed off" via radar from the Seattle Center to the Seattle TRACON at various entry points referred to as "gates". In other words, there are established arrival routes that aircraft utilize and the pilots are in contact with different controllers as they approach the Airport.

Aircraft Longitudinal Separations [1]

<u>Lead Aircraft Classification</u>	<u>Aircraft Classification</u>	<u>Separation (Nautical Miles)</u>
Heavy	Heavy	4
Heavy	Large	5
Large	Small	4
Heavy	Small	6

[1] Source: FAA Handbook 7110.65L, "Air Traffic Control" with changes.

For the purpose of wake turbulence separation minima, FAA classifies aircraft as Heavy, Large and Small as follows:

Heavy Aircraft capable of takeoff weights of 300,000 pounds or more whether or not they are operating at this weight during a particular phase of flight (Ex. B-747, B-777, DC-10).

Large Aircraft of more than 12,500 pounds, maximum certified takeoff weight, up to 300,000 pounds (Ex. B-737, MD-80, Business jets).

Small Aircraft of 12,500 pounds or less maximum certified takeoff weight (Twin and single piston/turboprops).

Within the Seattle Class B airspace, the Seattle TRACON provides all VFR aircraft a radar separation of 1/2 nautical mile longitudinally or 500 feet of vertical separation from all IFR and VFR aircraft.

VFR Operations

Flights conducted under VFR, unlike IFR flights, are not always under ATC jurisdiction. Under VFR, pilots may normally operate without an ATC clearance except when operating within Class B airspace. When operating in visual meteorological conditions, all pilots, regardless of type of airspace flight plan or ATC clearance, are ultimately responsible to see and avoid other aircraft.

The lower altitudes of airspace to the east and west of the Seattle area are restricted by the Cascade and Olympic Mountains. These mountains and the Class B Airspace tend to channel north/south VFR traffic. One north/south channel or VFR flyway exists at approximately five to six miles east of BFI and below 4,000 or 5,000 feet above mean sea level (MSL). The other north/south VFR flyway is somewhat wider and close to the Olympic Mountains. Those transiting under Class B Airspace in the vicinity of BFI and over the Puget Sound are below 3,000 feet. Some VFR aircraft fly through or over the top of the Class B Airspace. The top of the Class B Airspace is at 10,000 feet above MSL.

Existing Conditions. The term interaction as used in this section refers to a situation requiring special controller and/or pilot attention to ensure adequate separation or sequencing is accomplished. Although this broad definition could include random occurrences that do not affect capacity, there are two interactions which affect BFI capacity that occur regularly during IFR weather conditions and one that occurs regularly when visual approaches are in progress.

These three interactions occur during: (1) IFR south flow conditions; (2) IFR north flow conditions; and (3) visual approaches in south flow conditions.

IFR Weather Conditions-South Flow

During IFR weather conditions, when BFI and Sea-Tac are both operating with south flows, interactions exist between the arrivals to the two airports. Although a minimum of 1,000 feet of altitude separation exists between the published Instrument Landing System (ILS) approaches, a need exists to protect BFI missed approach possibility. In weather conditions which allow BFI Tower controllers to see the Sea-Tac arriving aircraft, visual separation is provided by the controllers and no loss in capacity is experienced. This operating arrangement is known as Plan Alpha. Cloud ceilings at BFI must be at least 2,500 feet for BFI Tower personnel to see Sea-Tac arrivals. The yearly

frequency of occurrence of south flow conditions, with ceilings below 2,500 (no Plan Alpha) feet is approximately 17 percent.

Weather statistics indicate this interaction should occur approximately 15 percent of the time. However, the actual time of this impact on capacity is less because of special ATC procedures. Under these procedures, during certain weather conditions and with pilots familiar with BFI, aircraft approaching Sea-Tac will be advised to maintain 3,000 feet MSL until BFI Tower advises TRACON that the landing of the other aircraft at BFI is assured. At this point the Sea-Tac approaching aircraft pilot is given his final approach clearance and authorization to land. If the BFI approaching pilot executes a missed approach, TRACON will vector the Sea-Tac approach back into the arrival stream.

IFR Weather Conditions - North Flow

During north flow IFR conditions, interactions exist between the arrivals to BFI and departures from Sea-Tac. Sea-Tac departures are held on the ground from the time a BFI arrival nears the final approach fix located just east of Sea-Tac until BFI Tower reports the landing is assured or until visual separation can be provided.

Visual Approaches - South Flow

Visual approaches can normally be conducted when the cloud ceiling is at least 5,000 feet over the Puget Sound and pilots have visual contact with the preceding aircraft or airport.

When visual approaches are being conducted, the TRACON will radar vector aircraft on three arrival routes and sequence them into a common arrival stream over Elliott Bay, for Sea-Tac arrivals. This activity takes place over the top of straight-in arrivals to BFI.

Radar Data

The King County Noise Abatement Office has a noise and flight track data collection and analysis program called TAMIS. This program collects and processes radar data from the FAA's ARTS radar system. Once collected, the TAMIS program performs a number of post analysis processes, including track smoothing, determining if the track is a departure or arrival and assigning a runway to the track. With this system the airport is able to analyze compliance with the noise abatement program and investigate particular incidents concerning aircraft operations.

Flight track data from the TAMIS system has been exported to our Bridge Reports program that will be used in the Part 150 Study in order to further analyze flight tracks at King County International Airport. The TAMIS program exports a file that consists of flight information about the aircraft that is operating on each track and position information as to the location of the flight. The flight information includes data such as the ARTS aircraft type, ARTS airline code, flight number, and type of operation and runway. The position information includes the X and Y position of each radar strike for the flight track for every 4 seconds of the flight as well as the altitude of the aircraft at each point and the time that the aircraft was at that point. The position information is given in distance relative to the ARTS radar antenna that is on the airport property.

Files from the TAMIS system have been successfully exported to our Bridge Reports program for analysis on the Part 150 Study. Note that the data that will be used is based upon the information from TAMIS, which is derived from the FAA's radar system. There is always some missing data in these radar systems. Where there may be lost data or gaps in the data, this information is not recoverable. In addition it is important to note that there is not radar data available for all aircraft. Typically there are not tracks for the small propeller aircraft operating under visual flight rules.

The Port of Seattle Noise Abatement Office has a flight track data collection and analysis program called GEMS. This program collects and processes radar data from the FAA's ARTS (Aircraft Radar Tracking System). Once collected, the GEMS program performs a number of processes, including determining if the track is a departure or arrival and assigning a runway to the track. With this system, the Port is able to analyze compliance with the Port's noise abatement program and investigate particular incidents concerning aircraft operations.

The GEMS program also collects KCIA operations data that can be used for this Study. The program exports a file that consists of flight information about the aircraft that is operating on each track and position information as to the location of the flight. The flight information includes data such as the ARTS aircraft type, ARTS airline code, flight number, and type of operation and runway. The position information includes the X and Y position of each radar strike for the flight track for every four seconds of the flight as well as the altitude of the aircraft at each point and the time that the aircraft was at that point. The position information is given in distance relative to the ARTS radar antenna that is on Sea-Tac property.

These files have been successfully exported to the Bridge Reports programs for analysis in the FAR Part 150 Study. Note that the data used is based upon the information from GEMS, which is derived from the FAA's radar system. There is always the possibility that some loss of data in these radar systems; however, every step possible is taken to insure this does not occur. Where there may be lost data or gaps in the data, this information is typically not recoverable.

Current Noise Abatement Program

King County International Airport (KCIA) has a history of implementing noise abatement programs. However, this is the first FAR Part 150 Study that the airport has undertaken. The airport has implemented several noise abatement procedures. These include; no "touch and go" operations between 10:00 p.m. and 7:00 a.m., intersection departures for jet aircraft are restricted, the short runway (13L/31R) is closed between 10:00 p.m. and 7:00 a.m., engine run-ups for maintenance purposes are prohibited between 10:00 p.m. and 7:00 a.m. (The Boeing Company maintains a self-imposed restriction on maintenance run-ups between 5:30 p.m. and 8:00 a.m. and all day Sunday or holidays), run-up area is designated on the west taxiway to mitigate noise, and Visual Approach Slope Indicators (VASI) have been installed on the general aviation runway to ensure proper altitude when on final landing approach. In addition, the airport worked with the FAA to develop a charted visual approach to Runway 13 Right, which was published in July, 1999. The approach will be available when the ceiling is at least 3,100 feet and visibility is at least four miles. This approach will utilize Elliot Bay to Harbor Island and then a straight-in visual approach to the airport. This will help approaching aircraft avoid noise sensitive areas.

Noise Complaint History

The King County International Airport Noise Abatement Office has been operating a noise complaint hotline since 1996. The purpose of the complaint hotline is to provide the public with a means of contacting the Airport concerning aircraft noise and giving staff insight into the issues that are important to the community. Citizens may call concerning particular incidents or about aircraft noise in general.

A recent sampling of the noise complaint database, which has been developed since 1996, will be reviewed to help identify current issues that are important to citizens that have contacted the hotline.

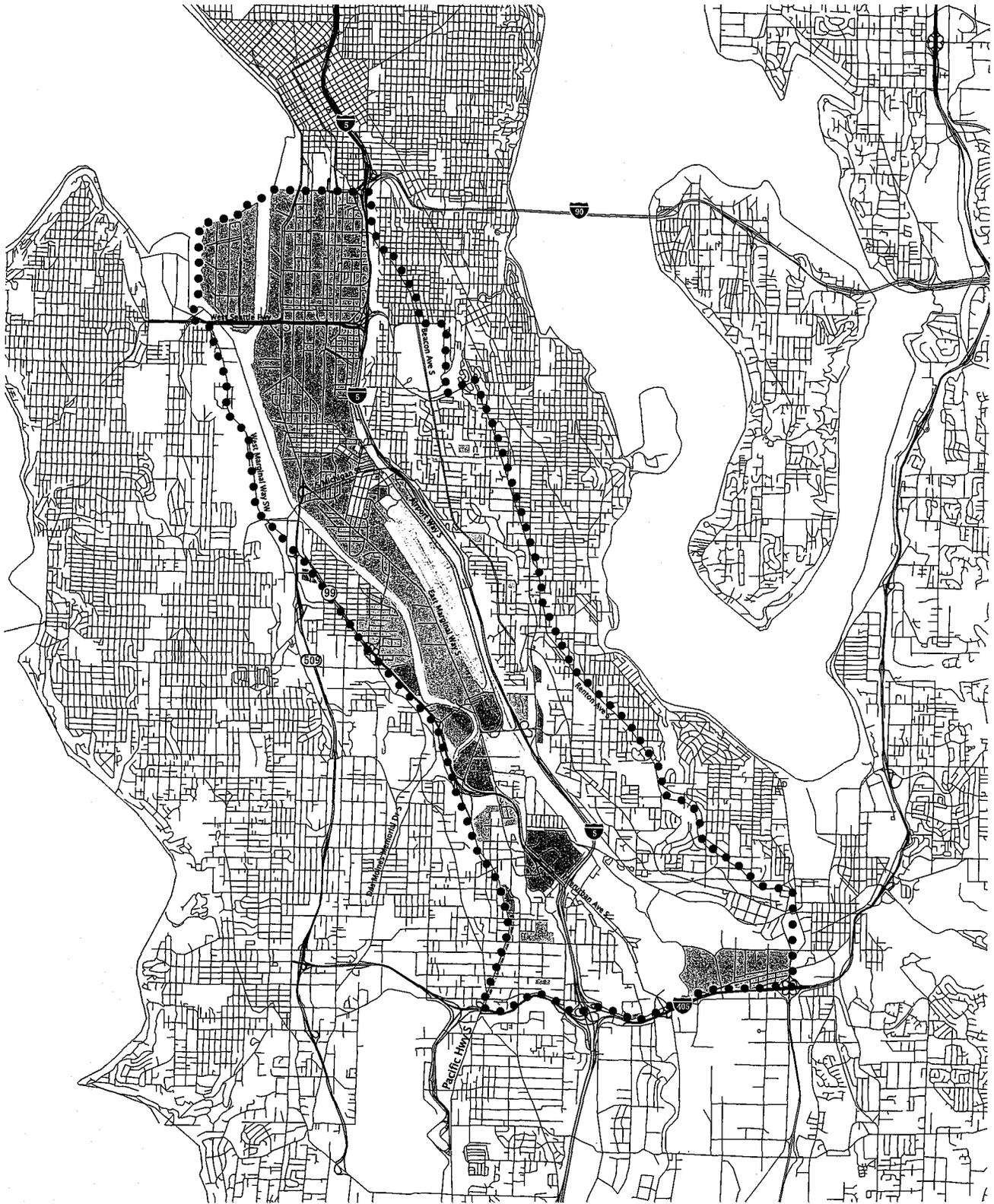
Airport Environs

King County International Airport is within the city limits of the City of Seattle. This is a recent change, in that the City limits of Seattle and Tukwila have been adjusted to reflect this. The City of Seattle has jurisdiction over property to the east, northeast and north of the airport, and the City of Tukwila has jurisdiction to the east and south. It appears that the 65 DNL noise contour will encompass these jurisdictions. FAR Part 150 specifies that the 65 DNL noise contour is the threshold contour for land use compatibility purposes and that the official Noise Exposure Maps reflect that contour. In addition, as part of this Study, we will also look at the 55 and 60 DNL noise contours. However, detailed land use evaluation will be limited to the 65 DNL contour, with generalized land use and population data presented for the 55 and 60 contours.

Existing Land Use. To present generalized existing land uses for the area surrounding the Airport, information was gathered from the recently completed Environmental Impact Statement for the proposed new runway at Seattle – Tacoma International Airport, the FAR Part 150 Study for SeaTac, data and aerial photographs from the Puget Sound Regional Council, and field updates. Preliminary existing land use is presented in Figure A6, *GENERALIZED EXISTING LAND USE*. The area beyond the 65 DNL contour will be evaluated to a more generalized extent.

Existing land use to the north/northwest of the Airport is a mixture of residential development and commercial uses associated with the community of Georgetown. The Steam Plant is a designated historic structure, listed on the National Register of Historic Places, and is just north of the airport's main runway. There are other state-designated historic structures in the Georgetown community.

The Burlington Northern/Santa Fe Railroad Company maintains a switching yard north of the Georgetown community and has several tracks east of the airport. Farther to the north are industrial and commercial uses.



Scale 1"=8000'

Figure A6 Generalized Existing Land Use Map

- Preliminary Study Area Boundary
- Commercial
- Industrial
- Residential
- Government

King County
 INTERNATIONAL AIRPORT/Boeing Field
 FAR Part 150 Study

The area south of the airport is mostly commercial and industrial uses, with residential development in the Allentown neighborhood of Tukwila. To the east of the airport, across Interstate 5 and on the bluff, is the Beacon Hill neighborhood of Seattle. Directly west of the airport is The Boeing Company complex and associated or similar uses. The Duwamish River and associated industrial uses are farther to the west. A more detailed evaluation of land use and population will be presented as they relate to the noise contours once the contours are developed.

In summary, there are areas of existing non-compatible land uses within the immediate airport environs. These include, for the most part, residential development and occur off the ends of the existing runways.

Future Land Use. Each of the jurisdictions within the vicinity of King County International Airport/Boeing Field has adopted future land use plans or guidelines, pursuant to the Washington State Growth Management Act. The adopted Future Land Use Plans are illustrated in Figure A7, *GENERALIZED FUTURE LAND USE*.

City of Tukwila

The City of Tukwila adopted a Comprehensive Land Use Plan in December 1995. The Plan contains a Comprehensive Land Use Plan that depicts future land uses, which is illustrated on Figure A7. The City has adopted several Policies addressing aircraft noise, addressing both Sea-Tac and KCIA.

Policy 7.2.5: Encourage the reduction of noise from Seattle-Tacoma International Airport and King County Airport, by promoting the development of new or the retrofit and modification of existing aircraft engines which are quieter, and operational procedures that help reduce aircraft noise emission levels.

Policy 7.2.6: Work with the Port of Seattle, King County Airport and the Federal Aviation Administration to promote the development and implementation of airport operational procedures that will decrease the adverse noise effects of airport operations on Tukwila and its residents.

City of Seattle

The City of Seattle has adopted a comprehensive plan; Seattle's Comprehensive Plan, *Toward a Sustainable Seattle* in July 1994 and amended it in November 1997. The Plan contains a future land use plan. The Plan is a goals and policy

plan with an accompanying map. The Transportation Element contains two Policies on air transportation:

Policy T5: Work with the state Department of Transportation, public transportation providers, and the public to identify, design, and incorporate noise mitigation measures into existing and planned traffic and transit operations and capital improvements. Encourage air and rail transport operations to reduce and mitigate their noise impact.

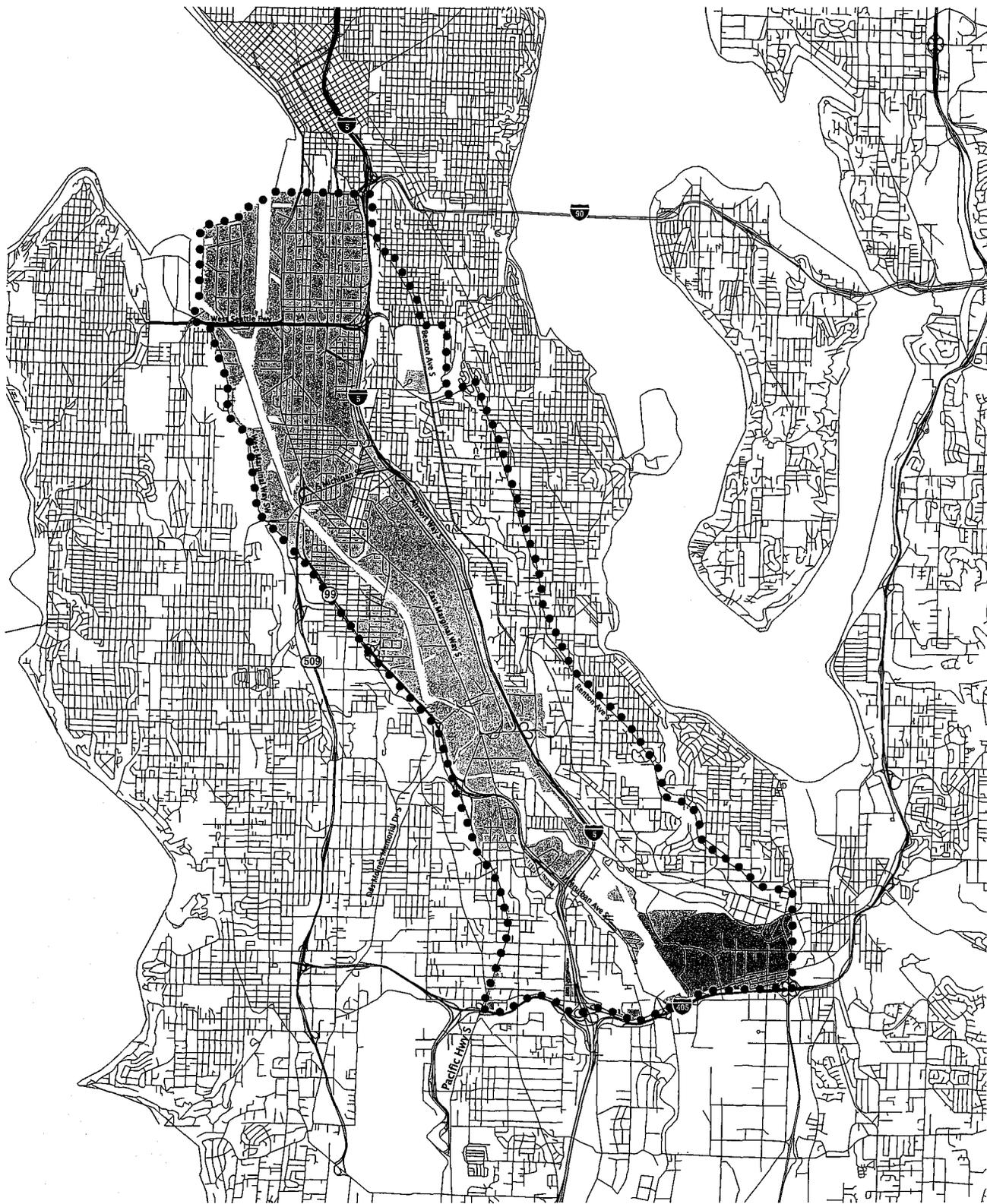
Policy T53: Promote a multi-modal commercial transportation strategy, including rail, trucks, and air and water transport, and advocate for improved freight and goods movement. Work toward improved multi-modal connections among rail yards, the waterfront, the Duwamish, Lake Union, Portage Bay, the ship canal, airports, and regional roadways.

The Future Land Use Map shows King County International Airport/Boeing Field as being an Industrial Area, as well as most of the surrounding area within the Seattle city limits. However, the Plan indicates the community of Georgetown as being residential and commercial with a Neighborhood Anchor designation at 13th Avenue South and South Albro Place.

King County

King County adopted the King County Comprehensive Plan in November 1994 and updated in 1997. The Plan contains several policies pertaining to new essential public facilities or the expansion of existing essential public facilities. However, the Plan does not address aircraft related noise issues or how such noise affects land use development in the county. The Plan contains one policy addressing aviation under Chapter Nine, Transportation, Section H Aviation, Freight, and Ferries;

Policy T-540: Regional aviation facilities play a foundational role in promoting a strong regional economy as well as providing significant direct and indirect employment opportunities to residents of the County and Puget Sound region. Consistent with this plan's policies concerning the siting of essential public facilities, King County should work with the Puget Sound Regional Council and its members to ensure that any regional projected capacity problems, and the air transportation needs of the region's residents and economy are addressed in a timely manner. Siting decisions must be consistent with the Regional Airport System Plan, the Countywide Planning Policies and this Plan.



Scale 1"=8000'

Figure A7 Future Land Use

- Preliminary Study Area Boundary
- Commercial
- Industrial
- Public/Open Space
- Residential
- Government

King County
 INTERNATIONAL AIRPORT/Boeing Field
 FAR Part 150 Study

Zoning. All of the jurisdictions in the vicinity of King County International Airport have adopted traditional land use zoning ordinances to control the types of land uses on specific parcels. The ordinances divide a jurisdiction into districts and prescribe certain requirements for allowable uses within those districts. The various zoning codes pertaining to airport-related activities are presented in the following paragraphs. Figure A8, *GENERALIZED EXISTING ZONING*, presents the zoning districts for the various jurisdictions.

The area immediately surrounding the Airport within the jurisdiction of the City of Seattle between the Interstate and West Marginal Way is generally zoned Industrial. The Georgetown community is generally zoned as Commercial and Residential. There are additional areas of Commercial zoning to the north of Georgetown. There is an additional area of Residential and Commercial zoning southwest of the airport, west of the Duwamish adjacent to the City of Tukwila and King County.

Tukwila has zoned the area directly south of the Airport and west of the Interstate is zoned Manufacturing Industrial Center/Heavy Industrial up to South 112th Street, where Low Density Residential zoning occurs. Farther south and west of the Airport are areas of mixed zoning until the Tukwila Urban Center south of Interstate 405. There is an area of Low Density Residential and Commercial zoning just east of Interstate 5 and the South Boeing Access Road.

King County zoning appears southwest of the airport west of the Duwamish River. There is industrial zoning between SR 99 and the river, with residential and commercial mixed zoning west of SR 99.

City of Tukwila

The City of Tukwila has adopted a zoning ordinance that does not address aircraft related noise issues in relationship to land uses.

City Seattle

The City of Seattle has adopted a zoning ordinance that does not address aircraft related noise issues in relationship to land uses.

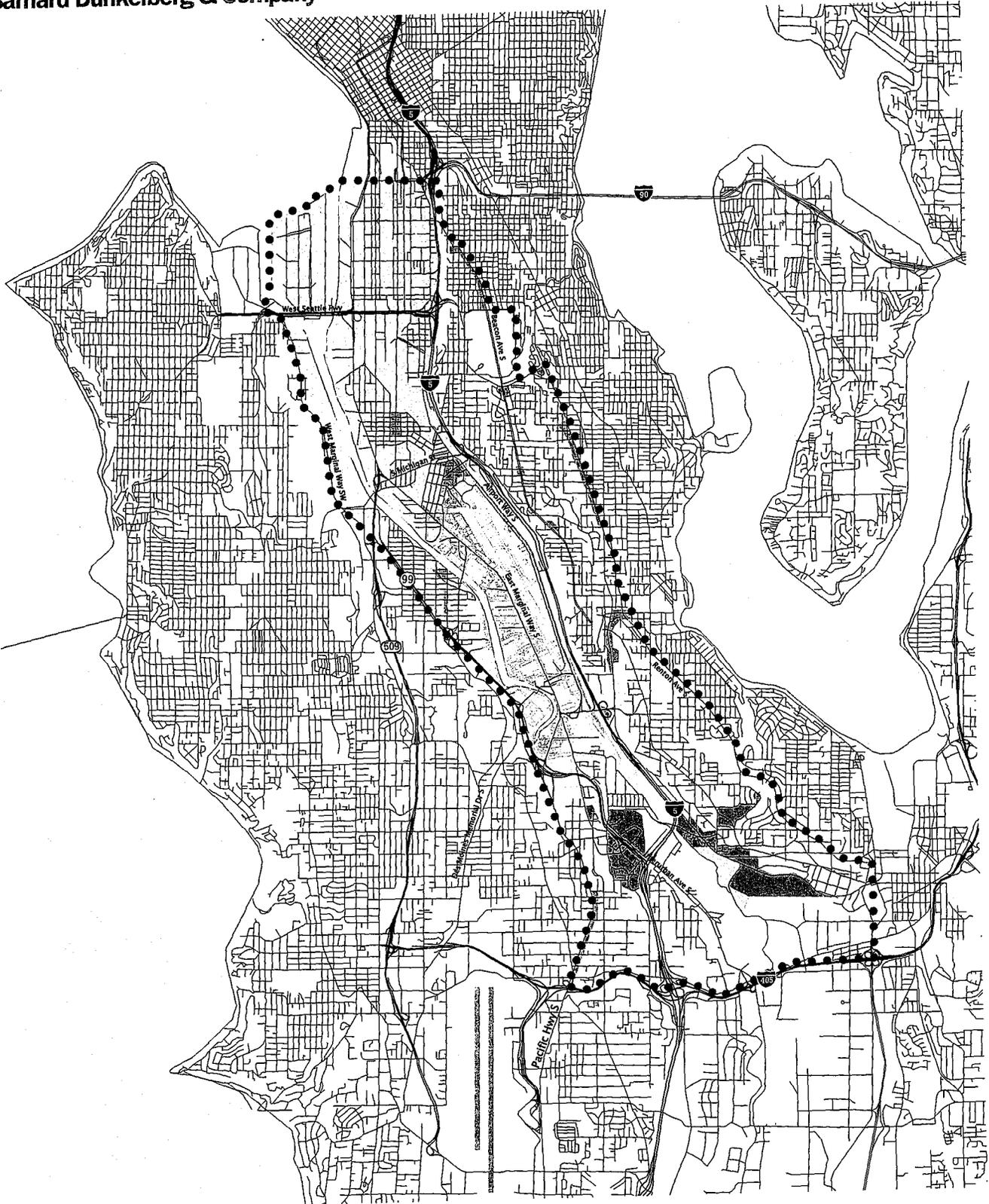
King County

King County has an adopted zoning ordinance that addresses land use development within King County, the King County Zoning Code, Title 21A. The Code was last amended in March 1998. The Code contains provisions for Special District Overlay Zones.

21A.38.160. Special District Overlay-Aviation Facilities. A. The purpose of the aviation facilities special district overlay is to protect existing non-commercial airports from encroaching residential development. Aviation facilities special district overlay shall only be established in the area up to ¼ mile around airports and shall be zoned UR or RA.

B. The following development standards shall apply to uses locating in aviation facilities special overlay districts: On the title of all properties within pending short subdivisions or subdivisions and binding site plans, the following statement shall be recorded and be shown to all prospective buyers of lots or homes: "This property is located near the (name of airport) which is recognized as a legitimate land use by King County. Air traffic in this area, whether at current or increased levels, is consistent with King County land use policies provided it confirms to all applicable state and federal laws."

Sound Attenuation Requirements. King County has sound attenuation requirements for new construction within aircraft noise contours. **A copy is in the Appendix.**



Scale 1"=8000'

Figure A8 Generalized Existing Zoning

- Preliminary Study Area Boundary
- Retail/Commercial
- ▨ Residential
- ▧ Industrial

King County
 INTERNATIONAL AIRPORT/Boeing Field
 FAR Part 150 Study

Land Use Controls Evaluation

Land use planning and development controls offer ways through which the county, cities, and the Airport may achieve certain objectives. These measures involve the various opportunities and options that are available for influencing, directing, managing, and controlling the type and sequence of development within the Airport environs. The various techniques and mechanisms range from fee simple land acquisition programs to more advanced regulatory mechanisms and advisory programs. Each different mechanism is useful in accomplishing desired objectives and can be used separately or in concert with others as the situation dictates. The following is a discussion of the land use planning and control measures available for consideration.

Fee Simple Land Acquisition. Fee simple land acquisition is often the most effective means that is available to an airport or community for controlling land use development and ensuring compatibility; it is also the most expensive. Land acquisition can be accomplished through negotiation and purchase from the owner or through condemnation proceedings. Although it is the most expensive, resale for a compatible use or joint purchase with another government agency for a compatible public use may help reduce the net cost of the property.

Condemnation of property is available to the County as a means of acquiring property. Condemnation is subject to the legal finding that it is for a public purpose, although this has traditionally been broadly defined by the courts. In fact, the acquisition of airspace by eminent domain is a proper use (*Port of Olympia v. Deschutes Animal Clinic, Inc.*, 1978, 19 Wash. App. 317). Washington Statutes specifically state that land for airports can be acquired by eminent domain (RCWA 14.08.030). If condemnation is used or outright purchase is made with the assistance of federal funds, provisions of the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 (URARPA, P.L. 91-646) would apply. The Act stipulates that homeowners be granted a payment of up to \$22,500 to compensate for any differential between the value of the condemnation unit and the cost of comparable replacement housing. Renters are granted up to 3-1/2 years of rent differential. Renters and owners alike are eligible for moving expenses. The federal assistance portion of relocation costs is in the same proportion as whatever grant is involved with the condemnation procedure.

The acquisition of property affected or potentially affected by airport operations is the most effective and efficient means of controlling land use in noise impacted areas. It is possible that compatible public use could compensate for the direct expenditure of purchasing the property. It should be noted that the acquisition of property is used more often than not in circumstances where the noise situation is critical for the continuation of existing uses or where such preventive measures as comprehensive planning and zoning are not working.

Zoning. Zoning is the most traditional approach, and the most common and widely used legal device to control land use development. It can be defined as “the division of a city (*or county*) by legislative regulation into districts and the prescription and application in each district of regulations having to do with structural and architectural design of buildings and of regulations prescribing use to which buildings within designated districts may be put.” This is accomplished through the adoption of a zoning ordinance, which specifies the use, size, height, and bulk of structures within each district. The regulation of land through a zoning ordinance is premised as part of the police power inherent in the state and delegated to the local jurisdiction through state enabling legislation. The county and various communities surrounding the Airport do have the statutory authority to adopt zoning ordinances and maps (RCWA 36.70.010, 36.70A.040 and 35.63.080, and Washington State Constitution, Article 11, §11). As stated earlier, the communities surrounding King County International Airport have adopted such zoning ordinances, and do control land use within their respective boundaries.

Zoning is a useful tool for controlling land use development and promoting compatibility while supporting private land ownership. Zoning cannot be relied upon as a “corrective measure” as it can only be applied prospectively and not retroactively. Also, since zoning is a creature of a political body and subject to changing conditions and situations, the zoning classification of any particular tract of land is always subject to change.

Zoning can also be used to regulate the height of objects around airports to prevent hazards to navigation. Washington Statutes specifically allow airport sponsors to implement height hazard zoning in certain designated areas within an airport’s environs to prevent the establishment of hazards (RCWA 14.12) and the Attorney General has stated that zoning of building heights near an airport is a proper use of police power (Op. Att. Gen. 1953-55, No. 298). The State of Washington has no specific enabling legislation to allow airports or airport sponsors to enact zoning ordinances based on aircraft noise or noise contours. Several states (Texas, California) have enacted such enabling

legislation, which prevents the encroachment of non-compatible land uses within the Airport environs.

In summary, zoning is the most widely used land use control mechanism and offers an acceptable tool for implementing a land use compatibility plan. There are several state statutes that grant zoning authority, which can have an effect on the area around King County International Airport, RCWA 36.70.10, 36.70A.040, 14.12 and 35.63.060. Zoning can be a time-consuming effort in that the designation of zoning classifications and their implementation must be closely monitored to ensure continuing compatibility.

Comprehensive Planning. A comprehensive plan is an expression of the community's policies and goals toward land use and development, and serves as a guide for policy implementation. As stated earlier, the county and the communities surrounding the Airport have adopted future land use plans to guide development based on Washington Statutes.

In 1990, Washington State enacted the Growth Management Act to address problems caused by rapid population growth and uncoordinated planning efforts throughout the state. The legislation seeks to ensure that population growth and planning for transportation, housing open space and other essential services and infrastructure make sense and are compatible. The Act provides a process for siting "Essential Public Facilities" such as an airport. Two principles of the Act are "consistency" and "concurrency". This means that not only consistent planning policies are required among various county and regional jurisdictions, but that the timing of such planning must occur in a manner that promotes the policies. The King County Growth Management Policy Council has been established to facilitate coordination of land use and transportation planning.

A comprehensive plan by itself does little good and cannot control development or relieve noise impacts/incompatibilities without implementing a development plan, but there are other tools available, which will be discussed subsequently.

Subdivision Regulations. The county and various communities have adopted subdivision regulations pursuant to the statutes outlined above, which govern the process of changing raw undeveloped land into subdivisions. This is an exercise of the police power by the local unit of government, as is the enactment of a zoning ordinance. To be most effective, subdivision regulations must be coordinated with the comprehensive plan and the zoning ordinance for proper implementation and goal achievement. Subdivision regulations can be used to ensure the granting of an aviation easement as part of the building permit process. In addition, the regulations can be utilized to

control utility size and placement, street design, and the timing of the installation of these facilities when coupled with a capital improvements program. It appears that the subdividing of land must be in conformance with the adopted comprehensive plan of a jurisdiction.

Subdivision regulations for the various jurisdictions within the Airport environs were examined. None of the jurisdictions requires notice of any kind on subdivision plats that the subdivision is within the vicinity of an airport and may experience aircraft noise. In addition, there is no requirement to grant an avigation easement to the jurisdiction for aircraft over flights in any of the subdivision regulations.

Easements. An easement is the right of the owner of land to make lawful and beneficial use of the land of another. It is a limited right, not an estate, or fee, in the land of another. Easements are probably the second most desirable, after the fee simple acquisition, as a means of land use control. Easements can be classified as one of two types, depending on what type of interest is involved. A *positive* easement is one in which the owner of the easement has the right to do something with the land, where a *negative* easement is one where the landowner gives up his right to do something. The right to construct an access road across someone's property is an example of a positive easement, compared to a landowner who gives up his right to build a tower, which is a negative easement. Many times both positive and negative easements are acquired in the same piece of property.

Easements may be acquired through grant, gift, devise, acquisition, or condemnation. The purchase of an easement in some cases can be as expensive as outright fee simple purchase. Easement acquisition by condemnation is usually restricted to certain types outlined in state enabling legislation and many times noise easements are not specifically mentioned in the legislation. Washington State case law specifically mentions that the acquisition of airspace by eminent domain is a proper use (*Port of Olympia v. Deschutes Animal Clinic, Inc.*, 1978, 19 Wash. App. 317).

Avigation easements are a prime and common example of the type of easement commonly required within the Airport environs. An avigation easement allows aircraft to fly over the property, make noise, and may limit the height of objects on the burdened property within approach areas.

Building Codes. Building codes are regulations that govern the construction practices in any given jurisdiction and which must be followed in order to obtain a building permit from the governing body. Adoption of a building code can

provide suitable noise attenuation of new construction throughout the city or county, but sound attenuation for *site-specific* noise exposure areas is not easily accomplished through the building code. However, certain sound attenuation measures can be included in the building code and referred to for specific areas through the zoning ordinance and subdivision regulations. The code is most easily enforced through the building permit procedure. As stated previously, King County has specific building code provisions addressing sound attenuation.

Capital Improvements Program. The implementation of capital improvements often encourages growth and development in those areas. To avoid incompatible land uses, capital improvements should be programmed to encourage compatible development and discourage incompatible development. Any programs, which might discourage noise sensitive uses, should be undertaken in the identified noise zone. This can be particularly effective in directing industrial/commercial development to areas, which would be incompatible for residential development.

State Legislation. The following are State of Washington statutes that may effect land use planning and compatibility with aircraft operations and airports.

State of Washington, Chapter 173-60 WAC

Maximum Permissible Environmental Noise Levels

Land use Noise Source	Land Use of Receiving Property		
	Residential	Commercial	Industrial
Residential	55 dBA	57 dBA	60 dBA
Commercial	57	60	65
Industrial	60	65	70

The maximum permissible levels are:

Reduced by 10 decibels at night (10 pm to 7 am) when the receiving land use is residential.

Increased by 15 dBA for up to 1.5 minutes, 10 dBA for up to 5 minutes and 5 dBA for up to 15 minutes.

Sounds created by aircraft in flight are exempt.

Sounds from engine testing and maintenance are exempt between the hours of 7 am and 10 pm, PROVIDED that aircraft testing and maintenance shall be conducted at remote sites whenever possible.

State of Washington WAC 248-64-240 “Site Approval (Schools)”

This administrative code establishes noise level conditions for proposed new or expanded school sites. It is a Permanent Rule of the Board of Health.

The Rule established an hourly LEQ limit of 55 dBA, and an hourly AL limit of 75 dBA during hours when school is in session, except sites exceeding these sound levels are acceptable if a plan for sound reduction has been submitted and approved. Also, interior levels are not to exceed 45 dBA.

County Legislation. The following King County Ordinance addresses non-aircraft and aircraft related noise.

King County Ordinance, Chapter 12.87, Environmental Noise

The Ordinance essentially mirrors the State Statute for sound sources located within King County or the City of Seattle. The Ordinance specifically exempts at all times “Sounds originating from aircraft in flight and sounds which originate at airports and are directly related to flight operations”.

“Sounds exempt during daytime hours-Aircraft testing and maintenance. Subject to the conditions of subsections A. through B. of this section, sounds created by the testing and maintenance of aircraft, or components of aircraft, are exempt from the maximum permissible sound levels between the hours of seven a.m. and ten p.m. daily; provided, that aircraft which are regularly scheduled to depart between the hours of seven a.m. and eight-thirty a.m. shall, subject to the same conditions, be exempt between the hours of six a.m. and ten p.m.” The ordinance then describes the conditions under which such operations can occur and describes areas specific to King County International Airport as designated on the Airport Layout Plan prepared December 1, 1976, revised October 10, 1978. These areas are entirely within the ultimate airport property line as described and designated on that Airport Layout Plan.

City of Seattle Ordinance, Chapter 25.08, Noise Control

The City of Seattle ordinance generally is the same as the King County noise ordinance, with the same exemptions and restrictions. The ordinance specifically addresses such operations at King County International Airport.

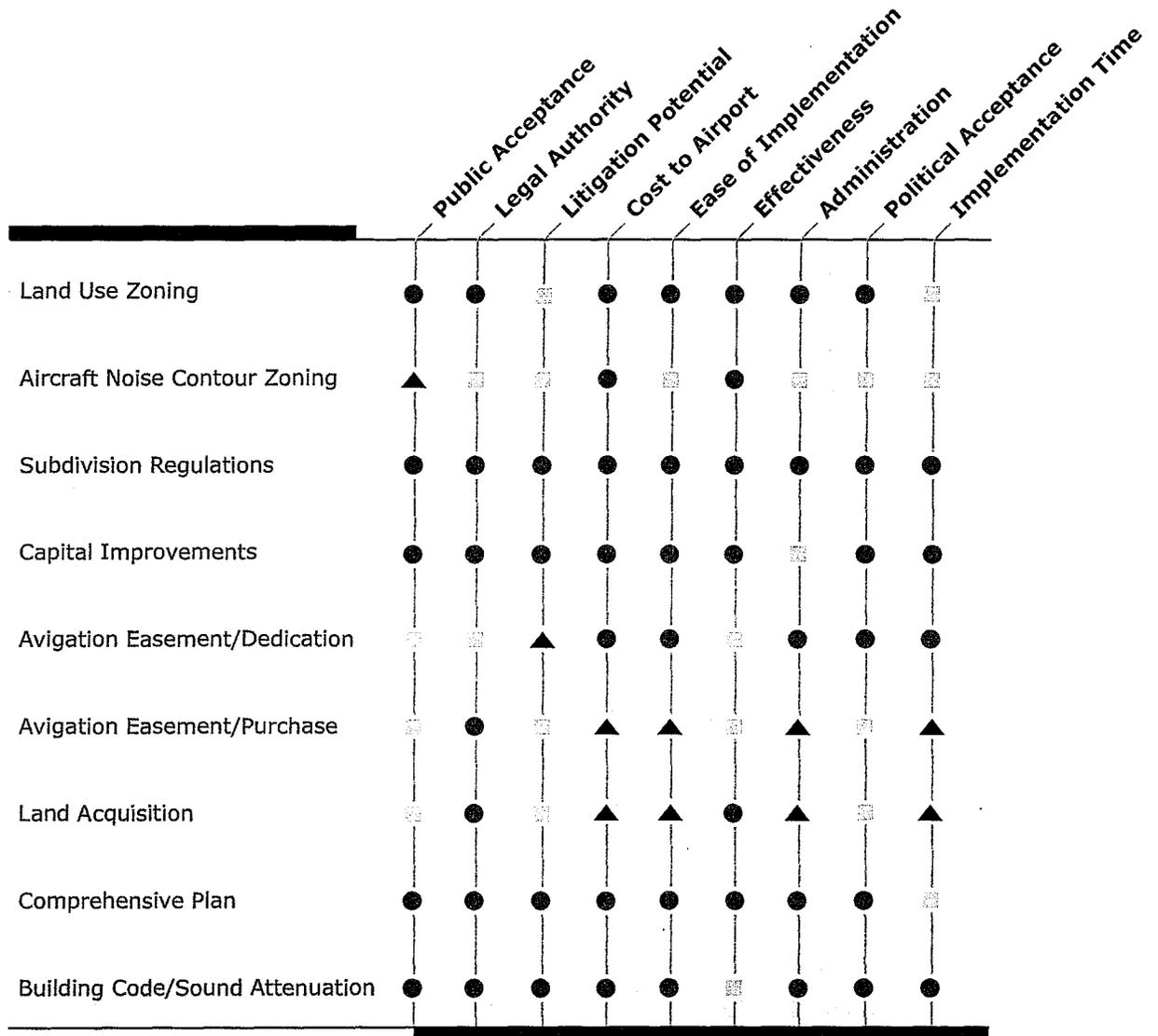


Figure A9 Land Use Decision Matrix

- Positive
- ▲ Negative
- ◻ Neutral

Aviation Activity Demand Forecast

Introduction

Forecasting is a key element in the FAR Part 150 planning process. The forecasts are essential for predicting future noise contours and evaluating different noise abatement/mitigation scenarios. Forecasting, by its very nature, is not exact, but it does establish some general parameters for development and, when soundly established, provides a defined rationale for various development activities in relation to anticipated demand. The purpose here is to provide a summary of the 1994 base data forecast information that was previously accepted by King County and the FAA and to update those forecasts as required in consideration of activity through the end of calendar year 1999. *The following Chapter has been taken from the on-going Airport Master Plan, with forecasts updated to reflect 1999 data and extrapolated to include 2006 as the five-year planning horizon future year. The final section of this Chapter reflects those operations which will be used for the FAR Part 150 Study.*

Master Plan Chapter Forecasts

Previous Forecast Summary

A summary of the unconstrained aviation activity forecasts as published by TRA-BV in December 1996 is presented in the following table, entitled *SUMMARY OF TRA-BV UNCONSTRAINED FORECAST SUMMARY*. As can be seen, this set of forecasts was prepared with 1994 base year data.

Unconstrained forecasts of activity are normally used as the basis in airport planning documents because they provide a theoretical estimate of demand for aviation facilities that will be placed on a certain airport within a defined planning period. In turn this then provides the airport sponsor with the information needed to understand what facilities will be required to meet the unconstrained forecast demand and make determinations whether or not those facilities can be provided.

Table B1
SUMMARY OF TRA-BV UNCONSTRAINED FORECASTS, 1994-2015
King County International Airport FAR Part 150 Study

Operations	1994	2000	2005	2010	2015
General Aviation	377,450	392,200	404,900	418,000	431,787
Military	3,076	3,000	3,000	3,000	3,000
Air Cargo	16,386	20,000	23,000	25,500	28,100
Aerospace	2,657	3,300	3,900	4,600	5,500
Passenger	2,000	5,000	7,200	9,000	10,200
Air Taxi	21,235	25,400	29,400	34,100	39,500
TOTAL OPERATIONS	422,804	448,900	471,400	494,200	518,100
Passenger Enplanements					
TOTAL ENPLANEMENTS	2,300	6,000	38,200	77,000	89,300
Based GA Aircraft					
TOTAL BASED GA AIRCRAFT	436	451	463	476	489

Source: TRA/BV, Aviation Demand Forecasts Draft Technical Paper, December 1996.
¹ Actual.

Revised Forecast Summary

As with all forecasts, those prepared by TRA-BV become flawed as time passes and actual operation counts become available for years that were at one time a part of the forecast period. Utilizing TRA/BV's forecast assumptions, the forecasts for this airport master plan have been updated using 1997 base year data, and are presented in the following table entitled, *REVISED UNCONSTRAINED FORECAST SUMMARY 1997-2015*. Following the table an explanation of the revised forecast components is provided.

Table B2

SUMMARY OF REVISED UNCONSTRAINED FORECASTS, 1997-2015*King County International Airport FAR Part 150 Study*

Operations	1999	2000	2005	2010	2015
General Aviation	311,313	323,274	339,608	356,600	374,275
Military	2,243	3,000	3,000	3,000	3,000
Air Cargo	23,750	25,658	29,387	33,904	38,184
Aerospace	2,950	3,300	3,900	4,600	5,500
Passenger	2,000	5,000	7,200	9,000	10,200
Air Taxi	28,812	31,484	36,498	42,311	49,051
TOTAL OPERATIONS	371,068	391,716	419,593	449,415	480,210
Passenger Enplanements					
TOTAL ENPLANEMENTS	2,300	6,000	38,200	77,000	89,300
Based GA Aircraft					
TOTAL BASED GA AIRCRAFT	443	451	463	476	489

Source: BARNARD DUNKELBERG & COMPANY.

¹ Actual.

To the extent reasonable, the forecasts of aviation activity produced by TRA/BV remain unchanged. Where revisions have been made, they have been driven by the historical operational activity documented in 1995, 1996, 1997 and 1999. By category, the revised forecast numbers are described below.

General Aviation Forecasts

Aircraft Operations. The basis for the forecasting of general aviation aircraft operations is most often determined by establishing a ratio of Operations Per Based Aircraft (OPBA). An aircraft operation is either a landing or a takeoff. A reexamination of the 1994 OPBA statistics at Boeing Field indicates that it was unusually high (the OPBA in 1994 was 866, 1995 was 659, 1996 was 639, and 1997 was 703), this resulted in an unusually high forecast for general aviation aircraft operations. In the revised forecasts presented above, a new growth trend has been

projected using OPBA statistics over the past decade as a basis. The revised forecast starts with an OPBA of 703 in 1997 and increases to 765 in 2015.

Military Activity

Aircraft Operations. The number of military aircraft operations is expected to remain a relatively small percentage of total aircraft operations at the airport. The revised forecast for military aircraft operations is unchanged from the original 1996 TRA/BV projection.

Air Cargo

The quantity of air cargo passing through the airport and the number of air cargo aircraft operations has increased significantly since 1994. These increases dictate the need to re-evaluate the projections made by TRA-BV in 1996.

Air Cargo Quantities. In 1994, approximately 40,000 tons of air freight passed through the airport. That quantity increased to approximately 142,000 tons in 1997. Using 1997 air cargo statistics as a basis and assuming a 4.6% growth rate for the remainder of the planning period (per the TRA/BV forecast update memorandum dated June 2, 1997) air cargo quantities are expected to increase to approximately 305,000 tons by the year 2015 in the unconstrained forecast.

Air Cargo Aircraft Operations According to the airport's FAA documentation, in 1994, there were approximately 18,218 air cargo aircraft operations at the airport (TRA/BV documented 16,386 operations of cargo aircraft in the 1996 Forecasts Technical Paper). The number of air cargo aircraft operations at the airport increased to 23,750 in 1997. As the quantity of air cargo passing through the airport has increased, the tons of cargo carried per aircraft operation has also increased. This is a trend that is expected to continue in the future. In 1997, each air cargo aircraft landing or taking off at the airport carried an average of almost six tons of air cargo. The average tons per aircraft operation is expected to increase by approximately two tons by the year 2015 (TRA-BV forecast update memorandum dated June 2, 1997). The number of annual air cargo aircraft operations is expected to increase to approximately 38,000 by the year 2015.

Aerospace Activity

Aircraft Operations. The projection of number of aerospace aircraft operations is unchanged from the original 1996 TRA/BV forecast.

Passenger Activity

Enplaned Passengers and Aircraft Operations The projections for number of enplaned passengers and the number of commercial passenger aircraft operations are unchanged from the 1996 TRA/BV forecast. The forecast of unconstrained demand for commercial passenger activity at the airport recognizes that in consideration of the airport's central location within Seattle Metropolitan area, there is certainly demand for passenger services. It must also be taken into consideration that at the present time, no airline is proposing a significant commercial passenger operation at the airport, and that no new facilities are programmed to accommodate such growth.

Air Taxi Activity

Aircraft Operations. The number of aircraft operations attributed to the air taxi category increased from 21,235 in 1994 to 28,812 in 1997. Using the 1997 activity as a base year, the TRA/BV projection of a 3% compound annual growth rate was used to forecast air taxi aircraft operations for the remainder of the forecast period.

Operations Forecast By Aircraft Type

The following table, entitled *OPERATIONS FORECAST BY AIRCRAFT TYPE, 1997-2015*, depicts the approximate level of use by aircraft types that are projected to use KCIA. This table reflects the growing percentage of turbine-powered aircraft anticipated to operate at the airport, and the decreasing percentage of piston-powered aircraft. This is indicative of the type of facility the airport is expected to become, the prevailing local economic conditions, and national trends.

Table B3
UNCONSTRAINED OPERATIONS FORECAST BY AIRCRAFT TYPE, 1997-2015
King County International Airport FAR Part 150 Study

Operations By Type	1997^(a)	2000	2005	2010	2015
<i>General Aviation</i>	<i>311,313</i>	<i>323,274</i>	<i>339,608</i>	<i>356,600</i>	<i>374,275</i>
Single Engine	217,919	223,059	227,537	235,356	239,536
Multi-Engine	31,131	32,327	33,961	35,660	37,428
Turboprop	15,566	16,164	16,980	17,830	18,714
Business Jet	31,131	35,560	42,451	46,358	56,141
Helicopter	15,566	16,164	18,678	21,396	22,457
<i>Military</i>	<i>2,243</i>	<i>3,000</i>	<i>3,000</i>	<i>3,000</i>	<i>3,000</i>
Variety of Types	2,243	3,000	3,000	3,000	3,000
<i>Air Cargo</i>	<i>23,750</i>	<i>25,658</i>	<i>29,387</i>	<i>33,904</i>	<i>38,184</i>
<60,000 pounds	17,462	18,730	21,159	24,072	26,729
>60,000 pounds	6,288	6,928	8,228	9,832	11,455
<i>Aerospace¹</i>	<i>2,950</i>	<i>3,300</i>	<i>3,906</i>	<i>4,600</i>	<i>5,500</i>
B-707 (AWACS)	148	148	148	148	148
B-737	1,800	2,392	2,837	3,432	4,177
B-747	10	10	10	10	10
B-757	600	700	850	950	1,100
B-767 (AWACS)	30	40	45	50	55
B-777	362	10	10	10	10
<i>Passenger</i>	<i>2,000</i>	<i>5,000</i>	<i>7,206</i>	<i>9,000</i>	<i>10,200</i>
Single-Engine	1,840	3,500	3,600	2,997	2,581
Multi-Engine	460	1,500	2,880	4,500	6,120
Turbojet ²	0	0	720	1,503	1,499
<i>Air Taxi</i>	<i>28,812</i>	<i>31,484</i>	<i>36,498</i>	<i>42,311</i>	<i>49,051</i>
Single Engine	20,168	21,724	24,454	27,925	31,393
Multi-Engine	2,881	3,148	3,650	4,231	4,905
Turboprop	1,441	1,574	1,825	2,116	2,453
Business Jet	2,881	3,463	4,562	5,500	7,358
Helicopter	1,441	1,574	2,007	2,539	2,943
TOTAL ANNUAL OPERATIONS	371,068	391,716	419,593	449,415	480,210

(a) Actual

1 Boeing Company Estimates

2 Turbojet passenger aircraft demand forecast; however, no airline is proposing this type of service for Boeing Field.

Source: BARNARD DUNKELBERG & COMPANY.

Part 150 Revised Forecast

The Forecasts presented above were updated for the FAR Part 150 Study based on 1999 activity levels and presented for the five-year planning horizon. The 2006 forecast is based on the long-range 2015 forecast presented earlier, but extrapolated to 2006. The 1999 Existing Year forecast is presented in the following table. The noise monitoring program has helped identify the actual breakdown of aircraft types.

Table B4
SUMMARY OF OPERATIONS, EXISTING, 1999
King County International Airport FAR Part 150 Study

Operations by Category	Operations Annual	Operations Daily
General Aviation	254,901	698.4
<i>Single Engine</i>	175,882	481.9
<i>Multi-Engine</i>	50,980	139.7
<i>Business Jet</i>	28,039	76.8
Air Cargo (< 60,000#)	17,462	47.8
Air Cargo (> 60,000#)	6,288	17.2
Aerospace	2,950	8.1
Passenger	2,300	6.3
Air Taxi	28,460	78.0
Military	2,373	6.5
Total Operations	314,734	862.3

A more detailed breakdown of aircraft types is presented in the Noise Analysis Chapter.

The Base Case Future (2006) Forecasts are presented in the following table. These reflect an extrapolation of the Unconstrained Forecasts presented above. These forecasts will be used to generate the Future Base Case noise contours. All future noise scenarios will be compared to the Future Base Case contours to determine noise abatement/mitigation value of those scenarios.

Table B5
SUMMARY OF OPERATIONS, FUTURE, 2006
King County International Airport FAR Part 150 Study

Operations by Category	Operations Annual	Operations Daily
General Aviation	343,006	939.7
Single Engine	229,101	627.7
Multi-Engine	51,451	141.0
Business Jet	43,232	118.4
Helicopter	19,222	52.7
Air Cargo (< 60,000#)	21,742	59.6
Air Cargo (> 60,000#)	8,549	23.4
Aerospace	4,040	11.1
Passenger	7,560	20.7
Air Taxi	37,660	103.2
Military	3,000	8.5
Total Operations	425,557	1,165.9

As can be seen, there is an approximate thirty-five (35) percent increase in overall operations from 1999 to 2006. Most of this increase is a result of general aviation operations with some increase in air cargo and air taxi. These represent unconstrained operations at the airport. The same operations numbers will be used to generate the future noise abatement scenarios.

Noise Analysis

This report is presented in five major sections including this introduction. Section 2 presents background information on sound, noise, and how noise affects people. Section 3 describes the methodology used for this study. Section 4 describes the existing noise setting in the environs of King County International Airport. Section 5 presents a description of the base-conditions future noise environment. The analyses presented in this working paper address existing aircraft noise and the predicted five-year future aircraft noise impacts.

Background/Introduction

The purpose of this section is to present background information on the characteristics of noise as it relates to King County International Airport and summarize the methodologies that were used to study the noise environment. This section is intended to give the reader a greater understanding of the noise metrics and methodologies used to assess noise impacts. This section is divided into the following sub-sections:

- Characteristics of Sound
- Factors Influencing Human Response to Sound
- Health effects of Noise
- Sound rating scales
- Noise/Land Use Compatibility Standards and Guidelines

Characteristics of Sound

Sound Level and Frequency. Sound can be technically described in terms of the sound pressure (amplitude) and frequency (similar to pitch). Sound pressure is a direct measure of the magnitude of a sound without consideration for other factors that may influence its perception.

The range of sound pressures that occur in the environment is so large that it is convenient to express these pressures as sound pressure levels on a logarithmic scale. The standard unit of measurement of sound is the Decibel (dB). The sound pressure level in decibels describes the pressure of a sound relative to a reference pressure. The logarithmic scale compresses the wide range in sound pressures to a more usable range of numbers.

For example, a sound level of 70 dB has 10 times as much acoustic energy as a level of 60 dB while a sound level of 80 has 100 times as much acoustic energy as 60 dB. In terms of human response to noise, the perception is very different. A sound 10 dB higher than another is usually judged to be twice as loud; and 20 dBA higher four times as loud; and so forth.

The frequency of a sound is expressed as Hertz (Hz) or cycles per second. The normal audible frequency range for young adults is 20 Hz to 20,000 Hz. The prominent frequency range for community noise, including aircraft and motor vehicles, is between 50 Hz and 5,000 Hz. The human ear is not equally sensitive to all frequencies, with some frequencies judged to be louder for a given signal than others. As a result of this, research studies have analyzed how individuals make relative judgements as to the "loudness" or "annoyance" to a sound. The most prominent of these scales include: Loudness Level, Frequency weighted contours such as the A-weighted scale and Perceived Noise Level. Noise metrics used in aircraft noise assessments are based upon these frequency weighting scales. These are discussed in the following paragraphs.

Loudness Level. This scale has been devised to approximate the human subjective assessment to the "loudness" of a sound. Loudness is the subjective judgment of an individual as to how loud or quiet a particular sound is perceived. The human ear is not equally sensitive to all frequencies with some frequencies judged to be louder for a given signal than others. This sensitivity difference also varies for different sound pressure levels.

This data is obtained through group laboratory studies of human response to noise. Generally a pure tone signal of 1000 hertz is played and then after an elapsed interval a second tone of a different frequency is played. The listener then adjusts the signal until the two tones are judged to be the same.

Frequency Weighted Contours (dBA and dBC). In order to simplify the measurement and computation of sound loudness levels, frequency weighted networks have obtained wide acceptance. The equal loudness levels contours for 40 dB, 70 dB and 100 dB have been selected to represent human frequency response to low, medium, and loud sound levels. By inverting these equal loudness level contours, the A-weighted, B-weighted and C-weighted frequency weightings were developed. These frequency weighting contours are presented in **Figure C1**.

The most common weighting is the A-weighted noise curve (dBA). The A-weighted decibel scale (dBA) performs this compensation by discriminating against frequencies in a manner approximating the sensitivity of the human ear. In the A-weighted decibel, every day sounds normally range from 30 dBA (very quiet) to 100 dBA (very loud). Most community noise analyses are based upon the A-weighted decibel scale. Examples of various sound environments, expressed in dBA, are presented in **Figure C2**.

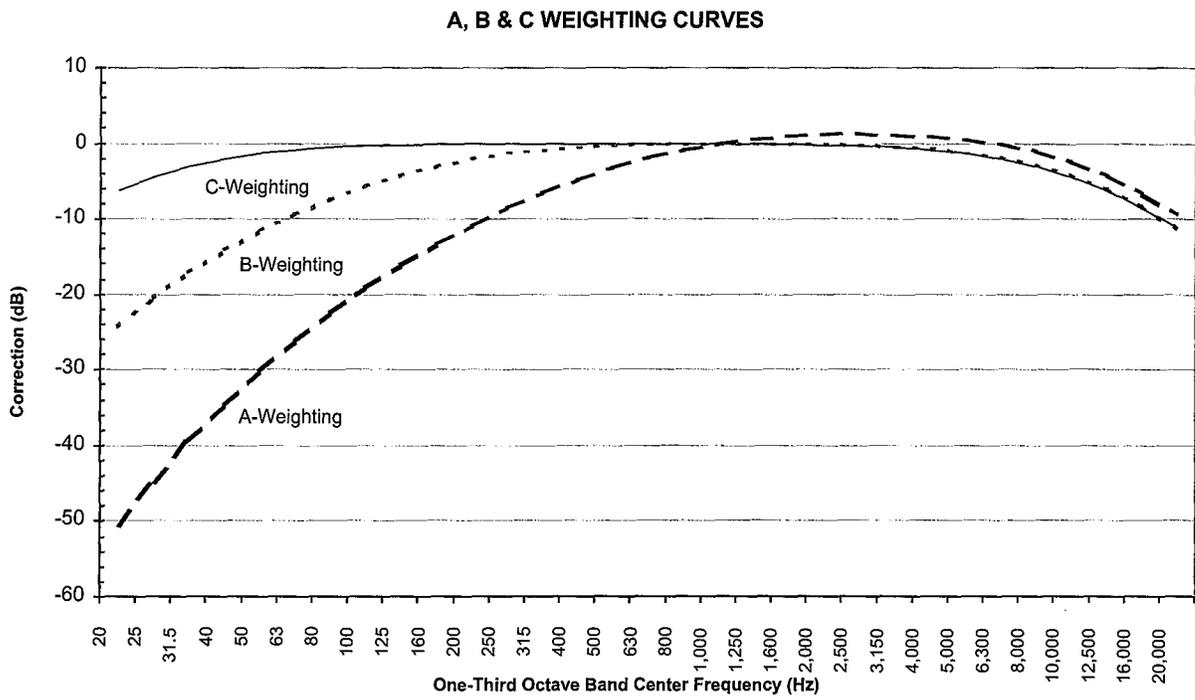


Figure C1 Frequency Weighted Contours

dB(A)	OVER-ALL LEVEL Sound Pressure Level Approx. 0.0002 Microbar	COMMUNITY (Outdoor)	HOME or INDUSTRY	LOUDNESS Human Judgement of Different Sound Levels
130	UNCOMFORTABLY	Military Jet Aircraft Take-Off with Afterburner from Aircraft Carrier @ 50 ft. (130)	Oxygen Torch (121)	120 dB(A) 32 Times as Loud
120 110	LOUD	Turbo-Fan Aircraft @ Take-Off Power @ 200 ft. (90)	Riveting Machine (110) Rock and Roll Band (108-114)	110 dB(A) 16 Times as Loud
100	VERY	Boeing 707 @ 1000 ft. (103) DC-8 @ 6080 ft. (106) Bell J2A Helicopter @ 100 ft. (100)		100 dB(A) 8 Times as Loud
90	LOUD	Power Mower (96) Boeing 737, DC-9 @ 6080 ft. (97) Motorcycle @ 25 ft. (90)	Newspaper Press (97)	90 dB(A) 4 Times as Loud
80		Car Wash @ 20 ft. (89) Prop. Airplane Flyover @ 1000 ft. (88) Diesel Truck, 40 mph @ 50 ft. (84)	Food Blender (88) Milling Machine (85) Garbage Disposal (80)	80 dB(A) 2 Times as Loud
70	MODERATELY LOUD	High Urban Ambient Sound (80) Passenger Car, 65 mph @ 25 ft. (77) Freeway @ 50 ft., 10:00am (76)	Living Room Music (76) TV-Audio, Vacuum Cleaner	70 dB(A)
60		Air Conditioning Unit @ 100 ft. (60)	Cash Register @ 10 ft. (65-70) Electric Typewriter @ 10 ft. (64) Conversation (60)	60 dB(A) 1/2 Times as Loud
50	QUIET	Large Transformers @ 100 ft. (50)		50 dB(A) 1/4 Times as Loud
40		Bird Calls (44) Low Urban Ambient Sound (40)		40 dB(A) 1/8 Times as Loud
	JUST AUDIBLE	(dB(A) Scale Interrupted)		
10	THRESHOLD OF HEARING			

Figure C2 Examples of Various Sound Environments



SOURCE: Reproduced from Melville C. Branch and R. Dale Beland, "Outdoor Noise in the Metropolitan Environment", Published by the City of Los Angeles, 1970, p2.

Some interest has developed to utilize a different noise curve other than A-weighting for lower frequency noise sources. For example, the C-weighted curve is used for the analysis of the noise impacts from artillery noise, which is dominated by low frequency. Noise from departure ground roll is another source of noise that is a greater low frequency component.

Perceived Noise Level. Perceived noisiness is another method of rating sound. It was originally developed for the assessment of aircraft noise. Perceived noisiness is defined as "the subjective impression of the unwantedness of a not unexpected, nonpain or fear-provoking sound as part of one's environment" (Kryter, 1970). "Noisiness" curves differ from "loudness curves" in that they have been developed to rate the noisiness or annoyance of a sound as opposed to the loudness of a sound.

As with loudness curves, noisiness curves have been developed from laboratory psychoacoustic surveys of individuals. However, in noisiness surveys, individuals are asked to judge in a laboratory setting when two sounds are equally noisy or disturbing if heard regularly in ones own environment. These surveys are more complex and therefore subject to greater variability. Aircraft certification data is based upon these types of noisiness scales.

Propagation of Noise. Outdoors sound levels decrease as a function of distance from the source, and as a result of wave divergence, atmospheric absorption, and ground attenuation. If sound is radiated from a source in a homogeneous and undisturbed manner, the sound travels as spherical waves. As the sound wave travels away from the source, the sound energy is distributed over a greater area dispersing the sound power of the wave. Spherical spreading of the sound wave reduces the noise level at a rate of 6 dB per doubling of the distance.

Atmospheric absorption also influences the levels that are received by the observer. The greater the distance traveled, the greater the influence of the atmosphere and the resultant fluctuations. Atmospheric absorption becomes important at distances of greater than 1,000 feet. The degree of absorption is a function of the frequency of the sound as well as the humidity and temperature of the air. For example, atmospheric absorption is lowest at high humidity and higher temperatures. Sample atmospheric attenuation graphs are presented in **Figure C3**. Turbulence and gradients of wind, temperature and humidity also play a significant role in determining the degree of attenuation. Certain conditions, such as inversions, can also result in higher noise levels than would result from spherical spreading as a result of channeling or focusing the sound waves.

Absorption effects in the atmosphere vary with frequency. The higher frequencies are more readily absorbed than the lower frequencies. Over large distances, the lower frequencies become the dominant sound as the higher frequencies are attenuated.

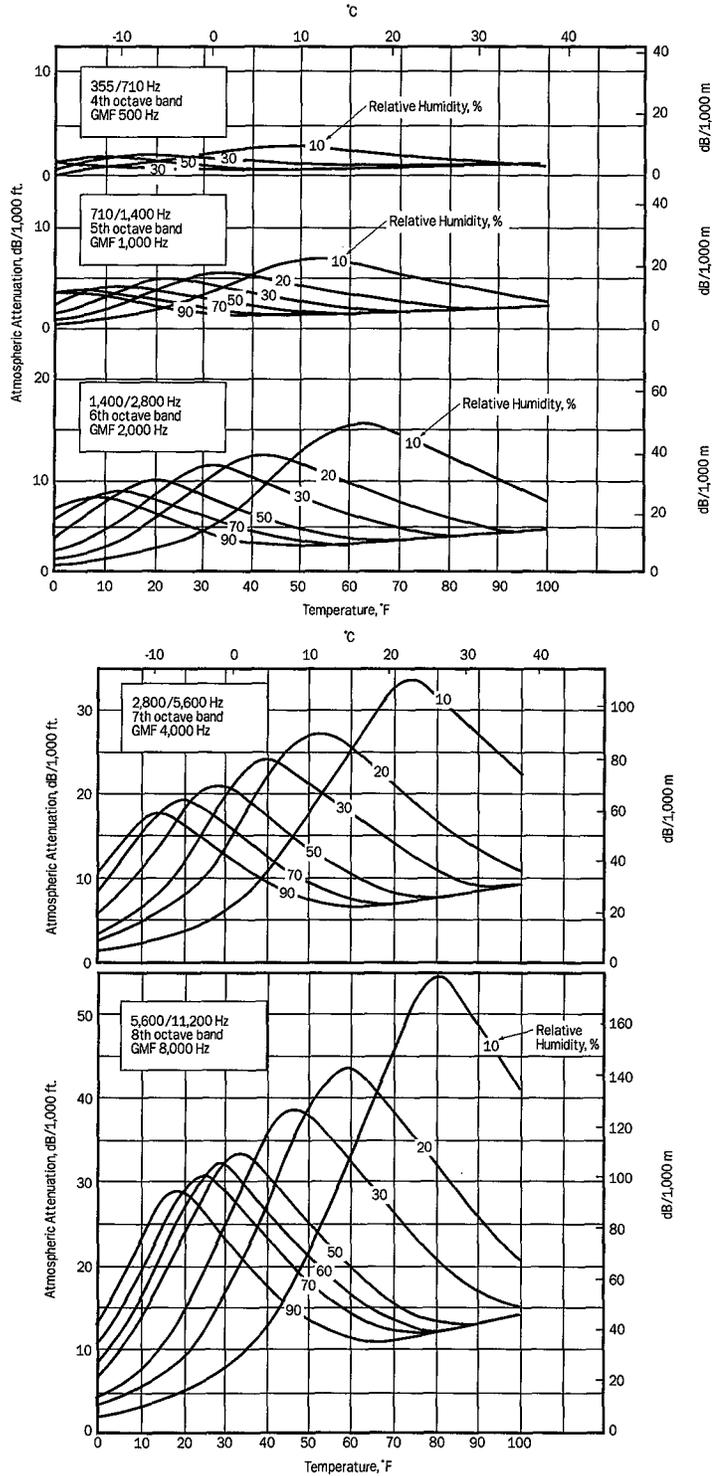


Figure C3 Atmospheric Attenuation Graphs

Duration of Sound. The annoyance from a noise event increases with increased duration of the noise event, i.e., and the longer the noise event lasts the more annoying it is. The "effective duration" of a sound is the time between when a sound rises above the background sound level until it drops back below the background level. Psycho-acoustic studies have determined a relationship between duration and annoyance. These studies determined the amount a sound must be reduced to be judged equally annoying for increased duration. Duration is an important factor in describing sound in a community setting.

