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# **RCAA**

## **Regional Commission on Airport Affairs**



**Maps and charts ■ Airports and alternative planning  
Demand and capacity ■ Economics ■ Health ■ Noise  
Environmental and social impacts**





801 S.W. 174th St.  
Normandy Park, WA 98166  
(206) 248-7603

**RCAA ENDORSING  
ORGANIZATIONS**

Airport Noise Action Council  
Aircraft Noise Coalition  
Aircraft Noise Group  
Beverly Park Community Club  
Brown's Point Improvement Club  
Citizen's Ad-Hoc Committee  
Citizens to Save Puget Sound  
Citizens Alternatives to  
Sea-Tac Expansion  
City of Burien  
City of Des Moines  
City of Normandy Park  
City of Tukwila  
Communities Against Noise  
- Beacon Hill  
Friends of Lincoln Park  
Community Council  
Greater Des Moines  
Chamber of Commerce  
Haller Lake Community Club  
The Highline Community Council  
Highline Hospital District  
Highline School District  
Highline Community College  
Hurstwood Community Club  
Lakewood/Seward Park  
Community Club  
Montlake Community Club  
Mt. Baker Community Club  
North Hill Community Club  
Ocean View Community Beach Club  
Portage Bay /Roanoke Park  
Community Council  
Ravenna-Bryant  
Community Association  
Redondo Community Club  
Salmon Creek Community Council  
Seahurst Community Club  
Seattle Citizens For Quality Living  
Shorewood Community Council  
Southeast Area Action Council  
WAAR  
Wesley Terrace Center  
White Center Chamber of Commerce  
White Center Ad Hoc Committee  
White Center Youth Task Force

January 26 1993

The Regional Commission on Airport Affairs (RCAA) is a unique consortium of cities and citizens working to protect Puget Sound Region's quality of life and economic stability.

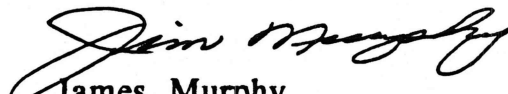
We are opposed to the proposed third dependent runway at Sea-Tac and are taking a pro-active approach to find financially feasible and environmentally responsible ways to meet the air capacity needs of our region.

We are pleased to present summary materials regarding the topics of airports and alternative planning; demand and capacity; economics; health, social and environmental impacts.

Because many of the issues under consideration are complex public policy concerns, the RCAA has sought to work with well respected and technically qualified experts. Summaries of their findings on these issues are included in this packet.

We hope you find this information useful in gaining a better understanding of the air capacity issues in the Puget Sound Region.

Best regards,

  
James Murphy  
President



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- *Charts: "Responsible Airport Planning," Osbun, Frank, CASE. 1992.*

### Noise

- *Executive Summary: "Noise Differences Between Stage 1, 2, and 3 Aircraft," Lloyd, Betsy. October, 1992.*
- *Executive Summary: "Comments On Noise Aspects Of Regional Airport System Plan," Chalupnik, James, Ph.D. 1992.*

### Health

- *Noise From Sea-Tac Airport: Adverse Effects On The Health Of Puget Sound Citizens*
- *Executive Summary: "The Adverse Health Impacts Of Airport Expansion With Particular Reference To Sea-Tac International Airport," Hansen, Dennis, M.D., and Sanders, Lee, M.D., Ph.D. October, 1992.*

### Environmental and Social Impacts

- *Sea-Tac Airport: Effect On The Environment*
- *Executive Summary: "The Impact Of Aircraft Noise On The Education Of Children," Angello, Nancy, Ph.D. January, 1993.*
- *Letter From Archdiocese Of Seattle*
- *Executive Summary: "How Does Air Pollution Contribute To Our Health Problems," Williams, Beth. November, 1992.*
- *"Sea-Tac Third Runway Land Requirements And Impacts," Lloyd, Betsy. 1992.*
- *"Water Quality Issues Related To Sea-Tac Airport Expansion," Hansen, Ingrid. 1993.*

### Economics

- *Economic Impact Of Proposed Third Runway At Sea-Tac Airport*
- *Presentation By Richard Zerbe, Jr., Ph.D. To The Port Of Seattle*
- *Remarks By Richard Aramburu Before The Port Commission*
- *"General Comments On The Draft Environmental Impact Statement," Michaelis, Lynn, Ph.D. 1992.*
- *Devaluation Of Real Estate: "Summary Of Marvin Frankel's Survey And Other Studies," Zerbe, Richard, Jr., Ph.D., and Andrea Hambly. 1992.*
- *"Estimated Remaining Mitigation Costs For Second Runway At Sea-Tac International Airport," Aschenbach, Hans, M.B.A. 1992.*
- *Executive Summary: "The Cost Of Noise Mitigation At Sea-Tac International Airport," Aschenbach, Hans, M.B.A. January, 1993.*

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*(Table Of Contents Continued)*

- *Executive Summary: "Costs And Effects Of Air Capacity Constraints," Dye Management Group. September, 1992.*
- *Cost Estimates For Recently Completed And Proposed Third Runways*

**Airport And Alternatives Planning**

- *"Preliminary Recommendations Of RCAA For Amendments To Regional Airport System Program," Aramburu, Rick. 1993.*
- *"Airports, Noise, And Airport Development," Rosenberg, Matthew. December, 1992.*
- *Excerpt From "Future High Speed Ground Transportation System Impacts On Airport Expansion Needs In The State Of Washington," Cooper, Hal, B.H., Jr., Ph.D, P.E. January, 1993.*
- *Excerpt From High Speed Ground Transportation Study Executive Summary. October, 1992.*
- *Letter To Washington State Air Transportation Commission Re: Statewide Siting*
- *Letter To Rick Aramburu Re: Toledo-Winlock Area Visitation*
- *Excerpt From Air Transportation Committee Meeting Minutes Re: Central Washington Siting*

**Demand And Capacity**

- *Executive Summary: "Flight Plan Air Travel Demand And Forecast Analysis Papers," Gibson Economics. January, 1993.*



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- Montlake Community Club
- Mt. Baker Community Club
- North Hill Community Club
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- Redondo Community Club
- Salmon Creek Community Council
- Seahurst Community Club
- Seattle Citizens For Quality Living
- Shorewood Community Council
- Southeast Area Action Council
- WAAR
- Wesley Terrace Center
- White Center Chamber of Commerce
- White Center Ad Hoc Committee
- White Center Youth Task Force

To achieve a long-term integrated plan for air and surface transportation to meet the competitive needs of Washington state.

To achieve immediate and permanent reduction in noise and other adverse environmental impacts from commercial aircraft in the Puget Sound Region.

**RCAA GOALS:**

Relative to Seattle-Tacoma International Airport:

- \* Prohibit building of a Third Runway
- \* Cap the number of operations
- \* Implement efficient Demand Management
- \* Insure enforcement and improvement of noise and pollution reduction budgets
- \* Rescind the "Four Post Plan"
- \* Insure economic vitality of the airport community

Relative to Regional and State Needs:

- \* Support intermodal transportation development, emphasizing high speed rail
- \* Secure fair and timely compensation for impacts from aircraft operations
- \* Support a cargo and maintenance base outside of urban areas
- \* Promote rapid development of new airport capacity at "green grass" sites



## R.C.A.A. WHITE PAPERS

### EXECUTIVE SUMMARY

\* ***The Sea-Tac Third Runway costs too much:*** Up to \$500 million construction costs alone; \$2-3 billion including construction, debt service, add-on's, and lost property values. Ninety percent of these costs will be paid by passengers, local taxpayers, and homeowners.

\* ***Passengers and taxpayers get very little for their money:*** The money buys a limited utility runway, a heavy public subsidy for inefficient commuter flights, the equivalent of seven King Domes of fill dirt, small additional passenger capacity, and heavy long-term liabilities. Even after expansion, Sea-Tac will still be an old 1950's urban airport: far too small and in the worst possible location for a major airport.

\* ***Contrary to myth, there is no evidence that Sea-Tac expansion will be good for the local economy:*** There is little evidence that airport expansions generate many jobs and studies show that neither delays nor capacity caps have any demonstrable effect on local economies. No true cost/benefit or residential property devaluation studies of the Flight Plan proposal have ever been done. Economists find the economic section of the Environmental Impact Statement both inaccurate and "woefully inadequate."

\* ***Sea-Tac is a white elephant:*** Old urban airports shoehorned into the middle of densely populated areas like Sea-Tac could face severe liability issues in the coming decade. Sea-Tac's tiny size (just 2600 acres) and hemmed-in location make it especially vulnerable.

Recent studies link noise & air pollution from jet airports to a whole host of *health* problems, ranging from low birthweight babies to heart disease. Long-term cancer studies have just begun because of the high concentrations of air pollutants and high concentrations of known carcinogens such as benzene & ozone in airport communities. 67,000 people live in the high noise area (65 + DNL) alone. Perhaps twice that number live in the 55 + DNL area associated with sharp increases in rates of heart disease & mental disorders. Hundreds of thousands live in the sleep disturbance area. No recent *safety* studies of Sea-Tac have been done despite its inadequate clear zones, massive increases in arrivals and departures since deregulation, and recent routing changes putting dense ground populations under the approach and takeoff corridors.

\* ***There are many near- and long-term alternatives not considered by Flight Plan that would provide better service and are a better long-term investment:***

Flight Plan virtually ignored a) alternative runway sites outside of King, Pierce, and Snohomish Counties and b) the use of high speed rail.

**Short to mid-term:** *Demand management* and *peak/demand pricing* would be an especially effective near- to mid-term alternative at Sea-Tac because commuter flights, primarily to Portland and Vancouver, B.C. consume 42% of the current capacity but serve just 8.5% of the total passengers.

**Mid-term:** *High speed rail service*, such as the "tilt-train" now operating in Sweden and being tested by Amtrak on the New York to Washington D.C. corridor, could be installed with initial moderate speed 110 M.P.H. service on existing rails from Eugene, Oregon to Vancouver B.C. for approximately \$1.2 billion dollars. The Everett to Portland link can be built by the year 2000. . In addition, opening *another regional airport* away from Sea-Tac provides more capacity than the third runway and more convenient ground access for those outside King County.

**Long-term:** A *new state-of-the-art* airport at a large, ex-urban green grass site serving global, freight, maintenance and transfer traffic connected to urban areas by high speed rail. The New Denver Airport at an exurban site cost \$3 billion for the largest airport in the world. Similar state-of-the-art airports are in planning or built for Chicago, Minneapolis, Atlanta, Texas, & San Diego.

## THE FACTS OF SEA-TAC EXPANSION

### HOW MUCH WILL IT COST?

The total cost of the third runway may reach \$2-3 billion: \$1.1 billion for construction with debt service; \$1.1 billion for add-on's with debt service, and \$400 million to \$1.3 billion in lost property values.

\* **CONSTRUCTION COSTS:** At up to \$500 million estimated construction costs, the proposed third runway at Sea-Tac will be the most expensive runway ever built in the U.S., costing twice as much as the next most expensive proposed runway (Orlando independent runway \$168 million.) With debt service over 20 years, actual construction costs could be \$1.15 billion.

\* **ADD-ON COSTS:** Not included in the construction cost estimate are necessary add-on's for the following:

- |  |  |
|--|--|
| 1) improved ground access                        | 2) expanded terminal and baggage facilities              |
| 3) second runway mitigation (est. \$225 million) | 4) third runway mitigation                               |
| 5) pollution cleanup and control                 | 6) legal liabilities for airport-induced health damages. |

These add-on's have not all been estimated, but the total could easily exceed the cost of the third runway itself, another \$500 million or \$1.1 billion with debt service.

\* **LOST PROPERTY VALUES:** Property values, especially residential, both inside and outside the immediate area of the airport will drop significantly due to noise and pollution. Economists estimate those losses between .4% and 1.3% per decibel above 55 LDN. Those losses to the tax base will result in higher taxes elsewhere in the County. One economist estimates lost property values in the most heavily impacted area alone to be roughly \$800 million. Property value losses in Seattle, Medina, Federal Way and Tacoma outside the immediate area of the airport have not been estimated but are substantial because the current 55+ LDN zone extends from the Ship Canal bridge to Commencement Bay, an area with hundreds of thousands of homes. One economist estimates the losses for 100,000 homes in 55+ LDN at between \$400 million and \$1.3 billion, the average loss to each homeowner between \$4,000 and \$13,000.

### WHO PAYS THE COSTS?

\* Ninety percent of the construction costs will be paid for by new passenger taxes (50.4%) and Port of Seattle general revenue (40.6%). About 8% will be paid by the F.A.A. King County taxpayers will be responsible for picking up the tab for shortfalls from airport revenues or passenger taxes. No revenue sources have been identified for add-on costs. Property value losses are paid by the property owners, and the loss in tax base will be shifted to the rest of King, Pierce & Snohomish County taxpayers.

### WHAT DOES THE MONEY BUY?

The passengers and taxpayers receive very little for their money.

\* **LIMITED UTILITY RUNWAY:** Despite the high cost, the proposed Sea-Tac third runway is only a 7,000 ft. parallel, dependent runway. It is of limited utility because it uses the same air corridors and is dependent on the operation of the other two runways. If Port of Seattle projections hold up, its primary use will be to reduce flight delays during bad weather at peak periods--approximately 17% of the time at Sea-Tac.

\* **HEAVY SUBSIDY FOR INEFFICIENT COMMUTER OPERATIONS:** 42% of current Sea-Tac capacity is consumed by just 8.5% of the passengers--those taking commuter flights local destinations, primarily Portland and Vancouver, B.C. Over the space of four years from 1986-1990, commuter operations tripled to over 150,000 operations a year, 410 flights a day. But the average passenger load was only ten people per operation.

It makes no sense to ask the taxpayers and other passengers to pay a grand total of \$2-3 Billion in order to subsidize 410 commuter flights a day for two or three airlines serving less than ten percent of the

total passengers. Commuter convenience could easily be served by half as many operations with more efficiency per operation or by high speed rail. Very small reductions in the number of commuter passengers on inefficient flights produces huge changes in the demand for runway capacity at Sea-Tac. Economists agree that much of the inefficient commuter operation is caused by unbusiness-like pricing and marketing policies by the Port.

\* **SMALL ADDITIONAL CAPACITY:** According to Flight Plan, the Sea-Tac third runway adds only 10 million additional annual passenger capacity. Reducing future demand for flight operations capacity by as little as 15% would reduce anticipated delays to below four minutes on average well into the next century.

\* **AN INADEQUATE AIRPORT:** Sea-Tac is too small and in the wrong location to serve as the major airport of the 21st century.

**Size:** Sea-Tac is one of the smallest major airports in the country, just 2600 acres with inadequate clear zones and no buffer area. 19th in operations, Sea-Tac is not in the top 100 airports nationally in terms of size. Rifle, Colorado has a larger airfield.

**Location:** Sea-Tac is in the worst possible location for a major jet airport. It occupies a hilly wetland requiring huge amounts of expensive fill to create flat runway areas (17,786,600 cu. yards--1,778,660 truckloads for the third runway alone.) Further expansion is even more difficult. It is tightly hemmed in by dense populations. 67,000 people live in the 65+ DNL high noise impact area alone. Flight lines beyond 65+ DNL extend over the densest residential population corridors in the entire state. Jets approach and takeoff over most of the major hospitals and two large universities.

**New Aircraft Technology:** Much of the global air traffic in the next century is going to be carried on the 600-800 passenger superjumbos, superfreighters, and hypersonic aircraft now under design. However, the special fuels used by these aircraft as well as the additional noise, air pollution, and toxic wastes generated by their large engines are unsuited to old, obsolescent urban airports like Sea-Tac.

#### **WILL EXPANSION BENEFIT THE LOCAL ECONOMY?**

\* **FEW JOBS:** Studies show that airports are poor generators of jobs and that the bulk of the jobs are low wage and/or temporary. Additional runways create even fewer jobs than new airports. Increasing noise pollution causes job losses because those who can afford it to leave the area reducing their custom with local businesses. Economists criticize the Flight Plan jobs analysis, pointing out that:

- 1) It counts jobs created twice.
- 2) It miscalculates net job benefits.
- 3) It does not estimate job losses.
- 4) It does not distinguish high wage from low wage jobs.
- 5) It does not distinguish between new jobs and old jobs.

\* **OTHER COSTS & BENEFITS NOT KNOWN:** A recent study concludes that neither significant delays nor outright capacity caps have any measurable effect on local economies. Certain businesses, such as the film industry or tourist businesses catering to vacationers suffer from noise pollution.

Economists criticize the Flight Plan analysis of economic benefits on several points:

- 1) It has no study at all of property value or tax base losses.
- 2) It does not calculate business losses or losses from people leaving the area to escape noise.
- 3) It overstates the economic impact of delays (and very likely overestimates predicted delays.)
- 4) It contains no estimates of costs of health and social impacts.
- 5) It contains no estimates of costs of ground access or pollution controls called for in the plan.
- 6) It contradicts other statements in the EIS.
- 7) It gives no value to the quality of life for residents near the airport, in City of Seattle, Federal Way, Medina, Bellevue, Issaquah and Tacoma--all of whom live in areas where Sea-Tac jet noise is sufficient to create sleep disorders.
- 8) It overstates the benefits for international traffic (2% of total traffic.)

Economists agree that the data in the Flight Plan analysis is so faulty and inadequate that no cost vs. benefit analysis can be done. Costs may very well outweigh the benefits.



## WHAT IS THE LIABILITY PROBLEM?

In the 1980's serious study was begun on the affects of airport noise and air pollution on human populations. Despite the location of both Sea-Tac and Paine Field in the middle of densely populated areas, the results of these studies were completely overlooked by the Flight Plan analyses. The prognosis for old urban airports is not good. The initial results show an enormous number of very serious health effects from noise, air, and toxic pollutants.

**NOISE:** Studies associate airport noise with the following health disorders:

- Reduced birthweights
- Premature births
- Possible birth defects
- Increased use of tranquilizers & sedatives
- Hypertension, high cholesterol, high blood pressure
- Heart disease
- Stomach and duodenal ulcers
- Alcoholism & cirrhosis of the liver
- Sleep disorders and REM sleep disorders
- Mental disorders & high rates commitment to mental institutions

Although Flight Plan doesn't study more than the 65 + DNL area, other epidemiological studies show sharp increases in hypertension and mental disorders at 55 + DNL. The 65 + DNL standard was adopted without any scientific basis, and its appropriateness is under fire nationwide. The effects are not minor. One study showed that antacid prescriptions for ulcers nearly doubled in one community after the building of an additional runway. Another found a 100% increase in the rate of cirrhosis of the liver related to alcoholism around a large international airport. Doctors conclude that airport communities are unsafe for pregnant women.

The change to Stage III (quieter) aircraft will have little effect, especially in the presence of increasing flights. The difference between Stage II and Stage III aircraft is between 3 decibels for hush-kitted planes and 7 decibels for new planes. Some 747's are already Stage III and are noisier on landing than some Stage II's on take off. Studies show that 10 decibel reductions are required for people on the ground to hear the difference, especially in high-noise neighborhoods. There is little evidence that the change to Stage III will significantly reduce the noise burden on those in the 55 + DNL zone or improve health problems, especially with predicted increases in operations.

**AIR POLLUTION:** Airports are a major source of air pollution: carbon monoxide, particulates, sulfur oxide, nitrogen oxide, hydrocarbons, benzene, ozone, and lead. Associated health effects include:

Asthma	Mental retardation
Emphysema	Kidney disorders
Allergies and sinus disorders	Miscarriage & still birth
Heart disease	Leukemia
Cancer	Respiratory illness

These pollutants are concentrated in airport communities. For example, the proposed WAC standard for benzene, a known carcinogen associated with leukemia, is .063 parts per trillion. The State Department of Ecology estimates that Sea-Tac airport communities experience concentrations of 24,000 parts per trillion at times, 381,000 times the acceptable standard. Studies measuring the concentrations of air pollutants around Sea-Tac have not yet begun. Long-term cancer studies in airport communities have just begun at Hartfield Airport in Clayton County, Georgia where the lung cancer rate is twice normal. The results of measurements and additional studies will be available in the next decade with the strong likelihood that anecdotal evidence of high rates of respiratory disease and cancer in airport communities will be confirmed.

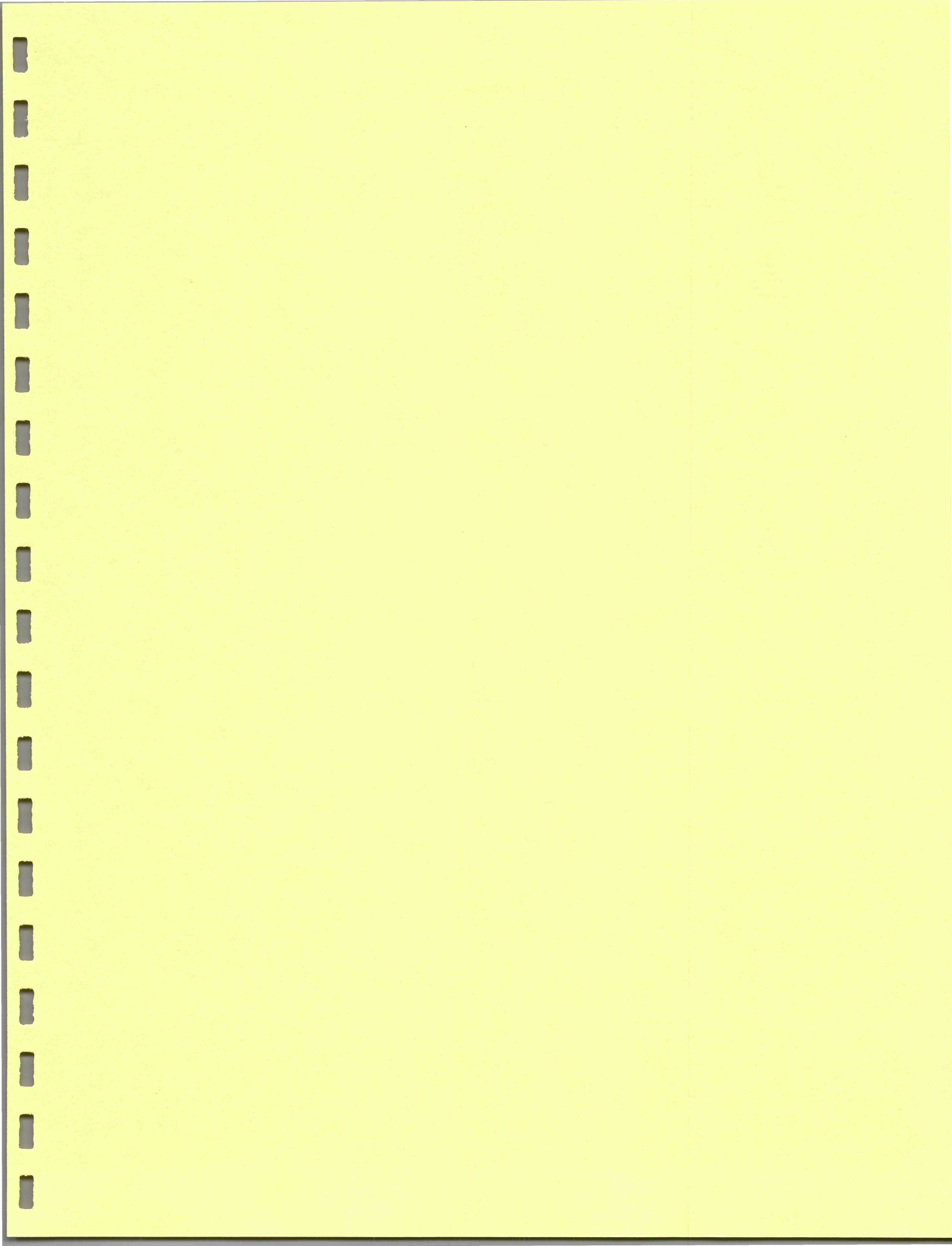
Flight Plan avoids the issue by failing to discuss impacts between now and the year 2020. The methods of measuring noise and drawing noise maps--indeed, the 65 DNL standard itself--are under hot dispute nationwide. Failure to measure the concentrations of air pollution in airport communities is also under attack. (The Hartfield study is being supervised by a grand jury.) The most likely outcome of this situation is lawsuits holding airport operators liable for damages from their pollution. Airports that have been shoehorned into existing dense communities, like Sea-Tac, are highly exposed. Although R.C.A.A. does not advocate closing Sea-Tac, policy makers should be aware that Sea-Tac may very well be faced with liability problems in the next decade. Response may eventually require severely curtailing Sea-Tac operations and much more extensive mitigation than the small programs currently proposed.

#### WHAT ARE THE ALTERNATIVES?

\* **SHORT TO MID-TERM:** *Demand management and peak-demand pricing* would be an especially effective near to mid-term alternative at Sea-Tac because 42% of the current capacity is consumed by just 8.5% of the passengers on short hop commuter flights, primarily to Portland and Vancouver B.C. With 410 flights a day (150,000 per year) averaging just ten passengers per flight, excellent service could still be provided with half those flights at just 20 passengers per flight. One study by the F.A.A., the Port and the airlines shows that a reduction of just 15% of future demand would reduce estimated delays below four minutes well into the next century, leaving plenty of time to develop broader intermodal solutions to long-term airport needs.

\* **MID-TERM:** A recent study by the Washington State High Speed Rail Commission showed that *high speed rail* service along the existing I-5 rail corridor would provide efficient downtown-to-downtown service as well as connecting to future airport sites. Existing technology, such as the Swedish built "tilt-train" now being tested by Amtrak on the New York to Washington D.C. corridor, could provide this service on existing rail lines. Initial moderate 110 M.P.H. speeds could be installed from Eugene, Oregon to Vancouver, B.C. for an estimated \$1.2 billion dollars. Similar service connecting Eastern and Western Washington could be provided on existing rails. *An additional regional airport* outside of King County would provide more capacity than a third dependent runway at Sea-Tac.

\* **LONG-TERM:** It is clear that sometime in the next century, the State of Washington will need a *new state-of-the-art airport* at a large ex-urban green grass site. It should have plenty of room for expansion, be capable of handling a variety of new aircraft, be well-connected to the entire state, and be able to serve global, freight, maintenance and transfer traffic. It can be connected to urban areas by high speed rail. The New Denver airport, the largest airport in the world, cost \$2.95 billion dollars total including 5 independent, multi-directional runways (\$380 million), terminal facilities, a 53 sq. mile site, room for seven more runways, and a high speed rail connection. Similar large, exurban airports are in planning or built for Atlanta, Minneapolis, Chicago, Texas, and San Diego. Setting aside a large, ex-urban green grass airport site with two runways and room for expansion could cost the same or less than the total costs of a third runway at Sea-Tac. Good sites exist in Southwest, Central and Eastern Washington.



## How Much Noise Does Each Plane Make?

80 decibels single event (SEL)-enough noise to wake a person up inside with the windows closed and REM sleep disturbances among those not waked up.

85 decibels SEL-enough noise to interrupt phone conversations, classes, meetings etc.

100+ decibels SEL-toxic levels of noise pollution linked with hearing loss, heart disease, increased rates of mental commitments, and attention deficit and other learning disorders.

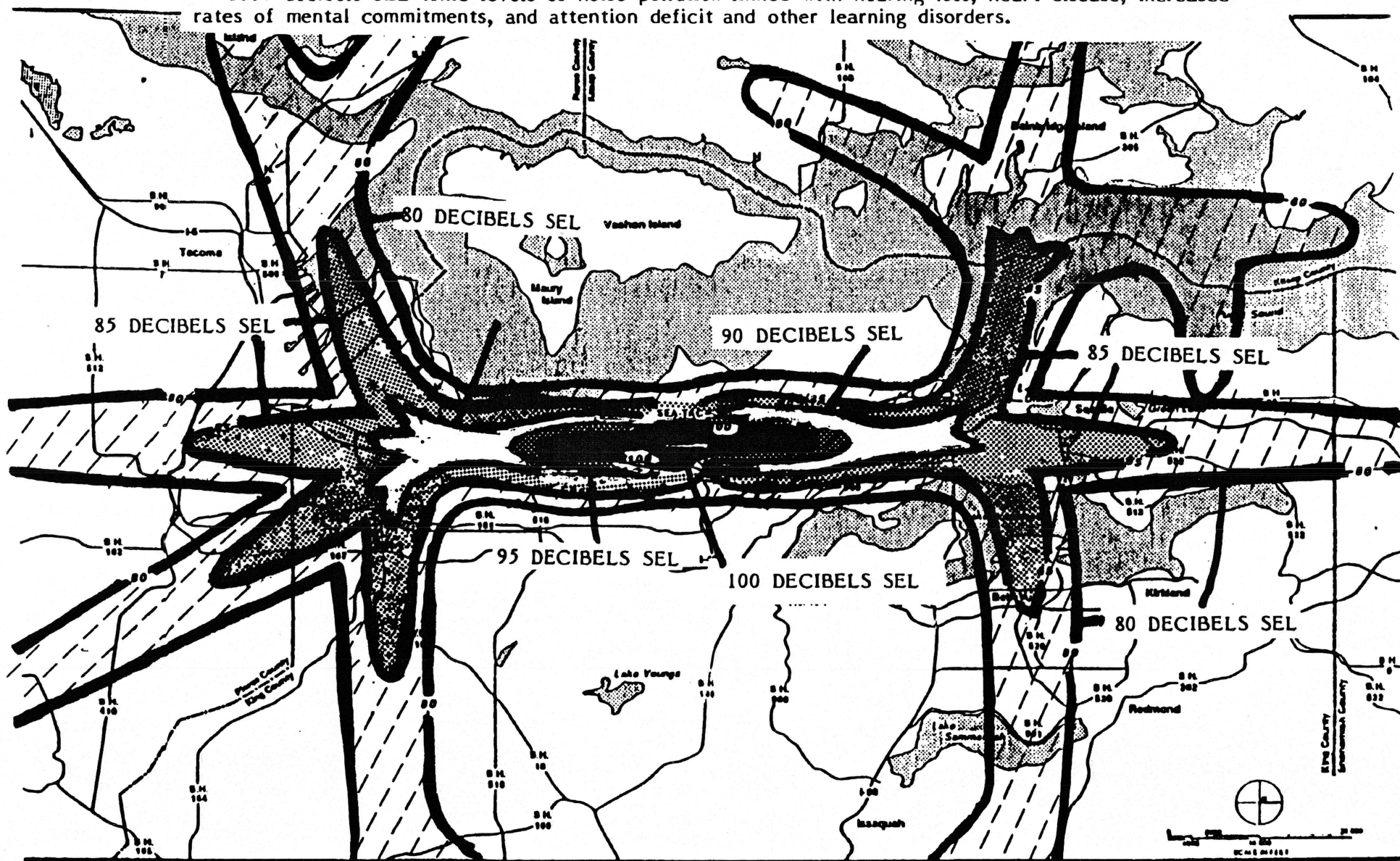


Exhibit 1-9

Sample Departure SEL Noise Levels (727-200/15QN)

Proposed 4-Post Conditions

January 29, 1990

727 is a "Stage II" (older) jet. A Stage III with a hush-kit would be three decibels quieter; a brand new Stage III would be 7 decibels quieter.