The relationship between duration and noise level is the basis of the equivalent energy principal of sound exposure. Reducing the acoustic energy of a sound by one-half results in a 3 dB reduction. Doubling the duration of the sound increases the total energy of the event by 3 dB. This equivalent energy principal is based upon the premise that the potential for a noise to impact a person is dependent on the total acoustical energy content of the noise [1]. CNEL, DNL, LEQ and SENEL are all based upon the equal energy principle and defined in subsequent sections of this study.

Change in Noise. The concept of change in ambient sound levels can be understood with an explanation of the hearing mechanism's reaction to sound. The human ear is a far better detector of relative differences in sound levels than absolute values of levels. Under controlled laboratory conditions, listening to a steady unwavering pure tone sound that can be changed to slightly different sound levels, a person can just barely detect a sound level change of approximately one decibel for sounds in the mid-frequency region. When ordinary noises are heard, a young healthy ear can detect changes of two to three decibels. A five-decibel change is readily noticeable while a 10-decibel change is judged by most people as a doubling or a halving of the loudness of the sound.

Recruitment of Loudness. Recruitment describes the perception of loudness in situations where masking elevates the threshold of hearing of a sound from a background sound. A listener's judgment of the loudness of a sound will vary with different levels of background noise. In low-level background situations that are near the threshold of hearing, the loudness level of a sound increases gradually. In these situations, a desired sound, such as music that is a level of 40 to 60 dB above the background, would be judged as comfortable. In loud background settings, a sound that is approximately 20 dB above the masking threshold will be perceived as the same loudness as the sound would have been if no masking sound were present.

Masking Effect. A characteristic of sound is the ability of a sound to interfere with the ability of a listener to hear another sound. This is defined as the masking effect. The presence of one sound effectively raises the threshold of audibility for the hearing of a second sound. For a signal to be heard, it must exceed the threshold of hearing for that particular individual and exceed the masking threshold for the background noise.

The masking characteristics of sound is dependent upon many factors, including the spectral (frequency) characteristics of the two sounds, the sound pressure levels and the relative start time of the sounds. The masking affect is greatest when the masking frequency is closest to the frequency of the signal. Low frequency sounds can mask higher frequency sounds, however, the reverse is not true

Factors Influencing Human Response to Sound

Many factors influence how a sound is perceived and whether or not it is considered annoying to the listener. This includes not only physical characteristics of the sound but also secondary influences such as sociological and external factors. Molino, in the Handbook of Noise Control [2] describes human response to sound in terms of both acoustic and non-acoustic factors. These factors are summarized in **Table C1**.

Table C1

FACTORS THAT AFFECT INDIVIDUAL ANNOYANCE TO NOISE
King County International Airport FAR Part 150 Study

Primary Acoustic Factors

- Sound Level
- Frequency
- Duration

Secondary Acoustic Factors

- Spectral Complexity
- Fluctuations in Sound Level
- Fluctuations in Frequency
- Rise-time of the Noise

Non-Acoustic Factors

- Physiology
- Adaptation and Past Experience
- How the Listener's Activity Affects Annoyance
- Predictability of When a Noise will Occur
- Is the Noise Necessary?
- Individual Differences and Personality

Source: C. Harris, 1979

Sound rating scales are developed to account for the factors that affect human response to sound. Nearly all of these factors are relevant in describing how sounds are perceived in the community. Many of the non-acoustic parameters play a prominent role in affecting individual response to noise. Background sound, an additional acoustic factor not specifically listed, is also important in describing sound in rural settings. Fields [4], in his analysis of the effects of personal and situation dependent variables on noise annoyance, has identified a clear association of reported annoyance and fear of an accident. In particular, Fields has stated that there is firm evidence that noise annoyance is associated with: (1) the fear of an aircraft crashing or of danger from nearby surface transportation; (2) the belief that aircraft noise could be prevented or reduced by designers, pilots or authorities related to airlines; and (3) an expressed sensitivity to noise generally. Thus, it is important to recognize that non-acoustic factors such as the ones described above as well as acoustic factors contribute to human response to noise.

Health Effects of Noise

Noise, often described as unwanted sound, is known to have several adverse effects on people. From these known adverse effects of noise, criteria have been established to help protect the public health and safety and prevent disruption of certain human activities. These criteria are based on effects of noise on people such as hearing loss (not a factor with typical community noise), communication interference, sleep interference, physiological responses and annoyance. Each of these potential noise impacts on people are briefly discussed in the following narrative:

- *Hearing Loss* is generally not a concern in community noise problems, even very near a major airport or a major freeway. The potential for noise induced hearing loss is more commonly associated with occupational noise exposures in heavy industry, very noisy work environments with long term exposure, or certain very loud recreational activities such as target shooting, motorcycle or car racing, etc. The Occupational Safety and Health Administration (OSHA) identifies a noise exposure limit of 90 dBA for 8 hours per day to protect from hearing loss (higher limits are allowed for shorter duration exposures). Noise levels in neighborhoods, even in very noisy neighborhoods, are not sufficiently loud to cause hearing loss.
- *Communication Interference* is one of the primary concerns in environmental noise problems. Communication interference includes speech interference and interference with activities such as watching television. Normal conversational speech is in the range of 60 to 65 dBA and any noise in this range or louder may interfere with speech. There are specific methods of describing speech interference as a

function of distance between speaker and listener and voice level. **Figure C4** shows the relation of quality of speech communication with respect to various noise levels.

- *Sleep Interference* is a major noise concern in noise assessment and, of course, is most critical during nighttime hours. Sleep disturbance is one of the major causes of annoyance due to community noise. Noise can make it difficult to fall asleep, create momentary disturbances of natural sleep patterns by causing shifts from deep to lighter stages and cause awakening. Noise may even cause awakening, which a person may or may not be able to recall.

Extensive research has been conducted on the effect of noise on sleep disturbance. Recommended values for desired sound levels in residential bedroom space range from 25 to 45 dBA, with 35 to 40 dBA being the norm. The National Association of Noise Control Officials [3] has published data on the probability of sleep disturbance with various single event noise levels. Based on experimental sleep data as related to noise exposure, a 75-dBA interior noise level event will cause noise induced awakening in 30 percent of the cases. A summary of these data is presented in **Figure C5** as presented in the FICON curve from 1992.

It is important to note that recent research from England [4] and the USAF [5] has shown that the probability for sleep disturbance is less than what had been reported in earlier research. This research showed that once a person was asleep, it is much more unlikely that they will be awakened by a noise. The significant difference in the recent studies is the use of actual in-home sleep disturbance patterns as opposed to laboratory data that had been the historic basis for predicting sleep disturbance. The results of that research is summarized in the 1997 FICAN curve of **Figure C5**. It is therefore likely that the data shown in the top of **Figure C5** overestimates the sleep disturbance at a given noise level and is more reflected by the field data presented in the bottom portion of the figure. The USAF study concluded that the prevalence of awakening associated with noise events of an indoor SEL on the order of 70 dBA is 1.6%. An increase in prevalence of awakening of 1.6% is predicted for each 10 dB increase in the SEL.

- *Physiological Responses* are those measurable effects of noise on people, which are realized as changes in pulse rate, blood pressure, etc. While such effects can be induced and observed, the extent is not known to which these physiological responses cause harm or are a sign of harm. Generally, physiological responses are a reaction to a loud short-term noise such as a rifle shot or a very loud jet overflight.

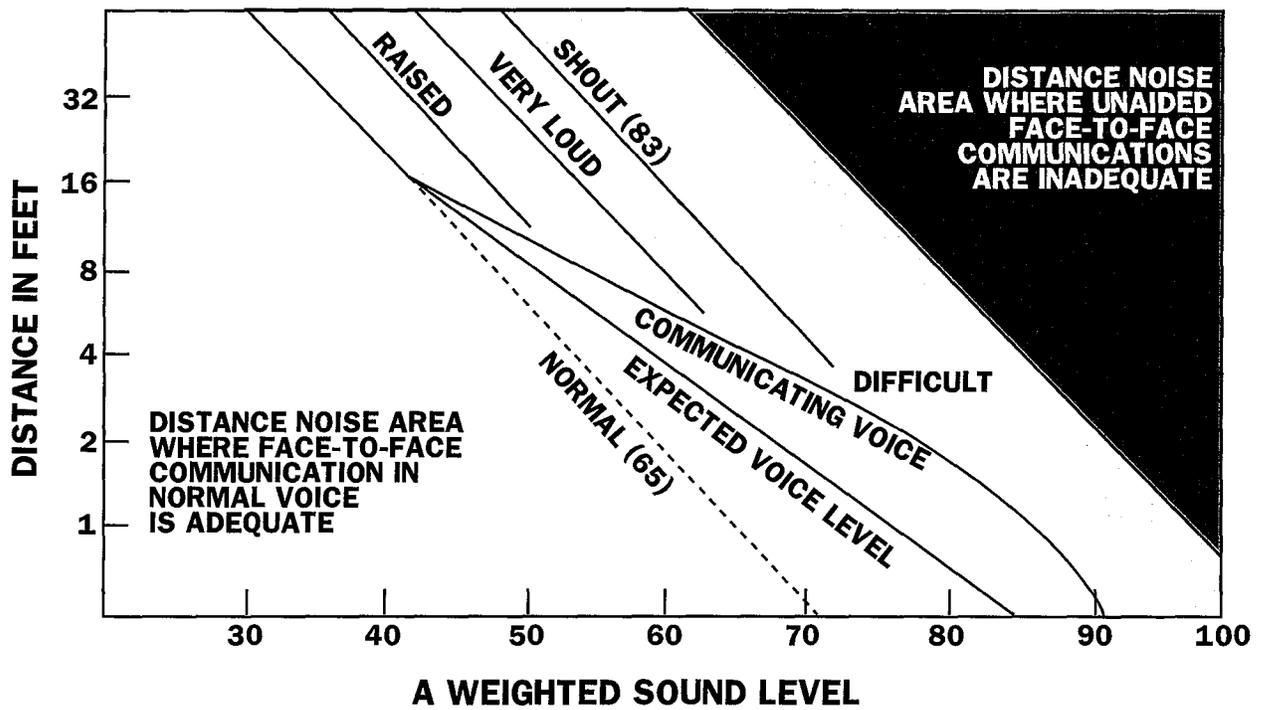


Figure C4 Quality of Speech Communication in Relation to Distance Between the Talker and the Listener

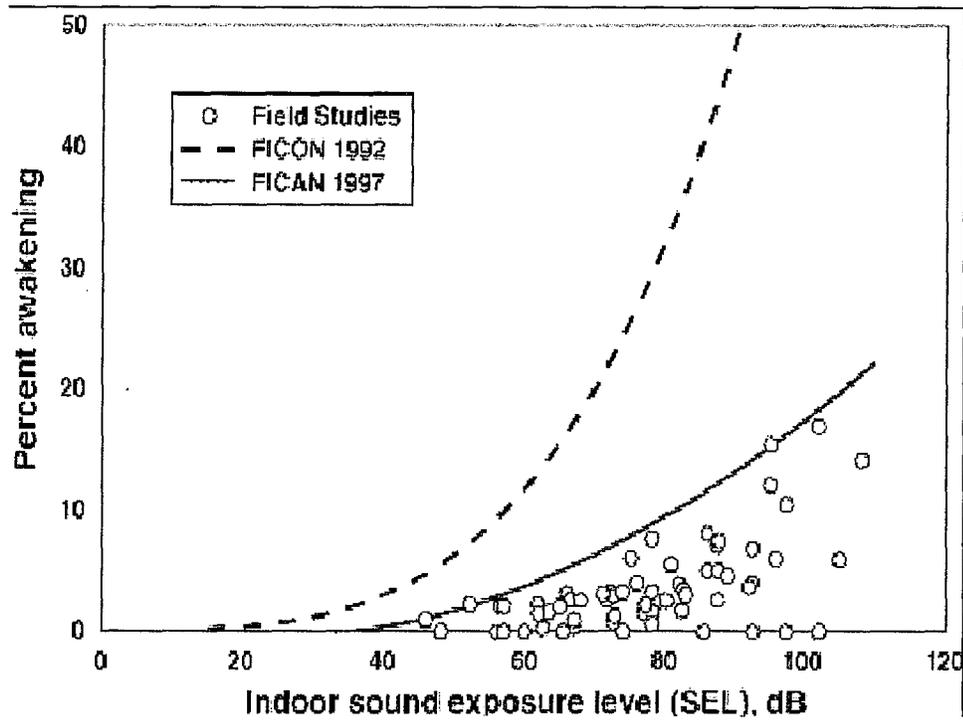


Figure C5 Recommended Sleep Disturbance Dose-Response Relationship Percent of Awakenings per SEL

INTERNATIONAL AIRPORT, Boeing Field

- Annoyance is the most difficult of all noise responses to describe. Annoyance is a very individual characteristic and can vary widely from person to person. What one person considers tolerable can be quite unbearable to another of equal hearing capability. The level of annoyance, of course, depends on the characteristics of the noise (i.e.; loudness, frequency, time, and duration), and how much activity interference (e.g. speech interference and sleep interference) results from the noise. However, the level of annoyance is also a function of the attitude of the receiver. Personal sensitivity to noise varies widely. It has been estimated that 2 to 10 percent of the population is highly susceptible to annoyance from noise not of their own making, while approximately 20 percent are unaffected by noise. Attitudes are affected by the relationship between the person and the noise source. (Is it our dog barking or the neighbor's dog?) Whether we believe that someone is trying to abate the noise will also affect our level of annoyance.

Sound Rating Scales

The description, analysis, and reporting of community sound levels is made difficult by the complexity of human response to sound and the myriad of sound-rating scales and metrics that have been developed for describing acoustic effects. Various rating scales have been devised to approximate the human subjective assessment to the "loudness" or "noisiness" of a sound. Noise metrics have been developed to account for additional parameters such as duration and cumulative effect of multiple events.

Noise metrics can be categorized as single event metrics and cumulative metrics. Single event metrics describe the noise from individual events, such as an aircraft flyover. Cumulative metrics describe the noise in terms of the total noise exposure throughout the day. Noise metrics used in this study are summarized below:

Single Event Metrics

- *Frequency Weighted Metrics (dBA)*. In order to simplify the measurement and computation of sound loudness levels, frequency weighted networks have obtained wide acceptance. The A-weighting (dBA) scale has become the most prominent of these scales and is widely used in community noise analysis. Its advantages are that it has shown good correlation with community response and is easily measured. The metrics used in this study are all based upon the dBA scale

- *Maximum Noise Level.* The highest noise level reached during a noise event is, not surprisingly, called the "Maximum Noise Level," or Lmax. For example, as an aircraft approaches, the sound of the aircraft begins to rise above ambient noise levels. The closer the aircraft gets the louder it is until the aircraft is at its closest point directly overhead. Then as the aircraft passes, the noise level decreases until the sound level again settles to ambient levels. Such a history of a flyover is plotted at the top of **Figure C6**. It is this metric to which people generally instantaneously respond when an aircraft flyover occurs.
- *Sound Exposure Level (SEL).* Another metric that is reported for aircraft flyovers is the Sound Exposure Level (SEL) metric. It is computed from dBA sound levels. Referring again to the top of **Figure C6** the shaded area, or the area within 10 dB of the maximum noise level, is the area from which the SEL is computed. The SEL value is the integration of all the acoustic energy contained within the event. Speech and sleep interference research can be assessed relative to Single Event Noise Exposure Level data.

This metric takes into account the maximum noise level of the event and the duration of the event. For aircraft flyovers, the SEL value is typically about 10 dBA higher than the maximum noise level. Single event metrics are a convenient method for describing noise from individual aircraft events. This metric is useful in that airport noise models contain aircraft noise curve data based upon the SEL metric. In addition, cumulative noise metrics such as LEQ, CNEL and DNL can be computed from SEL data.

Cumulative Metrics

- *Equivalent Noise Level (LEQ).* LEQ is the sound level corresponding to a steady-state A-weighted sound level containing the same total energy as a time-varying signal over a given sample period. LEQ is the "energy" average noise level during the time period of the sample. It is based on the observation that the potential for a noise to impact people is dependent on the total acoustical energy content of the noise. It is the energy sum of all the sound that occurs during that time period.

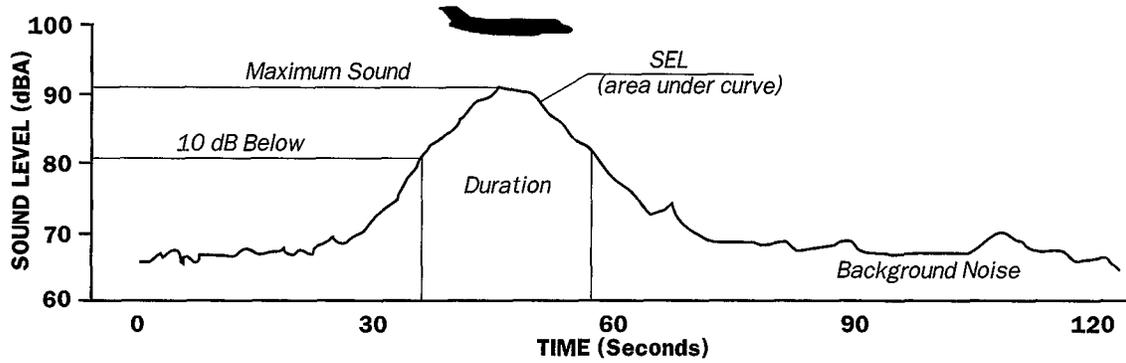
This is graphically illustrated in the middle graph of **Figure C6**. LEQ can be measured for any time period, but is typically measured for 15 minutes, 1 hour or 24-hours. Leq for one hour is called Hourly Noise Level (HNL) and is used to develop the Day Night Noise Level (DNL) values for aircraft operations.

- Cumulative noise metrics have been developed to assess community response to noise. They are useful because these scales attempt to include the loudness of the noise, the duration of the noise, the total number of noise events and the time of day these events occur into one single number rating scale. They are designed to account for the known health effects of noise on people described earlier.
- Day Night Noise Level (DNL). The DNL index is a 24-hour, time-weighted energy average noise level based on the A-weighted decibel. It is a measure of the overall noise experienced during an entire day. The time-weighted refers to the fact that noise that occurs during certain sensitive time periods is penalized for occurring at these times. In the DNL scale, noise occurring between the hours of 10 p.m. to 7 a.m. is penalized by 10 dB. This penalty was selected to attempt to account for the higher sensitivity to noise in the nighttime and the expected further decrease in background noise levels that typically occur in the nighttime. The FAA for airport noise assessment specifies DNL, and the Environmental Protection Agency (EPA) specifies DNL for community noise and airport noise assessment. DNL, also referred to as DNL, is graphically illustrated in the bottom of **Figure C6**. Examples of various noise environments in terms of DNL are presented in **Figure C7**.

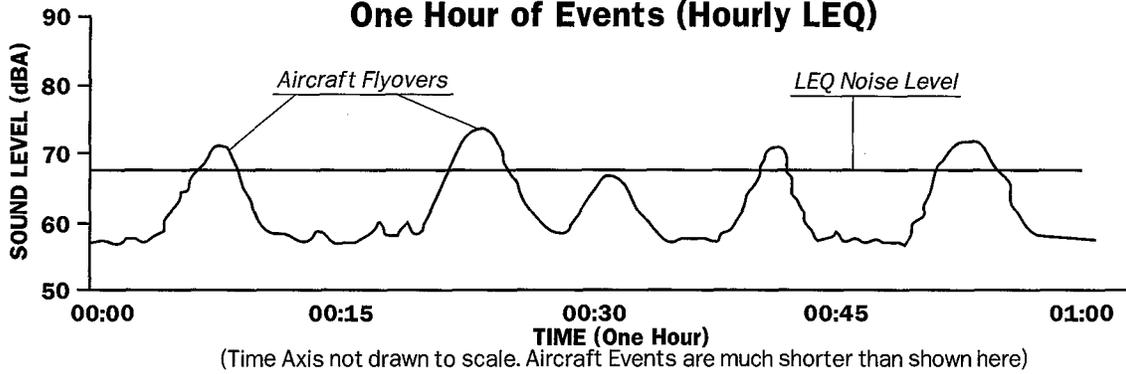
Supplemental Metrics

- *Time Above (TA)*. The FAA has developed the Time Above metric as a second metric for assessing impacts of aircraft noise around airports. The Time Above index refers to the total time in seconds or minutes that aircraft noise exceeds certain dBA noise levels in a 24-hour period. It is typically expressed as Time Above 75 and 85 dBA sound levels. While this index is not widely used, it may be used by the FAA in environmental assessments of airport projects that show a significant increase in noise levels. There are no noise/land use standards in terms of the Time Above index.

Single Event Sound Exposure Level (SEL)



One Hour of Events (Hourly LEQ)



One Hour of Events (Hourly LEQ)

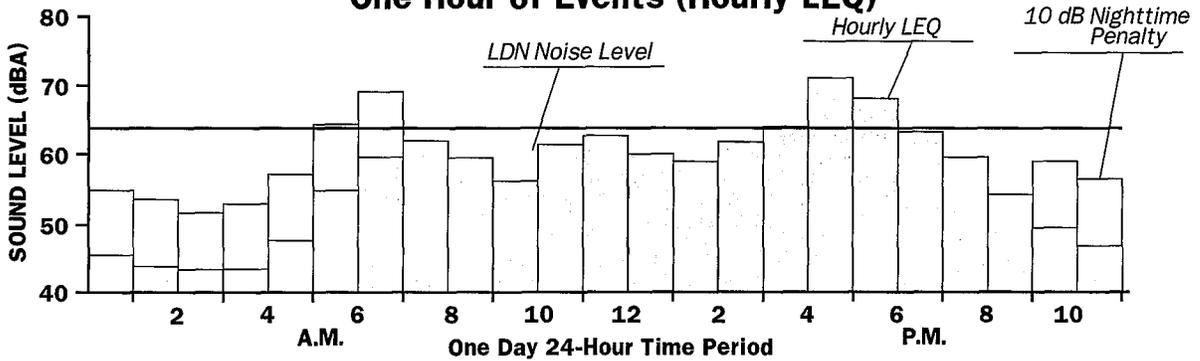


Figure C6 SEL, LEQ, and DNL Illustrations

DNL OUTDOOR LOCATION

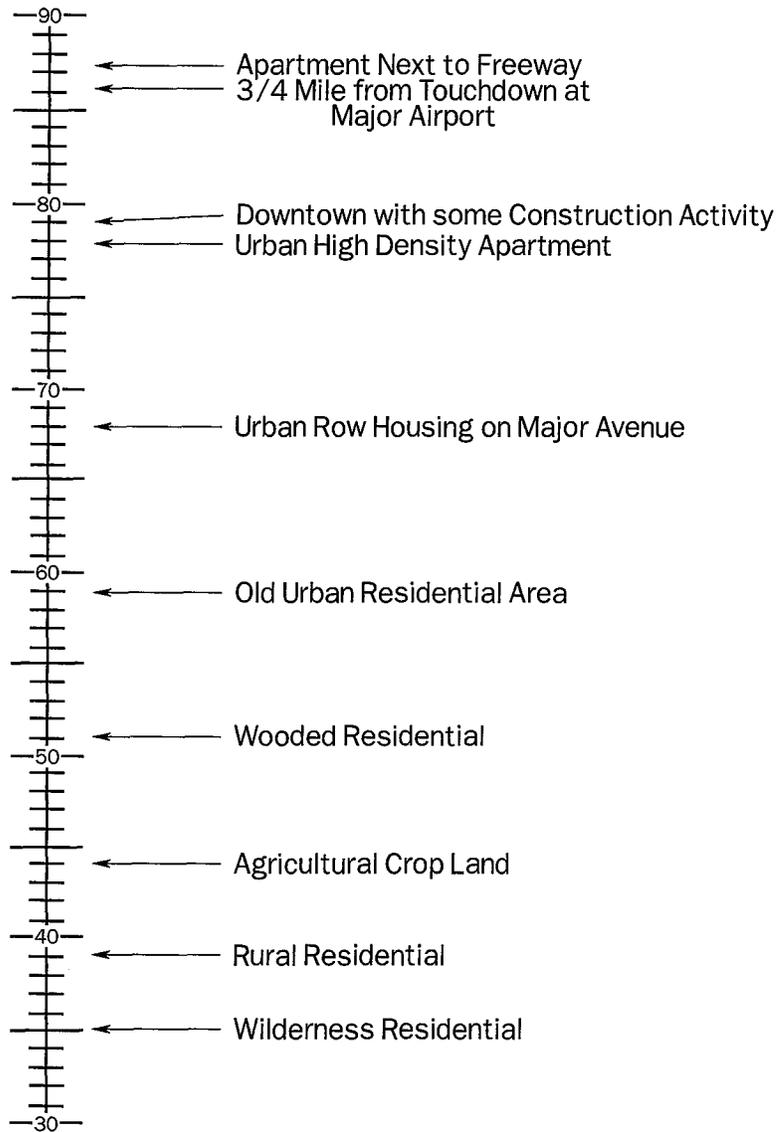


Figure C7 Typical Outdoor Noise Environments

Air Quality
INTERNATIONAL AIRPORT/Boeing Field
RPA Per LRG Study

- *Percent Noise Level (Ln)*. To account for intermittent or fluctuating noise, another method to characterize noise is the Percent Noise Level (Ln). The Percent Noise Level is the level exceeded n% of the time during the measurement period. It is usually measured in the A-weighted decibel, but can be an expression of any noise rating scale. Percent Noise Levels are another method of characterizing ambient noise where, for example, L90 is the noise level exceeded 90 percent of the time, L50 is the level exceeded 50 percent, and L10 is the level exceeded 10 percent of the time. L90 represents the background or minimum noise level, L50 represents the median noise level, and L10 the peak or intrusive noise levels. Percent noise level is commonly used in community noise ordinances which regulate noise from mechanical equipment, entertainment noise sources, and the like. It is not normally used for transportation noise regulation (although the FHWA Leq criterion for roadways was originally stated as an L10 criterion).

Noise/Land Use Compatibility Standards and Guidelines

The use of noise metrics is an attempt to quantify community response to various noise exposure levels. The public reaction to different noise levels has been estimated based upon extensive research on human responses to exposure of different levels of aircraft noise. **Figure C8** relates DNL noise levels to community response from one of these surveys. Community noise standards are derived from tradeoffs between community response surveys, such as this, and economic considerations for achieving these levels. These standards generally are in terms of the DNL 24-hour averaging scale that is based upon the A-weighted decibel. Utilizing these metrics and surveys, agencies have developed standards for assessing the compatibility of various land uses with the noise environment.

The purpose of this section is to present information regarding noise and land use criteria that may be useful in the evaluation of noise impacts. With respect to airports, the Federal Aviation Administration has a long history of publishing noise/land use assessment criteria. These laws and regulations provide the basis for local development of airport plans, analyses of airport impacts, and the enactment of compatibility policies. Other agencies, including the EPA and the Department of Defense, have developed noise/land use criteria. The most common noise/land use compatibility standard or criteria used is 65 dB DNL (CNEL in California) for residential land use with outdoor activity areas. At 65 dB DNL the Schultz curve predicts approximately 14% of the exposed population to be highly annoyed. At 60 dB DNL this decreases to approximately 8% of the population highly annoyed. It should be further pointed out that the data upon which the Schultz curve and the more recent updates are based include a very wide range of scatter among the data with communities near some airports

COMMUNITY REACTION

VIGOROUS
COMMUNITY
REACTION

SEVERAL
THREATS
OF LEGAL
ACTION, OR
STRONG
APPEALS
TO LOCAL
OFFICIALS TO
STOP NOISE

WIDESPREAD
COMPLAINTS
OR SINGLE
THREAT OF
LEGAL ACTION

SPORADIC
COMPLAINTS

NO REACTION
ALTHOUGH
NOISE IS
GENERALLY
NOTICEABLE

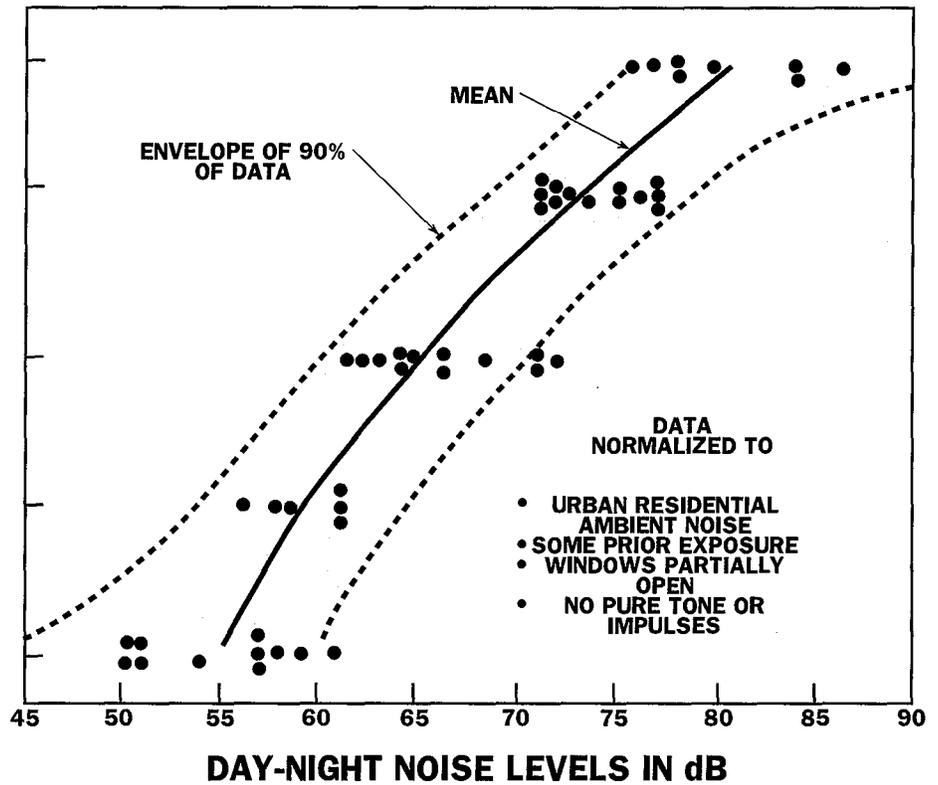


Figure C8 Community Reaction to Intrusive Noises

King County
INTERNATIONAL AIRPORT/Boeing Field
FAP Part 150 Study

reporting a much higher percentage of the population highly annoyed at these noise exposure levels. A summary of some of the more pertinent regulations and guidelines are presented in the following paragraphs.

Federal Aviation Administration

Federal Aviation Regulations, Part 36, "Noise Standards: Aircraft Type and Airworthiness Certification".

Originally adopted in 1960, FAR Part 36 prescribes noise standards for issuance of new aircraft type certificates. Part 36 prescribes limiting noise levels for certification of new types of propeller-driven, small airplanes as well as for transport category, large airplanes. Subsequent amendments extended the standards to certain newly produced aircraft of older type designs. Other amendments have at various times extended the required compliance dates. Aircraft may be certified as Stage 1, Stage 2, or Stage 3 aircraft based on their noise level, weight, number of engines and in some cases number of passengers. Stage 1 aircraft are no longer permitted to operate in the U.S. Stage 2 aircraft are being phased out of the U.S. fleet as discussed in a later paragraph on the Airport Noise and Capacity Act of 1990. Although aircraft meeting Part 36 standards are noticeably quieter than many of the older aircraft, the regulations make no determination that such aircraft are acceptably quiet for operation at any given airport.

U.S. Department of Transportation Aviation Noise Abatement Policy.

This policy, adopted in 1976, sets forth the noise abatement authorities and responsibilities of the Federal Government, airport proprietors, State and local governments, the air carriers, air travelers and shippers, and airport area residents and prospective residents. The basic thrust of the policy is that the FAA's role is primarily one of regulating noise at its source (the aircraft) plus supporting local efforts to develop airport noise abatement plans. The FAA will give high priority in the allocation of ADAP (now AIP) funds to projects designed to ensure compatible use of land near airports, but it is the role of State and local governments and airport proprietors to undertake the land use and operational actions necessary to promote compatibility.

Aviation Safety and Noise Abatement Act of 1979.

Further weight was given to the FAA's supporting role in noise compatibility planning by congressional adoption of this legislation. Among the stated purposes of this act is "To provide assistance to airport operators to prepare and carry out noise compatibility programs". The law establishes funding for noise compatibility planning and sets the requirements by which airport operators can apply for funding. The law does not require any airport to develop a noise compatibility program.

Federal Aviation Regulations, Part 150, "Airport Noise Compatibility Planning".

As a means of implementing the Aviation Safety and Noise Abatement Act, the FAA adopted Regulations on Airport Noise Compatibility Planning Programs. These regulations are spelled out in FAR Part 150. As part of the FAR Part 150 Noise Control program, the FAA published noise and land use compatibility charts to be used for land use planning with respect to aircraft noise. An expanded version of this chart appears in Aviation Circular 150/5020-1 (dated August 5, 1983) and is reproduced in **Figure C9**. These guidelines represent recommendations to local authorities for determining acceptability and permissibility of land uses. The guidelines specify a maximum amount of noise exposure (in terms of the cumulative noise metric DNL) that will be considered acceptable or compatible to people in living and working areas.

These noise levels are derived from case histories involving aircraft noise problems at civilian and military airports and the resultant community response. Note that residential land use is deemed acceptable for noise exposures up to 65 dB DNL. Recreational areas are also considered acceptable for noise levels above 65 dB DNL (with certain exceptions for amphitheaters that are recommended not to exceed 65 dB DNL). Several important notes appear for the FAA guidelines including one which indicates that ultimately "the responsibility for determining the acceptability and permissible land uses remains with the local authorities."

Federal Aviation Order 5050.4 and Directive 1050.1 for Environmental Analysis of Aircraft Noise Around Airports.

The FAA has developed guidelines (Order 5050.4D) for the environmental analysis of airports. Federal requirements now dictate that increases in noise levels in noise sensitive land uses of over 1.5 dB DNL within the 65 dB DNL contour are considered significant (1050.1A, 12.21.83). The FAA only considers noise impacts that occur at the 65 dB DNL or greater. No analysis is required beyond the 65 dB DNL.

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

Numbers in parentheses refer to notes.

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

Key to Table 1

SLUCM Standard Land Use Coding Manual.
 Y(Yes) Land Use and related structures compatible without restrictions.
 N(No) Land Use and related structures are not compatible and should be prohibited.
 NLR Noise Level Reduction (outdoor to indoor) to be achieved through incorporation of noise attenuation into the design and construction of the structure.
 25, 30 or 35 Land Use and related structures generally compatible; measures to achieve NLR of 25, 30 or 35 dB must be incorporated into design and construction of structure.

- Notes**
- (1) Where the community determines that residential or school uses must be allowed, measures to achieve outdoor to indoor Noise Level Reduction (NLR) of at least 25 dB to 30 dB should be incorporated into building codes and be considered in individual approvals. Normal residential construction can be expected to provide a NLR of 20 dB, thus, the reduction requirements are often stated as 5, 10 or 15 dB over standard construction and normally assume mechanical ventilation and closed windows year round. However, the use of NLR criteria will not eliminate outdoor noise problems.
 - (2) Measures to achieve NLR of 25 dB must be incorporated into the design and construction of portions of these buildings where the public is received, office areas, noise sensitive areas or where the normal noise level is low.
 - (3) Measures to achieve NLR of 30 dB must be incorporated into the design and construction of portions of these buildings where the public is received, office areas, noise sensitive areas or where the normal noise level is low.
 - (4) Measures to achieve NLR of 35 dB must be incorporated into the design and construction of portions of these buildings where the public is received, office areas, noise sensitive areas or where the normal noise level is low.
 - (5) Land use compatible provided that special sound reinforcement systems are installed.
 - (6) Residential buildings require an NLR of 25.
 - (7) Residential buildings require an NLR of 30.
 - (8) Residential buildings not permitted.

Figure C9 FAR Part 150 Land Use Compatibility Matrix



Airport Noise and Capacity Act of 1990

The Airport Noise and Capacity Act of 1990 (PL 101-508, 104 Stat. 1388), also known as ANCA or the Noise Act, established two broad directives to the FAA; (1) establish a method to review aircraft noise, and airport use or access restrictions, imposed by airport proprietors, and (2) institute a program of phase-out Stage 2 aircraft over 75,000 pounds by December 31, 1999. Stage 2 aircraft are older, noisier aircraft (B-737-200, B-727 and DC-9); Stage 3 aircraft are newer, quieter aircraft (B-737-300, B-757, MD-80/90). To implement ANCA, FAA amended Part 91 and issued a new Part 161 of the Federal Aviation Regulations. Part 91 addresses the phase-out of large Stage 2 aircraft and the phase-in of Stage 3 aircraft. Part 161 establishes a stringent review and approval process for implementing use or access restrictions by airport proprietors.

Part 91 generally states that all Stage 2 aircraft, over 75,000 pounds, will be out of the domestic fleet by December 31, 1999. There are a few exceptions, but for the most part, only Stage 3 aircraft greater than 75,000 pounds will be in the domestic fleet after that date. The airlines have options on how and when to phase-out Stage 2 aircraft, but it is anticipated that the domestic fleet in the mainland will be all Stage 3 by the year 2000.

Part 161 sets out the requirements and procedures for implementing new airport use and access restrictions by airport proprietors. Proprietors must use the DNL metric to measure noise effects, and that the Part 150 land use guideline table, including 65 dB DNL as the threshold contour, be used to determine compatibility, unless there is a locally adopted standard more stringent.

The regulation identifies three types of use restrictions and treats each one differently: negotiated restrictions, Stage 2 aircraft restrictions and Stage 3 aircraft restrictions. Generally speaking, any use restriction which affects the number or times of aircraft operations will be considered an access restriction. Even though the Part 91 phase-out does not apply to aircraft under 75,000 pounds, FAA has determined that Part 161 limitations on proprietors authority applies as well to the smaller aircraft.

Negotiated restrictions are more favorable from the FAA's standpoint, but still require unwieldy procedures for approval and implementation. They must be agreed upon by all airlines, and public notice must be given.

Stage 2 restrictions are more difficult, as one of the major reasons for ANCA was to discourage local restrictions more stringent than the ANCA's 1999 phase-out. To comply with the regulation and institute a new Stage 2 restriction, the proprietor must generally do two things. It must prepare a cost/benefit analysis of the proposed restriction and give proper notice. The cost/benefit analysis is extensive and entails considerable evaluation. Stage 2 restrictions do not require approval by the FAA.

Stage 3 restrictions are especially difficult to implement. A Stage 3 restriction involves considerable additional analysis, justification, evaluation and financial discussion. In addition, a Stage 3 restriction must result in a decrease in noise exposure of the 65 dB DNL to noise sensitive land uses (residences, schools, churches, parks). The regulation requires both public notice and FAA approval.

ANCA applies to all local noise restrictions that are proposed after October, 1990. It also applies to amendments to existing restrictions proposed after October, 1990. There have not been any Part 161 evaluations approved by the FAA to date.

Environmental Protection Agency Noise Assessment Guidelines

Environmental Protection Agency, "Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety".

In March 1974 the EPA published a very important document [1] entitled "Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare With an Adequate Margin of Safety" (EPA 550/9-74-004). In this document, 55 dB DNL is described as the requisite level with an adequate margin of safety for areas with outdoor uses, this includes residences, and recreational areas. This document does not constitute EPA regulations or standards. Rather, it is intended to "provide State and local governments as well as the Federal Government and the private sector with an informational point of departure for the purpose of decision-making". Note that these levels were developed for suburban type uses. In some urban settings, the noise levels will be significantly above this level, while in some wilderness settings, the noise levels will be well below this level. The EPA "levels document" does not constitute a standard, specification or regulation, but identifies safe levels of environmental noise exposure without consideration for economic cost for achieving these levels.

Federal Interagency Committee on Noise

Federal Interagency Committee on Noise (FICON) Report of 1992 [13]

The use of the DNL metric and the 65 dB CNEL criteria has been subject to criticism from various interest groups concerning its usefulness in assessing aircraft noise impacts. As a result, at the direction of the EPA and the FAA, the Federal Interagency Committee On Noise (FICON) was formed to review specific elements of the assessment of airport noise impacts and to make recommendations regarding potential improvements. FICON is composed of representatives from the Departments of Transportation, Defense, Justice, Veterans Affairs, Housing and Urban Development, the Environmental Protection Agency, and the Council on Environmental Quality.

FICON was formed to review Federal policies that are used in the assessment of airport noise impacts. The FICON review focused primarily on the manner in which noise impacts are determined, including whether aircraft noise impacts are fundamentally different from other transportation noise impacts; the manner in which noise impacts are described; and the extent of impacts outside of Day-Night Average A-Weighted Sound Level (DNL) 65 decibels (dB) that should be reviewed in a National Environmental Policy Act (NEPA) document.

The committee determined that there are no new descriptors or metrics of sufficient scientific standing to substitute for the present DNL cumulative noise exposure metric. The methodology employing DNL as the noise exposure metric and appropriate dose-response relationships to determine noise impact is considered the proper one for civil and military aviation scenarios in the general vicinity of airports. The report does support agency discretion in the use of supplemental noise analysis. The report does recommend improvement in public understanding of the DNL, supplemental methodologies and aircraft noise impacts.

The report states that if the screening analysis shows that noise-sensitive areas that are exposed to noise levels at or above DNL 65 dB and have an increase of DNL 1.5 dB or more, then further analysis should be conducted. For noise sensitive areas between DNL 60-65 dB and an increase of DNL 3 dB or more due to the proposed airport noise exposure then further analysis should also be conducted.

Methodology

The existing noise environment at King County International Airport was determined through a comprehensive noise measurement survey and modeling assessment. The foundation of a Part 150 Noise Study is the accurate prediction of airport noise levels. The noise environment at King County International Airport has been depicted through the employment of noise measurement surveys of aircraft events and ambient noise levels, collection of aircraft operational data, and the incorporation of this information into an airport noise computer model.

The methods used here for forecasting the future noise environment rely heavily computer noise modeling. These noise contours are supplemented here with specific noise data for selected points on the ground. The noise environment is commonly depicted in terms of lines of equal noise levels, or noise contours. Generating accurate noise contours is largely dependent upon the use of a reliable, validated, and updated noise model. Testing the validity of the computer model results using on-site noise measurements is one of the most effective methods of ensuring accurate noise contours. The following section details the methodology that was used in the measurement survey and the computer modeling of these results into noise contours. The operational data used in the analysis is also presented.

Noise Measurement Survey

Purpose of Measurement Survey. A noise measurement survey is an integral part of the Part 150 Noise Study. The purpose of the noise survey includes:

- Determine aircraft noise levels specific to the local environment
- Validate the computer model using the measurement results
- Determine the noise level at example locations around the Airport
- Give confidence to the community in the accuracy of the results of the study

Noise Measurement Locations. Noise measurements were recently conducted at selected locations around the airport. The measurement locations were selected on the basis of: (1) proximity to aircraft flight tracks, (2) the proximity to noise sensitive land use areas, and (3) ambient noise levels.

The measurement locations are presented in **Figures C9**. Each of the sites are also described in **Table C2**. The measurement sites are divided into two classes: semi-permanent sites, and temporary sites. The blue dots in **Figure C9** presents the semi-permanent locations that were used for continuous measurement of the aircraft noise. The red dots in **Figure C9** presents the temporary locations that were used for short-term spot measurement and ambient noise measurements.

Airport Noise Monitoring System. KCIA also has a permanent noise monitoring system. The system includes four permanent stations and portable noise monitors that have been located at various positions around the airport. These noise-monitoring locations from the airport's permanent system are presented in **Figure C10**. The airport noise monitor system also collects ARTS radar flight track information this data was obtained from the airport's system for the time period of the

Measurement Procedures. Noise measurements were conducted at various sites over several days for each site between November 16th, 1999 and December 1st, 1999. The equipment was checked and calibrated on a regular basis.

Aircraft identification was determined from on-site field observations by the acoustical engineer and ARTS flight track radar data. This data identified included the time of the operation, the type of aircraft, and the runway and flight track used.

Table C2
NOISE MEASUREMENT LOCATIONS
King County International Airport FAR Part 150 Study

Sites	Address	Neighborhood
Semi-Permanent Sites		
1	1515 28 th Ave. W	Magnolia
2	4117 SW Hill St.	West Seattle
3	37 th Ave. W and W Smith St.	Magnolia
4	3303 S. 132	Tukwila
5	12646 60 th Ave. S	Skyway
6	3903 S. Burns St.	Seattle
Temporary Sites		
7	S. Eddy and Flora	Georgetown
8	Campbell Hill Elementary School	Skyway
9	56 th Ave S and S 133 rd St.	Foster

Figure C9

Part 150 Noise Measurement Locations
King County International Airport Part 150 Study



King County
International Airport



Semi-permanent Sites

BN1 Magnolia
BN2 West Seattle
BN3 Magnolia
BS1 Tukwila
BS2 Skyway
BS3 Seattle

37th Ave W a
4117 SW Hill
1515 28th AV
3303 S. 132
12646 60th A
3903 S. Burns

Temporary Sites

TM1 Georgetown
TM2 Skyway
TM3 Foster

S. Eddy & Fl
Campbell Hill
56 Ave. S & S

Figure C10

Part 150 Noise Measurement Locations
King County International Airport Part 150 Study



Permanent Sites

NMS01	Tukwila	S. 124th St.
NMS02	Skyway	51th Ave. S.
NMS03	Tukwila	44th Ave. S.
NMS04	Georgetown	Ruby Chow J
NMS06	Tukwila	44th Ave. S.
NMS07	Magnolia	
NMS08	Beacon Hill	7201 Beacon
NMS09	West Seattle	3926 19th A
NMS10	Tukwila	4415 S. 150th
NMS11	Tukwila	5939 S. 149th
NMS12	Skyway	
NMS13	Beacon Hill	4925 Corson
NMS14	West Seattle	POS Terminal
NMS15	West Seattle	35th Ave. SW
NMS16	Magnolia	POS Smith C
NMS17	Beacon Hill	3701 S. Keny
NMS19	West Seattle	8th Ave. SW

Acoustic Data. The noise measurement survey utilized specialized noise monitoring instrumentation that allowed for the measurement of aircraft single event data and ambient noise levels. The noise data that was determined from each of the semi-permanent noise measurement sites is listed below:

- Daily DNL Noise Level
- Hourly Noise Data (LEQ, Level Percent, Time Above)
- Single Event Data (SEL, Lmax and Duration) for Individual Aircraft
- Correlation of Noise Data with Aircraft Identification
- Non-aircraft Ambient Sound Level (Level Percent)

For portions of the noise measurement the survey utilized instrumentation that included software that provide continuous measurement and storage of the 1 second LEQ noise level. From this data the above noise descriptors could be calculated. In addition, this data could be used to plot the time histories of any of the noise events of interests. Examples of the time histories of various noise events and aircraft correlation at each of the sites will be presented in the subsequent version of the report.

The temporary sites were used to measure aircraft single event noise levels (SEL) and ambient noise level descriptors.

Instrumentation. The monitoring program was consistent with state-of-the-art noise measurement procedures and equipment. The measurements consisted of monitoring the A-weighted decibel in accordance with procedures and equipment which comply with specific International Standards (IEC), and measurement standards established by the American National Standards Institute (ANSI) for Type 1 instrumentation.

These sites utilized Brüel and Kjaer 2236 Sound Level Meters. The analyzers automatically calculate the various single event data. The Brüel and Kjaer system includes software that provides storage of the data for later retrieval and analysis.

During the survey the noise monitoring instrumentation was calibrated at the start and end of each measurement cycle. This calibration was traceable to the National Institute of Standards and Technology, formerly the National Bureau of Standards. An accurate record of the meteorological conditions that existed during the time of the measurements was kept.

Computer Modeling

Contour modeling is a very key element of this noise study. Generating accurate noise contours is largely dependent on the use of a reliable, validated, and updated noise model. It is imperative that these contours be accurate for the meaningful

analysis of airport and roadway noise impacts. The computer model can then be used to predict the changes to the noise environment as a result of any of the development alternatives under consideration.

The FAA's Integrated Noise Model (INM) Version 6 was used to model the flight operations contours at King County International Airport. The INM has an extensive database of civilian aircraft noise characteristics and this most recent version of INM incorporates the advanced plotting features that are part of the Air Forces Noisemap computer model.

Airport noise contours were generated in this study using the INM Version 6. The original INM was released in 1977. The latest version, INM Version 6, was released for use in October 1999 and is the state-of-the-art in airport noise modeling. The INM is a large computer program developed to plot noise contours for airports. The program is provided with standard aircraft noise and performance data for over 200 aircraft types that can be tailored to the characteristics of the airport in question. Version 6 includes an updated data base that includes some newer aircraft, the ability to include run-ups in the computations, the ability to include topography in the computations, and the provision to vary aircraft profiles in an automated fashion.

One of the most important factors in generating accurate noise contours is the collection of accurate operational data. The INM programs require the input of the physical and operational characteristics of the airport. Physical characteristics include runway coordinates, airport altitude, and temperature and optionally, topographical data. Operational characteristics include various types of aircraft data. This includes not only the aircraft types and flight tracks, but also departure procedures, arrival procedures and stage lengths that are specific to the operations at the airport. Aircraft data needed to generate noise contours include:

- Number of aircraft operations by type
- Types of aircraft
- Day/Evening/Night time distribution by type
- Flight tracks
- Flight track utilization by type
- Flight profiles
- Typical operational procedures
- Average Meteorological Conditions

Existing Aircraft Operations

The existing noise environment for King County International Airport was analyzed based upon 1999 operational conditions. The data was derived from various sources. This includes aircraft tower counts, Aircraft Situational Display data, ARTS flight track data, Boeing commercial aircraft operations, commercial flight schedules, field observations and a review of the results of the noise measurement survey. A variety of operational data is necessary in order to determine the noise environment around the airport. This data includes the following summary information and is discussed in detail in the following paragraphs:

- Aircraft Activity Levels
- Fleet Mix
- Seasonal Variation in Operations
- Time of Day
- Runway Use
- Flight Path Utilization
- Run-up Activity

Aircraft Activity Levels. The total aircraft operational levels were derived directly from the King County International Airport air traffic control tower count. The breakdown by aircraft category was determined by a review of all of the sources of flight information described above. The data showed that there were 325,788 operations during that time period, or an average of 893 operations per day (an operation is one takeoff or one landing). The 1999 aircraft operations for each category of operation are summarized in **Table C3**. These operations consist of commercial aircraft, air taxi, air cargo and general aviation aircraft.

Table C3
SUMMARY OF OPERATIONS, EXISTING 1999
King County International Airport FAR Part 150 Study

Operations by Category	Operations Annual	Operations Daily	Percent Nighttime
General Aviation	255,450	699.9	
<i>Single Engine</i>	179,882	492.8	15%
<i>Multi-Engine</i>	59,080	161.9	15%
<i>Business Jet</i>	16,488	45.2	16%
Air Cargo (< 60,000#)	8,164	22.4	41%
Air Cargo (> 60,000#)	6,478	11.2	41%
Aerospace	3,183	8.7	0%
Passenger	4,100	11.2	15%
Air Taxi	46,318	126.9	15%
Military	2,094	5.7	0%
Total Operations	325,788	892.6	

Time of Day. In the DNL metric, any operations that occur after 10 p.m. and before 7 a.m. are considered more intrusive and are weighted by 10 dBA. Therefore, the number of nighttime operations is very critical in determining the DNL noise environment and is also very important to the residences around King County International Airport. The nighttime operational assumption data was summarized in Table C3.

Fleet Mix. The fleet mix of aircraft that operate at the airport is one of the most important factors in terms of the aircraft noise environment. Fleet mix data was determined from an extensive review of the data sources described earlier. The fleet mix assumptions are presented in **Table C4**.

The mix of corporate jet aircraft is an important consideration. There are a wide variety of corporate jets that operate at King County International Airport and these aircraft generate a wide range in noise. The analysis was based upon a compilation of the Aircraft Situational Display data for corporate jet aircraft operations at the airport. Table C4 presents the percentage of operations by type for corporate jets. The operations were grouped into multiple categories of corporate jets.

Table C4
**PERCENTAGE OF OPERATIONS BY TYPE FOR CORPORATE JETS
EXISTING 1999**
King County International Airport FAR Part 150 Study

Aircraft Type	INM Type	Annual Operations
<i>Business Jets - Stage 2</i>		
G-II	GIIB	643
LR-25	Lear25	646
Saberliner (Both 2/3)	SABR80	1,947
<i>Business Jets - Stage 3</i>		
Challenger	C600	2,343
Citations/Diamond	MU3001	4,326
Gulfstream	GIV	1,712
LR-35	Lear35	4,870
<i>Air Cargo > 60,000</i>		
B-727	727EM2	465
B-727	727Q15	408
B-747	74720B	458
B-757	757RR	2,173
Airbus/B-767	767300	688
DC-8	DC870	757
DC-8	DC8QN	1,470
DC-9	DC9Q9	151
<i>Aerospace</i>		
B-707 (AWACS)	707QN	151
B-737	737400	2,125
B-747	747400	10
B-757	757PW	661
B-767 (AWACS)	767300	35
B-777	777200	200

The airport has an average level of Stage II corporate jet aircraft. Stage II refers to the FAA's Federal Aircraft Regulations 36 that categorizes jet aircraft based upon noise levels. Stage II refers to the older louder aircraft. Stage III refers to the newer generation quieter aircraft. It is estimated that 11% of the total corporate jet fleet which operates out of King County International Airport are Stage II aircraft.

Runway Use. An additional important consideration in developing the noise contours is the percentage of time each runway is utilized. The speed and direction of the wind dictate the runway direction that is utilized by an aircraft. From a safety and stability standpoint, it is desirable, and usually necessary, to arrive and depart an aircraft into the wind. When the wind direction changes, the operations are shifted to the runway that favors the new wind direction.

The wind is generally calm with the dominate wind direction from the south. Therefore, Runways 13R and 13L are utilized about 69% of the time, while Runway 31L and 31R are used 31% of the time. The runway utilization assumptions used in the study are presented in **Table C5**. This table presents the percentage of operations by category utilizing each of the runways.

Table C5
RUNWAY UTILIZATION
King County International Airport FAR Part 150 Study

Aircraft Type	Percentage Utilization			
	13R	31L	13L	31R
General Aviation	34%	16%	35%	15%
Air Cargo	69%	31%	0%	0%
Aerospace	69%	31%	0%	0%
Passenger	69%	31%	0%	0%
Air Taxi	69%	31%	0%	0%
Military	69%	31%	0%	0%

Flight Path Utilization. The airport and tower have established paths for aircraft arriving and departing from King County International Airport. These paths are not precisely defined ground tracks, but represent a broad area over which the aircraft will generally fly. Example flight tracks from actual operations are presented in **Figures C11 and C12**. These figures present north flow conditions and south flow conditions respectively.

The modeling analysis includes a total of 15 departure flight tracks and 8 arrival flight tracks to model the aircraft flight paths at King County International Airport. Aircraft flight tracks were obtained by observations during the measurement survey, discussions with airport staff and air traffic control personnel, review of aeronautical charts and actual flight track information. These flight tracks are presented in **Figures C13 and C14** for both departure and arrival tracks respectively.

The noise monitoring system for King County International Airport provided several days of flight track data during November/December 1999. This flight track data was used to help define the location of the aircraft operations and in the correlation of the noise measurement data with the aircraft operational data. A daily plot of the flight tracks is presented in the Appendix.

Run-Up Operations. The run-up noise environment at King County International Airport was determined by incorporating the results of a survey of airport operators and the noise measurement survey with a computer modeling of the run-up operations. The primary source of noise analyzed in this report is nighttime run-up operations performed by Boeing as part of a maintenance program on their commercial jet aircraft.

Pertinent run-up information was obtained through a survey with airport operators. The majority of run-ups are at low power, but high power run-ups do occur and can last a number of minutes. Most run-ups take place near the ends of Runway 31L/13R. Run-ups do occur at other locations on the airport, but these are typically the smaller aircraft types. A synopsis of the most common aircraft types that conduct run-ups, the average number of run-ups per month, and the duration for the complete run-up process will be completed at the end of the calendar year.



▲ Scale 1"=15,000'

Figure C11 North Flow Actual Tracks

- ▲ 0-2000 AGL
- ▲ 2000 - 4000 AGL
- ▲ 4000 - 6000 AGL
- ▲ 6000 - 8000 AGL
- ▲ 8000 - 10000
- ▲ >10,000 AGL

King County
INTERNATIONAL AIRPORT/Boeing Field
FAR Part 150 Study

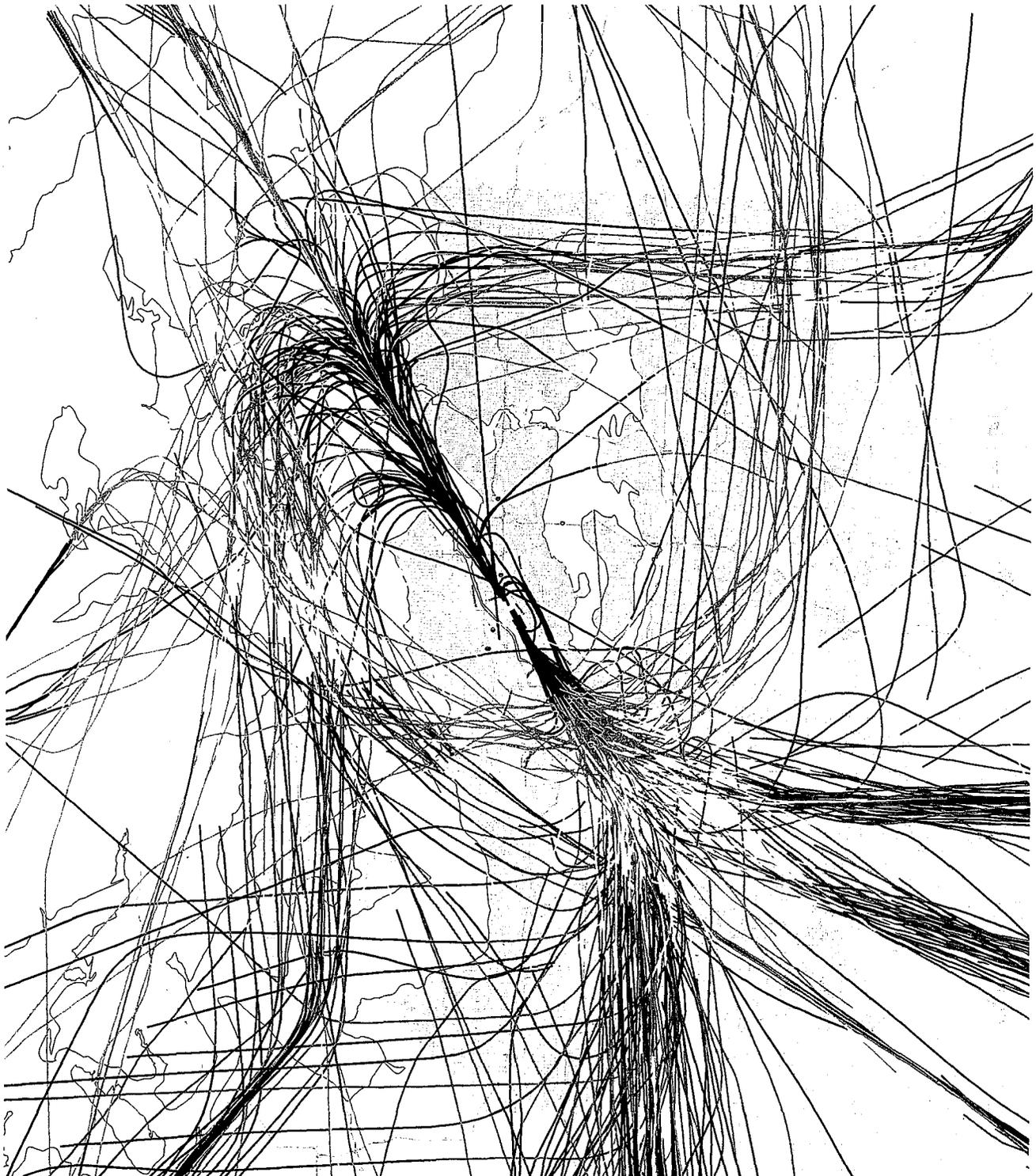
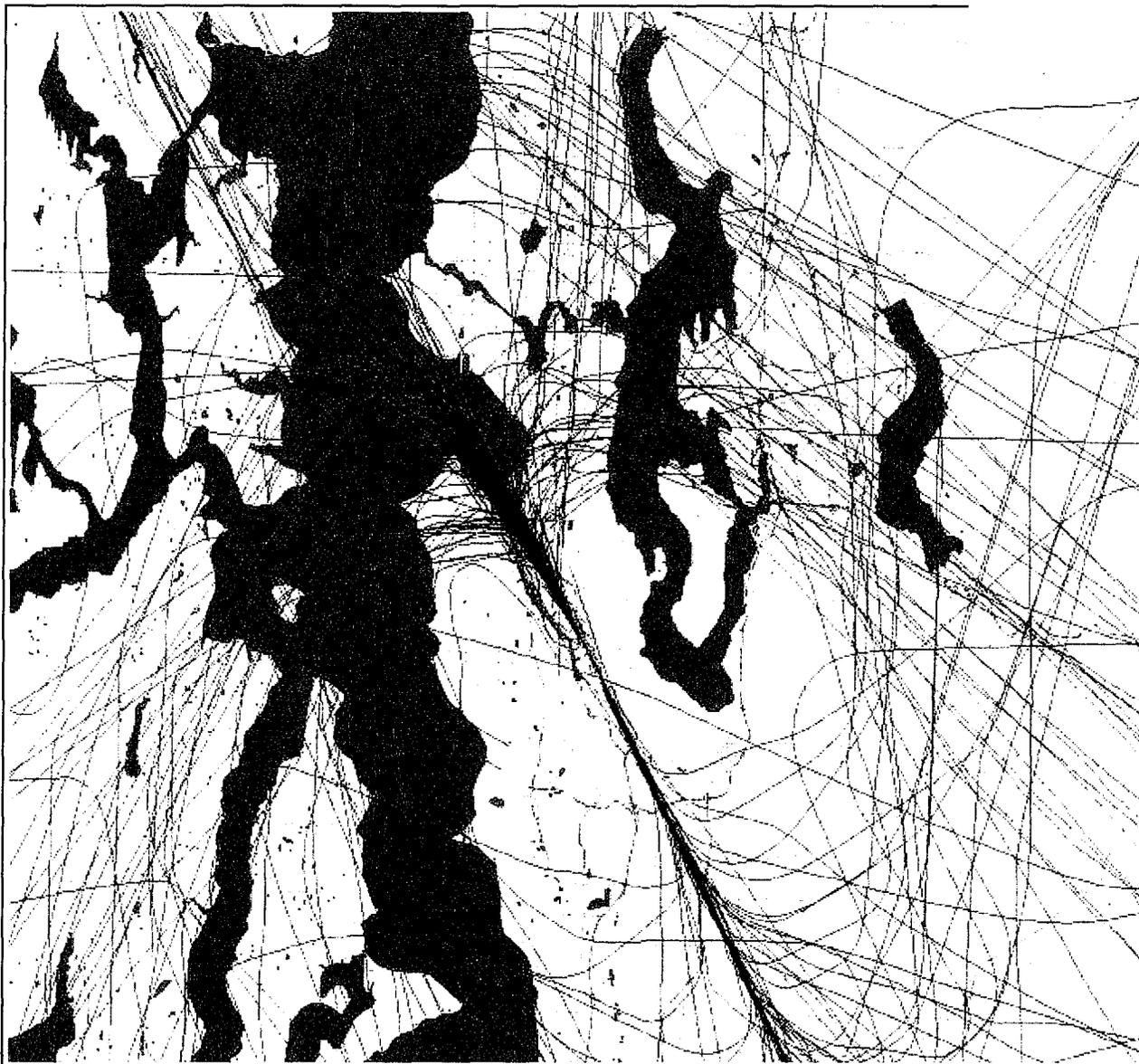


Figure C13
Example Flight Tracks (South Flow)
King County International Airport Part 150 Study



Figure C14
Example Flight Tracks (North Flow)
King County International Airport Part 150 Study



Future 2006 Aircraft Operations

The future noise environment for King County International Airport was analyzed based upon 2006 forecast operational conditions. The forecasts were presented in Chapter Two.

Aircraft Activity Levels. The forecasts estimate that there will be 425,647 operations during that time period, or an average of 1,166 operations per day (an operation is one takeoff or one landing). The 2006 aircraft operations for each category of operation are summarized in **Table C7**. These operations consist of air carriers and general aviation aircraft.

Table C7
SUMMARY OF OPERATIONS, FUTURE 2006
King County International Airport FAR Part 150 Study

Operations by Category	Operations Annual	Operations Daily	Percent Nighttime
General Aviation	343,058	938.1	
<i>Single Engine</i>	235,735	645.8	15%
<i>Multi-Engine</i>	81,901	224.4	15%
<i>Business Jet</i>	25,422	69.7	16%
Air Cargo (< 60,000#)	21,742	59.6	41%
Air Cargo (> 60,000#)	8,549	23.4	41%
Aerospace	4,040	11.1	0%
Passenger	7,560	20.7	15%
Air Taxi	37,660	103.2	15%
Military	3,090	8.5	0%
Total Operations	425,647	1,166.2	

All remaining assumptions are the same as with the existing conditions except for the mix of aircraft for the future year. The only assumption change is that the air cargo jets will either be hush kited to meet Stage III noise levels, or will be removed from the fleet and replaced by quieter aircraft, as mandated by federal law. The corporate jet fleet mix and night time percentages are assumed to remain the same.

Existing Noise Environment

The following section presents information concerning the existing noise environment at King County International Airport. The existing noise environment was determined through a noise measurement and modeling assessment. Operational data used to describe the existing conditions was summarized in the previous subsection. The results of the noise measurement survey and contour modeling are presented in the following paragraphs. The analysis presents noise data in terms of the DNL metric and supplemental Single Event noise data. More detailed information is presented in the Appendix.

Noise Measurement Results

Noise measurements were conducted between November 16th, 1999 and December 1st, 1999 at various locations around the airport. A total of nine (9) sites were monitored around King County International Airport using semi-permanent and temporary noise monitoring systems. These sites were presented in Figure C9 and included noise monitors that measured around the clock for as long as the monitors were present. These sites were measured for about two weeks during the time period of the survey.

The measurements consisted of: (1) single event noise levels from individual aircraft flyovers, (2) cumulative 24-hour continuous measurements, and (3) ambient non-aircraft noise sources. The survey utilized specialized equipment that allowed for the recording and display of the complete time history of noise events. The survey also included ambient or background noise measurements at the monitoring sites. Three of the sites were short-term measurement sites that also included some spot measurements of aircraft single event noise levels. The DNL noise level was not measured at these sites.

In addition to the temporary noise monitors used for this study, King County International Airport operates a series of their own noise monitors in the communities surrounding the airport. Some of these monitors are fixed in permanent locations while others are moved to different locations around the airport in response to residences' requests. The location of the noise monitors operated by King County International Airport were shown in **Figure C10**. Noise measurement data collected by some of these monitors was processed along with the data from the temporary monitors. Data from the airport monitors was taken for the same period the temporary monitors were in operation. The results of the measurement survey are presented in the following paragraphs.

The noise level was continuously recorded at each of the temporary noise monitoring sites. In addition to recording the noise events from aircraft, the monitors also recorded the ambient noise level of the community surrounding the monitoring site. An example of this is presented in **Table C8** where one hour of continuous noise data is shown for one site. The difference between an aircraft event and the ambient noise can be easily distinguished in this plot. Sample one-hour noise plots for each of the temporary noise monitoring sites is presented in Appendix A.

Single Event Noise Measurement Results. Aircraft single event noise levels were determined from this continuous noise data at each of the temporary measurement sites. The measurement data from the King County International Airport noise monitors consisted of single event levels. The acoustic data included the maximum noise level (L_{max}), Sound Exposure Level (SEL), and the time duration of the aircraft events. The noise data was correlated to the aircraft that caused the event using the flight track data that was simultaneously collected. The aircraft data included the aircraft type, type of operation and runway. The single event noise level data measured in the field was reduced and coded into a microcomputer-based data management program. This program includes a list of all of the aircraft events that can be analyzed in order to present various types of aircraft noise event information.