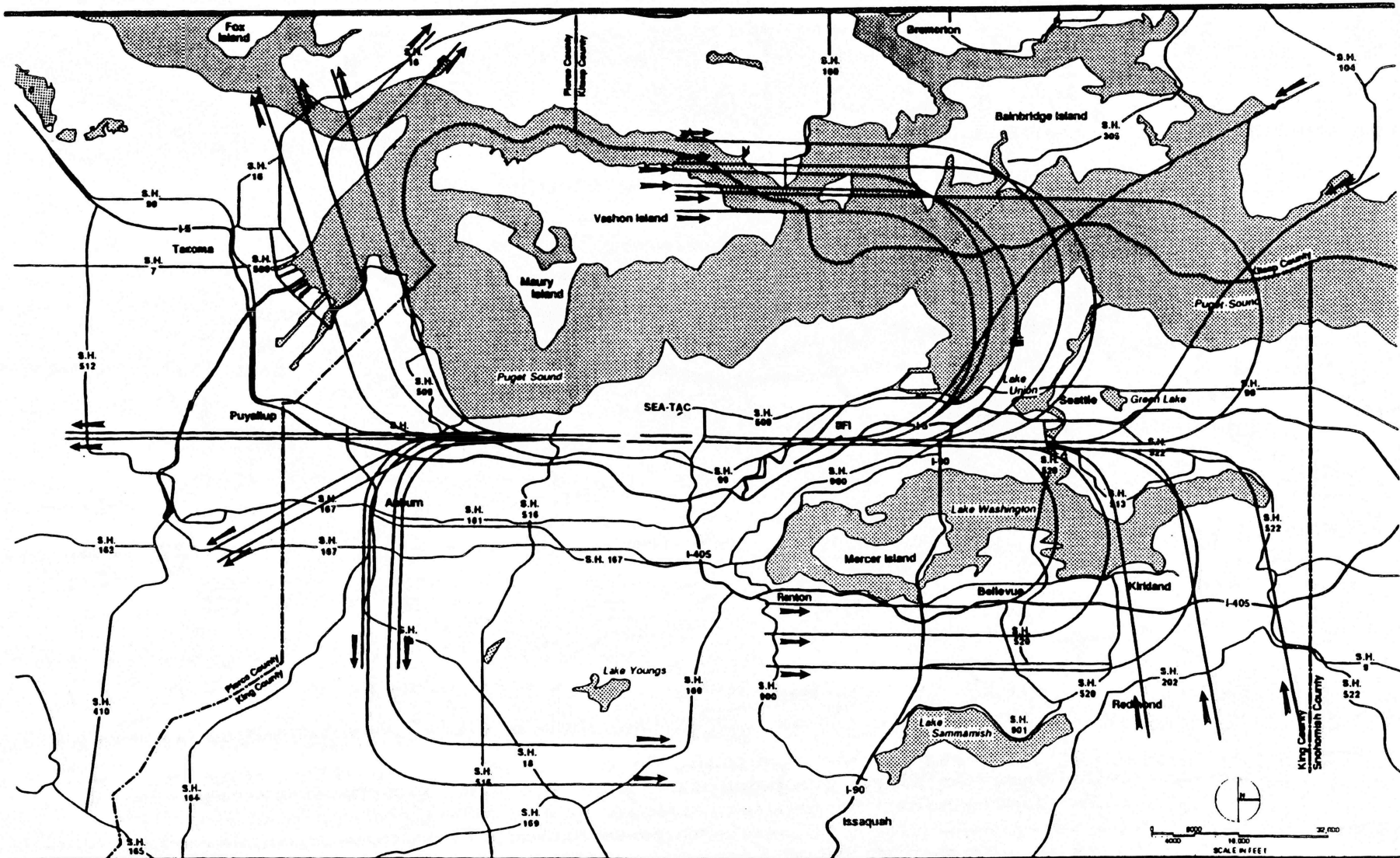


Exhibit 8  
Flight Track Map - Jets (South Flow)

4-Post Conditions

Noise Mitigation Project Seattle-Tacoma International Airport

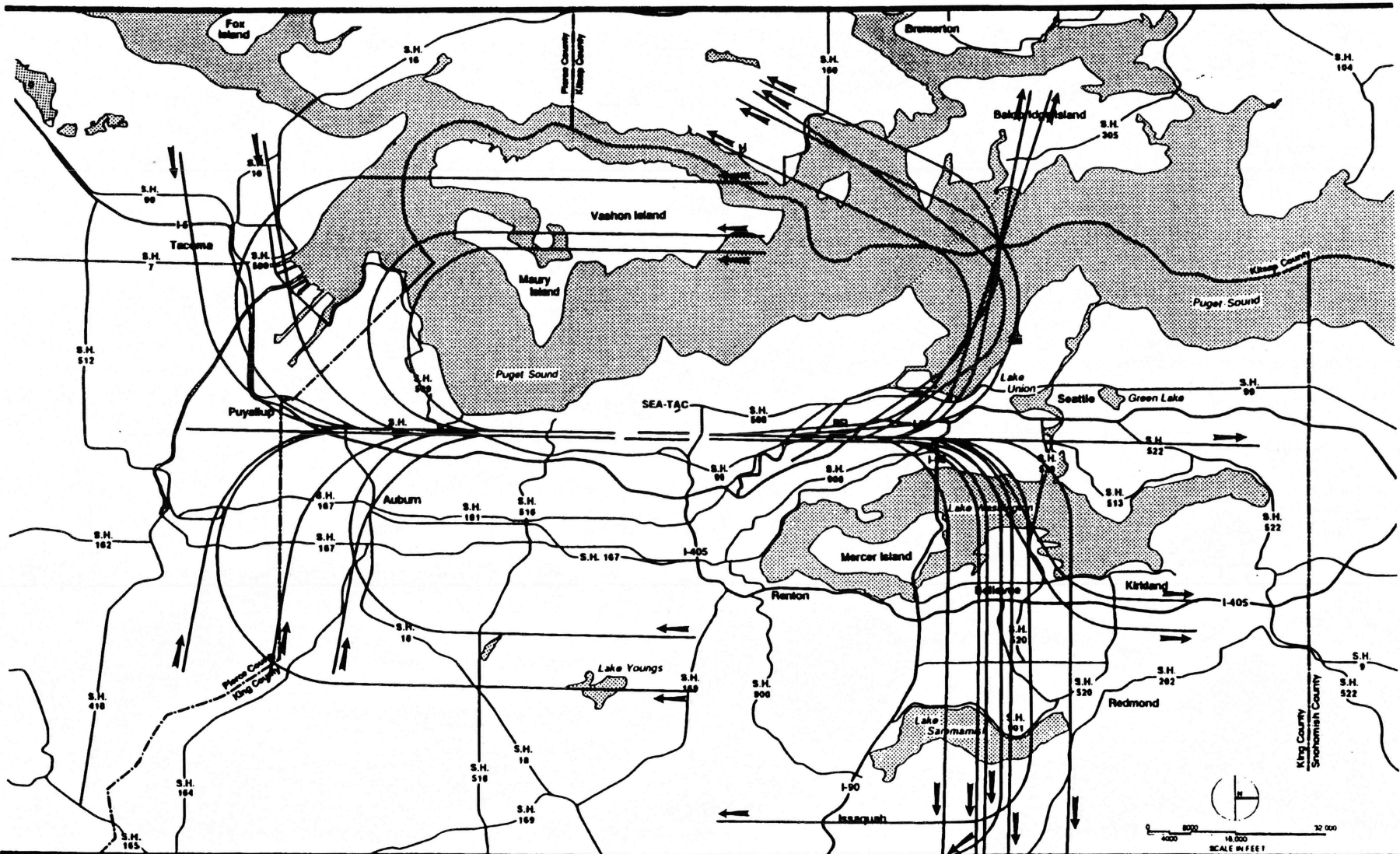


Exhibit 9  
Flight Track Map - Jets (North Flow)

4-Post Conditions

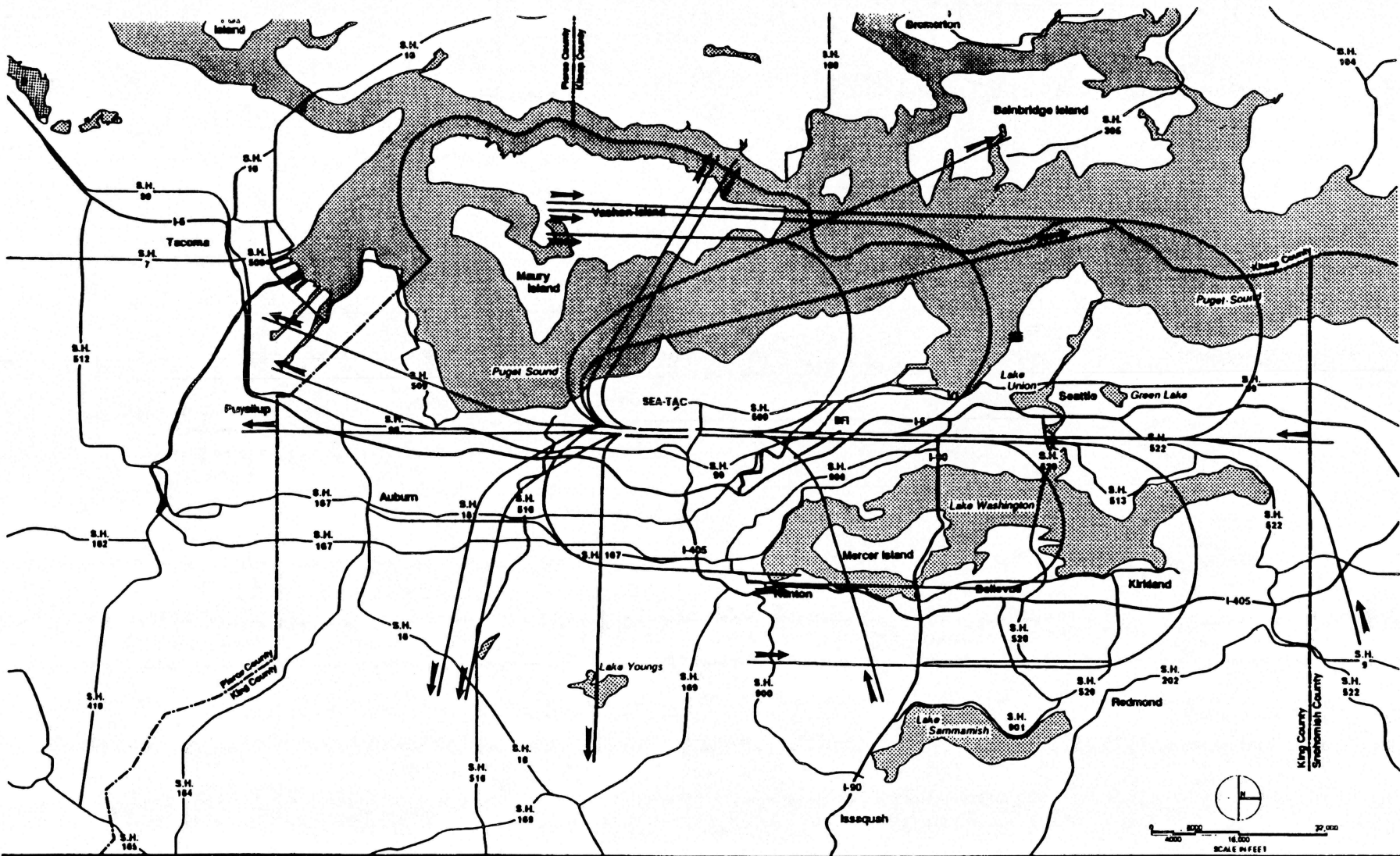


Exhibit 10  
Flight Track Map - Props (South Flow)

4-Post Conditions

Noise Mitigation Project Seattle-Tacoma International Airport





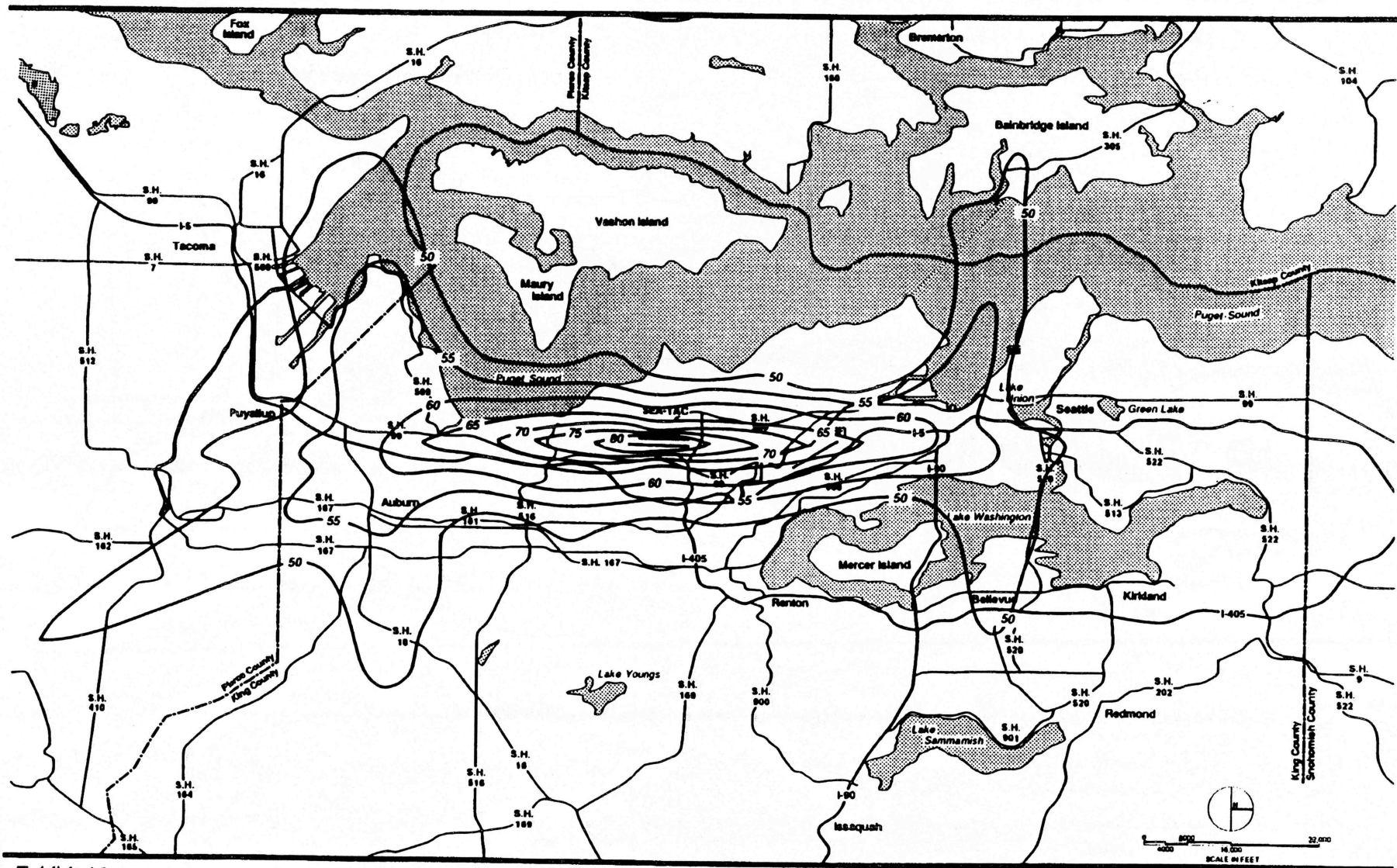
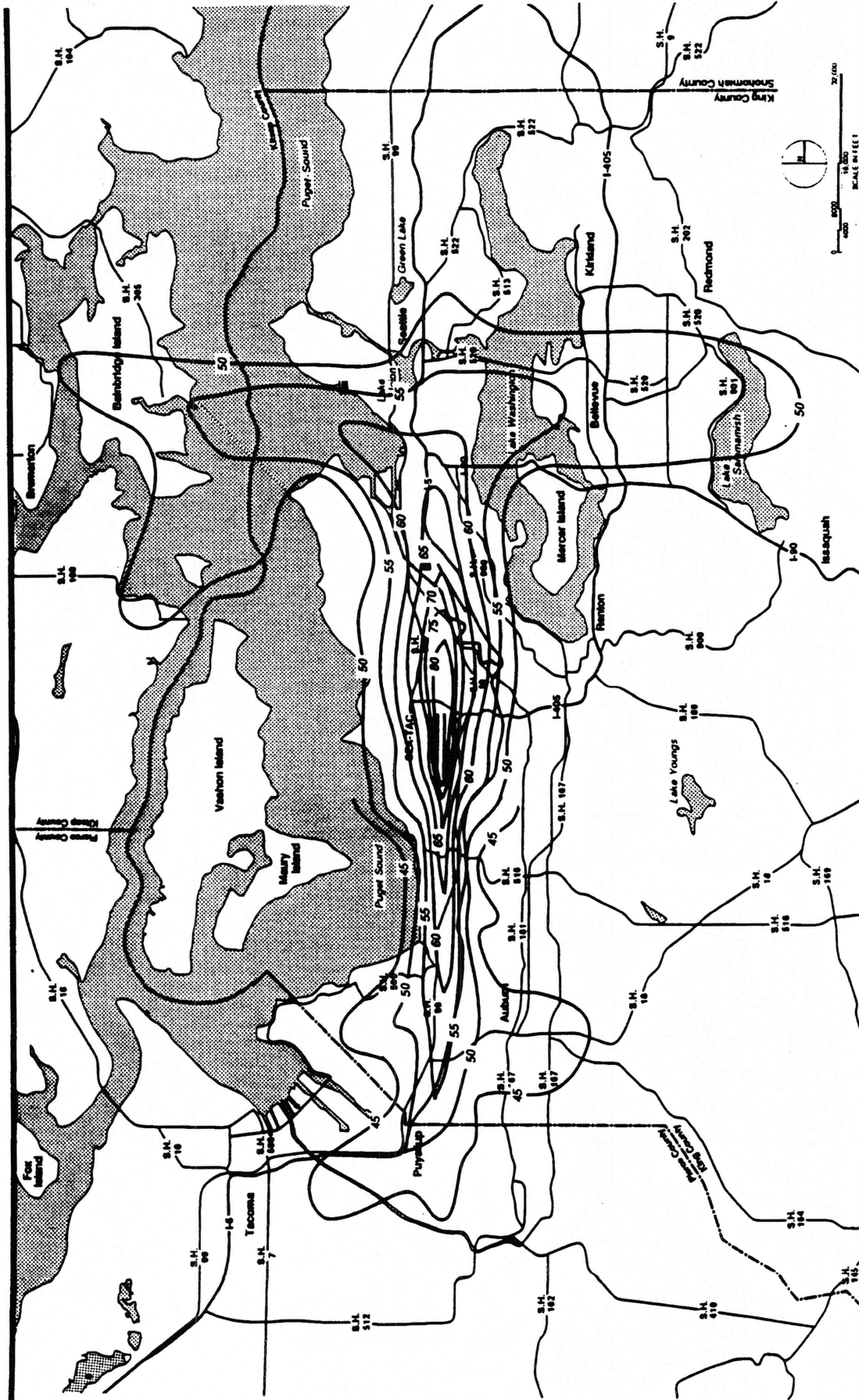


Exhibit 12  
 1989 Ldn Noise Contours (Annual Average)

4-Post Conditions

Noise Mitigation Project Seattle-Tacoma International Airport



**Exhibit 13**  
**1989 Ldn Noise Contours (North Flow)**

**4-Post Conditions**

**Noise Mitigation Project Seattle-Tacoma International Airport**

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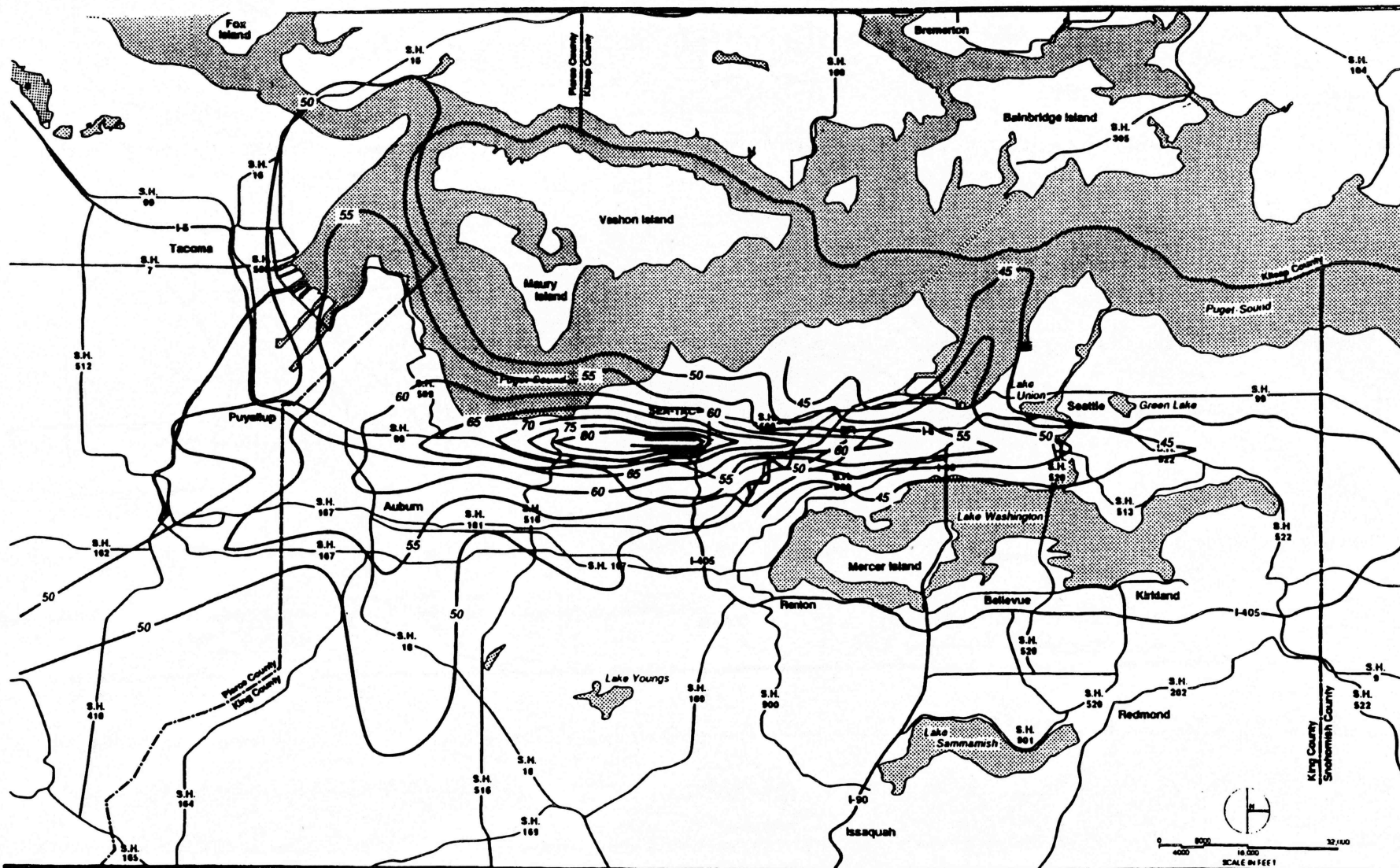


Exhibit 14  
1989 Ldn Noise Contours (South Flow)

4-Post Conditions

Noise Mitigation Project Seattle-Tacoma International Airport

# PORT OF SEATTLE FLIGHT TRACK SAMPLE

AIRPORT: SEA

08/26/91

11:00 - 22:00

ARRIVALS / DEPARTURES

ID: ALL FLIGHTS

A/C: JETS

SCALE: 0.28125 IN = 6000 FT

REMARKS: SOUTH FLOW



# PORT OF SEATTLE FLIGHT TRACK SAMPLE

AIRPORT: SEA

08/02/91

09:00 - 22:00

ARRIVALS / DEPARTURES

ID: ALL FLIGHTS

A/C: JETS

SCALE: 0.28125 IN = 6000 FT

REMARKS: NORTH FLOW



How many flights are there?

Current Sea Tac:

255,000-355,000 per year

699-973 flights per day

29-41 per hour

If Sea Tac expands:

488,000-600,000 (est) per year

1337-1644 per day

56-69 per hour

# PUBLIC USE LANDING FACILITIES BY ALKLEAGE TOP 100 FACILITIES

RANK	ACREAGE	SITE NUMBER	STATE	ASSOCIATED CITY	FACILITY NAME
1	24300	25974.0A	VA	RICHMOND	CHESTERFIELD COUNTY
3	24960	03326.0A	FL	MIAMI	DADE-COLLIER TRAINING AND TRANSITION
4	17574	23710.60A	TX	DALLAS-FORT WORTH	DALLAS/FORT WORTH INTERNATIONAL
5	13369	01971.0A	CA	OAKLAND	METROPOLITAN OAKLAND INTL
6	12508	21252.0A	PA	PITTSBURGH	GREATER PITTSBURGH INTL
7	9996	03002.0A	DC	WASHINGTON	WASHINGTON DULLES INTERNATIONAL
8	9047	11015.60A	MO	KANSAS CITY	KANSAS CITY INTL
9	9002	03407.0A	FL	ORLANDO	ORLANDO INTL
10	8520	01839.010C	CA	LOS BANOS	SAN LUIS RESERVOIR
11	7450	19136.0A	OK	OKLAHOMA CITY	WILL ROGERS WORLD
12	7303	25299.0A	UT	SALT LAKE CITY	SALT LAKE CITY INTL
13	7290	03250.10A	FL	JACKSONVILLE	JACKSONVILLE INTL
14	7200	24071.10A	TX	HOUSTON	HOUSTON INTERCONTINENTAL
15	7033	02543.0A	CO	COLORADO SPRINGS	CITY OF COLORADO SPRINGS MUNI
16	7000	04508.0A	IL	CHICAGO	CHICAGO O'HARE INTL
17	6670	23330.0A	TX	EL PASO	EL PASO INTL
18	6020	05375.0A	IN	INDIANAPOLIS	INDIANAPOLIS INTL
19	6000	19203.0A	OK	TULSA	TULSA INTL
20	5837	50799.0A	AK	UNALAKLEET	UNALAKLEET
21	5832	02313.0A	CA	PALMDALE	PALMDALE
22	5742	12375.10A	MT	GLASGOW	VALLEY COUNTY ENTERPRISE
23	5548	02711.0A	CO	RIFLE	GARFIELD COUNTY REGIONAL
24	5520	50492.0A	AK	MIDDLETON ISLAND	MIDDLETON ISLAND
25	5277	50415.0A	AK	KING SALMON	KING SALMON
26	5200	02107.0A	CA	SAN FRANCISCO	SAN FRANCISCO INTL
27	5200	15733.0A	NY	NEW YORK	JOHN F. KENNEDY INTL
28	5029	15719.0A	OH	ROSELLE	ROSWELL INDUSTRIAL AIR CENTER
29	5025	07090.0A	KY	COVINGTON/CINCINNATI, OH	GREATER CINCINNATI INTL
30	5000	09749.0A	MI	DETROIT	DETROIT METROPOLITAN WAYNE COUNTY
31	5000	12794.0A	ME	LINCOLN	LINCOLN MUNI
32	5000	13497.0A	NJ	ATLANTIC CITY	ATLANTIC CITY INTERNATIONAL
33	5000	17035.0A	NC	RALEIGH/DURHAM	RALEIGH-DURHAM INTERNATIONAL
34	5000	27754.0A	WY	CASPER	NATRONA COUNTY INTL
35	4745	26415.0A	WA	SPOKANE	SPOKANE INTL
36	4700	02576.0A	CO	DENVER	STAPLETON INTL
37	4531	26307.0A	WA	MOSES LAKE	GRANT COUNTY
38	4500	50034.0A	AK	ANCHORAGE	ANCHORAGE INTL
39	4400	17786.0A	OH	COLUMBUS	RICKENBACKER
40	4290	16906.0A	NC	MAXTON	LAURINBURG-MAXTON
41	4257	14528.10A	NH	ALBUQUERQUE	DOUGLAS EAGLE II
42	4220	52161.0A	HI	HONOLULU	HONOLULU INTL
43	4200	02651.0A	CO	LA JUNTA	LA JUNTA MUNI
44	4200	17910.0A	OH	DAYTON	JAMES M. COX DAYTON INTL
45	3904	01336.0A	CA	BLTYHE	BLTYHE
46	3900	23121.0A	TN	WASHVILLE	NASHVILLE INTERNATIONAL
47	3979	03992.0A	GA	SAVANNAH	SAVANNAH INTERNATIONAL
48	3872	02709.0A	CO	PUEBLO	PUEBLO MEMORIAL
49	3020	13130.0A	NV	TONOPAH	TONOPAH
50	3005	00816.0A	AZ	TUCSON	TUCSON INTL
51	3000	03640.0A	GA	ATLANTA	THE WILLIAM S. HARTSFIELD ATLANTA INTL
52	3000	25029.0A	TX	WICHITA FALLS	SHEPPARD AFB/WICHITA FALLS MUNI

## TOP 100 FACILITIES

RANK	ACREAGE	SITE NUMBER	STATE	ASSOCIATED CITY	FACILITY NAME
53	3585	07493.*A	LA	DE RIDDER	BEAUREGARD PARISH
54	3600	04149.*A	ID	BOISE	BOISE AIR TERMINAL /GOWEN FLD/
55	3600	50650.*A	AK	ST MARY'S	ST MARY'S
56	3547	23320.*A	TX	AMARILLO	AMARILLO INTL
57	3515	03199.2*A	FL	FORT MYERS	SOUTHWEST FLORIDA REGIONAL
58	3500	01010.*A	CA	LOS ANGELES	LOS ANGELES INTL
59	3500	03513.*A	FL	TAMPA	TAMPA INTL
60	3500	12597.*A	NE	ALLIANCE	ALLIANCE MUNI
61	3500	24062.*A	TX	HONDO	HONDO MUNI
62	3480	19505.*A	OR	MADRAS	CITY-COUNTY
63	3450	13051.*A	NV	ELY	ELY ARPT /YELLAND FLD/
64	3439	00716.*A	AZ	KINGMAN	KINGMAN
65	3400	02124.2*A	CA	SACRAMENTO	SACRAMENTO METROPOLITAN
66	3400	23319.*A	FL	MARIANNA	MARIANNA MUNI
67	3400	09304.02*A	MA	SPRINGFIELD/CHICUPEE	WESTOVER AFB
68	3350	16500.*A	NC	CHARLOTTE	CHARLOTTE/DOUGLAS INTL
69	3300	03333.*A	FL	MIAMI	MIAMI INTL
70	3293	11200.*A	MS	JACKSON	JACKSON INTERNATIONAL
71	3243	06975.4*A	KS	WICHITA	WICHITA MID-CONTINENT
72	3230	06370.*A	KS	SALINA	SALINA MUNI
73	3160	00456.*A	MD	BALTIMORE	BALTIMORE-WASHINGTON INTL
74	3150	09510.*A	MI	ALPENA	ALPENA COUNTY REGIONAL
75	3100	00841.*A	AZ	YUMA	YUMA MCAS/YUMA INTL
76	3067	04000.*A	IL	LAWRENCEVILLE	LAWRENCEVILLE-VINCENNES INTL
77	3056	23097.*A	TN	MEMPHIS	MEMPHIS INTL
78	3044	01197.*A	AR	WALNUT RIDGE	WALNUT RIDGE REGIONAL
79	3039	50222.*A	AK	FAREWELL	FAREWELL
80	3020	00305.1*A	AL	HUNTSVILLE	HUNTSVILLE INTL-CARL T JONES FIELD
81	3000	00571.*A	AZ	DOUGLAS BISBEE	BISBEE DOUGLAS INTL
82	3000	19571.*A	OR	PORTLAND	PORTLAND INTL
83	3000	24245.*A	TX	LUBBOCK	LUBBOCK INTL
84	2990	01899.*A	CA	MOJAVE	MOJAVE
85	2980	10653.*A	MN	DULUTH	DULUTH INTL
86	2930	07710.*A	LA	POLLACK	POLLACK MUNICIPAL
87	2930	10024.*A	MN	MINNEAPOLIS	MINNEAPOLIS-ST PAUL INTL/WOLD-CHAMBERLAIN/
88	2914	05004.*A	IA	CEDAR RAPIDS	CEDAR RAPIDS MUNI
89	2910	14595.*A	NM	DEMING	DEMING MUNI
90	2858	13124.*A	NV	RENO	RENO/STEAD
91	2854	06932.*A	KS	TOPEKA	FORDES FIELD
92	2840	23700.*A	TX	DALHART	DALHART MUNI
93	2837	01110.*A	AR	NEWPORT	NEWPORT MUNI
94	2827	11009.*A	MO	MALDEN	MALDEN MUNI
95	2800	10299.*A	MI	SAGINAW	TRI CITY INTERNATIONAL
96	2800	12077.*A	MO	ST LOUIS	LAMBERT-ST LOUIS INTL
97	2800	13003.*A	NV	LAS VEGAS	MC CARRAN INTL
98	2800	50219.*A	AK	FAIRBANKS	FAIRBANKS INTL
99	2711	53004.*A	PR	AGUADILLA	RAFAEL HERNANDEZ
100	2711	53100.1*A	PR	SAN JUAN	LUIS MUNOZ MARIN INTL

100 RECORDS PRINTED

PRODUCED BY NATIONAL FLIGHT DATA CENTER (ATM-600): REQUEST 91-054

2690.

See TAC

Table 1G

<b>Seattle-Tacoma International Airport 1990 Aircraft Stage Lengths</b>		
<b>Stage:</b>	<b>Length:</b>	<b>% of Departures:</b>
Stage I	Less than 500 miles	52.52%
Stage II	501 - 1,000 miles	24.47%
Stage III	1,001 - 1,500 miles	9.93%
Stage IV	1,501 - 2,500 miles	11.05%
Stage V	2,501 - 3,500 miles	0.61%
Stage VI	3,501 - 4,500 miles	0.00%
Stage VII	4,501 miles or greater	<u>1.42%</u>
Total		100.00%
source: Official Airlines Guide		

Slightly over fifty two percent of the total departures at the airport involved flights of less than 500 miles. These flights are generally the air taxi/commuter flights and air carrier service to destinations such as Portland, Spokane, Eugene, Vancouver, Boise, Pasco, Yakima and Bellingham, etc. Stage II stage length accounts for 24.5% of all departures including those to San Francisco, Salt Lake City, Reno and Los Angeles, etc. Stage III lengths include departures to Anchorage, Denver, Phoenix and Minneapolis; Stage IV lengths cover Detroit, Chicago, New York and Washington, D.C. Of special interest is the Stage VII lengths, which are the extended route mileages with international destinations. These include non-stop service to Hong Kong, Tokyo, London, and Seoul.

### Runway Utilization

Runway utilization is another important factor in modeling noise contours. A combination of weather information, traffic flow, and statistical data was used to determine runway utilization for both a north/south flow, and an east/west runway use split. Of particular importance is the understanding that all runways are used to a certain degree for most types of operations. Both the east and west runways are used for both arrivals and departures. In fact, during good weather conditions, visual arrivals are routinely conducted to both runways.

Runway utilization can also be associated with the percentage of time that air traffic activities occurred in either a north or south flow configuration. When the airport operates in a north flow configuration, arriving and departing traffic use Runways 34L and



SOURCE: FAA STATISTICAL HANDBOOK OF  
AVIATION (1989)

TABLE 4.11  
TOP 100 AIRPORTS  
IN RANK ORDER BY TOTAL ENPLANED PASSENGERS  
LARGE SCHEDULED CERTIFICATED AIR CARRIERS  
SCHEDULED AND NONSCHEDULED OPERATIONS  
1989

Rank	Airport	Total Enplaned Passengers	Rank	Airport	Total Enplaned Passengers
1	Chicago (O'Hare), IL.....	25,564,266	51	Kahului, Maui, HI.....	2,132,737
2	Dallas/Ft. Worth (Regional), TX.....	22,623,055	52	Dayton, OH.....	2,083,123
3	Atlanta, GA.....	20,337,697	53	Oakland, CA.....	2,030,847
4	Los Angeles, CA.....	18,583,292	54	Austin, TX.....	2,022,269
5	San Francisco, CA.....	13,326,085	55	Milwaukee, WI.....	1,871,914
6	Denver, CO.....	12,329,246	56	Sacramento, CA.....	1,800,078
7	New York (La Guardia), NY.....	10,935,833	57	El Paso, TX.....	1,672,402
8	Phoenix, AZ.....	10,166,035	58	Columbus, OH.....	1,662,389
9	New York (John F. Kennedy), NY.....	10,081,490	59	Buffalo, NY.....	1,629,990
10	Newark, NJ.....	9,822,419	60	Oklahoma City, OK.....	1,540,265
11	Detroit, MI.....	9,739,265	61	Ft. Myers, FL.....	1,525,884
12	Boston, MA.....	9,561,258	62	Tulsa, OK.....	1,440,936
13	St. Louis, MO.....	9,396,335	63	Reno, NV.....	1,359,684
14	Honolulu, Oahu, HI.....	8,943,521	64	Lihue, Kauai, HI.....	1,340,587
15	Miami, FL.....	8,591,936	65	Burbank, CA.....	1,319,568
16	Minneapolis/St. Paul, MN.....	8,460,115	66	Tucson, AZ.....	1,310,931
17	Pittsburgh, PA.....	7,940,962	67	Norfolk, VA.....	1,297,895
18	Orlando, FL.....	7,373,449	68	Syracuse, NY.....	1,271,958
19	Seattle-Tacoma, WA.....	7,059,777	69	Jacksonville, FL.....	1,249,258
20	Houston (Intercontinental), TX.....	7,030,001	70	Anchorage, AK.....	1,159,457
21	Las Vegas, NV.....	7,026,900	71	Rochester, NY.....	1,149,438
22	Charlotte, NC.....	6,903,492	72	Omaha, NE.....	1,008,752
23	Washington (National), DC.....	6,895,563	73	Birmingham, AL.....	989,614
24	Philadelphia, PA.....	6,247,489	74	Kailua-Kona, Hawaii, HI.....	982,227
25	San Diego, CA.....	5,317,177	75	Providence, RI.....	952,289
26	Salt Lake City, UT.....	5,244,238	76	Little Rock, AR.....	947,323
27	Washington (Dulles Int'l), DC.....	4,543,530	77	Louisville, KY.....	910,288
28	Baltimore, MD.....	4,446,139	78	Greensboro, NC.....	894,404
29	Tampa, FL.....	4,409,261	79	Albany, NY.....	838,447
30	Kansas City, MO.....	4,356,991	80	Richmond, VA.....	826,955
31	Raleigh/Durham, NC.....	4,116,520	81	Sarasota, FL.....	794,430
32	Memphis, TN.....	3,989,814	82	Spokane, WA.....	726,804
33	Houston (William P. Hobby), TX.....	3,927,329	83	Des Moines, IA.....	689,184
34	Cincinnati, OH.....	3,770,823	84	Long Beach, CA.....	661,766
35	Nashville, TN.....	3,746,367	85	Grand Rapids, MI.....	649,089
36	Cleveland, OH.....	3,722,208	86	Lubbock, TX.....	627,500
37	Ft. Lauderdale, FL.....	3,645,786	87	Guam, Guam.....	624,221
38	Chicago (Midway), IL.....	3,409,726	88	Hilo, HI.....	611,221
39	San Juan, PR.....	3,268,644	89	Conkwin Springs, CA.....	600,000
40	New Orleans, LA.....	3,170,067	90	Charleston, SC.....	600,000
41	San Jose, CA.....	3,093,643	91	Mt. Pleasant, TX.....	600,000
42	Portland, OR.....	3,054,925	92	Wichita, KS.....	592,617
43	Dallas (Love Field), TX.....	2,773,836	93	Brownsville, TX.....	534,945
44	Ontario, CA.....	2,608,568	94	Boise, ID.....	534,499
45	Indianapolis, IN.....	2,522,944	95	Savannah, GA.....	499,028
46	San Antonio, TX.....	2,493,393	96	Greenville, SC.....	493,426
47	West Palm Beach, FL.....	2,403,585	97	Columbia, SC.....	487,089
48	Albuquerque, NM.....	2,336,577	98	Knoxville, TN.....	481,898
49	Hartford, CT.....	2,259,982	99	Harrisburg/York, PA.....	443,954
50	Orange County, CA.....	2,173,502	100	Amarillo/Borger, TX.....	441,677

**AREA AVAILABLE FOR LANDSIDE AND TERMINAL EXPANSION  
AT VARIOUS AIRPORTS**

<b>Airport</b>	<b>1990 Passengers</b>	<b>Area Available For Landside Facilities*</b>
Ontario, CA	5,340,000	670 acres
Oakland	5,442,000	580
San Diego	10,976,000	360
* Sea-Tac	15,726,000	425
Houston	16,254,000	950+
Orlando	17,368,000	2500
Las Vegas	18,602,000	900
Phoenix	21,754,000	885
Miami	24,384,000	1300
Kennedy (N.Y.)	28,902,000	2000
San Francisco	29,388,000	735
Los Angeles	44,554,000	1100
Atlanta	48,540,000	1600+
Dallas/Ft. Worth	48,540,000	3500+
O'Hare	55,898,000	3100+

\* "Landside" facilities are passenger terminals, maintenance areas, cargo facilities, parking, airport drives and the like.