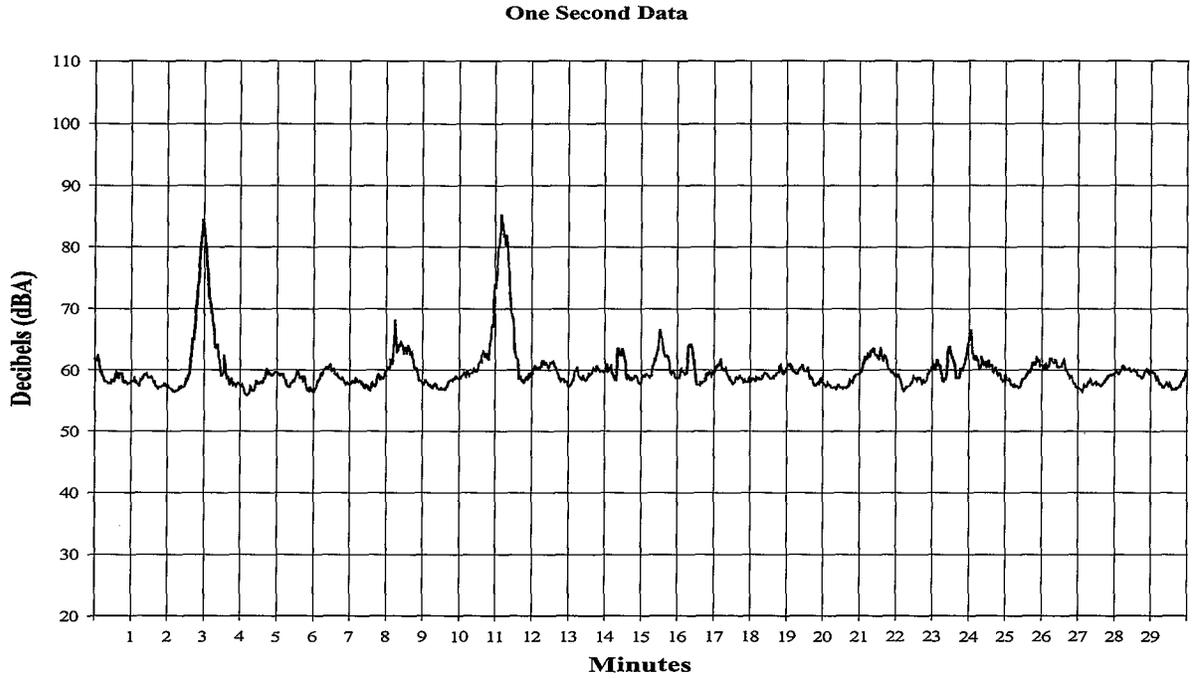
The daily number of noise events measured at each site is presented graphically in **Table C9**. This table presents one day of events for one measurement site. The table presents the SEL noise value plotted as a histogram. The vertical axis presents the number of events in each hour. The horizontal axis presents the hour of the day. The SEL values are plotted vertically for each event within each hour. This data is presented for additional days and additional sites in Appendix A.

The noise measurement data was used to determine the SEL noise levels for different types of aircraft operations. The ARTS data were then used to correlate the measured noise levels to the specific aircraft operation that generated them. The noise events from each monitoring sites that were correlated to specific aircraft departures or arrivals were grouped by aircraft type. **Table C10** lists the departing aircraft correlated to noise levels measured at Site 3. The tables listing the correlated events measured at each of the monitoring sites and grouped by aircraft type are presented in Appendix A.

Table C8 - Hourly Noise Graph by Site
King County International Airport Part 150 Study
Site: BS2 - Skyway



Period: Nov 24 1999 06:00:00 to Nov 24 1999 06:30:00



Period: Nov 24 1999 06:30:00 to Nov 24 1999 07:00:00

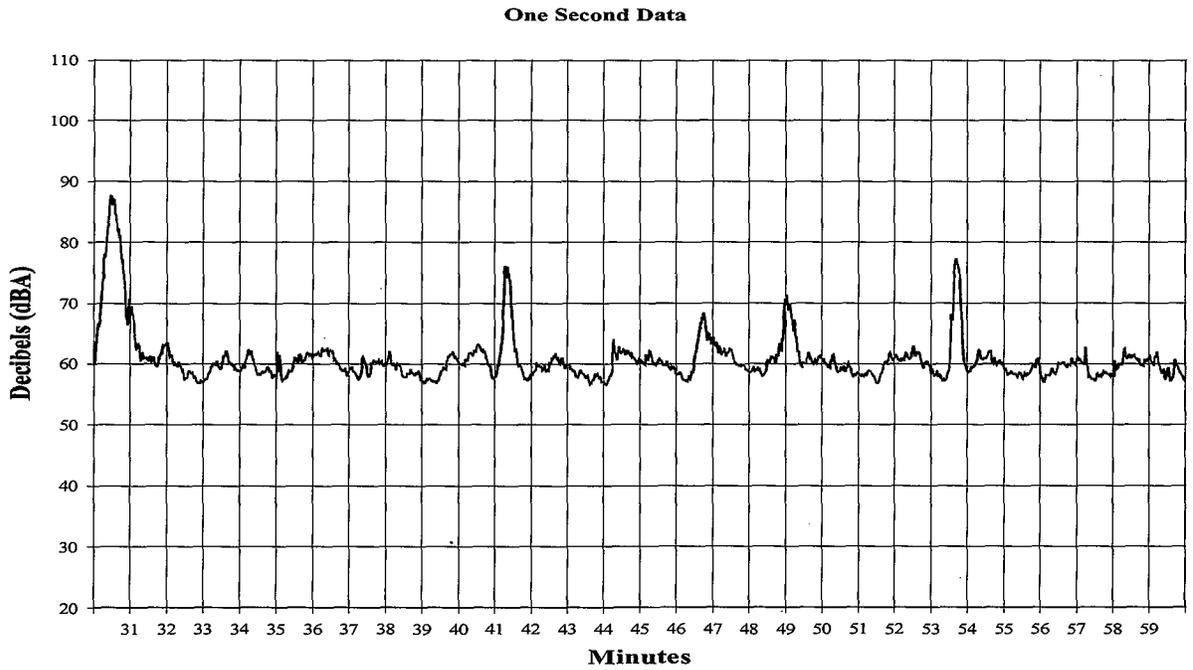


Table C9 - Daily Noise Events Histogram Report
King County International Airport Part 150 Study
 Period: November 27, 1999
 Site: BS1 - Tukwila - 3303 S. 132



KingCo
 International Airport

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	
23																						
22																						
21																						
20																						
19																						
18																						
17																						
16																						
15																						
14																						
13																						
12																						
11																						
10																						
9																						
8								84.4														
7								84.9	83.5					82.6	82.6							
6								83.0	85.0					87.9	82.5							
5								78.2	79.6	85.3				87.4	81.8							
4								82.5	84.2	93.4	86.6			88.5	85.0							
3								80.5	81.8	85.4	82.6			85.6	89.1	81.2						
2								84.6	86.4	85.0	86.8	86.7		83.7	81.3	85.8						
1	81.7	81.9			76.3	81.2	84.7	83.2	90.6	79.4	88.5		79.7	86.2	82.6	79.8	82.5	86.3	85.6	81.3	83.5	

Hour Of The Day

Table C10 - Single Event Noise Level by Aircraft Report
King County International Airport Part 150 Study
 Period: November 1999 to December 1999
 Site: BS3 - Seattle - 3903 S. Burns St.
 Operations: D Runways: 13L;13R Tracks: ALL



Aircraft	FAR 36 Stage	Event Count	Energy Average SEL	Graph of Energy Average SEL	
[REDACTED]	B722	2	10	98.8	[REDACTED]
[REDACTED]	B738	3	1	88.6	[REDACTED]
[REDACTED]	B73A	2	6	90.3	[REDACTED]
[REDACTED]	B752	3	8	90.7	[REDACTED]
[REDACTED]	B767	3	10	92.9	[REDACTED]
[REDACTED]	C560	3	3	88.5	[REDACTED]
[REDACTED]	DC8	2	4	93.9	[REDACTED]
[REDACTED]	DC8S	2	21	101.9	[REDACTED]
[REDACTED]	DC9	2	4	99.9	[REDACTED]
[REDACTED]	F900	3	2	91.0	[REDACTED]
[REDACTED]	FA50	3	6	91.8	[REDACTED]
[REDACTED]	GLF2	2	8	94.9	[REDACTED]
[REDACTED]	MD80	3	1	99.9	[REDACTED]
[REDACTED]	SBR1	2	1	90.4	[REDACTED]
[REDACTED]	T33		1	94.8	[REDACTED]
Other Aircraft			58	96.6	[REDACTED]

Note:

Energy Average is average of all events on a noise energy basis.
 FAR36 Stage is for general categories and does not account for hushkitted aircraft.

The correlated events at each of the monitoring sites were sorted to determine which operations produced the loudest events. **Table C11** lists the date, time, aircraft type, aircraft noise stage, operation, runway, and measured noise levels for the ten loudest events measured at Site 3. The tables listing the loudest ten events and associated aircraft for all of the noise monitoring sites are presented in Appendix A. The measured 1-second data from one of the loudest events at each of the monitoring sites was plotted to show the characteristic profile of an aircraft event at that location. **Table C12** lists the measured parameters and shows the plot of the 1-second data for one of the loudest ten events measured at Site 3. The tables showing time history plots for one of the loudest events at each of the temporary noise monitoring sites are presented in Appendix A.

The results of the departure noise analysis show that that many of the operations generate single event noise levels in excess of 95 SEL, up to a level of 110 SEL. These results show the wide range in aircraft events that occur at each site as well as some very high noise events. The noise levels generated by the corporate jet aircraft varies significantly for each type of aircraft. The older low-bypass-ratio engines (Stage II) generate significantly higher noise levels than the newer generation high-bypass-ratio engines (Stage III).

An analysis of the data showed that the average SEL for Stage II or hush kit aircraft is 10 to 15 dBA higher than for pure Stage III aircraft. The results show that the arrival noise for Stage III aircraft is quieter than for Stage II aircraft. This difference is less than with the departures. The difference between the energy average Stage II and Stage III aircraft SEL noise for arrival operations is approximately 5 dBA.

Table C11 - Loudest Aircraft Noise Events Site Report
King County International Airport Part 150 Study
 Period: November 16, 1999 to December 1, 1999
 Site: BS3 - Seattle



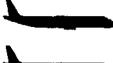
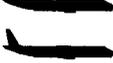
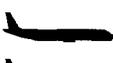
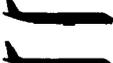
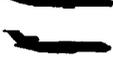
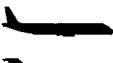
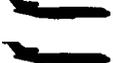
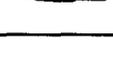
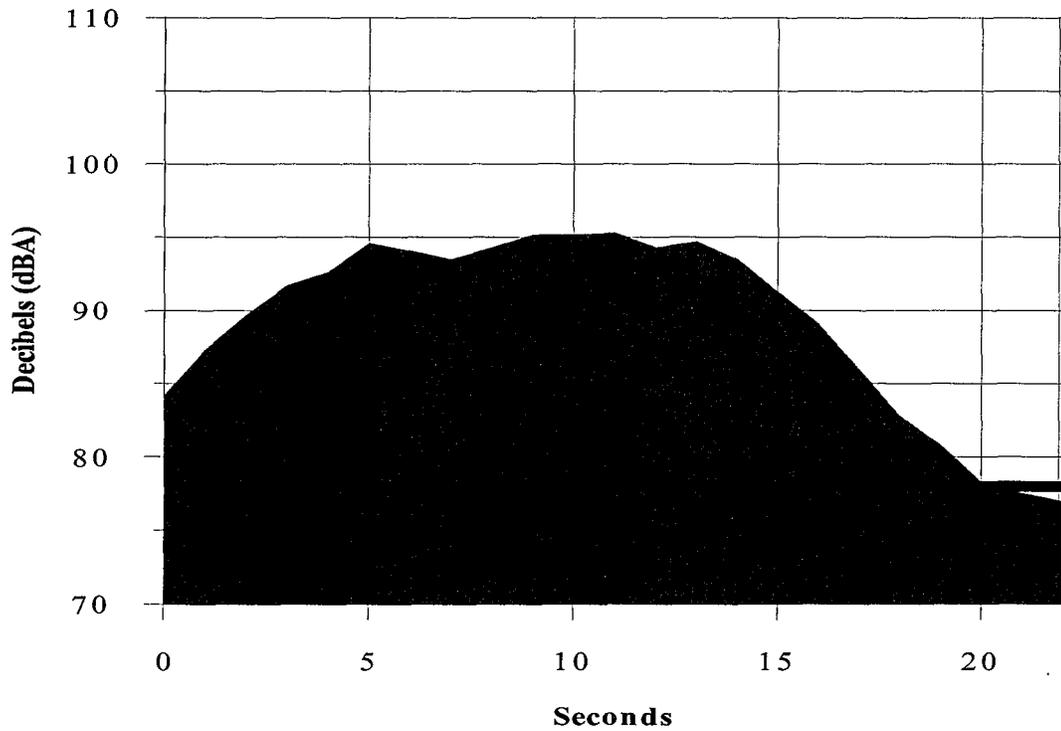
Aircraft	Airline	Event Time	Aircraft	Stage	Ops	Rwy	Lmax	SEL	Graph Of SEL
	MIL	Nov 28, 17:15	C141	2	D	13R	95.3	105.6	
	 AIRBORNE EXPRESS	Nov 24, 19:33	DC8Q	3	D	13R	98.1	105.1	
	 AIRBORNE EXPRESS	Nov 29, 19:47	DC8Q	3	D	13R	95.2	104.7	
	 BURLINGTON	Nov 29, 19:00	DC8	2	D	13R	96.6	104.6	
	 AIRBORNE EXPRESS	Nov 24, 16:27	DC8Q	3	D	13R	94.9	104.2	
	 AIRBORNE EXPRESS	Nov 18, 19:42	DC8Q	3	D	13R	92.4	103.8	
	 NORTHWEST	Nov 20, 23:09	B72Q	3	D	13R	94.7	103.7	
	 AIRBORNE EXPRESS	Nov 29, 19:35	DC8Q	3	D	13R	95.1	103.3	
	 NORTHWEST	Nov 30, 22:47	B72Q	3	D	13R	93.3	102.8	
	JUD	Nov 20, 13:05	B721	2	D	13R	93.9	102.5	

Table C12 - Noise Event Plot Report
King County International Airport Part 150 Study
Site: BS3 - Seattle - 3903 S. Burns St.



DateTime:	11/28/99 5:14:22 PM	
Aircraft Type:	C141	Lockheed Corp. C-141 Starlifter
Airline Code:	RCH	
Operation:	Departure	
Runway:	13R	
Destination:	UNK	

SEL (dBA):	105.6	Max (dBA):	95.3
Duration (seconds):	21	Start to peak (seconds):	11
SEL threshold (dBA):	78		



DNL Noise Levels. **Table C13** lists the results of the DNL noise measurements at the 6 semi-permanent noise-monitoring locations. This table lists the DNL due to aircraft events for the period the noise level was monitored at each site. The measurement results show that noise exposure at the six sites ranges from 49 DNL up to 65 DNL.

The major contributor to the DNL noise level at most of these sites is the corporate jet activity, especially the Stage 2 jets and those jets that occur during the nighttime hours. Sites 5 and 6 are exposed to more noise from traffic on the nearby freeway than from aircraft operations. **Table C14** shows the results of the DNL noise measurements at the 6 semi-permanent noise-monitoring locations in a graphical format. The top portion of the table shows the range of daily DNL values along with the overall DNL for the entire measurement period. The bottom portion of the table shows the total DNL level as well as the amount of aircraft noise and ambient noise that contributed to the overall level.

Table C15 lists the noise level due to the aircraft events, the noise due to the everything other than aircraft, and the total DNL for each day the noise level was monitored at Site 1. This table also includes a histogram of the noise levels of all of the events measured at the site. This helps illustrate the range in the single event noise levels measured at the site and the relative number of events. Additional tables presenting this information for the other sites is presented in Appendix A.

Table C13
MEASURED DNL NOISE LEVELS
King County International Airport FAR Part 150 Study

Site	Description	Date of Measurements	Measured DNL Noise Level
1	28 th Ave. W	Nov 17 th – Dec 1 st	57
2	SW Hill St	Nov 16 th – Dec 1 st	49
3	37 th Ave. W and W Smith St.	Nov 16 th – Dec 1 st	53
4	S. 132	Nov 16 th – Nov 30 th	56
5	60 th Ave. S	Nov 16 th – Dec 1 st	62
6	S. Burns St	Nov 16 th – Dec 1 st	65

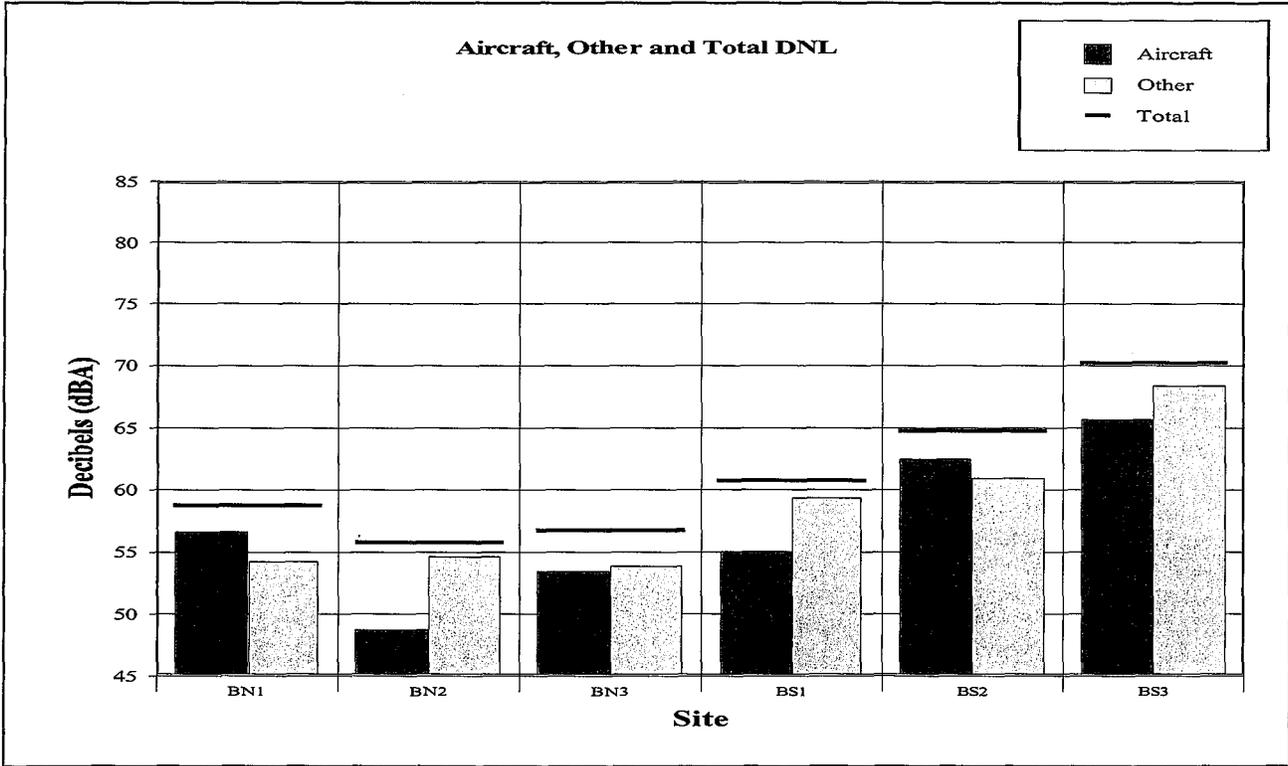
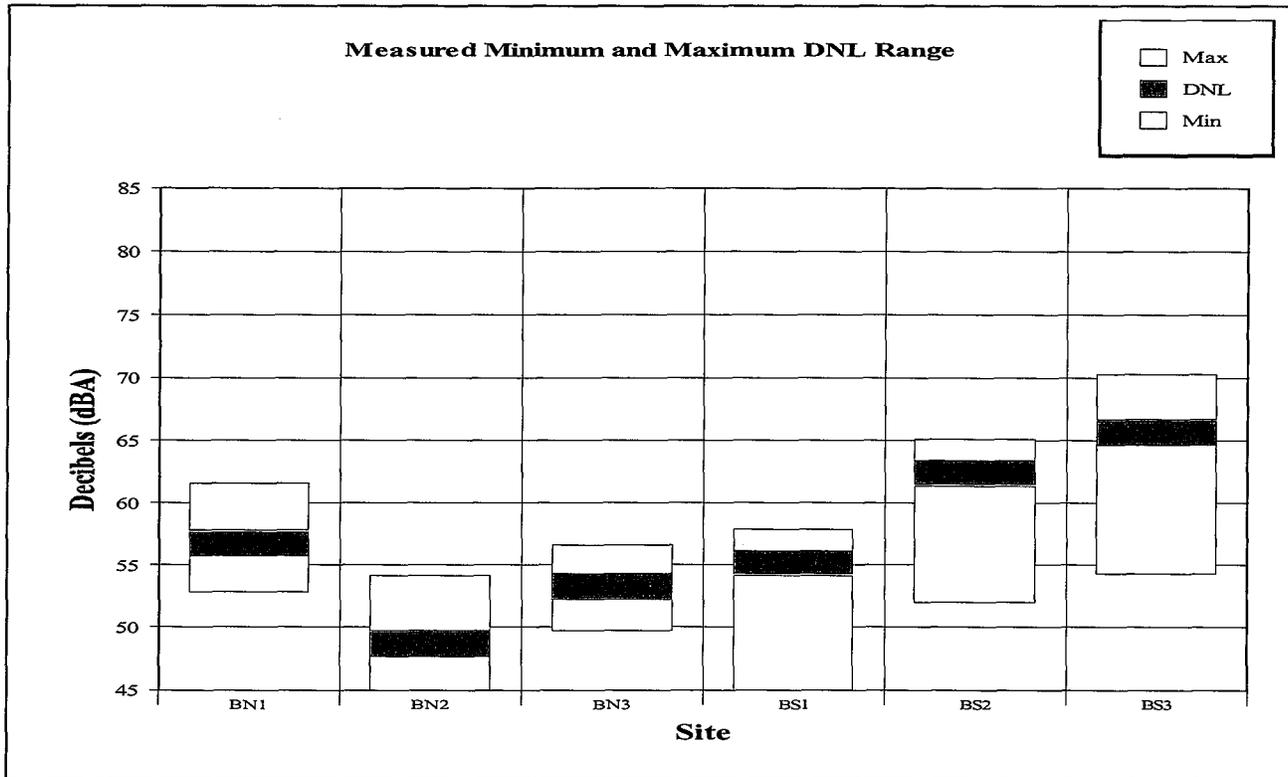
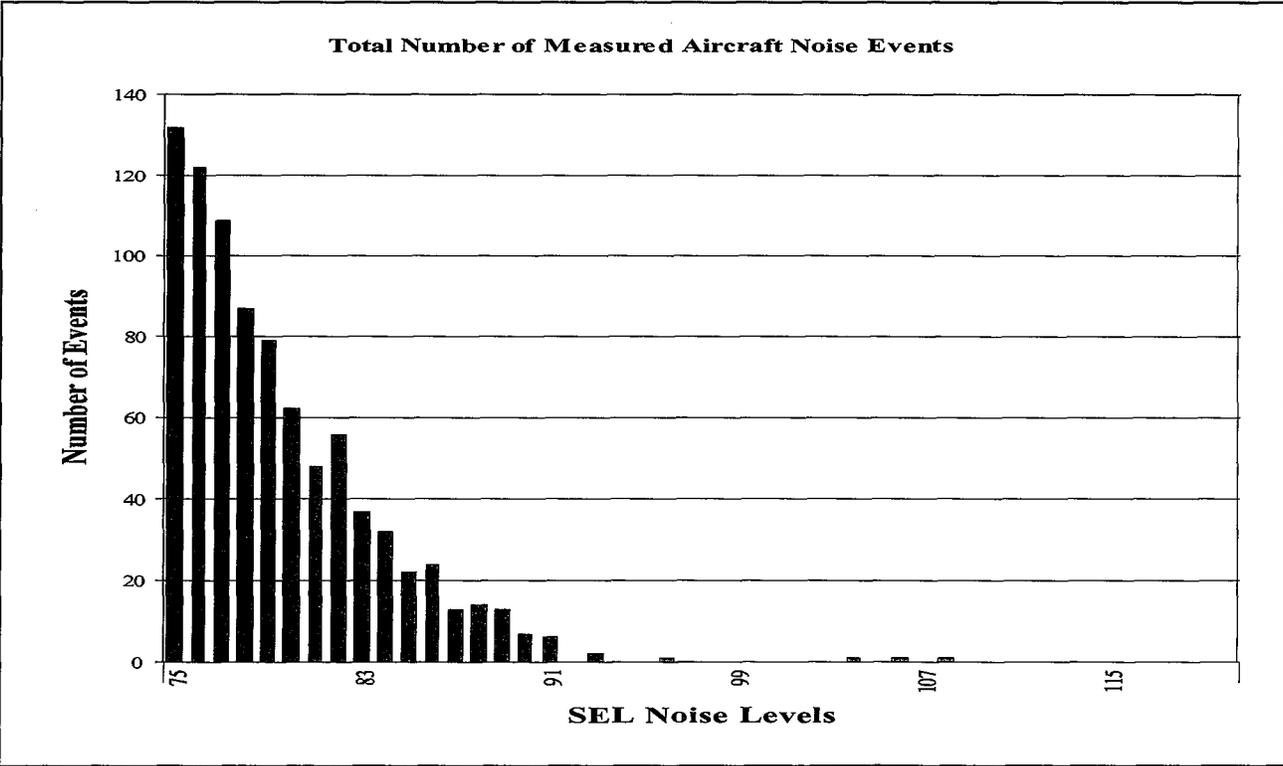
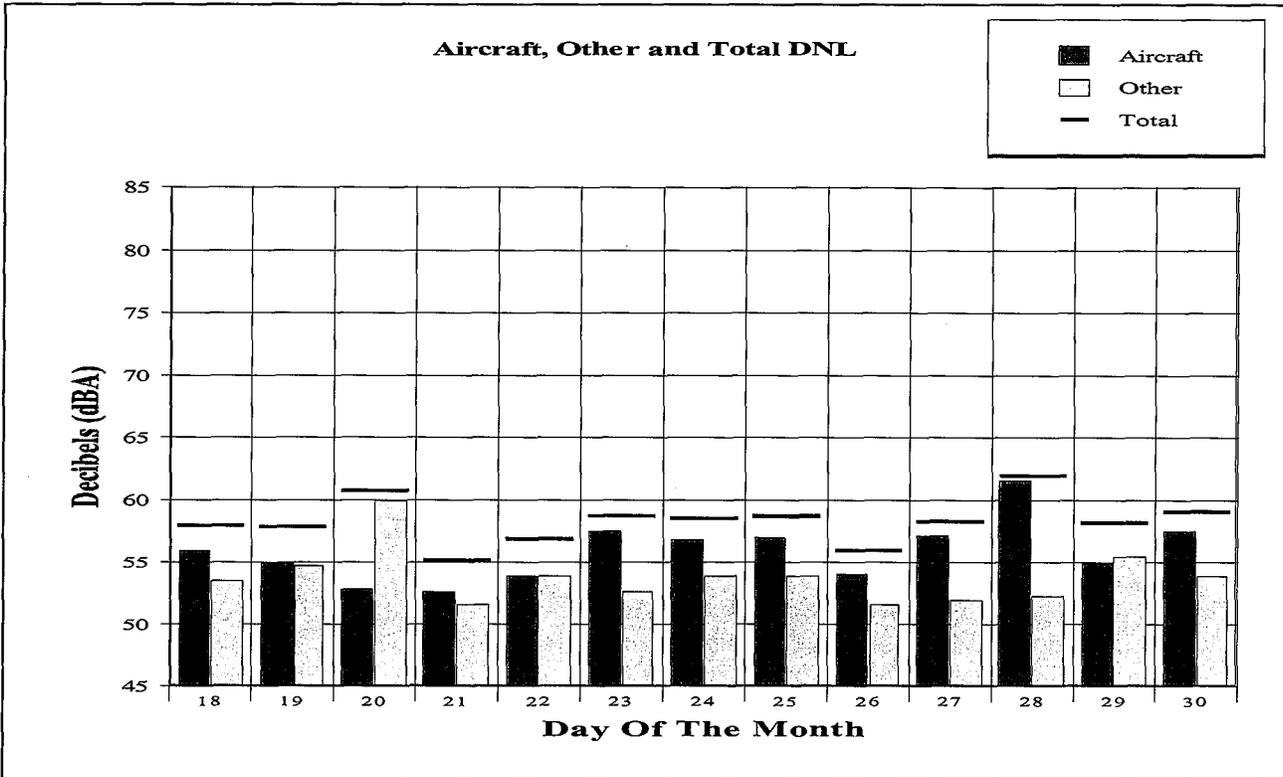


Table C15 - Periodic Site Noise Report
King County International Airport Part 150 Study
 Period: November 18, 1999 to November 30, 1999
 Site: BN1 - Magnolia - 37th Ave W and W Smith St



Ambient Noise Measurement Results. The ambient noise environment was also determined from the measurement survey. The ambient noise levels were determined at each of the measurement sites. The ambient noise levels were determined for all sources of noise affecting the sites. The quantities measured were the Maximum (LMAX) noise level, the Minimum (LMIN) noise level, and the Percent Noise Levels (Ln). These metrics were described in the background section. The data was used to help establish the ambient noise environment for all other sources other than airport operations in order to serve as an aid in assessing how intrusive the aircraft noise is on the ambient environment. This includes all other sources of noise including aircraft, roadway, commercial sources and the residual background noise.

The results of the ambient noise measurement survey at one of the semi-permanent sites is presented graphically in **Table C16**. An example of data from one of the sites for each day of the measurements is presented in **Table C17**. This exhibit presents a summary of the noise levels for each of the sites. This exhibit presents the statistical noise data (*the L(minimum), L90, L50, L10 and L(maximum)*) and graphically illustrating the range in noise. This illustrates the range in noise levels that exist at the sites. The *L(maximum)* is presented for the peak dBA measurement. Aircraft noise is included in this data. These metrics were defined on page C.18. The ambient measurement data for the other temporary sites is included in Appendix A.

Table C16 - Ambient Noise Measurement Results (All Sites)
King County International Airport Part 150 Study
 Period: November 16, 1999 to December 1, 1999
 Neighborhood: Part 150 Study Sites



Statistical Results

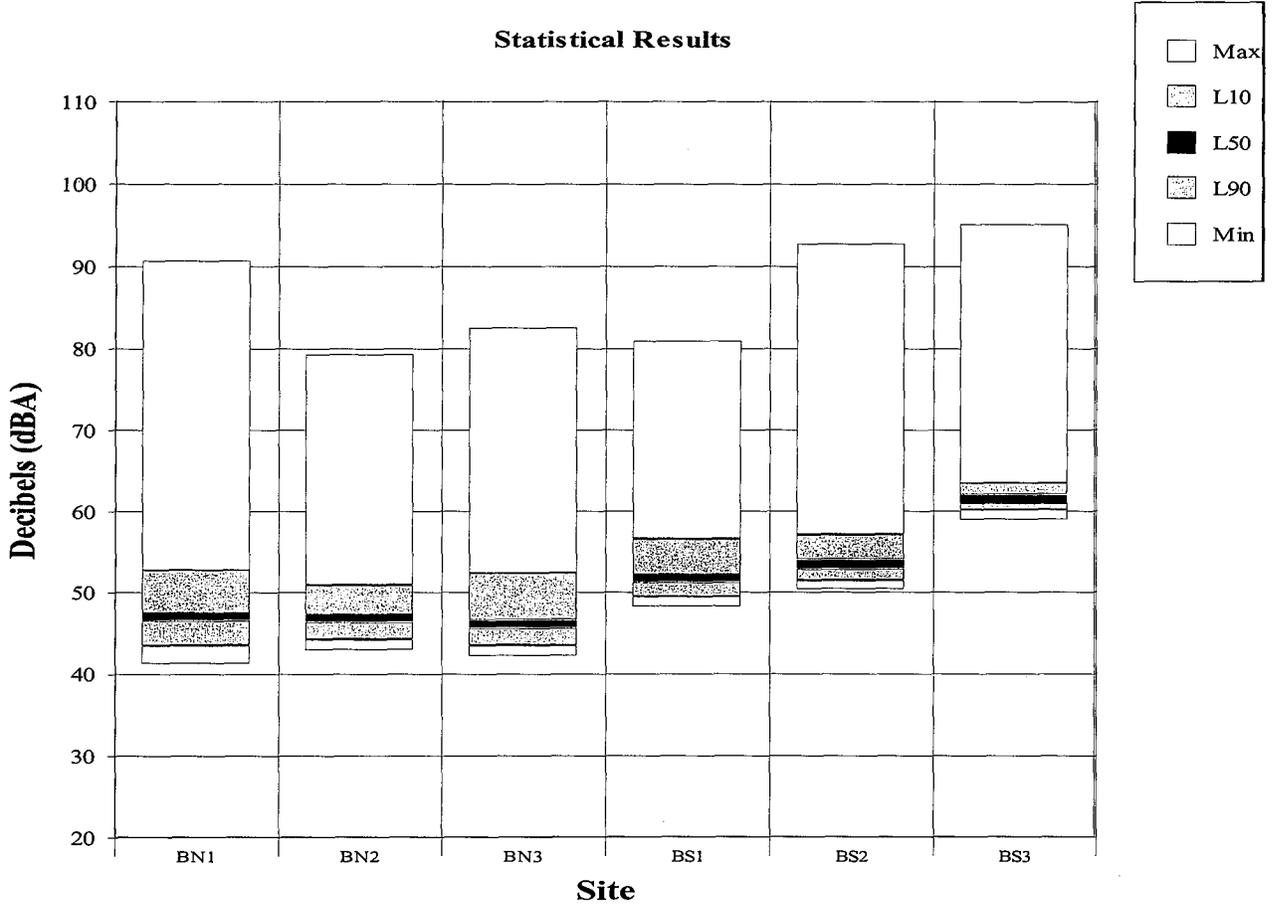
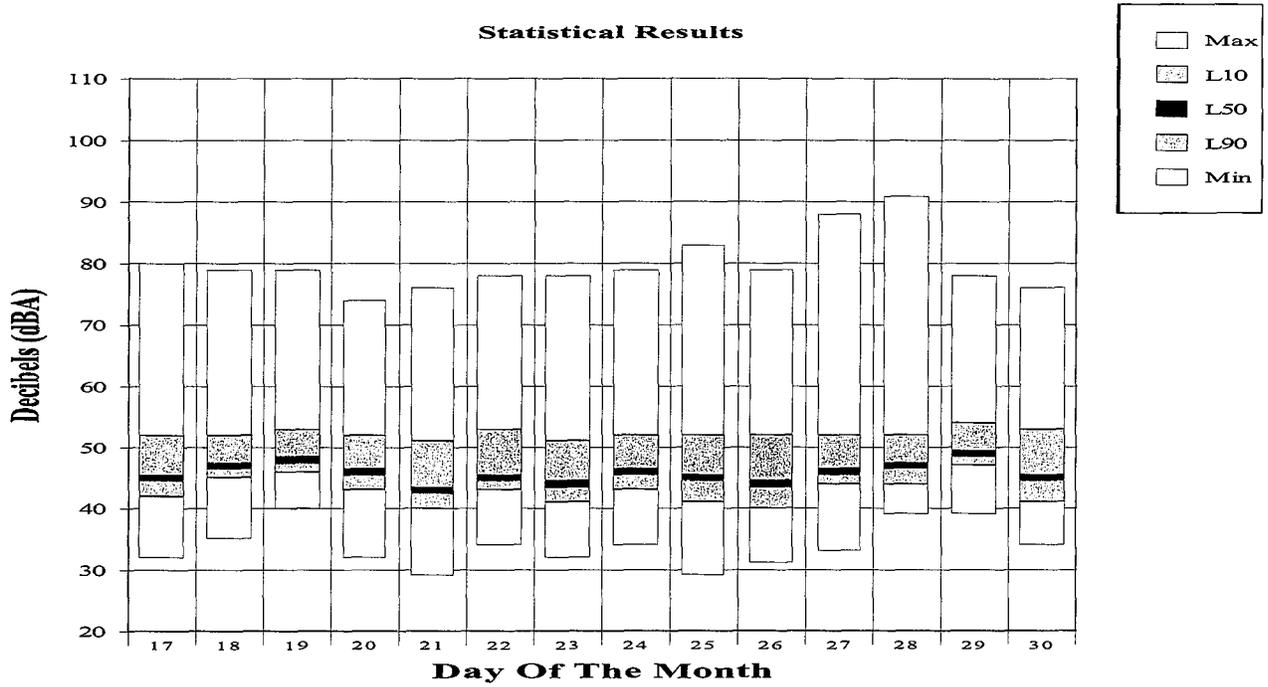


Table C17 - Ambient Noise Measurement Results
 King County International Airport Part 150 Study
 Period: November 17, 1999 to November 30, 1999
 Site: BN3 - Magnolia



Statistical Results



Noise Contour Modeling Results

The results from the noise measurement survey were used to facilitate the development of airport noise contours that have been validated through the noise measurement survey. The noise contours were generated using the INM Noise Model version 6. A description of the noise model and the operational data used to develop these contours was presented in previous sections. The existing noise contours are based upon 1999 operational conditions.

Noise contours were developed for both cumulative noise levels and single event noise levels. The cumulative noise levels were determined in terms of DNL. The single event analysis is in terms of SEL. The computer model was used to determine the SEL, DNL.

The primary noise criteria that will be used in the Part 150 Noise Study to describe the existing noise environment is DNL. DNL is the metric that is required by the FAA to be used in the Part 150. The SEL data will be used to supplement the DNL analysis.

DNL Noise Contours. While single event noise levels can be useful to help anticipate a community's response to noise, community noise standards are expressed in terms of cumulative noise exposure metrics such as the DNL. Therefore, the aircraft single event noise level data are combined with aircraft operational data to develop cumulative noise exposure levels over the full 24-hours. This combination of data generates the DNL noise level value. The existing annual 1999 DNL noise contours for King County International Airport are presented in **Figure C15**. This exhibit presents the 65, 70 and 75 DNL noise contours.

As a means of implementing the Aviation Safety and Noise Abatement Act, the FAA adopted Regulations on Airport Noise Compatibility Planning Programs. The guidelines specify a maximum amount of noise exposure (in terms of the cumulative noise metric DNL) that will be considered acceptable to or compatible with people in living and working areas. Residential land use is deemed acceptable for noise exposures up to 65 DNL. However, at levels below 65 DNL there can still be adverse community reaction to aircraft noise.



Scale 1"=10,000'

Figure C15 Existing DNL Noise Contours

- Existing Land Use
- Government
- Industrial
- Residential
- Retail-Commercial
- Noise Contour

Single Event Noise Contours. Single event noise levels are often a predictor of when annoyance from aircraft noise is likely to occur or other factors such as sleep interference. Single event noise contours are also useful in illustrating the various differences in the noise generated by different aircraft types. Single event noise contours were developed for King County International Airport. These were developed using specific aircraft types and their associated flight procedures.

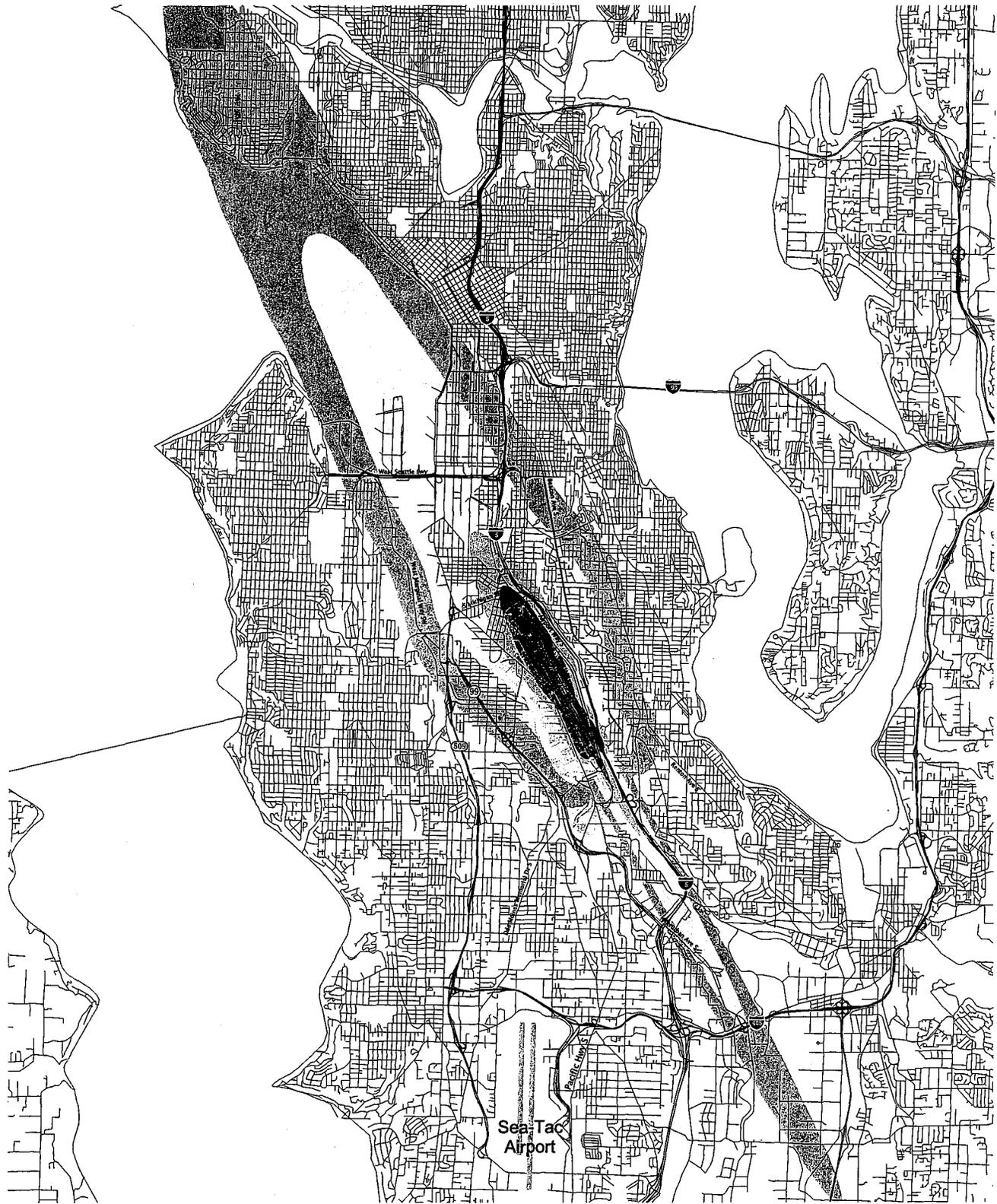
The single event analysis presents the single event noise levels along a typical flight track for a number of sample commercial aircraft. The INM noise model was used to generate the single event noise contours. Corporate Jets and freighters can generate a wide range in noise levels. To illustrate the range in single event noise levels, two corporate jets and two freighter aircraft were selected for modeling purposes. These aircraft are listed below:

- DC-8 Freighter
- B-757 Freighter
- Gulfstream II
- Gulfstream IV

The Gulfstream II aircraft represents the old generation Stage II corporate jets that generate the highest noise levels. The Gulfstream IV is representative of typical Stage III corporate jets. Note that there are many different variations of the flight tracks. Different flight tracks will result in a different noise exposure to different areas of the community. These contours are intended to reflect the single event noise levels from one typical departure and arrival track.

Single event contours for these different jet aircraft are presented in **Figures C16 through C23**. These exhibits present the SEL noise contour for the DC-8 freighter, the B-757 freighter, the Gulfstream II and the Gulfstream IV respectively for both north and south flight operations. Each aircraft is departing and arriving on a typical track for operations on each runway. These exhibits present the departure and arrival SEL noise contours for 100, 95, 90 and 85 dBA. The results illustrate the wide range in noise generated by corporate jet and freighter aircraft. The older Stage II aircraft generate significantly higher noise levels than the newer generation jet aircraft. This is most pronounced on departure. Note also that the sideline noise is significantly higher on the Stage II aircraft than the other stage 3 jets.

There are no standards in terms of single event criteria. An SEL level of 95 represents the level at which sleep disturbance starts to occur in the general population with the probability of awaking increasing with the noise level. An 85 SEL represents the level at which speech interference starts to take place. For windows closed situations, SEL levels above 95 will typically result in conversation interruption within a home.

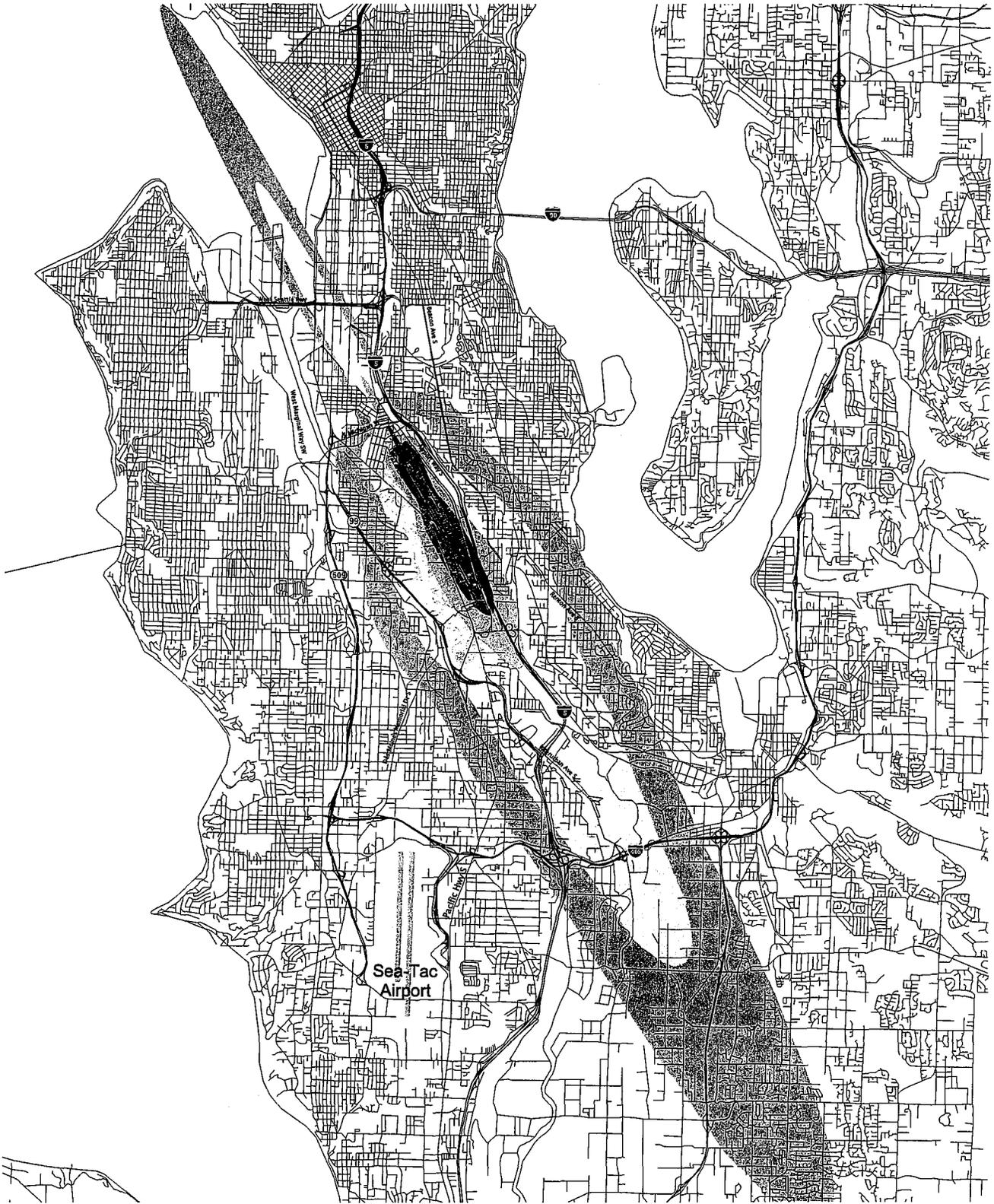


Scale 1"=10,000'

Figure C16 DC-8 SEL Contour North Departure

- SEL 105
- SEL 100
- SEL 95
- SEL 90
- SEL 85

King County
INTERNATIONAL AIRPORT/Boeing Field
FAR Part 150 Study

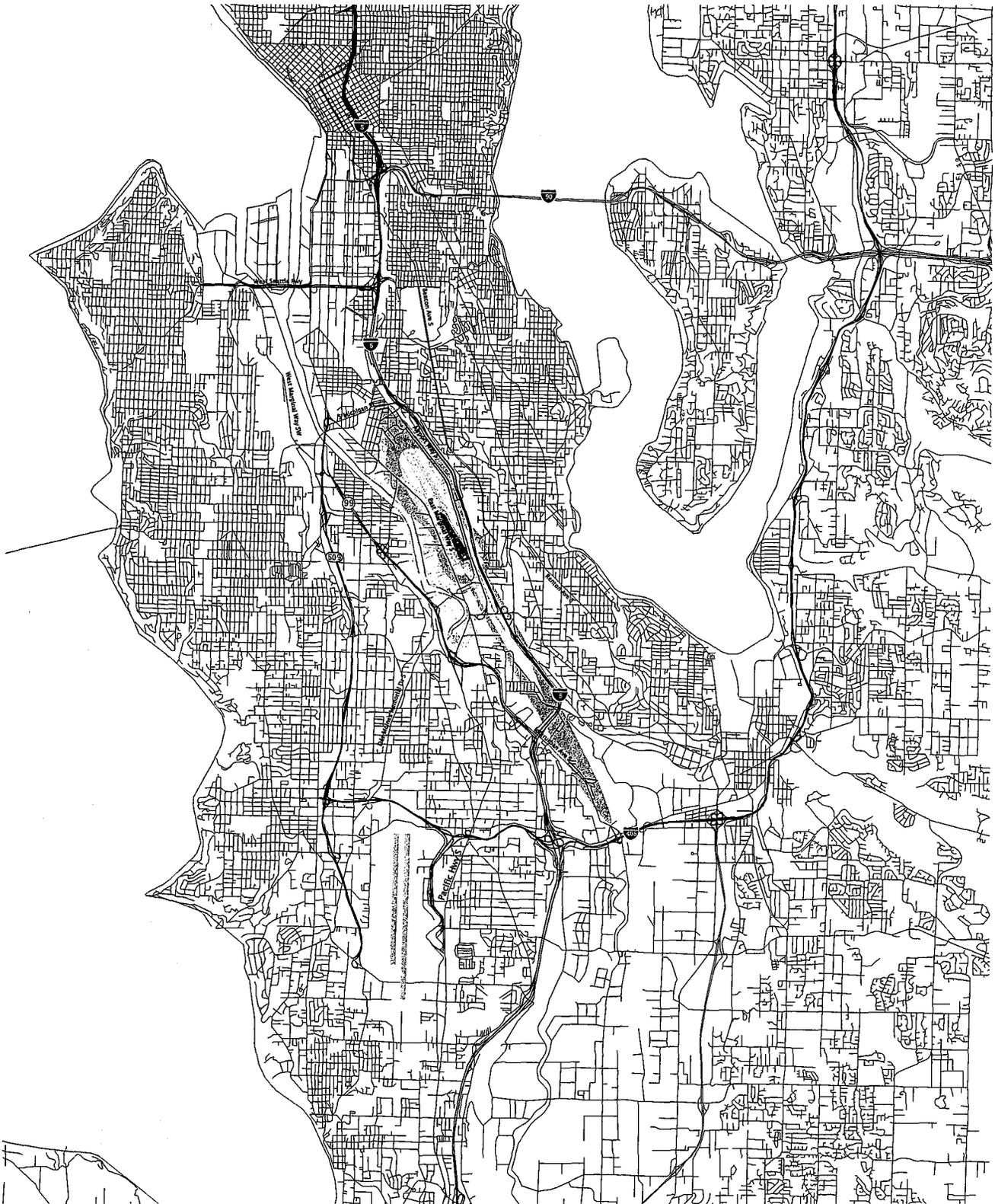


Scale 1"=10,000'

Figure C17 DC-8 SEL Contour South Departure

- SEL 105
- SEL 100
- SEL 95
- SEL 90
- SEL 85

King County
INTERNATIONAL AIRPORT/Boeing Field
FAR Part 150 Study

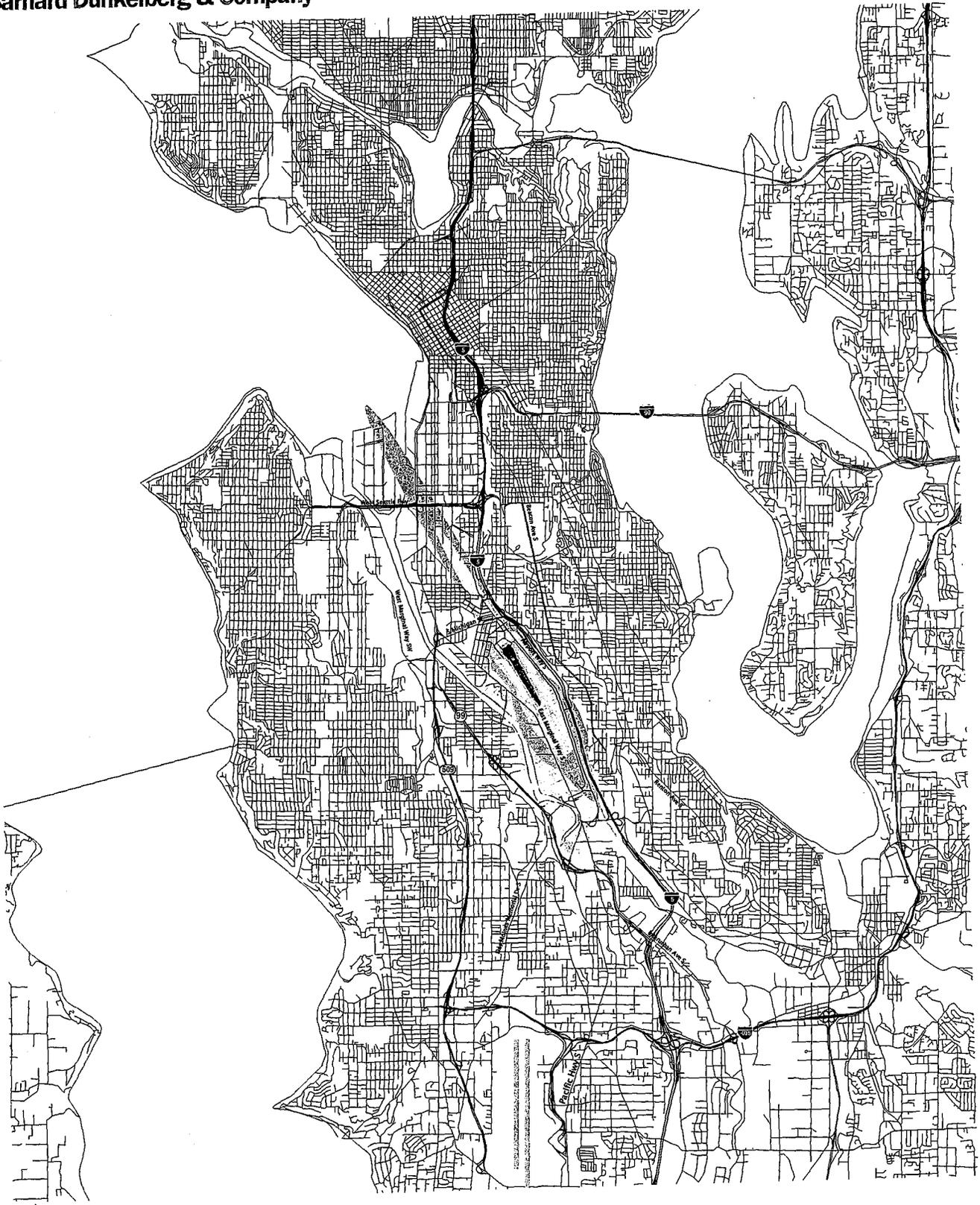


Scale 1"=10,000'

Figure C18 Boeing 757 Contour North Departure

- SEL 105
- SEL 100
- SEL 95
- SEL 90
- SEL 85

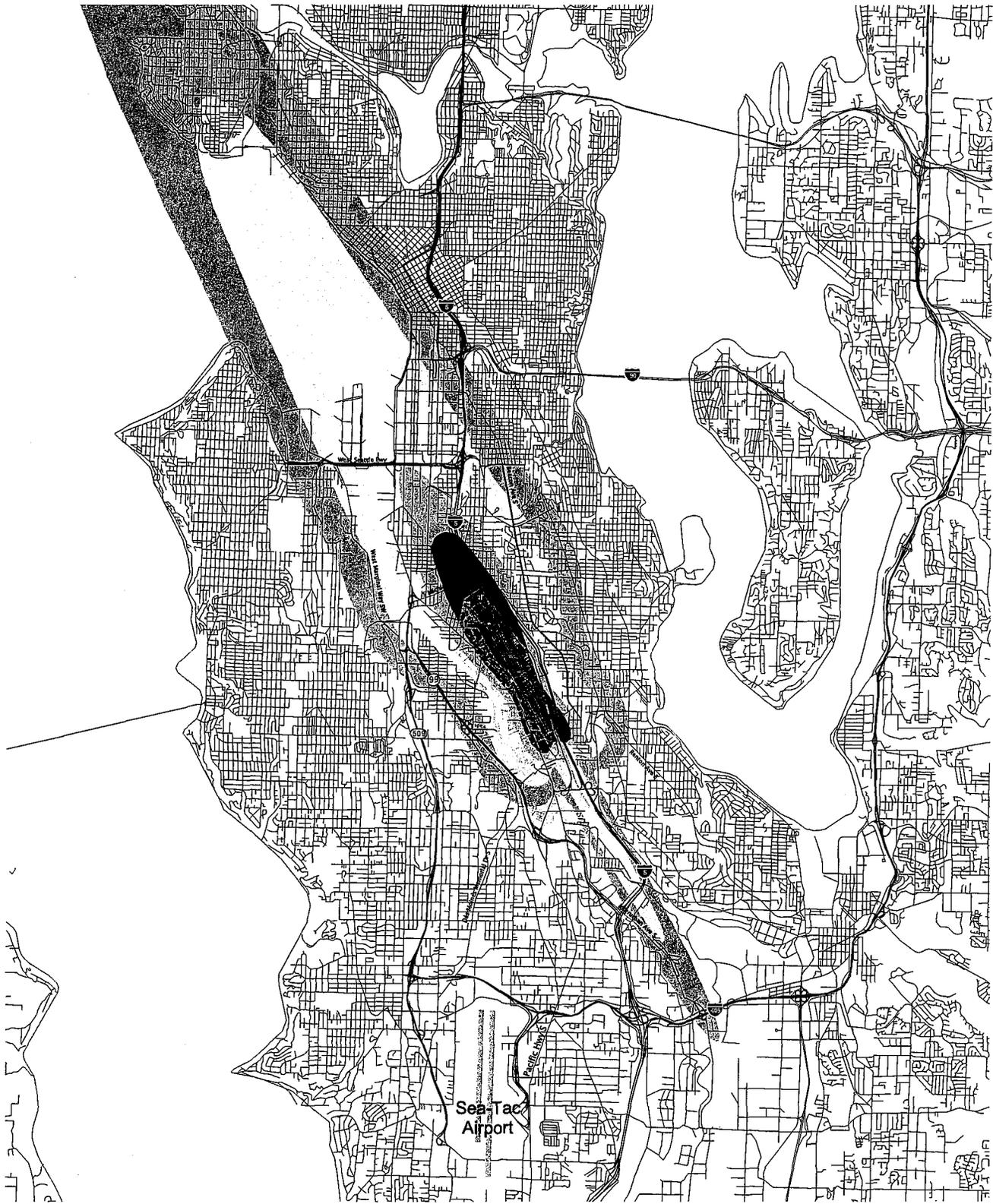
King County
 INTERNATIONAL AIRPORT/Boeing Field
 FAR Part 150 Study



Scale 1"=10,000'

Figure C19 Boeing 757 Contour South Departure

- SEL 105
- SEL 100
- SEL 95
- SEL 90

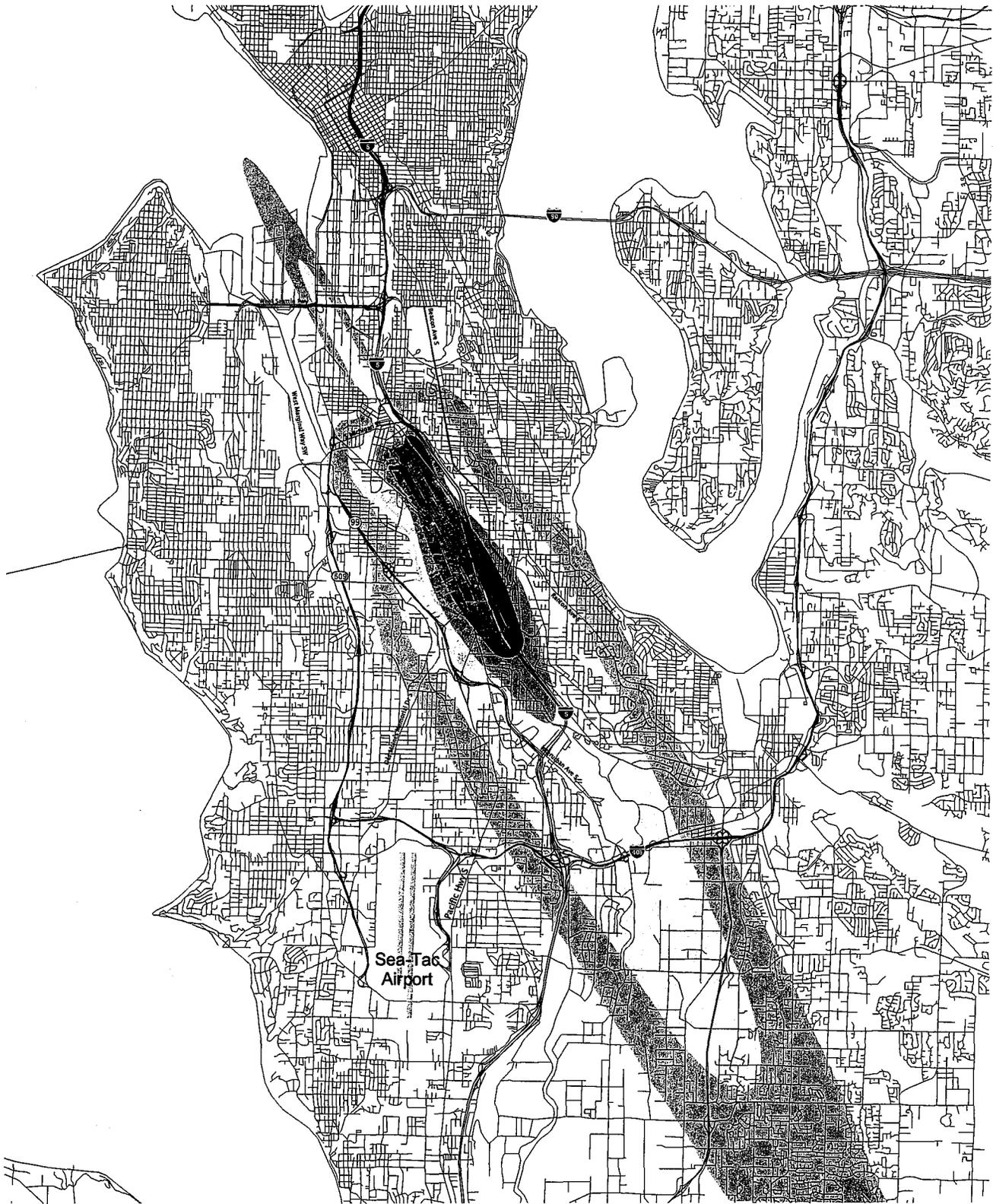


Scale 1"=10,000'

Figure C20 Gulfstream G II SEL Contour North Departure

- SEL 105
- SEL 100
- SEL 95
- SEL 90
- SEL 85

King County
INTERNATIONAL AIRPORT/Boeing Field
FAR Part 150 Study

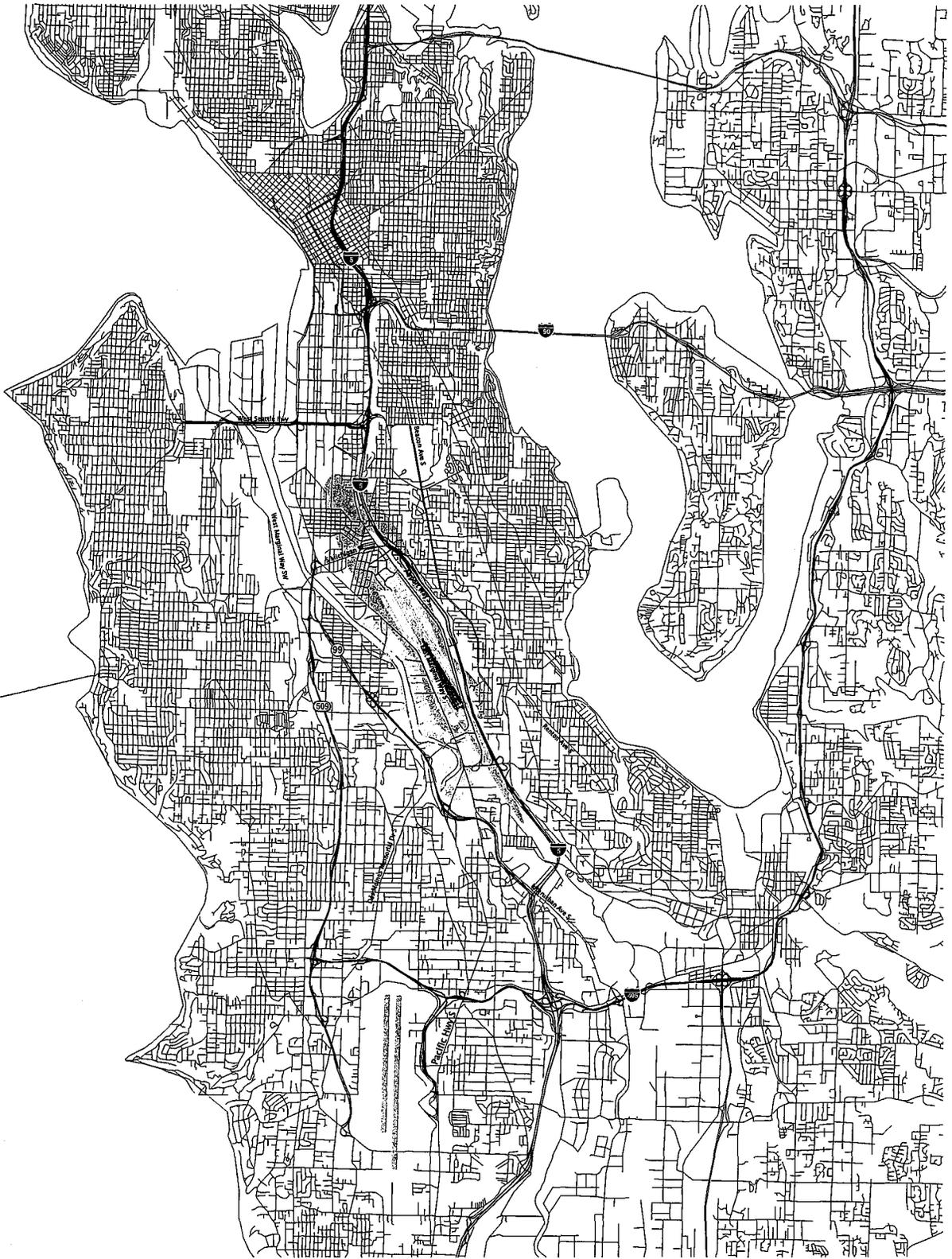


Scale 1"=10,000'

Figure C21 Gulfstream G II SEL Contour South Departure

- SEL 105
- SEL 100
- SEL 95
- SEL 90
- SEL 85

King County
INTERNATIONAL AIRPORT/Boeing Field
FAR Part 150 Study

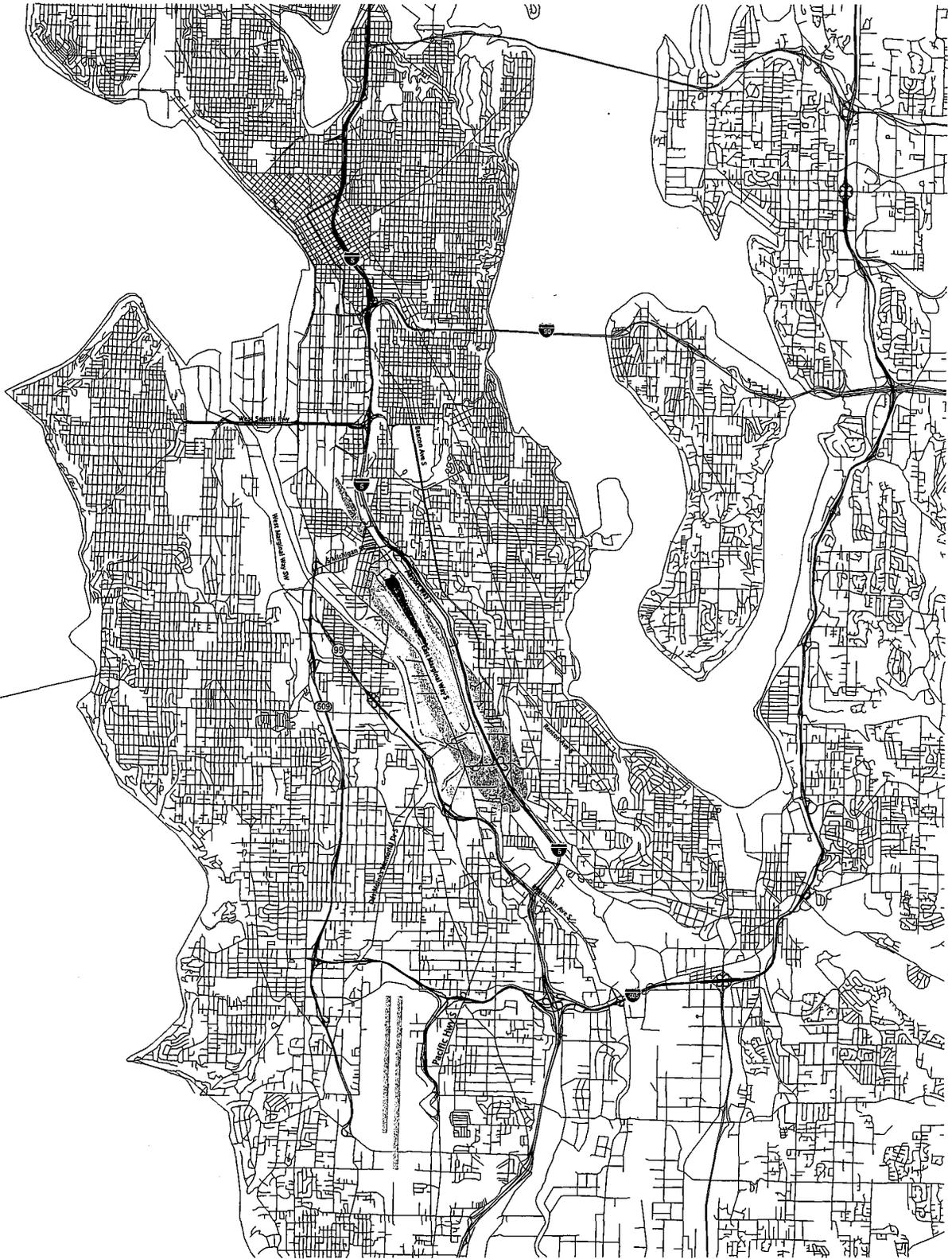


Scale 1"=10,000'

Figure C22 Gulfstream G IV SEL Contour North Departure

- SEL 105
- SEL 100
- SEL 95
- SEL 90
- SEL 85

King County
INTERNATIONAL AIRPORT/Boeing Field
FAR Part 150 Study



Scale 1"=10,000'

Figure C23 Gulfstream G IV SEL Contour South Departure

- SEL 105
- SEL 100
- SEL 95
- SEL 90
- SEL 85

King County
INTERNATIONAL AIRPORT/Boeing Field
FAR Part 150 Study

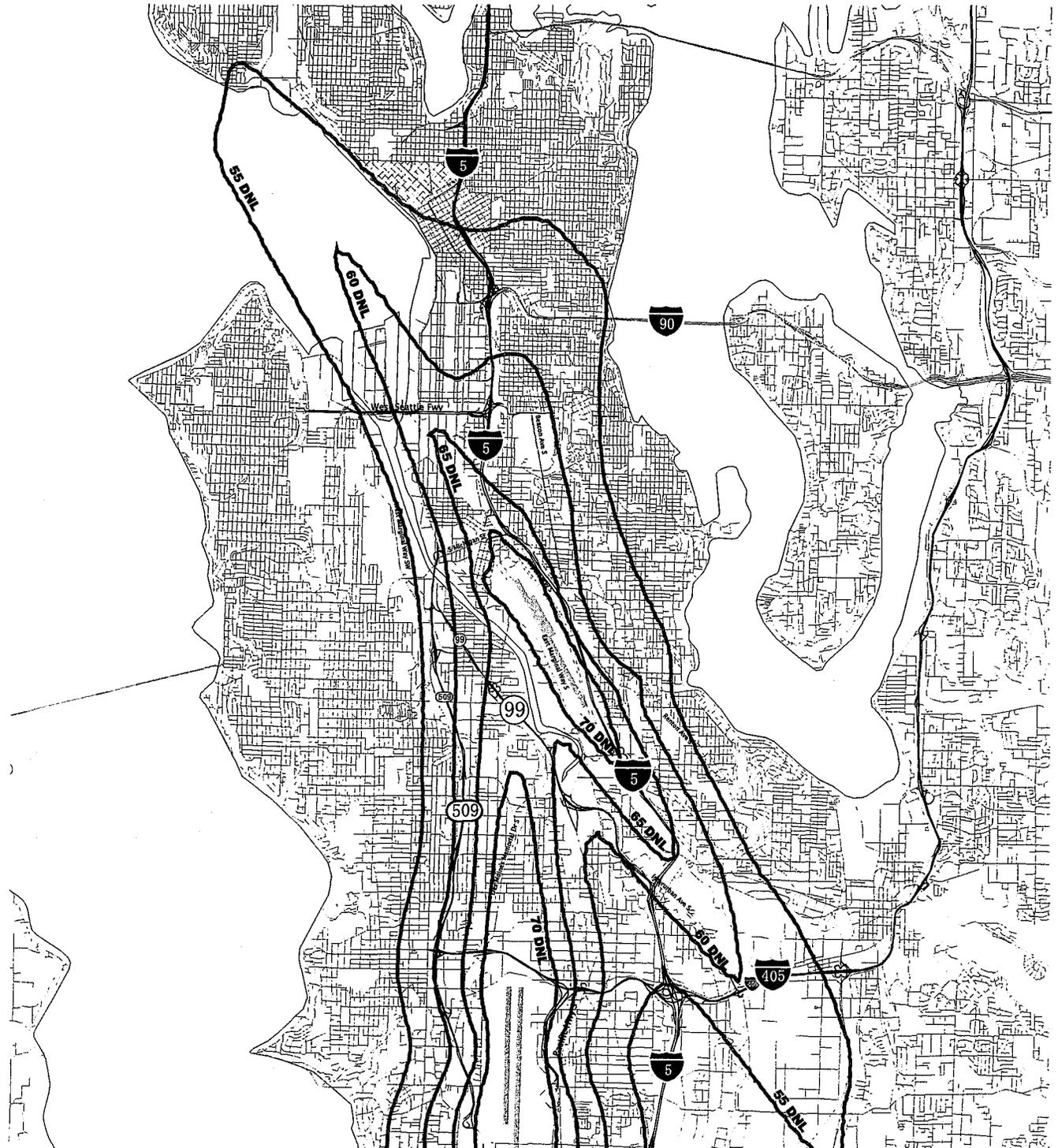
Existing Case (1999) Combined DNL Contours

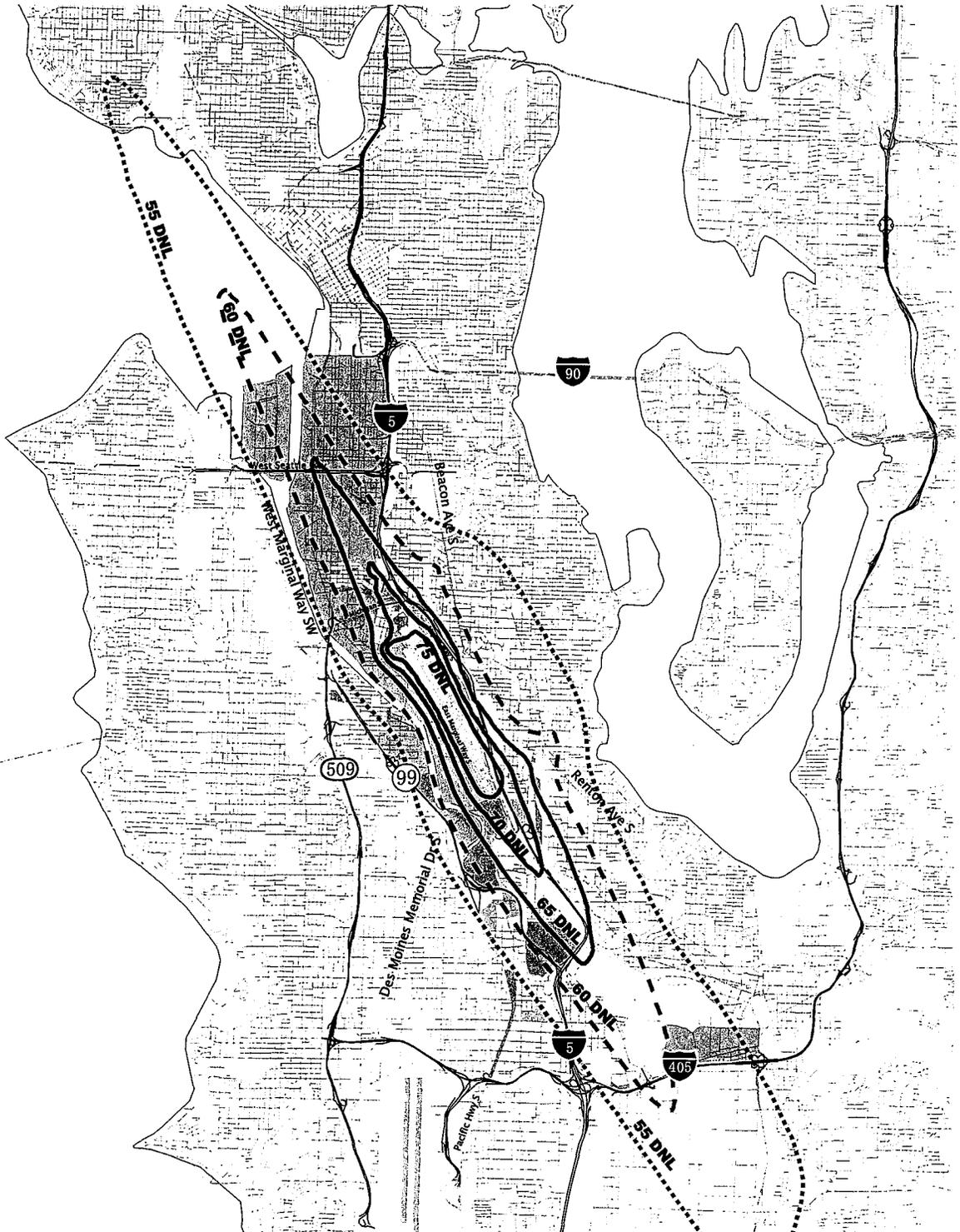
King County International Airport is located a few miles east of SeaTac International Airport and as a result the neighboring communities are affected by noise from aircraft flights from both airports. A set of DNL noise contours was calculated which combines the existing (1999) cases for both airports. These contours are shown in **Figure C24**. The figure shows that some of the communities located to the north and northwest of King County International Airport are equally impacted by noise from flights at both airports.