Acreages given are those presently utilized by existing "landside" facilities or could be utilized within current airport boundaries.

Maps showing the various airports discussed are attached hereto.

# NOISE IMPACT PROJECTIONS

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- Based on 65 LDN unlivable environment
- Impacts don't include potential "independent" runway by year 2010
- Contour mapping excludes runup, taxi-way future large aircraft (600-700 pass.) noise
- Impact excludes population added by GMA urban growth centers
- Using "filtered" measurements reduces noise by 10 DB (one half reduction)
- Benefit of "stage III" over stage II exaggerated

# **PSATC STUDY OMISSIONS AND MISREPRESENTATIONS**

con't

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- **System evaluation process not valid**
- **Noise impact grossly underestimated**
- **Potential impact of advanced radar technology on runway separation ignored**
- **No assurance of implementation of additional airports**
- **Governance of airport system not addressed**

# HEALTH IMPACT OF PROLONGED NOISE

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- **Promotes stress, anxiety, aggressive behavior, increased risk of heart disease and stroke, and gastrointestinal diseases**
- **Disrupts sleep**
- **Worsens learning disabilities in schools**
- **Pregnant mother exposure produces in infants**
  - **lower birth weight**
  - **prematurity**
  - **birth defects**

Sources: D. Dennis Hansen M.D.  
Lee A. Sanders M.D., Ph.D.

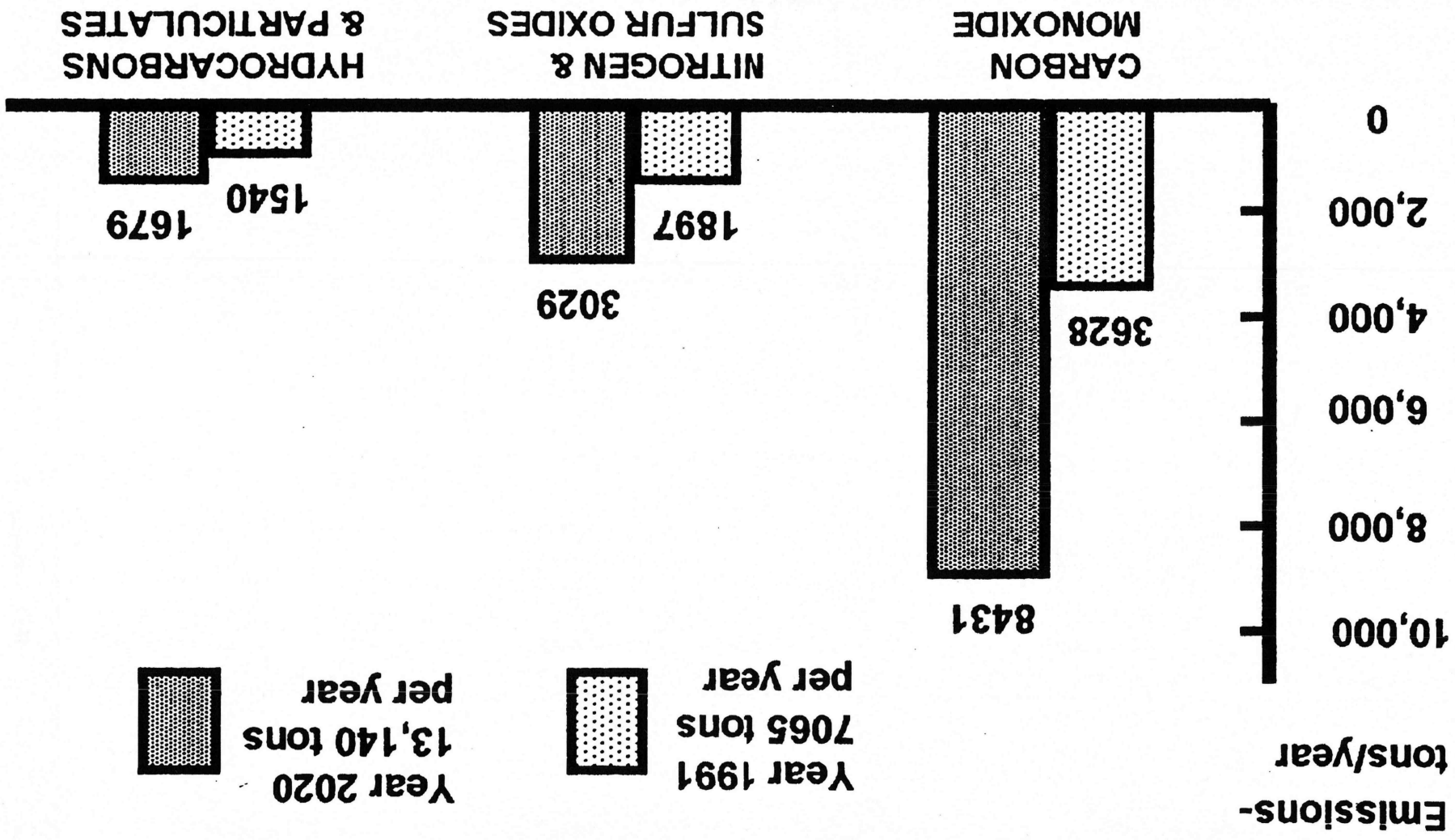
# HEALTH IMPACT OF AIR POLLUTION

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- **CO, particulates, nitrous oxide, benzene ( a carcinogen) lead to:**
  - **asthma**
  - **bronchitis**
  - **decreased lung function**
  - **emphysema**
  - **sinus-itis**
  - **sore throat**
  - **chest congestion**
  - **runny or burning eyes**
  - **cancer**

Source: Gordon Baker M.D.

# SEA-TAC AIRPORT EMISSIONS



Source: PSATC & State Ecology Dept.

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**WHAT'S WRONG WITH  
PSATC (FLIGHT PLAN)  
RECOMMENDATION**

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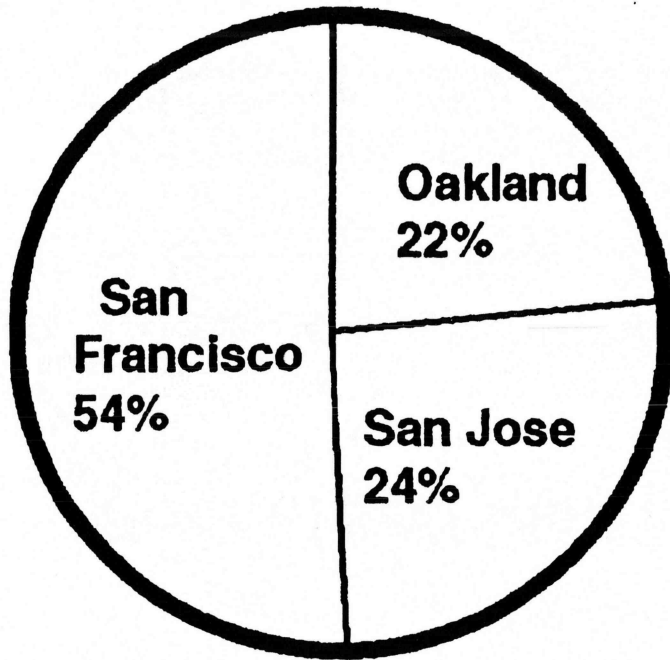
# **RECOMMENDATION NOT “TRUE” MULTIPLE AIRPORT SYSTEM**

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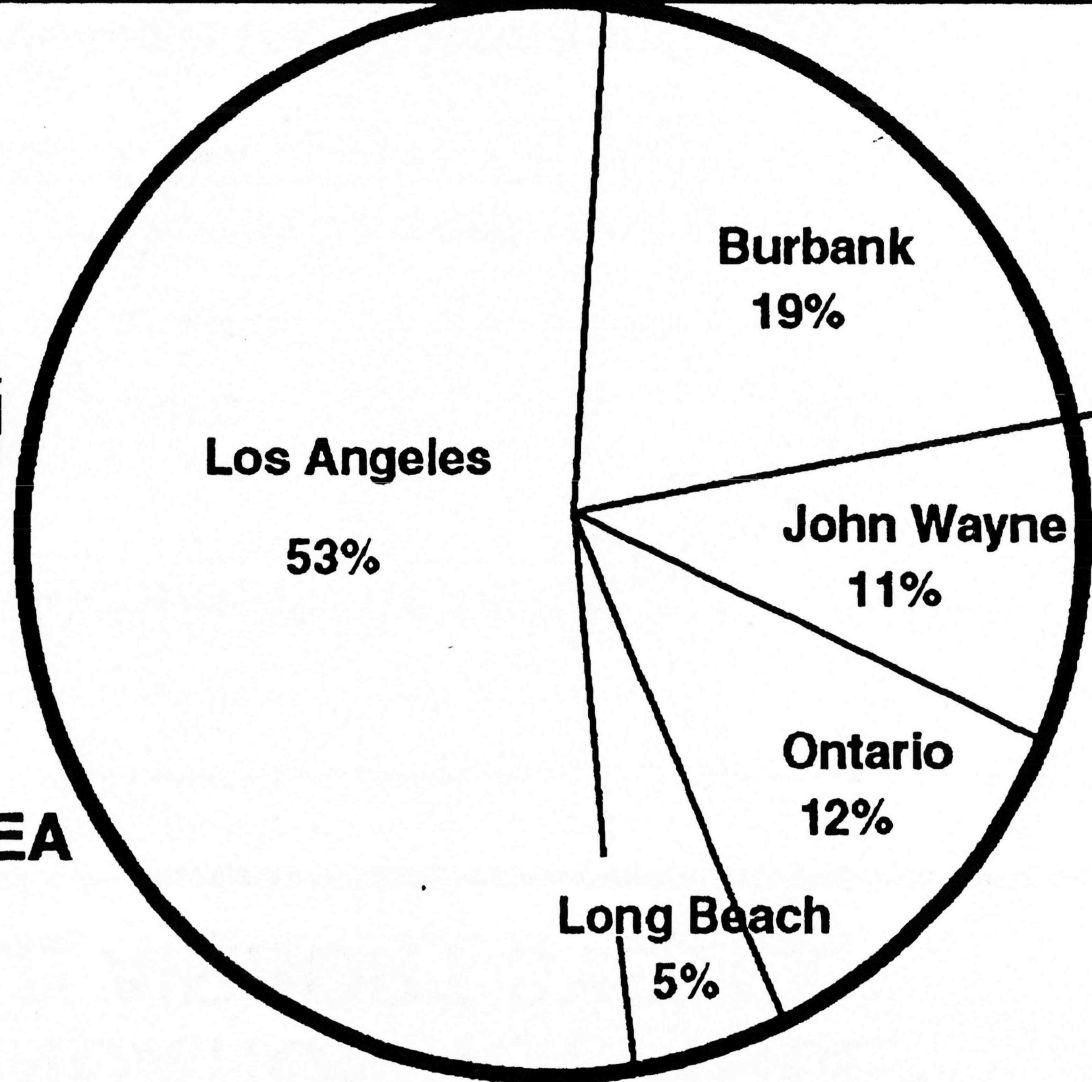
- **Poor distribution of economic benefits**
- **Less accessibility to users**
- **Degraded livability for largest number of people**
- **Creates increased vehicle traffic congestion**

# MULTIPLE AIRPORT SYSTEMS COMMERCIAL OPERATIONS

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**SAN FRANCISCO AREA**



**LOS ANGELES AREA**

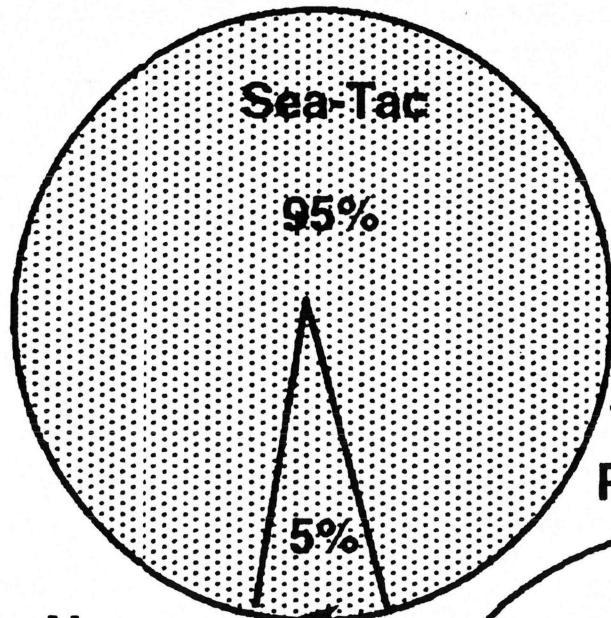
DATA SOURCE-PSATC REPORT



# FLIGHT OPERATIONS & PASSENGERS

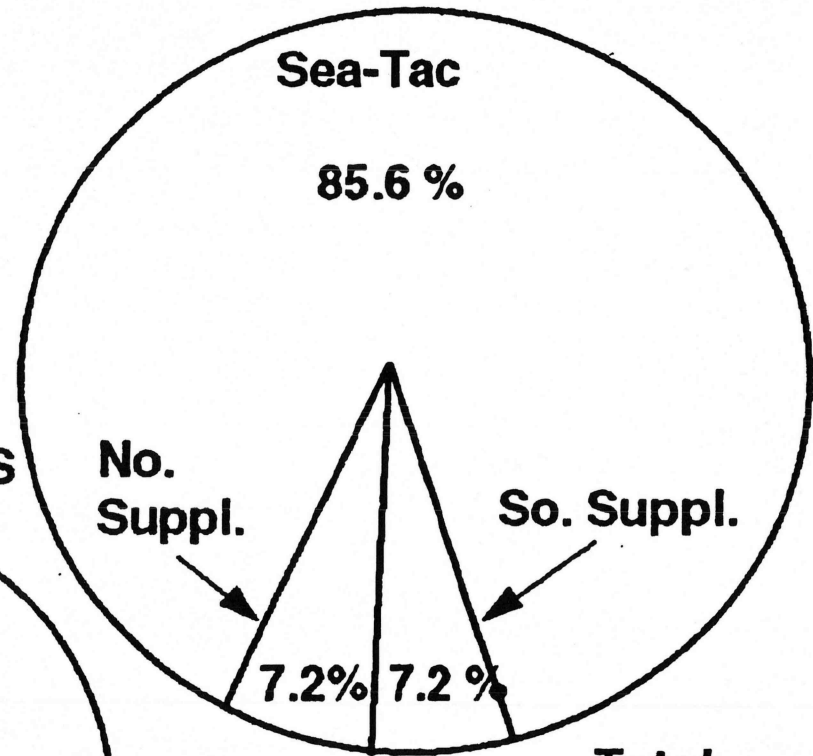
## PSATC RECOMMENDATION

**YEAR 2010--OPERATIONS**



No. Suppl.

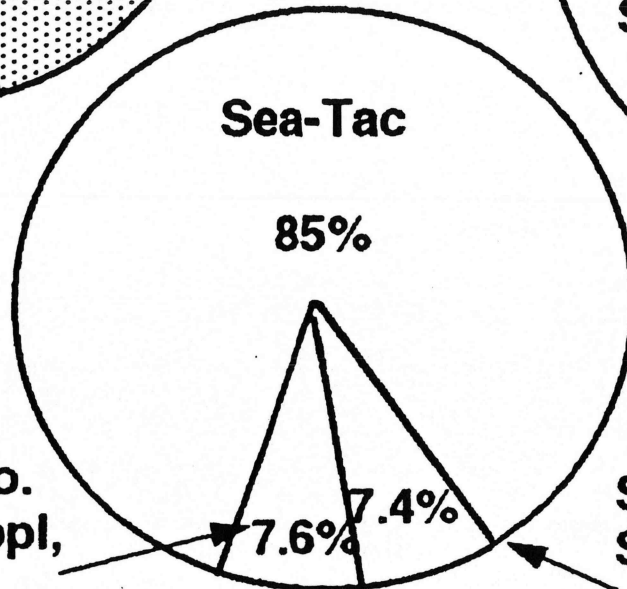
**YEAR 2020--OPERATIONS \***



No. Suppl.

So. Suppl.

**YEAR 2020 PASSENGERS**



No. Suppl.

Total  
45 Million  
So. Suppl.

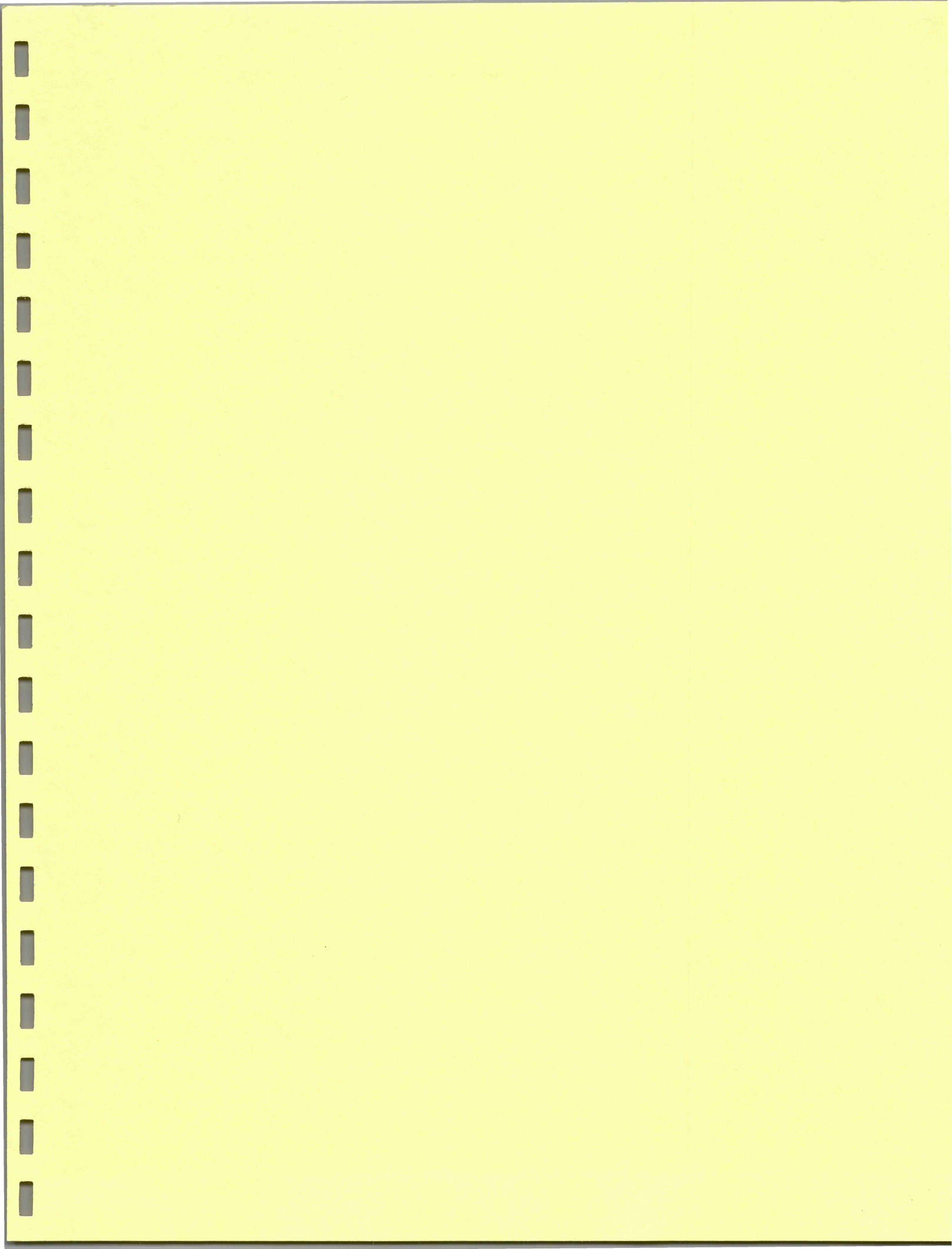
Total  
485,000

\* Data from PSATC final report

# **PSATC STUDY OMISSIONS AND MISREPRESENTATIONS**

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- **Capacity and demand projections unreliable**
- **Economic data misrepresented**
  - airport and tourist jobs
  - business and tax revenues
- **Significant costs not included**
  - noise mitigation
  - citizen costs
- **Operational safety not included**
- **Integration with high speed ground transportation not included**



### DO STAGE 3 AIRCRAFT MAKE A DIFFERENCE?

Aircraft meeting Stage 3 standards but lower aircraft noise only an insignificant amount as shown by Graphs A, B, and D attached.

Graph A: "STAGE 2 & 3 LIMITS ON TAKE OFF" shows that Stage 2 and 3 differ by only 3 to 4 decibels in many cases and by 7 decibels at most. For instance, at maximum weight, the Stage 2 limit is 108 EPNdB (Effective Perceived Noise level in decibels.) The Stage 3 limit for aircraft with 3 engines is 104 EPNdB, just 4 decibels quieter. The Stage 3 limit for aircraft with fewer than 3 engines is 101 EPNdB, just 7 decibels quieter. At takeoff, with a weight of 220,000 pounds, the Stage 2 limit is 99 EPNdB compared to the Stage 3 standards of 96 EPNdB (3 engine) and 93 EPNdB (fewer than 3 engine.)

Graph B: "STAGE 2 & 3 LIMITS ON SIDELINE & APPROACH" shows Stage 2 and 3 standards during sideline and approach. Again, the difference between Stage 2 and 3 for aircraft with less than three engines is 6 or 7 decibels. The difference between Stage 2 and Stage 3 limits for aircraft with 3 engines lingers around 2 or 3 decibels. These minor reductions of a few decibels are amounts<sup>1</sup> barely discernable by the human ear and bring little relief.

Graph C: "COMPARISON STAGE 2 & STAGE 3" demonstrates the noise variation within a group of one type of aircraft. It shows a variety of Boeing aircraft noise measurements, each with both Stage 2 and 3 noise measurements in NEL (Noise Exposure Level) units. Depending on the aircraft weight and weather conditions at the time of monitoring, a 737 Stage 2, for instance, can register 91.9 total NEL or 94.3 total NEL. A Stage 3 747's noise level can range from 91.5 Total NEL to 94.5 Total NEL.

Graph D: "UNMODIFIED VS. HUSHKIT" shows unmodified Boeing 727-200 noise measurements compared to a 727-200 with a hush kit. The difference between these to aircraft stays between 2 and 4.5 EPNdB. The 727-200 with a Hush-Kit still exceeds Stage 3 requirements. For a 3 engine aircraft at Takeoff with 190,000 Maximum Takeoff Gross Weight (MTOGW), Stage 3 standards are 95.2 EPNdB. The 727-200 with a Hush-Kit measured 97.7 EPNdB, exceeding the limit by 2.5 EPNdB at Takeoff and by .9 EPNdB at sideline. Because the regulations allow exceedences to total up to 3 decibels, this is still a Stage 3 compliant aircraft (see Attachment A.) While Hush Kits keep aircraft within regulations, the noise reduction remains essentially undetectable to human ears.

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<sup>1</sup> Brown-Buntin Associates, A Refresher Course on Noise Metrics, pg. 7, July 15, 1992.

SEA-TAC  
Stage 1,2,and 3  
October 26, 1992

Abstract

Recently established Stage 3 standards require lower noise levels than previous Stage 2 standards for subsonic Turbojets. Federal Law requires, with certain extensions and exceptions, the phase-out or upgrade of all Stage 2 Aircraft by December 31, 1999. Test flights measuring noise show that Stage III aircraft are a few decibels (dBA) quieter than Stage 2 aircraft. But, for people on the ground, not all Stage 3 aircraft reduce noise significantly.

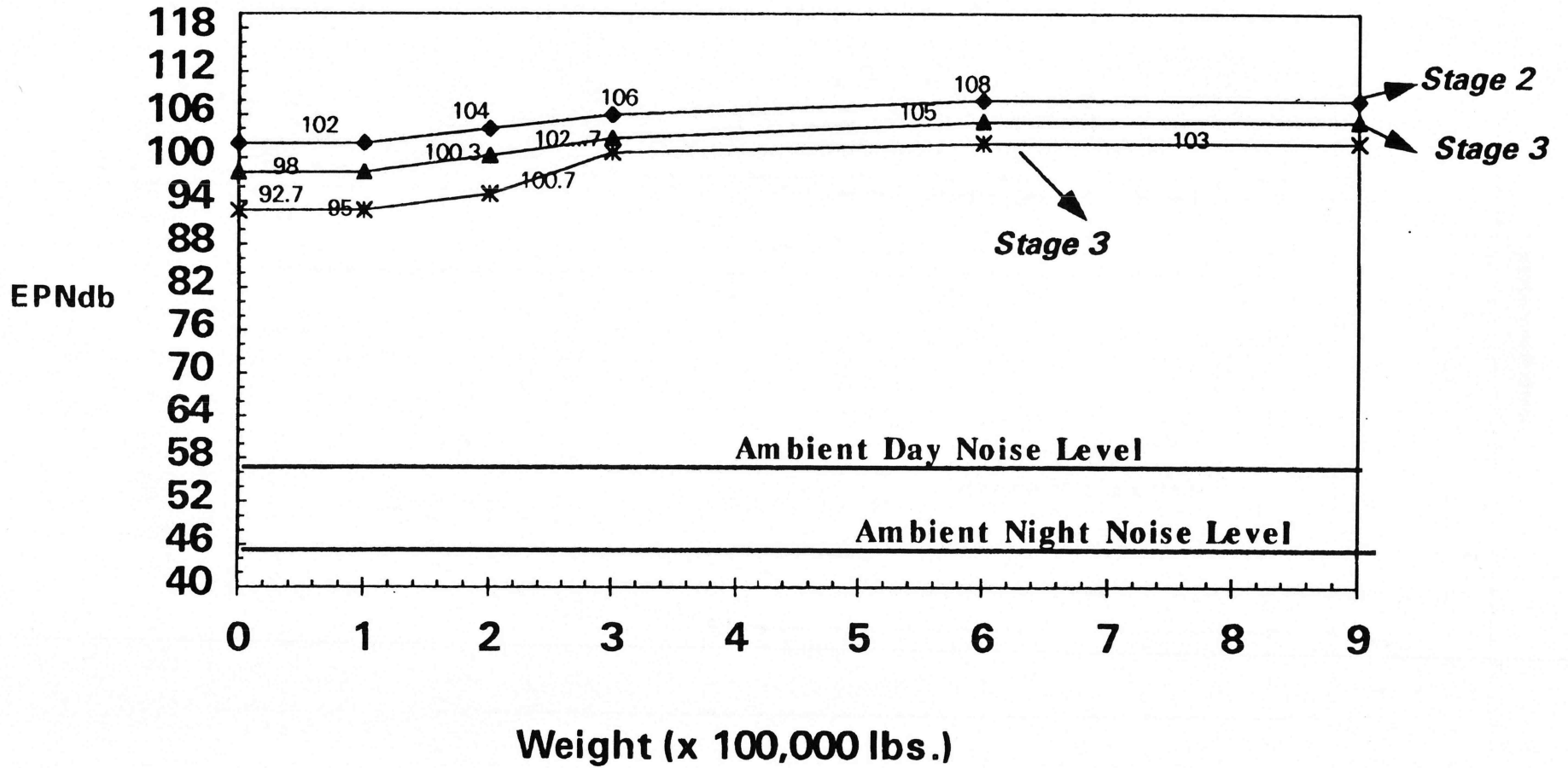
Stage 3 rules reduce Stage 2 noise levels often by only 3 or 5 dBA and at most 7 dBA. A study by Brown-Buntin Associates, Inc. show that a 3 dBA reduction, although it represents half as much energy, is barely detectable to human ears. Rather, noise must be reduced by 10 dBA or by 10 times the energy in order for people to perceive significant sound reduction.

Depending on the weight of the aircraft and weather conditions, Stage 3 compliant aircraft may vary significantly. For example, the Stage 3 727-100 series may fall short of Stage 2 727-100's noise levels by as much as 8 units or by as little as .02 units. In addition, not all Stage 3 aircraft are quieter than all stage 2 aircraft. For instance, many Stage 3 Boeing 747's may exceed noise levels of Stage 2 737's.

Modifying old aircraft to be Stage 3 compliant can be done by two processes: "hush kits" or re-engining. Because modifications offer a cheaper option than buying new aircraft for airlines in a time of severe economic losses, modified aircraft may be a significant percentage of future aircraft. While modifications adapt aircraft to meet Stage 3 regulations, reductions are minimal and as a result, noise reductions may be undetectable to human ears.

Graph B

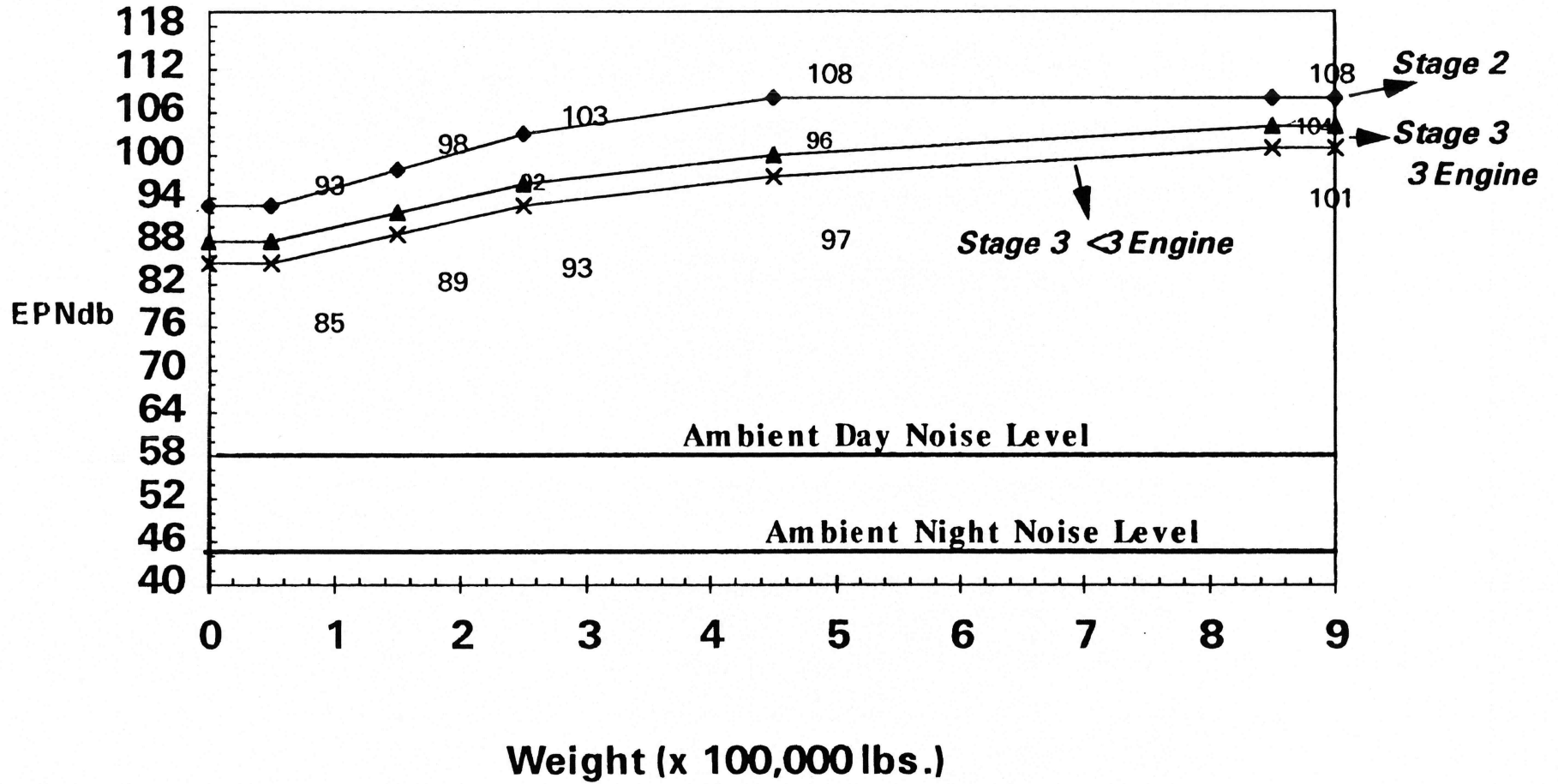
# Stage 2 & 3 Limits on Sideline & Approach