Future Base Case (2006) DNL Contours

The 2006 DNL contours for King County International Airport were prepared using Integrated Noise Model (INM) version 6. Noise contours for calendar year 2006 that depict the noise exposure in terms of DNL are shown in **Figure C25**. The contours shown are the 65, 70 and 75 dBA DNL. The operational assumptions used to generate these contours were presented in a previous section. The results of the analysis show that these future contours are slightly larger than the existing conditions contours. This is a result of the increase in operations that are forecasted to occur. These contours are approximately 0.5 dBA louder than the existing conditions contour.

These base case conditions will be used to develop future noise abatement alternatives at the airport. No noise abatement alternatives are included in these contours.





Land Use Analysis

Introduction

This section of the FAR Part 150 Noise Exposure and Land Use Compatibility Study for King County International Airport deals with the evaluation of land uses within both the existing (1999) and future noise contours (2006).

The development of realistic and effective alternatives is the focus of the FAR Part 150 noise compatibility planning process, with the overall objective being to explore a wide range of feasible alternatives of land use patterns, noise control actions and noise impact patterns. Solutions are explored which may accommodate both airport users and inhabitants, as well as environmental parameters. As a prelude to analyzing future noise exposure impacts resulting from changes in noise contours, an examination of existing conditions in terms of areas and persons affected by the existing noise contours is presented here. The following section deals with the types of land uses affected by the existing noise contours and the approximate number of persons within the designated noise contours. A subsequent section deals with these same items, but as they are affected by the future noise contours.

Existing Land Use Analysis/Existing Noise Contours, 1999

This section discusses the land use types found within the existing noise contours generated by aircraft utilizing King County International Airport. The existing situation is represented by five contours, the DNL 55, 60, 65, 70 and 75 contours. An FAR Part 150 Study utilizes the DNL 65 contour as the threshold contour for land use analysis. However, this Study will present very generalized housing units and population information for the 55 and 60 also. It must be remembered that the total figures given below are cumulative. The figures for the larger contours contain the area within all smaller contours; i.e., the DNL 65 contour area includes the area representing the 70 and 75 contours.

The DNL 55 contour is the largest and contains approximately thirteen thousand eight hundred eighty-three (13,883) acres. There are approximately 16,568 housing units representing approximately 40,592 persons, based on average 2.45 persons per household, within the contour.

The DNL 60 contour is the next largest and contains approximately five thousand four hundred thirty-six (5,436) acres. There are approximately 4,918 housing units representing approximately 12,049 persons within the contour.

The DNL 65 contour is the next largest and contains approximately two thousand two hundred sixty-five (2,265) acres. There are approximately 1,327 housing units representing approximately 3,251 persons within the contour. This represents approximately two hundred ninety (290) acres of residential development, mostly known as the Georgetown community. There are approximately one hundred forty-four (144) acres of commercial/retail development, and approximately six hundred fifty-five (655) acres of manufacturing/industrial development within the contour. The remaining property consists of airport property, transportation rights-of-way and open space. There is one historical site listed on the National Register (Georgetown Steam Plant) within the 65 DNL noise contour.

The DNL 70 is the next largest noise contour and contains approximately eight hundred seventy-five (875) acres. There are approximately 158 housing units representing approximately 387 persons within the contour, occurring on approximately forty (40) acres of residential land use. There are approximately two hundred ten (210) acres of manufacturing land use and approximately fifty-five (55) acres of commercial/retail land use. There is one historical site listed on the National Register (Georgetown Steam Plant) within the 65 DNL noise contour. There are no schools within the 70 DNL contour.

The DNL 75 is the smallest contour. It contains approximately four hundred twelve (412) acres. There is no residential development within the contour. There are approximately forty-nine (49) acres of manufacturing land use. The remaining three hundred sixty-three (363) acres are entirely on airport property.

The existing table, entitled *EXISTING LAND USE WITHIN EXISTING NOISE CONTOURS, 1999* summarizes the above land use information.

Table D1
EXISTING LAND USE WITHIN EXISTING NOISE CONTOURS, 1999
King County International Airport FAR Part 150 Study

Land Use	DNL 55 Contour	DNL 60 Contour	DNL 65 Contour	DNL 70 Contour	DNL 75 Contour
Residential	NA Ac	NA Ac	290 Ac	40 Ac	0 Ac
People	40,592	12,049	3,251	387	0
House. Units	16,568	4,918	1,327	158	0
Schools	NA	NA	0	0	0
Historical Sites	NA	NA	1	1	0
Com/Retail	NA Ac	NA Ac	145 Ac	55 Ac	0 Ac
Manufacture	NA Ac	NA Ac	655 Ac	210 Ac	49 Ac
Other	NA Ac	NA Ac	1,176 Ac	570 Ac	363 Ac
Total	13,883 Ac	5,436 Ac	2,266 Ac	875 Ac	412 Ac

The total figures for each contour are cumulative. The figures for the larger contours contain the area within all smaller contours.

SOURCE: Aerial Photography, PSRC Housing Data, Field Survey, BDC Analysis

Existing Land Use Inconsistencies

Land use incompatibility is an area of determination and regulation that is to be resolved solely at the discretion of the local community or by the state. To determine what constitutes land use incompatibility, the individual land use types within particular noise contours need to be defined. The Federal Aviation Administration, through the FAR Part 150 Study, has developed generalized guidelines for land use compatibility for land use planning purposes, as presented earlier. However, these are guidelines and do not automatically define incompatible land uses. Based on these guidelines, the residential land uses and school facilities within the 65 or greater DNL noise contours are inconsistent with these guidelines.

Existing Land Use Analysis/ Future (Base Case, 2006) Noise Contours

This section discusses the land use types found within the base case future (2006) noise contours generated by aircraft utilizing King County International Airport, assuming that all land uses will remain the same. This is the "base case" which assumes that no operational or facility modifications will occur at the airport, and is reflective of the forecast operations and aircraft types explained previously. This is the situation with which future alternative scenarios will be measured to quantify impacts as compared with the impacts that would occur if not mitigation measures were implemented.

The future base case situation is represented by five contours, the DNL 55, 60, 65, 70 and 75 contours. The DNL 55 contour is the largest and contains approximately seventeen thousand two hundred ninety-one (17,291) acres. There are approximately 21,818 housing units representing approximately 53,454 persons within the contour, based on an average of 2.45 persons per household.

The DNL 60 contour is the next largest and contains approximately six thousand eight hundred ninety (6,890) acres. There are approximately 6,827 housing units representing approximately 16,726 persons within the contour.

The DNL 65 contour is the next largest and contains approximately two thousand eight hundred seventy-two (2,872) acres. There are approximately 1,955 housing units representing approximately 4,790 persons within the contour, representing approximately four hundred sixty-four (464) acres of residential land use. There are approximately eight hundred sixty-four (864) acres of manufacturing/industrial development and approximately three hundred ninety-one (190) acres of commercial/retail development. The remainder of the area is composed of airport property, open space and rights-of-way. There is one historical site listed on the National Register (Georgetown Steam Plant) within the 65 DNL noise contour.

The DNL 70 is the next largest noise contour and contains approximately one thousand one hundred fifty (1,150) acres. There are approximately three hundred fifty-one (351) housing units representing approximately eight hundred sixty (860) people within the contour, occurring on approximately seventy (70) acres of residential development. There are approximately three hundred seven (307) acres of manufacturing/industrial land use and approximately eighty-four (84) acres of commercial/retail land use. There is one historical site listed on the National Register (Georgetown Steam Plant) within the contour.

The DNL 75 is the smallest contour. It contains approximately four hundred eighty-five (485) acres with no residential land use. There are approximately seventy-eight (78) acres of manufacturing/industrial development. The remaining four hundred seven (406) acres are on airport property.

The following table, entitled *EXISTING LAND USE WITHIN FUTURE NOISE CONTOURS, 2006* summarizes the above land use information.

Table D2
EXISTING LAND USE WITHIN FUTURE NOISE CONTOURS, 2006
King County International Airport FAR Part 150 Study

Land Use	DNL 55 Contour		DNL 60 Contour		DNL 65 Contour		DNL 70 Contour		DNL 75 Contour	
Residential	NA	Ac	NA	Ac	464	Ac	70	Ac	0	Ac
People	53,454		16,726		4,790		860		0	
House. Units	21,818		6,827		1,955		351		0	
Schools	NA		NA		0		0		0	
Historical Sites	NA		NA		1		1		0	
Com/Retail	NA	Ac	NA	Ac	190	Ac	84	Ac	0	Ac
Manufacture	NA	Ac	NA	Ac	864	Ac	307	Ac	78	Ac
Other	NA	Ac	NA	Ac	1,354	Ac	689	Ac	407	Ac
Total	17,291	Ac	6,890	Ac	2,872	Ac	1,150	Ac	485	Ac

The total figures for each contour are cumulative. The figures for the larger contours contain the area -within all smaller contours.
 SOURCE: Aerial Photography, PSRC Census Data, Field Survey, BDC Analysis

Future Base Case (2006) Land Use Inconsistencies

Based on the Federal guidelines, the residential land uses and schools within the 65 or greater DNL noise contours are inconsistent with these guidelines.

Existing Land Use Analysis/ Combined Existing Noise Contours

This section discusses the additional number of people and housing units that are within the combined Sea-Tac International Airport and King County International Airport existing noise contours (1999) generated by aircraft utilizing both airports. These are people and housing units that are not affected by the individual contours but are as a result of the combined contours.

The DNL 55 contour is the largest and contains approximately 4,625 additional housing units representing approximately 11,331 additional persons within the contour.

The DNL 60 contour is the next largest and contains approximately 584 additional housing units representing approximately 1,343 additional persons within the contour.

The DNL 65 contour is the next largest and contains approximately 687 additional housing units representing approximately 1,683 additional persons within the contour.

The DNL 70 is the next largest noise contour and contains approximately 196 additional housing units representing approximately 480 additional persons within the contour.

The following table, entitled *ADDITIONAL PEOPLE AND HOUSING WITHIN COMBINED NOISE CONTOURS* summarizes the above information.

Table D3

ADDITIONAL PEOPLE AND HOUSING WITHIN COMBINED NOISE CONTOURS

King County International Airport FAR Part 150 Study

Land Use	DNL 55 Contour	DNL 60 Contour	DNL 65 Contour	DNL 70 Contour	DNL 75 Contour
People	11,331	1,343	1,683	480	0
House. Units	4,625	548	687	196	0

SOURCE: Sea-Tac International Airport FAR Part 150, PSRC Census data, Bridgenet International Analysis, BDC Analysis

Existing Land Use Analysis/ Combined Future Noise Contours

This section discusses the additional number of people and housing units that are within the combined Sea-Tac International Airport and King County International Airport future noise contours (2006) generated by aircraft utilizing both airports. These are people and housing units that are not affected by the individual contours but are as a result of the combined contours.

The DNL 55 contour is the largest and contains approximately 5,108 additional housing units representing approximately 11,743 additional persons within the contour.

The DNL 60 contour is the next largest and contains approximately 1,066 additional housing units representing approximately 2,451 additional persons within the contour.

The DNL 65 contour is the next largest and contains approximately 367 additional housing units representing approximately 844 additional persons within the contour.

The following table, entitled *ADDITIONAL PEOPLE AND HOUSING WITHIN COMBINED FUTURE NOISE CONTOURS* summarizes the above information.

Table D4
ADDITIONAL PEOPLE AND HOUSING WITHIN COMBINED FUTURE NOISE CONTOURS
King County International Airport FAR Part 150 Study

Land Use	DNL 55 Contour	DNL 60 Contour	DNL 65 Contour	DNL 70 Contour	DNL 75 Contour
People	11,743	2,451	844	0	0
House. Units	5,108	1,066	367	0	0

SOURCE: Sea-Tac International Airport FAR Part 150, PSRC Census data, Bridgenet International Analysis, BDC Analysis

Initial Noise Abatement Alternatives

Introduction

The responsibility for evaluating alternative noise abatement and mitigation measures and taking the steps which are essential to minimizing the number of people who are adversely affected by noise does not rest with one individual, one governmental entity or agency, or one community. To the contrary, the authority and responsibility lie with a wide variety of federal, state, local and private entities. A coordinated approach to noise abatement and the sometimes difficult task of resolving noise impacts was outlined in the Department of Transportation/Federal Aviation Administration (DOT/FAA) Noise Abatement Policy of November 18, 1976. The need for noise compatibility programs has been nationally recognized since that time through passage of the Aviation Safety and Noise Abatement (ASNA) Act in 1979, the statutory authority for Federal Aviation Regulation (FAR) Part 150. Responsibility for the coordinated effort to abate noise impacts rests with the airport users, aircraft manufacturers, airport proprietors, federal, state and local governments, and residents within the environs of the airport.

The Federal government has the authority and responsibility to control aircraft noise sources, implement and enforce flight operational procedures and manage the air traffic control system in ways that minimize noise impacts on people. State and local governments have the responsibility to provide for land use planning, zoning and development controls that will encourage development or redevelopment of land that is compatible with both present and projected airport operations. In order to accomplish this task, the state must provide enabling legislation which grants authority to the local units of government to implement land use controls which are not confiscatory or discriminatory, based on the police power to protect the public health, safety and welfare.

In addition, the local units of government must work closely with airport management and staff, for it is the responsibility of the governmental unit having land use controls to ensure land use compatibility planning beyond the airport's boundary. The airport management has no authority to control the types of land uses outside the airport ownership boundary; this is the responsibility of the appropriate local unit of government.

The aircraft noise standards established by the Federal government must be met by the aircraft manufacturers through newly-designed engines and aircraft. The airlines are then responsible for replacing or retrofitting their fleet with these new aircraft and/or engines. The government established a timetable with which the airlines must comply, and full compliance was established in January 1, 1988 (FAR Part 36). Subsequent to this timeframe, Congress passed the Noise Act (The Airport Noise and Capacity Act of 1990 [ANCA], PL 101-508, 104 Stat. 1388) which established two broad directives for the FAA. The first directive established a method to review aircraft noise and airport use or access restrictions imposed by airport proprietors, and the second was to institute a program of phase-out of Stage II aircraft over 75,000 pounds by December 31, 1999. To implement ANCA, FAA amended FAR Part 91 and issued a new FAR Part 161. Part 91 addresses the phase-out of large Stage II aircraft and the phase-in of Stage III aircraft. The airlines were responsible for meeting this deadline by whatever method they could.

FAR Part 161 was established to work in conjunction with Part 91, in that it establishes a stringent review and approval process for implementing use or access restrictions by airport proprietors. This is in keeping with one of the major reasons for the Act, which was to discourage local restrictions more stringent than the Act's 1999 phase-out. Part 161 makes it more difficult for airport proprietors to implement use or access restrictions, especially those associated with Stage III aircraft. These difficulties are so significant that to date there have been no Part 161 plans approved by the FAA.

The Airport Proprietor is responsible for planning and implementing airport development actions designed to reduce noise. Such actions include improvements in airport design and noise abatement ground procedures, in addition to evaluating and recommending restrictions on airport use that do not unjustly discriminate against any user, impede the federal interest in safety and management of the air navigation system, unreasonably interfere with interstate commerce and are consistent with the provisions of ANCA. The proprietor of a public airport may establish restrictions, as long as the airport is available for public use, that do not unjustly discriminate among or between classes of aircraft; do not create an exclusive right; are reasonably related to a demonstrated noise problem; do not regulate aircraft safety or flight operations; do not regulate rates, routes or services of air carrier aircraft; and

do not create an undue burden on interstate commerce (Airport Sponsor Grant Assurances; Airport and Airway Improvement Act of 1982, as amended; Federal Aviation Act of 1958, as amended; and the U.S. Constitution).

Basically, an airport proprietor, and state and local governments, are preempted from regulating the operations of aircraft, with one exception. They may exclude aircraft from an airport for noise reasons as long as the exclusion is reasonable and nondiscriminatory. In addition, it must comply with the provisions of the Airport Noise and Capacity Act of 1990, through FAR Part 161, and it must not attempt to regulate military aircraft.

Residents and prospective residents in areas surrounding the airport should seek to understand the existing and projected aircraft noise environment and what steps can be taken to minimize its effect on people. Prospective residents of areas impacted by aircraft-generated noise should be aware of the effect of noise on their prospective residences and allow this to influence any decision to move into the area.

The development of reasonable alternatives is the focus of the FAR Part 150 noise compatibility planning process. The objective is to explore a wide range of feasible alternatives of land use patterns, noise control actions and noise impact patterns, seeking optimum accommodation of both airport users and airport neighbors within acceptable safety, economic and environmental parameters. Consideration of alternatives should address both physical planning and the implementation aspects of proposed solutions. Some alternatives may have little or no value in the particular situation, especially if used alone. Each alternative considered should: 1) have the potential of resolving the problem; 2) be implementable within acceptable economic, environmental and social costs; and, 3) be legally implementable within existing federal, state and local legislation, regulations, and ordinances.

This section contains a description of potential noise abatement and mitigation measures or actions for King County International Airport. A general evaluation of each is made on the basis of the three factors listed above, and will be presented in three different categories: a) those alternatives available to the airport proprietor; b) those alternatives available to the state or local unit of government; and, c) those alternatives dependent upon Federal government concurrence for implementation.

In addition, the Regulation identifies several alternatives that are required for evaluation. These required alternatives are:

- Acquisition of land or interest therein;
- Construction of barriers and acoustical shielding, including soundproofing of public buildings;
- Implementation of a preferential runway system;
- The use of flight procedures (including modification of flight tracks) to control operation of aircraft to reduce exposure to individuals;
- The implementation of any restriction on the use of airport by any type or class of aircraft based on the noise characteristics of those aircraft;
- Other actions or combination of actions which would have a beneficial noise control or abatement impact on the public; and
- Other actions recommended by the FAA.

These are explained in greater detail in the following sections.

A. Options Available to the Airport Proprietor

A.1. Denial of Use of Airport to Aircraft Not Meeting FAR Part 36 Standards.

This alternative is implemented by limiting access to the airport to allow aircraft that conform with certain FAR Part 36, Stage II, noise level requirements. Most turboprops and other large aircraft produced after 1964 were required to meet those standards. Older, noncomplying (Stage I) turbojets over 75,000 pounds maximum gross takeoff weight, which have standard airworthiness certificates, were required to be retrofitted with quieter engines and/or nacelles or cease operating in U. S. airspace as of January 1, 1985 (Part 91, Subpart E). Two provisions of Part 91, Subpart E, allow the operation of noncomplying two engine airplanes after the January 1, 1985, deadline. The "Replacement Plan" provisions allowed a one year extension (January 1, 1986) and the "Small Community Exemption" provision allowed a three year extension (January 1, 1988) for two engine aircraft with one hundred passenger seats or fewer. These dates have all been achieved and there is now full compliance.

Denying such Stage I aircraft use of the airport is a feasible option, provided the action is not unjustly discriminatory, does not constitute a burden on interstate and foreign air commerce, and does not conflict with any airport policy or requirement. In addition, military aircraft do not have to comply with these regulations during the same timeframe. This alternative is feasible

where the majority of the aircraft fall within the parameters of FAR Part 36. However, to restrict Stage III or Stage II aircraft under 75,000 pounds, the provisions of Part 161 must be complied with. This includes a cost/benefit analysis of the proposed restriction (with FAA approval of the methodology or results) and proper notice must be given, not only to the public but to all affected parties. This is a very difficult task, which can be very expensive and time consuming. To date, no such plans have been approved. However, as part of this Study, such an Alternative will be evaluated.

A.2. Capacity Limits Based on Noise.

Restrictions on airport use may be based upon noise limits. However, such restrictions often have uneven economic consequences and should be implemented only after careful consideration of other alternatives. The implementation of this type of restriction can take three broad forms. These are outlined below.

A.2.1. Restrictions Based on Cumulative Impact. With this alternative, a maximum cumulative impact (such as the total area within the existing DNL 65, 70 or 75 contour) is established as the baseline cumulative impact and then the airport's operations are adjusted or limited so as not to exceed that maximum in the future. This is accomplished through "capacity limitations", whereas either the aircraft types, based upon their "noisiness", or the numbers and mix of aircraft, are limited or adjusted so as not to exceed the existing noise impact. One variation of this alternative can be referred to as a "noise budget".

A.2.2. Restrictions Based on Certificated Single Event Noise Levels. Most aircraft today have been certificated for noise by the FAA, as part of the FAR Part 36 process explained earlier. These levels are published as part of Advisory Circular 36-1C and 36-3C, and it is possible to devise limitations based upon those certificated data. This alternative can be formulated so as to set a threshold noise level which cannot be exceeded, or different levels can be implemented for either day or night operations. An aircraft's compliance with this limit would be determined from the published FAA certification data. It should be noted that aircraft can be operated at less than certificated noise levels under certain operational conditions.

A.2.3. Restrictions Based on Measured Single Event Noise Levels. Although aircraft noise levels vary widely with changes in operational procedures as well as with atmospheric conditions, it is possible to set limits on estimated single event noise levels. Aircraft which exceed this

limit can be prohibited from using the airport. This does not mean that the airport, the community or citizen group can set up a microphone and noise level limit and challenge the pilots to "beat the box". Compliance with the single event level should be measured over an extended period of time for many single events, and violation is determined from repeated excess noise.

These are also the types of restrictions that are under the jurisdiction of Part 161 and are historically used in place of a general Stage II aircraft restriction. In addition, military aircraft are not subject to such restrictions.

A.3. Landing Fees Based on Noise.

This alternative is based on the premise that all or part of the landing fee for each aircraft focuses on the noise emitted by that individual aircraft. This would apportion the "cost" of producing the noise to those aircraft which contribute the most to it. This alternative would encourage the use of quieter aircraft while generating additional revenue for the airport. In order to avoid discrimination, the noise fee should be based upon a published standard for single event noise levels, such as those contained in Advisory Circular 36-3C. As a corollary to this, the opposite strategy can also be used. In other words, quieter aircraft could be apportioned a lesser fee than noisier aircraft, thus serving as an incentive for quieter aircraft. In this manner, operators which go to extra lengths to reduce noise generated by their aircraft are rewarded.

The cost of implementing this alternative, in terms of manpower, finances and public relations, many times is not offset by the revenue or benefit derived from it. The administrative cost involved in maintaining records of aircraft types and numbers, and billing statements are not commensurate with the noise reduction achieved. In addition, this does not apply to military aircraft as they do not pay landing fees. The implementation of this alternative would most likely require a Part 161 Study.

A.4. Complete or Partial Curfews.

Airport curfews are an effective but costly means of controlling noise intrusion into areas adjacent or close to the airport. Curfews can have a very significant negative effect on both aviation and the community, having economic impacts upon airport users, those providing airport-related services, and upon the community as a whole. In addition, other communities may also be impacted through curtailment of service. Thus there is a concern of an unreasonable burden to interstate or foreign commerce. A curfew can take various forms, from restrictions upon some or all flights during certain times of the day or night, or restrictions based upon noise thresholds and certificated aircraft noise

levels contained in AC 36-3C. Curfews are usually implemented to restrict operations during periods when people are most sensitive to noise intrusion, which most often occurs between the hours of 11:00 p.m. to 7:00 a.m., and are effective if there is a significant night noise problem. Curfews have been upheld by a Federal Court in California for a general aviation airport (Santa Monica Airport Assoc. v. City of Santa Monica, 659 F. 2d. 100,[9th Cir., 1981]), while at the same time, they have been denied by a Federal District Court in New York (Westchester County v. United States of America, 571 F. Supp. 786 [Southern District of New York, 1983]). The implementation of this alternative would require a Part 161 Study.

A.5. Noise Barriers (Shielding).

Noise generated from ground-level sources on an airport can be a result of engine run-up and maintenance operations, taxiways, thrust reverse on landing and warehouse activities. Noise intrusion from these sources is usually only significant to those areas close to the airport. One method of mitigating this type of noise is through the use of noise barriers or earthen berms. These can protect adjacent areas from the unwanted noise. Another method is through the strategic and well planned location of airport structures that can provide shielding to adjacent areas to prevent noise intrusion. Run-up and maintenance areas can also be moved to locations which are away from noise sensitive uses adjacent the airport, and if necessary "hush houses" can be constructed to absorb sound for specific run-up and maintenance operations. The evaluation of a ground run-up facility or hush house will be evaluated as part of this Study.

A.6. Ban All Jet Aircraft.

This alternative is sometimes proposed at airports to relieve noise intrusion, but it has been well settled and documented by case law that this is not legally possible (Santa Monica Airport Assoc. v. City of Santa Monica, 659 F. 2d. 100,[9th Cir. 1981]). It not only puts an unreasonable burden on interstate commerce, which is an area of regulation reserved for the federal government, but it also results in a discriminatory regulation and which is violative of the U.S. Constitution, along with violating the equal protection clause. An outright ban on all jet aircraft cannot be legally implemented, and therefore, is not recommended.

A.7. Acquisition of Land or Interest Therein.

The most complete method to totally control and mitigate noise intrusion is to purchase the impacted property in fee simple, but it is also the most costly and it removes the property from the tax rolls of the community, although a leasehold excise tax may be appropriate. However, certain land areas are more critical than others and can be purchased to mitigate severe noise intrusion where purchase of the full or partial interest may be the only means of achieving compatibility. This is especially true for residences within the 75 DNL noise contour.

An alternative to purchasing land in fee simple is to purchase an easement, which is the right to do something (positive easement) or the right to preclude the owner of the rest of the property from doing something (negative easement). An easement is sometimes preferred because it keeps property on the tax rolls, but may cost as much as the entire fee. There are two main types of easements associated with airports, the clear zone easement and a noise easement (an aviation easement sometimes combines portions of both), which was discussed in Working Paper One. Easements can be purchased, condemned or dedicated through the subdivision process.

One method of keeping the area on the tax rolls is to purchase the property and then resell it for a compatible use or to resell it for residential use but retain a portion of the "bundle of rights" that are part of property ownership. In other words, the airport can resell the property to the original homeowner or anyone else, but retain a covenant or easement which identifies the airport's right to fly over the property and to create noise. This results in the property owner giving up his/her right to initiate litigation against the airport for noise intrusion. In addition, this method allows the market to set the price and value of the noise easement which is retained by the airport. The airport could also develop or resell the property to another government agency to develop it as a compatible use (golf course, nature area, cemetery, etc.), or the agency could purchase the property outright for their own use. This would have to be coordinated with the airport staff and management to ensure redevelopment with a compatible use.

As an alternative to land purchase, sound attenuation is often recommended. Sound attenuation is the process of adding structural components to a structure to reduce the inside noise levels to a specific degree. Normally, a 25 to 30 dB(A) reduction from outside to inside noise levels is recommended. Such noise reductions are normally achieved through such activities as double paned windows, solid core doors, special ventilation systems and some wall treatments. Many residents prefer this alternative because it reduces the inside noise levels and allows the homeowner to remain in his/her home. Sound

attenuation when funded with public monies often requires the granting of a noise easement in return.

No matter what interest of land is purchased, if federal assistance is used, the provisions of the Uniform Relocation Assistance and Real Property Acquisition Policy Act of 1970 (URARPAPA, PL 91-646) must be followed.

A.8. Construct a New Runway in a Different Orientation.

Often the construction of a new runway with a different orientation will shift noise impacts away from noise sensitive uses to more tolerant and less populated areas. The orientation of a runway is dependent upon many factors, including prevailing winds, topography, obstacles and other conditions. A new runway cannot be constructed if wind direction and topographic conditions are such that safety criteria cannot be met. In addition, both existing and future land uses must be considered so that the noise is not shifted to other populated areas. This is an expensive endeavor which must be beneficial to both the airport users and the surrounding community. The ongoing Airport Master Plan evaluated several runway alternatives, including the construction of a new runway. Based on physical constraints, surrounding land uses and other considerations, this alternative was eliminated. Thus it will not be evaluated in this Study.

A.9. Runway Extensions.

Often a runway extension, coupled with other noise abatement procedures can mitigate noise impacts on areas in close proximity to the airport. The extension can allow aircraft to gain altitude sooner and produce less noise impact at ground level. In addition, noise abatement turns are sometimes possible with an extension as a result of enhanced altitude position. Many times, with an extension, the area off the end of the runway with the extension can experience greater amounts of noise due to lower approach altitudes at this end of the runway. This can sometimes be corrected by establishing a displaced threshold so that aircraft land farther down the runway and maintain altitude over the area beyond the extension. This practice is not generally recommended by the FAA. An additional factor to consider with a runway extension is that many times heavier, larger aircraft can be accommodated at the airport which were unable to operate in a safe manner previously. This may not necessarily be undesirable, however, because many of the larger, heavier aircraft are new generation aircraft and are actually quieter than those smaller aircraft presently operating. Runway extensions can also be used as a noise abatement measure to help reduce the need for using reverse thrust upon landing, which can generate a considerable amount of ground-level noise to

areas close to the airport. As with the previous alternative, this alternative was eliminated during the Airport Master Plan development process.

A.10. Touch and Go Restrictions.

Restrictions on training flights performing touch-and-go operations can mitigate noise impacts at airports where there are a significant number of such operations, especially jet training. This alternative is also effective if the operations are occurring during the nighttime and early morning hours, for the restriction may be for certain time periods. However, such restrictions may not be legal as it may be interpreted as a capacity restriction. Capacity restrictions are different from access restrictions based on noise (which may be possible subsequent to a Part 161 Study) as they are beyond the ability of an airport Sponsor to implement. They are pre-empted by Federal regulation.

A.11. High Speed Taxiways.

High speed taxiways can help reduce noise intrusion by allowing aircraft to exit the runway quicker and reducing the need for extended use of reverse thrust. This alternative is only viable with a runway of sufficient length to allow aircraft the opportunity to slow down to a speed sufficient enough to exit the runway. This alternative does little good as an independent measure, and must be implemented along with other alternatives.

A.12. Noise Monitoring Program.

Noise monitoring programs can enhance the effectiveness of noise compatibility programs. Continuous noise monitoring systems have been used as a part of aircraft noise abatement programs at airports experiencing severe encroachment. These airports have used the system to demonstrate how they were reducing noise impact. The noise monitoring of aircraft operations is a means of showing progress toward reducing the problem. At airports with less intense problems, the purchase of noise monitoring equipment and manpower is generally less justified. Most of the systems have several remote microphone units that sample the weighted sound level once or twice per second, code the samples, and transmit the data to a minicomputer system with printouts. Any FAA approved noise monitoring system would have the following minimum capabilities to provide: continuous measurement of dBA at each site, hourly Leq data, daily Ldn data, and single event maximum A-weighted sound level data. This is an expensive system that is recommended for airports with significant noise/land use compatibility concerns, and the Airport currently has such a system in place.

A.13. Noise Complaint/Citizen Liaison Program.

A comprehensive noise complaint handling system has many advantages, including identification of and notice to aberrant pilots, public accessibility, data collection to identify sensitive areas and positive public relations. The airport management will usually identify one person to handle noise complaints from citizens. The complaint officer then keeps a file on each complaint, noting the time, place, type of complaint, type of aircraft and N-number or other identifying characteristic of the aircraft. This will help identify problem areas and can be used to notify pilots of the noise abatement program, what they did to generate a noise complaint and why noise abatement is of particular concern at that airport. This will give the citizens of the community one central location to lodge noise complaints and to gain information concerning aircraft operations or changes in flight procedures. The airport currently has such a system in place and is keeping records of noise complaints. This program will be reviewed and revised as necessary.

B. Options Available to State or Local Governments

B.1. Land Use Controls.

Federal guidelines contained in FAR Part 150 indicate that residential development, along with other noise sensitive uses such as schools, churches, hospitals, rest homes, etc. should be prohibited from siting within areas with annual noise levels in excess of the DNL 65. These guidelines are recognized not only by the FAA but also by the Department of Housing and Urban Development, Department of Defense and the Environmental Protection Agency, as well as numerous state and local agencies. Land use and development controls are one method of ensuring such uses will be controlled within the noise contours. It should be remembered that it is within the discretion and authority of the local unit of government to determine what are incompatible land uses and to define their own threshold of sensitivity.

Land use and development controls which are based on a well defined and thoroughly documented comprehensive plan are among the easiest and most powerful tools available to the local unit of government to ensure land use compatibility. It is very important for the local unit of government to exercise these controls, for they are beyond the authority of the airport management to implement. It is the responsibility of the local unit of government having land use jurisdiction to implement these controls to protect its residents from

impacts and the airport from encroachment of incompatible land uses. Traditionally, even if the airport is managed by the same unit of government that has land use control authority for the land area beyond the airport's boundary, there has been little coordination and discussion as to what land use controls should be implemented and which land uses are compatible with airport development. This is very important and cannot be over-emphasized to ensure coordination of development plans for all parties involved. This is particularly important where more than one unit of government has land use control authority for the area outside the airport's boundary. It is extremely critical that the local unit of government accept the responsibility for ensuring land use compatibility in their planning and development actions. It is also important that the state government provide the necessary enabling legislation that will allow the local unit of government to institute land use controls. The most common forms of land use controls available to the local governments include: zoning, easements, transfer of development rights, building code modifications, capital improvement programs, subdivision regulations and comprehensive planning. These forms of land use controls have all been discussed earlier in a previous Working Paper, and will only be briefly outlined in the following paragraphs.

B.1.1. Zoning. Zoning is the most common and traditional form of land use control used in the United States today. It controls the type and placement of different land uses within designated areas. It is used to encourage land use compatibility while leaving property ownership in the hands of private individuals or business entities, thus leaving the land on the tax rolls. Zoning is not applied retroactively and is not necessarily permanent. It is most effective in areas which are not presently developed and which can be encouraged to develop with compatible uses. As stated earlier, all jurisdictions have typical zoning ordinances in effect concerning the way use districts are delineated. There are no Airport Overlay Zones in effect nor are there any specific noise contour/land use zoning districts. Recommendations may be made concerning these items once the Future Noise Exposure Map is finalized.

B.1.2. Easements. An easement is a right held by one to make use of the property of another for a limited purpose. Two specific types of easements are usually referenced in airport planning, a positive easement which would allow the generation of noise over the land and a negative easement to prevent the creation of a hazard or obstacle on the property of another.

B.1.3. Transfer of Development Rights. The transfer of development rights involves separate ownership of the "bundle of rights" associated with property ownership. The concept involves the transfer of the right to develop a certain parcel of property to a certain density/intensity to another

parcel of property under separate ownership. This would allow the property that obtains the added development rights to develop to an intensity/density that is beyond that which would normally be allowed. The airport could also purchase these rights from the landowner and retain them or sell them to another landowner. This concept can be used to retain property in compatible uses and still compensate the landowner for his loss of development. The idea depends upon market conditions of the area and (there is some disagreement on this point) upon the availability of state enabling legislation authorizing the development of the concept at the local level.

B.1.4. Building Code Modifications. This alternative is to modify existing or potential building codes to include specific sound attenuation provisions for structures within areas impacted by aircraft noise. Such sound attenuation measures are currently required by King County and the City of SeaTac. Recommendations will be made to other jurisdictions.

B.1.5. Capital Improvements Program. This is a document that establishes priorities and costs on the funding and development of public facilities (roads, streets, sewers, libraries, etc.). It can be used very successfully, in concert with subdivision regulations and a comprehensive plan, to control not only the areas of development but the timing of development by controlling the timing and location of public facilities construction.

B.1.6. Subdivision Regulations. Subdivision regulations are used to control the design and placement of public and private facilities in the conversion of raw land to developed property. The surrounding jurisdictions have adopted subdivision regulations.

B.1.7. Comprehensive Planning. Comprehensive future land use planning, when it is coordinated with the zoning ordinance, subdivision regulations and the capital improvements program, can reduce or avoid land use incompatibilities in the future. The surrounding jurisdictions have an adopted comprehensive plan for their areas of jurisdiction.

All of the land use controls mentioned above will be analyzed in greater depth as to their feasibility for implementation when the final noise contours are produced and a Future Noise Exposure Map is presented.

C. Options Dependent Upon the Federal Government

C.1. Departure Thrust Cutback.

This alternative would involve the imposition of thrust cutbacks following take-off. Because of system-wide needs, each operator has developed its own standardized take-off procedure. This alternative is recommended where the operators have the opportunity to utilize a different departure thrust setting and still be within safety limits as per the particular type of aircraft they are flying given the characteristics of the particular airport concerned. It is better for aircraft to climb faster and turn earlier than to fly over noise sensitive uses at lower power. In addition, this alternative cannot be implemented without the direct concurrence of the Federal Aviation Administration taking into account operational, safety and airspace considerations. The Federal Aviation Administration has recently revised AC 91-53 to identify two standard departure procedures for aircraft, a "close in" departure and a "distant" departure.

C.2. Noise Abatement Take-off/Approach Procedures (Flight Tracks).

This alternative is very similar to the previous one, except that it concerns take-off/approach procedures that dictate the location of aircraft during certain altitude and turning procedures. These procedures are dictated by considerations of operational safety and air traffic control procedures. Generally, the air traffic control procedures can be resolved, perhaps with penalties involving reductions in airport and airspace capacity. However, aircraft turns at low altitudes, when the aircraft are in a low-speed, high-drag configuration, can cut deeply into aircraft operating margins. Turns during the last three to four miles of the final approach in good weather, and within the final six to seven miles during poor weather, are undesirable for safety reasons because they do not allow pilots to establish and maintain a stabilized approach. Aircraft bank angles near the ground need to be restricted to no more than 15-20 degrees. These procedures cannot be implemented without the concurrence of the Federal Aviation Administration, taking into account both operational, safety and airspace considerations.

C.3. Preferential Runway System.

This alternative is to utilize one runway end the majority of the time, establishing operations in a certain direction, with operations occurring in the opposite direction held to a minimum. This alternative is very closely related to wind direction and airspace safety considerations. The FAA has the responsibility to implement this alternative through air traffic routing, with aircraft safety being the prime concern. This is only available for use during certain wind conditions and is only recommended when there is a severe noise compatibility problem directly off one end of the runway. The airspace conflicts that occur with Sea-Tac traffic make this alternatives rather limited in operational efficiency. In addition, only one runway is capable of accommodating jet aircraft, which limits the effectiveness of such a system.

C.4. Power and Flap Settings.

A variety of operating procedures are possible for implementation at the airport. These include minimum flap landings and delaying flap and gear deployment. To help minimize fuel costs and flight time, most operators of large jet aircraft have adopted procedures for reduced flap setting and delaying flap and gear extension, consistent with safety and current aircraft and air crew capabilities. During VFR weather conditions and low traffic conditions, large jet aircraft generally land with minimum flap settings at the airport. More sophisticated delayed flap procedures have not been considered safe with current air traffic control procedures and safety criteria.

C.5. Microwave/GPS Landing System.

A global positioning satellite (GPS) system is a new type of instrument landing system which, when fully installed, could allow new noise abatement landing procedures. The GPS system uses satellites to determine exact locations, and with the addition of a ground unit, can determine altitude. It is being considered as the precision instrument landing system of the future, as it is less expensive to equip and maintain both onboard and ground facilities. The airport currently has precision instrument landing systems in place, although the use of GPS for approaches, coupled with FMS (Flight Management Systems) for departures will be explored as part of this Study.

Draft Report

Blank Chapter F

Introduction

The Chapter has deliberately been left blank and the information incorporated into Chapter G.

Abatement Alternatives Evaluation

Introduction

The various alternatives potentially available for noise abatement presented earlier were analyzed in terms of applicability for reducing existing and future noise intrusion. In addition, comments and suggestions presented by the public in community meetings, Open Houses and personal communication, along with the alternatives directed for evaluation in the County Work Plan were measured against the alternatives presented in the previous chapter. Those have been categorized and are arranged according to the type of alternative it represents. The following alternatives were preliminarily determined to be applicable for noise abatement purposes and it is recommended that they be evaluated for the contribution each would make for noise abatement:

- (1) Alternative A.1 Access Restriction on Stage 2 Jets.
- (2) Alternative A.4 Complete or Partial Curfew.
- (3) Alternative A.5 Noise Barriers/Ground Run-up Enclosure
- (4) Alternative A.7 Acquisition of Land or Interest Therein.
- (5) Alternative A.12 Noise and Compliance Monitoring Program.
- (6) Alternative A.13 Noise Complaint/Citizen Liaison Program
and Other Administrative Actions.
- (7) Alternative B.1 Land Use Controls.
- (8) Alternative C.1 Departure Thrust Cutback.
- (9) Alternative C.2 Noise Abatement Procedures.
- (10) New Alternative Other Administrative Actions.

These Alternatives were renumbered for easier identification and to be consistent with additional evaluation. They are not listed in terms of priority. The new identification numbers appear in the parenthesis above. In addition, not all alternatives are subject to computer modeling, as some are not operational or facility changes that would affect the size or placement of the noise contours. These are to be considered as initial feasible alternatives that will be further refined and combined, which will result in final recommendations. There are several Alternatives presented below which are still being evaluated. The analysis will be presented in a subsequent Working Paper. The various suggestions for noise abatement recommended by citizens and the directions contained in the County Work Plan are arranged under the appropriate broad Alternatives presented. It is anticipated and encouraged, that additional Alternatives be recommended by the Committee for evaluation.

Noise Analysis Methodology

In order to evaluate the different noise abatement alternatives, various noise metrics are presented. These metrics include the traditional DNL, as well as supplemental noise metrics to better understand the character of the noise and how that noise may change with each alternative. The following are the different acoustical measures that will be presented in this analysis. All of the data is based upon year 2006 future conditions.

Noise Contour Analysis. Noise contours for each of the alternatives have been developed. These contours present areas representative of each noise level. This illustrates how the noise may change by the change in size of the contour and the shifting of the contour from one area to another.

DNL Noise Contours. The DNL noise contours are presented in terms of the 55, 60, 65 and 70 DNL noise value. These contours are the average annual DNL noise level.

Time Above Noise Contours. Noise contours presenting the Time Above noise level are also developed. These contours present the number of minutes per day that the noise is greater than 65 dBA. The contours presented are 5, 15, 30 and 60 minutes per day contour.

Representative Receptor Analysis. To illustrate the change in noise levels in the different communities around the airport, the noise levels at representative locations around the airport have been determined. The location of these representative locations are shown in Figure G5c. A number of different noise metrics have been calculated at each of these receptor locations. Generalized levels of significance are shown for each metric. These include;

DNL Noise Level.	The DNL noise levels are presented in Table G2. Significance=1.5 dB change.
Nighttime LEQ	The nighttime LEQ noise levels are presented in Table G3. Nighttime is from 10 pm to 7 am. Significance=1.5 dB change.
Time Above 65 dBA	The Time Above noise levels are presented in Table G4. These are in terms of minutes per day above 65 dBA. Significance=10-20% change.
Maximum Noise Level	The maximum noise level is presented in Table G5. This is the maximum or peak noise level reached by the worst-case (loudest) flight at each location. It is independent of the number of flights. Significance=5 dB change.
Noise Event Count	The number of noise events at each location above a specified level is presented in Table G6. This table presents the number of events that are above 75 SEL, 80 SEL, 85 SEL, 90 SEL and 95 SEL. Significance=10-20% change.

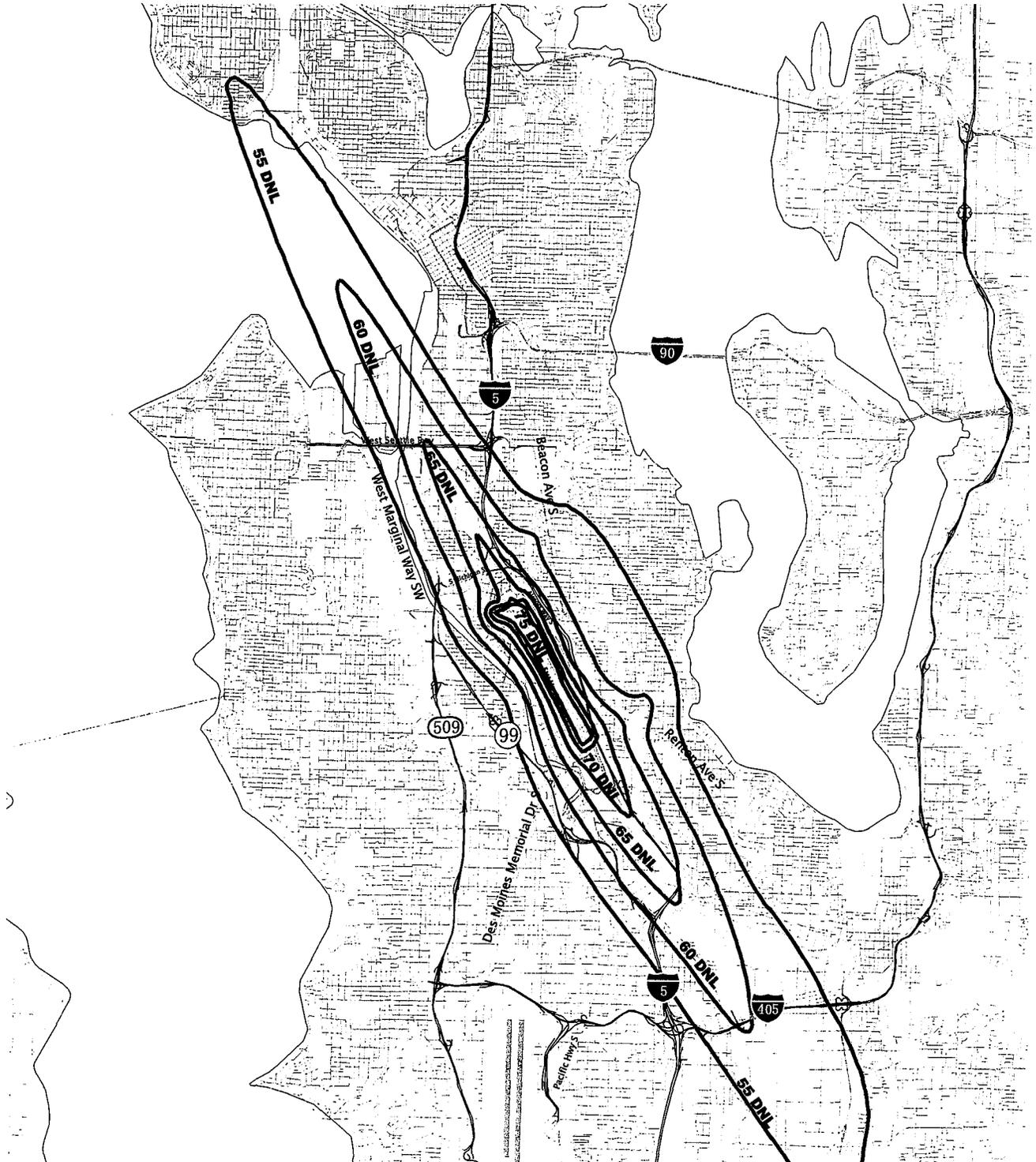
Alternative 1-Access Restriction Based on Part 36 Standards. This Alternative would entail the modeling of a restriction *on all Stage 2 aircraft at the airport*. It would assume that all Stage 2 aircraft, except those exempt such as military, emergency flights and state and Federal government aircraft, would be prohibited from using the airport.

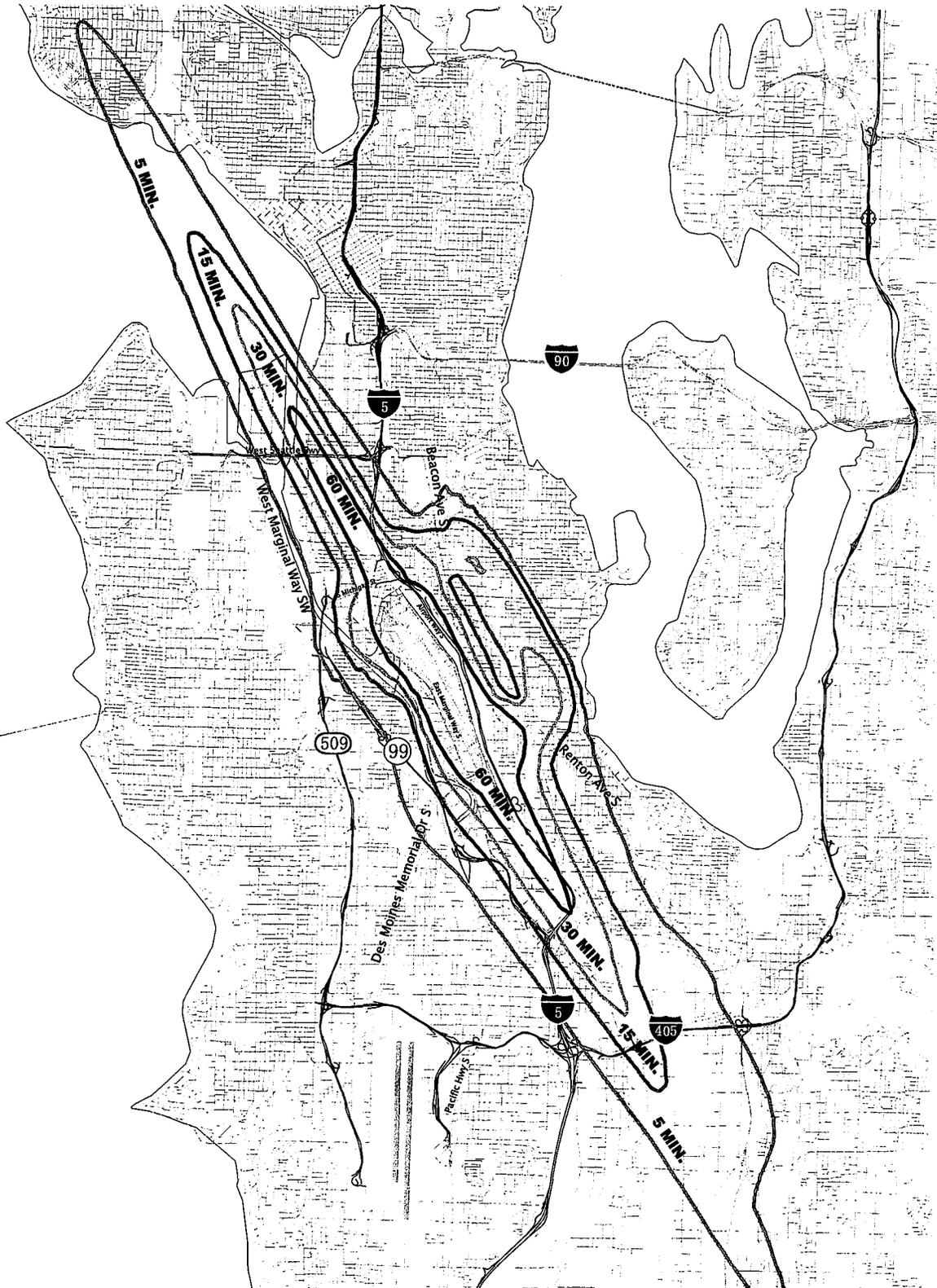
Since January 2000, all Stage 2 aircraft over 75,000 pounds in the civilian fleet have been prohibited from operating in the United States. Therefore, only those civilian Stage 2 aircraft under 75,000 pounds are still operating. These generally comprise the business jet fleet. At the present time there is no phase out requirement for these aircraft. To implement such a restriction, an FAR Part 161 Study would have to be prepared. This is an expensive cost/benefit and land use study that must evaluate the cost of the restriction on the user against the benefit to the community. The cost/benefit methodology must be acceptable to the Federal Aviation Administration, the noise and land use analysis must be consistent with FAR Part 150 and there must be proper notice given prior to actual implementation of the restriction, but the FAA *does not have to approve* the restriction.

This Alternative (A1a) was modeled and the DNL contours are shown in Figure G1a, entitled *ALTERNATIVE 1A, TOTAL RESTRICTION OF STAGE 2 OPERATIONS, DNL CONTOURS* and the Time Above contours are shown in Figure G1b, entitled *ALTERNATIVE 1A, TOTAL RESTRICTION OF STAGE 2 OPERATIONS, TA CONTOURS*. The represented receptor analysis is presented in Tables G2 through G6. The results show a reduction in noise levels. However, the existing Stage 2 aircraft at the airport, Stage 2 corporate jets, are not large in number nor are they significantly louder than other aircraft at the airport.

This type of restriction is consistent with FAR Part 161 requirements concerning Stage 2 restrictions that will require FAA agreement on the cost/benefit methodology and will not require FAA approval of the restriction. The alternative assumes that these aircraft are replaced by Stage 3 corporate jets or hush kitted corporate jet aircraft. There are roughly 10 operations per day that are affected by this alternative.

A variation of this Alternative is a ban on all non-manufactured Stage 3 (in other words, no hush kitted Stage 2) aircraft or a restriction of aircraft *types*. These types of restrictions may not be acceptable to the FAA since they are discriminatory. The FAA has identified specific noise levels that qualify an aircraft to be certified as Stage 3. It does not matter whether the noise levels are achieved through the use of hush kits, new engines or manufactured to meet Stage 3 requirements. In other words, a Stage 3 aircraft is a Stage 3 aircraft, regardless of how an aircraft achieves Stage 3 compliance. To restrict certain types of Stage 3 aircraft would raise issues of discrimination, and would trigger the more restrictive Stage 3 requirements of FAR Part 161, including the requirement of *FAA approval of the proposed restriction*. Restricting aircraft by type has been litigated and has been found to be discriminatory. Because of these uncertainties and very real legal implications, these types should be carefully considered. This variation was modeled in two ways; the first was a ban on hush kitted Stage 2 or louder aircraft at night and the second was a total ban on Stage 2 or louder aircraft at all hours. This Alternative (A1b) was modeled and the DNL contours are shown in Figure G1c, entitled *ALTERNATIVE 1B, NO HUSH KITTED OR LOUDER AIRCRAFT OPERATIONS, DNL CONTOURS* and the Time Above contours are shown in Figure G1d, entitled *ALTERNATIVE 1B, NO HUSH KITTED OR LOUDER AIRCRAFT OPERATIONS, TA CONTOURS*. The represented receptor analysis is presented in Tables G2 through G6. The results show a reduction in noise levels.

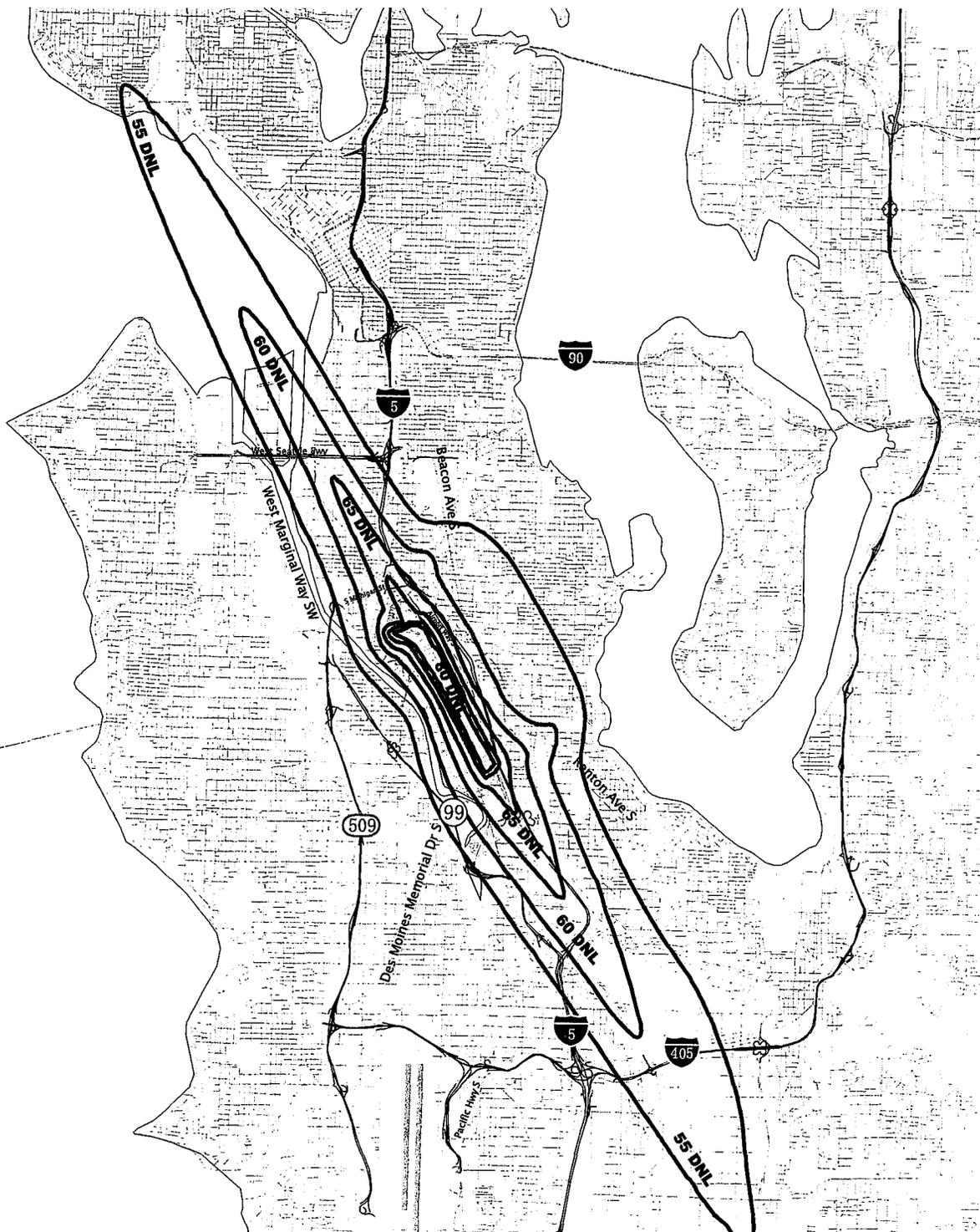


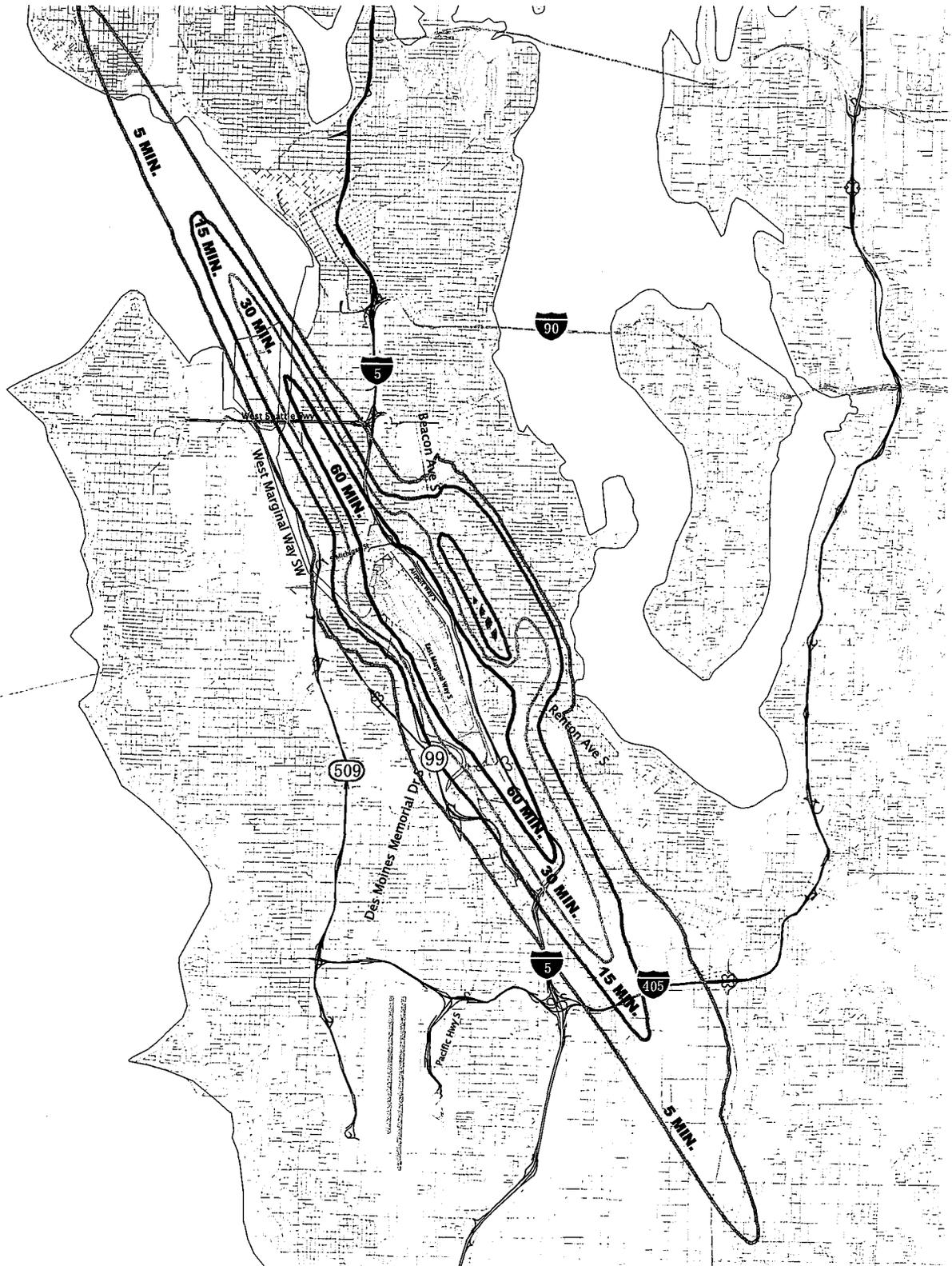


a Scale 1"=10,000'

Figure G1b Alternative 1a, Total Restriction of Stage 2 Operations TA Contours

- 60 minutes
- 30 minutes
- 15 minutes
- 5 minutes





Scale 1"=10,000'

Figure G1d Alternative 1b, No Hush Kitted or Louder Aircraft Operations, TA Contours

- 60 minutes
- 30 minutes
- 15 minutes
- 5 minutes

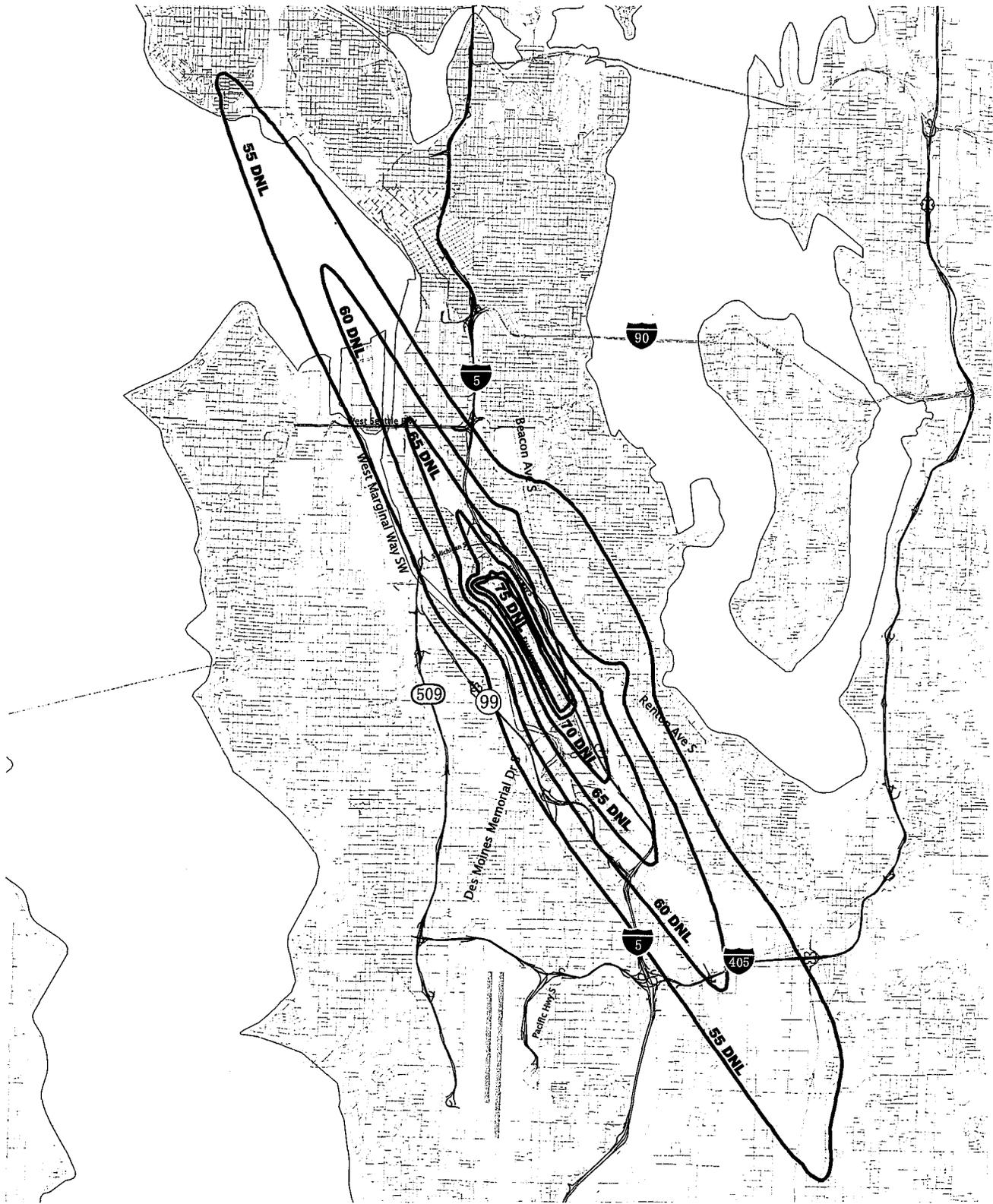
Another recommended restriction is to cap the cumulative noise levels at some acceptable and agreed upon level. With this alternative, a maximum cumulative impact (such as the total area within the existing DNL 65, 70 or 75 contour) is established as the baseline cumulative impact and then the airport's operations are adjusted or limited so as not to exceed that maximum in the future. This is accomplished through "capacity limitations", whereas either the aircraft types, based upon their "noisiness", or the numbers and mix of aircraft, are limited or adjusted so as not to exceed the identified noise impact. This has been accomplished at other airports (Sea-Tac, Jackson Hole) through the use of a "Noise Budget" or similar device where the total identified noise is allocated to different carriers and the carriers must adjust their schedule and aircraft types so as not to exceed their noise allocation, which in turn will not exceed the total allowable noise cap. This is only feasible with scheduled passenger service, due to the schedule and control that an airport could have over such carriers. It is not feasible at an airport without significant scheduled passenger service. Since King County International Airport/Boeing Field has only minimal scheduled passenger service, this Alternative should be considered carefully before implementation.