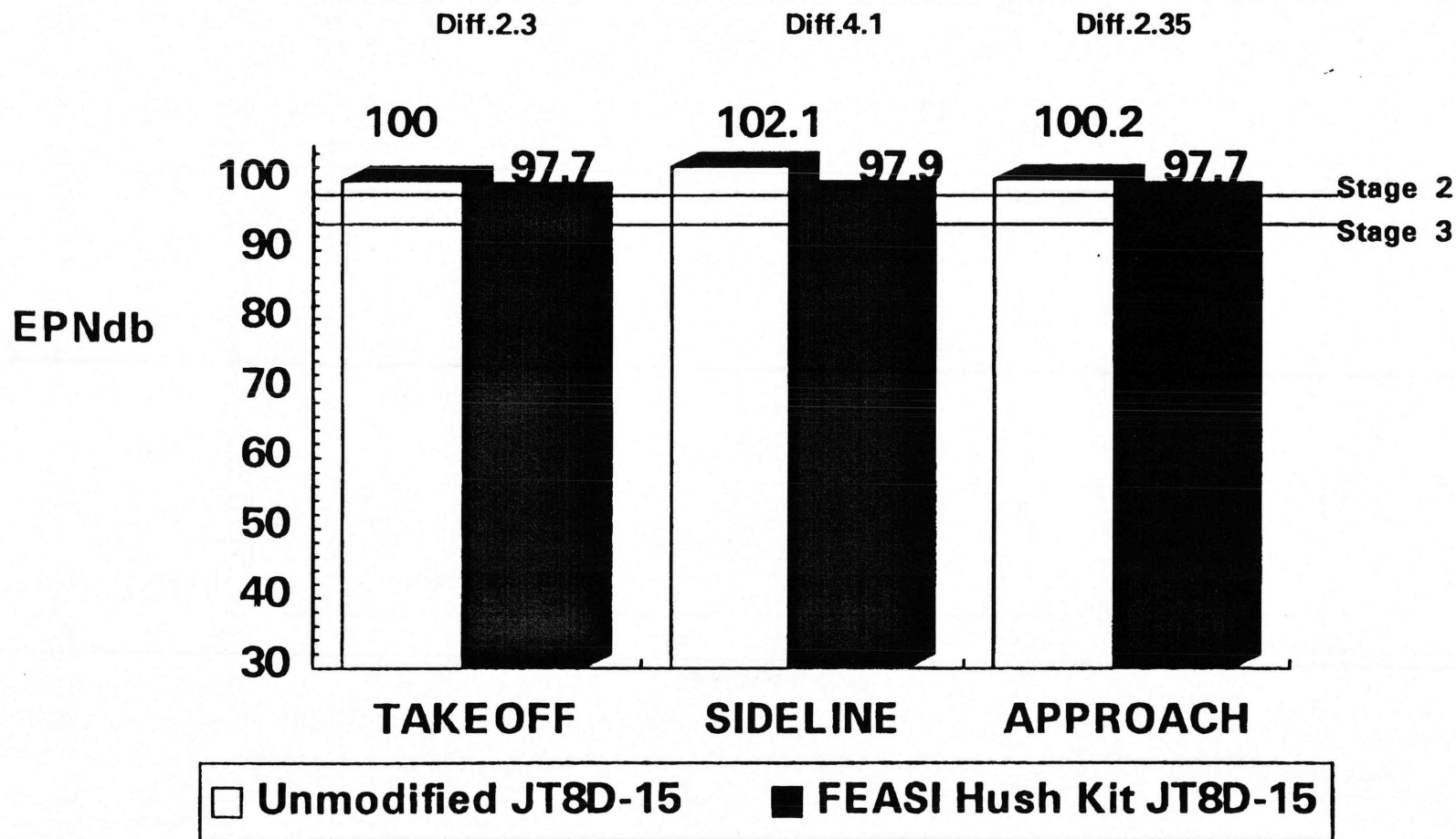
Graph A

# Stage 2 & 3 Limits on Takeoff



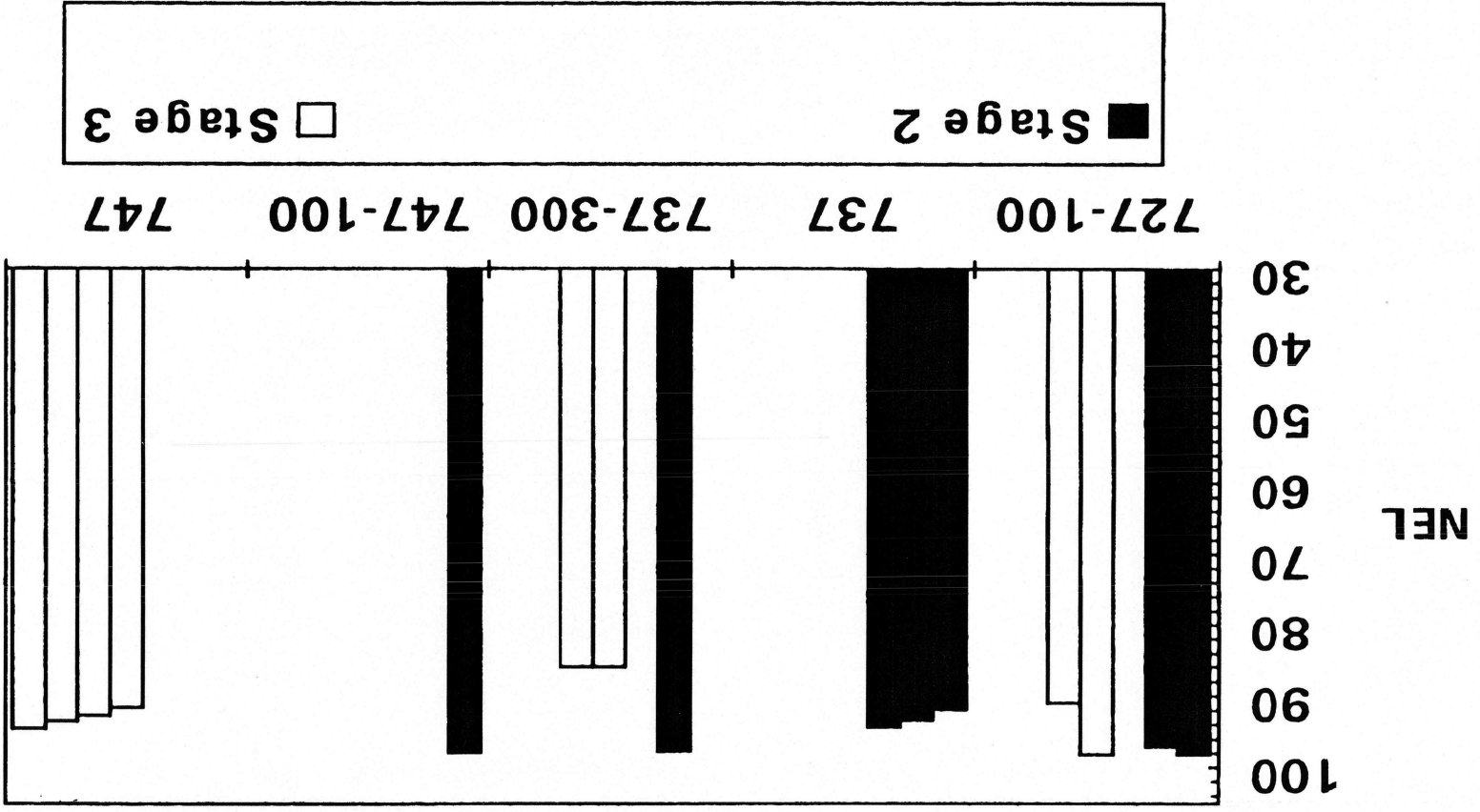
Graph D

# Unmodified vs. Hushkit



# Comparison Stage 2 & Stage 3

Graph C



## TABLE 1<sup>s</sup>

### Stage 2 Commercial Turbojet

### Total NEL\*

1. B727-100-JT8D -7	98.23
2. B737-JT8D-17	94.29
3. B747-100/JT9DTD	97.86
4. DC-850 DC-8-50/JT3D-3	99.61
5. DC-9-10/JT8D-7	92.77
6. B727-200-JT8D-7	<u>100.41</u>

Average NEL 97.18

### Stage 3 Commercial Turbojet

### Total NEL

1. B737-300/CFM56-3-B1	85.96
2. B747-100QN/JT9DFL	92.63
3. B747-200B/JT9D-7Q	94.50
4. B727 FEDEX HUSHKITB727	98.21
5. DC-8-70/CFM56-2	88.71
6. L-1011-500/RB211-524	92.04
7. B727RE VALSAN B727RE	<u>90.92</u>

Average NEL 92.83

Difference 4.35

\*Noise Exposure Level; a measurement calculated by plugging four Single Event Level noise measurements into a formula as described in STIA Noise Budget Program.



**Comments on Noise Aspects of the  
Regional Airport System Plan  
(Executive Summary)**

by  
James D. Chalupnik

Hubs of air transportation are also the focal point of potent noise pollution which bombards the residents near the hub and makes life miserable for those who must live near the hub.

If you wanted to cause the most inconvenience, annoyance, aggravation, and suffering for the most people in a metropolitan area, you could not pick a more suitable arrangement than has been chosen for the alignment of the runways at Seattle-Tacoma International Airport.

We should be looking for means of solving the problem that has been caused by this blunder while we are planning for the future of our community.

Land use policies of communities in the state should be considered when decisions are made which affect the noise environment of that community.

In evaluating the impact from a proposed action by an operator, such as Seattle-Tacoma International Airport, the state standards for noise control must be taken into consideration. The maximum permissible level in residential zones during the day is 55 dBA, and this level is reduced to 45 dBA between the hours of 10:00 pm and 7:00 am. Aircraft operating from Seattle-Tacoma International Airport exceed these limits both day and night, and they exceed these permissible levels by many tens of decibels.

There is considerable debate going on at the present time regarding the suitability of the  $L_{dn}$  metric for rating noises like aircraft noise that intrude into a person's private spaces.

The Day-Night Noise Level is an averaging metric that was contrived for the purpose of comparing similar noise environments. It is seriously defective when it is used to compare environments in which the noise level is subject to large variations, such as occur around Seattle-Tacoma International Airport where the maximum noise levels from aircraft landing and taking off are as much as 70 dB above the ambient level and 100 dB above the threshold of hearing.

For noises such as aircraft noise, each event is an affront to the individual who is required to endure these insults. As the number of events are increased, the impact is increased proportionally. If the number of operations at Seattle-Tacoma International Airport is increased by 100,000 a year, then the affected population will be impacted 100,000 times more each year.

The use of the SEL level is an innovative idea, but the way in which this metric is used in the Regional Airport System Plan is inaccurate and misleading. For noises such as aircraft noise, each event is an affront to the individual who is required to endure these insults.

The Integrated Noise Model, INM, is a mathematical model which does not consider the topographical features, meteorological conditions, or optional actions taken by the pilot that can

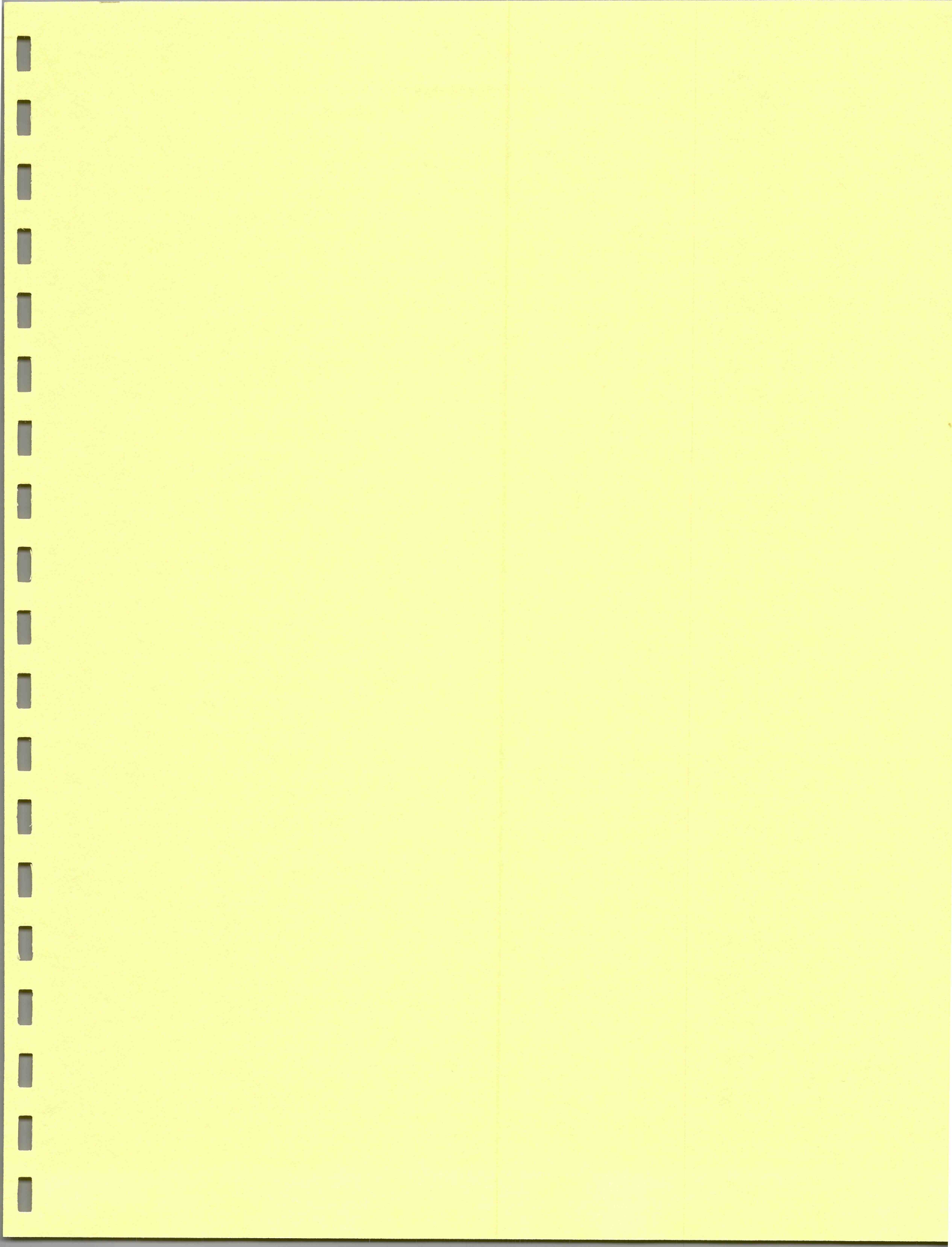
cause the model to give results that are significantly different from measurements made for aircraft under actual conditions in a given location. The impact is seriously misrepresented when the existing conditions are ignored, adding injury to insult.

In general, the fleet mix of the airlines is moving from smaller Stage 2 toward higher capacity, larger, heavier Stage 3 aircraft that may be more noisy than the smaller Stage 2 airplanes that they replace.

The Port of Seattle has undertaken an extensive program involving the purchase of certain residential properties within the  $L_{dn}$  75 contour and the insulation of some of the homes within the  $L_{dn}$  65 contour. This insulation program is controversial, expensive, and of questionable value. Residential homes are particularly difficult to insulate against this type of noise, and the home insulation program does little to keep out these noises. Insulation does not provide protection for those engaged in outdoor activities.

It is proposed that a new air transportation hub be developed in the Puget Sound basin and it is suggested that in evaluating the location of the new facility, we must:

1. Propose and evaluate additional options that direct aircraft over less populated areas rather than funneling air traffic up and down the most densely populated areas in the Puget Sound basin. In evaluating these options, the analysis should include the impact on all of the Puget Sound basin and not be limited to the impact within the  $L_{dn}$  65 contour.
2. Relate the impact of the proposed action to existing Washington State and King County noise code or ordinance. In particular, evaluate the proposed action on the basis of how many people will be exposed to how many overflights of a magnitude to create speech and sleep interference.
3. De-emphasize the use of the Day-Night Noise Level as a metric for evaluating the noise from flight operations at Seattle-Tacoma International Airport. This metric averages noises over an unrealistic time frame and distorts the impact of increased operations at Seattle-Tacoma International Airport.
4. Verify that the levels predicted by the Integrated Noise Model are accurate through a program of noise monitoring in the communities most heavily impacted by operations at Seattle-Tacoma International Airport.
5. Adopt an approach to evaluating the noise impact on areas surrounding the proposed regional hub airport and Seattle-Tacoma International Airport in which the number of overflights is directly addressed.







## **Noise From Sea-Tac Airport: Adverse Effects on the Health of Puget Sound Citizens**

"If one wanted to orient an airport so that it would create the maximum noise impact on the Puget Sound Basin, they would line it up exactly the way it is oriented today. The runways are lined up so that airplanes must fly over Seattle to the north and the cities of Sea-Tac, Des Moines, Federal Way, Tacoma and Auburn to the south."

James D. Chulupnik  
Professor of Mechanical Engineering, U.W.

### **How Is Noise From Sea-Tac Affecting the Health of Puget Sound Citizens?**

Noise influences the following skills and functions via the autonomic nervous system:

- Perception
- Motor Skills
- Cognitive Skills
- Behavior
- Glandular Function
- Cardiovascular Function
- Gastrointestinal Function

Constant exposure to noise pollution leads to:

- Increased use of tranquilizers
- Increased rate of alcoholism
- Reduced birthweights, higher rate of preterm labor and births
- Increased rates of hypertension, blood cholesterol, and blood glucose
- Disruption of sleep patterns leading to fatigue, lethargy, anxiety, and delayed reaction time.

### **Airport Noise Affects the Cardiovascular System**

Airport noise produces hypertension, a major cause of heart disease and stroke.

- Elderly and school children exposed to aircraft noise have been observed to develop hypertension.
- Increased blood cholesterol and glucose levels often occur as a result of airport noise.
- Further, prescriptions for blood pressure medicine are higher near airports.

## **Airport Noise Affects the Gastrointestinal System**

The Environmental Protection Agency (EPA) reports a 5-fold increase in stomach ulcers in noisy environments.

## **Airport Noise Affects Our Children's Ability to Learn**

65 Ldn is considered a significantly noise impacted area. Twenty-three Puget Sound schools are in this 65 Ldn contour.

Studies find that reading and math scores are lower in school classrooms impacted by airport noise. Even simple problem-solving skills are negatively affected when airport noise is present. Further, many students live in homes impacted by aircraft noise. They arrive at school tired and inattentive from sleep disturbance and are expected to listen and concentrate in classrooms where noise levels significantly interfere with noise education.

At 60 dBA, noise interferes with classroom speech and communication. In 1992, 85 dBA was found inside of Highline School District classrooms. This amount of noise is similar to starting a gas lawnmower every two to three minutes in the classroom.

## **Airport Noise Affecting Unborn Children**

Studies of noise exposed animals find a decrease in fertility rates and an increase in birth defects, including cleft palate, spina bifida, and anencephaly. Similar birth defect trends are found in humans. In addition, airport noise results in decreased birthweights, preterm labor, and premature births.

## **Third Runway Will Intensify Existing Noise Levels Increasing Health Risks**

The Port Of Seattle says noise impact will decrease 50% by the year 2,000 with the addition of the third runway. A 50% reduction in noise equates to a mere 3-4 decibel difference. A difference of 3-4 decibels is barely even detectable to the human ear. Further, even though 62% of existing airplane fleet is now the quieter Stage III aircraft, there have never been more aircraft noise complaints from more places in our region.

The proposed third runway would bring in 100,000 more flights per year. To say that 100,000 more flights per year to the same area will decrease noise defies logic. Common sense tells us that a third runway will intensify existing noise and air pollution. History tells us that it is unlikely the Port will do anything to significantly mitigate the number of people impacted by this noise and air pollution. Economists tell us that it is unlikely the economic benefits will outweigh the new runway's construction costs. If the cost of health care necessary to treat those affected by airport noise and air pollution is taken into consideration, the costs will surely outweigh the benefits.

## THE ADVERSE HEALTH IMPACTS OF AIRPORT EXPANSION

### (Executive Summary)

Noise is a non-specific biologic stressor, eliciting a response that prepares the body for "fight or flight". By means of the autonomic nervous system, noise can influence perceptual, motor, cognitive, behavioral, glandular, cardiovascular, and gastrointestinal function. Noise promotes stress and anxiety, disrupts sleep and is a major threat to human health.

Studies have shown a marked increase in the use of tranquilizers and sedatives by residents around jet airports, and an increase in the rate of alcoholism and its associated medical problems. Many studies have shown an increased number of psychiatric admissions from noise-impacted neighborhoods around jet airports.

Hypertension has been produced experimentally in humans and in animals after exposure to only moderate noise. Hypertension has also been demonstrated in school children under a jet flight path. Prescriptions for antihypertensive medications have been observed to double in communities after building of a new jet runway. Noise has also been shown to elevate blood cholesterol and blood sugar levels, both of which are associated with heart disease and stroke. The public health implications of these findings in a noise-exposed, urban population are enormous. One large study of noise-impacted people near the Amsterdam Airport found an increase in the use of cardiovascular drugs, and an increase in the incidence of heart disease. A 15% increase in the incidence of stroke has been reported near the L.A. International Airport compared to quieter communities.

Heavily noise-impacted areas around jet airports are probably unsafe for pregnant women. Several studies have shown reduced birth weights and a higher rate of premature births in airport communities. Low birth weight is a known marker for reduced infant survival. Experimental studies have documented lower fertility rates and an increase in birth defects in noise exposed animals. One study has found an increase in the rates of neural tube defects (spina bifida and anencephaly) in children born to women living under the flight path of a large international airport.

The Environmental Protection Agency has reported that people working in noisy areas have five times as many stomach and duodenal ulcers as the general population. Prescriptions for antacids, commonly used to treat ulcers and related acid peptic problems, nearly doubled in a community after the building of a new jet runway.

Experts have also claimed that loud and disturbing noises trigger changes in circulating hormones and may lower resistance to disease and infection.

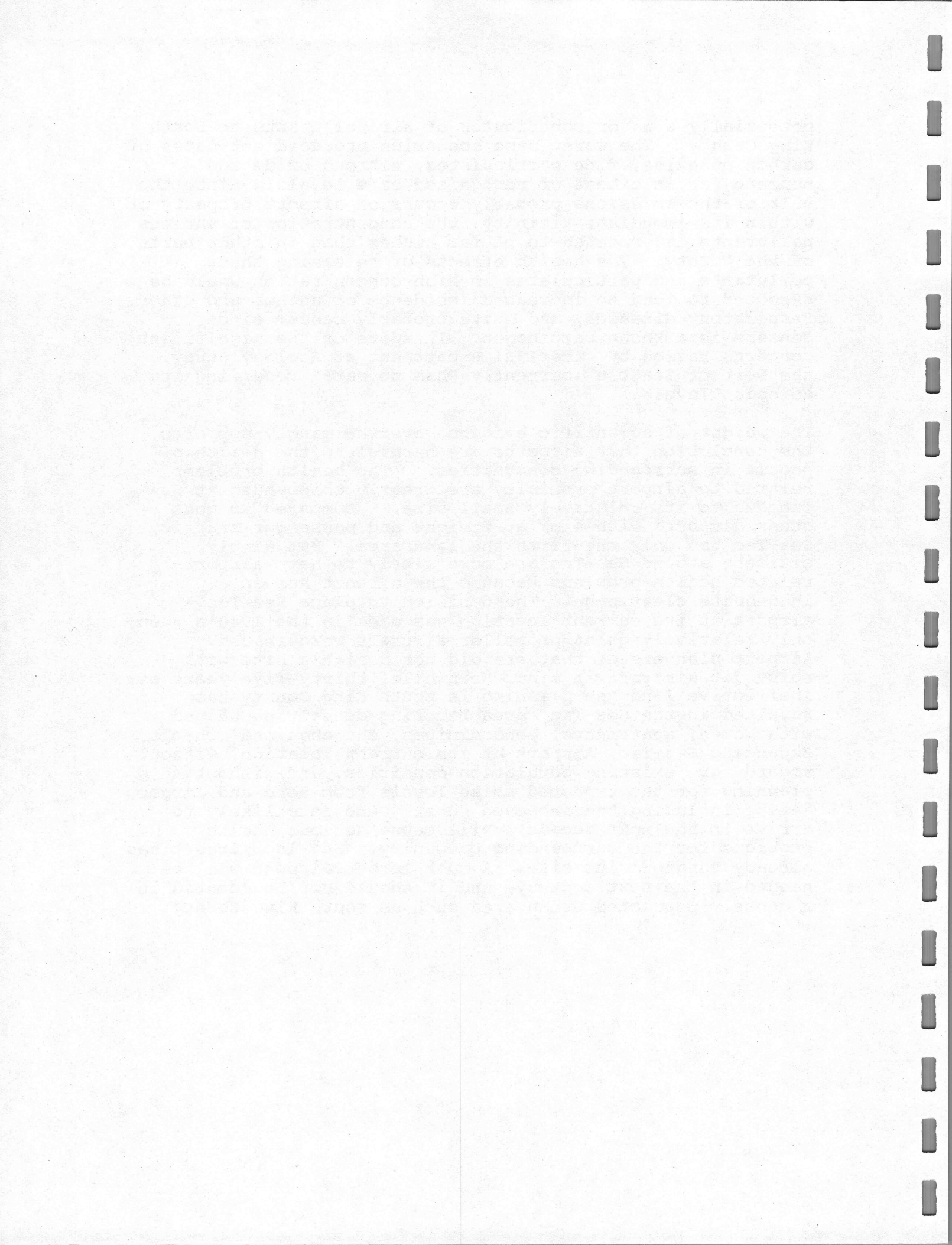
Several Highline schools (up to 6000 students) are located in heavily noise-impacted areas. Sound measurements done in schools in the Highline district in 1992 recorded levels of 85 dBA in the classrooms. Noise levels outside the schools reached 100 dBA. Noise begins to interfere with speech and learning when it exceeds 60 dBA. Studies have shown that students in noisy classrooms are more likely to read at least one year below grade level compared to students in quiet classrooms and that children in schools exposed to airport noise were more likely to give up on a task, and less likely to succeed at simple problem solving compared to students in quiet schools. These effects are most marked in students who have attended the noisy school the longest. In the Highline School District, it was found that students in the noisiest schools do significantly worse on standard mathematics tests when compared to students studying in quieter schools. Highline School District M.A.T. scores have fallen from among the best in the state to the third lowest in the state concomitantly with the growth of jet aircraft traffic at Sea-Tac airport. Many students live in homes impacted by aircraft noise. They arrive at school tired and inattentive from sleep disturbance and are expected to listen and concentrate in class rooms where noise levels significantly interfere with their education.

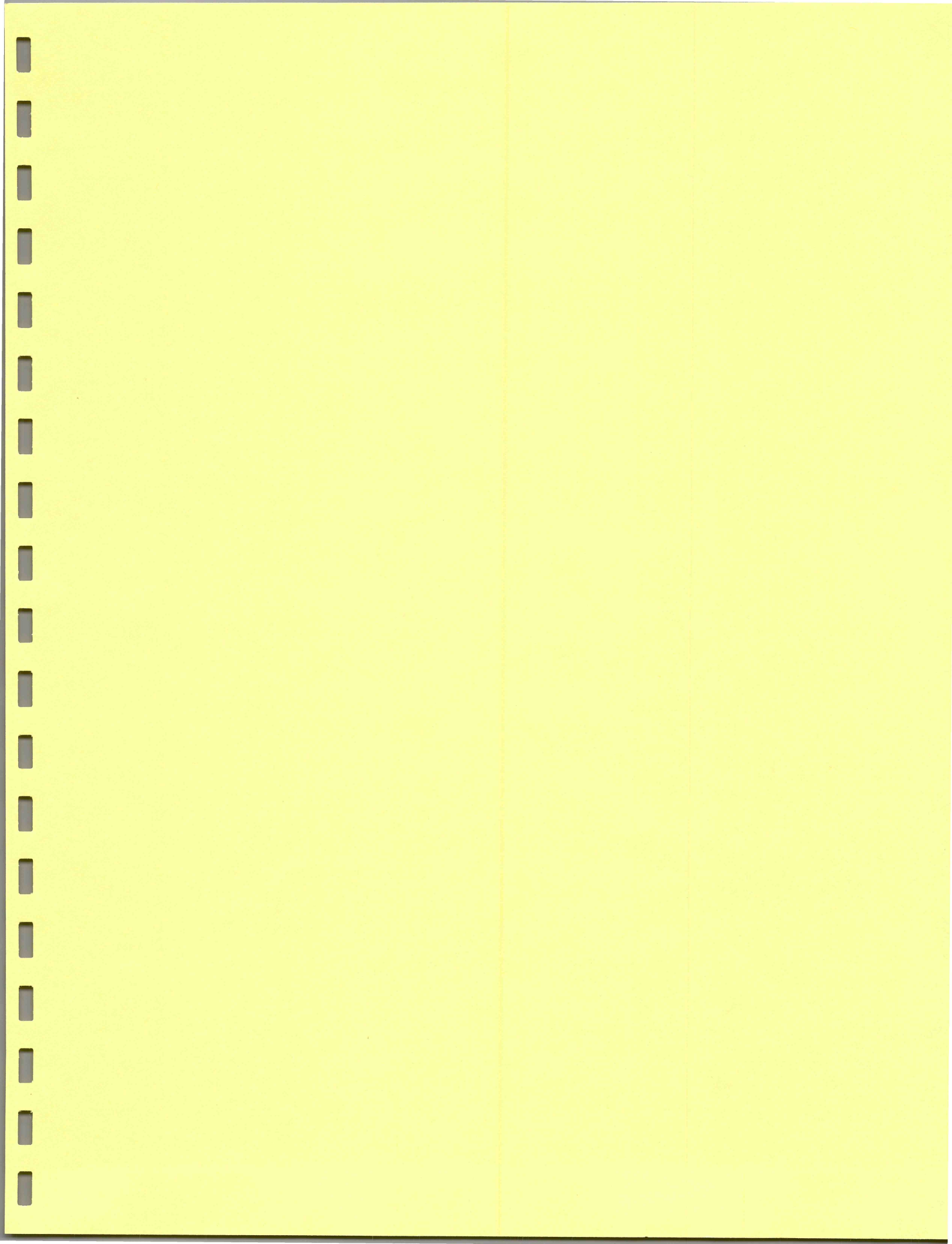
Disturbance of sleep is probably the most widespread source of distress caused by noise. According to one sleep study, 10% of people living 19 kilometers from Kennedy Airport reported difficulty sleeping compared with 60% of those within 6 kilometers of the airport. Falling asleep takes considerably longer with peak levels of 60 dBA and ambient levels of 50 dBA. Forty to 50 dBA are capable of changing the stage of sleep without producing complete awakening. The threshold for complete awakening is variable, but violently fluctuating noise such as aircraft noise, is the worst. Complete awakening can be seen with an increase of only 10 dBA over baseline. Since deep and REM sleep are physiologically important, sleep impairment is most certainly damaging. Disruptions of sleep lead to symptoms of fatigue, lethargy, decreased efficiency, anxiety, and desire to be left alone. Research supports the recommendation that night time noise levels not exceed 35 dBA. Ldn 55 from aircraft noise is equivalent to 50 daily episodes of aircraft noise with a peak level of 81 dBA. At Dallas Fort Worth airport, Ldn 55 is not reached until 6 miles from the end of the runway.

The Seattle Tacoma International Airport Air Pollution Contribution Study of May, 1991 (generated by the Washington State Department of Ecology) identified the airport as being

potentially a major contributor of air pollutants to South King County. The worst case scenarios produced estimates of carbon monoxide, fine particulates, nitrous oxide and benzene far in excess of recognized safe levels. Since the bulk of the emissions probably occurs on airport property or within its immediate vicinity, the concentration of various pollutants is expected to be far higher than in other parts of the County. The health effects of releasing these pollutants and particulates in high concentration would be expected to lead to increased incidence of asthma and other respiratory diseases, and quite probably cancer since benzene is a known carcinogen. In spite of the significant concerns raised by the 1991 Department of Ecology Study, the Port of Seattle currently "has no data" regarding its emission levels.

The weight of scientific evidence overwhelmingly supports the conclusion that airports are harmful to the health of people in surrounding communities. The health problems related to airport proximity are greatly compounded at Sea-Tac due to its relatively small size. Compared to most other airports with similar freight and passenger traffic, Sea-Tac has only one-fifth the land area. Put simply, citizens around Sea-Tac are more likely to have airport-related health problems because the airport has an inadequate clear zone. The decision to place Sea-Tac airport at its current location was made in the 1940's when only relatively quiet propeller aircraft were in use. Airport planners of that era did not design a site with noisy jet aircraft in mind. Meanwhile, thirty-five years of ineffective land use planning in south King County has resulted in the Sea-Tac area becoming densely populated with homes, apartments, condominiums, churches and schools. Expanding Sea-Tac Airport at its current location, without regard for existing population densities, and without planning for the expected noise levels from more and larger jets, (including the proposed super jumbo jets likely to arrive in the next decade), will cause serious health problems for the surrounding community. Sea-Tac Airport has already outgrown its site. A much larger airport will be needed in the next century, and it should not be located in a densely populated urban area such as south King County.







## Sea-Tac Airport: Effect on the Environment

Sea-Tac airport already emits high levels of toxic air pollutants into the environment. The addition of a third runway would increase these already harmful levels and the severity of the impact. Consequently, the health of citizens in the Puget Sound Region is affected.

### Sea-Tac Airport's Contribution to Air Pollution

Sea-Tac Airport presently contributes 6,550.70 metric tons of severely toxic air pollutants to Southwestern King County. Included in these dangerous toxic pollutants are carbon monoxide, nitrogen oxide, hydrocarbon emissions, sulfur oxide (acid rain), particulates, and benzene.

### How Do These Air Pollutants Affect Your Health?

Toxic air pollution affects the upper respiratory system which can lead to chronic bronchitis, chronic lung diseases, and nervous system disorders. Below is a list of how each of the specific toxic pollutants emitted from operations at Sea-Tac Airport affect your health.

#### Sea-Tac Airport Emits 3,050 Metric Tons of Carbon Monoxide.

Carbon Monoxide can be deadly in high enough concentrations. Carbon monoxide binds to the hemoglobin in the bloodstream and replaces the oxygen molecules. This causes a lack of oxygen which has been found to cause heart difficulties in people with chronic diseases. It also reduces capacity, aggravates arteriosclerosis, and impairs mental abilities.

#### Sea-Tac Airport Emits 1,950 Metric Tons of Nitrogen Oxides.

Nitrogen Oxides contribute to acid deposition and increase the incidence of chronic bronchitis. They also cause lung irritations, ciliary paralysis, bronchitis, pneumonia and exacerbate influenza by impairing the body's immune system.



## **Sea-Tac Airport Emits 1,300 Metric Tons of Hydrocarbon Emissions**

**Hydrocarbons** are highly irritating to the mucous membrane and contribute to upper respiratory distress.

## **Sea-Tac Airport Emits 175 Metric Tons of Sulfur Oxide (Acid Rain).**

**Oxides of Sulphur** become acidic by reacting with moisture in the atmosphere. Our respiratory system attempts to filter the acid out but becomes damaged in the process. The acid and other inorganic sulfates penetrate the mucous lining, irritate the bronchial mucous and damage the cilia. This initiates bronchitis and produces asthma. Asthma decreases the respiratory function at both the acute and chronic levels. Heart disease may be aggravated as well.

## **Sea-Tac Airport Emits 68 Metric Tons of Particulates.**

**Particulates**, both total suspended particulates and particulate matter, aggravate chronic diseases and heart and lung disease symptoms. Particulates also transport toxic elements such as lead, cadmium, antimony, arsenic, nickel, vinyl chloride, asbestos, and benzene compounds to the respiratory, digestive and lymphatic systems.

## **Sea-Tac Airports Emit 12.7 Metric Tons of Benzene.**

**Benzene** is a known carcinogen that has been linked to leukemia. Due to the long latency period between exposure to chemicals such as benzene and the development of disease, it may not be possible to detect an increased incidence of cancer in airport communities.

However, lack of documented increased cancer incidence does not mean it does not exist. The average contribution of benzene at Sea-Tac airport is estimated to be about 24,000 parts per trillion annually. The acceptable source impact level for new sources proposed by WAC is .063 parts per trillion.

Although Sea-Tac airport is relatively small, health problems related to proximity to Sea-Tac are high. Citizens living around Sea-Tac airport are more likely to experience airport-related health problems because Sea-Tac lacks an adequate clear zone surrounding its facilities. Money earmarked for expansion of Sea-Tac airport would be better spent alleviating existing air and noise pollution currently affecting Puget Sound citizens.

*Source Information Available Upon Request  
(206) 824-3120*

# The Impact of Aircraft Noise on the Education of Children

January 14, 1993

Executive Summary

Dr. Nancy Angello

*Research and Evaluation*

## **Executive Summary: The Impact of Aircraft Noise on the Education of Children**

### **Highline School District Seattle, Washington**

The Highline School District is the ninth largest school district in the state of Washington. It has the distinction of serving as the landbank surrounding Sea Tac airport. There are several points that the district would appreciate the Commissioners consider regarding the impact on children of the existing Sea Tac Airport and its proposed expansion. The Highline School District is in a unique position to comment on this because of its experience with the airport and its diligent monitoring of the research on the impact of aircraft noise on learning.

#### **Expansion keeps expanding:**

The Highline School District and the Port of Seattle reached a settlement \$ 3.6 million based on a 1973 study of the impact of aircraft noise on instruction. In a 1973 study there were on average 220 daytime flights per day. In 1992 there were an average of 808 daytime flights every day. (1) Settlements do not settle the problem if impact continues to expand.

The programmatic Environmental Impact Statement did not address the increased frequency of flights. This expansion of flights "just happened." The Port did not invite the district to plan with it during the last twenty years to deal with this major increase in flights over our schools. It is currently the burden of each governmental jurisdiction to monitor the impact of major shifts in number of flyovers, loudness of aircraft, change in landing patterns, and the like so that needs can be addressed in a timely manner.

#### **Aircraft noise is cheating our children out of their right to an education:**

Studies show a negative impact of noise on children's general academic achievement, including auditory discrimination, reading ability and competence in mathematics (2). Studies by Green and Pasternack found that the percent of children reading one year below grade level increased as the school's noise level increased. Why is this? Two key reasons include children living and learning in an environment where aircraft noise masks the words they hear (3). These children are poor at auditory discrimination. Such children are disadvantaged when it comes to learning to read. Secondly, their teachers have to contend with aircraft noise when they instruct. Studies show teachers will not shout over airplane noise.(4) Instead they pause. When this happens teachers and students lose school time. Those that do not pause report that their concentration, their "train of thought" has been disrupted. Again, when this happens children lose out on their education. Teachers and children are affected by aircraft noise and do not become habituated to it. Cohen (1981) in one of the most carefully controlled studies found that children do not adapt to noise over time.(5) A study of school children near the Los Angeles airport found children who attended noisy schools showed no signs of adaptation. They had a higher blood pressure than those from quiet schools, even if the students actually lived in quiet neighborhoods.

(6) Noise makes children harder to teach.