Alternative 2- Complete or Partial Curfew. This Alternative is a derivative of the previous Alternative. Instead of a total ban on Stage 2 aircraft, this Alternative would be *to impose a nighttime restriction on Stage 2 operations*. This Alternative pertains to the nighttime hours (10 pm to 7 am, or some variation thereof) and would restrict the use of the airport during this time period to Stage 3 aircraft only. For reasons stated above, the restriction would apply only to Stage 2 aircraft, and not Stage 2 aircraft with hush kits to meet Stage 3 criteria. The restriction would be written to include only those aircraft less than 75,000 pounds and would also require the preparation of an FAR Part 161 Study. As stated in the previous section, the implementation and enforcement of such an ordinance, known as an access restriction, would require the preparation of a cost/benefit study known as an FAR Part 161 Study. Such a study identifies the costs and benefits that would result from the implementation of such a restriction. The cost/benefit methodology must be acceptable to the Federal Aviation Administration, the noise and land use analysis must be consistent with FAR Part 150 and there must be proper notice given prior to actual implementation of the restriction, but the FAA *does not have to approve* the restriction. This is a very costly and time consuming study, which is only eligible for FAA funding participation if it is included as a recommendation in an FAR Part 150 Study. However, since it is just a partial curfew, it maybe easier to implement. A partial curfew may not generate the same conflicts as a total ban on Stage 2 aircraft and may result in a better cost/benefit analysis. The alternative assumes that these aircraft are replaced by Stage 3 corporate jets or hush kitted corporate jet aircraft. There are 1.3 nighttime Stage 2 corporate jet operations per day that are affected by this alternative.

This Alternative (A2a) has been modeled and the DNL contours are shown in Figure G2a, entitled *ALTERNATIVE 2A, NIGHTTIME RESTRICTION OF STAGE 2 OPERATIONS, DNL CONTOURS* and the Time Above contours are shown in Figure G2b, entitled *ALTERNATIVE 2A, NIGHTTIME RESTRICTION OF STAGE 2 OPERATIONS, TA CONTOURS*. The represented receptor analysis is presented in Tables G2 through G6. The results show a reduction in the nighttime noise and overall noise levels. This reduction is less than shown for Alternative One.

Another variation of this Alternative is to ban only hush kitted Stage 2 aircraft at night. This Alternative (A2b) was modeled and the DNL contours are shown in Figure G2c, entitled *ALTERNATIVE 2B, NO HUSH KITTED OR LOUDER OPERATIONS AT NIGHT, DNL CONTOURS* and the Time Above contours are shown in Figure G2d, entitled *ALTERNATIVE 2B, NO HUSH KITTED OR LOUDER OPERATIONS, TA CONTOURS*. The represented receptor analysis is presented in Tables G2 through G6.

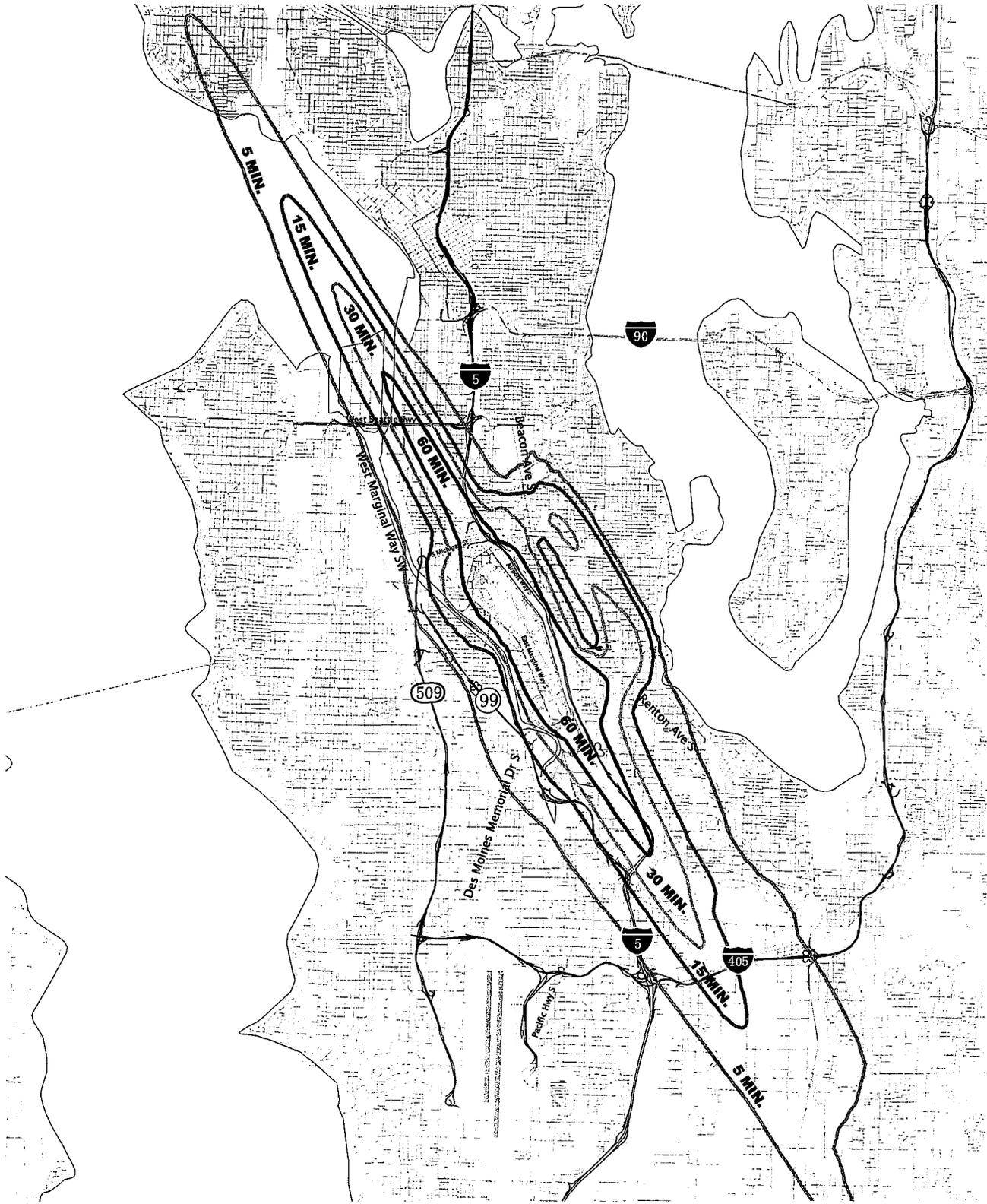
A third variation of this Alternative is a total ban of all aircraft at night. This Alternative (A2c) was modeled and the DNL contours are shown in Figure G2e, entitled *ALTERNATIVE 2C, TOTAL RESTRICTION OF NIGHT OPERATIONS, DNL CONTOURS* and the Time Above contours are shown in Figure G2f, entitled *ALTERNATIVE 2C, TOTAL RESTRICTION OF NIGHT OPERATIONS, TA CONTOURS*. The represented receptor analysis is presented in Tables G2 through G6. The results show a reduction in noise levels. However, the existing Stage 2 aircraft at the airport, Stage 2 corporate jets, are not large in number nor are they significantly louder than other aircraft at the airport.



Scale 1" = 2,800'

**Figure G2a Alternative 2a, Nighttime Restriction of Stage 2 Operations
DNL Contours**

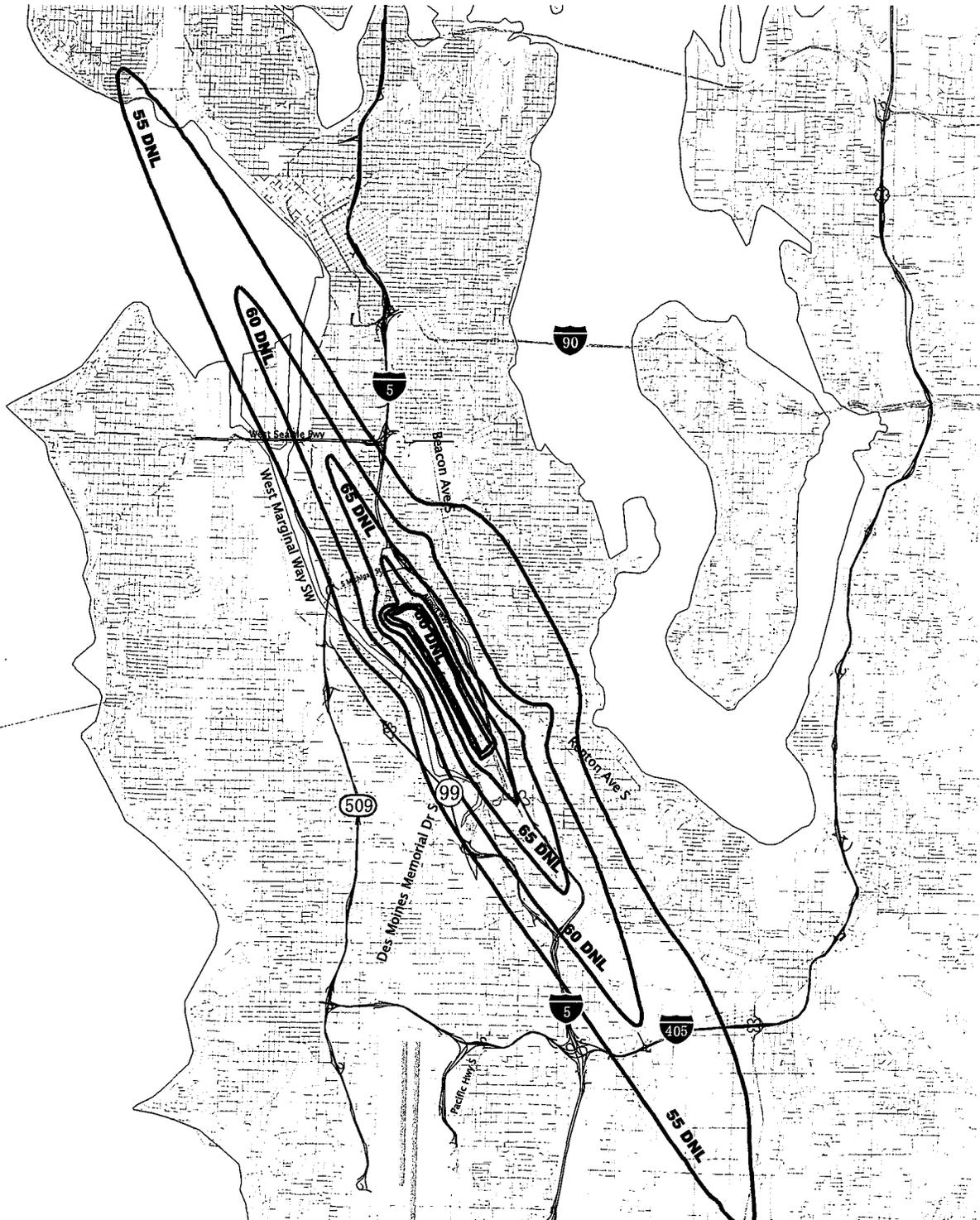
Noise Contour

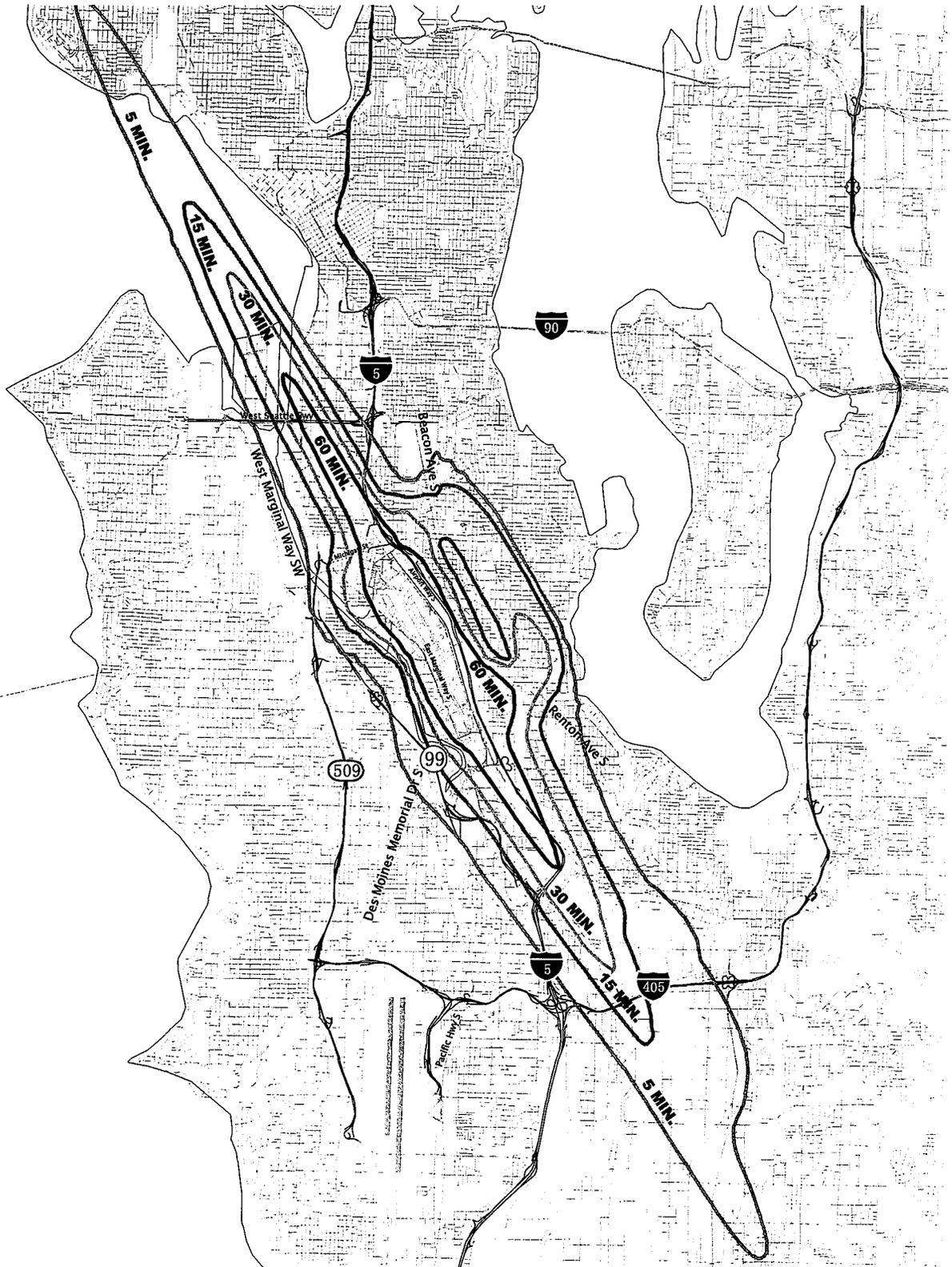


Scale 1"=10,000'

Figure G2b Alternative 2a, Nighttime Restriction of Stage 2 Operations

- TA Contours**
- 60 minutes
 - 30 minutes
 - 15 minutes
 - 5 minutes

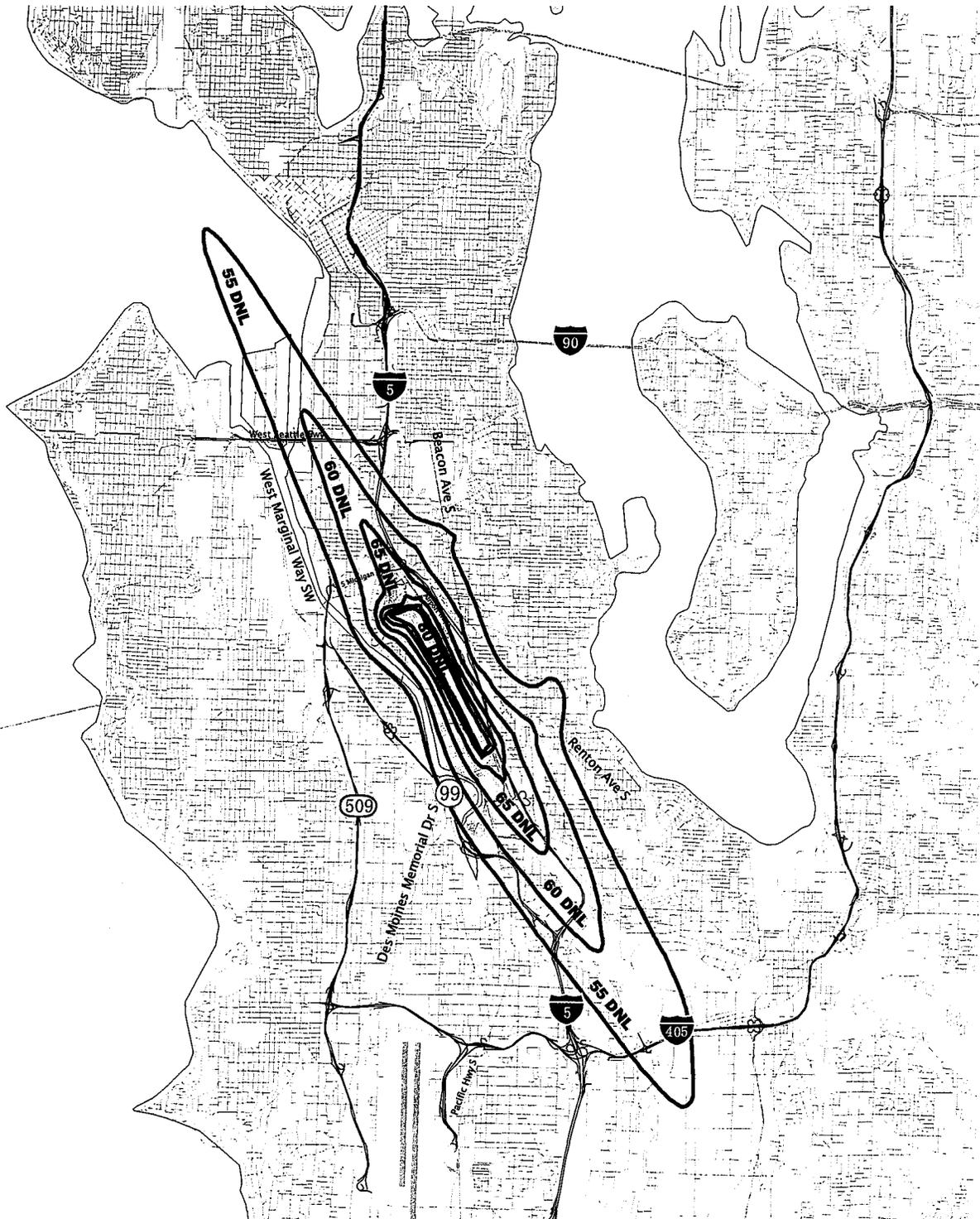


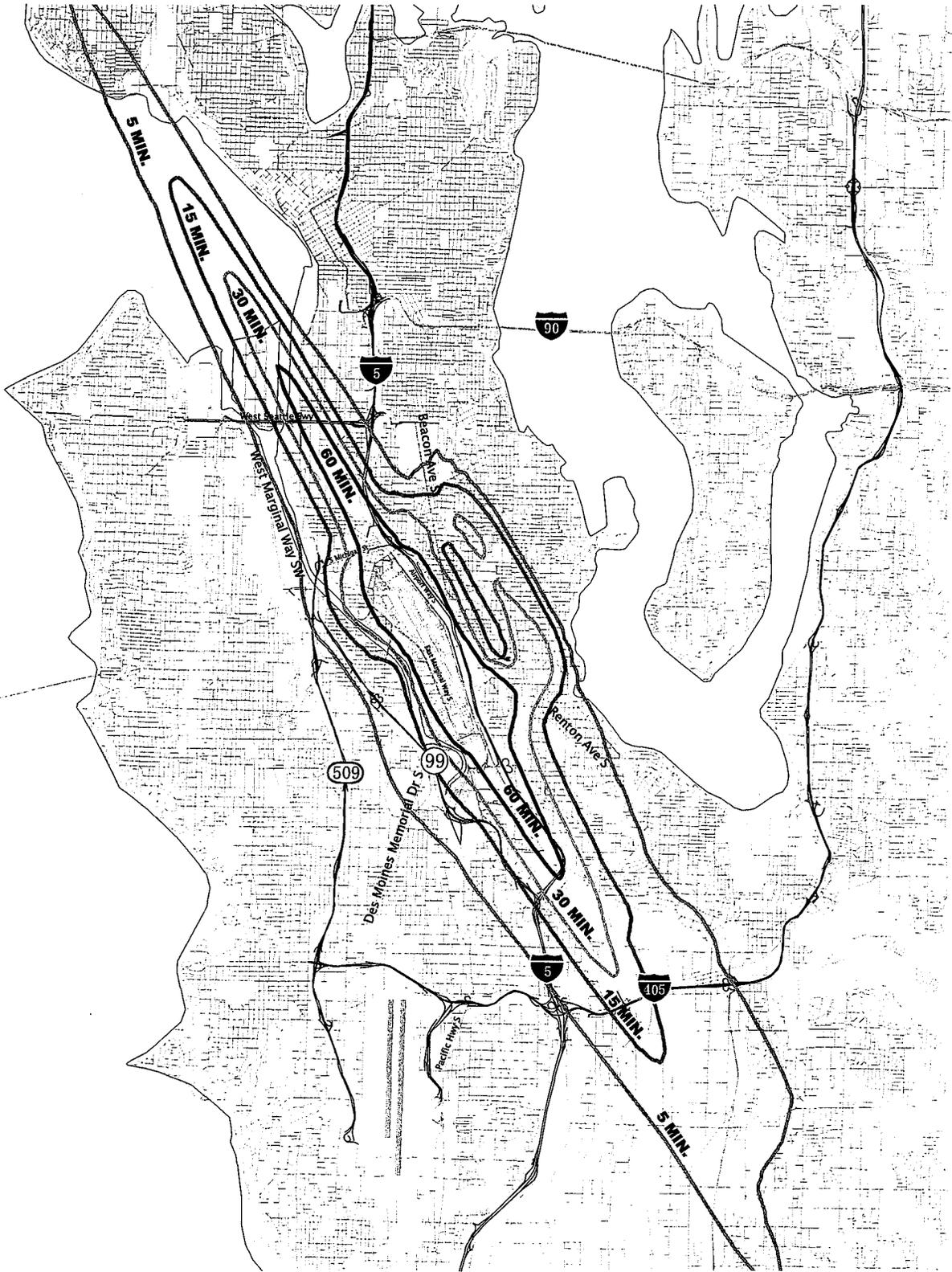


Scale 1"=10,000'

Figure G2d Alternative 2b, Restriction of Hush Kitted or Louder Operations At Night, TA Contours

- 60 minutes
- 30 minutes
- 15 minutes
- 5 minutes





Scale 1"=10,000'

Figure G2f Alternative 2c, Total Restriction of Night Operations, TA Contours

- 60 minutes
- 30 minutes
- 15 minutes
- 5 minutes

Alternative 3-Noise Barrier/Ground Run-up Enclosure. This Alternative is to evaluate the need and placement of a Ground Run-up Enclosure at the airport. Such a facility would be used for maintenance and testing of engines so that they would take place in a facility designed to reduce noise levels associated with such operations. The sizing, placement and direction of such a facility is very important, as they are very site and aircraft specific. In addition, the use of barriers along the perimeter of the airport will be evaluated and recommended, as necessary, for implementation.

Background on Aircraft Run-up Noise

Introduction. Noise associated with jet aircraft maintenance run-ups is a major issue of concern to the citizens living near King County International Airport. Engine run-ups that occur during the daytime and evening can result in significant noise levels and complaints from citizens in communities near the airport. The extent of the noise problem from run-ups is difficult to quantify because of the random nature of maintenance run-ups and the large variability in the noise levels that are generated by these run-ups.

Sources of Run-ups. There are three basic sources of run-ups that occur at the airport. These are all from jet aircraft. Run-ups from other types of aircraft occur less often and generate lower noise levels than occur with jet aircraft. Each of the general categories of sources aircraft run-ups are listed below:

- Airline (cargo) Maintenance
- Boeing Aircraft Corporation Maintenance
- General Aviation Maintenance

Airline (cargo) Maintenance. Cargo carriers must occasionally complete maintenance repair on aircraft. For certain types of maintenance, the aircraft must conduct an engine run-up in order to demonstrate that the aircraft's in-flight systems are working properly. The only type of airline maintenance work at KCIA is unscheduled special repairs associated with cargo aircraft. The unscheduled special repair is a maintenance repair on aircraft that are in service and require preflight repair. Of the aircraft that require some type of service, 10% are estimated to require maintenance that will include an engine run-up. Most of these run-ups are conducted at less than full power. An estimated 20% of all maintenance run-ups require a full power run-up. All cargo carriers operating at KCIA will occasionally need this type of maintenance. Because of the small number of cargo only carriers that operate at KCIA and because there are no maintenance facilities at the airport for these airlines, very little maintenance work is done at this airport.

Boeing Aircraft Corporation Maintenance. As part of the overall procedure on aircraft being prepared for delivery, Boeing conducts run-up tests on the engines. However, these runs are typically done at the airport where the aircraft is

assembled, not KCIA. The run-ups that occur at KCIA are related to special projects that can be summarized as follows;

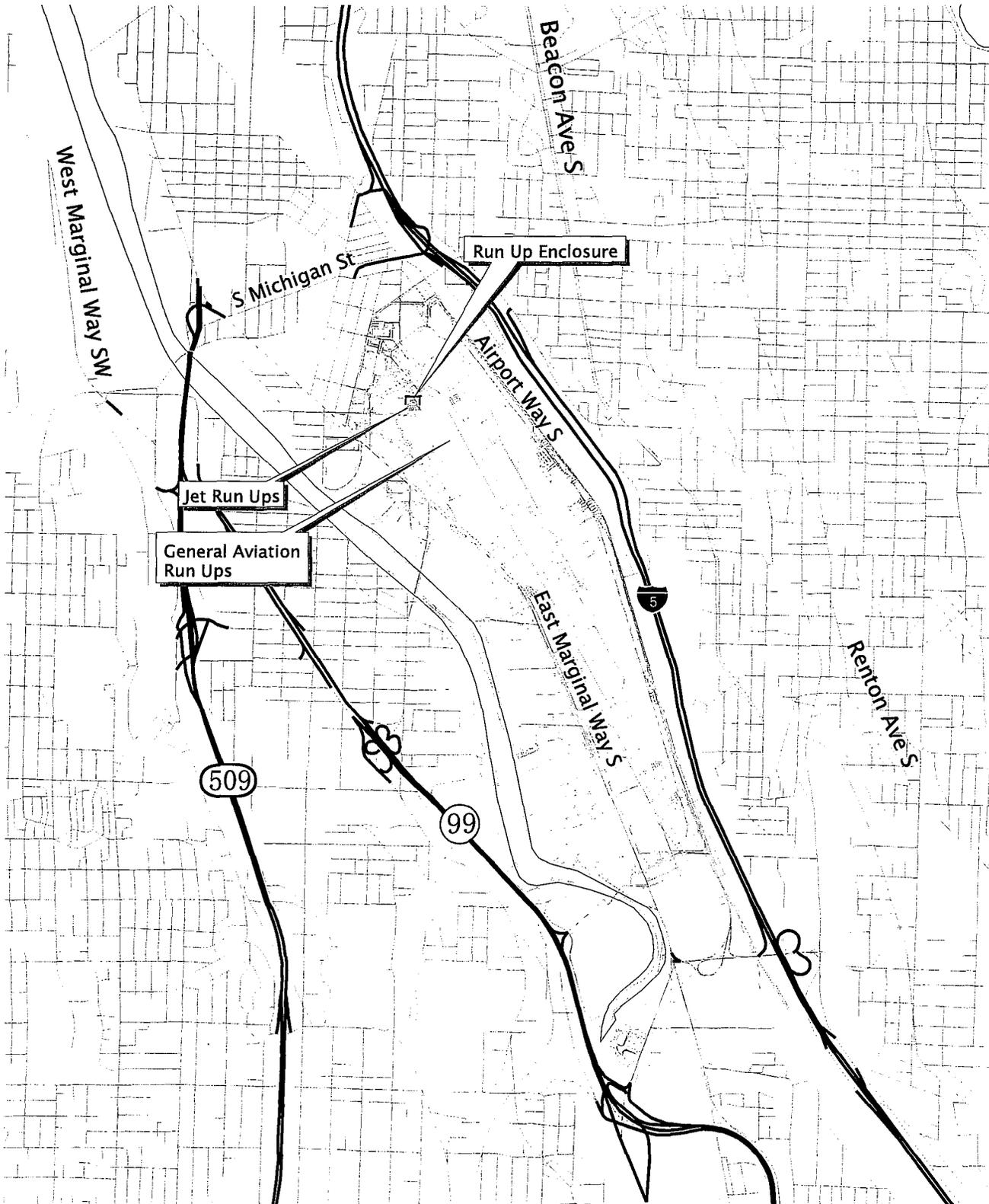
- Run-ups for aircraft returning to service from storage
- Normal cycle run-ups after repairs for evaluation
- Fan balancing run-ups

Run-ups are normally required after aircraft have been in storage for some period and returned to service in order to ensure all engine systems are functioning properly. Run-up operations can take several minutes to complete to allow a thorough inspection of all mechanical and electrical systems. Normal cycle run-ups that are completed after special repairs are conducted as evaluation tests on aircraft. Fan Balancing run-ups are runs to test and ensure that an engine fan is balanced properly.

General Aviation Maintenance at KCIA. General Aviation aircraft must also occasionally complete maintenance repair on aircraft. The types of general aviation maintenance work at KCIA are scheduled and unscheduled special repairs. Most of these run-ups are conducted at less than full power. The maintenance work will be completed by one of the local FBOs. This will include a wide variety of aircraft including corporate jets, turbo props and piston aircraft. The aircraft with the greatest potential for generating noise off-airport are the corporate jet aircraft. There are also a wide variety of corporate jet aircraft types that may conduct run-ups at KCIA.

King County International Airport Regulations. King County has regulations concerning the time of aircraft run-ups. All run-ups must be conducted during the hours of 7 am to 10 pm. No run-up can occur during the nighttime hours.

Run-up Locations: The run-up locations are not specifically delineated. However, there are two primary locations where the run-ups occur. The commercial aircraft run-up operations take place on the Boeing Company apron (Apron 1) located west of the north end of Runway 13R-31L. General Aviation and cargo run-ups take place toward the north end of Taxiway B on the west side of Runway 13R-31L. Locations are presented in Figure G3a.



 Scale 1"=3,000'

Figure G3a Run Up Locations

Run-up Procedures. A typical run-up at KCIA starts with the maintenance personnel notifying the tower of the run-up and in the case of general aviation or airlines, then contacting the Tower for permission to taxi to the run-up location. Once the aircraft has reached this position, the brakes are set and the maintenance personnel start the engine run. The type of run-up varies widely depending upon the type of repairs that have been completed. Each airline has manuals that describe the specific procedure for the run-up that must be followed as part of the test. Most maintenance runs last less than 20 minutes at power levels ranging from idle to below 80%. A number of maintenance repairs require a run-up at full power. Full power runs usually last five minutes or less. Some procedures require several full power runs conducted intermittently over a long period of time. Occasionally, a specific test does require a run-up at full power that lasts longer than 10 minutes.

Details of Run-ups. The number of run-ups, aircraft types, power levels and durations that occur at KCIA has been estimated based upon conversations with Boeing Aircraft Corporation and operators at the airport. These operations are summarized below:

The normal cycle operations include operating the engines at idle power. These operations are conducted by the B-737, B-747, and B-757 series of aircraft and typically last from fifteen (15) to thirty (30) minutes. Currently Boeing conducts about eight (8) normal cycle run-ups per month that are thirty minutes in duration, half of which involve B-737 aircraft and the other half involve B-757 aircraft.

Boeing also conducts an estimated four (4) normal cycle run-ups per month that are fifteen minutes in duration and these involve the B-737, B-747, and B-757 aircraft. In the past the number of these run-ups was higher. The run-up operations at King County International Airport would be conducted by any of the several types of commercial aircraft being prepared for delivery, including the B-737, B-747, and B-757 series of aircraft.

The Boeing fan balancing run-up operations consist of cycling the engines from idle power up to full power and back to idle power. These types of operations can last up to about seventy-five (75) minutes and during these types of run-ups, the engine will be at full power for approximately 20% of the time with a number of cycles to full power. An estimated two (2) fan balancing run-ups occur per month. These run-ups have the greatest potential for impacting the nearby communities.

Corporate jet aircraft also must complete engine maintenance run-ups as with any other commercial jet aircraft. These run-ups may involve scheduled or unscheduled maintenance on the aircraft. Heavy maintenance is not done at KCIA. The majority of these run-ups would be at idle power, however about 20% may be at full power. For this type of operation, the engines are brought

up to full power while all of the required systems are checked for proper operation. These types of run-ups will last about five to 20 minutes. There are an estimated three (3) run-ups per month.

Run-ups by airlines such as the cargo operators are rare. There are no maintenance facilities for these airlines at KCIA. It would only be necessary for an unscheduled repair that had to be completed prior to putting an aircraft back into service. The majority of these run-ups would be at idle power. The exact number of these run-ups is not known, but is believed to be less than 1 per every 3 months.

Time of Day of Run-ups. There are no exact data as to the time of day that run-ups occur at KCIA. The regulations restrict these run-ups to daytime hours (7 am to 10 pm). The majority of the run-ups are thought to occur from 7 am to 4 pm.

Noise Complaints from Run-ups. Noise complaints from run-ups do occur. Although not specifically categorized, airport staff reports that the complaints from run-ups are lower today than in the past. Some forms of run-up noise are very difficult to distinguish from other sources of aircraft noise on the airport. Many complaints from run-ups may be as a result of other sources of aircraft noise.

Noise Characteristics of Run-ups

Overview. Noise from aircraft engine run-ups has varying characteristics depending upon the type of run-up procedure, the power level, the engine type and the orientation of the plane. Full power run-ups present the greatest potential for noise impacts. The characteristics of engine run-up noise are summarized below:

- Varying duration noise events that can last many minutes.
- Quick onset and drop-off of the noise.
- Dominate low-frequency characteristics that attenuate slowly.
- Magnitude of the noise is similar to departure ground roll.
- Some run-ups include a number of cycles of full power.
- Greatest potential for impact is sideline to the airport and near the Boeing plant.

Direction and Frequency Characteristics of Run-up Noise. Two important factors to be considered in the evaluation of aircraft run-up noise are the direction and frequency characteristics of the engine run-up noise. These factors influence the location of the noise impact and the potential for mitigation.

Noise generated from engine run-ups is not equally distributed in all directions. The noise levels increase with power. The noise levels under full power are significantly greater than under lower power levels. Under idle and 80% power, the noise levels are approximately equal in all directions. At full power, the noise levels are significantly greater toward the rear of the aircraft at angles of approximately 150 and 210 degrees back from the front of the plane.

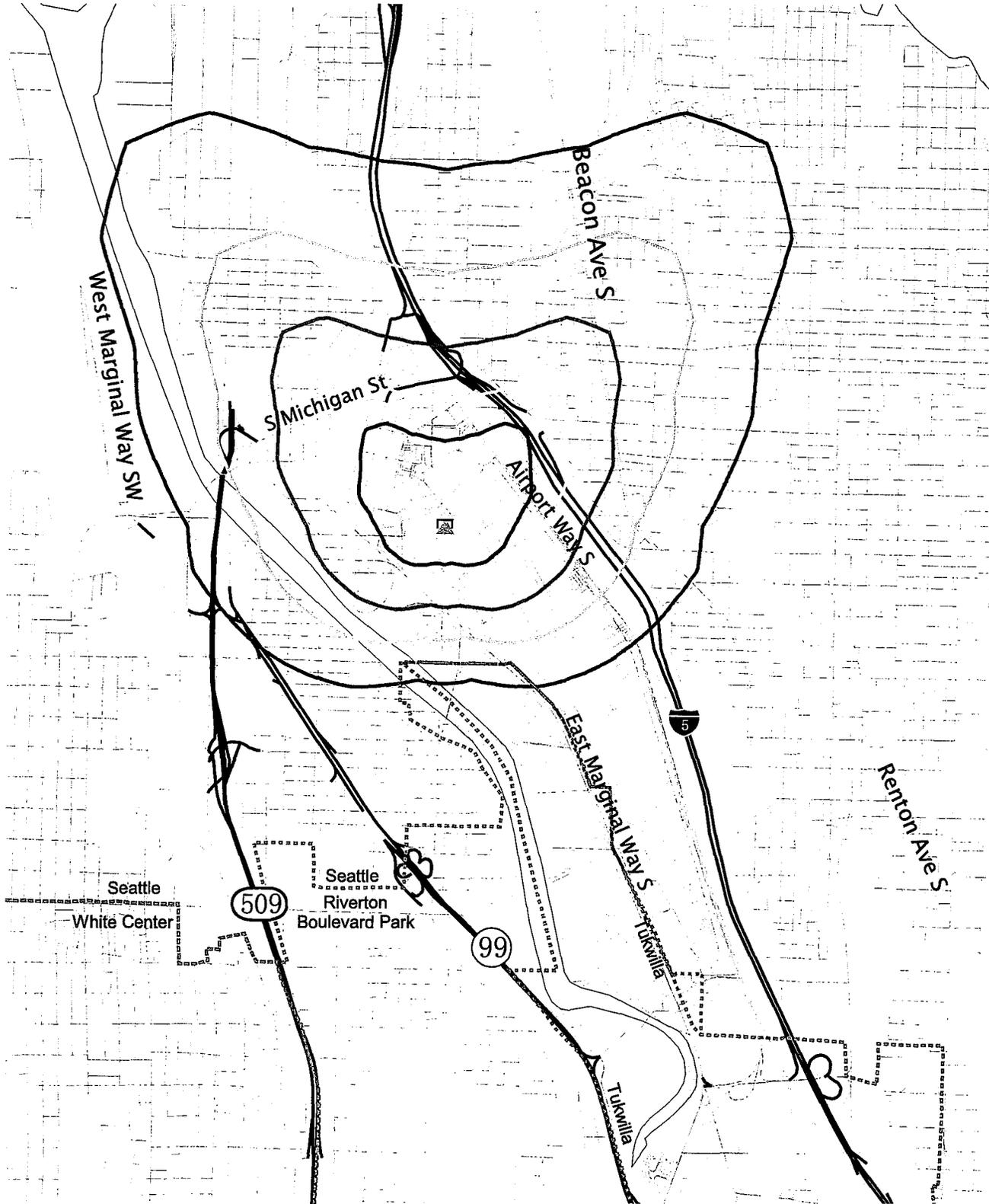
A second important aspect of the impacts from run-up noise is that the frequency characteristics of the noise are not equal in all directions. There are frequency differences between the front of the aircraft and the rear of the aircraft. The noise from the front of the aircraft is dominated by high-frequency fan and compressor noise. The noise from the rear part of the aircraft is dominated by low-frequency combustor noise and turbulence mixing.

Run-up Contours. Of all the commercial aircraft types the loudest would probably be the B747-400. Noise contour plots were calculated for the B747-400. There are several types of corporate jets that utilize King County International Airport. One of the loudest corporate jets would be the Gulfstream II, which is one of the older general aviation jets that uses the lower bypass ratio engines. As a worst case, this type of aircraft was used to show the loudest levels generated by corporate jet run-up operations.

BridgeNet International has developed custom software specifically for calculating the noise levels generated by stationary aircraft operating under various power settings. The software is also designed to calculate the effect of a noise barrier, or a run-up enclosure. Noise contours from this noise model will be used to assess the potential impact to the adjacent noise sensitive land uses.

The B-747 aircraft was modeled as if it was located at the north end of the Boeing company apron (Apron 1), with a heading of 180 degrees, which is consistent with the primary wind conditions at the airport. The engines were modeled as one engine operating at take-off power and a second engine at a balancing power of 80%. The corporate jet was modeled as if located on Taxiway B with a heading of 130 degrees, and the engines were modeled as operating at take-off power.

The unmitigated noise levels generated by the B747-400 were calculated and the results are shown in Figure G3b as contours of equal loudness. The exhibit shows the location of the unmitigated 65 dB, 70 dB, 75 dB, 80 dB, and 85 dBA maximum noise level contours for the proposed run-up operations. These contours do not take into account the existing buildings or hangars located at this end of the airport.



Scale 1"=3,000'

**Figure G3b Run Up Noise Contours
B 747 Non-Mitigated**

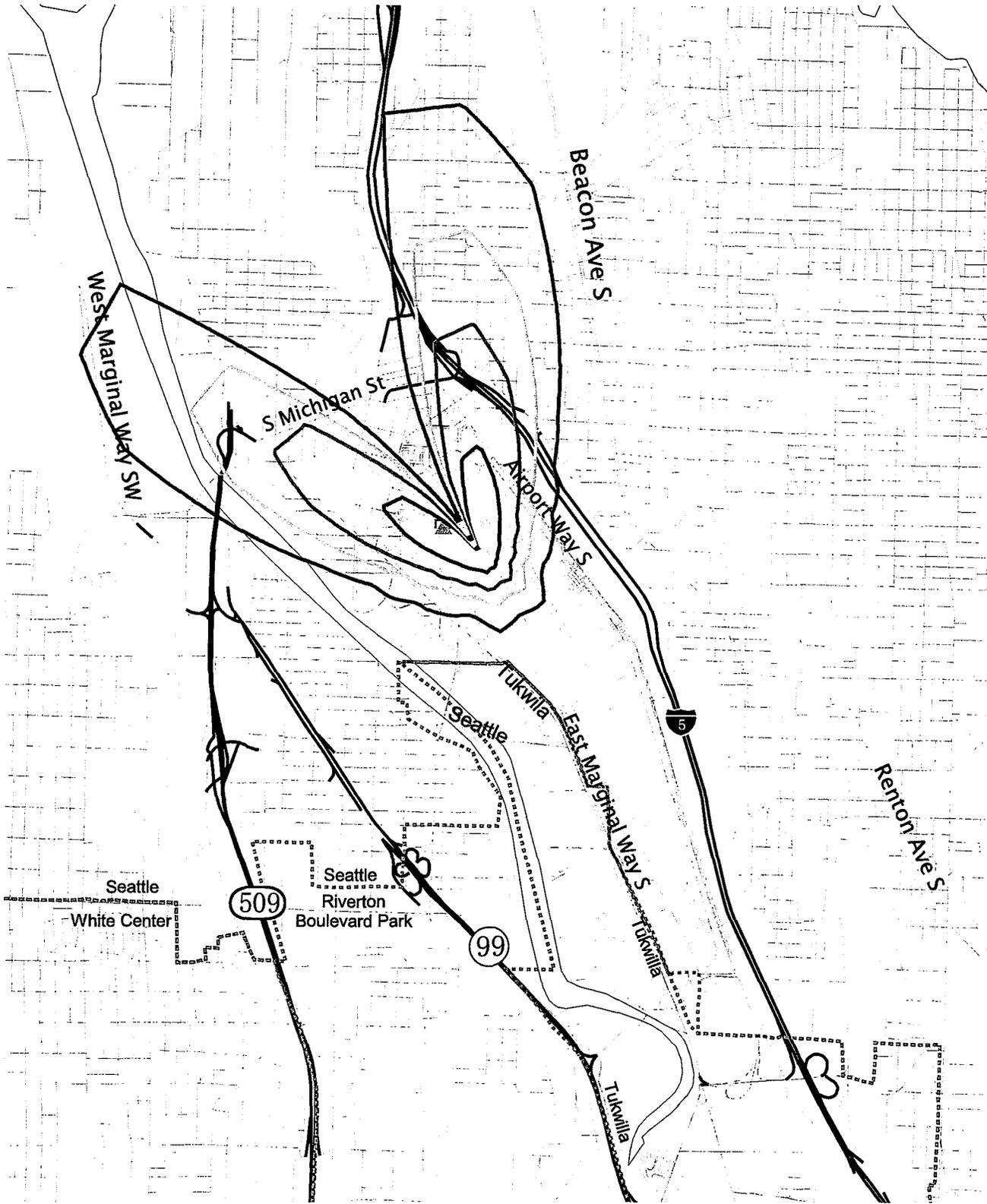
- 65 DBA
- 70 DBA
- 75 DBA
- 80 DBA
- 85 DBA

The unmitigated noise levels generated by the GII were calculated and the results are shown in Figure G3c as contours of equal loudness. The exhibit shows the location of the unmitigated 65 dB, 70 dB, 75 dB, 80 dB, and 85 dBA maximum noise level contours for the proposed run-up operations. These contours do not take into account the existing buildings or hangars located at this end of the airport.

The unmitigated noise levels generated from both the B-747 and the G II at full power are significant. The greatest amount of noise coming from a jet engine is produced by the turbulence between the high velocity exhaust gases exiting the engine and the low velocity static air surrounding the engine. This turbulence is most significant at a location normally between 30 and 45 degrees off the rear centerline of the aircraft.

Run-up noise that is predominately daytime usually does not alter the DNL noise contour level. DNL is more dominated by aircraft overflight noise. Because run-ups are less frequent than overflights so they do not have as great of an affect on the DNL contour. Mitigating run-up noise is more design to reduce single event disturbance, and not DNL.

Airports with GREs, generally require that the facility be used for all run-ups as much as possible. The only limitation on that requirement is that the wind conditions must be suitable for use of a GRE (because of aerodynamics, GREs can not be used under all conditions). When there are the need for more than one aircraft run-up at a time, then that is accommodated on a first come first serve basis. Usually there is a time limit as well, such as 1 hour.



Scale 1"=3,000'

**Figure G3c Run Up Noise Contours
GII Un-Mitigated**

- ~ 65 DBA
- ~ 70 DBA
- ~ 75 DBA
- ~ 80 DBA
- ~ 85 DBA

Run-Up Noise Summary

The following summary presents some of the findings concerning noise impacts from run-up noise from jet aircraft at KCIA.

- Aircraft run-ups can generate a wide range of noise levels. Important factors affecting noise levels are the type of aircraft, the level of power of the run-up, and the meteorological conditions.
- Low-frequency noise from the aft portion of the aircraft is the greatest impact from run-up noise. This is critical because low-frequency noise: (1) is the most difficult to mitigate with a barrier, (2) has the lowest atmospheric absorption rate, and (3) more easily penetrates the interior of building structures.
- The potential of impacts from aircraft run-ups are greatest for the full (*takeoff*) power runs. Run-ups at lower power levels generate significantly less noise.
- Long duration run-ups may often include a number of high power cycles that increase the annoyance and impact from the run-ups.
- A significant portion of the run-ups at KCIA are by Boeing Corporation aircraft. The number of run-ups per year varies widely depending upon special projects that may occur at the airport. Currently the number of run-ups are lower averaging an estimated 15 per month.

Run-up Noise Attenuation.

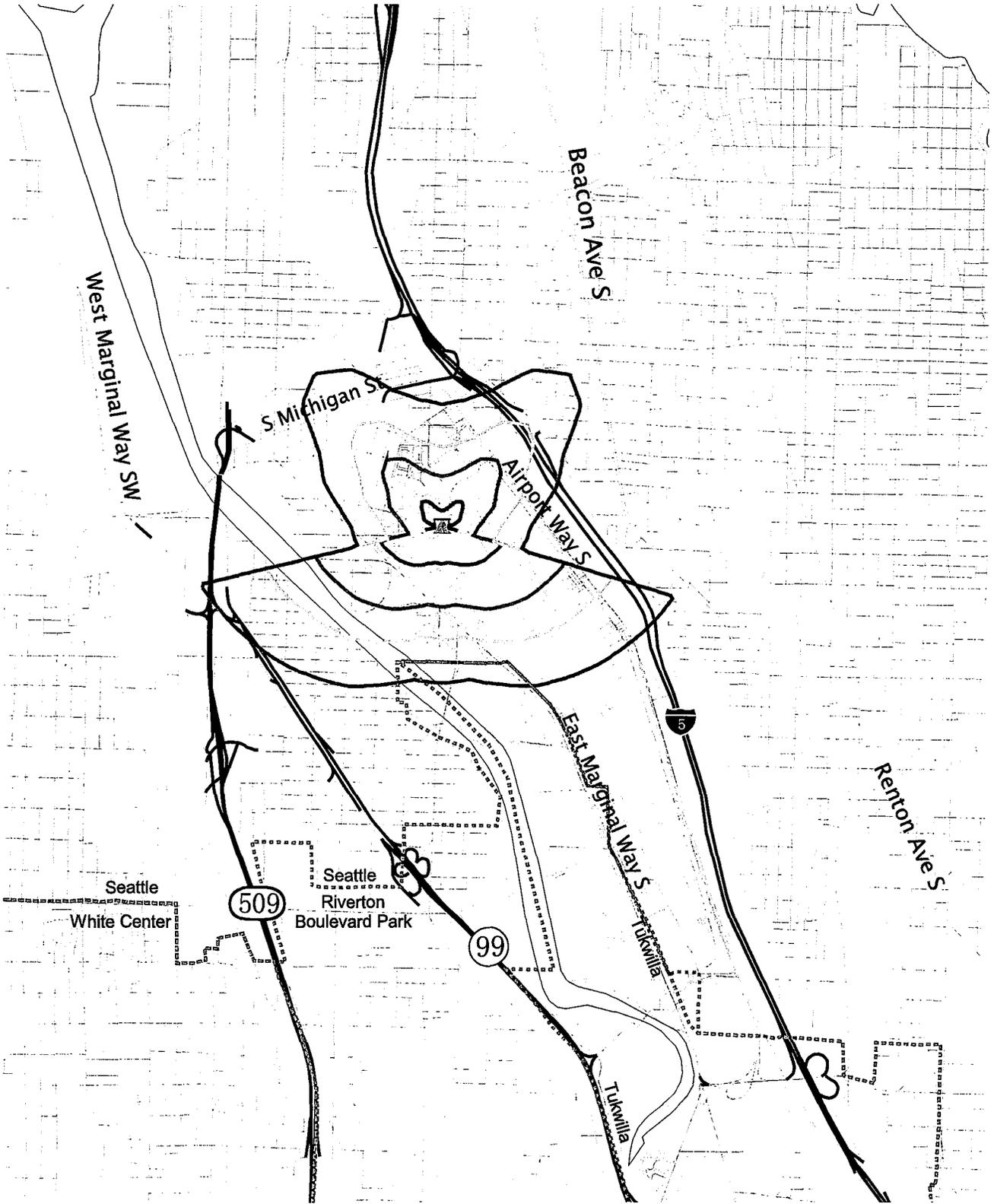
The most effective method of reducing the noise from stationary aircraft is with the use of either a barrier or an enclosure. The effectiveness of a complete enclosure is dependent upon several factors such as location and orientation. The location must be such that the aircraft can be either taxied or towed easily in and out of the structure. The enclosure must also be properly oriented in order to allow proper airflow into the engines and to be most effective in reducing noise sensitive land uses most heavily impacted by the noise.

The run-up enclosure was modeled as if located at the north end of the Boeing company apron (Apron 1) with the back of the enclosure parallel to the north property line. The proximity to the apron where the aircraft are serviced would allow fairly easy access into and out of the enclosure. This location also allows for the enclosure to be opened to the south that will allow unrestricted airflow into the aircraft engines for the predominant wind direction of the airport.

The ground run-up enclosure was modeled to be 300 feet wide, which is sufficient to accommodate the wingspan of a B747-400 aircraft. The sidewalls were estimated to be 180 feet long, which is sufficient to provide mitigation from engine noise while allowing access around the front of the enclosure. The height of all three sides of the enclosure was modeled as 45 feet high.

The aircraft was modeled backed into the structure with the tail located about 20 feet from the rear wall. The mitigated noise levels generated by the B747-400 were calculated and the results are shown in Figure G3d as contours of equal loudness. The exhibit shows the location of the mitigated 65 dB, 70 dB, 75 dB, 80 dB, and 85 dBA maximum noise level contours for the proposed run-up operations. These contours take into account the mitigation effects of the run-up enclosure only, but do not take into account the effect of any existing buildings or hangars located at this end of the airport.

The figure shows that under these conditions, the noise level reduction of a three-sided enclosure will provide about 15 dB of noise reduction. This level of reduction is based only upon the shielding characteristics of the perimeter walls. In addition, no airfield evaluation was conducted as to the actual availability of the modeled site for accommodation of such an enclosure. Additional information concerning Ground Run-up Enclosures is contained in the Appendix.



Scale 1"=3,000'

**Figure G3d Run Up Noise Contours
B 747 Mitigated**

- 65 DBA
- 70 DBA
- 75 DBA
- 80 DBA
- 85 DBA

Alternative 4-Acquisition of Land or An Interest Therein. This Alternative will evaluate the feasibility of sound attenuation for noise sensitive uses within both the 65 and 60 DNL noise contours. Noise sensitive uses (residences, schools, religious facilities, hospitals) within the 65 and greater DNL noise contours are eligible for Federal funding participation for sound attenuation to reduce inside noise levels. However, the County has determined that this Study should go beyond the Federal guidelines and eligibility requirements, by evaluating the feasibility of sound attenuating residential uses within the 60 DNL noise contour. Thus this Alternative will evaluate and consider the sound attenuation of residences within both 60 DNL contour as well as the 65 DNL and greater contours. This will be evaluated based on the number of residences within those contours and generalized costs of sound attenuation. As a requirement for sound attenuation, the County would receive an avigation easement as consideration. In addition, land acquisition will be evaluated as to the feasibility for noise mitigation purposes.

As stated above, the County wishes to evaluate the feasibility of sound attenuating noise sensitive structures within the 60 and 65 DNL noise contours. There are approximately 4,918 housing units within the existing 60 DNL noise contour. This number most likely will be reduced by various noise abatement actions, however, it is a good number to start the evaluation. Based on the average cost to sound attenuate houses within the 65 DNL contour associated with Sea-Tac (approximately \$20,000 per home), the cost to sound attenuate all of the homes within the 60 DNL contour at King County International Airport would be approximately 99.5 million dollars. Based on the same information, the approximate cost to sound attenuate the homes within the 65 DNL only (1,327 homes) would be approximately 26.5 million dollars. For information purposes, the approximate cost to sound attenuate the homes within the 70 DNL (158 homes) would be approximately 3.2 million dollars.

This even becomes more costly when using the Base Case future noise contours to identify residences. There are approximately 6,827 homes within the 60 DNL noise contour in the future. The cost to sound attenuate this many homes would be approximately 136.5 million dollars. The approximate cost to sound attenuate the homes within the future Base Case 65 DNL contour (approximately 1,955) would be 39.1 million dollars. The approximate cost to sound attenuate the homes inside the 70 DNL contour would be about 7.0 million dollars.

The actual number of housing units and other noise sensitive uses within the 60 and greater DNL noise contours will depend upon the noise abatement/mitigation programs adopted as part of the Noise Compatibility Program. It is quite possible that the final noise contour to be used as the basis for the Noise Compatibility Program will be smaller than either the existing or future contours. However, the foregoing comparison can be used to identify magnitude of costs when considering sound attenuation programs.

Alternative 5-Noise and Compliance Monitoring Program. This Alternative is concerned with on-going activities at the airport including measuring noise levels on and around the airport and monitoring compliance with the noise abatement programs implemented as a result of this FAR 150 study. There are two purposes to this alternative: one is to measure changes in noise exposure over time, and the second is to monitor compliance with specific operational programs. A prerequisite to this alternative is a noise monitoring system (which may be supplemented from time to time with portable monitors) to keep track of noise levels at specific points around the airport.

Fly Quiet

Using the data produced by a noise monitoring system, the airport will be able to produce reports covering a variety of topics. These monitoring activities and reports, as a group, are called a "Fly Quiet" program, because they provide incentives for airlines and pilots to operate as quietly as is physically possible. The key to Fly Quiet is the availability of information both to the operators and to the public. This information is gathered from noise monitors, quantified and then prepared into reports providing comparative data for each quarter at KCIA.

Continuous Feedback/Continuous Training

Distribution and publication of Fly Quiet reports provides continuous feedback to aircraft operators about how well they are complying with noise abatement regulations and procedures. And, these reports allow the interested public around KCIA access to information about which operators are achieving the highest level of compliance with noise abatement procedures and which need improvement. Fly Quiet reports will be publicized and distributed in a variety of ways including:

- Posted in the public areas at KCIA and in the FBO waiting areas
- Published in KCIA newsletters
- Distributed to local libraries
- Press releases sent to local papers
- Distributed to Roundtable members, public and elected officials in the County.

Using this information, KCIA staff will be able to meet with airlines, pilots and FBOs to work through problems and improve compliance. In addition to encouraging pilots to score well compared to similar operators, KCIA can choose to offer specific incentives to high achievers. Awards, prizes, publicity and similar ideas may be used to encourage the best possible noise abatement techniques.

A Voluntary Program Avoids Time Consuming Regulations

Because Fly Quiet is a voluntary program, it has the advantage of reinforcing desirable flight procedures without going through the time consuming regulatory requirement of FAR Part 161 filing process, or it can be used in conjunction with a Part 161 analysis. In addition, the program would build a database for future updates of the FAR Part 150 Study. A Fly Quiet Program has the potential of reducing single event noise levels and encouraging greater compliance with preferential flight corridors and procedures, and could potentially result in continued overall reductions in cumulative noise levels for areas around the airport.

Fly Quiet Components

A Fly Quiet Program can have several components. At KCIA it would likely include monitoring:

- Compliance with noise abatement flight tracks
- Adherence to noise abatement departure climb profiles
 - Monitoring late night departure procedures
- Analysis of noisiest single event flights/aircraft
- Quantifying runway use
- Monitoring run-up regulations

Monitoring Elliott Bay Procedures

Examples of how these Fly Quiet components would be analyzed and treated include:

- Measured single event operations producing the highest, lowest, mean, and average levels.
- Measured distance from ideal flight path, identifying operations in or out of compliance with a procedure and rating the quality of the flight in meeting that procedure.
- Measured flight profile identifying operations producing the highest, lowest, mean, and average altitudes at different points along a flight path
- Categorize operations by time of day (day or night)
- Categorize operations under different weather conditions

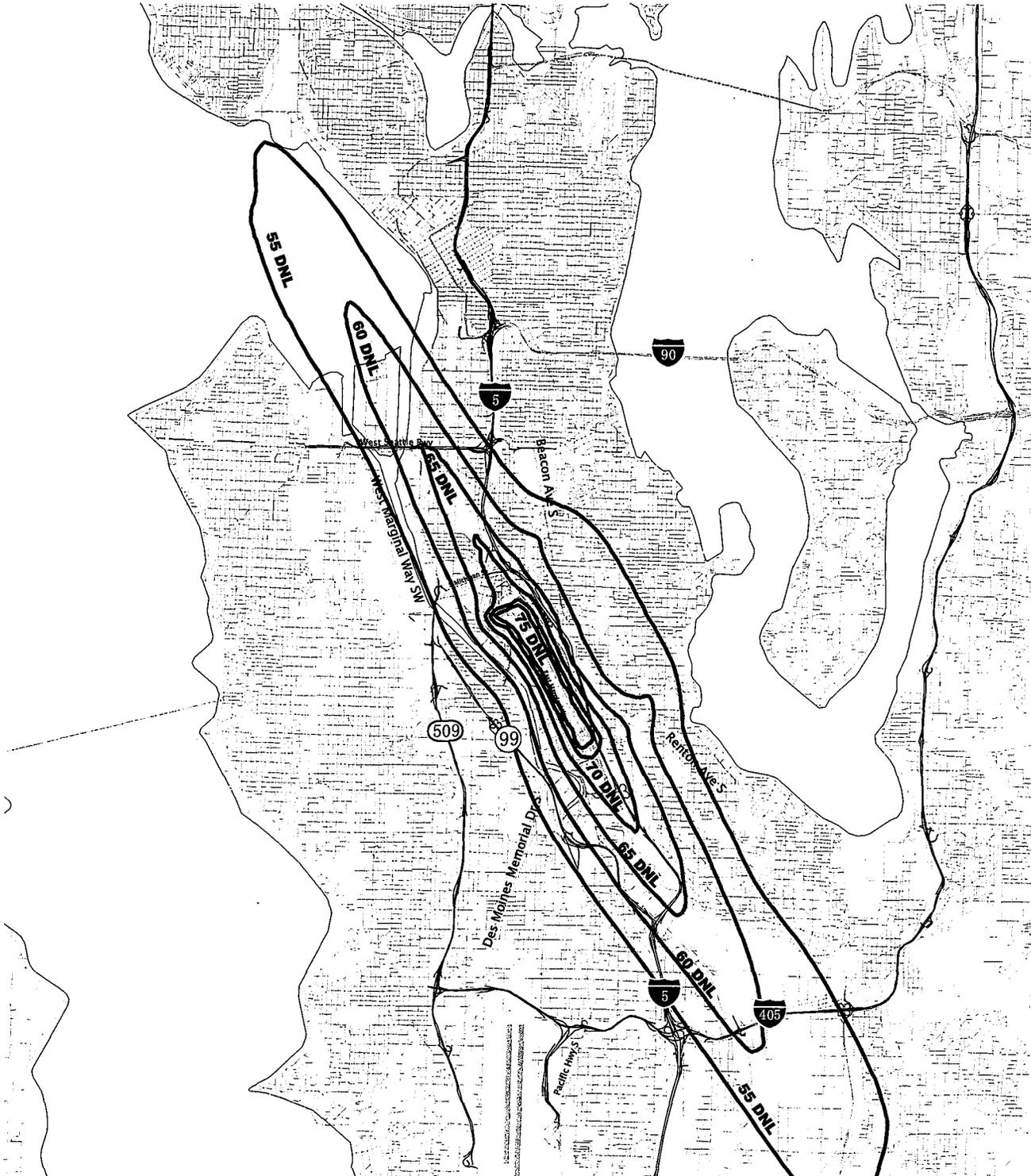
Tailoring Fly Quiet to KCIA

Many of these Fly Quiet Program elements will be refined as the Noise Compatibility Program is finalized. Special attention will need to be devoted to the question of applying Fly Quiet to a primarily general aviation airport rather than a scheduled air carrier airport where operators are easily identified. Defining the specifics of this program as well as the nature of the reports generated will be one of the challenges facing the airport and the Part 150 committee.

As an example of how the Fly Quiet program would work, a contour combining two Alternatives is presented below. Both alternatives involve flight paths directed toward Elliott Bay: the charted visual approaches and the departure procedures. The Fly Quiet program would be designed to specifically measure adherence to those procedures to maximize compliance and effectiveness. Fly Quiet would be designed to measure not only how often each procedure is followed, but also how well it is followed.

The Fly Quiet Alternative (A5) DNL contours are shown on Figure G5a, entitled *ALTERNATIVE 5, FLY QUIET PROGRAM, DNL CONTOURS*, and the Time Above contours are shown on Figure G5b, entitled *ALTERNATIVE 5, FLY QUIET PROGRAM, TA CONTOURS*. The represented receptor analysis is presented in Table G2 through G6, and the receptor sites are shown on Figure G5c. The results show reduction in noise in the Magnolia and Queen Anne areas when the noise abatement flight track is flown properly.

By analyzing a quantity of data such as all Elliott Bay flight tracks for each quarter, it will be possible to determine which aircraft habitually follow the noise abatement procedures correctly and which deviate from the ideal flight track. KCIA staff would then follow up with a two-pronged approach. The best operators would receive praise, good publicity and perhaps an award or other incentive, and poor performers would receive further instruction on how to fly the procedure properly. At the end of the year, the best operator would be determined, using a full year's worth of flight track data. A specific award or incentive, such as operator or FBO of the year, would be granted, preferably by the Airport Director or another high-ranking King County official in a public ceremony.