Noise can effect children's tolerance for frustration. Even moderate noise levels can increase anxiety, decrease the incidence of helping behavior, and increase the risk of hostile behavior in experimental subjects. (7) The longer the Los Angeles children had been in a noisy environment the more distractible they were and more they exhibited frustration and exhibited what is called in the literature a "giving up" syndrome when asked to do cognitive tasks. (8) Students in one of our schools heavily impacted by aircraft noise took a nationally normed test to measure sources of school stress. They scored high. Stress scores were brought down into the medium range only after considerable deployment of time and money for special interventions.

#### The problem is big:

Noise impacts many thousands of students in the Puget Sound region.

By its own report the Port cites 23 schools within unacceptable noise boundaries for Sea Tac airport. (9) That represents schools in three different public school districts, and one private school district. In Highline alone every year over 6,000 students attend schools whose noise level is been designated unacceptable. Sound attenuating classrooms is important but these children must go outside to play. We have not figured a way yet to sound attenuate the playground. The way school is in the 1990's children move around our district for special program needs. Thus, every school in the Highline district, regardless of how far it is from the airport or what noise contour it is in has students who live in the very noisy 70 to 75 LDN bands. Students no longer stay in one school district. Students who lost education because of noise in the Highline school district may be moved and need to be remediated in another school district.

#### Noise costs money:

One of the most expensive direct costs of noise is sound attenuating school buildings. Sound attenuating classrooms is expensive. It costs as much a \$6 a square foot. The square feet needed for an average elementary school, middle school and high school respectively are 60,000 80,000 and 200,000 square feet. Changing or expanding sound contours is expensive for school districts. Since most of the Highline School District falls within the noise shadow there is an additional problem of siting a new school in a quiet zone. Currently remedy available for remodeling is based on LDN measures. Studies suggest that LDN is not the appropriate measure of impact on schools. (10) Schools in high LDN are certainly affected by noise but the educational interference seems to be more tightly linked to their orientation to runway noise rather than LDN measures. (11) For example, an independent study of the Highline schools found one of the schools reported by the Port to be in the 65 LDN had more classroom interference than schools in the 70 and 75 LDN. A study by the Department of Labor and Industries found that the 65 LDN school had a classroom noise level of 60+ dBA when measured during vacation to more accurately isolate aircraft noise from classroom activities. A study conducted by the Puget Sound Educational Service District using independent raters who observed four weeks of classroom activities and monitored the extent of interference of aircraft noise recommends that measures using the commonly reported dBA rating scale may mask classroom interference. They suggested that aircraft noise be monitored on the db C scale, a scale more similar to what the human ear receives as speech. Better measures of impact must be addressed.

Also, there is no way for jurisdiction to recover recurring costs of air conditioning, transporting children around the airport, etc. Local patrons should not pay for recurring costs incurred from a regional benefit.

Health and safety costs:

There are expensive health and safety issues that must be dealt with in order to move seven kingdome worth of dirt over the next three years. These are expensive in terms on monetary impact but also in terms of the loss of health and possible lawsuits that may result from the impact of congestion and presence of so many big earth moving vehicles on surface streets in front of several of our schools for the next several years. Recall that the Highline school district literally encircles the airport. What safety considerations will be put in place to safeguard our youngsters as they walk back and forth to school? We are largely without sidewalks. Children sharing the road with so many earth moving trucks is going to be a very dangerous condition and most estimates suggest that the earth removal will continue for at least three years. What about the dirt and noise that will be created from this? Our schools are located on key routes around the airport. It will be unavoidable for them not to bear the brunt of this enormous land relocation. And, of course, who will pay for the extra crossing guards, street repair, extra school bus runs needed because of congestion, etc. that will be required if the airport is to expand?



## ARCHDIOCESE OF SEATTLE

910 MARION STREET  
SEATTLE, WASHINGTON 98104  
(206) 382-4375

OFFICE OF THE ARCHBISHOP

October 19, 1992

Mr. John C. Schuster  
Principal, Kennedy High School  
140 S. 140th Street  
Seattle, Washington 98168

Dear Mr. Schuster,

I have received your letter regarding the efforts of yourself, Father Philip D. Wallace, pastor of St. Francis of Assisi Parish, and members of your respective communities to address the proposed development of a third runway at Sea-Tac International Airport. I fully support these efforts.

While I cannot comment on the particular dimensions of all the issues raised by members of your community, the Archdiocese does have four concerns it shares with you.

First, the Archdiocese feels a special concern for people in the community for which we take direct responsibility. I am thinking here of children who attend our schools and residents of housing projects we have developed. You and I must speak out for their interests. They must not be subjected unnecessarily to the noise, disruption and pollution attendant on the proposed development. The Port District must be allowed to proceed only if the protection of those people directly impacted is provided for as a matter of first priority. It is unjust if these people are taken care of after the fact and only after prolonged struggle.

Secondly, justice does require mitigation and full compensation for real losses. Such compensation must be swift and sure. Slow and begrudging compensation procedures can become in themselves a violation of this responsibility. The record on previous airport expansions does not give much encouragement on this score.

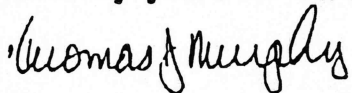
Thirdly, we have a concern that everybody affected by this decision be accorded their right to participate. Given the broad impacts of the decisions involved, we believe that these decisions are beyond the scope of the mandate and public accountability of the Port District. Other, more representative governmental institutions, must be involved and should be the primary decision maker.

Finally, the decisions made regarding this project must not be simply for the good of the clients of the Port District, it must be for the common good. This is, of course, a central tenet of Catholic social teaching. On this issue, as any other, we must collectively come to a decision which takes into account all those affected.

In this case, it is not only those who are directly impacted or those who directly benefit from the planned action. It is all of us in this state who may benefit from a transportation development program which protects our environment and secures for us, especially those most in need, the economic goods possible from a wisely planned system.

I would appreciate it if you would convey my concerns along with yours to the Port District at its hearing on October 20.

Sincerely yours in Christ,

A handwritten signature in cursive script that reads "Thomas J. Murphy". The signature is written in dark ink and is positioned below the typed name.

Thomas J. Murphy  
Archbishop of Seattle



# John F. Kennedy MEMORIAL HIGH SCHOOL

140 SOUTH 140th, SEATTLE, WASHINGTON 98168-3496

246-0500

October 20, 1992

## STATEMENT OF JOHN C. SCHUSTER, PRINCIPAL OF JOHN F. KENNEDY MEMORIAL HIGH SCHOOL CONTINUED

As for my concerns, I have been a high school teacher and administrator for 25 years. This is my 16th year as a high school principal. I love my job because in spite of what you might read about teenagers, the vast majority are responsible, caring and talented young men and women. They are our future and from where I stand, the future is bright.

Governmentally, however, we sometimes throw up roadblocks that make teaching them more difficult than is necessary. The proposed runway at Sea-Tac will make it more difficult because of increased noise, pollution and disruption of neighborhoods.

Presently, Kennedy, Highline, Tye, Foster, Seattle Christian, and Mount Rainier High Schools are directly impacted by airport noise along with numerous elementary schools and junior highs, both public and private. I do not think that the plan before you today will be adequate for the future of air transportation in our area. Why not accept that fact and make a decision to build an additional airport away from populated areas. Connect it to Seattle with high speed rail service. Demonstrate to our young people and the Highline community that you are concerned about their future as much as you are about the future of air transportation.

  
John C. Schuster  
Principal



## EXECUTIVE SUMMARY

How does air pollution contribute to our health problems?

\* Carbon monoxide in high enough concentrations can kill. In fact it is responsible for many deaths. Carbon monoxide binds to the hemoglobin in the bloodstream and replaces the oxygen molecules. This causes a lack of oxygen which has been found to cause heart difficulties in people with chronic diseases, reduce lung capacity and aggravate arteriosclerosis, as well as impair mental abilities.

\* Particulates, both total suspended particulates (TSP) and particulate matter (PM<sub>10</sub>) aggravate chronic diseases and heart and lung disease symptoms. Particulates also transport toxic elements such as lead, cadmium, antimony, arsenic, nickel, vinyl chloride, asbestos and benzene compounds to the respiratory, digestive and lymphatic systems.

\* Oxides of sulphur become acidic by reacting with moisture in the atmosphere. Our respiratory system attempts to filter the acid out but becomes damaged in the process. The acid and other inorganic sulphates penetrate the mucosal lining, irritate the bronchial mucosa and damage the cilia. This initiates bronchitis and produces asthma. Asthma decreases the respiratory function at both the acute and chronic levels. Heart disease may be aggravated as well.

\* Nitrogen oxides contribute to acid deposition and increase the incidence of chronic bronchitis. They also cause lung irritations, ciliary paralysis, bronchitis, pneumonia and exacerbate influenza by impairing the body's immune system.

\* Hydrocarbons are highly irritating to the mucous membrane and contribute to upper respiratory distress.

\* Benzene, a known carcinogen, has industrial standards but is not currently regulated as an air pollutant. It is about 4% of hydrocarbon emissions. A rough estimate by the Radian Corporation is that in 1984, Sea-Tac airport emitted 12.7 tons of benzene.<sup>1</sup> The hourly average contribution of benzene at Sea-Tac airport is estimated to be about 0.16 parts per million (or an average of 24,000 parts per trillion annually). The acceptable source impact level for new sources proposed in WAC 173-460 is 0.063 parts per trillion.<sup>2</sup>

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<sup>1</sup> Pg. 7, SEATTLE TACOMA INTERNATIONAL AIRPORT: Air Pollutant Contribution, Department of Ecology, 1991

<sup>2</sup> Pg. 21, IBID

\* Hydrocarbons and nitrogen oxides form the dangerous ozone which is a serious pollutant because it allows the harmful ultraviolet rays (UVb) to enter the troposphere. Ozone (O<sub>3</sub>) exacerbates mortality in the elderly and very young populations because of heat stress. It increases preterm and prenatal births and increases diseases carried by fleas, ticks and mosquitoes.<sup>3</sup>

\* Ozone (O<sub>3</sub>) exposure results in eye irritations, damage to lung tissues, reduced resistance to colds and pneumonia, aggravates heart disease, asthma, bronchitis and emphysema. It affects healthy as well as impaired respiratory systems in children and adults. It can cause shortness of breath and coughing during exercise in healthy adults. There are other, more serious effects in the young, old and infirm as well.

\* Lead accumulates in the body within the blood, bones and soft tissues. Lead affects the kidneys, nervous system and blood forming organs. Excessive exposure may cause nervous system impairments resulting in seizures, mental retardation, behavioral disorders, miscarriages, stillbirths and defects of the newborn. It may also contribute to high blood pressure and subsequent heart disease.

Air pollutants affect our total environment: earth, water and air. Air pollutants drift downward and settle into the soil, contaminating whatever grows there, including our food sources. Recent research has found significantly higher levels of extremely long lived stable chemicals such as DDT, DDE and PCB's in the fatty breast tissue of 40 women -- twenty of whom had cancerous lumps and twenty who had benign lumps. Even Dr. Michael Morgan, Environmental Health Professor, hired by the Puget Sound Air Transportation Committee to discuss health impacts for the FLIGHT PLAN PROJECT FINAL ENVIRONMENTAL IMPACT STATEMENT states:

"THE CLAIM OF CANCER CASES AT HIGHER THAN EXPECTED FREQUENCIES AROUND AIRPORTS CANNOT BE DISMISSED WITHOUT SYSTEMATIC INVESTIGATION."<sup>4</sup>

Elizabeth M. Williams  
Seahurst, Washington  
November, 1992

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<sup>3</sup> Pg. 4, AIR QUALITY ANALYSIS, Revised October, 1990,  
Puget Sound Council of Governments

<sup>4</sup> Pg. 4-29, FLIGHT PLAN PROJECT FINAL ENVIRONMENTAL IMPACT STATEMENT

SEA-TAC THIRD RUNWAY  
LANDFILL REQUIREMENTS AND IMPACTS

To build the third runway, the Port of Seattle proposes to fill in the west slope of the current airport area with 13,682,000 million cubic yards of compacted dirt.<sup>1</sup> Since compacted dirt is about thirty percent less than the actual loose dirt needed, the cubic yardage of dirt needed is about 17,786,600 million cubic yards. How much dirt is this exactly?

By examining how many Kingdomes or how many #1001 Fourth Avenue buildings this amount of dirt could fill, we can better imagine its quantity. For example, the Kingdome's volume is 67 million cubic feet or 2.5 million cubic yards. Therefore, the fill required to build a third runway would occupy 7.1 Kingdomes, (see Attachment A for graphic representation). Or, the dirt would fill 36.9 1001 Fourth Avenue buildings, which has a volume of 13.5 million cubic feet, or .46 million cubic yards, (see Attachment B).

To transport the dirt, however, presents a complex and difficult task with quantifiable impact. To show realistically the work involved to move this amount of dirt, we need to examine how many trucks are needed, how much they hold, how far they would go to get the dirt, and how many hours it would take to truck and dump the dirt.

One of the excavating companies said the project may utilize end dump-trucks, which hold 10 cubic yards are about 25 feet in length. Using these figures, the project requires 1,778,660 trucks total, which if lined up would stretch for 8421 miles. This would be a line of trucks stretch around the United States and further. (see Attachment C).

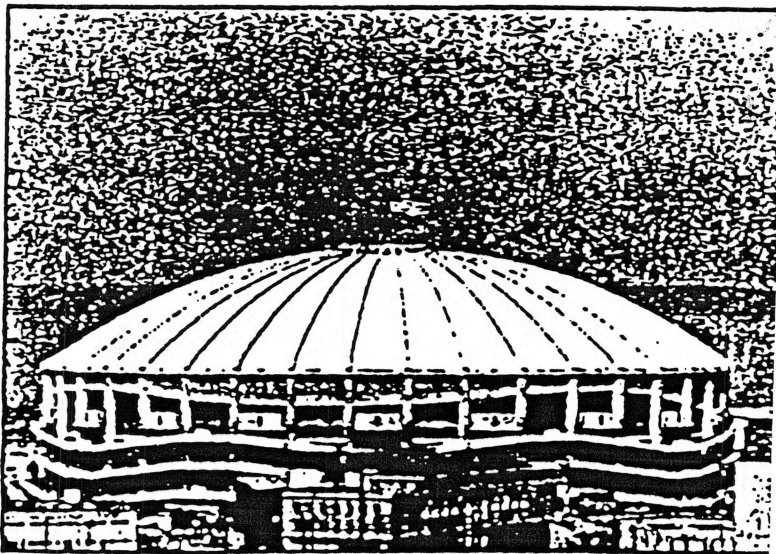
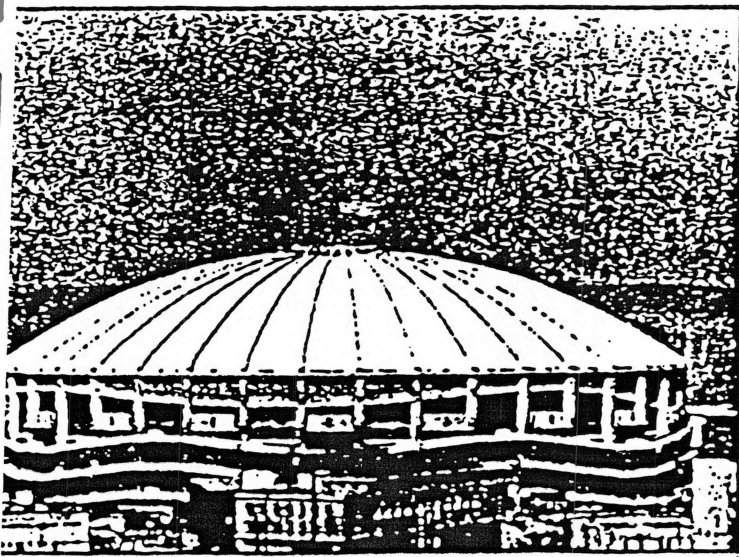
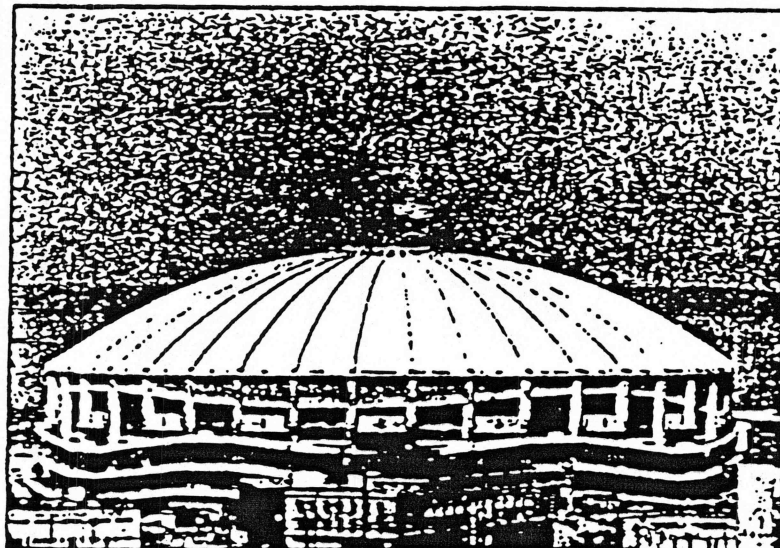
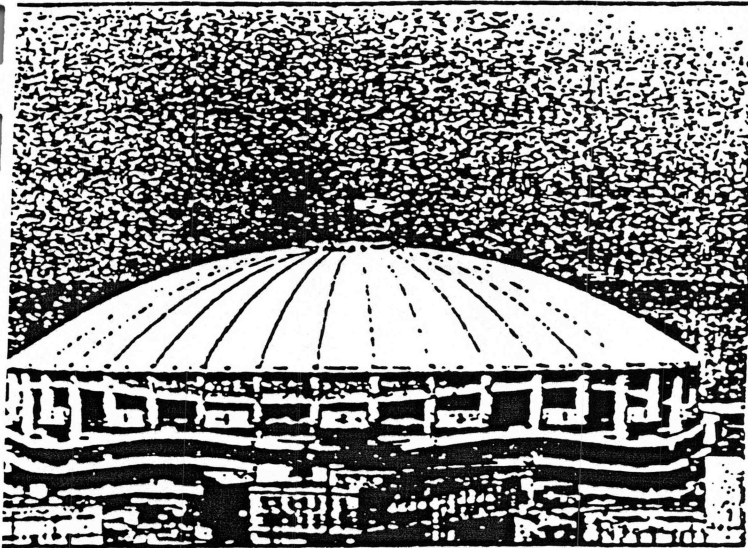
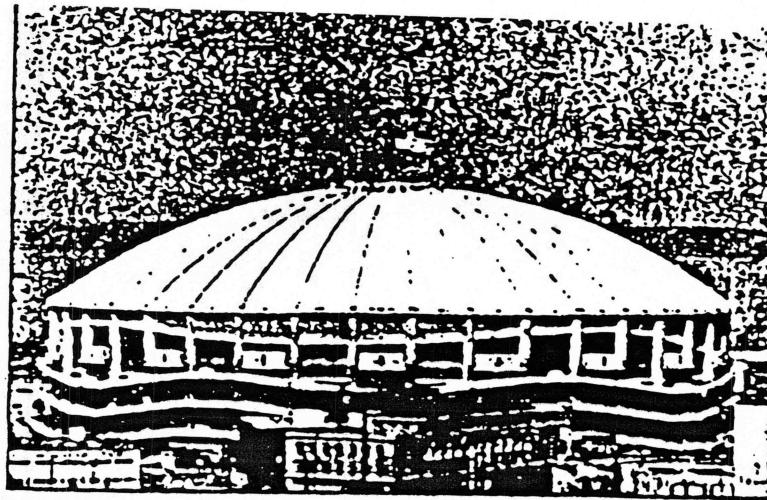
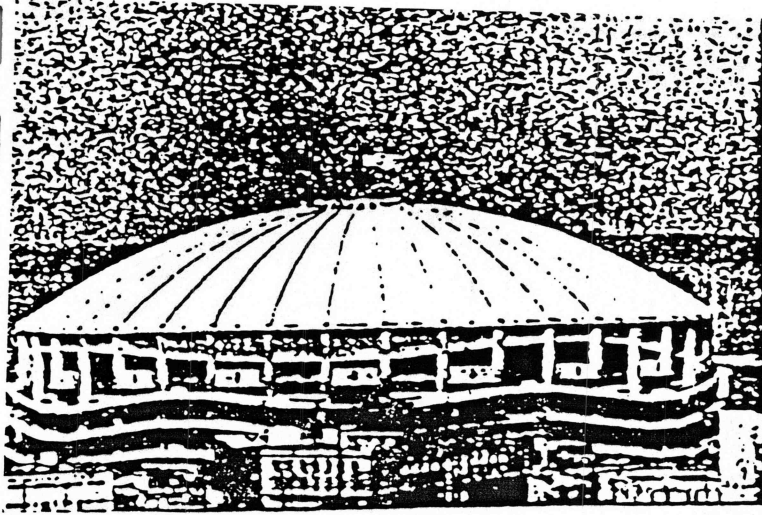
In order to finish this dirt moving portion of the project in 3 years, more than 1976 trucks per day would have to transport dirt to Sea-Tac. This many trucks lines up, each 25 feet long, would create a line 9.4 miles long. Consider facing almost 2000 additional trucks on I-5 for three years, or 900 working days. Since trucks would use an already congested area of I-5, this may well be an unacceptable impact for the entire region.

Furthermore, one company alone can on average only supply a maximum

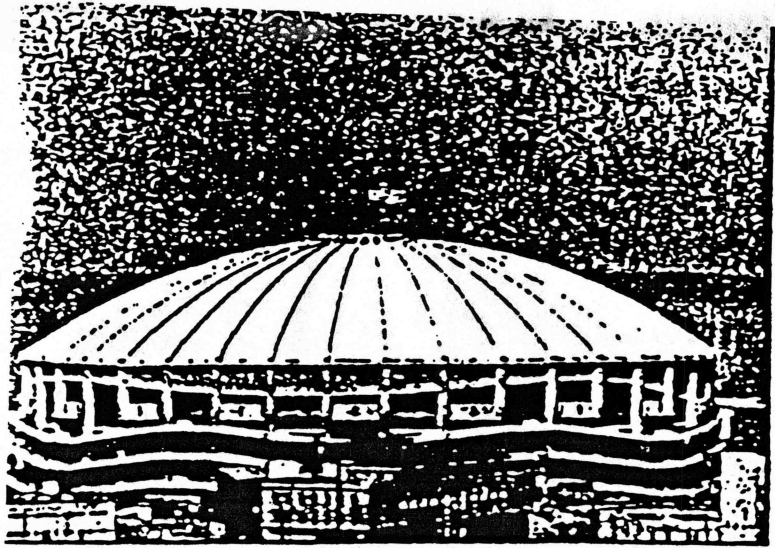
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<sup>1</sup> Puget Sound Air Transportation Committee, The Flight Plan Project, Draft Final Report & Appendices, p.3-41, January 1992.

of 55 trucks during an 8 hour working day. This would mean at least 35 companies would have to work simultaneously, assuming that they are all local, can get dirt by barge to Seattle and finally, supply this many trucks per day to transport and dump the fill.



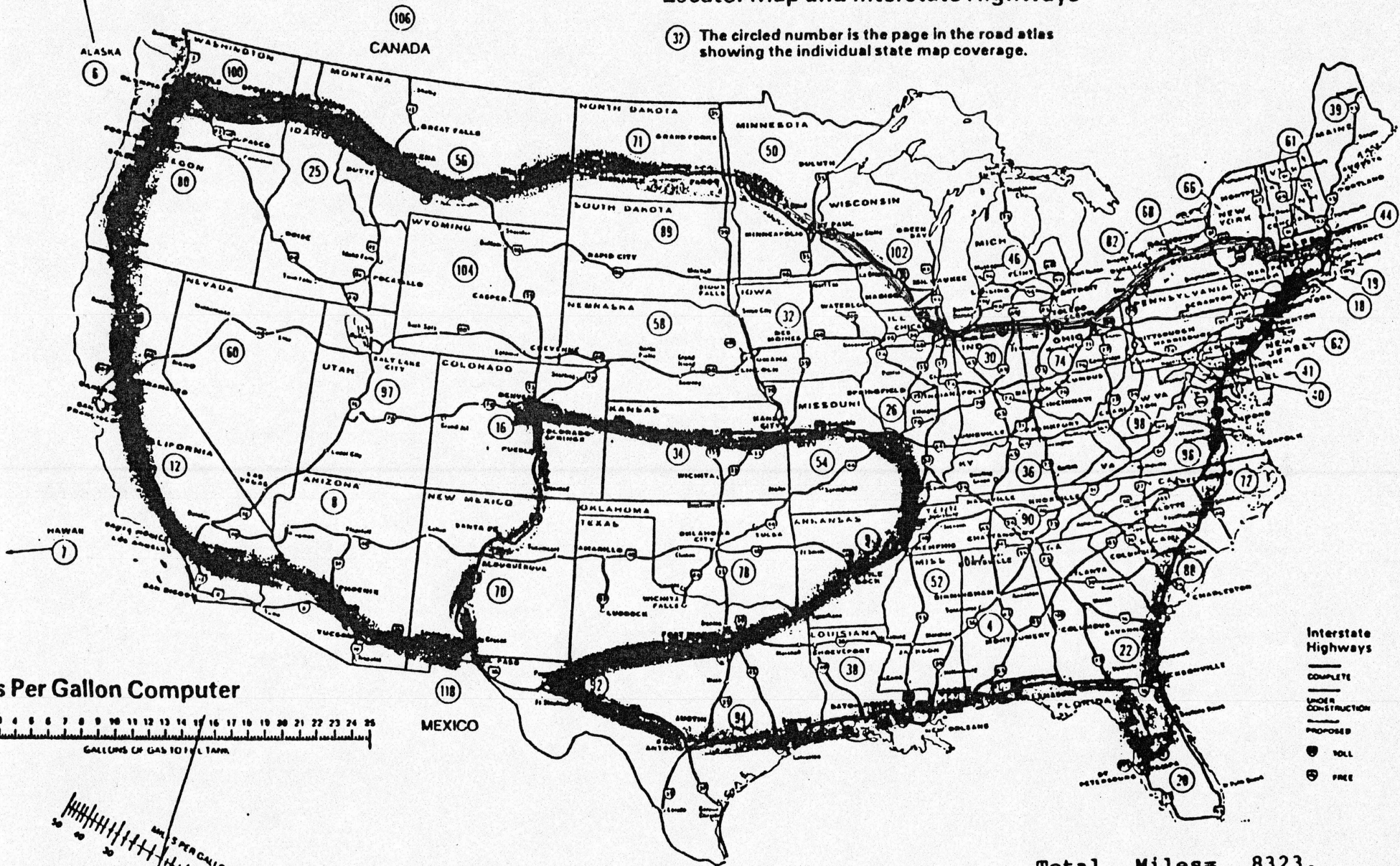
In order to build a third runway on the west side of Sea-Tac airport, the Port of Seattle proposes to excavate and pack a quantity of dirt that would fill 7.1 Kingdomes!



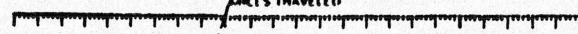
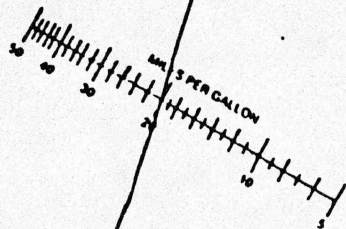
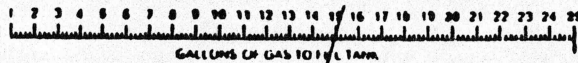
Line of trucks filled with 17,786,600 cu. yards of dirt

### Locator Map and Interstate Highways

37 The circled number is the page in the road atlas showing the individual state map coverage.



### Miles Per Gallon Computer



#### Directions for use of the computer:

- A Determine the total miles traveled and the gallons of gas needed to refill tank.
- B Use a straight-edge and line-up (connect) both of these figures on the appropriate upper and lower horizontal scales. (The red line illustrates the procedure.)
- C Read off the miles per gallon where the straight-edge line intersects the center

Total Miles = 8323,  
still 100 miles short  
of the line of  
trucks.

WATER QUALITY ISSUES  
Related to Sea-Tac Airport Expansion

Storm and waste water from Sea-Tac Airport discharge into Miller and Des Moines Creeks, and to Puget Sound through sewer treatment plants. On several occasions jet fuel spills have killed nearly all aquatic life in creek discharge areas, with even partial recovery of fish runs taking years. Petroleum leaks have contaminated soil and threatened groundwater. The Industrial Waste System (IWS) used to treat discharges from shop drains in maintenance hangars and gate de-icing areas is beyond design capacity, and receives improper discharges from the Port's tenants. The IWS has not been upgraded to handle fire-fighting foam discharges, despite nearly a decade of study of the problem. The Port of Seattle must implement, not defer with continued study, major improvements to its waste and storm water treatment systems. The existing systems have not kept up with expanding SeaTac operations.

**1. Inadequacy of the Industrial Wastewater Treatment System.** In July, 1992, the Department of Ecology inspected the airport's industrial wastewater treatment system. Operation was judged "Unsatisfactory" and the system was found to be overloaded with oil and grease. The IWS was not operating as a dissolved air flotation system as designed, but was instead using a physical/chemical settling system with alum. (K. Fitzpatrick, DOE 7/1/92 Inspection Report.) While the IWS was designed to handle a 225-acre area, it now serves 262 acres. (3/92 POS DEIS for South Aviation Support Area.) On the management side, not only was the Port of Seattle delinquent in filing its Discharge Monitoring Reports (DMR's), it was also behind in paying fees under its discharge permit. (K. Fitzpatrick, DOE 7/1/92 inspection report.)

In June, 1992, Puget Sound Air Pollution Control Agency (PSAPCA) inspectors responded to citizen complaints of odors and found petroleum and solvent contamination in the IWS lagoons. (K. Fitzpatrick, supra.) The Port attributed the odor problem in its wastewater lagoons to low water levels, and planned to complete an investigation by the end of August, 1992, and then do a further complete analysis of its systems by October 31, 1993 (the 5-year renewal date for its NPDES permit). (W.E. Brougher, Aviation Facilities and Maintenance Director, POS, 6/25/92 letter.) Thus the Port would study the odor problem until the end of the summer, and study the overall problems until it would have its new permit.

**2. Ethylene Glycol (antifreeze) Contamination.** Ethylene glycol, classified as a hazardous waste because of its carcinogenic effects, is used by airlines for de-icing. For example, Alaska Airlines uses ethylene glycol mixed with water to de-ice aircraft, applying as much as 5,000 gallons at a time. The Port has responsibility under its NPDES permit for the activities of its airline tenants that pollute water. When used on aircraft out on the runway, the antifreeze is not collected or treated, but is allowed to flow off the runways. When used in the hangar "ramp area" the solution flows into slot drains and then into the IWS. The IWS may not be effective in treating ethylene glycol. (DOE Hazardous Waste Inspection Report 12/18/91.) On February 10, 1992 R. Devitt (DOE) wrote that the Port was considering use of ethylene glycol and urea with surfactant (UCAR product by Union Carbide) for de-icing runways. Four thousand gallons would be used at one time. UCAR could be considered "hazardous waste," and not suitable for discharge to Des Moines Creek or Puget Sound.

**3. Solvent and Chemical Contamination.** Airline shop drains result in discharge to the IWS of hazardous materials such as paint overspray and methylene chloride stripping agent, which should have extensive pretreatment. The DOE inspector in July, 1992 concluded the IWS was



"badly overloaded with petroleum-based products" and odors indicated chlorinated solvents could be present.

**4. Fire Fighting Foam Emulsions.** Contamination of the IWS by fire fighting foam has been studied at least since the problem was noted in an inspection report by DOE 10/18/85. The foam contains an emulsifier which makes the IWS's oil skimmers ineffective. The Port retained a consultant to develop a method to dispose of the foam. In 1989 a demonstration project for two treatment methods was recommended, but no effective system to deal with large quantities of foam required for an emergency has yet been implemented. When the Port had a problem over several months in 1986 with fire fighting foam and jet fuel overflowing from the practice pit and polluting the surrounding area, a waterproof sheet weighted down with rocks was found over the pit's drain. The Port's superintendent found this situation both embarrassing and illegal. (D. Waye, 12/9/86)

**5. Groundwater Contamination by Leaking Fuel Tanks and Spills.** Leaking underground storage tanks at the rental car refueling area contaminated aquifers up to 50' deep. (4/11/89) In 1990, the Port agreed to study the level of soil contamination around fuel tanks, and to install monitoring wells. (DOE phone record 5/8/90.) High levels of pollution were found 15' under the Pan Am fuel farm in 1991. In May, 1992, jet fuel seeped into underground tunnels at the NW Airlines facility. In July, 1992, a similar problem was noted at the Continental Airline fuel area. Soil contamination to 27' with petroleum hydrocarbons, benzenes, lead and other substances, was found during demolition for Concourse D improvements. A remediation project was required. (1/24/91) M. Santee of DOE reported on 2/7/91 that the soils remediation project at SeaTac involved an area where monitoring wells indicate groundwater impacts. Many fuel tanks are located around the airport, and the full extent of the groundwater problem is not yet known. Spills occur frequently on Port property. In the first 3 months of 1987, 26 spills of from 5 to 400 gallons were reported to DOE.

Aquifers beneath the Highline area 50 and more feet deep are of a quality generally adequate for domestic use. (1/91 S T Engineering Comprehensive Sewage Plan for Southwest Suburban Sewer District.) The City of Seattle uses three on-line production wells in Riverton Heights, withdrawing groundwater July to October. (*id.*)

Cleanup of water contamination, if possible, is expensive and time consuming. Cleanup of jet fuel containing carcinogens such as benzene threatening an aquifer at LAX may take 20 years and cost \$13 million. (LA Business J. 9/23/91 p.32.)

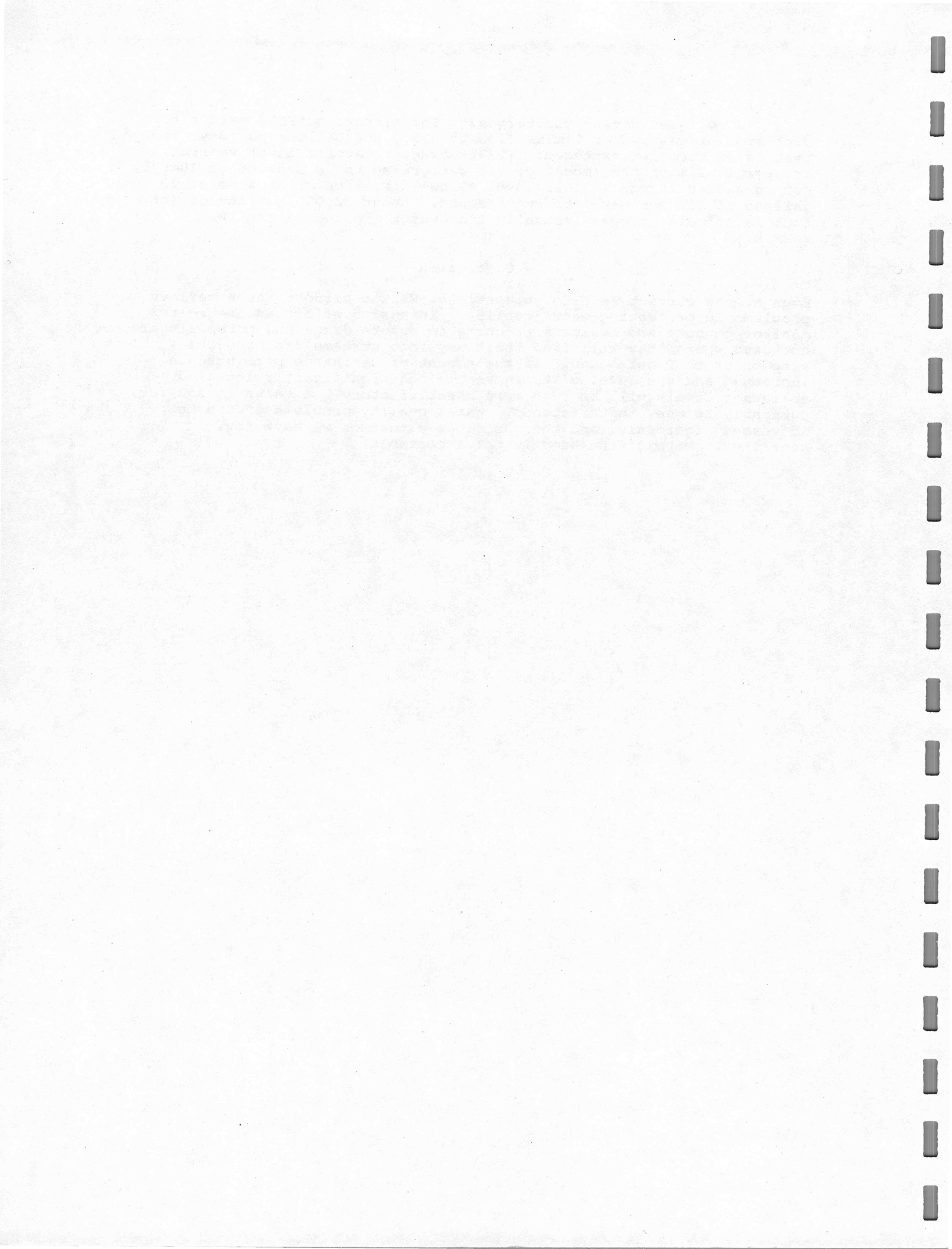
**6. Jet Fuel Spills Kill Fish.** Since at least 1957, when inspectors found heavy contamination with oil and grease, airport discharges have been poisoning fish in Des Moines creek. (Carey and Kramer, Report on Preliminary Engineering Study of Industrial Wastes Problem at SeaTac International Airport 1959.) Spills of a large amount of jet fuel by an airline in 1973, of 30,000 gallons in 1985, and of over 5,000 gallons in 1986, killed coho salmon, cutthroat trout and other aquatic life in Des Moines Creek. (3/92 POS DEIS for South Aviation Support Area.)