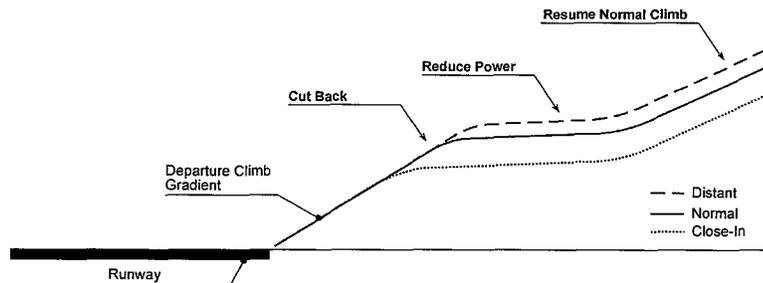
Alternative 6-Noise Complaint/Citizen Liaison Program and Other

Administrative Actions. This Alternative involves the continuation of the existing Noise Complaint Hotline system in place at the airport. The objective of this system is to record all noise concerns received from citizens. This will assure that personnel can explain the nature of the concern and, in most instances, what caused the concern. This will assist in the annual review of the FAR Part 150 Study to determine the effectiveness of the noise abatement recommendations. In addition, this Action should continue independently of what ever other operational modifications are recommended as part of this planning effort, and is not contingent upon the implementation of any other action. This is especially important in relationship to the noise monitoring program. This current system will be reviewed and evaluated during the course of the Study, and recommendations may be made at the conclusion to improve the system.
Additional analysis will be presented in a subsequent Working Paper.

Alternative 7-Land Use Controls/Planning. Some residents living within the environs of the airport have expressed significant concern with aircraft over-flights and the noise intrusion associated with them. This is true even though many are outside the 65 DNL noise contour, as they are experiencing noise intrusion associated with single event operations. The communities should be cognizant of this fact and take aircraft noise levels, and over flight patterns, into consideration in the land use planning and development actions taken by these entities. It is evident from historical data that many residents are annoyed beyond the 65 DNL noise contour, thus it may be advantageous to use a large contour for land use planning purposes. In addition, it may be wise for future noise sensitive uses, such as schools, hospitals, rest homes, religious facilities, etc. to be avoided within the approach and departure paths of the runways for a distance of approximately two miles. It is much easier to avoid problems in the future than to solve them once they have occurred. One of the unique problems facing the airport is the reality of inter-jurisdictional issues. In other words, the airport is surrounded by jurisdictions that have land use control but are not the Sponsor of the airport and the airport has not land use control authority.

In addition, the requirement for sound attenuation in new structures would be appropriate for new or in-fill development in those communities that do not presently have such requirements. It is recognized that most of the area surrounding the airport is presently developed, and that it is the intent of both the County and the Airport to help preserve those areas of existing residential development. Therefore, sound attenuation programs for existing structures may be an important element of the Study, as described in Alternative 4. Specific land use recommendations will be made subsequent to the identification of the Future Noise Exposure Map, taking into consideration the adopted Future Land Use plans of the various communities.

Alternative 8-Departure Thrust Cutback. Many citizens have complained about departure noise levels. The Federal Aviation Administration has developed specific departure procedures for aircraft and have directed the Airlines to develop specific procedures for the specific aircraft types they operate. These procedures are known as the “close in” and “distant” procedures. The business jet manufacturers and operator organizations have developed specific “fly quiet” procedures for many aircraft.



A departure thrust cutback is a procedure where the aircraft’s thrust or power setting is reduced soon after departure in an effort to reduce noise levels on the ground. Although use of a power cutback procedure can reduce noise at certain locations, it can also shift noise from close in to further away from the Airport or vice-versa. Since all Noise Abatement Departure Profiles (NADPs) involve a power cutback, this analysis explores the impact of alternative altitudes where this cutback could occur in the Seattle region.

The FAA has worked to develop and standardize aircraft noise abatement departure profiles called Noise Abatement Departure Profiles (NADPs). FAA Advisory Circular 91-53A (FAA AC 91-53A) establishes standards and operational guidelines for implementation of these procedures. Key features of AC 91-53A are:

- Each aircraft operator may develop a maximum of two NADPs for each airplane type. These are designated as either a “Close-in community NADP” or a “Distant community NADP”. The terms “Close-in” and “Distant” refer to the physical distance from the Airport runway to the community. A “Close-in community NADP” is designed to reduce noise at locations close to the Airport. A “Distant community NADP” is designed to reduce noise at locations distant from the Airport. These terms are relative, and allow each operator to develop procedures that provide the greatest noise benefit to their individual destinations.

- For each NADP the operator should specify the altitude above field elevation (AFE) at which takeoff thrust or airplane configuration change, excluding landing gear retraction, is initiated. The absolute minimum altitude at which throttle reduction may be initiated is 800 feet AFE.
- The minimum thrust setting for each aircraft type is to be determined based upon the minimum engine out- climb gradients.
- The thrust reduction will be maintained to an altitude of 3,000 feet AFE or until the airplane has been fully transitioned to the en route configuration (whichever occurs first), then transition to normal en route climb procedures may be initiated.
- Airports may request airlines to use the appropriate NADP to reduce noise for either a close-in or a distant community.

Although NADPs are defined in terms of community location, the actual point of thrust reduction is determined by aircraft altitude. This is a key safety consideration as aircraft climb performance varies by aircraft type and weight. The designation of altitude to determine the location at which the reduction in thrust takes place ensures that departing aircraft are at a safe altitude prior to reducing power.

At King County International Airport, the NADP is determined by each airline. Currently the cutback is in between the close-in and distant procedure. Data indicates that at KCIA, a power cutback occurs at about 1,200 feet (versus the 800 feet for the close-in or 1,500 feet for the distant procedures).

In response to the requirements of AC 91-53A major airlines have developed NADPs. These standardized procedures recommend that thrust reductions commence at 800 feet above field elevation (AFE) for the close-in and 1,500 feet AFE for the distant community NADP. Although the actual location on the ground of thrust reduction varies from flight to flight, as a practical matter, thrust reductions typically occur in the vicinity of one nautical mile (nm) from brake release for the close-in procedure and at approximately three nautical miles (nm) from brake release for the distant procedure.

The departure thrust cutback significantly decreases aircraft noise emissions in the vicinity of the cutback, but the decrease in noise levels is accompanied by a corresponding decrease in aircraft climb performance. Changes in climb performance result in lower flyover altitudes compared to a typical or normal departure procedure. The amount of decrease in altitude can be assessed through computer simulation.

Noise levels at any given receptor are primarily a function of the loudness of the noise source, and the distance from the noise source to the receiver. Thus, noise levels increase as the distance between the source and the receptor decreases, and reducing departure thrust also reduces aircraft altitude. Therefore, departure thrust cutback reduces noise on the ground when the reduction in noise at the source (power cutback) is greater than the detrimental effect caused by the decrease in distance between the noise source and the receptor (reduced altitude).

AC 91-53A specifies that normal climb power will be re-applied at an altitude of 3,000 feet AFE, or when the airplane has been fully transitioned to the en route configuration, whichever occurs first. At King County International Airport, the re-application of normal climb thrust would occur in the vicinity of three to six nautical miles (nm) from the beginning of takeoff.

Locations where normal climb thrust is re-applied may experience an increase in noise above what would be experienced during a typical departure due to lower aircraft altitude and the re-application of normal climb thrust.

To assess the cumulative effect of alternative NADPs, single event noise levels were determined along the departure path for three departure procedures:

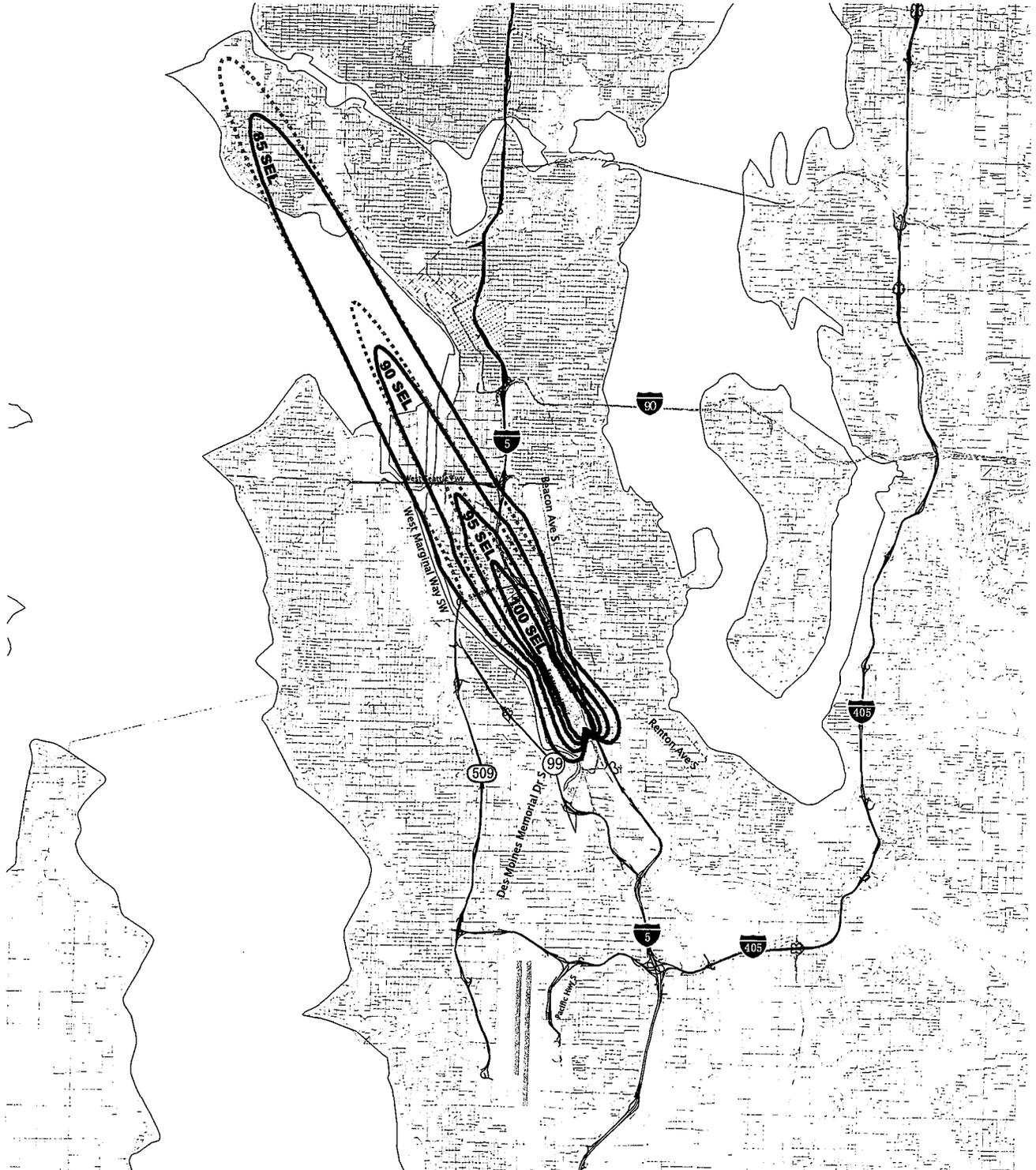
- A typical departure with no noise abatement power cutback,
- The close-in noise abatement departure procedure and
- The distant noise abatement departure procedure.

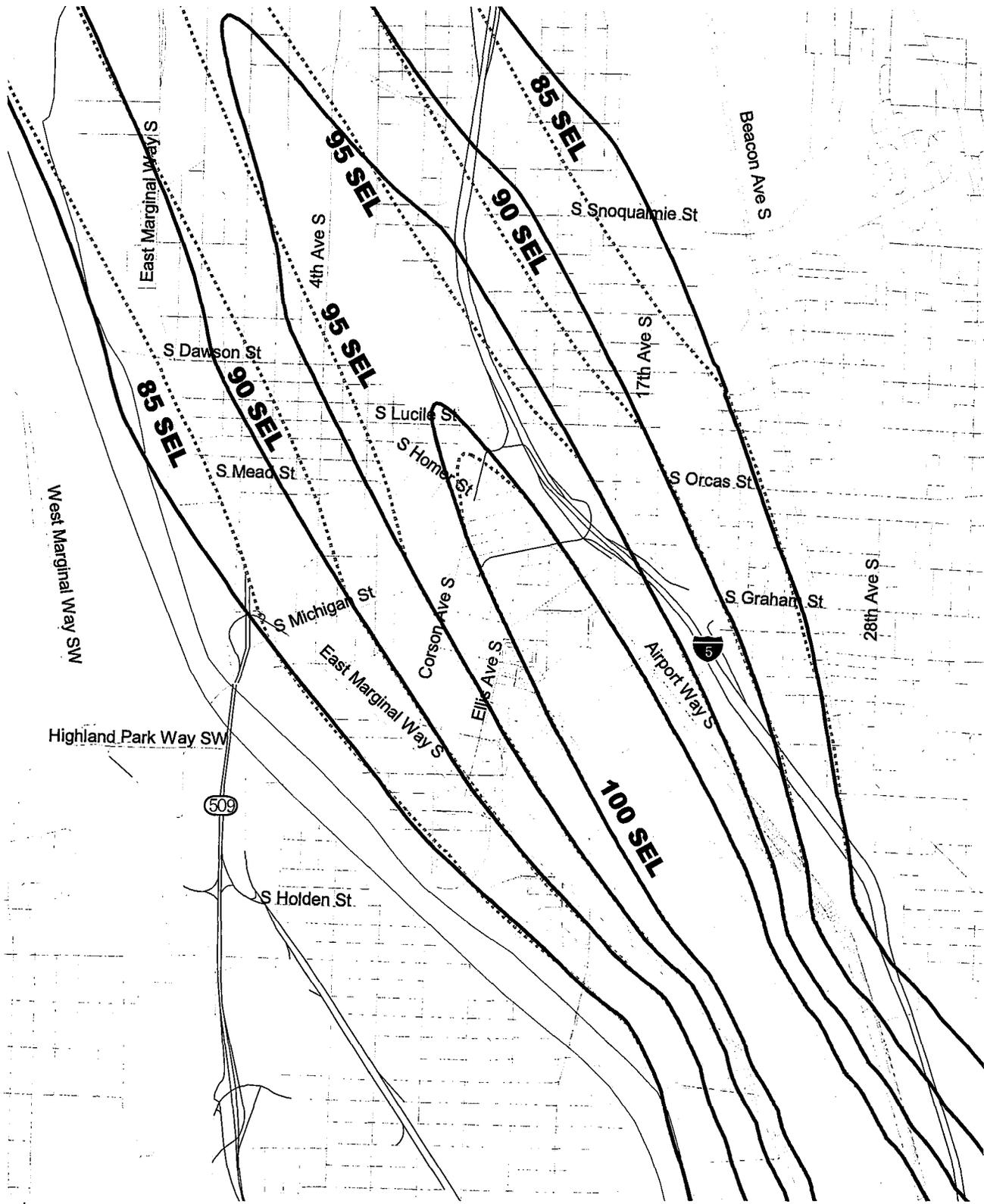
Alternative 8a. The Integrated Noise Model (INM), validated to conditions at King County International Airport by means of field noise measurement data, was used to predict and compare noise levels from these procedures. The results of this analysis (Alternative 8a) for the DC9 Hush Kit aircraft are shown in the Figures G8a through G8d for north flow departures and Figures G8e through G8g for south flow departures.

As shown in these figures, single event departure noise levels would be reduced at locations near the Airport if a close-in noise abatement departure procedure were implemented at King County International Airport; however, noise levels in the more distant communities would increase. Implementation of a distant noise abatement departure procedure would increase the noise levels closer to the Airport, while reducing them further away.

Alternative 8b. A similar Alternative is to evaluate the noise reduction associated with delaying the deployment of flaps until residential areas are avoided. This was modeled for a southern approach where flap deployment was delayed until passing Magnolia, at which time flaps are set to normal. SEL contours depicting normal and delayed flap deployment are shown on Figure G8e, entitled *ALTERNATIVE 8B, NORMAL FLAP DEPLOYMENT, B757 SEL CONTOURS* and Figure G8f, entitled *ALTERNATIVE 8B, DELAYED FLAP DEPLOYMENT, B757 SEL CONTOURS*, for north flow departures. South flow departures are illustrated on Figures G8k and G8l.

Alternative 8c. Another similar Alternative is to evaluate the noise reduction associated with an increase in the angle of approach. In other words, instead of a 3 degree approach while using the ILS, could a steeper approach of 3.5 degrees reduce noise impacts. SEL contours were developed for both the 3 and 3.5 degree approach angle for a southern approach to the north end of the main runway. Approaches from the south would reflect the same degree of change. Figure G8m, entitled *ALTERNATIVE 8C, THREE DEGREE APPROACH ANGLE* and Figure G8n, entitled *ALTERNATIVE 8C, THREE AND ONE-HALF DEGREE APPROACH ANGLE*, for south flow approaches, show the SEL contours associated with these approach angles.

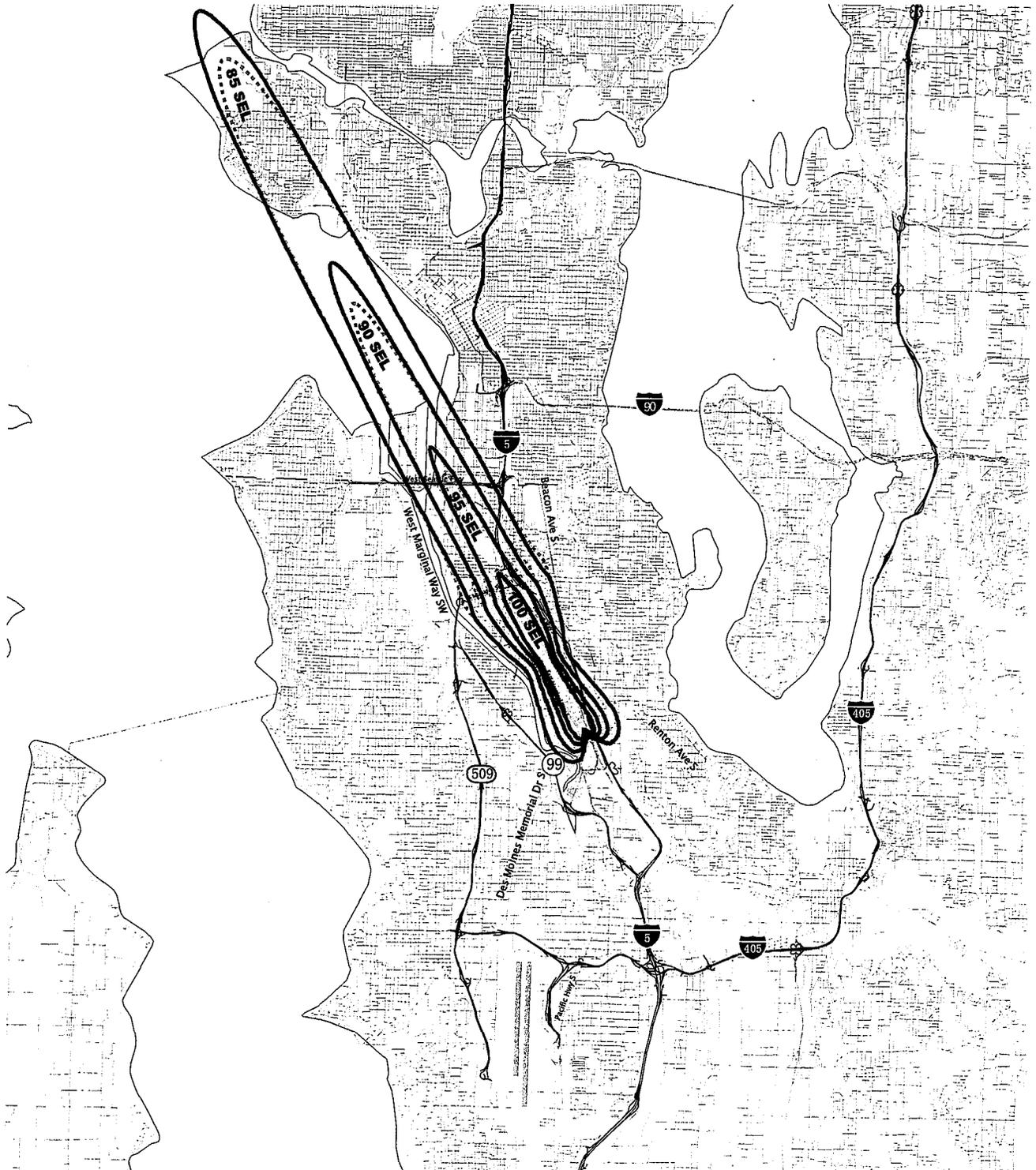


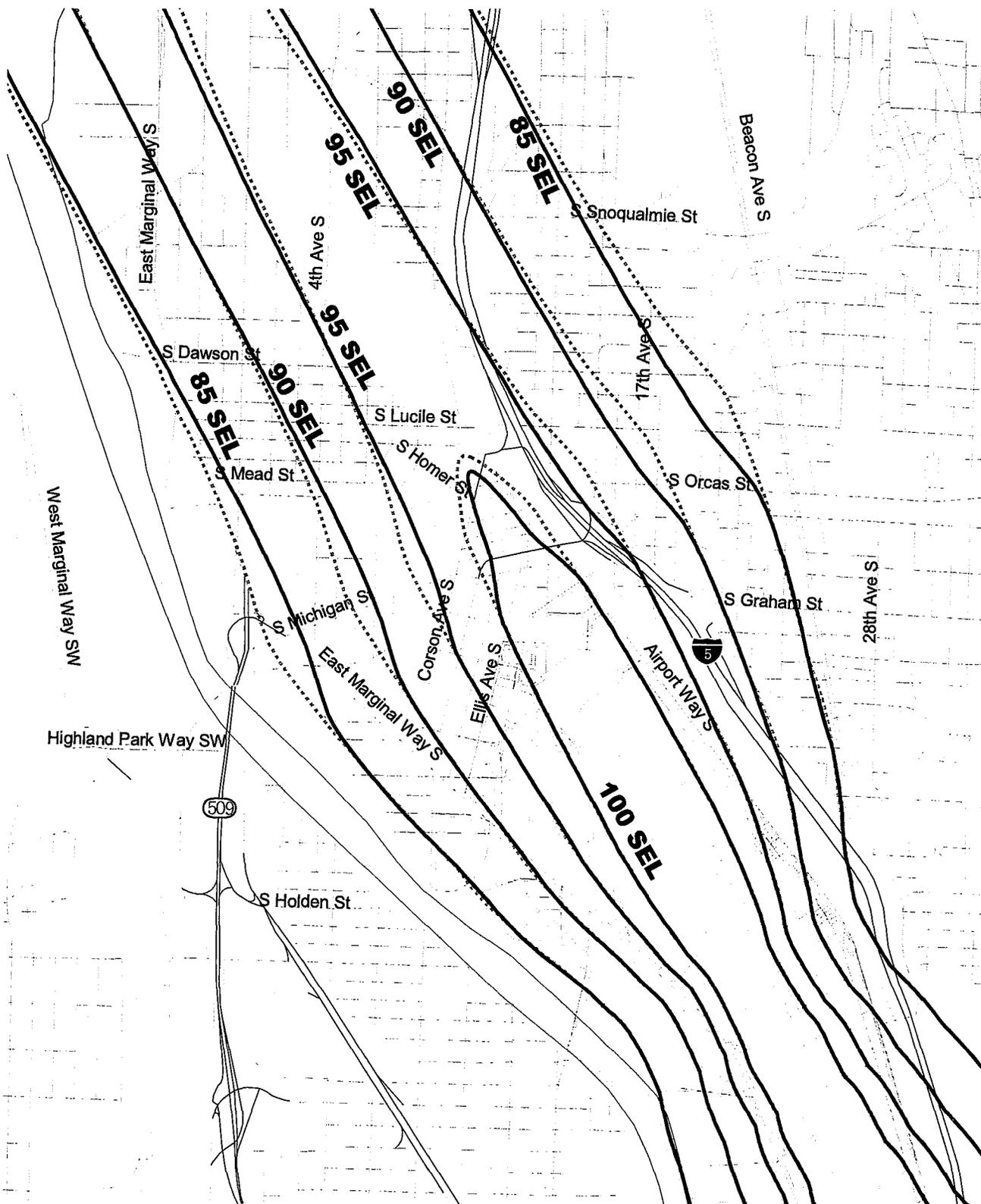


Scale 1"=2,000'

Figure G8b Alternative 8a, Distant and Normal Departure (North) SEL Contours - Detail View

- ~ Distant SEL Noise Contour
- ~ Normal SEL Noise Contour

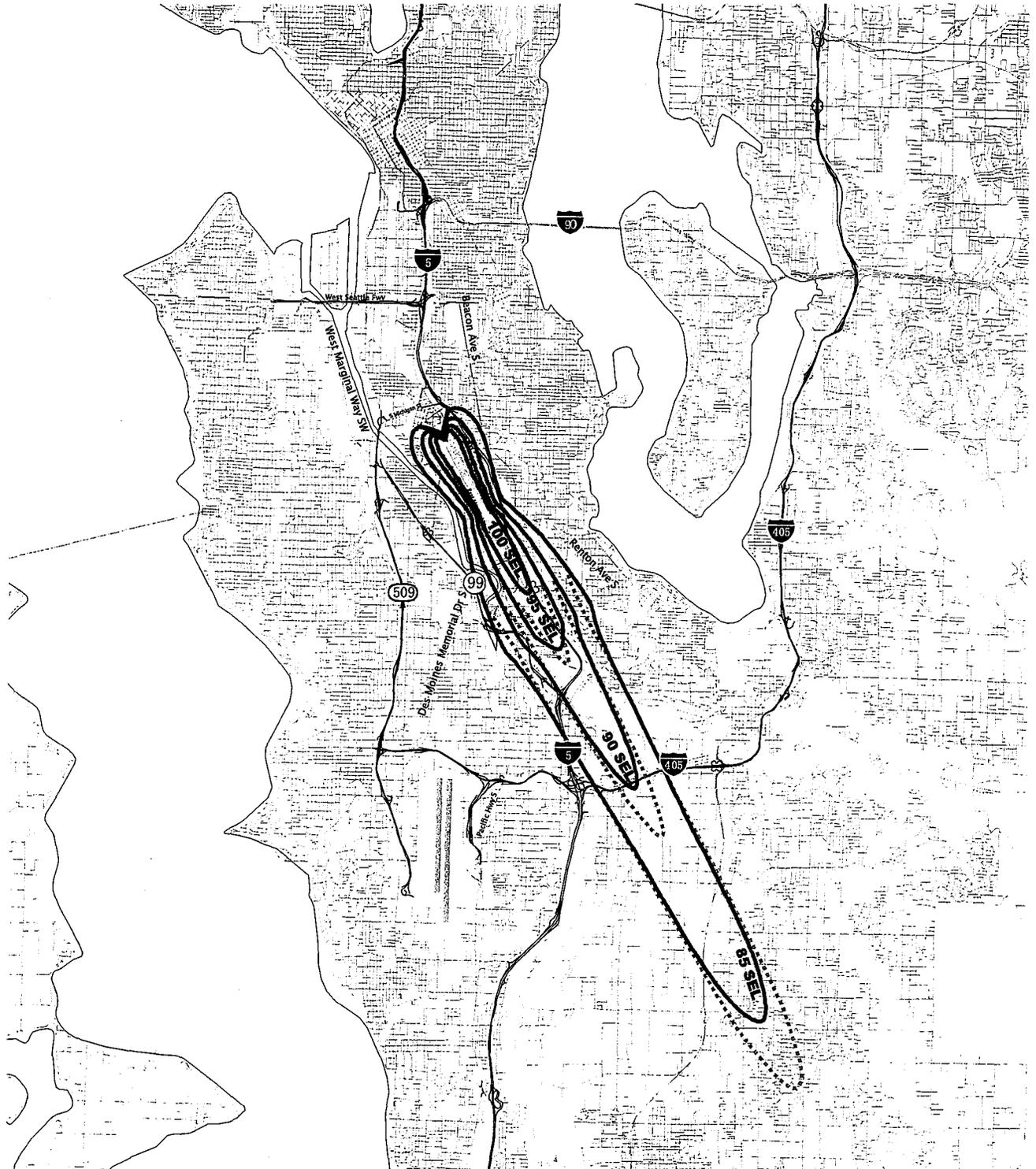


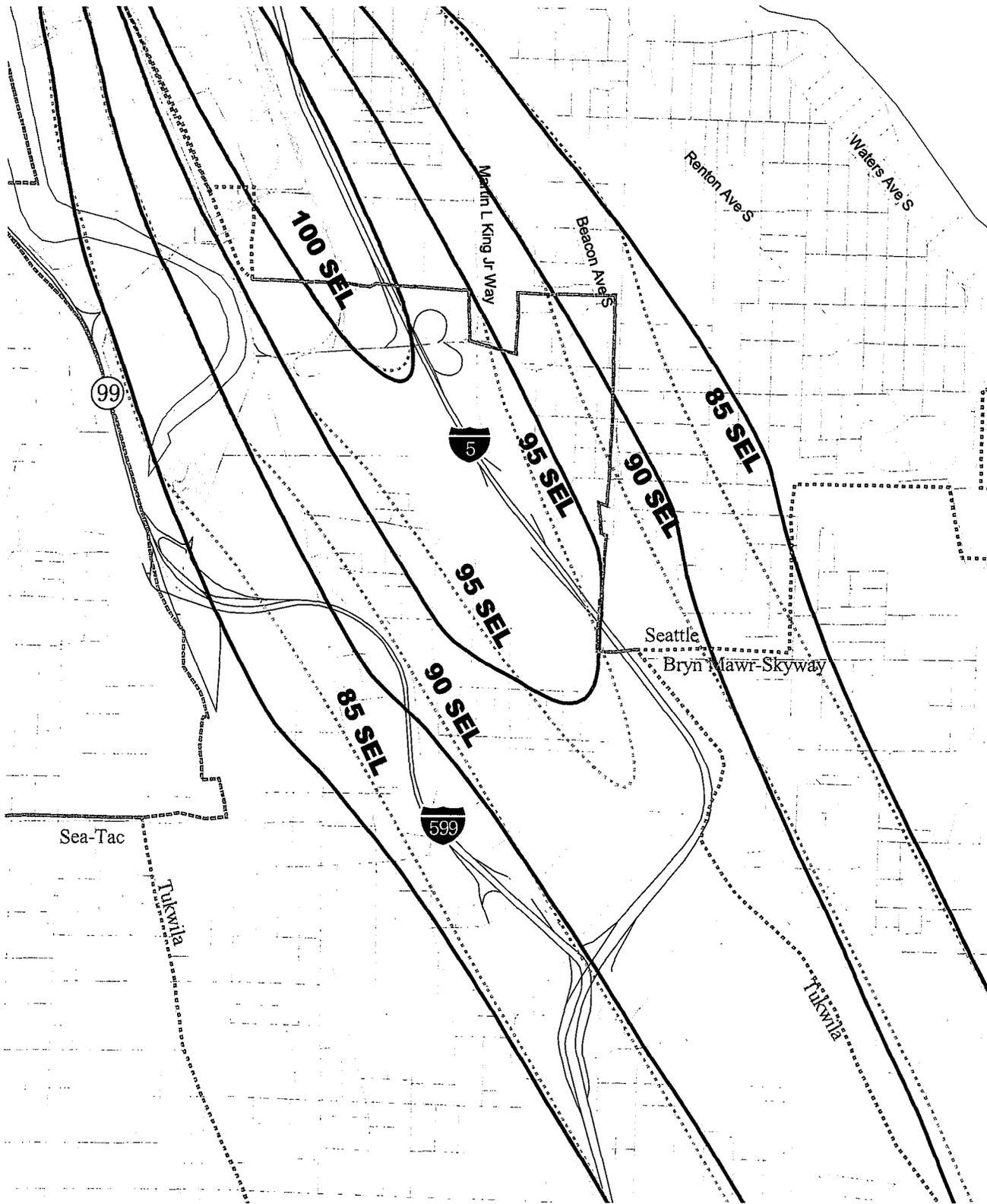


Scale 1"=2,000'

Figure G8d Alternative 8a, Close In and Normal Departure (North) SEL Contours - Detail View

- Close In SEL Noise Contour
- - - Normal SEL Noise Contour

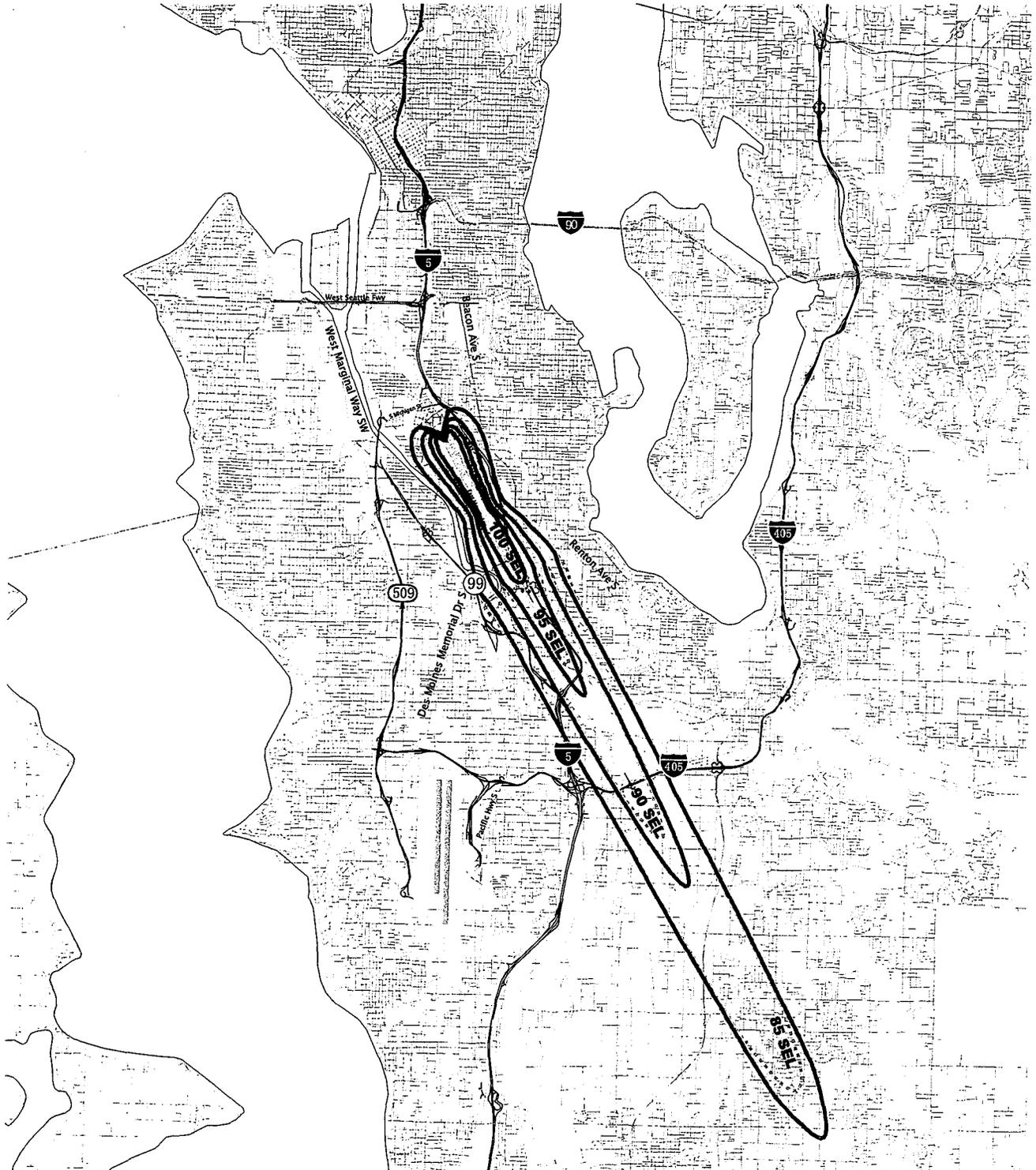


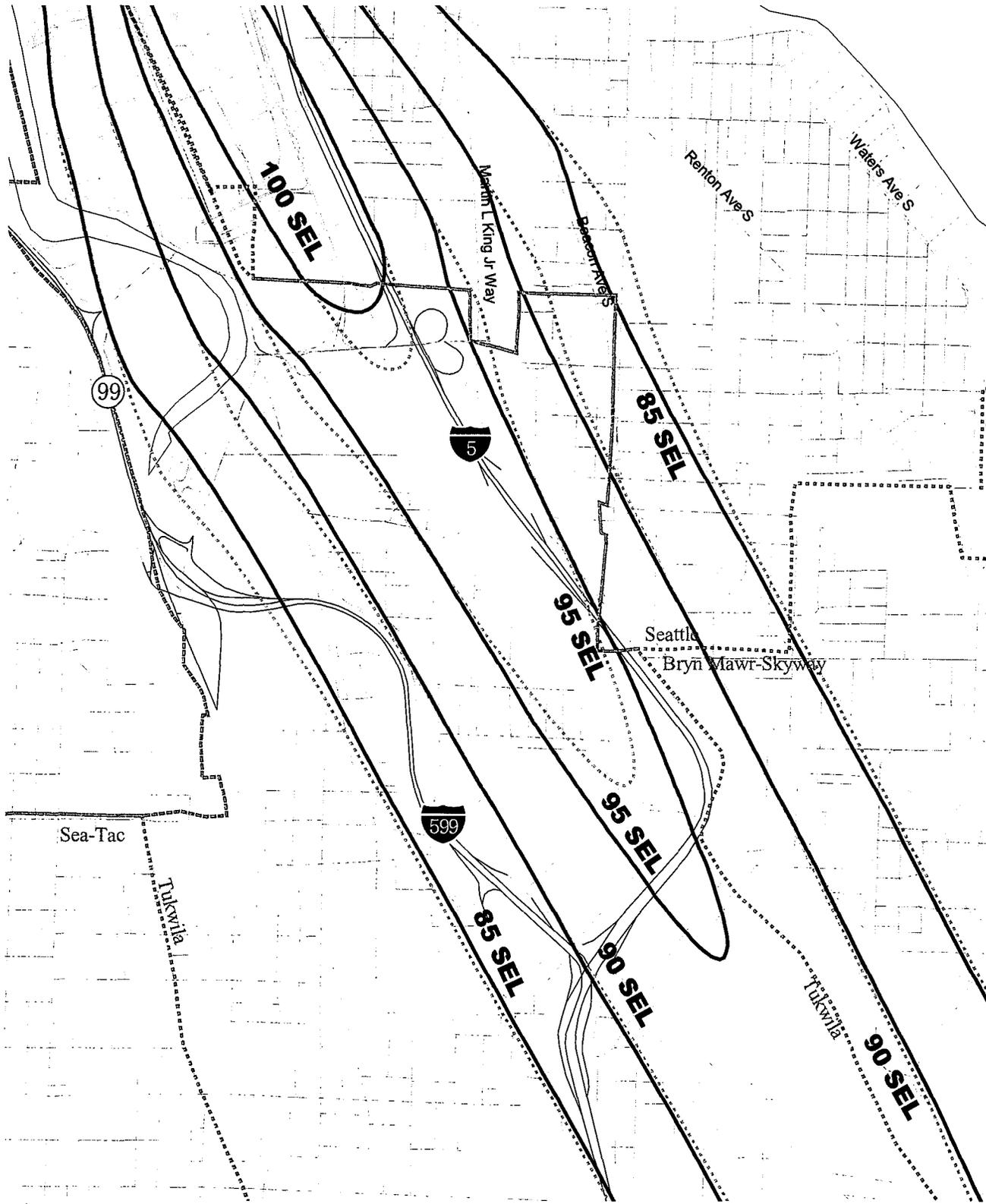


 Scale 1"=2,000'

**Figure G8f Alternative 8a, Distant and Normal Departure (North)
SEL Contours - Detail View**

-  Distant SEL Noise Contour
-  Normal SEL Noise Contour

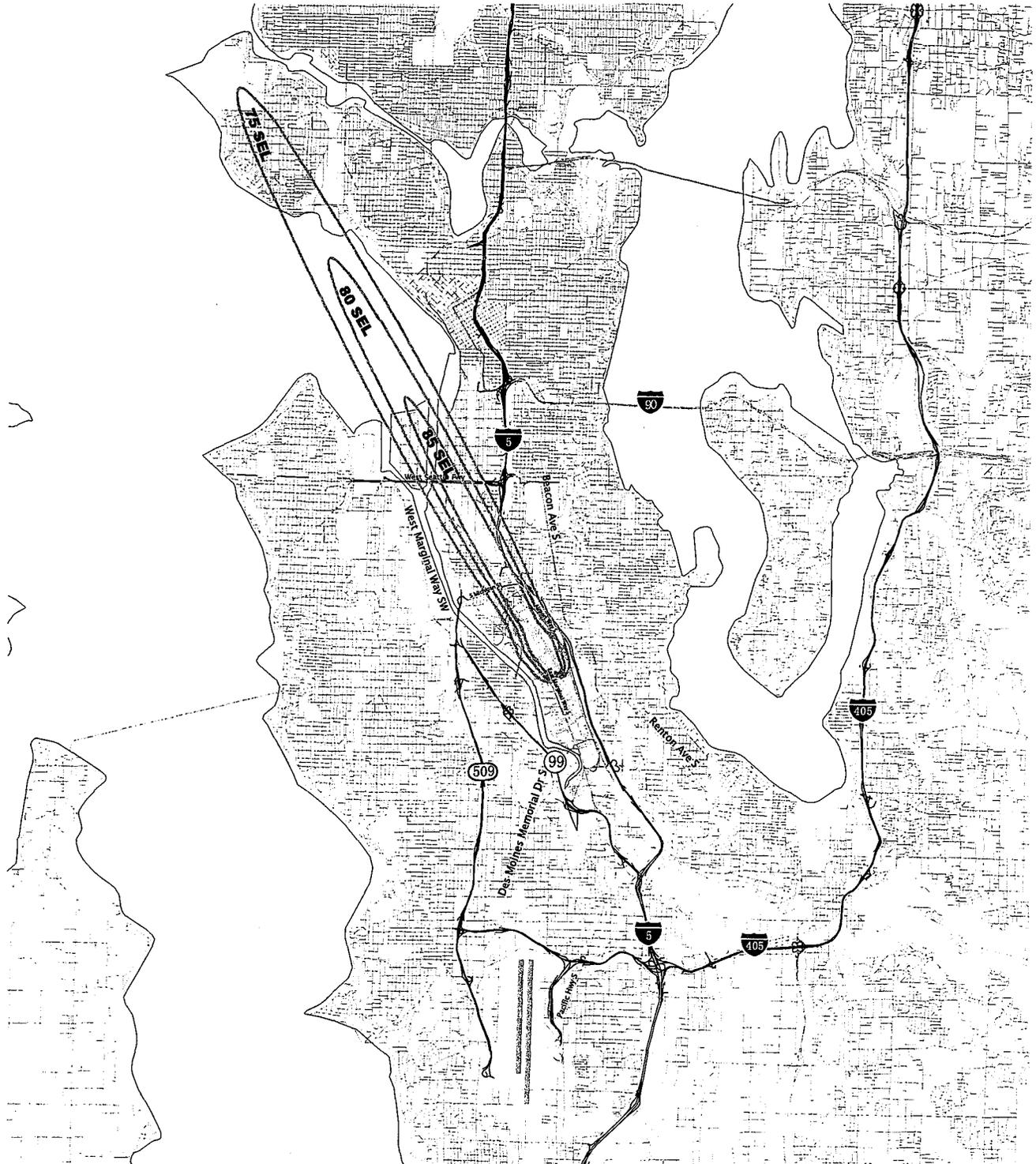


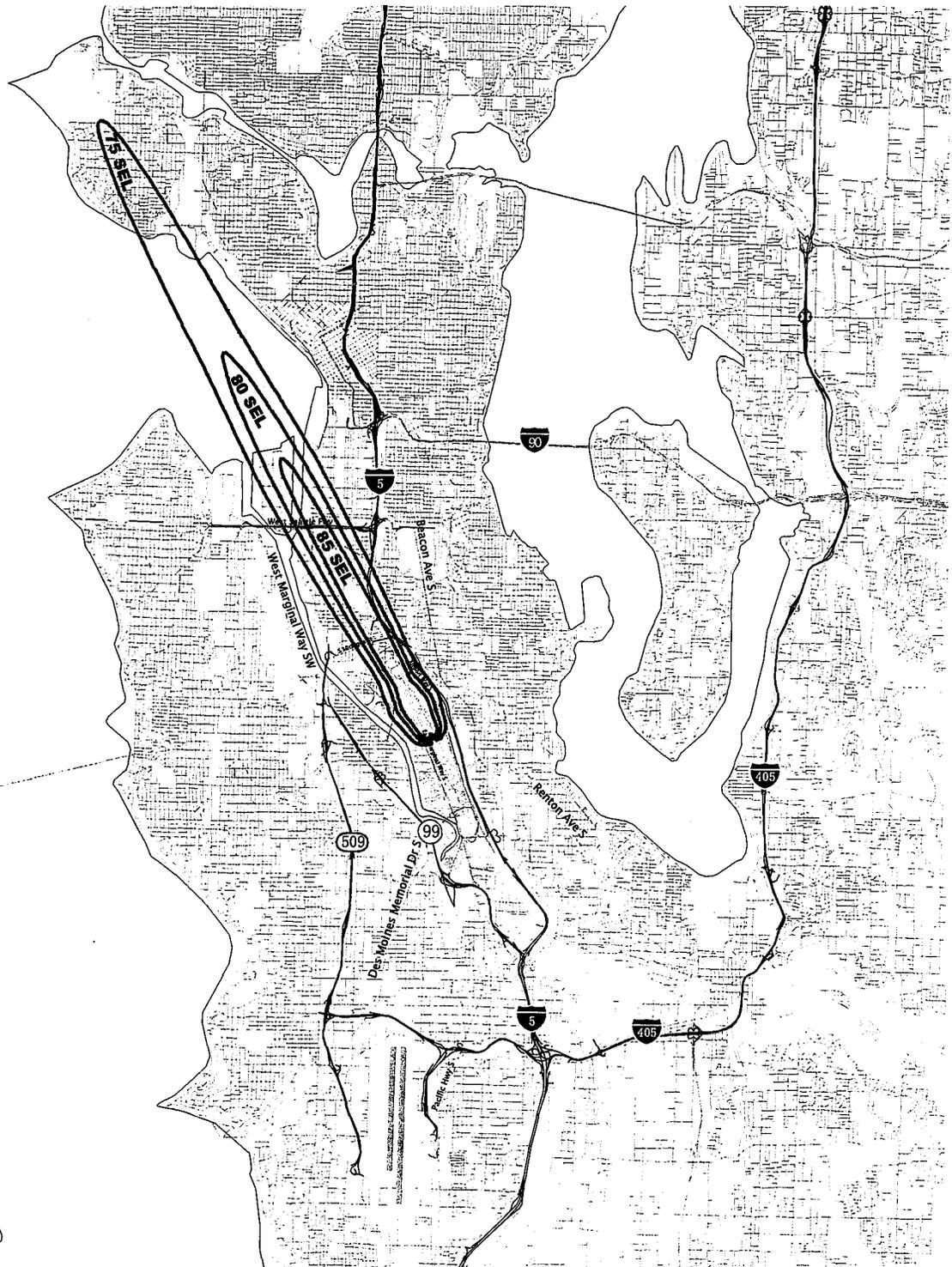


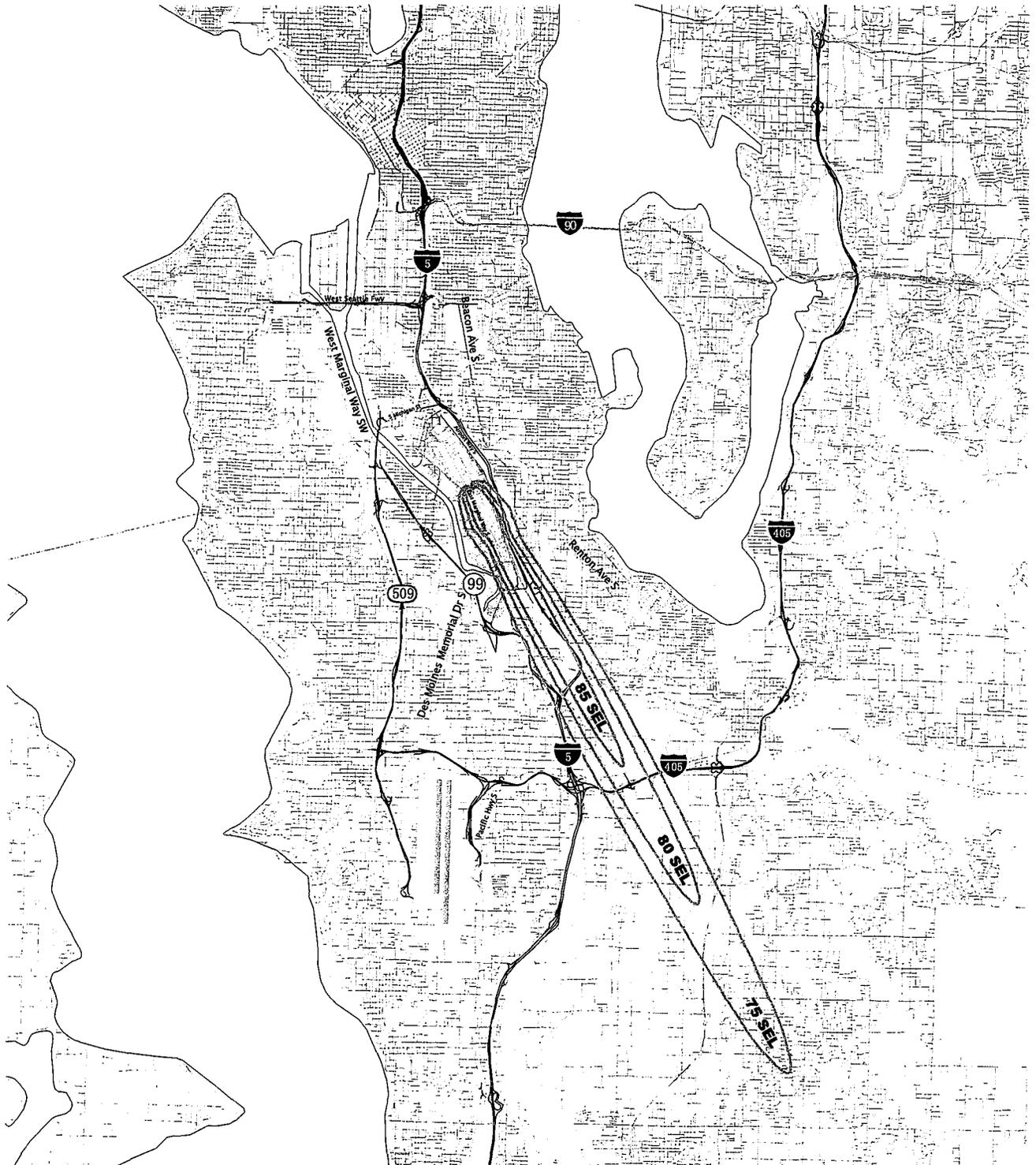
Scale 1"=2,000'

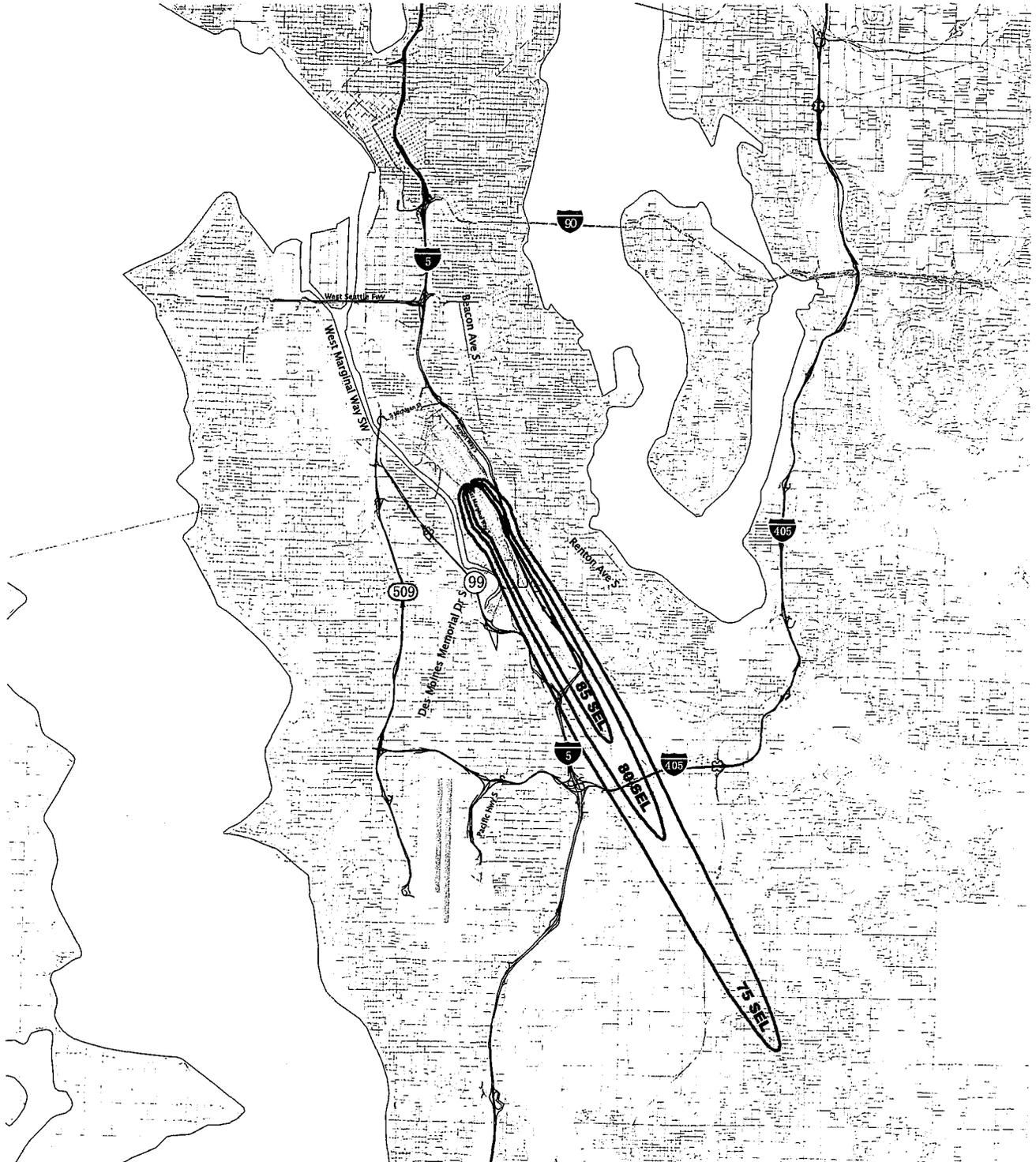
Figure G8h Alternative 8a, Close In and Normal Departure (South) SEL Contours - Detail View

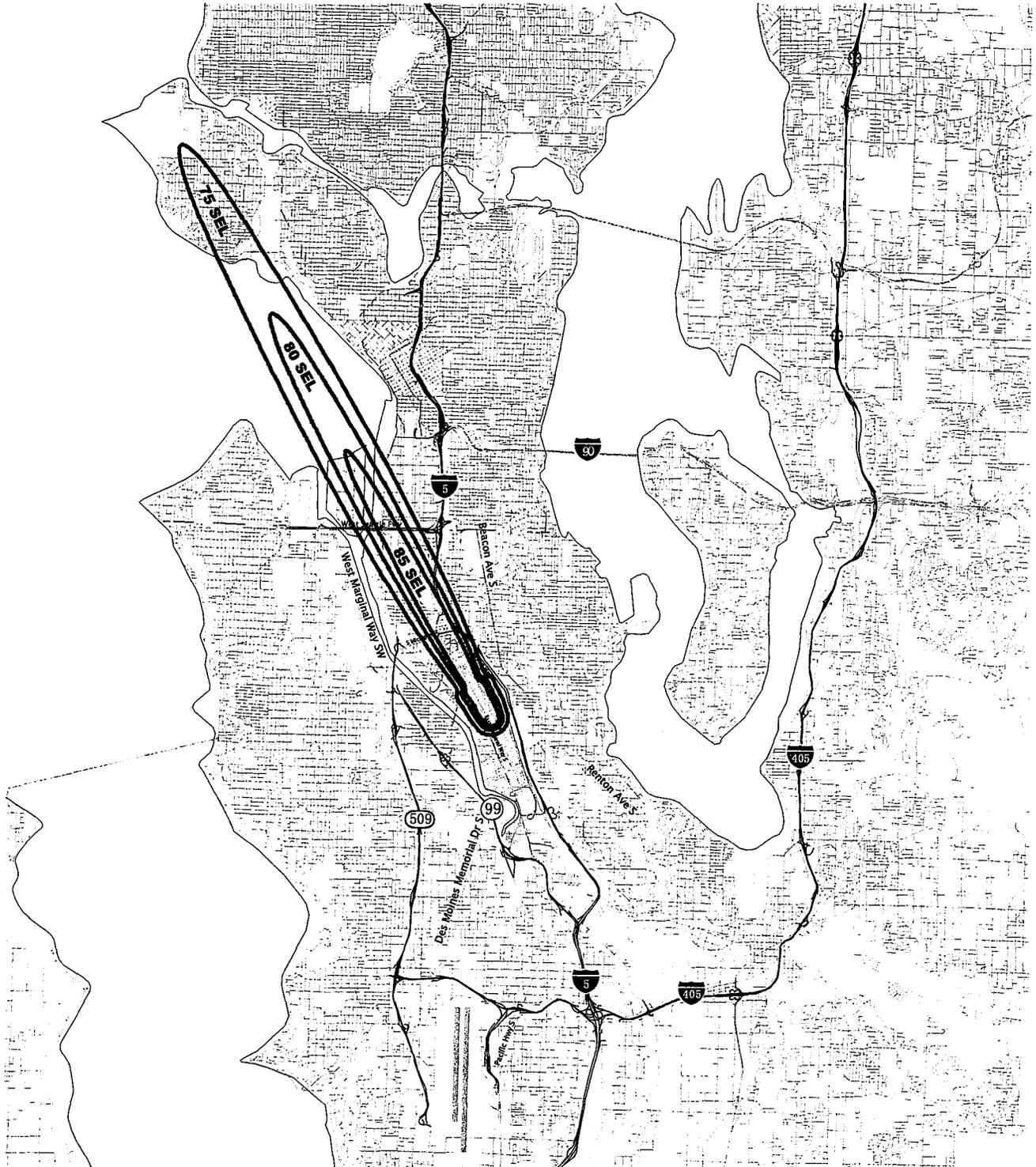
- Close In SEL Noise Contour
- Normal SEL Noise Contour

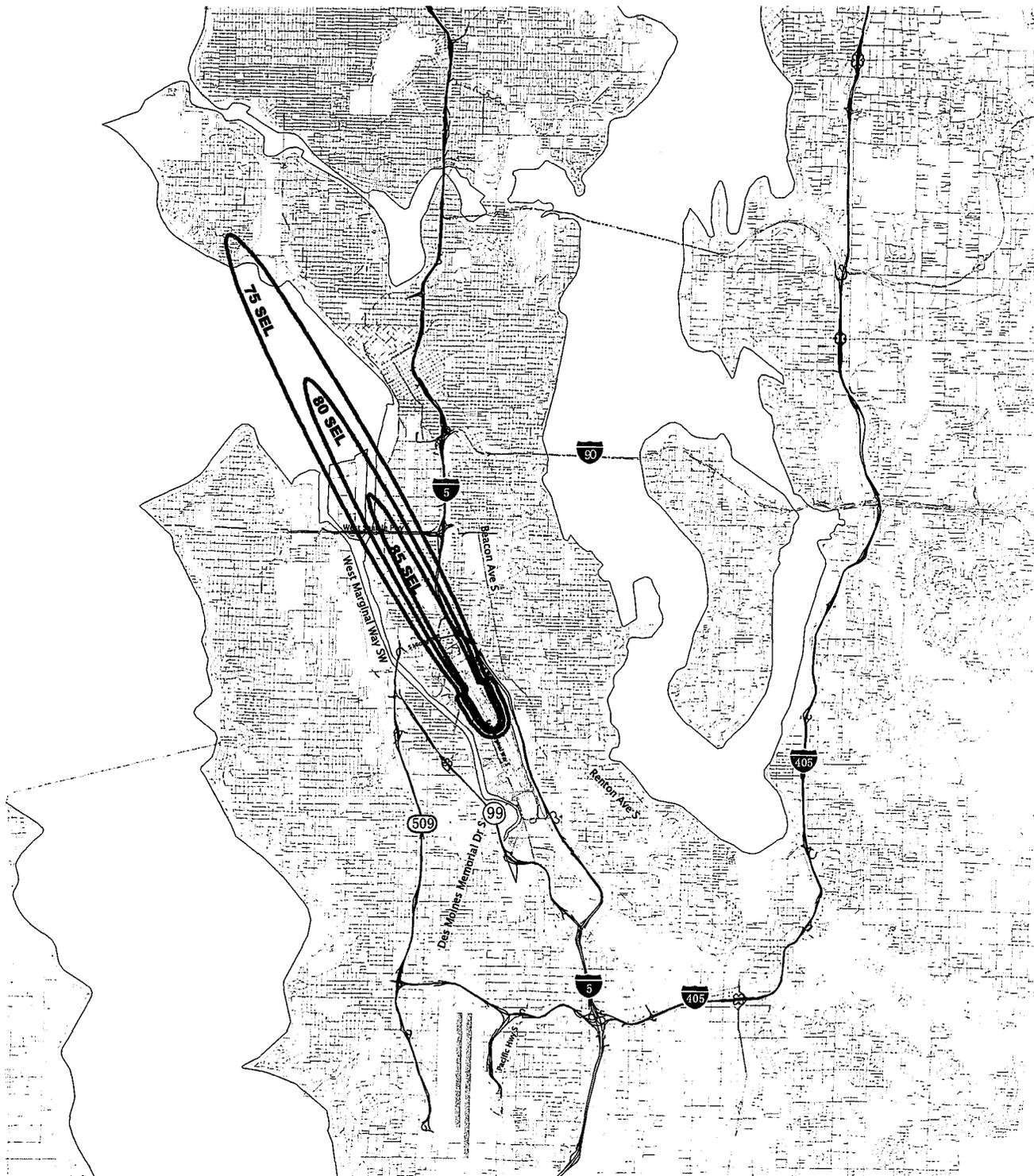






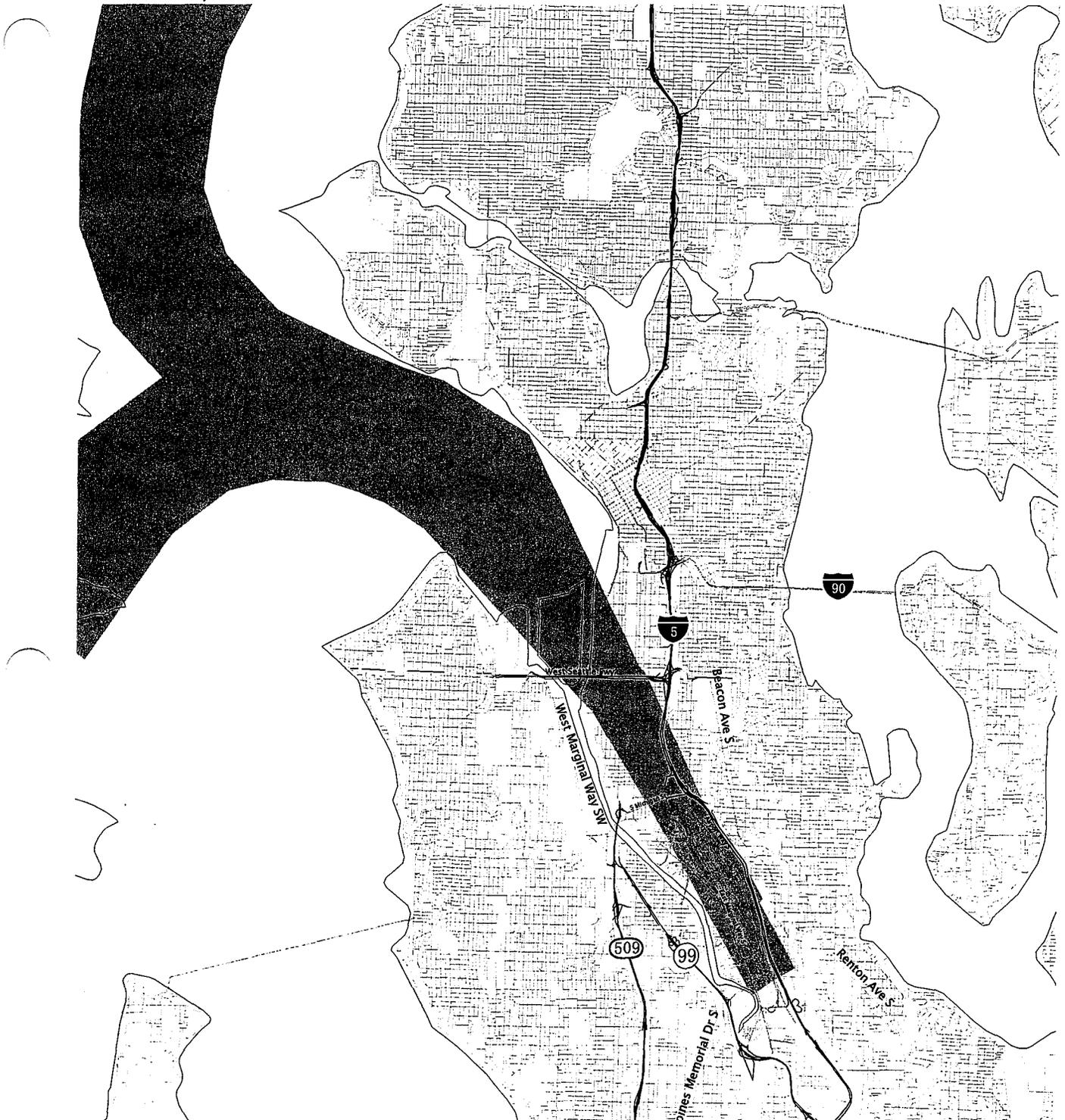


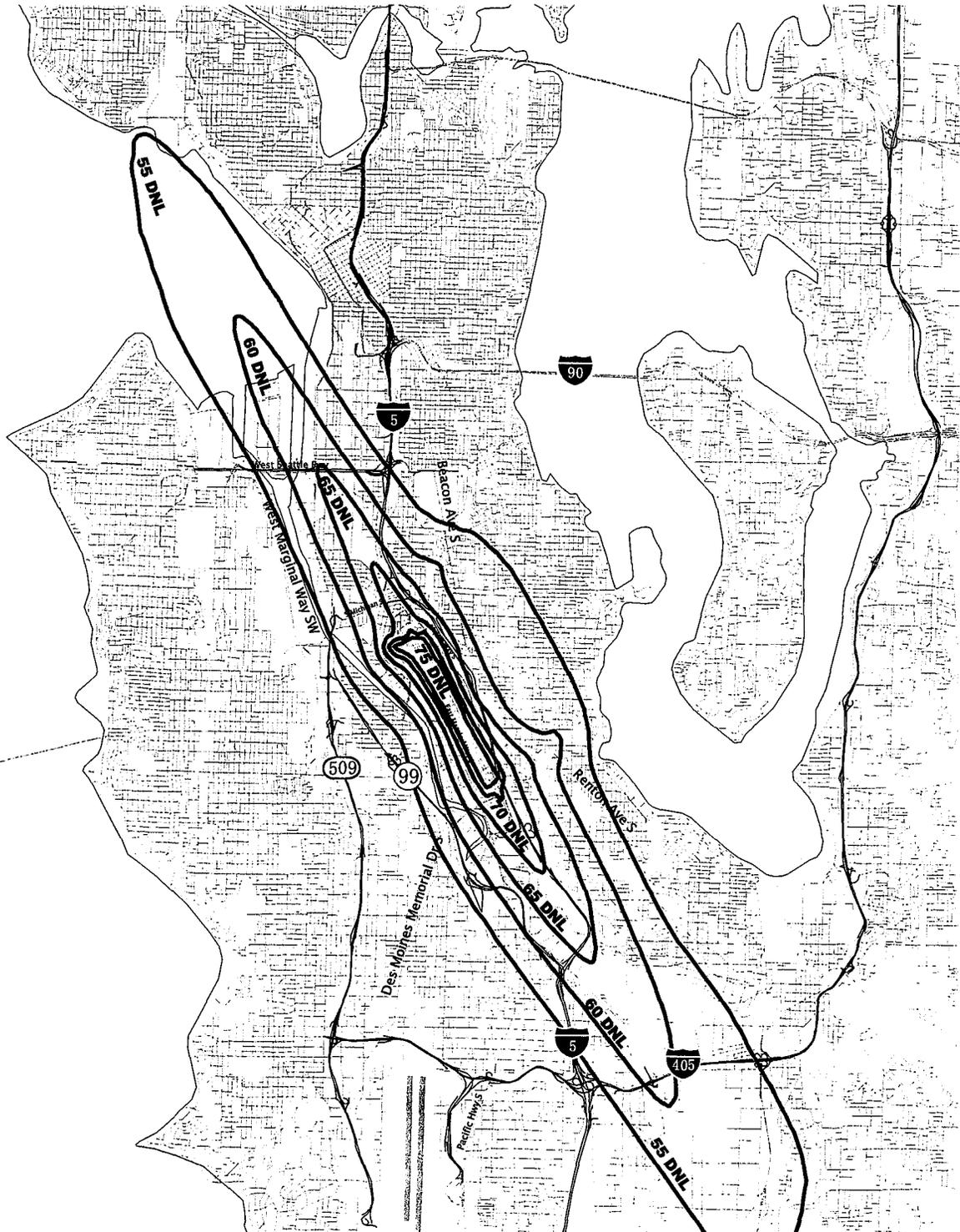


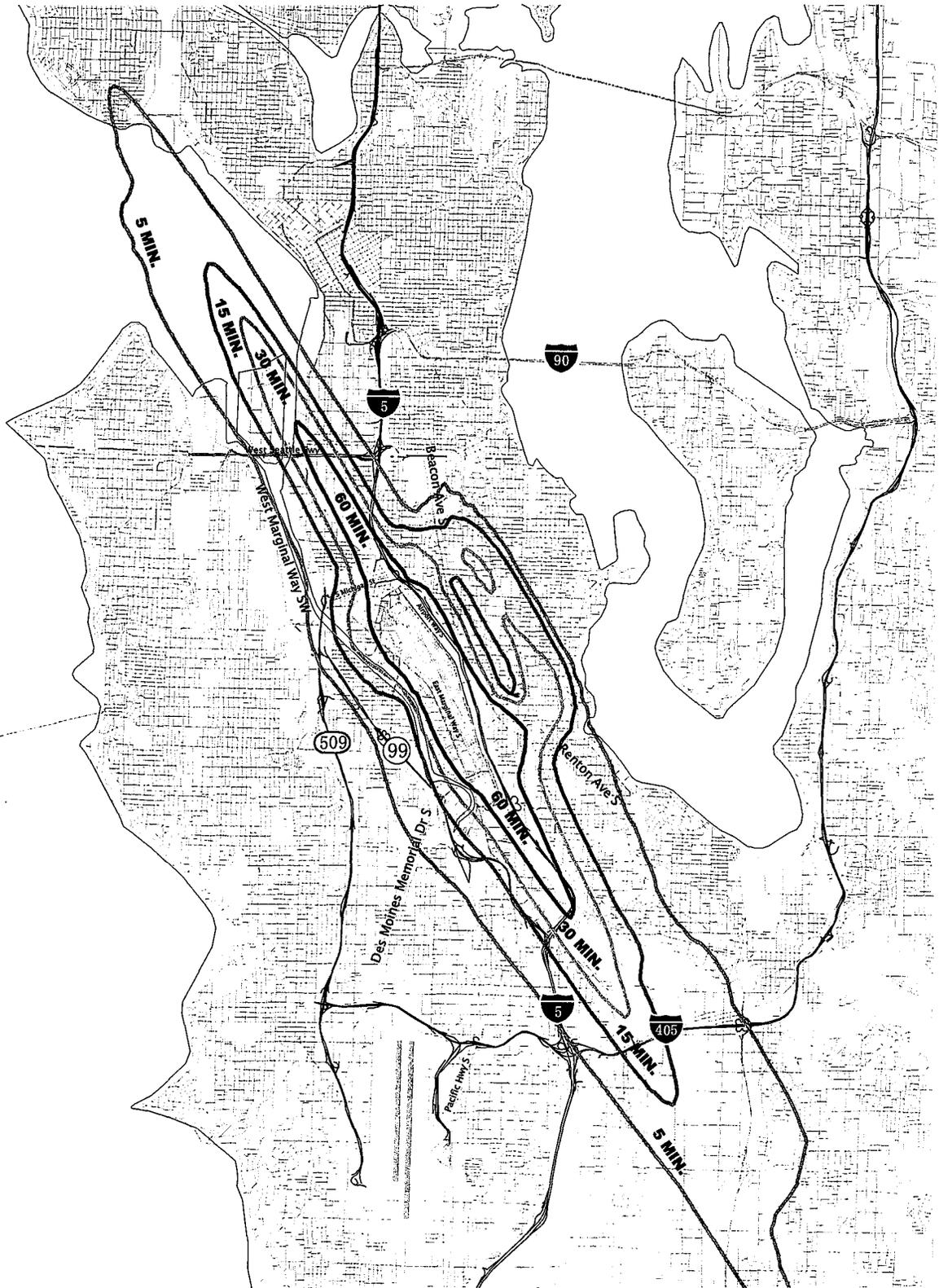


Alternative 9-Noise Abatement Procedure (Flight Track Changes). The Federal Aviation Administration has direct control over each aircraft as it leaves the ground and proceeds to its destination. The direction and orientation that an aircraft takes as it departs or arrives at an airport, as projected on the ground, is referred to as the aircraft flight track. This Alternative intends to evaluate the implementation of several new flight tracks for the Airport. These will include the Bay Visual Approach, use of Flight Management Systems (FMS) for departure, West Seattle flight tracks for small planes, southern departure variations, minimal population tracks, transponder landing system and possible altitude evaluation. Any such flight track change will require the preparation of environmental documentation and evaluation prior to implementation. This process can normally take several years. These Alternatives would be modeled in various forms.

Alternative 9a. The first Alternative in this series involves the use of the Charted Visual approach for operations to Runway 13R for all hours during both the day and night. This alternative affectively shifts the flight path from a long straight-in approach to arriving through Elliot Bay. This is labeled as Alternative 9a and a description of this procedure is shown in Figure G9a. Because of weather, this procedure cannot be utilized all the time. There may also be times when, due to capacity constraints, this procedure may be difficult to implement. The analysis assumes that this procedure could be used about 50% of the time. Thus, 50% of the operations on the straight-in approach are shifted to this procedure. The Alternative 9a DNL contours are illustrated in Figure G9b, entitled *ALTERNATIVE 9A, CHARTED VISUAL ALL HOURS, DNL CONTOURS*, and the Alternative 9a Time Above contours are illustrated in Figure G9c, entitled *ALTERNATIVE 9A, CHARTED VISUAL ALL HOURS, TA CONTOURS*. The results show some reduction in noise in the Magnolia and Queen Anne area.







Scale 1"=10,000'

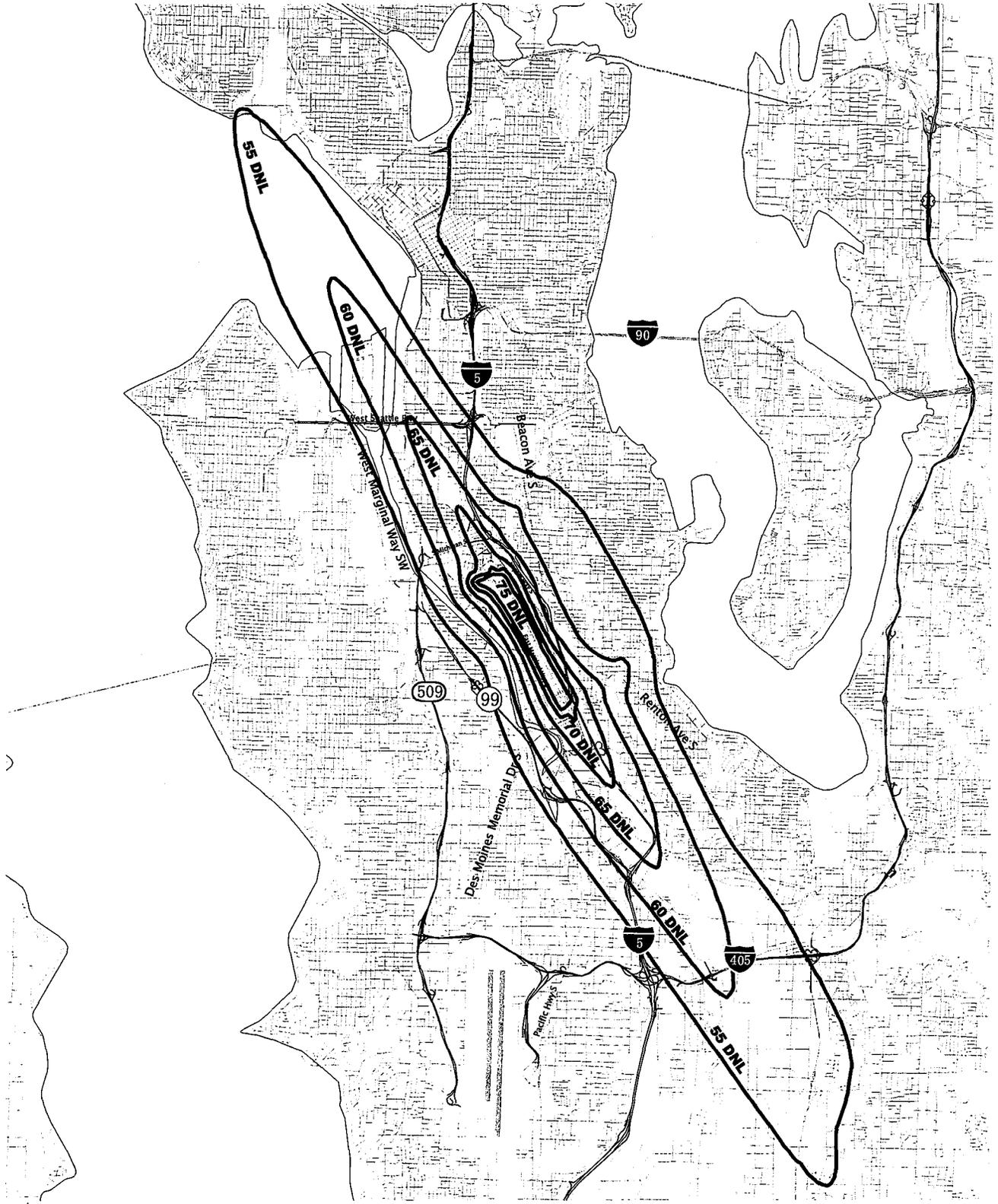
Figure G9c Alternative 9a, Chartered Visual Approach, All Hours TA Contours

- 60 minutes
- 30 minutes
- 15 minutes
- 5 minutes

Alternative 9b. The second Alternative in this series involves the use of the Charted Visual approach for operations to Runway 13R during the nighttime hours only. This is the same as Alternative 9a, except that it is used only during the nighttime hours when airport operations are lower. This Alternative affectively shifts the flight path from a long straight-in approach to arriving through Elliott Bay. Because of weather, it is assumed that only 50% of the operations are shifted from the straight-in procedure to this procedure. The Alternative 9b DNL contours are shown in Figure G9d, entitled *ALTERNATIVE 9B, CHARTED VISUAL NIGHTTIME ONLY, DNL CONTOURS*, and the Alternative 9b Time Above contours are shown in Figure G9e, entitled *ALTERNATIVE 9B, CHARTED VISUAL NIGHTTIME ONLY, TA CONTOURS*. The represented receptor analysis is presented in Tables G2 through G6 and show some reductions in noise in the Magnolia and Queen Anne area, although it is less than Alternative 9a.

Alternative 9c. The third Alternative in this series involves directing north flow departures through Elliott Bay for all hours of the day and night. Currently many aircraft already utilize this procedure and turn through Elliott Bay. This alternative would more formally establish a procedure to better define that path and direct the aircraft toward the center of the Bay. It would also be designed to monitor and maintain the traffic so that it does not shift too far south over West Seattle. This Alternative is called Alternative 9c, and a description of this procedure is shown in Figure G9f. This figure shows the relative location of the Elliott Bay departure path. The Alternative 9c DNL contours are shown on Figure G9g, entitled *ALTERNATIVE 9C NORTH FLOW ELLIOTT BAY DEPARTURES, ALL HOURS, DNL CONTOURS*, and the Alternative 9c Time Above contours are shown on Figure G9h, entitled *ALTERNATIVE 9C NORTH FLOW ELLIOTT BAY DEPARTURES, ALL HOURS, TA CONTOURS*. The represented receptor analysis is presented in Tables G2 through G6. The results show some reduction in noise in the Magnolia and Queen Anne area.

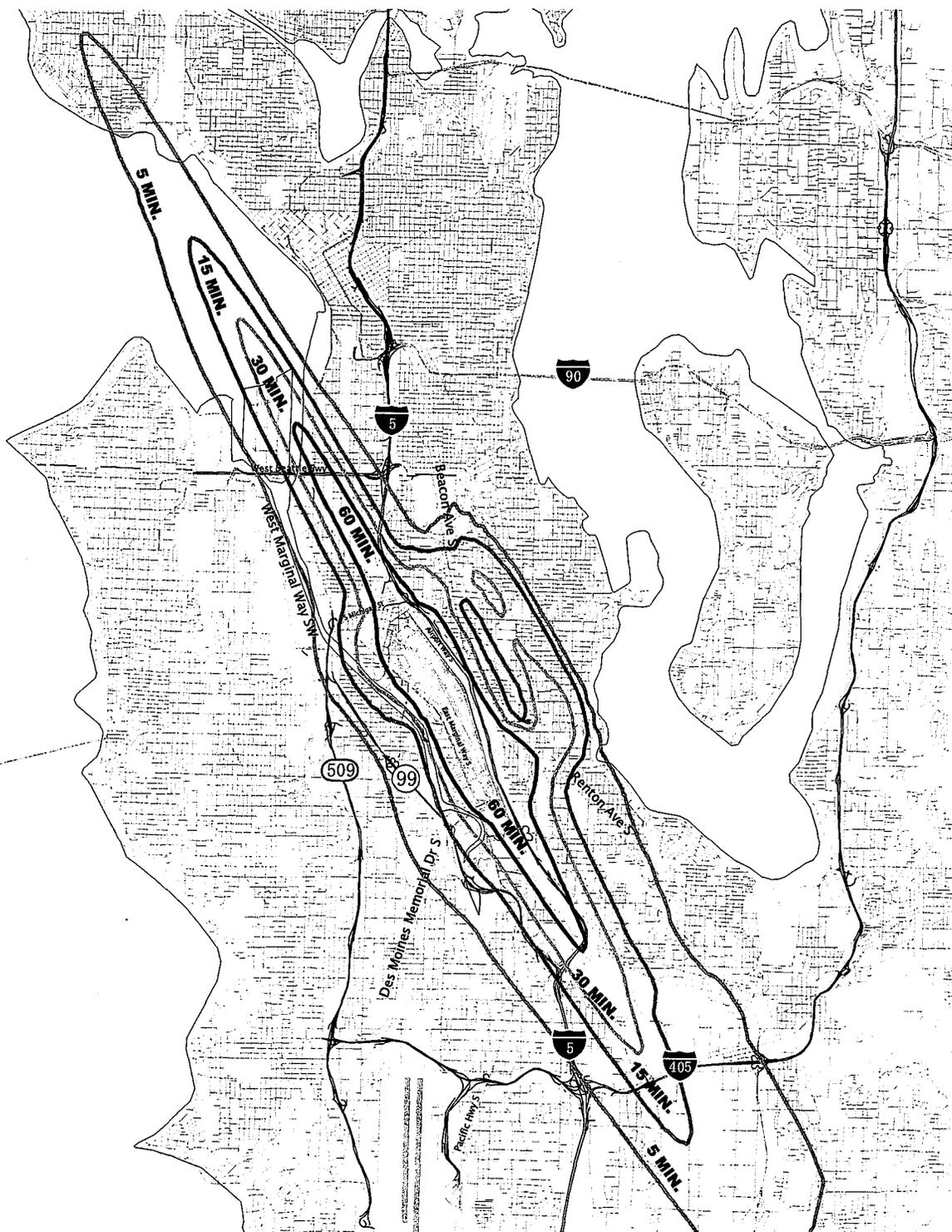
Alternative 9d. The fourth Alternative in this series involves directing north flow departures through Elliott Bay during the nighttime hours only. Currently many aircraft do turn toward Elliott Bay. This alternative would more formally establish a procedure to better define that path and direct the aircraft toward the center of the Bay. It would also be designed to monitor and maintain the traffic so that it does not shift too far south over West Seattle. This is essentially the same as Alternative 9c, except that it would occur only during the nighttime hours when activity is less. The Alternative 9d DNL contours are shown on Figure G9i, entitled *ALTERNATIVE 9D NORTH FLOW ELLIOTT BAY DEPARTURES, NIGHT ONLY, DNL CONTOURS*, and the Alternative 9d Time Above contours are shown on Figure G9j, entitled *ALTERNATIVE 9D NORTH FLOW ELLIOTT BAY DEPARTURES, NIGHT ONLY, TA CONTOURS*. The represented receptor analysis is presented in Table G2 through G6 and the results show some reduction in noise to the Magnolia and Queen Anne area.

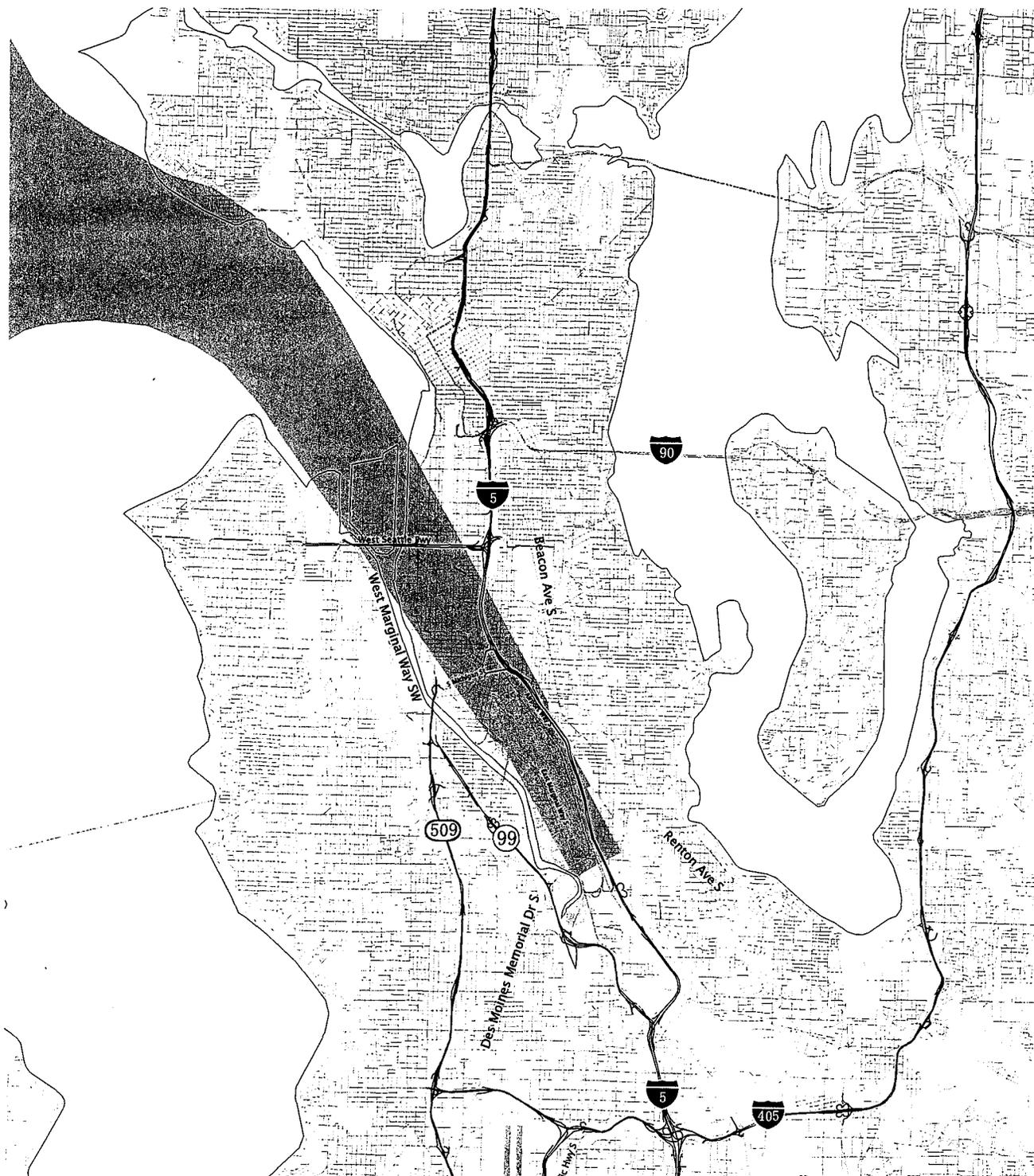


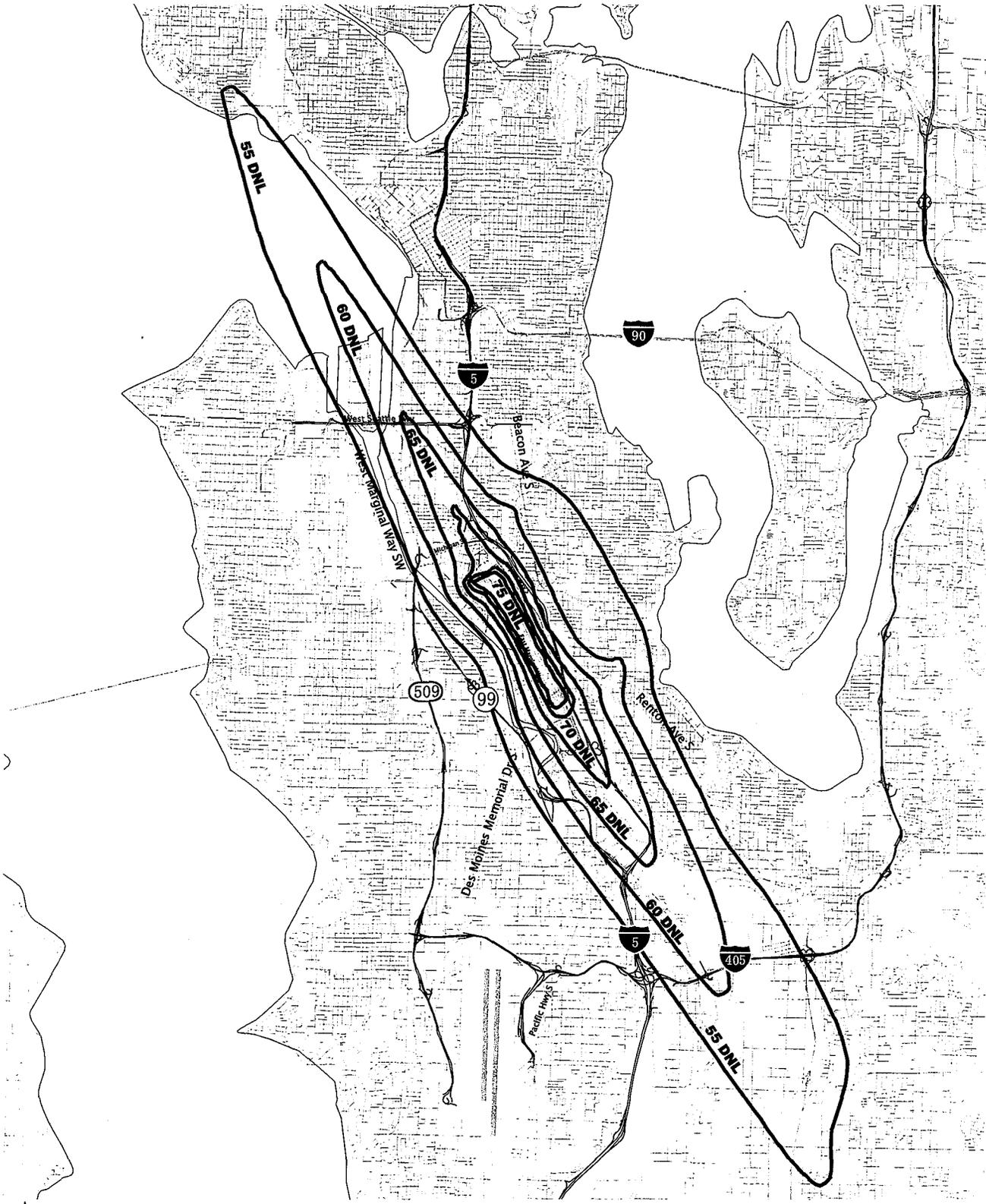
Scale 1"=10,000'

Figure G9d Alternative 9b, Chartered Visual Approach, Nighttime only DNL Contours

∩ Noise Contour

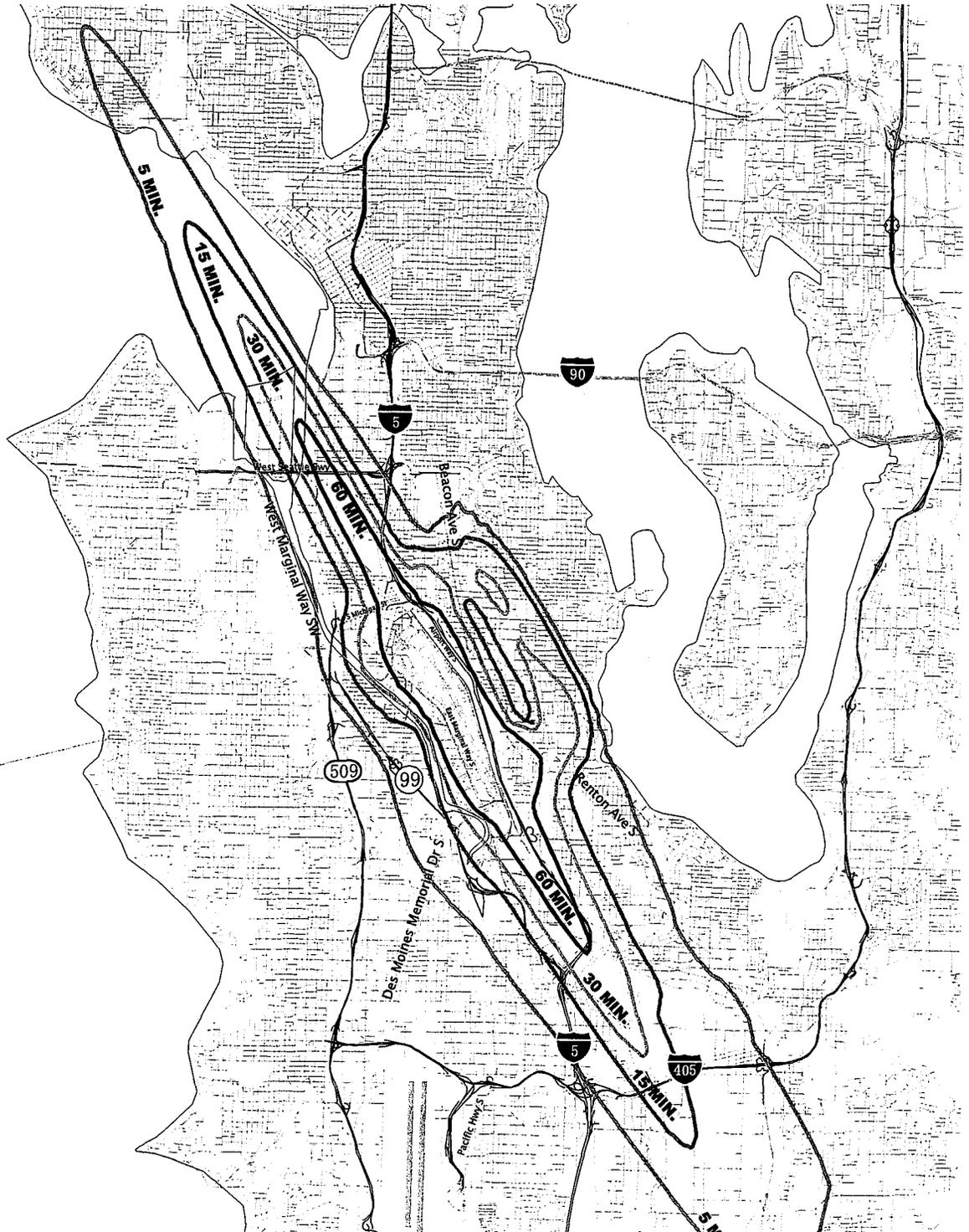


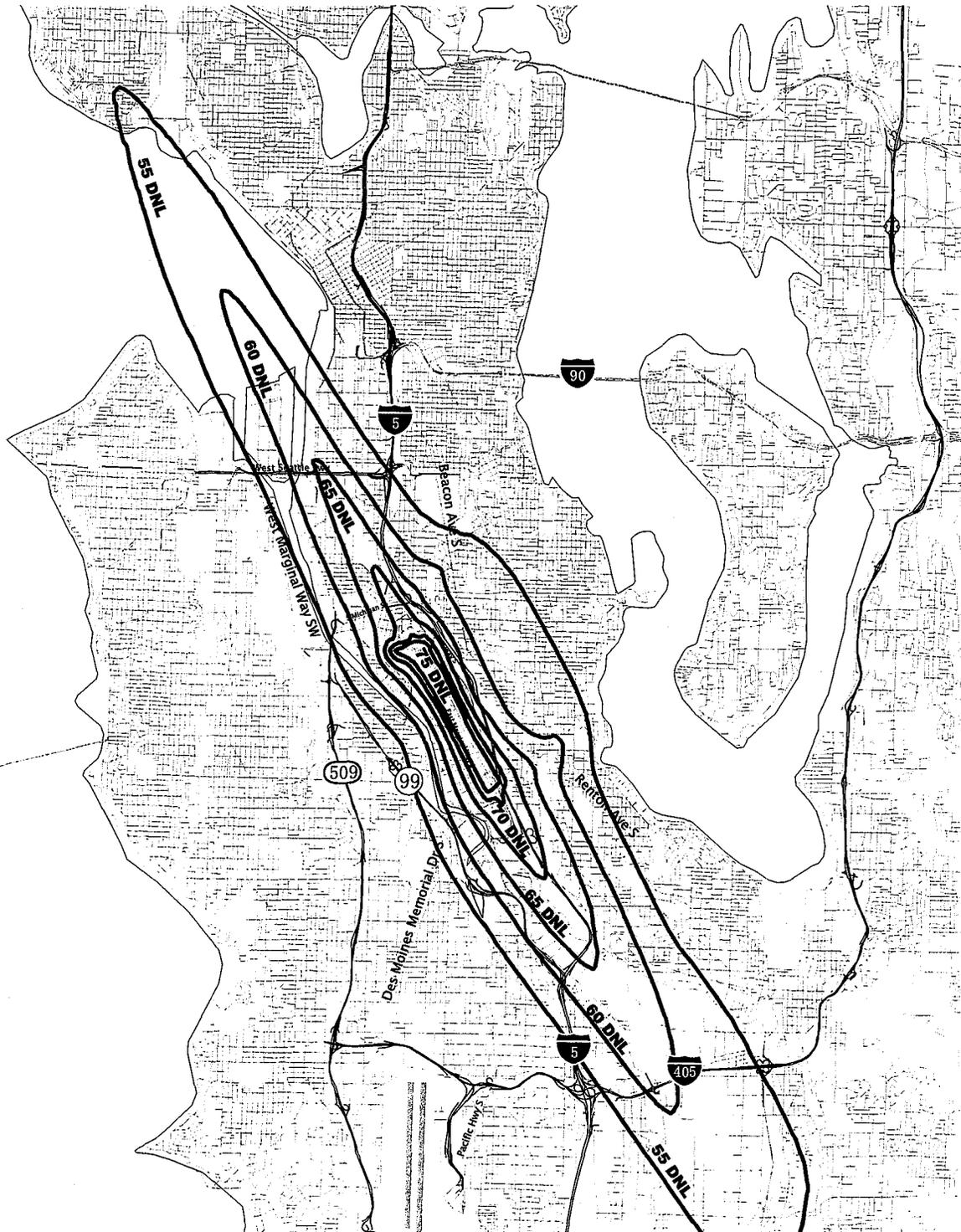


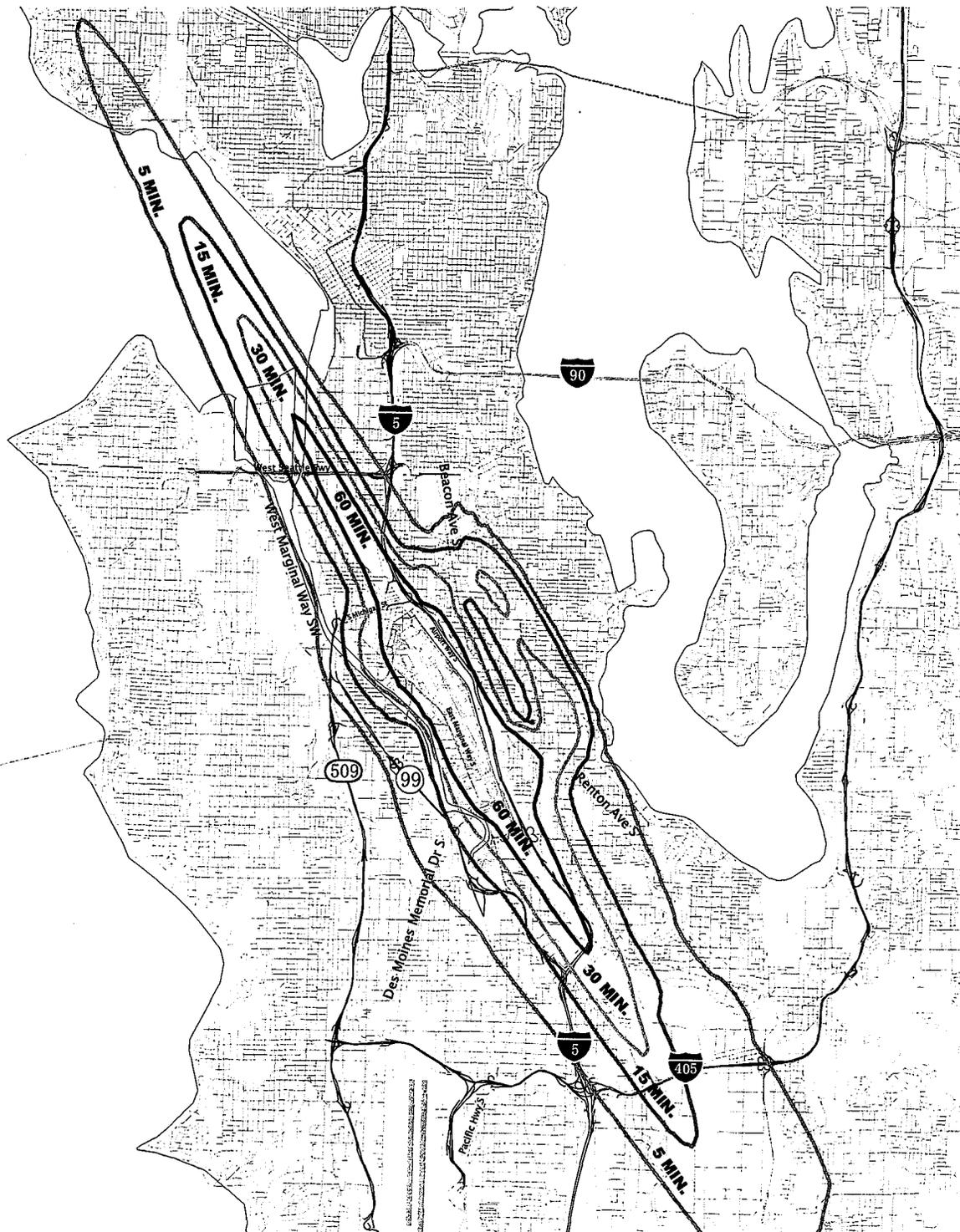


Scale 1" = 2,800'

**Figure G9g Alternative 9c, North Flow Elliot Bay Departure, All Hours
DNL Contours**
Noise Contour

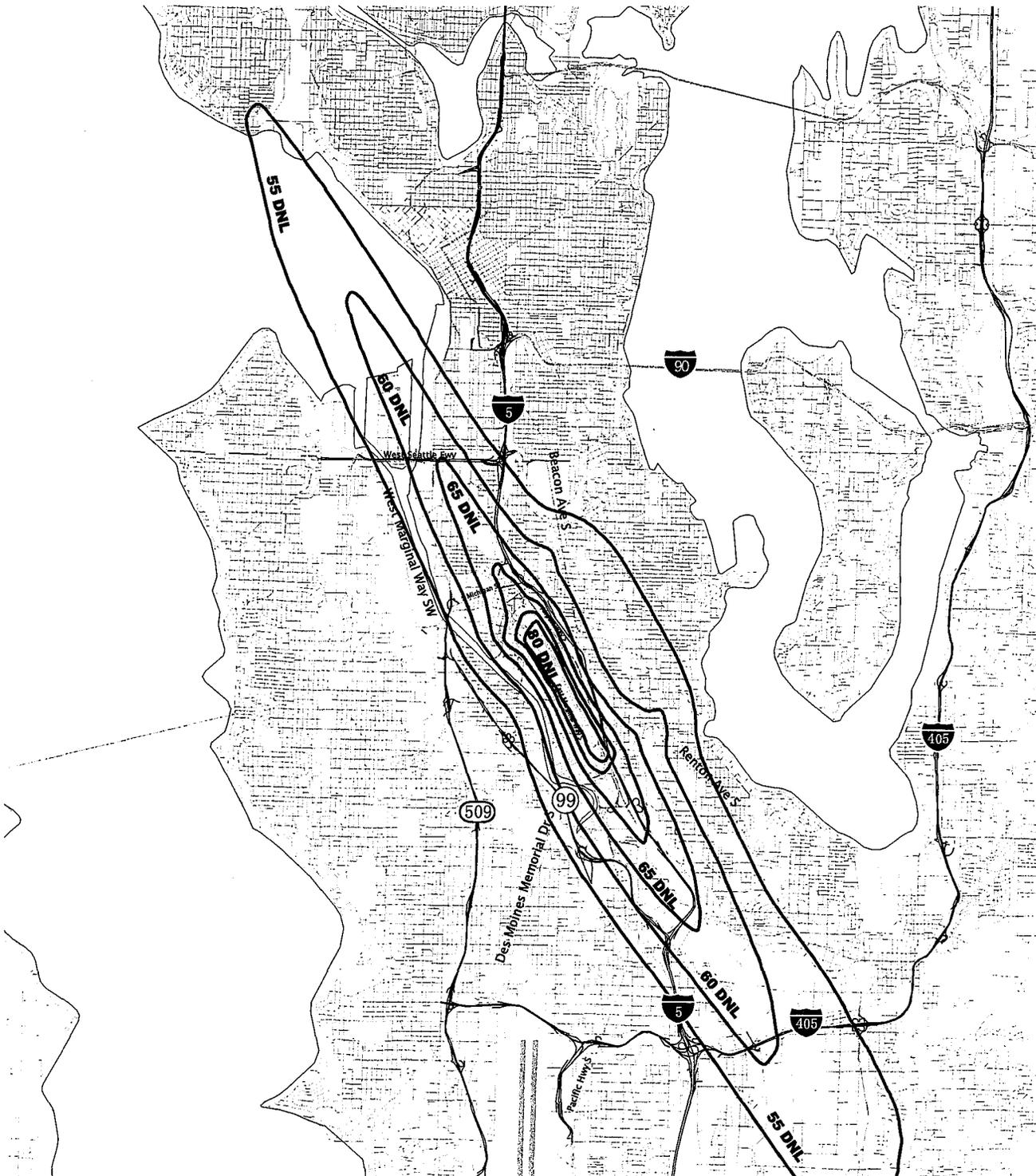


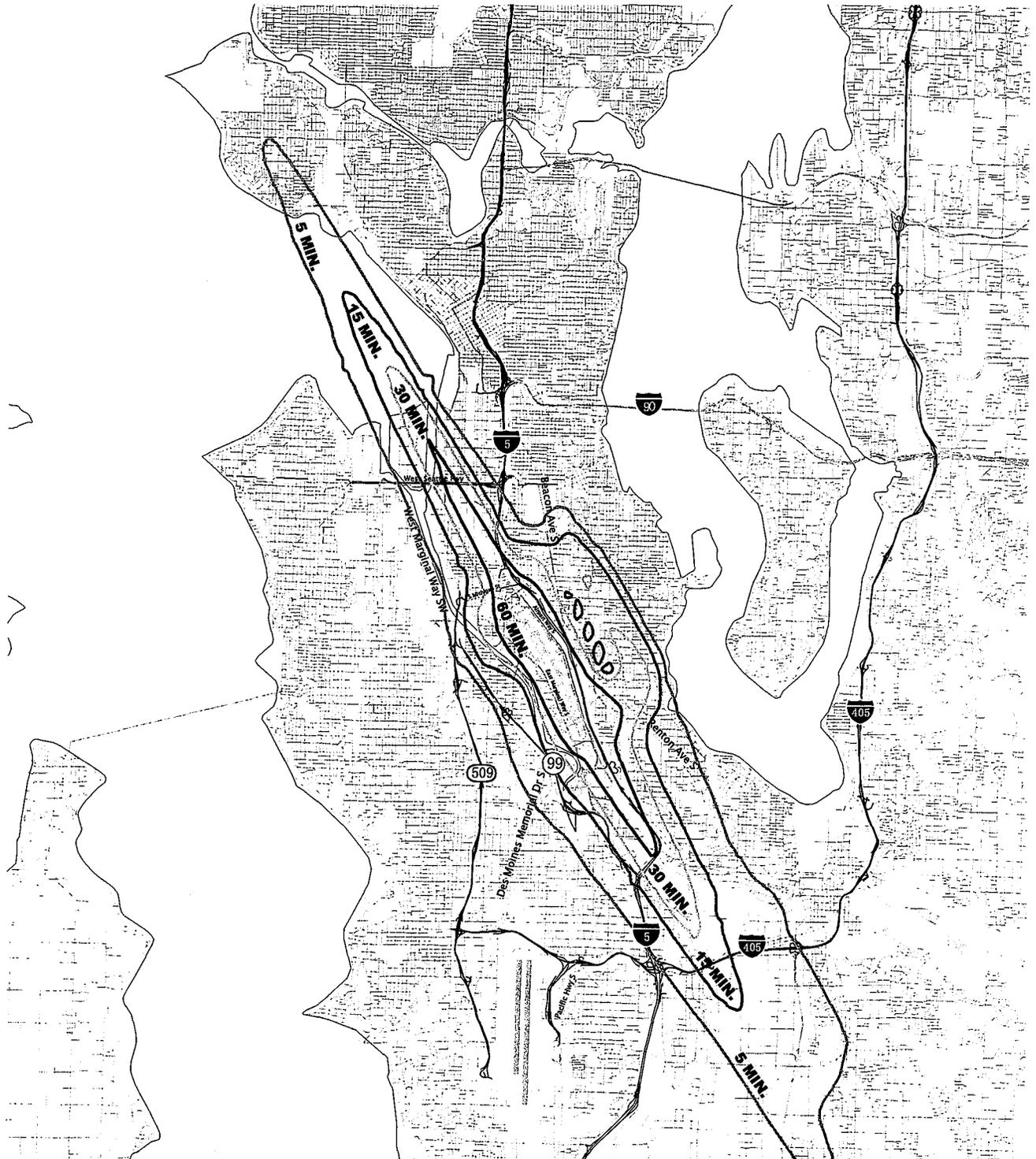




Alternative 9e. The fifth Alternative in this series involves establishing a Global Positioning Satellite (GPS)/Flight Management System (FMS) departure procedure for north flow operations. These procedures would be established to direct the departure operations through the center of Elliott Bay. The Alternative assumes that approximately ninety percent of the departures could comply with this procedure and ten percent would continue with a straight-out departure. As with all departure procedures, this would require close coordination by FAA with the Sea-Tac departures. The Alternative 9e DNL contours are shown on Figure G9k, entitled *ALTERNATIVE 9E NORTH FLOW ELLIOTT BAY GPS/FMS DEPARTURES, DNL CONTOURS*, and the Alternative 9e Time Above contours are shown of Figure G9l, entitled *ALTERNATIVE 9E NORTH FLOW ELLIOTT BAY GPS/FMS DEPARTURES, TA CONTOURS*. The represented receptor analysis is presented in Table G2 through G6.

Alternative 9f. This Alternative is to implement a Transponder Landing System (TPS) at the airport. This is intended to operate in a south flow condition, at least in the initial stages, for approaches from the north. The TLS is a new type of instrument landing system that could allow aircraft to utilize a non-linear approach to the airport in all weather conditions. The system is brand new and no operating procedures have been approved by the FAA yet. The system utilizes the transponder in the aircraft and equipment on the ground to provide vertical and horizontal guidance. Each aircraft using the system would be given a specific transponder code. This requires an attended to provide such a code to approaching aircraft and requires airport personnel as the operator of the TLS. This and other details are still being developed for implementation. However, when it is finally operational, it is reasonable to assume that the noise contours associated with aircraft using the system would be very similar to those associated with an ILS, at least until a curved approach could be implemented. Since this system is not yet operational, no specific contours have been generated.





Alternative 10-Administrative Actions. This Alternative includes several Administrative actions other than those described above. These could include a Fly Quiet Program, use of ground leases to encourage use of quiet aircraft, as well as other educational efforts and the continuation of the Advisory Committee. The Fly Quiet Program has several components, with the aim being to encourage operators to use quiet aircraft, fly in a responsible manner, recognize operators who operate consistently in a responsible manner and monitor compliance with both voluntary and regulatory noise abatement procedures. Various pilot and operational educational programs, through the FBO's, pilots groups, and national organizations can be used to inform pilots of noise sensitive uses, preferred operating procedures and the Fly Quiet Program. This can be accomplished through various means including noise abatement brochures, Jeppesen Manual chart inserts, publication in national manuals, video programs and corporate discussions.

Use of Leases or Other Fees. Using leases or airport fees to positively affect noise levels around airports is an idea that has been much discussed, but rarely implemented in the U.S. In theory, fees could be used as an incentive to change behavior from undesirable to desirable in such areas as night flights and/or aircraft types. The basic principle in variable fees would be to charge less for a quieter operation and more for a noisier one. Clearly for this approach to have any measurable impact on operations, the variation in fees charged would need to be sufficient to motivate an operator to make a change. Depending on the relative operating costs of each aircraft type, the amount of additional "noise fee" would need to be substantial (probably in the thousands of dollars for a jet aircraft) if it is to successfully influence fleet assignment or schedule decisions. This paper will discuss how such an approach might conceivably apply at KCIA.

Relevant Factors

Before considering any specific ideas, the question of variable fees, as any other noise abatement alternative, needs to be put into a legal and procedural context. According to DOT and FAA regulations, fee schedules need to be consistent, non-discriminatory, based on a defensible economic and acoustic framework (meaning that they are not arbitrary and are tailored towards solving a specific noise problem), and consistent with applicable laws, policies and grant assurances. In addition, military flights, which are among the noisiest operations at KCIA, are exempt from any airport noise regulations, and jets (including corporate aircraft) weighing less than 75,000 pounds are exempt from federal regulations phasing out older and noisier aircraft types. Another important factor for an airport such as KCIA is the fact that most operations are unscheduled, and, therefore, both unpredictable and difficult to regulate. Finally, a change in fee structure for environmental purposes would almost certainly require a Part 161 study. The extent of that study would

depend on the specific nature and application of the fee proposed – specifically whether it only applied to Stage 2 aircraft or to Stage 3 aircraft also.

Possible Fee Areas

At KCIA, there are two areas where variable fees might apply: leases and landing fees.

Leases At KCIA all tenants have leases of some kind, which vary considerably in nature and duration. Many leases are for non-aeronautical uses and would not logically be included in any noise abatement program. Two categories of lease holders might be responsive to noise abatement fees: airlines/cargo carriers and fixed base operators (FBOs), who handle the unscheduled corporate and itinerant aircraft. FBOs are companies servicing all types of aircraft for general aviation, corporate, charter and other operators without permanent facilities at KCIA. FBOs provide parking, fuel, maintenance, and other services for hire.

For airlines/cargo carriers, lease rates could theoretically be an incentive for quieter operations; however, for FBO tenants this concept is more difficult. By definition FBOs service all kinds of aircraft and do not have the ability to influence their customers' decisions on aircraft type or time of operation. Changing either the rates per square foot, or any other provision in the overall lease, is unlikely to affect the behavior of the FBO's customer base and is probably too blunt an instrument to create the changes desired by local area residents.

Airlines operating at KCIA range from cargo operators in large aircraft to small commuter and helicopter operators. Their varying operating characteristics, noise levels and financial strength would seem to make any consistent price incentive per square foot in ground rents both difficult to calculate and highly unlikely to affect aircraft operations. The relative scale of the cost structures of these airline tenants is simply too wide to achieve a consistent approach to lease rates that would achieve any environmental benefit.

In addition, from a practical standpoint, leases at KCIA run for different terms. Although a few are up for re-negotiation within the period considered during this Part 150 Study, most run for long periods of time – in some cases decades beyond this Study's completion. For these reasons, variable rental rates in leases are not likely to be fruitful as a topic for additional analysis or consideration in the area of noise mitigation. It is also explicit in the regulation that noise provisions in leases are subject to FAR Part 161.

Landing and Similar User Fees. At KCIA landing fees are charged to all commercial operators; that is all flights that carry passengers and/or cargo for a fee. As at all U.S. airports, landing fees are charged at a fixed price per 1,000 pounds of landed aircraft weight. Aircraft are not literally weighed on arrival; rather weights are taken from standard aircraft operating documents, and the appropriate fee is then applied.

Again, although there has been occasional discussion in the U.S. about varying landing fees according to the noise characteristics of aircraft, little has actually been implemented. The few examples that do exist have been at air carrier airports, where operations are scheduled and therefore more easily tracked. Even these examples have largely become moot as of January 1, 2000 when the entire U.S. fleet became all Stage 3. However, they may be useful to review as historical precedents and possible partial models for KCIA.

Palm Beach International Airport (PBI)

Perhaps the most innovative and extensive variable fee program was instituted at PBI more than a decade ago. This date is important, because the regulation was implemented before the Aviation Noise and Capacity Act (ANCA) legislation was enacted making it “grandfathered” for Part 161 purposes meaning that the airport did not need to complete a Part 161 Study in order to implement the regulation. The premise of the PBI fee structure was to radically increase landing fees both for less desirable (Stage 2) aircraft and for nighttime operations and to simultaneously reduce or credit landing fees for carriers operating the quietest aircraft types.

The fee structure at PBI is set out in the following matrix.

Aircraft Part 36 Stage	Time of Day Operation Type	Multiplier	Fee Amount
2	Night Landing	13	\$260.00
2	Night Departure	130	\$2600.00
2	Day	1.3	\$26.00
3	Night	1.0	\$20.00
3	Day	NA	Credit based on % Stage 3 operations

During the last decade this fee structure combined with publicity about the Stage 3 percentage each carrier maintained at Palm Beach caused the airport to hasten the transition towards a totally Stage 3 fleet. Now that all air carrier aircraft greater than 75,000 pounds are Stage 3, the only flights paying the multiplier costs at night are general aviation flights. These fees are collected through the FBOs, which has caused some logistical issues including tracking non-scheduled flights and collecting the fees. These logistics are important to consider for application at KCIA as well.

Minneapolis/St. Paul International Airport

In 1990, MSP instituted an environmental fee or surcharge on the regular landing fee as part of their general terminal lease to help fund an extensive noise abatement program. This lease provision was superceded at the end of 1999 when the U.S. fleet became 100% Stage 3. The fee was calculated by determining the cost of the airport's noise abatement programs and then charging each airline a percentage in proportion to their scheduled Stage 2 operations. Stage 3 operations were charged a lower rate. This program has been replaced by a straight assessment negotiated with the airlines for the noise abatement program.

Stapleton Airport – Old Denver

As part of a “noise budget” program established during the late 1980s, Stapleton allocated a fixed amount of noise to each carrier based on its projected schedule, aircraft and engine types and time of day. Every six months the airport calculated whether or not each airline had exceeded this allocation, and if they did, the excess would be converted to “equivalent aircraft flights”, which were then charged \$2,000.00 each. Of course, Stapleton airport was closed in 1995, when the new Denver International Airport was opened, so this rule ceased to exist.

Lessons From These Examples

In one sense this short list of variable fees for noise abatement is a microcosm of the situation which led Congress to adopt ANCA. Airlines complained heatedly that there were too many different and uncoordinated regulations being created at the local level. The airlines' position was (and is) that aviation is a national system requiring consistency, since aircraft must move about through many local jurisdictions. Responding to this argument, Congress agreed to the national phase out of Stage 2 aircraft to reduce noise nationally in a consistent fashion, and in exchange passed the Part 161 regulation making it very difficult (some would argue impossible) for local airport proprietors to write local noise regulations.

Possible Application at KCIA

The landing fee at KCIA has not been changed for some time, so there might be an argument that it needs updating with or without noise as a consideration. However, if a noise component were to be added to the landing fee, FAA would most likely require a Part 161 Study. The extent and stringency of the required cost benefit analysis would depend on whether the proposed noise fee applied to Stage 2 aircraft only or to all aircraft. Equally important is the clearly identified purpose for such a fee, and what goals it is intended to achieve.

Among possible goals for a variable fee program are:

- Reducing the number of operations at night
- Changing the type of aircraft operating at night
- Improving the noise characteristics of the fleet in general
- Raising revenue for noise abatement programs.

To assess the probably effectiveness of a variable fee or noise surcharge in achieving any of these goals, an economic analysis would need to consider a variety of factors:

- How does the proposed fee relate to the general operating costs of the aircraft in question?
- Would the amount of the proposed fee be sufficient to affect the desired change; for example, what kind of fee would be required to motivate a carrier to hush kit an aircraft or purchase a new, quiet aircraft?
- Is the desired change possible to achieve in any circumstances; for example, would any fee cause an airline to move a cargo flight out of the nighttime period?
- Would a fee of sufficient magnitude to affect the desired change be consistent with existing federal policies on airport rates and charges?
- Would the user costs of the program be in proportion to the environmental benefits achieved?

Hypothetical Example of Nighttime Fee for Stage 2 Operations at KCIA

For purposes of discussion, the following example demonstrates how a variable landing or similar fee might be applied at KCIA and how it would be evaluated for effectiveness. The goal of this theoretical example would be to reduce the number of Stage 2 operations at night by either moving these flights out of the nighttime period, or by causing an operator to replace a Stage 2 aircraft with a Stage 3 model. All Stage 2 aircraft in the U.S. are below 75,000 pounds, and at KCIA, these are either commuter flights or older, corporate jets. Projections for 2006 indicate about one nighttime flight per night in Stage 2 corporate jets.

The fee proposed in this discussion example is not a landing fee, but an operations fee, because as the name implies, landing fees are only charged on arrival. Night noise is, of course, as much a departure problem as an arrival one. Therefore, whatever the basis for the fee, to be successful in affecting nighttime noise, it would have to apply to both arrivals and departures. This would be considered an operations rather than a landing fee.

Again for purposes of discussion, let us assume that the nighttime operations fee would be a multiple of the daytime landing fee. If a regular landing fee was \$50.00, a nighttime fee might be a multiple of 10, or 20 (\$500 or \$1,000). For operators not subject to a daytime landing fee, specifically non-commercial flights, two options are theoretically possible: either institution of a 24 hour landing fee for non commercial flights subject to the same multiplier at night as would apply to commercial operators, or a specific fee that would only apply to flights during the nighttime period.

For purposes of analyzing the environmental benefit of such a fee, an economic analysis would consider several factors including: the hourly operating cost for each aircraft to see whether a nighttime operations fee would likely cause a flight to be re-scheduled. On average, it costs about \$3,000 an hour to operate a business jet of this size. A price elasticity analysis would help predict what the impact on actual flight times might be for a nighttime operations charge of \$500 or \$1,000.

Another variable to consider is the development of retrofit or hush kits for some of the Stage 2 business jets. Similar to the hush kits now installed on previously Stage 2 passenger and cargo aircraft (737s, DC9s and 727s in particular), these engine installations serve to lower noise levels sufficiently to allow an aircraft to be re-certified by FAA as meeting the Stage 3 noise standards. Although these kits are not yet available on the market, they are being developed and tested.

One possible outcome of a nighttime operations fee might be to encourage operators of Stage 2 business jets to purchase and install hush kits once they are certified. To evaluate the probability that a nighttime noise charge would motivate operators to install hush kits, one would need to know their initial cost (probably in the \$1 million range for a Gulfstream 2), as well as any other operational factors such as decreased gross takeoff weight and/or reduced power settings that might be involved in their operation. Then a calculation might be made as to how operators of Stage 2 business jets might respond to the question of whether to pay the additional nighttime fee, reschedule the flight, or install a hush kit. Purchase of a new Gulfstream model is in the range of \$20 million, so there is no conceivable noise fee which could affect a decision of that magnitude.

In considering an airport's desire to enact a nighttime operations fee, the FAA will require a clear identification of the noise problem to be solved and a thorough cost benefit analysis showing the relative scale of the economic impact compared to the environmental benefit. If the benefit to be achieved is merely the rescheduling of one flight per night, for example, there will need to be a compelling argument in favor of such a fee. That argument might turn around the concept of future protection; that is the introduction of an insurance policy, so to speak, during a period when the economic costs to operators are low, because there are few operations. The environmental benefit might be to protect the nighttime hours from future operations noisy aircraft. Whether this or any similar argument would prevail is, of course, unknown.

On-Going Committee. An additional administrative action is recommended for consideration. Some variation of the Study Advisory Committee should remain in place subsequent to the completion of this study and meet on a regular basis to discuss noise abatement issues at the airport. This is especially true concerning the community planning representatives and their role in keeping the airport, citizens, communities and others informed on land use issues that concern the airport environs as well as Air Traffic Control tower personnel in discussing aircraft procedures. It is recognized that the Roundtable is an on-going Committee, however, the expanded Roundtable that is serving as the Study Advisory Committee may be advantageous to continue. This on-going committee structure has been successful elsewhere in the form of a "Planners Forum" that involves both citizens and staff representatives. This is especially important due to the inter-jurisdictional issues involved. Considerable time and effort will be expended, by both the airport and the Committee, in the development of this Study, especially in the "learning curve" effort, that is too valuable a tool for communication to risk losing at the end of this process.

Closure of the Airport. Another administrative action requested by the Committee is the impact of closing the Airport. Closure of King County International Airport, if possible, would require King County to meet several terms related to its past acceptance of grants of funds administered by the Federal Aviation Administration. Over the years, King County has accepted funding for various projects from the Airport and Airway Improvement Trust Fund, which requires the County to meet several assurances (referred to as Grant Assurances). Upon acceptance of the grant funds, these assurances are incorporated into the contractual agreement between King County and the FAA.

The grant assurances are numerous and include:

"The terms, conditions and assurances of the grant agreement shall remain in full force and effect throughout the useful life of the facilities developed or equipment acquired for an airport development or noise compatibility program project, or throughout the useful life of the project items installed within a facility under a noise compatibility program project, but in any event not to exceed twenty (20) years from the date of acceptance of a grant offer of Federal funds for the project.

However, there shall be no limit on the duration of the assurances regarding Exclusive Rights and Airport Revenue so long as the airport is used as an airport. There shall be no limit on the duration of the terms, conditions and assurances with respect to real property acquired with Federal funds....” (B.1.)

“It will make the airport available as an airport for public use on reasonable terms and without unjust discrimination to all types, kinds and classes of aeronautical activities, including commercial aeronautical activities offering services to the public at the airport.” (C.22.a)

“In any agreement, contract, lease or other arrangement under which a right or privilege at the airport is granted ... to conduct or to engage in any aeronautical activity for furnishing services to the public at the airport, the sponsor will insert and enforce provisions requiring the contractor to (1) furnish said services on a reasonable and not unjustly discriminatory, basis to all users thereof, and (2) charge reasonable, and not unjustly discriminatory, prices”(C.22b.)

As a result, the closure of KCIA as a public use airport would find King County in default of its grant assurances. Theoretically, the County could reimburse the FAA for the receipt of all federal grants received, in current dollars, in addition to the cost of acquiring all lease interests that have been granted over the years. However, the cost to do so would be substantial. Further, because of the Boeing Company’s dependence on use of the airfield, it is likely that the facility would remain an airport, but be designated as a private facility. While in theory, this could limit the Airport’s use to Boeing Company activities, it is possible that the Boeing Company could then lease lands within its landholdings to other aircraft operators (airlines, cargo operators, and general aviation operators). The end product theoretically could be the Airport as it exists today, without the governmental oversight provided by King County.

The closure of KCIA would have an economic impact on the Puget Sound Region. Today, the Airport generates about 10,600 jobs within the Puget Sound Region and contributes about \$1.5 billion to the economy. If the Airport were closed, it has been estimated that there would be a loss of 75-80 percent of these benefits – or a loss of 7,687 jobs and impact of about \$1.2 billion in economic impact. Although it can be debated as to how the closure of the Airport would affect the economy, some of the effects would be re-distributed within the Puget Sound Region while others would be exported from the region and possibly from the State. The University of Washington estimates that about 87 percent would be exported from the region.

Contour Evaluation

Each modeled alternative has been evaluated and compared not only to each other, but to the Base Case Future noise contours. The DNL evaluation will compare the number of residents and acres of residential land uses within the 55 and greater noise contours, other noise sensitive uses within those contours and overall size of the contours. The DNL contour comparison is shown in Table G1, and the Representative Receptor comparisons are shown in Tables G2 through G6 which address the supplemental noise metrics described earlier.

Table F1
CONTOUR COMPARISON FOR EACH MODELED ALTERNATIVE
King County International Airport FAR Part 150 Study

Land Use	Existing	Base Case	A1a	A2a	A5	A9a	A9b	A9c	A9d	A9e	A2c
DNL 55											
Residences	16,568	21,818	19,015	19,698	20,096	20,055	20,054	20,305	20,433	20,233	8,768
People	40,592	53,454	47,214	48,873	49,983	49,920	49,923	50,429	50,682	50,225	21,261
Schools	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total Acres	13,883	17,291	16,010	16,505	17,144	17,177	17,180	17,150	17,166	17,139	8,519
DNL 60											
Residences	4,918	6,827	5,631	5,952	6,430	6,437	6,437	6,429	6,428	6,420	2,588
People	12,049	16,726	13,518	14,299	15,442	15,454	15,451	15,440	15,420	15,432	6,104
Schools	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total Acres	5,436	6,890	6,241	6,493	6,852	6,839	6,845	6,882	6,876	6,875	3,531
DNL 65											
Residential	290	464	361	400	463	461	460	463	460	533	126
Residences	1,327	1,955	1,511	1,638	1,852	1,844	1,844	1,853	1,842	1,844	586
People	3,251	4,790	3,310	3,623	4,166	4,152	4,151	4,163	4,141	4,155	1,263
Schools	1	1	0	0	0	0	0	0	0	0	0
Com/Retail	145	190	164	172	189	188	188	189	188	267	116
Manufacture	655	864	773	810	860	861	861	864	865	1,224	596
Other	1,176	1,354	1,268	1,304	1,354	1,354	1,356	1,354	1,355	844	639
Total Acres	2,266	2,872	2,566	2,686	2,866	2,864	2,865	2,870	2,868	2,868	1,477

A1a Ban Stage 2 Aircraft
A2a Ban Stage 2 Aircraft at Night
A5 Example Fly Quiet Program
A9a Chartered Visual Approach, All Hours
A9b Chartered Approach, Nighttime Only
A9c Elliot Bay Departure, All Hours
A9d Elliot Bay Departures, Nighttime Only
A9e North Flow Elliott Bay GFS/FMS Departure
A9f North Flow Elliott Bay GFS/FMS Departure
A9g North Flow Elliott Bay GFS/FMS Departure
A9h North Flow Elliott Bay GFS/FMS Departure
A9i North Flow Elliott Bay GFS/FMS Departure
A9j North Flow Elliott Bay GFS/FMS Departure
A9k North Flow Elliott Bay GFS/FMS Departure
A9l North Flow Elliott Bay GFS/FMS Departure
A9m North Flow Elliott Bay GFS/FMS Departure
A9n North Flow Elliott Bay GFS/FMS Departure
A9o North Flow Elliott Bay GFS/FMS Departure
A9p North Flow Elliott Bay GFS/FMS Departure
A9q North Flow Elliott Bay GFS/FMS Departure
A9r North Flow Elliott Bay GFS/FMS Departure
A9s North Flow Elliott Bay GFS/FMS Departure
A9t North Flow Elliott Bay GFS/FMS Departure
A9u North Flow Elliott Bay GFS/FMS Departure
A9v North Flow Elliott Bay GFS/FMS Departure
A9w North Flow Elliott Bay GFS/FMS Departure
A9x North Flow Elliott Bay GFS/FMS Departure
A9y North Flow Elliott Bay GFS/FMS Departure
A9z North Flow Elliott Bay GFS/FMS Departure
A1b No Hush Kitted or Louder, All Hours.

Table F1 Continued
CONTOUR COMPARISON FOR EACH MODELED ALTERNATIVE
King County International Airport FAR Part 150 Study

Land Use	Existing	Base Case	A1a	A2a	A5	A9a	A9b	A9c	A9d	A9e	A2c
DNL 70											
Residential	40	70	47	54	68	65	65	67	65	73	10
Residences	158	351	238	267	326	326	326	324	325	334	18
People	387	868	466	538	678	670	669	668	663	693	46
Schools	0	0	0	0	0	0	0	0	0	0	0
Com/Retail	55	84	70	76	84	84	84	84	84	81	8
Manufacture	210	307	248	274	308	311	310	306	310	363	163
Other	570	689	618	643	684	686	686	686	686	616	423
Total Acres	875	1,150	983	1,047	1,144	1,146	1,145	1,143	1,145	1,133	604
DNL 75											
Residential	0	0	0	0	0	0	0	0	0	4	0
Residences	0	0	0	0	0	0	0	0	0	6	0
People	0	0	0	0	0	0	0	0	0	14	0
Schools	0	0	0	0	0	0	0	0	0	0	0
Com/Retail	0	0	0	0	11	9	7	10	9	0	0
Manufacture	49	78	50	60	79	74	74	78	74	59	41
Other	363	407	367	380	405	403	403	405	403	409	308
Total Acres	412	485	417	440	484	477	477	483	477	472	334

A1a Ban Stage 2 Aircraft **A2a** Ban Stage 2 Aircraft at Night **A5** Example Fly Quiet Program **A9a** Chartered Visual Approach, All Hours **A9b** Chartered Approach, Nighttime Only **A9c** Elliot Bay Departure, All Hours **A9d** Elliot Bay Departures, Nighttime Only **A9e** North Flow Elliott Bay GPS/FMS Departure Night Flights **A2b** No Night Hush Kitted or Louder

A1b No Hush Kitted or Louder, All Hours.

Contour totals do not include rights-of-way or bodies of water.

The following tables, G2 through G6 show changes in noise levels for the representative receptor locations for the following metrics; DNL, nighttime Leq, Time Above, Lmax and SEL. The significant changes, as presented on page G.2, are shown in **red type** in each of the tables.