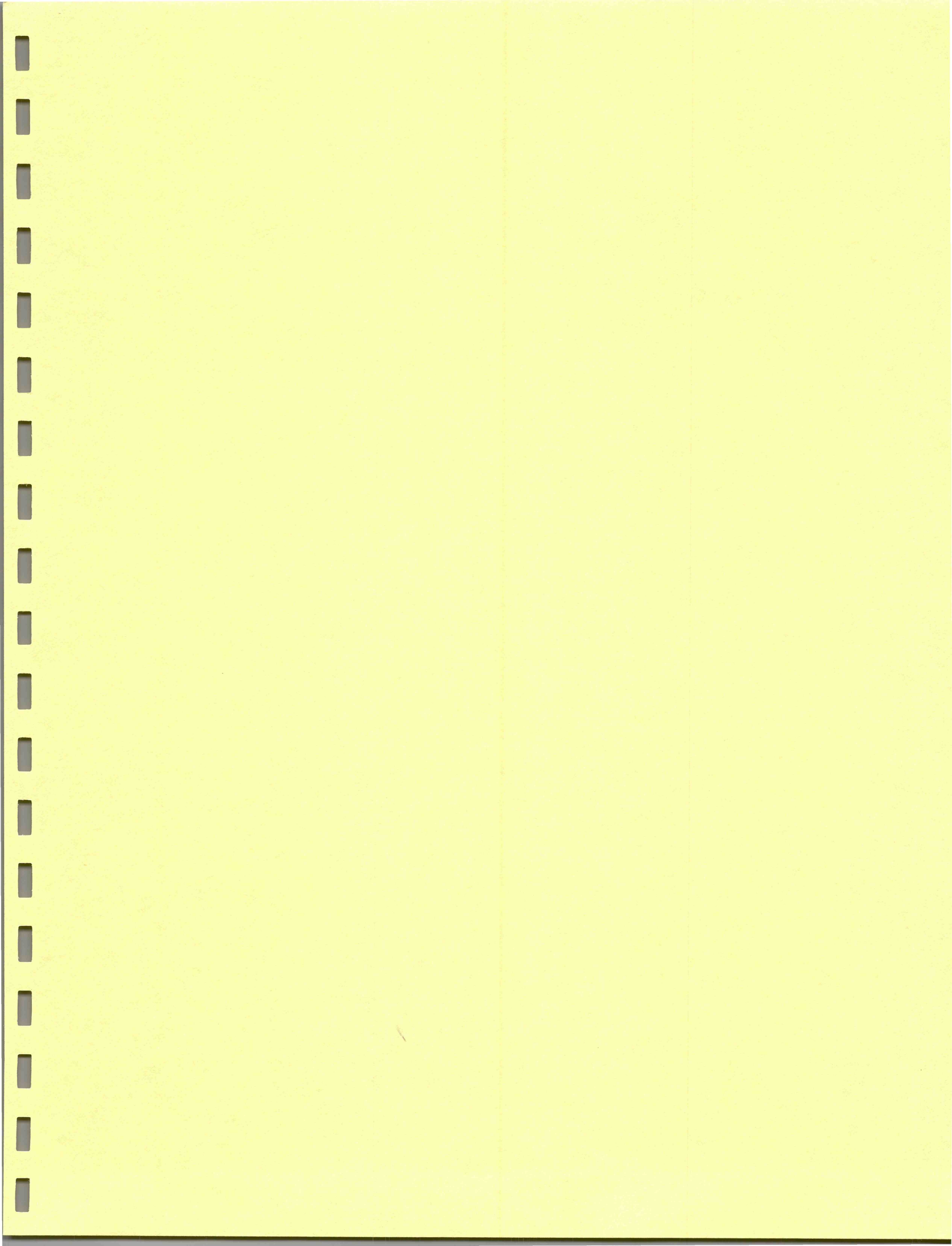
Fish have long been planted in Des Moines Creek to maintain trout and salmon runs. Trout Unlimited releases 30,000 salmon fingerlings a year at the Des Moines marina and in November, 1992, larger than normal numbers of salmon were seen in Des Moines Creek. (The Times-News 11/27/92.) The Seattle Times reported 12/14/92 that the creek salmon died before then spawned.

7. **Oil and Grease Discharges.** The airport's NPDES permit for discharge of wastewater limits flow to 5,985,000 gallons per day, though that is on occasion exceeded. (2/92 sewage treatment plant records.) The permit limits the amount of oil and grease to an average of 10mg/l, not to exceed 15 mg/l. This level allows discharge of upwards of 70 gallons of oil per day into Puget Sound. About 30,000 gallons of jet fuel is normally removed annually from water treated in the IWS. (DMR's.)

#### Conclusion

Even at the current level of operations, SeaTac airport faces serious problems in protecting water quality. Intensive effort is needed to monitor tenants and evaluate products to ensure dangerous materials are not used where they will find their way into streams draining the airport or to Puget Sound. If the amount of discharge permitted is increased and the level of treatment is not significantly improved, pollutant levels will be even more unsatisfactory. A valuable aquifer, currently in use, is threatened. Water quality problems should be addressed vigorously, and the dangerous situation we have now, rectified. More of the same is not acceptable.







## **Economic Impact of Proposed Third Runway At Sea-Tac Airport**

The correlation between airport expansion and economic welfare is unclear. There is no guarantee that the benefits would outweigh the costs.

University of Washington economist,  
Professor of Public Affairs Richard Zerbe, Jr. PhD.

### **Most Expensive Runway Ever Built in the U.S.**

The proposed dependent runway by the Port of Seattle is estimated to cost approximately \$500,000,000 in construction costs alone, making it the most expensive runway ever built in the United States. This would be the biggest capital construction project in the history of the Port of Seattle.

For comparison purposes, an independent runway built in 1990 in Orlando, Florida cost \$168,000,000. In Louisville, Kentucky they are currently completing two independent runways for \$350,000,000. In Denver International, Colorado, 5 independent runways will be completed next year for \$380,000,000.

To build a third runway, the Port of Seattle would need fill dirt that would occupy 7.1 Kingdomes. The high cost of construction is due to the need to raise the existing level of 12th Avenue South to conform to the height of Sea-Tac's landing fields.

### **Estimates Exclude Mitigation Costs to Surrounding Cities**

When the second runway at Sea-Tac Airport was built in the early 1970s, promises were made by the Port of Seattle and the King County Council that mitigation of noise impacts upon the surrounding communities would be funded. To date, only 741 out of 10,000 eligible homes have been insulated primarily because of the lack of funding available for mitigation efforts.

Recent Port of Seattle cost estimates to complete insulation work from the second runway are well over \$250,000,000 not including total buy-out costs to affected homeowners. Costs to mitigate the third runway have not been calculated but are expected to far exceed second runway mitigation costs.

## **Costs to the Community Include Lower Property Values**

An additional 100,000 flights per year will negatively impact lifestyle and property values throughout the Puget Sound region. Depending upon number of flights, noise levels, and time of day of flights, communities now experiencing aircraft noise under the Four Post Plan will see a further erosion of their quality of life and corresponding property values.

## **All Costs, Direct and Indirect, Must Be Counted**

According to Lynn O. Michaelis, chief economist for a major corporation and immediate past president of the National Association of Business Economists, the Port of Seattle has failed to develop realistic economic projections:

"Because there is so much at stake for the long term economic health of the Puget Sound region, and the South King County area in particular, economic data must be developed which includes direct and indirect costs, short term impacts and benefits as well as the longer term benefits. The airport has to internalize the cost of the pollution it is generating just like the rest of the manufacturing businesses.

The costs associated with airport operations have been shifted to the neighboring residents and communities. This has resulted in the price being set too low for airplane operations and has created excess demand."

## **The Port Has Not Compared Costs to New Revenues**

If the third runway is being built to enable 100,000 commuter aircraft which carry only 1 million passengers, then we are spending society's resources on a project which will generate less than \$4 million in revenue, or less than a 1% return on capital. Since the runway requires operating expenses, the return would be far less than 1%.

Before we embark on the Port of Seattle's ambitious plans for expansion, a long look at costs and benefits is needed. When this is done, and only then, can a fair comparison of the long term social costs of various alternatives be made.

**Richard Zerbe and Associates**  
**ECONOMIC CONSULTING**  
939 21st Ave East • Seattle, WA 98112

Jonathan Lesser, Ph. D.  
*Olympia*

Richard O. Zerbe Jr. Ph. D.  
Andrea Hambly  
*Seattle*

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(206) 325-6118 • University of Washington (206) 543-4900 • FAX (206) 543-1096  
Olympia Office (206) 786-9353

Monday, October 19, 1992

Dick Zerbe  
Presentation to POS

I am a professional economist at the University of Washington and confine my remarks to my area of expertise-economic analysis. For twenty some years, I have served as a consultant in the area of the viability of public investments. I teach a course that considers this very question.

The final EIS does not yet answer the central question. The question we are presented with here is which of the suggested alternatives for handling air traffic is the best public investment. On the basis of data furnished to date, my answer is that I do not know. Surely, I speak for the Port as well as for myself when I say that we want economic growth that enhances the quality of life. But, if I with twenty years experience can not readily determine from the FEIS what decision is the most likely to serve this end, can you?

The work to date has been primarily engineering rather than economic in its conceptions. The approach is reminiscent of some other work in which I was involved. When I arrived in Seattle in the mid-1970's, I was asked to comment on the demand forecasts prepared as part of the selling of WPPSS. My comment was to the effect that the forecasts were crucially flawed because they did not relate the amount demanded to price.

My remarks here today are similar to my remarks then. The analyses taken together, some of which are very well done, are crucially flawed because they have not been developed under a guiding scheme which attempts to access benefits and costs of the various alternatives. Let me give a few examples.

#### *Demand*

The very definition of airport capacity is an engineering concept that maximizes volume not economic benefit. To maximize the volume of traffic is not the same as maximizing economic benefit nor more than maximizing the electrical generating capacity for the region maximizes net benefits-as WPPSS taught us.

Most utilities in which peak demands are important, use prices to spread out demand and to gain revenues. Telephone companies, for example, charge more during peak periods. The use of such peak load pricing improves the net economic impact even though it leads to fewer flights, and peak prices serve as a source of funds to remove or build other facilities--such as a third runway or another expansion at another airport.

Similar to the WPPSS approach to estimating demand, the work in the FEIS scarcely considers using peak pricing to limit the quantity demanded and to generate revenues for capacity expansion. A failure to consider further this issue would be a mistake. Several hours of phone conversations with the FAA convinces me that such an approach could be realistic. There is a nationwide policy trend towards using the price mechanism to manage demand and to meet costs. The success of Boston's Logan Airport with peak load pricing and the USDOT guidelines for peak load pricing should be at the forefront of the Port's demand management strategies. The experience at Boston has been that only marginal flights in markets with already high service levels were eliminated. This nationwide trend is ignored in the final EIS. Such pricing strategies are barely considered at all.

#### *Jobs*

Proponents of the third runway stress its role in job creation. Job data provided to date can not be the basis for any decision for the following reasons. First, the economic estimates do not well distinguish between new money and old money so that the estimates of job creation are unreliable. Second, jobs created are treated as



net benefits and they are not. In fact, new jobs can impose greater social costs than benefits in terms of the impact on schools, traffic congestion and lost jobs elsewhere in the economy including in the local economy. Third, no estimate is made of jobs lost elsewhere.

The recent review by the Dye Management Group for AIRTRAC found no evidence that caps on airport traffic at Boston's Logan Airport, San Francisco International Airport, and Vancouver International adversely affected economic development.

The FEIS is admittedly not an economic document. Earlier discussion confused net benefits in the form of additional tax revenues with gross revenues and jobs which are not net benefits, thus making a conclusion impossible. In short, the relationship between economic prosperity of the region and the various options to the Port of Seattle is not clear from the FEIS. The relationship between the prosperity of the Port itself is, however, more clearly linked to the development of the third runway than to other options. I would like to be as sure about the region as a whole. The third runway will undoubtedly give the maximum return on investment to the Port, but it may not for the region.

#### *Noise*

The FEIS shows a table of the adverse effects of noise on residential property values. This table is a welcome addition to the DEIS. What is needed, however, is application of the results of the studies cited there (and other studies) to the alternatives facing the Port of Seattle. Since residential and commercial property value effects can capture a measure of the social cost, and since these costs can be very large indeed, it is incomprehensible to me that no such study was carried out before recommendations were made.

The FEIS suggests that the loss of residential property values will be more than offset by increases in commercial and industrial property values outside the 65 L<sub>dn</sub> contours. They provide no evidence for this. More importantly, the comparison is not a valid one. The decrease in property values due to airport noise is a real loss. The rise in property values caused by increased airport activity, however, is an effect already taken into account when examining the value of the airport to passengers and airlines. Thus, it is incorrect to count the benefit of time saved, etc. resulting from the airport expansion and to also count as a benefit the increase in land values. This is double counting benefits. A dam that allows

irrigation and increases crop production generates benefits from crop production. The land value will also go up but the increase in property values can not be added to the crop value without double counting.

The presence of the airport does change the ideal land use. Noise may also cause a change in ideal property uses but noise can only lessen property values, not increase them. The final EIS can not finesse this important issue.

Without such analysis as I have suggested, we can not even be sure that the costs of the four post plan do not exceed its benefits. Surely, in considering options involving alternative airports, we should consider the alternative costs, including the benefits of moving even some of the existing traffic to another location.

I do not say here that it is a mistake to build the third runway. I do say however, that benefits and costs have not yet been assessed.

Demand management combined with peak load pricing and expansion at an alternative site can meet economic demand but at a lower social cost in terms of noise and traffic. I ask that the Port Commissioner attempt to discover whether this might not be the case.

REMARKS OF J. RICHARD ARAMBURU  
BEFORE PORT COMMISSION  
OCTOBER 20, 1992

I. INTRODUCTION.

As you have heard, there are significant environmental problems with the continued expansion of STIA. However, I am to talk today about the 3rd runway as a business and fiscal issue.

The RCAA feels that the 3rd runway makes no business sense. It would create a huge public debt at a time that the whole country is demanding fiscal restraint, and finding ways to avoid public expenditure. In the case of the 3rd runway, this huge debt can be avoided if the Commission will simply manage demand and control operations.

II. ECONOMIC VIABILITY.

Lets begin by talking facts about this proposal. We have done some investigation and, as best as we can tell, the 3rd runway would be the most expensive runway ever built.

We have spent some time trying to find out how much this runway will cost. After reviewing the data in the Flight Plan Report, and talking to Port Of Seattle staff, our best estimate is about \$500 million, which is probably low, given that the

base figures were developed in 1990 and the project will not be built until 1996 at the earliest.

At a price tag of \$500 million, the 3rd runway is significantly more expensive than its next competitor. Table 1 shows the cost compared to other recent runway projects. In preparing this table we reviewed FAA data, industry sources and called each of these airports to confirm the costs. As may be seen, the 3rd runway is by far and away the single most expensive runway.

Using figures from the Flight Plan project, the 3rd runway is paid off the total cost to the taxpayers will be probably at least \$1.2 Billion.

The 3rd runway is also the most expensive single project ever built by the Port Of Seattle.

People have asked us why this runway is so expensive. The expense comes from the fact that the project is not just building a runway, but creating the land for it to go on. Currently, the 3rd runway is a street well below the level of the airport. To fill this area, it will take about 17.8 million cubic yards of dirt (or 480 million cubic feet) or about 1.8

million dump trucks that would stretch 8400 miles. If none of this registers, consider the graph, which shows the dirt required would fill 7.1 Kingdoms.

Of particular significance here is that this is not even a fully operational independent runway. It is a dependent runway, limited by operations on adjacent runways.

### III. SIGNIFICANT FINANCIAL ISSUES.

Three significant financial issues stand out here

a) The source of funds to repay this debt is directly related to revenues from passengers going through the airport; only 8% of funds available will come from federal (FAA) funds. There are also many good reasons to believe that the passenger forecasts being used in the industry are wrong, given what we know about increasing airline fares, declining business travel, increasing fuel prices and the like. If the passenger increase does not occur, the public may be left with paying off this white elephant. "Betting" this kind of money is reminiscent of the WPPSS debacle in the 1970s when public agencies bet the nuclear power plants would be paid off by new customers, using more power. We all know the story of that financial debacle.

b) The second significant financial issue is that this huge expenditure will tie up most of the possible revenue sources for the airport for the next 30 years; it leaves the Port without reserves for the unforeseen problems that may occur. It is strangely like our huge budget deficits at the federal level that are tying the hands of the government.

c) Finally, the Port is using the only available source of funds to develop any other airport. We know that other airports are not economically viable without funding from funds generated by Sea-Tac. It also uses money that could be available for other uses.

#### IV. ALTERNATIVES

The curious thing about this whole fiasco is that the only reason a 3rd runway is built is to take care of the hoard of small commuter planes that have been taking up airspace since they started getting really popular in the mid 1980's. As may be seen from the appendix on commuter operations, these operations constitute about 42% of the flights, but only about 8.5% of the passengers. Indeed they average only about 10 passengers per plane. (See Chart 2)

Indeed responsible commissioners would assure that the

airlines (the real beneficiaries), not the taxpayers, be responsible for such a massive expenditure for a minor portion of the market. But there is no apparent intention to place the responsibility there.

From the foregoing, it is clear that the 3rd runway makes no sense. The cost and expense are far beyond what is required for task at hand. The days of expensive solutions at taxpayer expense are well beyond us in the 1990s. Lets make use of what we have by doing three things:

a) reduce commuter operations by demand management and pricing techniques that put more people on planes. Putting 20 people on a plane would reduce commuter operations by half and provide significant additional capacity.

b) increase efficiency of the airport by improved navigation techniques; these techniques can reduce delays significantly.

c) use the money that would be spent on the 3rd runway on a new realistic airport, away from residential areas. Cap operations at Sea-Tac at current or reduced levels to provide relief to surrounding areas.

COMMUTER AIRLINE OPERATIONS  
SEA-TAC AIRPORT

\* Since 1981, commuter airline operations have increased by 262%, from 39,400 to 142,828. During the same time air carrier operations have increased only by 32%.

\* Commuter airline operations now constitute 42% of Sea-Tac operations, but only 8.5% of the enplaned passengers.

-Commuter operations average 10 people per plane.

\* In 1991, one-half of all commuter operations went to Portland or Vancouver B.C. or 21% of total airport operations.

\* If commuter operations were limited to 100% growth over 1981 operations (a total of 78,800) that would save over 60,000 operations per year.

\* Total operating revenue per passenger at Sea-Tac is only about \$1.20. Operating revenue for commuter passengers is thus about \$1.6 million per year. Over the 30 years needed to pay off the \$1200 million debt for the third runway, commuters would only contribute \$60 to \$70 million or about 6 to 7%.



General Comments on the  
draft environmental impact statement (DEIS)

By Dr. Lynn O. Michaelis

March 22, 1992

Introduction

Because of my professional background, I will limit my comments on the EIS to my professional area. I am a professional economist, working for the Weyerhaeuser Co. and am President of the National Association of Business Economists. **The comments and criticisms in this statement do not reflect the position or concerns of either organization.** Rather, they reflect my concerns as a resident of Marine Hills in Federal Way and for the future quality of life in the city of Seattle.

I also want to be clear, that the concerns being raised are not to be interpreted as being anti-port, anti-business or anti-growth. Growth is a fact of life and should be encouraged. However, if not correctly channeled growth can destroy. The purpose of having government oversight of the growth process is that sometimes business and the market do not capture the indirect costs imposed on some members of society. The other perspective government brings that is sometimes lost in the market is the long term socially optimal solution. Because of the way businesses make investment decisions, the near term dominates the long term consequences. The environmental assessment process is meant to remedy that deficiency of the free market system.

Businesses in which I work have for years been forced to recognize external pollution problems and have been forced to internalize those costs through pollution equipment. The result is cleaner air and water, but at a higher cost in the production of the product. But clearly the result is socially desirable, even if the regulatory approaches taken can be inefficient. The product reflects the true cost of the product to society. Then society can choose how much it demands at a price that reflects the true cost to society. I can not understand why an airport that produces air travel and noise pollution should not be subject to the same rules.

**This at the heart of my concern and the focus of additional work before the EIS can be complete. First, the criteria being used for selection are flawed and the data being used are inadequate to reach the correct solution on the long term optimal solution for Seattle. Second, the data currently being presented on costs and benefits is one sided and extremely biased. I hope to demonstrate that if the full costs are taken into account, then the "capacity problem" will disappear. Third, the data creates a sense of urgency that is misplaced, if the pricing problem is corrected. Because of the pricing system being used, scarcity is not being allocated correctly. Rather, the pricing system is creating an artificial shortage. Fourth, more work has to be done on assessing the long term impact on downtown Seattle, if the airport expansion continues at SeaTac rather than at a remote airport.**

#### **Criteria being used is not correct**

It appears the primary criteria for site selection is **minimize first time exposure to airplane noise**. This is a political and not an economic criteria. This criteria implies that max. exposure of people already exposed to aircraft noise is the desirable alternative. This criteria has to be reassessed. A recent article in the Seattle Times makes it clear that serious health problems can develop, even after long term exposure to aircraft noise. They cited a study done recently that shows that 'even after five years of exposure to aircraft noise, physical responses (higher blood pressure, higher stress levels) continues." In economic terms, more frequent and sustained exposure to aircraft comes at higher and higher cost to an individual not less cost.

Where an occasional flight is a nuisance, **sustained and continuous aircraft noise has major consequences on lifestyle and residential property characteristics**. Outside entertainment becomes nearly impossible. Educational activities can be seriously impaired. Health can be affected, not only because of sleep interruptions, but also because of higher stress induced by noise beyond your control. When taken together, sustained noise levels will eventually force those that have an option to move away from the noise shadow of a major airport will do so. More importantly, if people looking for a home come to believe these risks are possible, they will attach a stigma to the properties. A number of recent studies have assessed how stigma and pollution can affect property values.

Rather than first time exposed, **THE CRITERIA SHOULD BE: WHICH SITE HAS THE LOWEST OVERALL SOCIAL COST WITH THE HIGHEST LONG TERM SOCIAL BENEFITS.** This assessment is possible only if realistic and complete economic data is available.

### Develop realistic and complete economic impact information

To be able to use an economic or financial criteria, a more complete set of economic information has to be developed. The data prepared so far is woefully inadequate. Only part of the costs associated with expanding the existing airport are considered. The process used to estimate benefits needs to be revised, because they are seriously biased to the high side.

**1. There has been no information developed on the costs being imposed on surrounding communities and residents from the aircraft noise.** Insulation of schools and offices are not captured in the cost estimate. Declining property values have not even been considered. The Port of Seattle has been willing to purchase properties required for expansion, but does not compensate others that are adversely affected. I believe a careful assessment of adverse effects on home values in the South End in the Noise Shadow needs to be done. Data will show there has already been significant erosion in **relative values** as a consequence of the airport growth. With values of \$800,000 to \$2,000,000 per acre, given home values in some areas, I believe a 10% loss in relative appreciation over the next ten years **will cost homeowners in the Southend at least \$800,000,000 dollars in opportunity cost.** (This has to be refined. I assumed 21.5 sq. miles were adversely affect, which could be too small.) For some areas the likely decline could be significantly more than 10%.

An estimate of insulation and school construction costs have to be developed as well. Part of the final approval needs a more complete compensation scheme for affected individuals and communities. Highline School district has already submitted its estimates of costs associated with insulating existing schools. They have also estimated the higher costs required for newer schools to make them compatible with aircraft noise. Other school districts need to be solicited for their input and potential costs.

An **actual on site noise audit** also is required to truly dimension the area adversely affected. Computer simulations are inadequate given the change to the four post pattern and due to the variability in actual take-off patterns.

2. **Benefits listed in Working Paper #8 are biased for several reasons.** First, the projected increase in traffic is high. Second, the assumption of visitor share is questionable, given the high level of commuter traffic. Third, it fails to recognize that an airport also allows more people to leave the area, thus draining sales dollars. Fourth, most of the growth could occur without an additional runway if the existing one were just used more efficiently. The true net benefit to the expansion would be significantly lower, even if the optimistic assumptions on traffic and visitors were correct.

3. **Develop a set of scenarios on potential passenger traffic growth at the airport.** Long term economic forecasts are risky at best. In fact, forecasting the next decade based on the last has been shown to be incorrect. To reflect the uncertainty of long term forecasts, a number of scenarios need to be developed considering the following developments. (I will submit more details on the following if requested to do so.)

- . Overall economic growth will be significantly lower in the next 20 years than in the last 20 years due to demographic and productivity trends.
- . Benefits of airline deregulation have been captured
  - Real cost of travel will not decline as fast (according to Boeing)
- . An oil shock/shortage could significantly alter air travel
- . Growing restraints on airports will limit the number of airplanes
- . Northwest growth was uniquely strong in 1980s, much slower in 1990s
  - Boeing growth will be reversed
  - Resource industries, fishing and timber, are declining
- . Consumer surge of 1980s was unique due to policy and demographics
  - . Aging population implies higher savings rate
  - . Debt leverage and tax cuts of 1980s being reversed
- . Technology will reduce business travel in 1990s
  - . Video conference lowers business costs (recent WSJ)
  - . Business traveler crucial to lower fares for tourists
  - . Forces higher travel cost and lower growth for tourist trade

**IF CORRECTLY DONE, A FEW SCENARIOS WOULD HELP TO ASSESS ALTERNATIVES AND THE SENSE OF URGENCY OF THE EXPANSION.**

Growth will occur, but if the likely growth is to 30 million by 2020, rather than 45 million. The estimating procedure used by KPMG Peat Marwick did not consider the above factors, but appears only to have used population and income. **If so, the approach is woefully inadequate.**

**4. Net Benefits to Local Government have to be reassessed.** The drop in property values will lower tax revenue in affected communities and to King Co. Further, the government needs to estimate the cost of building the support infrastructure for the airport. Similar to approaches being used with residential developers, the Port should have to fund part of the infrastructure cost to feed its development. This is important for two reasons. First, it will insure that the operating cost of the airport and the price of airplane operation correctly reflects the true operating cost of the airport. **Second, it will make the trade-off between an urban airport and rural airport more soundly based on economic costs rather than on emotional appeals, such as "protects open spaces, sensitive areas, and farm lands".** This is currently viewed as an unfeasible alternative and too costly, only because the full costs at SeaTac are not captured in the DEIS.

**5. Reassess Overall benefits of airport to Seattle and South End Business.** The focus was strictly on Airport related and Visitor related benefits (Working Paper #8). They failed to take into account the second order affects. As people migrate away from the Noise Shadow, average income will drop and retail sales will drop. Expenditures on remodeling and maintaining the housing base will drop as well. Eventually, the property use will change as the economic value for residential use declines.

An assessment of migration away from the airport noise needs to be included. For instance, a careful assessment of the suburban blight that has already developed around the airport and how it might spread if the airport grows further has to be included in the EIS. The impact is likely to be quite large in light of the four post pattern. This will include parts of Seattle plus the south end. Migration will be away from the noise. For South End residents the migration will be into Pierce Co. (Gig Harbor and Puyallup) or East (Enumclaw, Kent Highlands). For Seattle, the migration will be to Bellevue/east or further north.

**6. Incorporate the true cost estimates in estimating the demand for operations (landings and take-offs) at SeaTac.** The study has gone to great lengths in defining the capacity of the airport and in showing that based on optimistic demand growth we will be out of capacity by the year 2000. The study contends that jobs will be lost and international competitiveness will be lost if we fail to act. The study however fails to address the crucial issue that is creating the "shortage", the pricing mechanics at the airport. The airport prices landings on a per pound basis.

Under current pricing schemes there is no procedure for allocating space based on time of day or for more efficient operations to bid for landing space as in the open market. This approach is only possible in a government operation where costs are heavily subsidized. Like in the BPA fiasco of WPPS, low prices of energy were used to forecast shortages and immanent doom for the Northwest unless we built a nuclear power system. Those projections also failed to take into account a variety of pricing schemes that would have dealt with the problem more efficiently, such as peak our pricing.

BPA also failed to discuss the extremely low rates being offered to aluminum producers. Such is the case here as well. All the growth at SeaTac has been in commuter traffic. Because of the extremely low cost of operations (about \$80 for a round trip-takeoff and landing), they can operate small planes inefficiently. In fact, the pricing scheme encourages small inefficient plane operation. To demonstrate this fact, United Express and Horizon accounted for 35% of passenger operations in 1990, but only 8.7% of the passengers. In fact the average operation of a United Express carried less than 10 passengers, while a Horizon operation carried about 12 people. I was recently on a flight from Portland with only 3 people on a United Express flight. The benefits estimates treat all operations of equal value. Further, the pricing scheme encourages inefficient operations just to hold an operating time slot.

This pricing scheme does not penalize for night time flights. These operations create extremely high costs for residents around an airport. If FAA restricts such pricing, then the rule needs to be changed. Heathrow airport prices night time flights at a very high level. Result: very few operations.

**WHAT NEEDS TO BE DONE:** Estimate demand for take-off and landings at various price levels. Also, implement a peak hour pricing system. If these methods are used, the shortage will not be as critical and will allow time to consider other alternatives with more complete information. For instance, ask how many commuter operations there would be at \$500 per landing or at \$1000 per landing or \$4800 ( high enough to generate an 8% return on \$600 million).

**7. Do a realistic pro forma financial return on the third runway to help understand the true economics of the third runway versus other alternatives.**

First, consider the capital cost of \$600 million versus the revenue being generated. If the third runway is being built to enable 100,000 commuter aircraft which carry only 1 million passengers to continue operation at SeaTac, then we are spending society's capital on a project that will generate less than \$4 million in revenue, or less than a 1% return on capital. Since the runway requires operating expenses, the return would be far less than 1%. At a time that our society is trying to find solutions to our deficit and other social needs, such as better schools, diverting money to a project that can not even pay minimum rates of return is a serious issue.

Second, the indirect costs have to be included as well. Community costs to insulate schools and potential lost revenue from declining property values. The infrastructure costs in an area with high land values have to be calculated. Finally, the implicit property value loss of current home in the SouthEnd have to be included. If this is done, the true overall cost of the Third Runway could be found to approach \$2 billion.

When this is done, and only then, can a fair comparison to long term social costs of alternatives be made. Right now that is not possible, given the information and data included in the EIS. Using current data, there is only one conclusion possible: build the third runway at an existing airport. But this could be a serious strategic error. Other major cities have been moving airport noise and growth away from the center of the city or capping the operations (Miami). By using limited information and a short term focus, Seattle could make a serious mistake. We had an opportunity to make a truly long term move in the 1970s and chose to expand SeaTac. We should be careful to not make the same mistake in the 1990s.



8. Revisit the question of how much of the estimated benefits could be captured by the existing capacity, if it were used more efficiently. If the average number of passengers per airplane rose to 80 and the operating efficiency improves due to new landing equipment, then the airport runways as currently configured could handle 32 million passengers, without adding the third runway. Other infrastructure costs would be required, however. It might mean commuter flights would be restricted. If they could not compete against more efficient flight and those that bring the greatest economic benefit, then they should be eliminated, just like other inefficient businesses or operations are eliminated in the real business world. Arguments concerning the need to provide frequent service to small towns just don't make economic sense. Similar arguments were used to stop the railroads from dropping inefficient rail lines. Eventually, they had to since the government was not subsidizing the industry operations any longer.

9. A different set of questions need to be asked in assessing community interest in supporting the expansion of the airport. As any market researcher knows, the way a question is asked can lead to what ever answer you want.

So far, the information provided to the business community has been limited. When asked, "Would you support a third runway that costs you nothing and will create jobs and encourage growth and international competitiveness?" They answer yes. When the broader community is told that they will face two hour delays without a third runway, they clearly would support it, again if the cost is zero. But what if we asked the following set of questions:

Would the City of Seattle support a bond levy of \$800 million to pay affected homeowners in the Southend?

Would Business vote for a new tax of \$80 million per year to pay taxes on affected home owners and to fix the schools?

What airplane operations would be economic at \$5,000 per landing and takeoff?

How would people south end feel about expansion if you said their property taxes would be lowered ( potentially even be negative get a check from the county) depending on number of flights, noise level, time of day of flight?

## CONCLUDING COMMENTS/CONCERNS, PLUS MY SUGGESTED ALTERNATIVE

Because there is so much at stake for the long term economic health of Seattle and the South King County area, the economic data has to be fundamentally reworked. It has to be developed to include all costs, direct and indirect. The short term impacts and benefits have to be balanced with the longer term benefits. The airport has to internalize the cost of the pollution it is generating just like the rest of the manufacturing businesses.

Only when this is done, will we know the true demand for the product. Just like when a sawmill was free to burn its waste, neighbors bore the cost. Environmental regulation made us stop and find a way of disposing of the waste differently. In a similar vein, the airport takes as a free good, its right to generate flight operations and the associated noise pollution. The cost associated with those operations have been shifted to the neighboring residents and communities. This has resulted in the price being set too low for airplane operations and has created excess demand.

At a time that the Federal Government is running huge deficits, it is also imperative, that we truly decide what is socially required. Using \$600 million of America's scarce savings on a project that can not even generate 1% return on investment is clearly not in societies near term interest. But more important, building an ever bigger airport next to the heart of your city, probably is not even desirable in the longer term.

**I BELIEVE A CAREFUL LOOK AT THE ECONOMIC COSTS AND BENEFITS COULD LEAD TO THE FOLLOWING CONCLUSION:**

1. Eventually, transform SeaTac into a commuter airport, with primary service to the west coast cities. The airport would be closed from 11 pm to 6 am.
2. Build another remote airport for International, cross continental flights and for cargo operations (Boeing field might be optimal for cargo, esp. if SeaTac were transformed to a commuter airport).
3. Link these operations with a light rail or bus service
4. Work with Portland and Vancouver in developing a broad Northwest regional strategy to avoid duplication. Shifting some flight activity to Portland might be in Seattle's best interest, given the location of the Portland airport. We can no longer afford to use narrow economic interests.