Table F2
Representative Receptor Analysis (DNL)

Site	Description	DNL Noise Level												
		Ex	Base	A1a	A2a	A5	A9a	A9b	A9c	A9d	A9e	A2c	A2b	A1b
		1999	2006	2006	2006	2006	2006	2006	2006	2006	2006	2006	2006	2006
A1	Magnolia	52.0	53.5	53.3	53.4	51.2	52.0	52.4	53.1	52.9	53.0	49.0	53.0	52.9
A2	West Seattle	51.3	52.6	52.0	52.2	52.6	52.6	52.6	52.6	52.6	52.6	48.7	50.5	50.0
A3	Magnolia	54.2	55.7	55.5	55.6	53.5	54.3	54.6	55.4	55.2	55.2	51.2	55.1	55.0
A4	Tukwila	62.1	63.3	62.7	62.9	63.3	63.3	63.3	63.3	63.3	63.3	59.5	61.0	60.3
A5	Skyway	45.7	47.1	46.5	46.8	47.8	47.4	47.4	47.4	47.5	47.7	43.4	45.8	45.5
A6	Seattle	69.1	70.6	69.6	70.0	70.6	70.6	70.6	70.6	70.6	70.6	67.1	68.4	68.1
A7	Georgetown	66.4	67.7	66.9	67.2	67.9	67.8	67.8	67.8	67.8	67.9	64.5	65.6	65.2
A8	Skyway	58.6	59.8	59.1	59.4	59.8	59.8	59.8	59.8	59.8	59.8	56.1	57.7	57.1
A9	Foster	63.8	65.0	64.5	64.7	65.0	65.0	65.0	65.0	65.0	65.0	60.9	63.2	62.7
S01	Tukwila	61.1	62.3	61.7	62.0	62.3	62.3	62.3	62.3	62.3	62.3	58.4	59.9	59.1
S03	Tukwila	58.6	60.0	59.3	59.6	60.0	60.0	60.0	60.0	60.0	60.0	56.2	58.2	57.8
S04	Georgetown	70.0	71.4	70.9	71.1	71.2	71.3	71.3	71.4	71.3	71.3	67.3	69.9	69.6
S06	Tukwila	66.9	68.2	67.5	67.8	68.2	68.2	68.2	68.2	68.2	68.2	64.3	65.6	64.8
S07	Magnolia	47.4	48.7	48.6	48.7	48.3	48.5	48.6	48.6	48.5	48.4	44.9	48.5	48.5
S08	Beacon Hill	60.4	61.7	61.2	61.4	61.7	61.7	61.7	61.7	61.7	61.7	58.2	60.8	60.6
S09	West Seattle	51.2	52.6	51.9	52.2	53.0	52.7	52.7	52.8	52.9	53.0	48.9	50.9	50.6
S10	Tukwila	48.6	50.0	49.3	49.6	50.0	50.0	50.0	50.0	50.0	50.0	46.4	48.3	48.0
S11	Tukwila	57.2	58.6	57.9	58.2	58.6	58.6	58.6	58.6	58.6	58.6	54.8	56.9	56.5
S13	Beacon Hill	59.5	60.9	60.3	60.5	60.7	60.9	60.9	60.8	60.7	60.6	57.1	59.0	58.5
S14	West Seattle	49.1	50.6	49.9	50.2	51.2	50.9	50.8	50.8	50.9	51.1	46.8	49.0	48.8
S15	West Seattle	40.2	41.5	41.3	41.3	41.5	41.5	41.5	41.5	41.5	41.5	37.7	40.6	40.3
S16	Magnolia	53.4	54.9	54.7	54.8	53.0	53.6	54.0	54.6	54.4	54.4	50.6	54.4	54.3
S17	Beacon Hill	55.8	57.2	56.9	57.0	57.2	57.2	57.2	57.2	57.2	57.2	53.6	56.5	56.4
		Change in Noise Relative to Base Case 2006												
A1	Magnolia	--	--	-0.2	-0.1	-2.3	-1.5	-1.1	-0.4	-0.6	-0.5	-4.5	-0.5	-0.6
A2	West Seattle	--	--	-0.6	-0.4	0.0	0.0	0.0	0.0	0.0	0.0	-3.9	-2.1	-2.6
A3	Magnolia	--	--	-0.2	-0.1	-2.2	-1.4	-1.1	-0.3	-0.5	-0.5	-4.5	-0.6	-0.7
A4	Tukwila	--	--	-0.6	-0.4	0.0	0.0	0.0	0.0	0.0	0.0	-3.8	-2.3	-3.0
A5	Skyway	--	--	-0.6	-0.3	0.7	0.3	0.3	0.3	0.4	0.6	-3.7	-1.3	-1.6
A6	Seattle	--	--	-1.0	-0.6	0.0	0.0	0.0	0.0	0.0	0.0	-3.5	-2.2	-2.5
A7	Georgetown	--	--	-0.8	-0.5	0.2	0.1	0.1	0.1	0.1	0.2	-3.2	-2.1	-2.5
A8	Skyway	--	--	-0.7	-0.4	0.0	0.0	0.0	0.0	0.0	0.0	-3.7	-2.1	-2.7
A9	Foster	--	--	-0.5	-0.3	0.0	0.0	0.0	0.0	0.0	0.0	-4.1	-1.8	-2.3
S01	Tukwila	--	--	-0.6	-0.3	0.0	0.0	0.0	0.0	0.0	0.0	-3.9	-2.4	-3.2
S03	Tukwila	--	--	-0.7	-0.4	0.0	0.0	0.0	0.0	0.0	0.0	-3.8	-1.8	-2.2
S04	Georgetown	--	--	-0.5	-0.3	-0.2	-0.1	-0.1	0.0	-0.1	-0.1	-4.1	-1.5	-1.8
S06	Tukwila	--	--	-0.7	-0.4	0.0	0.0	0.0	0.0	0.0	0.0	-3.9	-2.6	-3.4
S07	Magnolia	--	--	-0.1	0.0	-0.4	-0.2	-0.1	-0.1	-0.2	-0.3	-3.8	-0.2	-0.2
S08	Beacon Hill	--	--	-0.5	-0.3	0.0	0.0	0.0	0.0	0.0	0.0	-3.5	-0.9	-1.1
S09	West Seattle	--	--	-0.7	-0.4	0.4	0.1	0.1	0.2	0.3	0.4	-3.7	-1.7	-2.0
S10	Tukwila	--	--	-0.7	-0.4	0.0	0.0	0.0	0.0	0.0	0.0	-3.6	-1.7	-2.0
S11	Tukwila	--	--	-0.7	-0.4	0.0	0.0	0.0	0.0	0.0	0.0	-3.8	-1.7	-2.1
S13	Beacon Hill	--	--	-0.6	-0.4	-0.2	0.0	0.0	-0.1	-0.2	-0.3	-3.8	-1.9	-2.4
S14	West Seattle	--	--	-0.7	-0.4	0.6	0.3	0.2	0.2	0.3	0.5	-3.8	-1.6	-1.8
S15	West Seattle	--	--	-0.2	-0.2	0.0	0.0	0.0	0.0	0.0	0.0	-3.8	-0.9	-1.2
S16	Magnolia	--	--	-0.2	-0.1	-1.9	-1.3	-0.9	-0.3	-0.5	-0.5	-4.3	-0.5	-0.6
S17	Beacon Hill	--	--	-0.3	-0.2	0.0	0.0	0.0	0.0	0.0	0.0	-3.6	-0.7	-0.8

A1a Ban Stage 2 Aircraft, A2a Ban Stage 2 Aircraft at Night, A5 Fly Quiet Example, A9a Charted Visual, All Hours
A9b Charted Visual Approach, Nighttime Only, A9c Elliot Bay Departure, All Hours, A9d Elliot Bay Departures, Night
A9e GPS/FMS Departure A2c No Night Flights, A2b No Night Hush Kitted or louder, A1b No Hush Kitted or louder, All Hours

**Table F3
Representative Receptor Analysis (Nighttime LEQ)**

Site	Description	Nighttime LEQ Noise Levels (10 pm to 7 am)												
		Ex 1999	Base 2006	A1a 2006	A2a 2006	A5 2006	A9a 2006	A9b 2006	A9c 2006	A9d 2006	A9e 2006	A2c 2006	A2b 2006	A1b 2006
A1	Magnolia	44.6	46.3	46.1	46.1	43.9	44.7	44.7	45.8	45.8	45.8	0.0	45.6	45.6
A2	West Seattle	43.7	45.0	44.4	44.4	45.0	45.0	45.0	45.0	45.0	45.0	0.0	42.1	42.2
A3	Magnolia	46.9	48.5	48.3	48.3	46.3	46.9	46.9	48.0	48.0	48.0	0.0	47.7	47.7
A4	Tukwila	54.5	55.7	55.1	55.1	55.7	55.7	55.7	55.7	55.7	55.7	0.0	52.2	52.3
A5	Skyway	37.9	39.4	38.9	38.9	40.2	39.8	39.8	39.8	39.8	40.0	0.0	37.7	37.7
A6	Seattle	61.2	62.6	61.7	61.7	62.6	62.6	62.6	62.6	62.6	62.6	0.0	59.7	59.8
A7	Georgetown	58.3	59.6	58.8	58.8	59.8	59.7	59.7	59.8	59.8	59.8	0.0	56.4	56.5
A8	Skyway	50.9	52.1	51.4	51.4	52.1	52.1	52.1	52.1	52.1	52.1	0.0	49.0	49.1
A9	Foster	56.3	57.5	57.1	57.1	57.5	57.5	57.5	57.5	57.5	57.6	0.0	55.0	55.0
S01	Tukwila	53.5	54.8	54.2	54.2	54.8	54.8	54.8	54.8	54.8	54.8	0.0	51.2	51.3
S03	Tukwila	51.0	52.3	51.7	51.7	52.3	52.3	52.3	52.3	52.3	52.3	0.0	49.9	50.0
S04	Georgetown	62.5	64.0	63.5	63.5	63.7	63.8	63.8	63.9	63.9	63.9	0.0	61.9	61.9
S06	Tukwila	59.3	60.6	59.9	59.9	60.6	60.6	60.6	60.6	60.6	60.6	0.0	56.7	56.8
S07	Magnolia	39.8	41.1	41.0	41.0	40.6	40.9	40.9	40.9	40.9	40.7	0.0	40.8	40.8
S08	Beacon Hill	52.5	53.8	53.3	53.3	53.8	53.8	53.8	53.8	53.8	53.8	0.0	52.6	52.6
S09	West Seattle	43.5	44.9	44.2	44.2	45.3	45.0	45.0	45.2	45.2	45.3	0.0	42.6	42.6
S10	Tukwila	40.8	42.2	41.5	41.5	42.2	42.2	42.2	42.2	42.2	42.2	0.0	39.9	40.0
S11	Tukwila	49.5	50.9	50.3	50.3	50.9	50.9	50.9	50.9	50.9	50.9	0.0	48.6	48.6
S13	Beacon Hill	51.9	53.2	52.7	52.7	53.1	53.3	53.3	53.1	53.1	53.0	0.0	50.6	50.6
S14	West Seattle	41.3	42.9	42.2	42.2	43.5	43.2	43.2	43.2	43.2	43.4	0.0	40.9	40.9
S15	West Seattle	32.4	33.8	33.6	33.6	33.8	33.8	33.8	33.8	33.8	33.9	0.0	32.5	32.5
S16	Magnolia	46.1	47.6	47.5	47.5	45.7	46.2	46.2	47.2	47.2	47.2	0.0	47.0	47.0
S17	Beacon Hill	48.0	49.4	49.1	49.1	49.4	49.4	49.4	49.4	49.4	49.4	0.0	48.5	48.5

		Change in Noise Relative to Base Case 2006												
A1	Magnolia	--	--	-0.2	-0.2	-2.4	-1.6	-1.6	-0.5	-0.5	-0.5	-46.3	-0.7	-0.7
A2	West Seattle	--	--	-0.6	-0.6	0.0	0.0	0.0	0.0	0.0	0.0	-45.0	-2.9	-2.8
A3	Magnolia	--	--	-0.2	-0.2	-2.2	-1.6	-1.6	-0.5	-0.5	-0.5	-48.5	-0.8	-0.8
A4	Tukwila	--	--	-0.6	-0.6	0.0	0.0	0.0	0.0	0.0	0.0	-55.7	-3.5	-3.4
A5	Skyway	--	--	-0.5	-0.5	0.8	0.4	0.4	0.4	0.4	0.6	-39.4	-1.7	-1.7
A6	Seattle	--	--	-0.9	-0.9	0.0	0.0	0.0	0.0	0.0	0.0	-62.6	-2.9	-2.8
A7	Georgetown	--	--	-0.8	-0.8	0.2	0.1	0.1	0.2	0.2	0.2	-59.6	-3.2	-3.1
A8	Skyway	--	--	-0.7	-0.7	0.0	0.0	0.0	0.0	0.0	0.0	-52.1	-3.1	-3.0
A9	Foster	--	--	-0.4	-0.4	0.0	0.0	0.0	0.0	0.0	0.1	-57.5	-2.5	-2.5
S01	Tukwila	--	--	-0.6	-0.6	0.0	0.0	0.0	0.0	0.0	0.0	-54.8	-3.6	-3.5
S03	Tukwila	--	--	-0.6	-0.6	0.0	0.0	0.0	0.0	0.0	0.0	-52.3	-2.4	-2.3
S04	Georgetown	--	--	-0.5	-0.5	-0.3	-0.2	-0.2	-0.1	-0.1	-0.1	-64.0	-2.1	-2.1
S06	Tukwila	--	--	-0.7	-0.7	0.0	0.0	0.0	0.0	0.0	0.0	-60.6	-3.9	-3.8
S07	Magnolia	--	--	-0.1	-0.1	-0.5	-0.2	-0.2	-0.2	-0.2	-0.4	-41.1	-0.3	-0.3
S08	Beacon Hill	--	--	-0.5	-0.5	0.0	0.0	0.0	0.0	0.0	0.0	-53.8	-1.2	-1.2
S09	West Seattle	--	--	-0.7	-0.7	0.4	0.1	0.1	0.3	0.3	0.4	-44.9	-2.3	-2.3
S10	Tukwila	--	--	-0.7	-0.7	0.0	0.0	0.0	0.0	0.0	0.0	-42.2	-2.3	-2.2
S11	Tukwila	--	--	-0.6	-0.6	0.0	0.0	0.0	0.0	0.0	0.0	-50.9	-2.3	-2.3
S13	Beacon Hill	--	--	-0.5	-0.5	-0.1	0.1	0.1	-0.1	-0.1	-0.2	-53.2	-2.6	-2.6
S14	West Seattle	--	--	-0.7	-0.7	0.6	0.3	0.3	0.3	0.3	0.5	-42.9	-2.0	-2.0
S15	West Seattle	--	--	-0.2	-0.2	0.0	0.0	0.0	0.0	0.0	0.1	-33.8	-1.3	-1.3
S16	Magnolia	--	--	-0.1	-0.1	-1.9	-1.4	-1.4	-0.4	-0.4	-0.4	-47.6	-0.6	-0.6
S17	Beacon Hill	--	--	-0.3	-0.3	0.0	0.0	0.0	0.0	0.0	0.0	-49.4	-0.9	-0.9

A1a Ban Stage 2 Aircraft, A2a Ban Stage 2 Aircraft at Night, A5 Fly Quiet Example, A9a Charted Visual, All Hours
A9b Charted Visual Approach, Nighttime Only, A9c Elliot Bay Departure, All Hours, A9d Elliot Bay Departures, Night
A9e GPS/FMS Departures A2c No Night Flights, A2b No Night Hush Kitted or louder, A1b No Hush Kitted or louder, All Hours

Table F4
Representative Receptor Analysis (Time Above 65 dBA)

Site	Description	Time Above 65 dBA (Minutes per Day)												
		Ex 1999	Base 2006	A1a 2006	A2a 2006	A5 2006	A9a 2006	A9b 2006	A9c 2006	A9d 2006	A9e 2006	A2c 2006	A2b 2006	A1b 2006
A1	Magnolia	1.8	2.5	2.1	2.4	1.2	1.8	2.2	2.4	1.9	2.0	2.5	1.9	1.7
A2	West Seattle	3.3	4.6	3.6	4.5	4.6	4.6	4.6	4.6	4.6	4.6	4.6	3.2	2.1
A3	Magnolia	6.5	9.4	8.8	9.3	5.0	5.6	8.3	9.3	8.8	8.9	9.4	8.7	8.3
A4	Tukwila	23.9	32.5	31.1	32.3	32.5	32.5	32.5	32.5	32.5	32.5	32.5	30.6	29.7
A5	Skyway	1.0	1.4	1.1	1.4	1.5	1.4	1.4	1.4	1.5	1.6	1.4	1.0	0.6
A6	Seattle	81.8	108.9	106.9	108.7	108.9	108.9	108.9	108.9	108.9	109.0	108.9	105.9	104.8
A7	Georgetown	59.4	72.3	70.7	72.1	73.3	73.2	72.5	72.4	72.5	72.6	72.3	70.4	69.4
A8	Skyway	9.2	13.0	11.9	12.8	13.0	13.0	13.0	13.0	13.0	13.0	13.0	11.3	10.5
A9	Foster	41.5	54.6	53.3	54.5	54.6	54.6	54.6	54.6	54.6	54.6	54.6	52.8	51.9
S01	Tukwila	13.7	19.2	18.1	19.0	19.2	19.2	19.2	19.2	19.2	19.2	19.2	17.4	16.3
S03	Tukwila	12.4	17.7	16.4	17.5	17.7	17.7	17.7	17.7	17.7	17.7	17.7	16.0	15.1
S04	Georgetown	100.7	126.5	125.2	126.3	125.3	125.5	126.3	126.5	126.3	126.2	126.5	124.9	124.4
S06	Tukwila	43.5	57.4	56.2	57.2	57.4	57.4	57.4	57.4	57.4	57.4	57.3	55.5	54.2
S07	Magnolia	0.2	0.3	0.2	0.3	0.2	0.3	0.3	0.3	0.2	0.1	0.3	0.2	0.1
S08	Beacon Hill	29.5	38.8	37.0	38.6	38.9	38.8	38.8	38.8	38.9	38.8	38.8	35.9	35.0
S09	West Seattle	2.2	3.1	2.6	3.0	3.3	3.1	3.1	3.1	3.2	3.3	3.1	2.4	2.0
S10	Tukwila	2.3	3.2	2.4	3.1	3.2	3.2	3.2	3.2	3.2	3.2	3.2	2.1	1.4
S11	Tukwila	9.0	12.9	11.6	12.7	12.9	12.9	12.9	12.9	12.9	12.9	12.9	11.2	10.4
S13	Beacon Hill	10.7	14.8	14.1	14.7	15.4	15.6	15.0	14.7	14.6	14.4	14.8	13.7	13.0
S14	West Seattle	1.6	2.3	1.8	2.2	2.5	2.3	2.3	2.3	2.4	2.5	2.3	1.6	1.3
S15	West Seattle	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
S16	Magnolia	3.9	5.6	5.1	5.5	3.1	3.6	4.9	5.5	5.0	5.0	5.6	4.9	4.6
S17	Beacon Hill	5.1	7.2	5.9	7.0	7.2	7.2	7.2	7.2	7.2	7.2	7.2	5.2	4.0
		Change in Noise Relative to Base Case 2006												
A1	Magnolia	--	--	-0.4	-0.1	-1.3	-0.7	-0.3	-0.1	-0.6	-0.5	0.0	-0.6	-0.8
A2	West Seattle	--	--	-1.0	-0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-1.4	-2.5
A3	Magnolia	--	--	-0.6	-0.1	-4.4	-3.8	-1.1	-0.1	-0.6	-0.5	0.0	-0.7	-1.1
A4	Tukwila	--	--	-1.4	-0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-1.9	-2.8
A5	Skyway	--	--	-0.3	0.0	0.1	0.0	0.0	0.0	0.1	0.2	0.0	-0.4	-0.8
A6	Seattle	--	--	-2.0	-0.2	0.0	0.0	0.0	0.0	0.0	0.1	0.0	-3.0	-4.1
A7	Georgetown	--	--	-1.6	-0.2	1.0	0.9	0.2	0.1	0.2	0.3	0.0	-1.9	-2.9
A8	Skyway	--	--	-1.1	-0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-1.7	-2.5
A9	Foster	--	--	-1.3	-0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-1.8	-2.7
S01	Tukwila	--	--	-1.1	-0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-1.8	-2.9
S03	Tukwila	--	--	-1.3	-0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-1.7	-2.6
S04	Georgetown	--	--	-1.3	-0.2	-1.2	-1.0	-0.2	0.0	-0.2	-0.3	0.0	-1.6	-2.1
S06	Tukwila	--	--	-1.2	-0.2	0.0	0.0	0.0	0.0	0.0	0.0	-0.1	-1.9	-3.2
S07	Magnolia	--	--	-0.1	0.0	-0.1	0.0	0.0	0.0	-0.1	-0.2	0.0	-0.1	-0.2
S08	Beacon Hill	--	--	-1.8	-0.2	0.1	0.0	0.0	0.0	0.1	0.0	0.0	-2.9	-3.8
S09	West Seattle	--	--	-0.5	-0.1	0.2	0.0	0.0	0.0	0.1	0.2	0.0	-0.7	-1.1
S10	Tukwila	--	--	-0.8	-0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-1.1	-1.8
S11	Tukwila	--	--	-1.3	-0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-1.7	-2.5
S13	Beacon Hill	--	--	-0.7	-0.1	0.6	0.8	0.2	-0.1	-0.2	-0.4	0.0	-1.1	-1.8
S14	West Seattle	--	--	-0.5	-0.1	0.2	0.0	0.0	0.0	0.1	0.2	0.0	-0.7	-1.0
S15	West Seattle	--	--	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
S16	Magnolia	--	--	-0.5	-0.1	-2.5	-2.0	-0.7	-0.1	-0.6	-0.6	0.0	-0.7	-1.0
S17	Beacon Hill	--	--	-1.3	-0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-2.0	-3.2

A1a Ban Stage 2 Aircraft, A2a Ban Stage 2 Aircraft at Night, A5 Fly Quiet Example, A9a Charted Visual, All Hours
A9b Charted Visual Approach, Nighttime Only, A9c Elliot Bay Departure, All Hours, A9d Elliot Bay Departures, Night
A9e GPS/FMS Departure A2c No Night Flights, A2b No Night Hush Kitted or louder, A1b No Hush Kitted or louder, All Hours

Table F5
Representative Receptor Analysis (Lmax)

Site	Description	Maximum Noise Level (dBA)												
		Ex 1999	Base 2006	A1a 2006	A2a 2006	A5 2006	A9a 2006	A9b 2006	A9c 2006	A9d 2006	A9e 2006	A2c 2006	A2b 2006	A1b 2006
A1	Magnolia	81.4	81.4	81.4	81.4	74.5	81.4	81.4	81.4	74.5	74.5	81.4	81.4	80.1
A2	West Seattle	82.5	82.5	82.5	82.5	82.5	82.5	82.5	82.5	82.5	82.5	82.5	82.5	77.9
A3	Magnolia	83.1	83.1	83.1	83.1	77.4	83.1	83.1	83.1	77.4	77.4	83.1	83.1	82.0
A4	Tukwila	100.7	100.7	100.7	100.7	100.7	100.7	100.7	100.7	100.7	100.6	100.7	100.7	94.6
A5	Skyway	76.9	76.9	76.9	76.9	76.9	76.9	76.9	76.9	76.9	76.9	76.9	76.9	76.9
A6	Seattle	106.6	106.6	106.6	106.6	106.6	106.6	106.6	106.6	106.6	106.6	106.6	106.6	101.4
A7	Georgetown	108.4	108.4	108.4	108.4	108.3	108.4	108.4	108.4	108.3	108.3	108.4	108.4	102.5
A8	Skyway	97.7	97.7	97.7	97.7	97.7	97.7	97.7	97.7	97.7	97.6	97.7	97.7	92.0
A9	Foster	99.7	99.7	99.7	99.7	99.7	99.7	99.7	99.7	99.7	99.7	99.7	99.7	94.5
S01	Tukwila	97.4	97.4	97.4	97.4	97.4	97.4	97.4	97.4	97.4	97.3	97.4	97.4	91.7
S03	Tukwila	90.6	90.6	90.6	90.6	90.6	90.6	90.6	90.6	90.6	90.6	90.6	90.6	89.8
S04	Georgetown	108.6	108.6	108.6	108.6	108.6	108.6	108.6	108.6	108.6	108.6	108.6	108.6	102.8
S06	Tukwila	104.1	104.1	104.1	104.1	104.1	104.1	104.1	104.1	104.1	104.1	104.1	104.1	98.1
S07	Magnolia	72.1	72.1	72.1	72.1	72.1	72.1	72.1	72.1	72.1	72.1	72.1	72.1	71.4
S08	Beacon Hill	87.5	87.5	87.5	87.5	87.5	87.5	87.5	87.5	87.5	87.5	87.5	87.5	87.5
S09	West Seattle	86.0	86.0	86.0	86.0	86.0	86.0	86.0	86.0	86.0	86.0	86.0	86.0	85.1
S10	Tukwila	77.9	77.9	77.9	77.9	77.9	77.9	77.9	77.9	77.9	77.9	77.9	77.9	76.2
S11	Tukwila	89.2	89.2	89.2	89.2	89.2	89.2	89.2	89.2	89.2	89.2	89.2	89.2	88.8
S13	Beacon Hill	97.6	97.6	97.6	97.6	97.6	97.6	97.6	97.6	97.6	97.6	97.6	97.6	93.2
S14	West Seattle	81.4	81.4	81.4	81.4	81.3	81.4	81.4	81.4	81.3	81.3	81.4	81.4	81.4
S15	West Seattle	66.8	66.8	66.8	66.8	66.8	66.8	66.8	66.8	66.8	66.8	66.8	66.8	66.8
S16	Magnolia	82.5	82.5	82.5	82.5	79.1	82.5	82.5	82.5	79.1	79.1	82.5	82.5	81.4
S17	Beacon Hill	77.3	77.3	77.3	77.3	77.3	77.3	77.3	77.3	77.3	77.3	77.3	77.3	77.3

Change in Noise Relative to Base Case 2006														
A1	Magnolia	--	--	0.0	0.0	-6.9	0.0	0.0	0.0	-6.9	-6.9	0.0	0.0	-1.3
A2	West Seattle	--	--	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-0.1	0.0	0.0	-4.6
A3	Magnolia	--	--	0.0	0.0	-5.7	0.0	0.0	0.0	-5.7	-5.7	0.0	0.0	-1.1
A4	Tukwila	--	--	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-0.1	0.0	0.0	-6.1
A5	Skyway	--	--	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
A6	Seattle	--	--	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-5.2
A7	Georgetown	--	--	0.0	0.0	-0.1	0.0	0.0	0.0	-0.1	-0.1	0.0	0.0	-5.9
A8	Skyway	--	--	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-0.1	0.0	0.0	-5.7
A9	Foster	--	--	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-5.2
S01	Tukwila	--	--	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-0.1	0.0	0.0	-5.7
S03	Tukwila	--	--	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-0.8
S04	Georgetown	--	--	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-5.8
S06	Tukwila	--	--	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-6.0
S07	Magnolia	--	--	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-0.7
S08	Beacon Hill	--	--	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
S09	West Seattle	--	--	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-0.9
S10	Tukwila	--	--	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-1.7
S11	Tukwila	--	--	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-0.4
S13	Beacon Hill	--	--	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-4.4
S14	West Seattle	--	--	0.0	0.0	-0.1	0.0	0.0	0.0	-0.1	-0.1	0.0	0.0	0.0
S15	West Seattle	--	--	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
S16	Magnolia	--	--	0.0	0.0	-3.4	0.0	0.0	0.0	-3.4	-3.4	0.0	0.0	-1.1
S17	Beacon Hill	--	--	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

A1a Ban Stage 2 Aircraft, A2a Ban Stage 2 Aircraft at Night, A5 Fly Quiet Example, A9a Charted Visual, All Hours
A9b Charted Visual Approach, Nighttime Only, A9c Elliot Bay Departure, All Hours, A9d Elliot Bay Departures, Night
A9e GPS/FMS Departures A2c No Night Flights, A2b No Night Hush Kitted or louder, A1b No Hush Kitted or louder, All Hours

Table F6
Noise Event Counts (Number of Events Above SEL Noise Level)

Site	Description	Average Daily Noise Events (>75 SEL)											
		Base	A1a	A2a	A5	A9a	A9b	A9c	A9d	A9e	A2c	A2b	A1b
		2006	2006	2006	2006	2006	2006	2006	2006	2006	2006	2006	2006
A1	Magnolia	47	44	46	26	24	41	46	45	43	48	46	46
A2	West Seattle	12	11	12	12	12	12	12	12	12	13	11	11
A3	Magnolia	67	63	67	42	38	61	67	63	64	67	65	63
A4	Tukwila	200	199	200	200	200	200	200	200	200	201	201	200
A5	Skyway	4	4	4	4	5	4	4	5	4	4	3	3
A6	Seattle	450	449	450	450	450	450	450	450	450	477	476	476
A7	Georgetown	220	217	219	221	221	220	220	220	220	221	220	219
A8	Skyway	111	111	111	111	111	111	111	111	111	111	111	110
A9	Foster	281	281	281	281	281	281	281	281	281	281	281	281
S01	Tukwila	118	117	118	118	118	118	118	118	118	137	136	135
S03	Tukwila	134	133	134	134	134	134	134	134	134	135	134	134
S04	Georgetown	538	537	538	527	527	537	538	538	538	538	536	534
S06	Tukwila	284	284	284	284	284	284	284	284	284	286	285	284
S07	Magnolia	2	2	2	2	1	2	2	1	2	2	1	1
S08	Beacon Hill	328	327	328	328	328	328	328	328	328	328	327	327
S09	West Seattle	19	18	19	19	21	19	19	20	19	19	18	18
S10	Tukwila	9	7	8	9	9	9	9	9	9	9	6	5
S11	Tukwila	119	118	119	119	119	119	119	119	119	121	120	120
S13	Beacon Hill	126	122	126	123	121	125	126	124	126	129	125	122
S14	West Seattle	9	9	9	10	11	9	9	10	9	9	9	9
S15	West Seattle	4	4	4	4	4	4	4	4	4	4	4	3
S16	Magnolia	66	62	66	41	38	59	66	64	63	66	63	62
S17	Beacon Hill	144	143	144	144	144	144	144	144	144	145	142	143

		Average Daily Noise Events (>80 SEL)											
A1	Magnolia	6	5	5	4	3	5	5	5	5	5	3	3
A2	West Seattle	7	6	7	7	7	7	7	7	7	7	5	3
A3	Magnolia	9	8	9	6	6	8	9	8	8	9	7	7
A4	Tukwila	39	38	39	39	39	39	39	39	39	39	38	38
A5	Skyway	3	2	3	3	3	3	3	3	3	3	2	1
A6	Seattle	259	258	259	259	259	259	259	259	259	259	258	258
A7	Georgetown	141	137	141	143	143	142	141	140	140	141	137	137
A8	Skyway	19	18	19	19	19	19	19	19	19	19	17	17
A9	Foster	109	109	109	109	109	109	109	109	109	109	109	109
S01	Tukwila	29	28	29	29	29	29	29	29	29	29	28	28
S03	Tukwila	41	39	40	41	41	41	41	41	41	41	39	38
S04	Georgetown	415	414	415	410	409	414	415	414	414	415	414	414
S06	Tukwila	124	123	124	124	124	124	124	124	124	124	124	123
S07	Magnolia	1	1	1	1	0	1	1	0	0	1	0	0
S08	Beacon Hill	113	113	113	113	113	113	113	113	113	113	111	113
S09	West Seattle	4	4	4	4	5	4	4	5	5	4	3	3
S10	Tukwila	6	5	6	6	6	6	6	6	6	6	4	2
S11	Tukwila	21	19	21	21	21	21	21	21	21	21	19	19
S13	Beacon Hill	24	23	24	24	23	24	24	24	24	24	21	20
S14	West Seattle	4	3	3	4	4	4	4	4	4	4	3	2
S15	West Seattle	0	0	0	0	0	0	0	0	0	0	0	0
S16	Magnolia	6	6	6	5	4	6	6	6	6	6	4	3
S17	Beacon Hill	11	10	11	11	11	11	11	11	11	11	8	8

A1a Ban Stage 2 Aircraft, A2a Ban Stage 2 Aircraft at Night, A5 Fly Quiet Example, A9a Charted Visual, All Hours
A9b Charted Visual Approach, Nighttime Only, A9c Elliot Bay Departure, All Hours, A9d Elliot Bay Departures, Night
A9e GPS/FMS Departures A2c No Night Flights, A2b No Night Hush Kitted or louder, A1b No Hush Kitted or louder, All Hours

Selected Alternatives Evaluation

Introduction

This chapter presents additional more detailed evaluation of selected alternatives to determine applicability for noise reduction at King County International Airport. Using the Evaluation Criteria presented in the Alternatives Matrix, certain alternatives were selected for additional analysis utilizing four additional or “overlaid” criteria; legality, financial feasibility, realistic implementation time, simple to administer and simple to implement.

This conceptual evaluation is presented in the following paragraphs for residential sound attenuation and residential purchase. Facility and operational alternatives are considered in the second section of this Chapter.

Residential Sound Attenuation

This Alternative is to evaluate the feasibility of sound attenuating (insulation) residential and other noise sensitive uses within certain DNL noise contours. The Federal guideline and limit of funding eligibility is normally the 65 DNL contour. However, this Study will also evaluate the feasibility of sound attenuating such structures within the 60 DNL noise contours, as directed by the County Work Plan. The first step in evaluating sound attenuation is to determine which contour set should be used for evaluation, existing, future or mitigated future. Normally land use decisions are based on the future mitigated contour. However, for general decision guidance, the future base case noise contour will be used as it is the largest and represents the greatest number of persons within the contours.

Home Insulation Within KCIA 65 DNL Contour (Standard Program). This represents the standard, Federally eligible sound attenuation program. Based on the future base case noise contour, there are approximately 1,955 homes within the 65 DNL noise contour. At a cost of approximately \$30,000 per home, this would result in approximately \$59 million to sound attenuate the homes in the 65 and greater contour.

Legality. This Alternative is legal, is eligible for Federal funding and has precedence within the Seattle area.

Financial Feasibility. This Alternative is costly but is eligible for Federal funding at 90 percent. Over a five-year period, the cost would be approximately \$12 million, not counting administrative costs, per year. This could result in Federal funding of approximately \$11 million per year with County funding of approximately \$1 million per year. In addition, Federal funding is not available for upgrading residences to bring them “up to code”, which is normally required by the local jurisdiction prior to sound attenuation. It is FAA policy that each airport is limited to \$5 million per year for residential sound attenuation or purchase, therefore the program will take 10 to 12 years to complete.

Realistic Implementation Time. The time required to fully implement this program would be several years. It takes a year or more to develop the administrative portions of the program, select the contractors and prioritize the structures. The actual sound attenuation work could take three to four years to complete.

Simple to Administer. Once the program is developed and set up, it is relatively simple to administer. It can be administered either with additional airport staff or a consultant hired to administer the program.

Simple to Implement. This type of program requires several contractors, administrative personnel and consultants to implement. Many varied issues will arise throughout the life of the program that will require some sophistication in addressing. The construction techniques themselves are not complicated, program implementation takes time.

Home Insulation Within Combined KCIA and SEA 65 DNL Contours (Standard Program). This represents a departure from the standard, Federally eligible sound attenuation program. Even though the homes are within what is normally considered eligible for Federal funding (the 65 DNL noise contour), the fact that many of the homes are not within the contour for a single airport is not standard. Based on the future base case noise contour, there are approximately 687 homes within the combined 65 DNL noise contour that are not within either the KCIA or SEA only noise contours. At a cost of approximately \$30,000 per home (687 homes), this would result in a cost of approximately \$20.6 million beyond the KCIA only 65 DNL noise and greater contours cost. The combined cost would be approximately \$80 million.

Legality. This Alternative is legal, may be eligible for Federal funding and has precedence within the Seattle area. This issue of “combined contour funding” has never arisen in the Seattle region before, and there may be questions of legality from a Federal funding perspective.

Financial Feasibility. This Alternative is costly but may be eligible for Federal funding at 80 or 90 percent (SEA receives funding at 80 percent and KCIA receives funding at 90 percent). Over a five-year period, the cost would be approximately \$4.1 million, not counting administrative costs, per year. This could result in Federal funding ranging from approximately \$3.3 million to \$3.7 million per year, depending on the funding ratio, with local funding (County, Port of Seattle, local community) ranging from approximately \$400,000 to \$800,000 per year, depending on the funding ratio. As stated above, the probability of Federal funding is undecided and there is the question of “bringing the structure up to code” that would have to be addressed.

Realistic Implementation Time. The time required to fully implement this program would be several years, including time to coordinate with the Port of Seattle and the Federal Aviation Administration. As this is a non-standard program, coordination and evaluation time could be extensive. It takes a year or more to develop the administrative portions of the program, select the contractors and prioritize the structures. The actual sound attenuation work could take four to five years to complete.

Simple to Administer. This particular program could be difficult to administer, since it would most likely consist of two separate airports working together. However, if just King County administered the program, it would be much easier. It can be administered either with additional airport staff or a consultant hired to administer the program. One possibility could be that KCIA could contract with the Port of Seattle to provide administrative services since they have such services in place and have experience in sound attenuation administration.

Simple to Implement. This type of program would be more difficult to implement due to the several entities involved. Many varied issues will arise throughout the life of the program that will require some sophistication in addressing. The construction techniques themselves are not complicated, program implementation takes time.

Home Insulation Within KCIA 60 DNL Contours (Non-Standard Program). This represents a departure from the standard, Federally eligible sound attenuation program. The homes are within a contour that is normally considered *not* eligible for Federal funding (beyond the 65 DNL noise contour). Based on the future base case noise contour, there are approximately 6,827 homes within the 60 DNL noise contour. At a cost of approximately \$30,000 per home, this would result in a cost of approximately \$204.8 million to sound attenuate homes within the 60 DNL or greater contours.

Legality. This Alternative is legal, although the homes beyond the 65 DNL are not eligible for Federal funding and has no precedence within the Seattle area. The standards for sound attenuation reduction would have to be developed.

Financial Feasibility. This Alternative is costly as it would not be eligible for Federal funding. Over a five-year period, the cost would be approximately \$41 million, not counting administrative costs, per year. This would be the responsibility of the County and/or the local jurisdiction. In addition, there is the question of “bringing the structure up to code” that would have to be addressed.

Realistic Implementation Time. The time required to fully implement this program would be several years. It takes a year or more to develop the administrative portions of the program, select the contractors and prioritize the structures. The actual sound attenuation work could take five to seven years to complete.

Simple to Administer. Once the program is developed and set up, it is relatively simple to administer. It can be administered either with additional airport staff or a consultant hired to administer the program. However, sound attenuation standards would have to be developed and tested to achieve the desired attenuation.

Simple to Implement. This type of program requires several contractors, administrative personnel and consultants to implement. Many varied issues will arise throughout the life of the program that will require some sophistication in addressing. The construction techniques themselves are not complicated, program implementation takes time.

Home Insulation Within Combined KCIA and SEA 60 DNL Contours (Non-Standard Program). This represents a departure from the standard, Federally eligible sound attenuation program. There are two non-standard elements associated with this insulation program; homes are beyond the traditional 65 DNL contour and they are within a combined noise contour that would not be within the contour for either airport if considered independently. Based on the future base case noise contour, there are approximately 1,343 homes within the combined 60 DNL noise contour that are not within either the KCIA or SEA “only” noise contours. At a cost of approximately \$30,000 per home, this would result in a cost of approximately \$40 million beyond the KCIA only 65 DNL noise and greater contours cost.

Legality. This Alternative is legal, would most likely not be eligible for Federal funding for the portion beyond the 65 DNL and has no precedence within the Seattle area. This issue of “combined contour funding” has never arisen in the Seattle region before, and there may be questions of legality from a Federal funding perspective. The standards for sound attenuation would have to be developed.

Financial Feasibility. This Alternative is costly and would not be eligible for Federal funding of those homes beyond the 65 DNL contour. Over a five-year period, the cost would be approximately \$8 million, not counting administrative costs, per year. This would be the responsibility of the County, Port of Seattle or local jurisdictions. In addition, there is the question of “bringing the structure up to code” that would have to be addressed.

Realistic Implementation Time. The time required to fully implement this program would be several years. It takes a year or more to develop the administrative portions of the program, select the contractors and prioritize the structures. The actual sound attenuation work could take six to seven years to complete.

Simple to Administer. This program would be more difficult to administer due to the different entities involved. Once the program is developed and set up, it should be relatively simple to administer. It can be administered either with additional airport staff or a consultant hired to administer the program. One possibility could be that KCIA could contract with the Port of Seattle to provide administrative services since they have such services in place and have experience in sound attenuation administration.

Simple to Implement. This type of program is more difficult to implement due to two entities being involved. This type of program requires several contractors, administrative personnel and consultants to implement. Many varied issues will arise throughout the life of the program that will require some sophistication in addressing. The construction techniques themselves are not complicated, program implementation takes time.

Home Insulation Within Locations with Significant SEL Events (Non-Standard Program). This represents a departure from the standard, Federally eligible sound attenuation program. This would base sound attenuation eligibility on the Sound Exposure Level (SEL) of a critical aircraft, which is not recognized by the FAA. Sound attenuation standards are not developed for residential attenuation based on SEL levels. Based on the 90 SEL contour for the hush-kit DC-9 aircraft, there are approximately 5,000 homes within the contour. At a cost of approximately \$30,000 per home, this would result in a cost of approximately \$150 million.

Legality. This Alternative is legal, would most likely not be eligible for Federal funding for the portion beyond the 65 DNL and has no precedence within the Seattle area. This issue of "SEL contour funding" has never arisen in the Seattle region before, and there may be questions of legality from a Federal funding perspective. The standards for sound attenuation would have to be developed.

Financial Feasibility. This Alternative is costly and would not be eligible for Federal funding of those homes beyond the 65 DNL contour. Over a five-year period, the cost would be approximately \$30 million, not counting administrative costs, per year. This would be the responsibility of the County or local jurisdictions.

Realistic Implementation Time. The time required to fully implement this program would be several years. It takes a year or more to develop the administrative portions of the program, select the contractors and prioritize the structures. The actual sound attenuation work could take seven to ten years to complete.

Simple to Administer. Once the program is developed and set up, it is relatively simple to administer. It can be administered either with additional airport staff or a consultant hired to administer the program.

Simple to Implement. This type of program requires several contractors, administrative personnel and consultants to implement. Many varied issues will arise throughout the life of the program that will require some sophistication in addressing. The construction techniques themselves are not complicated, program implementation takes time.

Residential Purchase

This Alternative is to evaluate the feasibility of purchasing residential uses within certain DNL noise contours. The Federal guidelines limit funding eligibility to residential structures within the 65 DNL contour. In addition, most airports with a residential purchase program limit such purchases to the most highly impacted contours. There are various options to consider when evaluating a residential purchase program. The first is to determine which contour to use to identify eligibility; the 65, 70 or 75 DNL. The next is to determine if the purchase program is voluntary or mandatory. What if not all of the residents want to be purchased, how do you address those situations? How do you determine the actual purchase area boundaries to prevent community deterioration? What about Sales Assistance Program instead of outright purchase?

A Sales Assistance Program is a program where the airport guarantees the fair market value of the residence, but the homeowner sells the residence to a new

buyer and the airport never takes title to the home. This way the seller receives fair market value for his/her home. In this transaction, the seller grants an aviation easement to the airport prior to closing the sale. This does not remove the home from the noise contour, but it does let the market dictate the value of the home and allows a resident to purchase the home at a reduced cost knowing that the home is subject to an aviation easement. These are some of the issues which must be addressed when discussing a residential purchase program. Again, for general decision guidance, the future base case noise contour will be used in this evaluation as it is the largest and represents the greatest number of persons within the contours. The housing costs illustrated in the following analysis do not include relocation costs, closing costs or other administrative cost. They represent recent average sales for homes within close proximity to the airport.

Residential Purchase Within KCIA 65 DNL Contour. This represents the largest, Federally eligible residential purchase program available for the airport. Based on the future base case noise contour, there are approximately 1,955 homes within the 65 DNL noise contour. At a cost of approximately \$180,000 per home, this would result in approximately \$359.1 million to purchase the homes in the 65 and greater contour.

Legality. This Alternative is legal, is eligible for Federal funding although it has little precedence within the Seattle area.

Financial Feasibility. This Alternative is costly but is eligible for Federal funding at 90 percent. Over a five-year period, the cost would be approximately \$72 million, not counting administrative costs, per year. This could result in Federal funding of approximately \$65 million per year with County funding of approximately \$7 million per year. However, FAA policy is that they can only fund up to approximately \$5 million per airport each year, excluding public buildings.

Realistic Implementation Time. The time required to fully implement this program would be several years. It takes a year or more to develop the administrative portions of the program, select the contractors and prioritize the structures. The actual purchasing of the properties could take six to seven years to complete.

Simple to Administer. Once the purchase program is developed and set up, it is relatively simple to administer. It can be administered either with additional airport staff or a consultant hired to administer the program. However, once the property is purchased, the maintenance and upkeep of the properties requires constant supervision and attention, especially during the process of purchasing the homes prior to full purchase of the neighborhoods.

Simple to Implement. This type of program requires several realtors, contractors, administrative personnel and consultants to implement. Many varied issues will arise throughout the life of the program that will require some sophistication in

addressing. There are significant Federal guidelines and requirements that must be met, including relocation benefits and appraisal processes.

Residential Purchase Within Combined KCIA and SEA 65 DNL Contour.

This represents a potentially Federally eligible residential purchase program which may be available for the airport, although it is not known for certain as to what may be eligible. Based on the combined noise contour, there are approximately 687 additional homes within the combined 65 DNL noise contour that are not within the KCIA 65 DNL noise contour. At a cost of approximately \$180,000 per home, this would result in an additional approximately \$124 million to purchase the homes in the combined 65 DNL noise contour.

Legality. This Alternative is legal, may be eligible for Federal funding although it has little precedence within the Seattle area.

Financial Feasibility. This Alternative is costly and may be eligible for Federal funding at either 80 or 90 percent Federal participation. Over a five-year period, the cost would be an additional approximate \$25 million, not counting administrative costs, per year. This could result in Federal funding eligibility of approximately \$20 to \$22.5 million per year with County, Port of Seattle or local funding of approximately \$3 to \$5 million per year. However, FAA policy is that they can only fund up to approximately \$5 million per airport each year, excluding public buildings.

Realistic Implementation Time. The time required to fully implement this program would be several years. It takes a year or more to develop the administrative portions of the program, select the contractors and prioritize the structures. It would require coordination between the County, the Port of Seattle and the FAA for implementation. The actual purchasing of the properties could take six to seven years to complete.

Simple to Administer. Once the purchase program is developed and set up, it will still be difficult to administer due to the several entities involved. Some properties may be eligible for Federal funding and others may not. In addition, this is not consistent with existing Port of Seattle residential purchase policies and may not be jointly administered or funded by the Port. It can be administered either with additional airport staff or a consultant hired to administer the program. However, once the property is purchased, the maintenance and upkeep of the properties requires constant supervision and attention, especially during the process of purchasing the homes prior to full purchase of the neighborhoods. Again, one possibility could be that KCIA could contract with the Port of Seattle to provide administrative services since they have such services in place and have experience in sound attenuation administration.

Simple to Implement. This type of program requires several realtors, contractors, administrative personnel and consultants to implement. In addition, with implementation will be more difficult because it will require participation by not

on the FAA and County, but also the Port of Seattle. Many varied issues will arise throughout the life of the program that will require some sophistication in addressing. There are significant Federal guidelines and requirements that must be met, including relocation benefits and appraisal processes.

Residential Purchase Within KCIA 60 DNL Contours (Non-Standard Program). This represents a departure from the standard, Federally eligible residential purchase program. The homes are within a contour that is normally considered *not* eligible for Federal funding (beyond the 65 DNL noise contour). Based on the future base case noise contour, there are approximately 6,827 homes within the 60 DNL noise contour. At a cost of approximately \$180,000 per home, this would result in a cost of approximately \$1,229 billion to sound purchase homes within the 60 DNL or greater contours.

Legality. This Alternative is legal, although the homes beyond the 65 DNL are not eligible for Federal funding and has no precedence within the Seattle area.

Financial Feasibility. This Alternative is costly as it would not be eligible for Federal funding. Over a five-year period, the cost would be approximately \$246 million, not counting administrative costs, per year. This would be the responsibility of the County and/or the local jurisdiction. However, those homes within the 65 or greater DNL contour would be eligible for Federal funding which would reduce the overall non-Federal share.

Realistic Implementation Time. The time required to fully implement this program would be many years, most likely decades. It takes a year or more to develop the administrative portions of the program, select the contractors and prioritize the structures. The funds to acquire such properties are extraordinary and not within the budgetary constraints of the Federal government to help fund.

Simple to Administer. Once the program is developed and set up, it is relatively simple to administer. It can be administered either with additional airport staff or a consultant hired to administer the program. However, the purchase, removal and upkeep of the vacant properties would be very difficult to administer.

Simple to Implement. This type of program requires several contractors, administrative personnel and consultants to implement. Many varied issues will arise throughout the life of the program that will require some sophistication in addressing. A major issue confronting implementation would be the removal of such a significant number of structures from the County tax roles and the impact that it may have on the revenue of the County should be considered.

Residential Purchase Within Combined KCIA and SEA 60 DNL Contours (Non-Standard Program). This represents a departure from the standard, Federally eligible residential purchase program. There are two non-standard elements associated with this purchase program; homes are beyond the traditional 65 DNL contour and they are within a combined noise contour that would not be

within the contour for either airport if considered independently. Based on the future base case noise contour, there are approximately 1,343 homes within the combined 60 DNL noise contour that are not within either the KCIA or SEA "only" noise contours. At a cost of approximately \$180,000 per home, this would result in a cost of approximately \$241.7 million beyond the KCIA only 65 DNL noise and greater contours cost.

Legality. This Alternative is legal, would most likely not be eligible for Federal funding for the portion beyond the 65 DNL and has no precedence within the Seattle area. This issue of "combined contour funding" has never arisen in the Seattle region before, and there may be questions of legality from a Federal funding perspective. The standards for sound attenuation would have to be developed.

Financial Feasibility. This Alternative is costly and would not be eligible for Federal funding of those homes beyond the 65 DNL contour. Over a five-year period, the cost would be approximately \$48 million, not counting administrative costs, per year. This would be the responsibility of the County, Port of Seattle or local jurisdictions. In addition, this does not include the cost to purchase those homes within the KCIA "only" 60 DNL noise contour.

Realistic Implementation Time. The time required to fully implement this program would be decades. It takes a year or more to develop the administrative portions of the program, select the contractors and prioritize the structures. The number of structures is extraordinary and is without precedence in the Seattle area.

Simple to Administer. This program would be more difficult to administer due to the different entities involved. Once the program is developed and set up, it should be relatively simple to administer. It can be administered either with additional airport staff or a consultant hired to administer the program. However, the purchase, removal and upkeep of the vacant properties would be very difficult to administer. Again, one possibility could be that KCIA could contract with the Port of Seattle to provide administrative services since they have such services in place and have experience in sound attenuation administration.

Simple to Implement. This type of program is more difficult to implement due to two entities being involved. This type of program requires several contractors, administrative personnel and consultants to implement. Many varied issues will arise throughout the life of the program that will require some sophistication in addressing. A major issue confronting implementation would be the removal of such a significant number of structures from the County tax roles and the impact that it may have on the revenue of the County should be considered.

This section presents additional more detailed evaluation of selected operational and facility alternatives to determine applicability for noise reduction at King County International Airport.

Ground Run-up Enclosure

This Alternative is to evaluate the feasibility of constructing a Ground Run-up Enclosure on the airport for aircraft maintenance run-up operations. The GRE does provide significant noise reduction to close-in neighborhoods. The major concerns are two fold: one, is there a significant number of such operations to justify a GRE, both now and in the future; and two, is there sufficient area on the airport to accommodate such a facility without losing use of existing facilities and complying with FAA design standards?

Legality. This Alternative is legal, as long as it does not violate airport design and height requirements, and could be eligible for Federal funding (one at Oakland County Airport, Michigan is being funded with AIP funds).

Financial Feasibility. This Alternative is within reasonable cost parameters to construct, between one and two million dollars, depending upon apron and taxiway improvements needed.

Realistic Implementation Time. The time required to fully implement this program would be approximately two to three years. It will take time to identify and agree on a location, provide plans and specifications, take bids, select a contractor and the construct the facility.

Simple to Administer. This program would be rather easy to administer with existing staff and design consultants. Rules and regulations could be amended to require use of the facility.

Simple to Implement. This type of facility is rather simple to implement, once a location is identified, the facility constructed and rules adopted for its use.

Noise Wall on North End of Airport

This Alternative is to evaluate the feasibility of constructing a noise wall on the north end of the airport to reduce ground generated noise impacts to the residences adjacent to the airport. The noise wall does provide ground generated noise reduction to close-in neighborhoods.

Legality. This Alternative is legal, as long as it does not violate airport design and height requirements, and is eligible for Federal funding.

Financial Feasibility. This Alternative is within reasonable cost parameters to construct, approximately 3-500,000 dollars.

Realistic Implementation Time. The time required to fully implement this program would be approximately one year. It will take time provide plans and specifications, take bids, select a contractor and the construct the facility.

Simple to Administer. This program would be rather easy to administer with existing staff and design consultants.

Simple to Implement. This type of facility is rather simple to implement, just like any other construction project.

Noise and Compliance Monitoring System

This Alternative is to amend the existing noise complaint and monitoring system to be more responsive to citizen concerns and to provide additional information concerning significant loud noise events. This Alternative is tied to an expanded Fly Quiet Program.

Using the capabilities of the noise monitoring system, the process would include the ability to investigate special complaints by determining what the named operation was including the aircraft type, time of occurrence, flight track, altitude, aircraft operator and noise level. This information could be communicated to the person lodging the complaint by means of a basic report. Only unusual occurrences would receive this full analysis treatment. Airport staff would determine which events would be analyzed in this manner.

All complaints would be recorded and quantified quarterly and annually so that there would be a tally by neighborhood, time of day, and period of the year. This tally would be presented to the KCIA Roundtable on a quarterly basis.

Legality. This Alternative is legal, as long as it does not result in a fine or any type of mandatory flight procedure. Many elements are eligible for Federal funding.

Financial Feasibility. This Alternative can be within reasonable cost parameters, depending upon the sophistication of the system desired.

Realistic Implementation Time. The time required to fully implement this program would be approximately one to two years. It will take time to fully develop the program in conjunction with the Fly Quiet Program and may require time to upgrade some equipment.

Simple to Administer. This program would be rather easy to administer with existing staff, although as the system grows, additional staff may be necessary.

Simple to Implement. This type of program can vary in ease of implementation, once a program is decided upon. However, the program can also be rather sophisticated, requiring greater demands for implementation.

Fly Quiet Program

This Alternative is to develop a tracking system where operators at KCIA would be compared according to how well they complied with specific noise abatement procedures at the airport. Among the issues to be evaluated would be:

- Quality (noise level) of cargo operator's fleet
- FBO (Fixed Base Operator) pilot education/information program for itinerant aircraft
- FBO and Airline program for adherence to noise abatement flight tracks for based operators

Fly Quiet would use the information produced from the Noise Monitoring System to create quarterly reports which rank operations in three categories:

1. Cargo Airlines
2. FBO itinerant
3. Based aircraft

Fly Quiet reports would emphasize the positive in that they would reward those operators and/or FBOs which adhere the most consistently to the noise abatement procedures.

Positive accomplishments would be publicized by the airport by means of public information at the Roundtable, in airport publications and through information to elected officials in the City of Seattle and King County.

Legality. This Alternative is legal, as long as it does not result in a fine or any type of mandatory flight procedure.

Financial Feasibility. This Alternative can be within reasonable cost parameters, although it would require staff and/or Consultant time to fully implement. It may also require additional software upgrades will be required. An annual cost of approximately \$50,000 is anticipated.

Realistic Implementation Time. The time required to fully implement this program would be approximately six months to one year. It will take time create the report format from the Noise Monitoring System software and to define the appropriate numeric ranking system, so that operators are fairly compared.

Simple to Administer. This program would be rather easy to administer with existing staff although it may require some start-up time.

Simple to Implement. This process is rather simple to implement.

Pursuing Flight Paths to Reduce Noise

This Alternative is to alter existing flight paths (tracks) to reduce noise over residential areas. This Alternative was evaluated under several different scenarios, including the use of the Charted Visual Approach and Elliot Bay Departures. Each of these will be addressed separately.

Charted Visual Approach for arrivals to Runway 13R to shift arrivals to the Bay.

Legality. This Alternative is legal, although it requires FAA concurrence and development of the procedure. The Airport cannot implement this on its own.

Financial Feasibility. This Alternative does not result in any significant financial burdens to avoid implementation.

Realistic Implementation Time. This Alternative is in the implementation stage at the present time. The procedure has been developed and is being processed. In addition, it may require the preparation of an environmental document prior to actual use.

Simple to Administer. This Alternative is simple for the airport to administer, as no action is required by the Airport, but it may be an administration issue for the FAA.

Simple to Implement. This Alternative is simple to implement, as it just requires publication once it is developed and does not result in a drastic change in flight tracks.

Greater Use of Elliot Bay Departures.

Legality. This Alternative is legal, although it requires FAA concurrence and development of the procedure. The Airport cannot implement this on its own.

Financial Feasibility. This Alternative does not result in any significant financial burdens to avoid implementation.

Realistic Implementation Time. This Alternative would require additional procedure development and evaluation by the FAA to determine feasibility. It would also most likely require the use of FMS on board the aircraft for more precise guidance.

Simple to Administer. This Alternative is not difficult for the airport to administer as no action is required by the Airport, but it would require actions by FAA and aircraft owners and pilots.

Simple to Implement. This Alternative is not simple to implement, as it requires additional evaluation by the FAA and on board equipment for each aircraft. In addition, it would require publication once it is developed.

Make Policies Promoting Flying Over Non-Residential Areas

This Alternative is to publicize and encourage flying over non-residential areas on a voluntary basis. This is especially helpful for VFR flights.

Legality. This Alternative is legal as long as they are voluntary policies. There is no enforcement mechanism as such, although an accountability program can be developed through a Fly Quiet Program.

Financial Feasibility. This Alternative does not result in any significant financial burdens to avoid implementation.

Realistic Implementation Time. This Alternative can be implemented very quickly, with publication of the policies and specific guidelines taking the longest period of time.

Simple to Administer. This Alternative is simple for the airport to administer and no action is required by the Airport except a policy.

Simple to Implement. This Alternative is simple to implement, as it just requires publication once it is developed, as it does not result in a drastic change in flight tracks.

Increase Minimum Altitude over West Seattle

This Alternative is to increase the altitude over West Seattle for VFR flights approaching the airport.

Legality. This Alternative is legal, although it will be up to the FAA to publish and advise on the minimum altitude on approach.

Financial Feasibility. This Alternative does not result in any significant financial burdens to avoid implementation.

Realistic Implementation Time. This Alternative can be implemented as long as it does not interfere with other airspace issues. It may take some review time by the FAA to evaluate feasibility.

Simple to Administer. This Alternative is simple for the airport to administer, as no action is required by the Airport.

Simple to Implement. This Alternative is simple to implement. It just requires publication once it is developed, as it does not result in a drastic change in flight tracks.

Implement Building Design Standards for Noise Reduction

This Alternative is to develop and implement design standards for building constructed on the airport so that they will aid in noise reduction to close-in communities.

Legality. This Alternative is legal and can be implemented by the airport and County as a unilateral action.

Financial Feasibility. This Alternative should not result in any significant financial burdens to avoid implementation.

Realistic Implementation Time. This Alternative can be implemented very quickly. It is more of a declaration of policy to require new buildings to consider noise reduction/containment in their placement and orientation.

Simple to Administer. This Alternative is simple to administer, although it will require review time by airport staff.

Simple to Implement. This Alternative is simple to implement, as it is a policy declaration for new building construction.

Access Restrictions on Stage 2 Jets

This Alternative represents a restriction on Stage 2 jets, under 75,000 pounds, at the airport.

Legality. This Alternative is legal only after the completion of an approved FAR Part 161 Study. The approval is required concerning the methodology and the parameters, not the restriction itself.

Financial Feasibility. This Alternative requires a significant financial commitment, in the range of \$300,000 to \$1,500,000 in preparing the Part 161 Study and responding to FAA comments. This will most likely be without FAA participation.

Realistic Implementation Time. This Alternative would most likely take a minimum of two to three years to implement.

Simple to Administer. This Alternative can be rather difficult to administer. It would require publication and continued monitoring of aircraft operations by either airport employees or FBO's. If there is a violation of the restriction, a fine of some type would have to be levied.

Simple to Implement. Implementation of this Alternative is not difficult once it is approved, as several airports have such programs in place currently. It will take staff time to monitor and enforce, and could best be enforced when utilizing an improved flight tracking system.

Allow True Stage 3 Only

This Alternative represents a restriction on Stage 2 hush kitted jets, either under 75,000 pounds or over 75,000 pounds. Although there are few hush kitted jets under 75,000 pounds currently, hush kits are being manufactured and certified for use.

Legality. This Alternative is most likely not legal. The Federal government has determined that a hush kitted Stage 2 qualifies as a Stage 3. Therefore, it would be discriminatory to differentiate between hush kitted Stage 2 and manufactured Stage 3. In addition, it would require approval of the restriction by the FAA through a Part 161 Study.

Financial Feasibility. This Alternative requires a significant financial commitment, most likely more than the \$300,000 to \$1,500,000 for a Stage 2 ban, in preparing the Part 161 Study and responding to FAA comments. It would also most likely result in a loss of airport grant funds, and finding of being in non-compliance with grant assurances.

Realistic Implementation Time. This Alternative would most likely take a minimum of two to three years to implement, not including court time.

Simple to Administer. This Alternative is rather simple to administer although it would require publication and continued monitoring of aircraft operations.

Simple to Implement. Implementation of this Alternative is not difficult once it is approved. It will take staff time to monitor and enforce, and could best be enforced when utilizing an improved flight tracking system.

Restrict Certain Types of Aircraft

This Alternative represents a restriction on certain types of aircraft at the airport.

Legality. This Alternative would most likely not be considered legal, as it discriminates between aircraft types or users.

Financial Feasibility. This Alternative requires a significant financial commitment (\$300,000-\$1,500,000) in preparing the Part 161 Study and responding to litigation or administrative actions.

Realistic Implementation Time. This Alternative would most likely never be implemented.

Simple to Administer. This Alternative would be difficult to administer.

Simple to Implement. Implementation of this Alternative would be very difficult, if not impossible to implement.

Complete or Partial Curfew

This Alternative represents a restriction on Stage 2 jets during certain hours.

Legality. This Alternative is legal only after the completion of an approved FAR Part 161 Study. The approval is required concerning the methodology and the parameters, not the restriction itself.

Financial Feasibility. This Alternative requires a significant financial commitment, in the range of approximately \$300,000 to \$1,500,00, in preparing the Part 161 Study and responding to FAA comments.

Realistic Implementation Time. This Alternative would most likely take a minimum of two to three years to implement.

Simple to Administer. This Alternative is rather simple to administer although it would require publication and continued monitoring of aircraft operations.

Simple to Implement. Implementation of this Alternative is not difficult once it is approved, as several airports have such programs in place currently. It will take staff time to monitor and enforce, and could best be enforced when utilizing an improved flight tracking system.

Limiting Run-ups to Certain Hours

This Alternative represents a restriction on the time of day when run-ups can occur at the airport. The airport currently has a restriction that limits such run-ups to daytime hours.

Legality. This Alternative is legal as long as it applies to all operators so as not to be discriminatory.

Financial Feasibility. This Alternative requires little financial commitment by the airport. However, it could result in significant financial burden to operators.

Realistic Implementation Time. This Alternative would most likely take a minimum of six to nine months to implement.

Simple to Administer. This Alternative is rather simple to administer although it would require publication and continued monitoring of aircraft operations.

Simple to Implement. Implementation of this Alternative is more difficult. It can be difficult to monitor and enforce. It will take staff time to monitor and enforce, which may not be the most efficient use of time.

Prohibit Ground Testing at Night

This Alternative represents a continuation of the existing prohibition of engine run-up testing at night. Since this is an existing situation, no additional analysis is required.

Noise Complaint/Citizen Liaison Program

This Alternative represents an update and revisions to the current program in place at the airport. It should be incorporated with a Fly Quiet Program to achieve the best results.

Legality. This Alternative is legal and completely within the purview of the airport to implement.

Financial Feasibility. This Alternative requires some financial commitment by the airport in terms of both staff and equipment. The airport currently has committed staff to this program.

Realistic Implementation Time. This Alternative would most likely take a minimum of six to nine months to implement.

Simple to Administer. This Alternative is not difficult to administer although it would require commitment of staff personnel, which is currently the case.

Simple to Implement. Implementation of this Alternative is not difficult. The major problems are just time and resources.

Land Use Controls

This Alternative represents the implementation of various land use controls to ensure future land use compatibility with the airport.

Legality. This Alternative is legal and completely within the purview of the various jurisdictions to implement.

Financial Feasibility. This Alternative requires little financial commitment as each jurisdiction currently has planning and zoning personnel on staff.

Realistic Implementation Time. This Alternative would most likely take a minimum of nine to twelve months to implement, depending upon the adoption process of each jurisdiction.

Simple to Administer. This Alternative is simple to administer once it is adopted, using existing staff.

Simple to Implement. Implementation of this Alternative is not difficult. All of the jurisdictions have experience in implementing land use controls and procedures in place to expedite such implementation.

Alter the Angle of Climb/Descent

This Alternative represents an effort to reduce noise by altering the angle of climb after departure or the angle of descent prior to arrival.

Legality. This Alternative is legal only if it is voluntary and coordinated with the FAA. The airport cannot mandate where and how aircraft operate.

Financial Feasibility. This Alternative requires little financial commitment by the aircraft users and no significant burden to them.

Realistic Implementation Time. This Alternative would most likely take a minimum of several months to implement, based on FAA agreement to help implement such procedures. However, it may require publication and notification in publications for full implementation.

Simple to Administer. This Alternative is difficult to administer to ensure adherence due to the varied nature of the aircraft, the pilots, airspace considerations and weather conditions. Each aircraft has safety parameters for that specific aircraft which will define acceptable angles of climb or descent. When using the ILS, the glide slope is set at an approximate 3 degree approach angle, which is what most aircraft are designed to utilize.

Simple to Implement. Implementation of this Alternative is could be difficult due to the voluntary nature of the procedure, aircraft operating variations, weather conditions and airspace considerations.

Delay Point of Lowering Flaps and Gear

This Alternative represents an effort to reduce noise by delaying the point where aircraft would lower flaps and gear to somewhere past Magnolia, over the Bay.

Legality. This Alternative is legal only if it is voluntary and coordinated with the FAA. The airport cannot mandate where and how aircraft operate.

Financial Feasibility. This Alternative requires little financial commitment by the aircraft users and no significant burden to them.

Realistic Implementation Time. This Alternative would most likely take a minimum of three to six months to implement, based on FAA agreement to help implement such a procedure. However, it may require publication and notification in publications for full implementation.

Simple to Administer. This Alternative is difficult to administer to ensure adherence due to the varied nature of the aircraft, the pilots, airspace considerations and weather conditions.

Simple to Implement. Implementation of this Alternative is could be difficult due to the voluntary nature of the procedure, aircraft variations, weather conditions and airspace considerations.

Administrative Actions/Use of Ground Leases/Fees to Influence Operation Types

This Alternative represents an effort to use ground leases/landing fees to influence the types of operations that occur at the airport.

Legality. This Alternative is most likely legal in certain aspects and questionable in others. If leases/landing fees are used to influence noise levels, it can be accomplished only through the Part 161 process.

Financial Feasibility. This Alternative requires some financial commitment by the airport in terms of staffing requirements and time.

Realistic Implementation Time. This Alternative would most likely take a minimum of one to three years to complete the Part 161 process and implement. If lease provisions are involved, it will take even longer due to long term lease provisions.

Simple to Administer. This Alternative is difficult to administer, which is one reason most general aviation airports do not have such landing fee provisions. Lease provisions are easier to administer, except for cases where there are long term leases involved that are not all on the same terms..

Simple to Implement. Implementation of this Alternative is difficult, and would most likely require successful completion of a Part 161 Study.

Reserved for adopted
Noise and Land Use Compatibility Program

Appendix

BACKGROUND

GROUND RUN-UP ENCLOSURES

Noise from aircraft maintenance run-ups is a concern facing many commercial airports. Airlines must conduct maintenance repair on aircraft. For certain types of aircraft maintenance, the airline must conduct an engine run-up in order to demonstrate that the aircraft's in-flight systems are working properly before the aircraft can be put back into service.

To mitigate the noise from run-up operations, a number of options are available. These options have a wide range in application, cost, degree of noise reduction and technical complexity. Therefore, it is important to first focus on the noise problem and the level of noise reduction that is necessary and then select the design options that best address the noise problem. The design options must account for the unique conditions that exist at each airport. These unique conditions include availability of land, wind conditions, atmospheric conditions and the types of maintenance work performed at the airport.

Noise control measures for aircraft run-up operations at commercial airports in the United States have primarily consisted of restrictions on the orientation and location of the aircraft during the run-ups and through airport restrictions on the time and duration that run-ups can occur. Airports in Europe and Asia have also utilized noise barriers and ground run-up enclosures to control run-up noise. These enclosures have had varying degrees of success, with the primary constraint being aerodynamics, not acoustics.

Military airports have also had to control aircraft run-up noise. Considerable technology has been developed for these military aircraft to control the noise from run-ups. The military primarily uses fully enclosed structures (hush houses) to mitigate the very high noise levels associated with fighter aircraft. These noise suppressor designs are built throughout the world. However, the use of this technology does not easily translate into applications for commercial aircraft. There are currently no fully enclosed hush houses for commercial aircraft.

Ground Run-up Enclosure vendors are now developing new designs to address the special challenges associated with conducting run-ups for commercial jet aircraft within structures. These enhancements are designed to allow proper airflow into the engine inlet and to reduce the potential for exhaust gas re-circulation., while still achieving the necessary noise reduction.

Ground Run-up Noise Control Options

Various vendors have proposed a number of alternative noise control options. Sample alternative technologies are presented in the following exhibit and are described below:

Run-up Operational Management: This method consists of utilizing noise control measures to mitigate the noise impacts from run-up operations. These measures include operational restrictions on run-ups as well as sitting and orienting the run-up location to minimize the noise impacts upon the community.

Aircraft Run-up Barrier/Berm: This system generally consists of a barrier or berm that is located on one side of the run-up location. Typically the barrier/berm is not located close enough to the aircraft, so that its effectiveness is reduced. This type of system is most effective when the required amount of noise reduction is low and the effected community is located on one side of the airport.

Aircraft Ground Run-up Enclosure: An aircraft run-up pen generally consists of a two, three or four-sided barrier that surrounds the aircraft. The barriers are located close to the aircraft and usually include noise absorption panels. A common term for these facilities is Ground Run-up Enclosures (GRE).

Noise Suppressor System (Trim Pad Suppressor): This system consists of a complete and operable facility capable of satisfying the operational requirements of the assigned aircraft during engine trim pad service operations. This system is commonly called a trim pad noise suppressor and consists of a fixed or movable structure that attenuates the exhaust noise. The exhaust gas is directed through a specially designed exhaust muffler.

Aircraft Acoustic Enclosure (Hush House): Aircraft acoustic enclosures, commonly referred to as hush houses, are engine exhaust muffler systems where the aircraft and the exhaust muffler are fully enclosed in a building. The buildings have movable entry doors to allow the aircraft to enter the building. They are generally designed for a specific type of military aircraft and have not previously been demonstrated to be practical for commercial aircraft use.

Active Noise Control: Active noise control reduces the noise through noise cancellation technology. Small-scale research studies have shown that this technology can provide reductions in aircraft run-up noise in the communities near the airport. However, this has not actually been applied at any airport and represents a future technology.



Noise Reduction Goals

An important step in a noise mitigation study is to identify the noise reduction goals for the program. Often noise standards developed by the local government dictate the standards or goals. One additional criterion would be based upon speech and sleep interference criteria and research.

Evaluation Criteria

A vast array of potential mitigation designs may be considered. Thus, it is important to identify criteria that would be used to evaluate the different alternative. This allows for a method of comparison under which a cost benefit analysis can be completed. This evaluation criterion includes not only the acoustic performance, but also aerodynamic performance, ease of use and cost.

Design Considerations

There are a number of important design considerations in evaluating ground run-up enclosure facilities. These are listed below and described in greater detail in the following paragraphs.

- Blast Wall Design
- Acoustic Panel Design
- Aerodynamic Design
- Door Design
- Meteorology

The most important point is that the design considerations include designs that effect both the acoustic and aerodynamic performance. Unfortunately many designs may be good for acoustics but poor for aerodynamics. Aerodynamics are important because if the airlines can not use the facility its value is diminished. Thus, the design must be a balance between two competing factors that are both equally important.