**It is crucial that a more imaginative approach be taken than just taking one more step in a direction that entrenches the existing airport as our only alternative. Failure to do so will leave future generations wondering why we did what we did. Why we took some of the most beautiful areas around the sound and turned them into slums and warehouse. We accelerated the retreat of the population from the city core, with all of the negative consequences seen in other major cities. We have time to consider the economic issues carefully. The decision and the consequences are too important to be rushed by inadequate and biased economic information.**

*James O. Michaelis*  
3/23/92



APPENDIX  
SUMMARY OF MARVIN FRANKEL'S SURVEY AND OTHER STUDIES  
Richard O. Zerbe Jr.  
Andrea Hambly

*Population Surveyed*

200 realtors and 70 appraisers from 40 suburban communities surrounding O'Hare Airport were asked to fill out a survey with greater emphasis given to individuals located in about 20 communities closest to the airport. The response rate was about 50%. 85% of the realtors and two thirds of the appraisers reportedly spend at least 30 hours per week practicing their specialty. (pp.2)

*Factors Affecting Residential Property Values*

Quality of other dwellings in the neighborhood, proximity to schools and the amount of property taxes were ranked as the three primary concerns out of a list of twelve. Conversely, proximity to jobs at the airport and related activities and access to the airport ranked eleventh and twelfth on that list, implying that prospective home owners assign these amenities a rather low value. (pp. 8)

*How Well Informed Are Buyers?*

Two thirds of the realtors thought that buyers were at least moderately well informed and approximately half of the appraisers thought the same. (pp.10)

*Buyer and Seller Behavior Toward Noise Affected Properties*

A clear desire to avoid such properties was expressed by 42.2% occasionally and by 49.1% frequently. 38% of sellers occasionally put their homes on the market wholly or primarily because of noise and 8.8% do so frequently. Lower than listed prices were sought specifically because of noise by 42.3% of buyers occasionally and by 17.1% frequently. (pp.12)

III. and IV. above indicate a thinner market on the buying side for noisy properties. The presence of noise is used as a bargaining chip shows that there is a willingness to accept compensation via a lower purchasing price for such disamenities as aircraft noise. (p. 13)

*Property Turn-Over And Selling Time*

While 53.8% of the realtors and 68.4% of the appraisers thought that the turn-over of noisy properties was about average, the remaining interviewees pretty well split down the middle with

respect to below and above average turn-over time. Thus, 21.8% of the realtors and 15.8% of the appraisers thought the turn-over time was below average and 24.4% of the realtors and 15.8% of the appraisers believed the turn-over time to be above average. Clearly, the results are inconclusive regarding the effect of noise on the turn-over time of properties.

Concerning selling time, however, the results indicate that it takes longer for noisy properties to clear the market than for quiet ones. In fact, 75% of the realtors (appraisers were not asked this question) believed that the selling time for noisy properties was above average. 22.5% of them thought it took an appreciably greater amount of time to sell such properties.

To recap, the real estate market is affected by aircraft noise primarily in the following ways:

- 1) Sellers are pressured into reducing their asking price to compensate buyers for the disamenity of aircraft noise.
- 2) Demand is weakened because some prospective buyers do not want to live in noisy surroundings.
- 3) Greater selling time is required to move such properties.
- 4) Supply could outstrip demand because people want to move out of the area to escape the noise and buyers do not want to move into the area for the same reason resulting in a weaker market for that category of residential real estate.

#### *Impact Of Noise On Property Values*

The survey also asked the realtors' and appraisers' opinion on how much in percentage terms the value of a property might be discounted for being exposed to low, moderate, substantial, and severe noise. First, they were to choose from a set of percentage figures and draw on their past experience in dealing with such properties. Secondly, they were asked to define properties they knew about that were exposed to moderate, substantial, and severe noise levels and assign their own percentage discount to these properties. This was done for single-family housing in the first case and for single and multi-family dwellings in the second case.

In the first case, the median % discount (pp. 18) ranged from 1.6% to 21.6% for the realtors and 1.2% to 16.5% for the appraisers. In the second case, the mean reduction in value was judged by the realtors to lay between 3.9% and 6.5%--the low-noise level was not included in this portion of the survey--and by appraisers between 2.7% and 12.7% for single-family homes. Multi-family dwellings were assigned a median discount between 2.6% and 12.9% by realtors

and 2.0% and 9.7% by appraisers. Appraisers assigned a discount consistently lower than did the realtors but the pattern for both groups is the same. Also worth noting is the fact that multi-family housing was discounted less by both groups reflecting perhaps the greater mobility and a higher turn-over rate of these residents. There is no long-term commitment to stay in the area; i.e., if the noise becomes unbearable one can quite easily move to a quieter area and these residents do not engage in the risk of losing on their investment should property values fall as a result of increased aircraft noise. (See the tables below)

**ESTIMATED REDUCTIONS IN PROPERTY VALUES  
DUE TO AIRCRAFT NOISE**

Based on Past Experience with Similar Properties

	MEDIAN REDUCTION	
<i>Noise Level</i>	<i>Realtors</i>	<i>Appraisers</i>
Low	1.6%	1.2%
Moderate	5.5%	3.0%
Substantial	13.0%	10.0%
Severe	21.6%	16.5%
Sample Size	199	69

Based on Identifiable Properties  
(figures in parentheses are standard errors)

MEAN REDUCTION			
<i>Noise Level</i>	<i>Moderate</i>	<i>Substantial</i>	<i>Severe</i>
<b>Realtors</b>			
a. Single-Family	3.9% (0.29)	9.6% (0.47)	16.4% (0.81)
b. Multi-Family	2.6% (0.48)	6.8% (0.60)	12.9% (0.90)
<b>Appraisers</b>			
a. Single-Family	2.7% (0.34)	6.3% (0.57)	12.7% (0.98)
b. Multi-Family	2.0% (0.41)	4.1% (0.62)	9.7% (1.21)

The low, moderate, substantial, and severe noise levels were then related to  $L_{dn}$  levels of 62.5, 67.5, 72.5, 77.5  $L_{dn}$  respectively to draw a comparison between the survey results and the results of existing hedonic measures (refers to the use of the Property Value Method which regresses the price of a home on its various characteristics and neighborhood and environmental characteristics) of noise impact on property values. However, these measures stem from studies of airports other than O'Hare Airport. A hedonic approach had not been taken yet with respect to O'Hare Airport. The table below compares these results.

TYPE OF STUDY	NOISE LEVEL ( $L_{DN}$ )			
	<i>Low</i>	<i>Moderate</i>	<i>Substantial</i>	<i>Severe</i>
Case I (Median Values)				
Realtors	1.6%	5.5%	13.0%	21.6%
Appraisers	1.2%	3.0%	10.0%	16.5%
Case II				
Realtors				
Single Family		3.9%	9.6%	16.4%
Multi Family		2.6%	6.8%	12.9%
Appraisers				
Single Family		2.7%	6.3%	12.7%
Multi Family		2.0%	4.1%	9.7%
Hedonic Regression Studies				
Single Family (0.58% reduction per decibel increase in the noise level over 60 $L_{dn}$ )	1.4%	4.8%	7.2%	10.2%

Ableson mentions a survey of households in Rockdale and Marrisonville that found that "80% of households underestimated aircraft noise before they moved into the area and 20% positively regretted buying their house because of the noise, which is strong



evidence that the adverse effects of aircraft noise are not always fully reflected in house prices." This could also go the other way in that noise paranoia may induce a greater, perhaps excessive, property depreciation. Ableson offers other reasons for inefficiency in the real estate market with respect to internalizing the disamenity of aircraft noise such as:

- 1) Increased costs to home owners when the market is in disequilibrium after land-use changes. Some households will be living in an environment no longer suitable to their needs.
- 2) Hedonic prices do not capture indirect or dynamic secondary effects of amenities such as decreases in home and land property maintenance because homeowners try to avoid exposure to noise. This results in additional devaluation of the property.

#### *Distribution of Benefits and Costs*

The construction or expansion of an airport affects homeowners and renters differently depending on when they settled in the area surrounding the airport. While one could argue that the residential real estate market internalizes a negative externality such as aircraft noise via lower property values, this is only true for that portion of the population which moved into the area after the airport was constructed or expanded. Hence, these buyers and renters were compensated through lower real estate prices and rents. One might expect, however,--and the survey seems to confirm this--that not all buyers and renters are equally well informed about the true extent of the aircraft noise and thus might not have been fully compensated for this disamenity. A lack of information or misinformation leads to inefficiencies in the market as the prices do not reflect the true value of a commodity, in this case, real estate. On the other hand, homeowners who settled in the area prior to the airport's construction or expansion not only incur a financial loss as the value of their properties, and thus their home equity, falls but also must adjust to an environment that no longer represents their preferences. What value might be assigned to the loss of control over the enjoyment of one's home?

#### *Land Use And Demographic Changes*

The table below summarizes the results of several studies, all except J.F. Gautrin's employing regression analysis. The R-squared values range from .50 to .90 with most of them greater than .65. Gautrin used a modified Moehring Model rather than a regression analysis. (For description, see J.F. Gautrin (1975)) According to

these studies, properties exposed to noise take a discount in value ranging from 0.40% to 2.09% per NEF. Paik's result of a 2.09% discount per NEF seems a bit high. Nelson reran that regression which yielded an even higher discount, namely 2.2%. However, Nelson feels that this merely reflects a much greater concern about aircraft noise stemming from lack of information at that time remembering that the study used 1960 data. Disregarding this study would give a range of discount of 0.4% to 1.3% per decibel above the threshold level of 20 - 25 NEF. In 1990, Uyeno et al. conducted a property value study of Vancouver Airport to measure the impact of noise on property values. Their result of a 0.65% discount falls well within the range of figures of the earlier studies which seems to indicate that the amount of noise discount has not changed over time. The results also are similar for airports in diverse geographical locations. Taking a simple average of the noise discount in all these studies, one arrives at 0.65%. Therefore, it's reasonable to assume that the results of these studies may be applied to Sea-Tac airport for a simple approximation of noise impact on property values in the area surrounding the airport.

The following example will illustrate how in the aggregate the economic loss via depressed property values due to aircraft noise can be immense while seemingly small when looking at an individual property.

Take one hundred thousand homes valued at \$100,000 each situated in the 65 Ldn zone. Apply first a .4% per decibel (above 55 Ldn) and then a 1.3% per decibel.

$100,000 \text{ homes} \times \$100,000 \times .4\% \times 10 \text{ dB} = 400,000,000$

$100,000 \text{ homes} \times \$100,000 \times 1.3\% \times 10 \text{ dB} = 1,300,000,000$

Thus, the economic loss, in this case, ranges from \$400 million to \$1.3 billion. The loss to the individual home owner ranges from \$4,000 to \$13,000.

ESTIMATED REMAINING MITIGATION COSTS for the SECOND RUNWAY at  
SEA-TAC INT'L AIRPORT

These costs are based on a variety of mitigation promises made by officials of Sea-Tac Int'l Airport (STIA) to the surrounding community. Many of the promises date back to the Sea-Tac Communities Plan of 1973. The area covered by these promises is within the current Noise Remedy Program, the extent of which is allegedly based on the 65 Ldn noise contour predicted for year 2000. The 1991 65 Ldn noise contour is substantially greater.

Estimates are by Port of Seattle (POS)

1. Outright Acquisition

Only includes the currently defined buyout area	\$ 1 M*
Does not include land "permanently" under 75 Ldn but not offered buyout due to incorrect noise contours.	
A conservative estimate would be \$100M+ (Aschenbach).	

2. Sound Insulation

a. Custom insulation- single family (SF) houses	
\$18,000 per house for construction	
+ \$ 2,000 per house for administration	
\$20,000 per house x 2,700 houses =	\$ 54 M
b. Cost share insulation SF houses	
\$ 8,000 per house for construction	
+ \$ 2,000 per house for administration	
\$10,000 per house x 6,600 houses =	\$ 66 M
c. Public buildings (68 buildings identified)	
Public Schools	\$ 50 M
Other (includes churches, private schools public & private hospitals, nursing homes, libraries etc.	\$ 22.5 M

d. Multi-family residences		
\$4,000 per unit x 11,000 units		\$ 44 M
e. Mobile homes		
\$6,000 per unit moving costs x 500 units		\$ 3 M
Estimate for next five years only		
3. Transaction Assistance		
a. Special purchase option		
75 SF expected to participate x \$12,000		\$ 900K*
(350 eligible)		
b. Regular transaction assistance		
500 SF expected to participate x \$7,000		\$ 3.5 M
(2,000 eligible)		
\$7,000 is the average cost to reach full market		
value		=====
Total POS estimate		\$255,9 M

\* M = million; K = thousand

## THE COSTS OF NOISE MITIGATION AT SEA-TAC INT'L AIRPORT EXECUTIVE SUMMARY

by Hans Aschenbach M.B.A., Assistant Planner, City of Des Moines  
24 January 1993

including: Mitigation paper #1 - Broken Promises  
Mitigation paper #2 - Bad Noise Contours

### BROKEN PROMISES

In 1973 the Port of Seattle (POS) co-sponsored the Sea-Tac Communities Plan. This document promised hundreds of millions of dollars in noise mitigation to residents of the Highline area which surrounds Sea-Tac Int'l Airport. POS endorsed the plan by resolution 2626 on 8 June 1976. Since then POS has been very long on representations that it has the best noise mitigation program in the nation, but very short on funding and performance of its promises. (see attachment) The \$110 million in 'noise expenditures' that Port spokesmen continuously tout, barely scratch the surface of one of the worst airport noise problems in the nation. Furthermore more than half of this expenditure was actually used to increase flight line safety zones for an airport which is physically too small. The fact that this program removed homes from under thundering aircraft on final approach or takeoff is billed as 'noise mitigation'.

Over the past twenty years POS has revised its Noise Remedy Program numerous times, each time promising an angry public more mitigation, but doing very little to deal with the problem. What POS did do was to change the outyear of the all important planning period on which its program is based from 1993 to the year 2000.

POS has always hoped that two things would happen 1) that newer quieter aircraft would shrink the noise contours and 2) that new housing stock, insulated at the owners expense, would replace the older housing which POS had promised to insulate. In reality the noise contours are not shrinking as predicted (see discussion in mitigation paper #2) and given the housing conversion waiting game, POS has condemned thousands of citizens to a lifetime of unending noise intrusion. In fact, under several ways of calculating the rate of mitigation, the results are always similar: POS has placed the Highline Community on a 100 year mitigation timetable - for the second runway.

## BAD NOISE CONTOURS

The 1973 Sea-Tac Communities Plan produced a series of noise contour maps for the present year 1973 and progressing to the twenty year outyear 1993. Airport noise was said to be at its peak in 1973 and would steadily decrease over the next two decades. By 1984 POS realized that it had drastically missed its targets. POS resolution 2943, 8 Jan 85, solved the looming problem of 'broken promises' by changing the outyear to the year 2000.

Subsequent map series, 1984/85 and 1991 gave a similar picture of shrinking noise contours. Instead of shrinking as the 1984/85 series predicted, the 1991 noise contours are actually larger on the north/south axis than they were in 1985. Not only did POS miss the magnitude of change, it didn't even get the direction right. When confronted with this information POS spokespersons have called it a 'temporary' increase.

It has been difficult for local jurisdictions to make POS accountable for its bad noise contour predictions. Comparability of the map series has been difficult because over the years POS has made numerous changes to its models. When the fact that the contours weren't shrinking as POS predicted became apparent, local jurisdictions had to seek their own explanation. POS has not been helpful. The reason for the bad noise contour predictions is that the assumptions behind them are faulty.

Despite other bad predictions POS has stuck by its noise contours for the year 2000 which are the basis of its Noise Remedy Program Area (NRPA). To concede a potential error would commit POS to increasing the size of the NRPA and thus potential mitigation costs. POS has recently estimated that insulation costs for second runway mitigation in the NRPA would run more than \$250 million. That amount of course does not include potential buyout of areas that remain in the larger 75 Ldn contour. The costs of mitigation in an urban environment such as the Highline area are enormous.

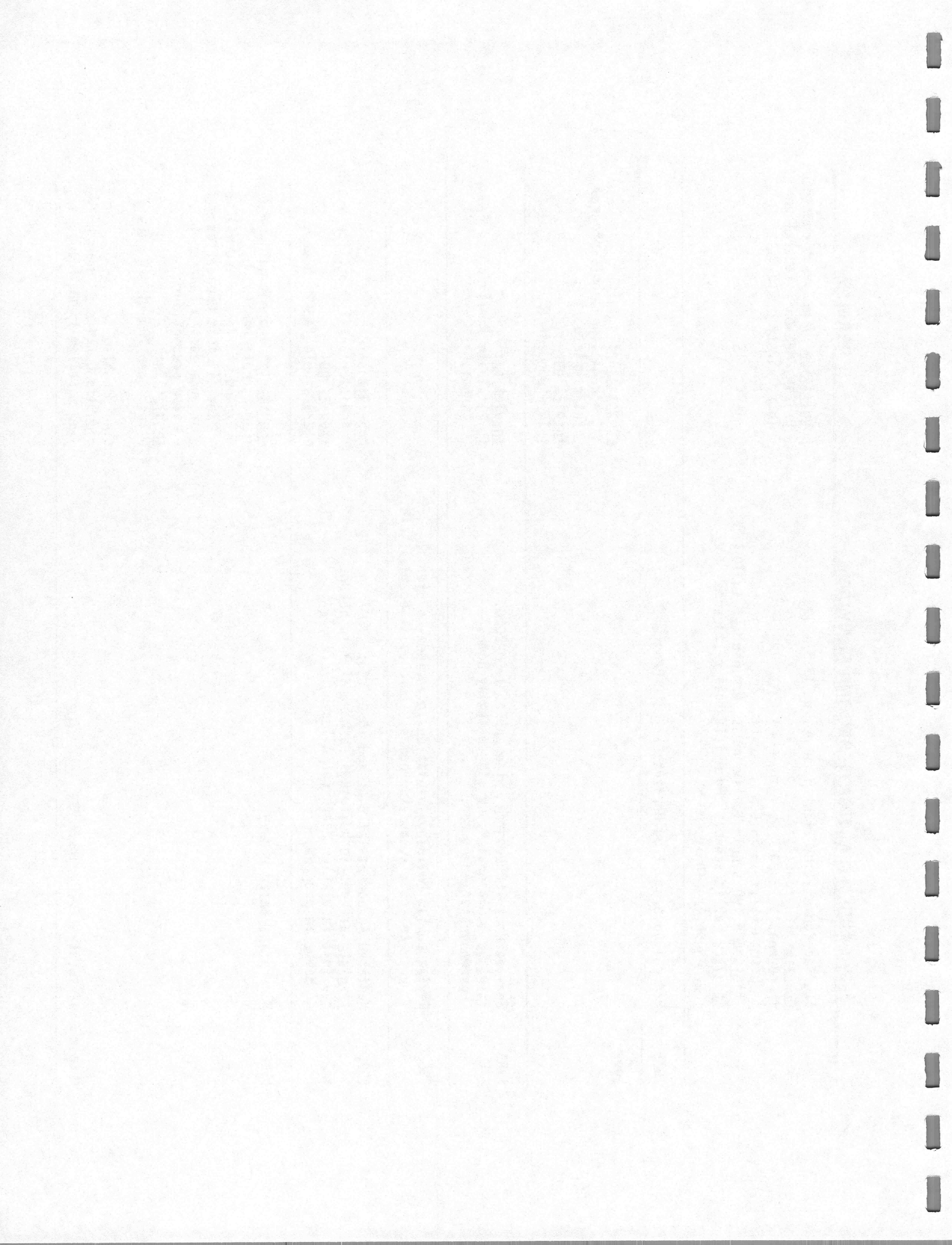
Given the inadequacies of Flight Plan noise exposure maps, local planners currently have no way to make an accurate assessment of the noise effects and costs of the third runway. Because these noise mitigation costs are greater by far at STIA than at any other site, Flight Plan has unfairly understated the costs of the third runway.

PROMISE TO MITIGATE SECOND RUNWAY

REALITY

1973	Sea-Tac Communities Plan--plan period 1973-1993. <u>Acquire</u> all property: • currently in 80 Ldn. • permanently* in 75 Ldn. <u>Insulate</u> 5,790 single family homes permanently* in 70 Ldn. <u>Insulate</u> public schools and multifamily residences permanently* in 70 Ldn.	<u>Acquisition</u> of property commences primary reason: federal and local safety criteria.
1979	Federal Government authorizes Part 150 Program.	
1984		<u>Acquisition</u> : • \$36.2 million spent, program not complete. <u>Insulation</u> : • \$0 expended.
1985	Sea-Tac Part 150 Program--plan period 1980-2000. <u>Insulate</u> additional 4,000 single family homes permanently* in 65 Ldn.	<u>Insulation</u> : • 21 single family homes from 1985-1987.
1988	<u>Revise</u> public building insulation to include hospitals, private schools, nursing homes, churches, libraries, etc.	
1990	Mediated Agreement--plan period 1980-2000. <u>Insulate</u> all public buildings permanently* in 65Ldn. <u>Pay</u> full insulation costs for all single family homes in program.	<u>Acquisition</u> : • Additional \$41.6 million spent. <u>Insulation</u> : • 229 single family homes.
1992	Port plans third runway.	<u>Acquisition</u> program not complete: • 30 parcels remaining. • Expend. to date = \$90 million • Many eligible properties not in program due to inaccurate noise predictions. <u>Insulation</u> : • less than 700 single family homes. • no schools. • public buildings--demo only. • no multifamily buildings.

\*Minimum of twenty (20) years.





## VI. COSTS AND EFFECTS OF AIR TRANSPORTATION CAPACITY CONSTRAINTS



### Executive Summary

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This executive Summary highlights the results from case study analysis of the costs and effects of air capacity constraints. A case study approach was taken to identify the costs and effects of air capacity constraints and their implications for Washington. The following are the key findings in the case study areas.

- There are direct economic costs arising from capacity constraints. These costs are the additional operational costs incurred by airlines as a result of delay. They also include the value of passengers' time lost due to delays.
- Currently, there is little evidence of wider economic costs associated with existing air capacity constraints. However, there is an expectation that at some time in the future capacity constraints will have economic costs.
- There is little evidence of wider economic effects upon the location and expansion decisions of business and hence upon economic development. Air capacity is a consideration for industrial location and expansion. However, it is one among many factors influencing economic development.
- Airports and airlines work around capacity constraints to increase passenger throughput. There is evidence that congestion at San Francisco International has resulted in displacement of service to other regional airports.
- Airports have made specific operational adjustments in response to congestion. They are also engaged in extensive planning efforts to identify options for increasing capacity.

- At Vancouver International and Boston Logan the frequency of service provided by the commercial scheduled airlines is largely unaffected by the capacity constraints. Typically, if there is a market for more service it is added.
- The bulk of general aviation operations have been effectively relocated to other airports in the vicinity to address capacity constraints.
- Access to a major airport from regional areas by air does not appear to have been adversely impacted by current capacity constraints.

## Introduction

This section examines the potential costs and effects for Washington's economy that might arise from a shortfall in air transportation capacity in central Puget Sound. Rather than attempt to "model" any economic costs arising from an air capacity shortfall, the analysis describes the expected effects of a capacity shortage and draws conclusions about their likely impacts on the wider economy.

The assessment draws on the technical analysis presented in the preceding sections of this report and from additional case study research.

The section is organized as follows:

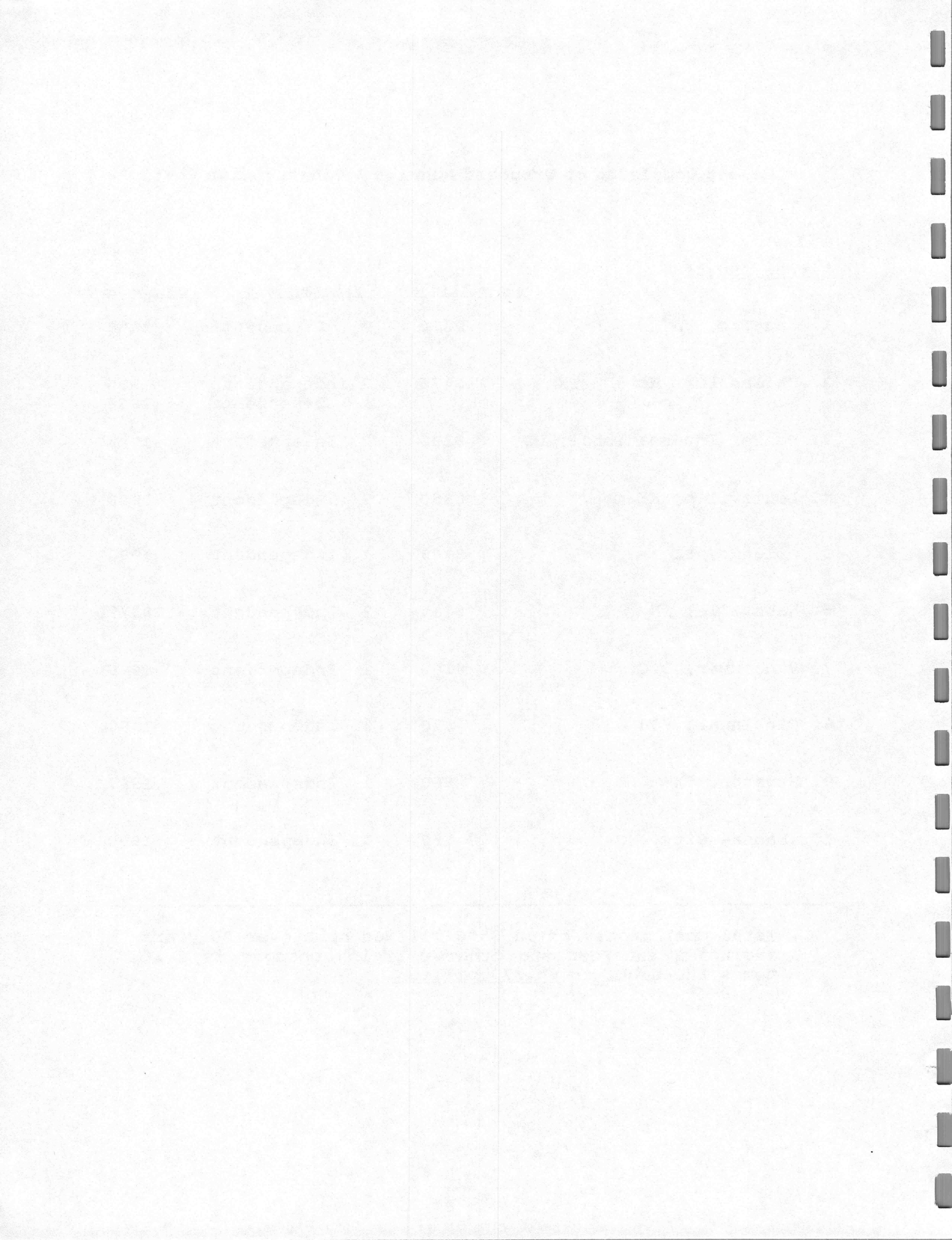
- The nature of air transportation capacity constraints.
- Expected consequences of air capacity constraints.
- Case study analysis of the effects of capacity constraints.

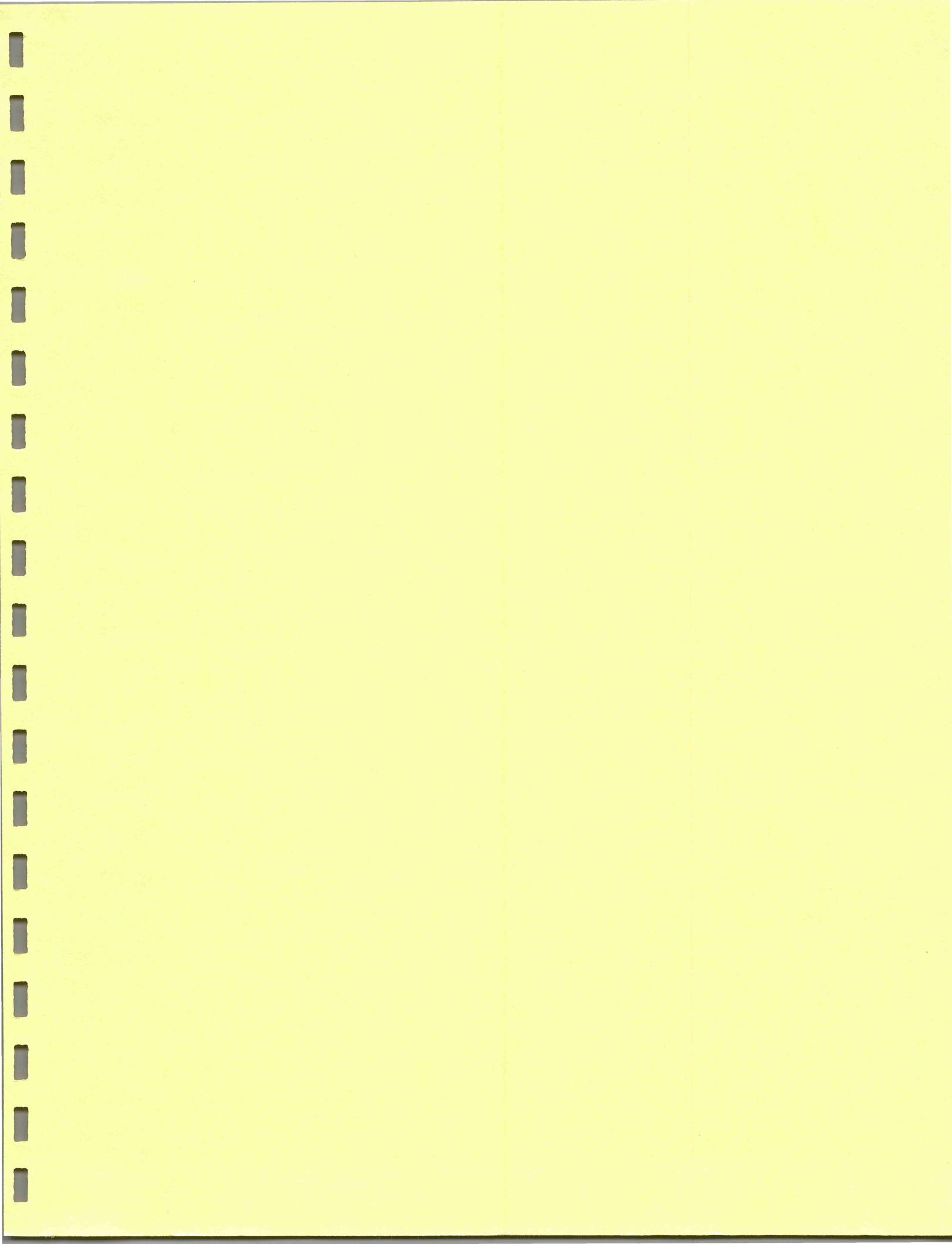
### Recent Completed or Proposed Runways & Construction Costs

<u>Airport/State</u>	<u>Cost (in millions)</u>	<u># of Runways</u>	<u>Year Completed</u>
1. Sea-Tac, WA	\$500	1 Dependent	1998
2. Dallas/Fort Worth, TX	\$475	2 Independent 1 Dependent	1996 1986
3. Denver International, CO	\$380	5 Independent	1993
4. Louisville, KY	\$350	2 Independent	1992
5. Orlando, FL	\$168	1 Independent	1990
6. Nashville, TN	\$114	2 Independent	1989/90
7. Vancouver, B.C.	\$100	1 Independent	1996
8. Cincinnati, OH	\$70	1 Independent	1990
9. Houston, TX	\$60	1 Independent	1987
10. Kansas City, MO	\$50	1 Independent	1990

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Total cost to pay off a \$500 million debt over 20 years including interest and other carrying charges is 2.35 times the debt, or \$1.175 billion.





PRELIMINARY RECOMMENDATIONS OF REGIONAL COMMISSION ON  
AIRPORT AFFAIRS FOR AMENDMENTS TO REGIONAL  
AIRPORT SYSTEM PROGRAM

I. INTRODUCTION

Based upon all of the various input to the PSRC process, the RCAA makes the following recommendations for amendment of the Regional Airport System Program. Many of the recommendations refer to capacity and other issues at Sea-Tac International Airport ("STIA").

1. Immediately Place into Effect Measures to Conserve STIA Capacity and Enhance Existing Resources.

These measures are intended to make the most efficient use of available resources at the lowest potential costs to the public.

a) Adopt measures for Capacity Enhancement at STIA, including navigational and field improvements.

The 1991 Capacity Enhancement Study prepared for the POS indicates that significant savings of potential delays at STIA through navigational and other improvements to the existing facility. The utilization of these and other suggested measures will allow significant savings and increase the actual operational capacity of the existing airfield.

b) Adopt and Implement Demand Management Measures to Reduce Operations and Shift Operations Out of Peak Hours.

The FAA has recommended that Demand Management Measures be adopted at congested airports to reduce operations and shift flights from busy times. Such measures may be economic or regulatory in nature and involve an increase in landing fees for small capacity aircraft. This will have the effect of shifting operations from small occupancy aircraft ("SOA's") to high occupancy aircraft ("HOA's"). Such measures will reduce congestion and conserve valuable operational capacity at STIA.

c) Utilize Boeing Field for Commuter Operations with Low Numbers of Connecting Passengers.

In conjunction with demand management measures being taken at STIA, Boeing Field ("BFI") should be utilized for certain commuter operations.

BFI has a passenger terminal which is not currently being used. BFI would be opened to commuter operations for which is well suited given its proximity to downtown, less travel time on congested I-5 and its compact size which reduces in-terminal transit. These factors would be important to local residents whose sole purpose is commuting to or from one destination like Portland, Spokane or Vancouver B.C. Limited number of connecting passengers could be transferred to STIA by vans or other ground transportation.

BFI would be used in conjunction with demand management techniques at STIA. Carriers could avoid higher landing fees for SOAs by using BFI, which would continue to offer landing fees consistent with current STIA fees.

2. Rely on Trends in Airline and Airport Operations and Forecast as Support for Plan Decisions.

The measures identified in Section 1 herein are ones that require active steps to implement. However on a policy basis, the PSRC should rely on certain other identified trends that are predicted to occur. The two that are the most significant are the following

a) Trends to Larger Aircraft Which Increase Passengers Served Per Operation and Lower the Number of Operations to Serve the Population.

Trends projecting into the future suggest that larger aircraft will be used. Indeed, the projections presented to flight Plan suggest that about 25,000,000 more passengers per year can be accommodated on only 120,000 more operations, while it currently takes about 360,000 operations to serve 16,000,000 passengers.

This is indeed a dramatic trend. The actions of the active portion of the plan support this trend and bolster its use as a part of the RASP.

b) Trends Toward Lower Forecasts of Total Passengers.

As we have noted, there are many signs that the predictions of future passengers may be significantly overstated. Fare increases, alternative communication techniques, and consolidation of existing carriers all point to the possibility of less travel per person than was the case in the 1980's.

Reliance on this trend as a plan measure is appropriate and in support of the actions taken in other parts of the plan calling for physical improvements. Measures to use lower cost means of providing extra capacity are consistent with allowing more time to determine whether these trends will actually occur. They also balance the need for further possible future short-falls in capacity with responsible management of public funds.

c) Development of Alternative Communication and Travel Facilities.

Into the next century it is not impossible to see the development and common use of alternative means of communication. Several of these have the potential to substantially reduce the current reliance on air travel. The two most significant are the following.

i) High Speed Rail. Recent reports by the High Speed Rail Commission support the proposition that High Speed Rail will be a feasible alternative means of transportation in the mid-term future. Such facilities have the real potential for removing certain commuter operations from STIA.

ii) Alternative Communications Techniques. The country appears to be on the verge of alternative means of communication. These include the ever-increasing use of fax machines and video conferencing. Both techniques offer alternatives to physical, face-to-face communications.

3. Begin An Immediate Program for Development of a Second Airport Comparable in Size and Function with STIA.

The third step in the plan is to commence siting procedures for a second airport in the central puget sound region. The Flight Plan report also calls for a second airport to be developed, the preference being operation of Paine Field by the year 2000.

However, the Paine Field facility is not proposed to be comparable with STIA in function or number of operations and passengers. Because STIA cannot deal with the number of passengers and amounts of cargo predicted in the future, the second airport should be comparable with STIA and be prepared to



provide functions not possible at STIA.

The search area for the second airport will be significantly broadened by the possible development of light-rail or high-speed rail facilities. Such facilities could provide reasonable travel times between population centers and the new airport. This is especially true if a new airport is sited adjacent to the I-5 corridor.

The second airport should be prepared to open by the year 2005.

4. Continue Use of STIA as Major Air Carrier Airport Without a third Runway; Reduce Operations at STIA in Conjunction with the Second Airport.

The fourth part of the plan calls for STIA to remain the major air carrier airport until the second airport is opened.

Additional runway capacity is deleted at STIA because insufficient space is available for ground facilities. In addition, the funds required for the third runway are so substantial (about \$450 million) that it will detract from planning and implementation for a second airport. In addition, considerations of environmental impact and equity to long-impact STIA neighbors mitigate against additional capacity at STIA.

It is also the objective of the plan to reduce STIA operations. A required reduction of STIA operations will assure that a second airport will become economically viable.

Further a reduction of STIA operations will allow the elimination of the four-post plan and a return to the Elliott Bay (north) and the I-5 (south) approaches which offers noise abatement and mitigation to thousands of residents.

5. Adopt (or Recommend Adoption of) Governance and Finance Measures Which will Assure Plan Implementation.

To assure the implementation of a successful plan, certain modifications to financial and governmental structure are necessary. These changes are to primarily related to a) how the provisions of the plan will be financed and b) who will be responsible to complete the tasks required.

a) Financial Resources Must be Available to Pay for New Facilities.

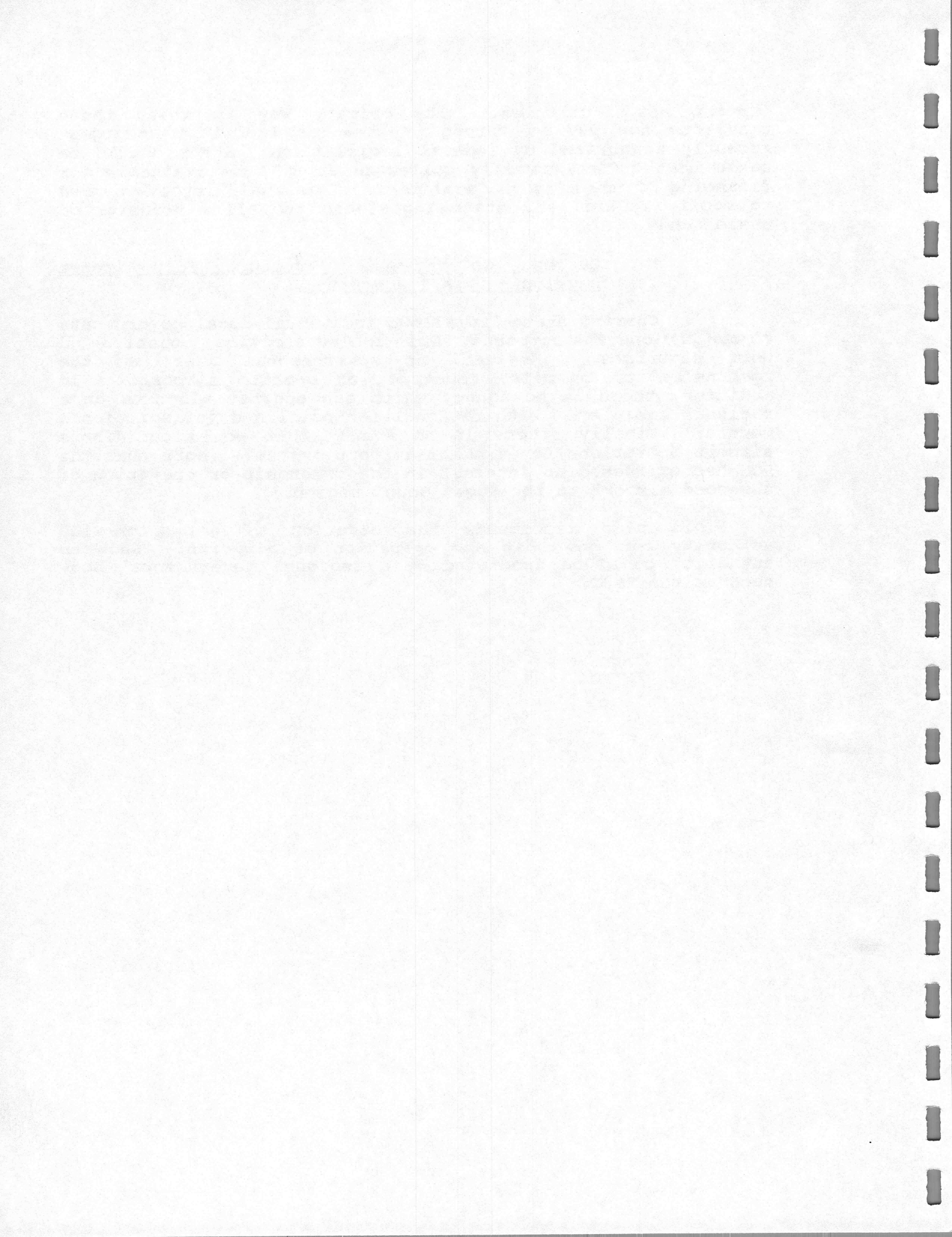
Construction of new airport facilities requires a significant capital expenditure. Since new facilities are to benefit future air travellers, those current travellers should

support new facilities. The primary way in which these travelers now pay is through "passenger facilities charges" recently authorized by federal legislation. Steps should be taken that PFC's currently collected at STIA be available for financing of new airport facilities. This would involve a need to modify federal and state legislation to allow transfer of these funds.

b) Current Governmental Structure for Airport Development is Inadequate.

Current state law allows individual local governments to own and operate airports. This includes cities, counties and port districts. However, no governmental unit has the responsibility to site, construct or operate airports. In addition, there is no agency which can operate airports on a regional basis and with regional financial and jurisdictional powers. Finally, there is no agency that would coordinate airport operations for a multi airport system. (Note that the POS has expressed no interest in the ownership or operation of a second airport in the Puget Sound region.)

This plan recommends the creation of a region-wide authority for ownership and operation of airports. Such an authority could be appointed by a regional governmental body such as the PSRC.



*Special Report***AIRPORTS, NOISE,  
AND AIRPORT DEVELOPMENT**

*[The following special report was prepared by Matthew Rosenberg, director, O'Hare Citizens Coalition; Communications Director, National Airport Watch Group]*

In recent years, airport noise has become a serious issue that now occupies center stage in the ongoing debate over how America can achieve the expanded airport capacity needed to remain competitive in the global economy. It's no surprise that the noise issue has ascended since airline deregulation gave flight to huge increases in air travel. America's airports have become stretched to the breaking point as boarding passengers nearly doubled, from 235 million in 1977 to 453 million in 1991. That number is projected by the Federal Aviation Administration to grow by another 60 percent over the next 11 years. The forecast is for substantial air cargo growth, as well.

Even if all "planned improvements," many including new runways, were achieved at primary airports, there would still be 33 airports suffering "severe congestion" in 1997, according to the FAA-commissioned report released last year, "Challenge 2010: Planning for the U.S. Airport Capacity Needs of the Year 2010 and Beyond." This report, by a team including former Airport Operators Council International head J. Donald Reilly and former FAA Administrator Donald Engen, notes that among the 33 airports where planned improvements would not alleviate severe congestion are O'Hare, Dallas Fort-Worth, Atlanta, Boston, Kennedy, LaGuardia, Newark, Atlanta, Minneapolis, Seattle, St. Louis, San Francisco, San Jose, Los Angeles, Phoenix, and Salt Lake City.

**Rest of the World Far Ahead**

Meanwhile, as battles over new runways rage around the airports serving Chicago, St. Louis, Dallas, Minneapolis, Seattle, Phoenix, and elsewhere, the rest of the world is far ahead of America in constructing new airports. New airports is one "competition" issue that transcends blind boosterism and has real economic consequences. The countries that invest in upgrading their airport infrastructure while meeting critical environmental concerns over airport noise will have a decided advantage in handling economic growth and the major increases in air traffic.

Since the 1970s, major new airports have been built for the regions of Paris, Munich, London, Jakarta, Riyadh, and Jeddah. New airports are under construction now for Osaka, Seoul, Macau, and Milan, and are planned for Athens, Tokyo, and Hong Kong, possibly Warsaw and Berlin. Japan intends to build several major new airports apart from Osaka and Tokyo, and China sent shock waves through the international business community by announcing this summer that it would seek Western capital to help finance six new airports.

**Promising Developments in U.S.**

In comparison, American has been bigger on studying new airports than getting them built, although that's starting to change. As early as 1977, in a report to the U.S. Transportation Secretary, the FAA observed that up to 10 major new U.S. airports would be needed by 2000 and that large buffer zones were required to avoid serious community noise impacts. Since that date, not one major new airport has yet opened in the United States. The responsibility to build public support for new airports lies outside Washington, DC. To wit, one major trade journal reports, "a top FAA official has been overheard telling an industry group that the agency is so frustrated by the lack of new airport starts that its policy now is to sit back and watch as public frustration builds over system delays."

However, there have been some promising developments in the United States. First and foremost is the 33,000-acre new airport to serve the Denver region, now nearing completion. The new Dallas-Ft. Worth airport yielded mixed results. Built on nearly 16,000 acres in 1974, at some distance from downtown, it was first ridiculed as too distant. Now a vital hub, the airport is embroiled in battle with its neighbors over expansion. In Orlando, FL, McCoy Air Force Base was converted to a 15,000-acre airport now handling nearly 300,000 annual flights. Military aviation facilities are being converted to commercial or joint-use airports in New York's Hudson Valley region, in Myrtle Beach, SC, outside St. Louis in St. Clair County, IL, and in Austin, TX. Austin's new site may be too close to neighborhoods, according to some local observers. The Hudson Valley and St. Louis region military field conversions have given impetus to community-based noise groups, and in their eyes the verdict is still out.

One clear bright spot, like Denver, is the recently clarified plan for a new ex-urban airport south of Chicago, following the well-deserved defeat of an ill-inspired, in-city site that would have required the destruction of nearly 10,000 homes and the closure of once-again reinvigorated Midway Airport. Also illustrative of good planning and the "dare to be bold" approach needed for 21st Century airports are the land banking of 15,000 acres in Palmdale by the City of Los Angeles for a joint-use airport, and ambitious plans for new mega-airports, each more than 20,000 acres, in North Texas and Martin County, FL, halfway between Orlando and Miami.

There's more still. New airports are under serious study for the regions of San Diego, Minneapolis, New Orleans, Atlanta, Boston, Seattle, Northeastern, OH, Long Island, and in Alabama, Arkansas, Arizona, Oklahoma, Nebraska, Kentucky, and North Dakota. In most of the above instances, feasibility studies are well underway. Most of the sites are decidedly ex-urban, yet with fairly quick access for substantial numbers of users, access that will be even quicker as proposed high speed rail links are implemented. The urban regions airports under study are envisioned mainly as passenger facilities. Some of the others are

proposed primarily as air cargo centers. In many cases strong business support and significant government interest have developed. Many build-no build decisions will hinge on community acceptance, size, location and in some cases runway layout.

### Community Acceptance

Community acceptance of new airports cannot be achieved by the insistence that technology alone will negate the noise problem. The public does not regard the newer "Stage 3" jets as the unqualified solution to jet noise, and rightly so, considering the actual noise levels of those planes (particularly the larger ones), often exceed single-event noise thresholds for annoyance, speech interference, and sleep disruption.

Even the FAA seems to realize more acutely now that concerns over jet noise from current or new airports can be expected to remain a major consideration even as new jets continue to gradually replace their older counterparts. FAA's summary report in its "National Program for Integrated Airport Systems - 1990-1999" (NPIAS) clearly states some reality checkpoints based not on technology but on the interplay between airports and their neighbors. "The opportunities to expand airports or to build major new ones are limited by a lack of suitable sites, because most land has already been developed for residential or commercial use or has been reserved for conservation and recreation."

New airport proponents in Denver have the right idea, as do backers of the large, well-buffered ex-urban sites proposed for Northeastern Illinois, North Texas, and Florida. They know, to begin with, what they want to avoid: an outraged noise-battered public. From San Diego to Boston, from Seattle to Raleigh-Durham, from New Jersey to St. Louis, to Phoenix, to Los Angeles, to Minneapolis, to Chicago, to Dallas, airport noise has become an issue of loud, often ear-splitting controversy. Community groups are increasingly well-mobilized. Some, in fact, are now backed with municipal government funds; armies of hard-nosed volunteers; assistance from lawyers, community organizers, experts on airport delays and noise metrics; and strong support from elected officials at all levels.

Many of the community groups and local governments, which regard them as assets, have finally turned the corner in the airport expansion battle. These so-called "anti-noise" interests have succeeded in making it clear they are not against noise or against airports, but that they are against excessive and increasing noise in communities that are already bearing more than their fair share of the national jet noise burden. And they are against poor airport systems planning. Most importantly, many are actively working for increased airport capacity through the development of carefully-sited, new ex-urban airports.

As always, the question of "Who Pays?" arises. Funding sources are varied, and can include bonds, private capital, substantial federal dollars (as for Denver), the new local airport local tax (Passenger Facility Charge) allowed by Congress, and conceivably municipal, county, or state

funds. The accumulated and future revenues from the special federal use tax on all commercial air passenger tickets are a major potential funding source for new airports, even though other system needs are funded from this pool as well. Still, some detractors say the airline industry can't support new airports or that demand will be weak. However, the FAA's projections, even if they're off somewhat, are still for substantial growth. Recent news shows signs of an economic recovery. Moreover, as the rest of the world, and Asia in particular, proceed to build new airports and implement more high speed rail, does America really want to sit around fretting that our economy won't be on the upswing in a few years at the most? Do we want to neglect the importance of new airports as a major stimulus to that very growth we want?

Yet another argument against new airports comes from some high-speed rail backers, who downplay the great speed advantage of planes over even the fastest trains on the drawing board, not to mention the trains in use now. Still, today's "high speed trains," most going 100 to 200 m.p.h., are part of the systems solution to airport gridlock. But it cuts the other way, too. The "trains - but no more planes crowd" tends to overlook the crucial role that the more smoothly functioning, sensitively expanded and capacity-enhanced airport system will play in attracting more train usage. It is no surprise that many new airport proposals include high-speed rail, and that rail interests are eager to connect their tracks and trains with current and future airports.

### Clarion Call

Realizing that local concerns about jet noise and the increasing strength of "noise groups" will not be diminished no matter what legislation is passed by Congress, the "Challenge 2010" report noted above represents a clarion call to those concerned with the need for more airport capacity. It is a landmark for what it admits and what it recommends.

It's noteworthy that the report was requested by the FAA to meet a statutory requirement of the Airport Safety and Capacity Expansion Act of 1987, to develop an "overall airport system plan through the year 2010 which will assure long-term availability of adequate airport system capacity." To meet that need, Reilly and Engen, along with a team of airline officials and other transportation experts, call for a re-focused effort on building new airports in well-buffered, ex-urban locations. "Challenge 2010" breaks sharply with the "expand 'em 'till they burst at the seams and then some" school of thought that has largely characterized airport systems development in the United States.

Instead, the report argues that not only will delays be largely unimproved and capacity gains relatively modest if new runways are built at existing primary airports, but that such projects are in many cases unlikely to get off the drawing board anyhow, due to intense community resistance. In fact, the "Challenge 2010" team makes this point no fewer than a half-dozen times in the report, and

asserts that the only logical alternative for real long-term aviation capacity growth is the construction of carefully-placed new "wayports" on 20,000 acres in more, away from densely-populated areas, but still close enough to draw local as well as connecting traffic.

Proper definition of wayports is important. The Reilly-Engen "Challenge 2010" report notes that wayports are not, as detractors have claimed, some bizarre fantasy of airports in the middle of nowhere, but that the work and the concept are in fact very appropriate for the kind of new airports the country needs, situated in "evolving population areas" on a large land mass to minimize outcries over noise, to facilitate future expansion, to provide ample space both for important airport-related business development, and for anticipated new supersonic and super-jumbo jets.

New, well-buffered airports will allow for the implementation of legitimate "land use planning," a concept often misapplied in relation to communities affected by today's busy airports. These are communities where neighborhoods and residents often predate the heavy commercial air traffic brought on by deregulation, communities in some cases that were promised "no more runways," communities where in any case it often is too late to dismiss the public pressure for fair and balanced noise limits in favor of bulldozing our way to something called "noise compatibility."

Most arresting in "Challenge 2010" is the call for "the involvement and support of ... the general public, particularly those residing proximate to present and future airport facilities" in efforts to get new, responsibly-sited airports built. The authors are on to something. Some organizations belonging to the National Airport Watch Group, fully aware they will still pay their fair share of the "price of progress" through continuing airport noise in their neighborhoods, have already begun devoting much time and energy to building public support for new "green grass" airports, where needed, and where they can be accepted.

The FAA, apparently frazzled by support from the luminaries on the Reilly-Engen team for the agency's own informal recommendations of new ex-urban airports, hoarded most of the "Challenge 2010" copies intended for public distribution. This reportedly prompted calls from congressmen, organizations, consulting firms, and at least one bank claiming that they were being denied access to the report. Ultimately, a businessman from North Carolina had 10,000 copies printed, and sent one to every member of Congress, among others. This same "get up and go" spirit can greatly aid joint efforts by diverse interests trying to win community acceptance of responsibly sited, well-buffered new airports in the United States. For reasons environmental and economic, we can't afford not to take control of the process.Δ

### *Sarasota Bradenton Int'l*

## **FAA APPROVES LARGEST PART 150 GRANT EVER MADE**

The largest allocation of grant money ever made for a Part 150 Airport Noise Compatibility Program, \$5.6 million, has been approved by the Federal Aviation Administration for the Sarasota Bradenton International Airport.

The money will be used for the purchase of residential property in Sarasota and Manatee counties located in the 75 dB DNL noise contour around the airport.

"We are now working on the application required to be completed for the FAA to give us this money," said Deborah Murphy, manager of the airport's Noise Abatement Department. At least 65 properties are eligible for buyout with the money, she said.

The FAA plans to issue the grant by March 1, 1993, according to the airport.

### **Sarasota Awards 'Good Neighbor' Airlines**

The Sarasota Bradenton International Airport recently honored several airlines for being "good neighbors," that is, scheduling at least 70 percent of their operations with Stage 3 aircraft. Delta and United met the quota, which took effect on Oct. 1 at the beginning of the fiscal year in October; and Delta, United, and USAir made the list in November. United scheduled 100 percent of its operations using Stage 3 aircraft for both months.

The goal of the airport authority is to have the major carriers use all Stage 3 operations by fiscal year 1996. It increases the percentage of Stage 3 operations required to reach "good neighbor" status by 10 percent each year.Δ

### *Conferences*

## **IATA CONFERENCE TO ADDRESS ENVIRONMENT**

The International Air Transport Association will hold a conference in Washington, DC, on March 24-26, 1993, on air transport and the environment.

An international panel of speakers will address a broad range of topics, including the implications for air transport after the Rio environmental summit, whether airports are doing enough to minimize their impact on the environment, policy options for dealing with the environmental problems raised by travel and tourism, whether noise and emission technology is effective and provides affordable solutions for the industry, the impact of aircraft emissions on the atmosphere, the effectiveness of environmental regulations, the Japanese experience in regulations airports, and the role of economic and fiscal incentives/disincentives.

Speakers at the conference include representatives of IATA, the International Civil Aviation Organization, the

**FUTURE HIGH SPEED GROUND TRANSPORTATION  
SYSTEM IMPACTS**

on

**AIRPORT EXPANSION NEEDS IN THE STATE OF WASHINGTON**

presented to the

**COMMUNITY GROUP INTERFACE PUBLIC MEETING**

on the

**REGIONAL AIRPORT SYSTEM PLAN AMENDMENT**

to the

Transportation Policy Board

of the

Puget Sound Regional Council  
216 First Avenue South  
Seattle, Washington 98104

at the

Bellevue Conference Center  
505 106th Avenue NE  
Bellevue, Washington 98004

**PREPARED BY:**

Hal B.H. Cooper, Jr., PhD, P.E.  
Consulting Environmental Engineer  
11715 NE 145th Street  
Kirkland, Washington 98034

held on

Thursday, January 21, 1993

## **EXPECTED BENEFITS**

A high speed ground transportation system would alleviate much if not all of the future airport construction requirements if it were extensively implemented and supported. The proposed construction of a new high speed ground transportation system in the State of Washington would connect both Eastern and Western Washington. It could initially be extended to Eugene at the Southern end of the Willamette Valley, and then to Southern Oregon and into Northern California. This high speed ground transport system could also connect with a similar system to connect Southern and Northern California as the basis for a long distance regional high speed system throughout the Pacific Coast states. It would also allow an expansion of conventional Amtrak rail passenger services.

The proposed high speed ground transportation system in the State of Washington would have a number of associated benefits. It would eliminate the need to remove 1,500 to 3,000 homes which are adjacent to the SeaTac Airport property. The high speed ground transport system would reduce noise levels near the airport itself and overall community noise levels in general. The high speed ground transport system would eliminate air pollutant emissions directly from the transport vehicles themselves, and could be operated without needing to import and burn any oil.

The HSGT system proposed to be built in the State of Washington could alleviate much if not all of the expected future SeaTac congestion. It would enhance economic growth and development throughout the state and adjacent areas of the Pacific Northwest to tie the entire region closer together as a single economic unit. This system could reduce the transit times for both freight and passengers between cities to provide a means for reducing overall transportation costs for both goods and people and facilitate long distance commuting. It would reduce both urban and rural traffic congestion in terms of gridlock, and also reduce winglock at airports. It would reduce highway and road maintenance costs at the same time.

## **CONCLUSIONS**

This HSGT system would also facilitate interlinkages with urban mass transit systems, which are also becoming increasingly electrically-powered so as to alleviate auto traffic problems. For all of the above reasons, high speed ground transportation should be considered as an alternative to either the expansion of the present SeaTac Airport or of the construction of a new or expanded airport. In implementing such a system, consideration should be given to the development of an initial core rail transit system to connect Bellingham, Olympia and Ellensburg with Seattle. This high speed rail network should be interlinked with present and future urban mass transit systems. Priorities at SeaTac Airport would then be placed on long distance flights with the shorter trips below 300 miles to go by rail.

The present SeaTac Airport should be kept in its present location and configuration without the addition of a third runway. If a new airport is necessary, a remote location at the Grant County Airport in Moses Lake in Eastern Washington would be practical to handle



international flights, cargo flights and passenger flights to Eastern Washington from outside of the Northwest area. The future rail passenger system should be linked to these airports as well as to downtown urban centers.

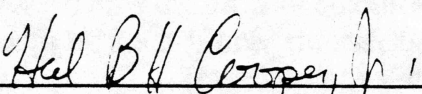
The possible growth of new manufacturing, energy production and environmental cleanup activities in the Moses Lake-Ephrata and Tri-Cities (Kennewick, Pasco, Richland) areas could provide major impetus to the future development of the alternative Grant County Airport. A major area for new economic growth would thus be created in Eastern Washington with a greater need for new rail service. In addition, the location of new manufacturing facilities by the Boeing Company and others in Eastern Washington would also act to spur this growth. All of these factors would create additional passenger ridership demands and cargo haulage needs for a proposed high speed ground transportation system in the State of Washington.

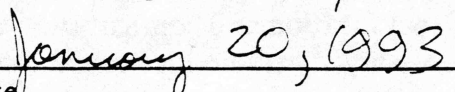
High speed ground transportation system in the State of Washington could connect all of its major cities into a single network. This system could connect all of major airports as well as urban downtown locations to connect with their respective mass transit systems. The high speed ground transportation system could be built in a series of successive steps going from the present Amtrak system through a series of upgrades. The high speed ground transport system would then be relatively immune to adverse weather conditions relating to snow, ice, fog or rain, especially during winter months.

The proposed high speed ground transportation system could alleviate or even eliminate the need for the construction of a third runway at the SeaTac Airport. Approximately 20 percent of the total flights at SeaTac go between the single origin-destination pair of Seattle to Portland. Approximately 40 percent of the total flights at SeaTac go either North-South or East-West within a 350 mile range from Seattle and could be amenable to upgraded rail passenger service with the ultimate goal of high speed rail service. A new wayport at Moses Lake to serve Eastern Washington would be a part of this system.

A further analysis of the air traffic indicates that up to 75 percent of the total flights into and out of SeaTac Airport go in a linear North-South corridor along the West Coast. The upgrading of rail passenger service along the West Coast could alleviate both airport and highway congestion for intercity travel. The West Coast states would be ideal for a long distance high speed ground transportation system in the future. Such a system would have additional benefits in reducing air pollution, noise levels, energy consumption and petroleum imports at the same time.

Respectfully submitted,

  
\_\_\_\_\_  
Hal B.H. Cooper, Jr., PhD, P.E.

  
\_\_\_\_\_  
Date

**III. FINDINGS** *from: High Speed Ground Transp. Study  
Exec. Summary, Oct. 92.*

**A COMMITMENT TO HIGH SPEED GROUND TRANSPORTATION  
SERVICE IS WARRANTED**

- **Existing air and highway modes are facing severe congestion**
  - Total intercity travel will increase by more than 75% by the year 2020. It's unlikely that the highway and air systems could be expanded to meet this demand.
  
- **A third intercity passenger mode can be a major factor in maintaining the quality of life and economic vitality of Washington**
  - HSGT is compatible with Regional Transportation Plans as they exist today, and with proper planning, can result in a comprehensive intermodal network.
  
  - HSGT can be integrated and coordinated with urban high capacity transit, commuter rail and local bus services.
  
  - HSGT has the potential to support growth management objectives in the counties it serves.
  
  - To offer an effective supplement to air commuter service and to maximize flexibility among intercity modes, HSGT should serve the major airports and the major urban areas.
  
  - The N-S Corridor between Everett and Portland offers the best near term opportunity for implementing a high quality intercity rail service. Completion of this corridor north to Vancouver, B.C. would assist the northwest economy in reaching its full international potential.
  
  - The E-W Corridor between Spokane and Seattle offers the best long term opportunity to utilize the speed advantage of true high speed service and provides attractive long term opportunities for supporting increased economic activity and diversity east of the Cascades.

- **Significant ridership potential exists for HSGT**

- Population in the study area is projected to increase by over 39% by 2020; employment is projected to increase by over 49%. These are more than double the U.S. national average.
- There is significant HSGT ridership potential even under the assumption that existing levels of highway and air congestion remain the same through the year 2020.

Assuming 1992 congestion levels on the highway and air systems, a 185 mph HSGT system would attract the following annual ridership in the year 2020

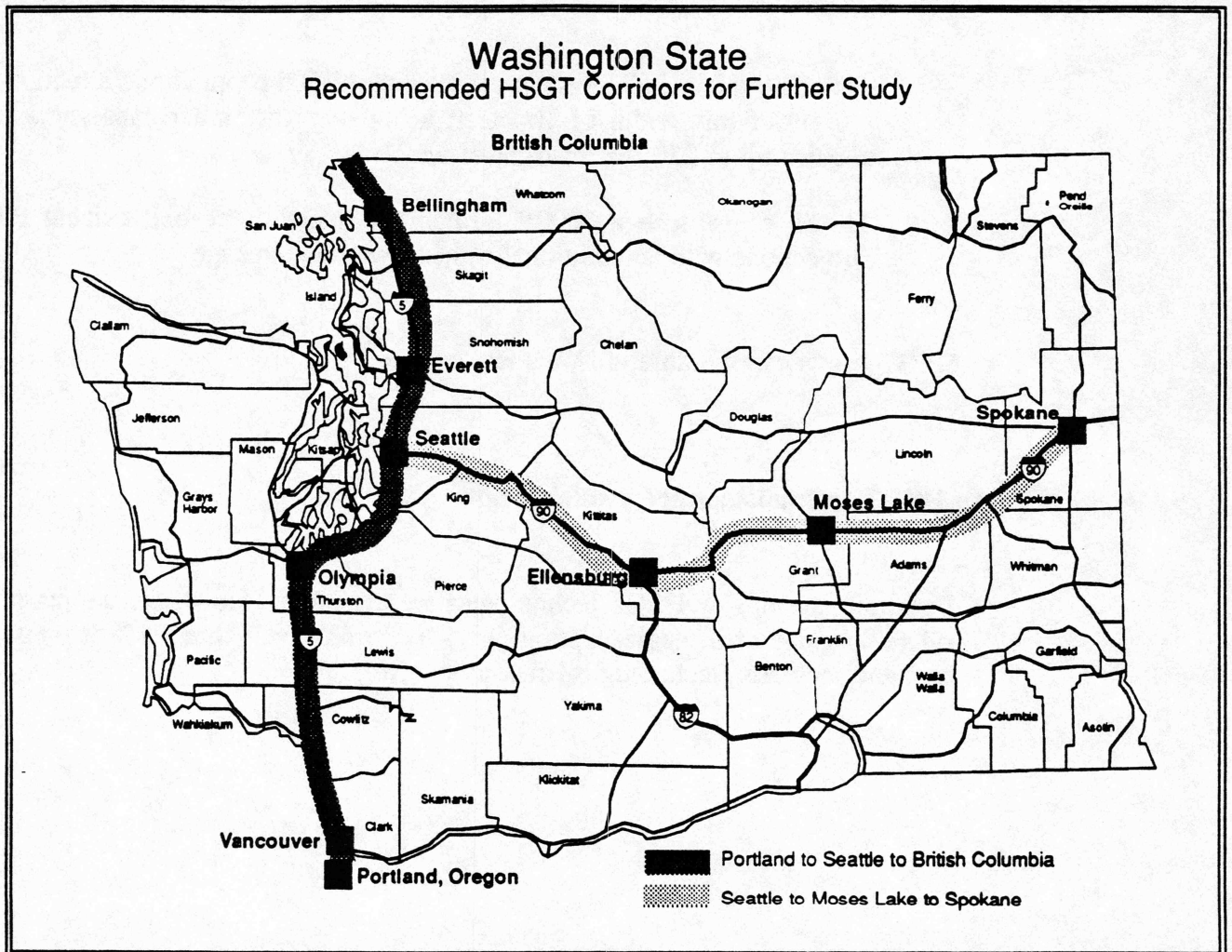
Corridor		Ridership
North-South	:	5,121,000
East-West	:	<u>2,264,000</u>
Total	:	7,385,000

- Sensitivity testing of the demand model based on recent survey data indicates that a decrease in the average speed on I-5 through the Seattle and Portland urban areas to 35 mph would result in an increase of 8% in HSGT ridership.
- Sensitivity testing of the demand model also indicates that an increase in the average cost of gasoline to \$1.80/gallon would result in an increase of 23% in HSGT ridership.
- Depending on the alternative selected, farebox revenues will cover annual operating and maintenance (O&M) costs within 12 to 15 years after start of operations and generate a surplus from that point forward. By comparison, most urban public transit systems operate at less than 50% fare box recovery.

- **HSGT provides a safer, environmentally superior and cost effective method for providing increased travel capacity.**
  - Environmentally, there are no "fatal flaws" to HSGT implementation.
  - HSGT need not depend on petroleum based fuels.
  - Compared to competing modes, HSGT is cost effective. It offers significant opportunities to reduce the cost of accidents and environmental degradation while accommodating the projected growth.
    - A double-track HSGT system could carry 12,000 people/hour/direction on a right-of-way width of 100 feet; a highway of similar capacity would require up to 250 feet of right-of-way.
    - HSGT can absorb a 2000% growth in ridership beyond current 2020 projections without additional right-of-way or trackage.
  - HSGT provides a reliable, all-weather service.
- **Proven HSGT technologies are available now**
  - Both rail and maglev HSGT technologies are available. However, the marginal ridership gains of a maglev option (13.6%) do not justify the 37% increase in cost and increased technological risk at this time.

• **Candidate Corridors**

- The study applied criteria of corridor length, population, employment, current travel levels and other factors to select corridors for further analysis as possible corridors for high speed implementation. Two corridors were chosen for further evaluation: a North-South line from Vancouver, BC through Seattle, WA to Portland, OR, and a second East-West line from Seattle across and through the Cascades and Moses Lake to Spokane.



OFFICE OF  
COUNTY COMMISSIONERS

WILLIAM S. PINE  
FIRST DISTRICT

DICK DIXON  
SECOND DISTRICT

BOB PAYLOR  
THIRD DISTRICT



P.O. BOX 350  
MONTESANO, WASHINGTON 98563  
PHONE (206) 249-3731

**GRAYS HARBOR COUNTY**  
**STATE OF WASHINGTON**

January 6, 1993

Mr. Robert Leventhal, Chair  
Washington State Air Transportation Commission  
711 South Capitol Way  
Olympia, Washington 98504

Dear Mr. Leventhal:

At your July Commission meeting in Ocean Shores, I was given the opportunity to testify concerning our region's interest in the possible siting of an additional airport on the scale of SeaTac. I testified at that time that our region views such an airport as much needed economic development not a LULU (locally unwanted land use).

Earlier in the meeting it was stated that to date it was not within the scope of the Commission's work to address siting issues. We urge the Commission to take up the siting issue at its earliest opportunity, either directly or to make recommendations to the Legislature to initiate such a process as soon as possible.

I have met and talked with my colleagues in Cowlitz, Wahkiakum, Lewis and Pacific Counties. We are in agreement that growth in the I-5 Corridor will require the development of at least one more airport comparable to SeaTac some time within the next six to thirty years. It is difficult to be precise in predicting the time that such a facility will be needed. Population, technology, and travel forecasts are unreliable for planning horizons as long as those needed for airport planning. A location south of Olympia would seem to be appropriate. Deciding now where such a facility should be located and the amount of land required is essential for local jurisdictions to conduct sound land use and transportation planning. The decision for siting a state-wide facility rests with the state. The political leadership from these counties would like to aid the state in beginning the process of site identification.

The Growth Management Act addresses the siting of essential public facilities. The Act (36.70A.200 RCW) recognizes that airports are essential public facilities and are typically difficult to site. While the Act requires that the Office of Financial Management maintain a list of essential state public facilities that are required or likely to be built in the next six years, it does not address the siting of such facilities. The Act merely states that, "No local comprehensive plan or development regulation may preclude the siting of essential public facilities." It is beyond the capacity of local governments to make siting decisions for facilities of such immense state-wide significance,

such decisions should be made at the state level.

Jurisdictions in our area are developing a regional transportation plan and local comprehensive plans. A major facility of state-wide significance dropped in our area after this difficult and expensive process is complete would nullify the plans and waste considerable time and money. Six years may not be enough lead time for local plans to incorporate a facility such as an airport. The site needs to be identified very early and environmental assessments completed so land use and transportation plans can include policies to protect the site for later development. Zoning, subdivision, and capital investment decisions can then be made early to aid the development of the facility. Such efforts would minimize development conflicts in the future.

It is our hope that the Air Transportation Commission will initiate a process that will lead to the identification of a site (or sites) for a future major airport. The identification of a site will ensure that the planning being done today will be valid tomorrow. If the Commission can not or does not want to perform this task, we urge the Commission to recommend to the legislature that they charge a separate group to perform the narrow task of identifying a site for an additional major airport. Early identification and reservation of such lands would assure citizens of Washington that an appropriate, cost effective site is available when needed.

Sincerely,

*William J. Pine*

William Pine, Grays Harbor County Commissioner  
Chairman, Southwest Washington Regional Transportation Planning Organization

Copies: Lewis County Commissioners  
Pacific County Commissioners  
Wahkiakum County Commissioners  
Cowlitz County Commissioners  
Glen Munsey, Chair  
Kalama City Council  
  
Karen Bergquist  
Longview City Council  
  
Alan Slater  
Kelso City Council  
  
Gerald Smith  
WA State Dept. of Transportation  
  
Joe Phillips  
Lewis County Economic Development Council  
  
Steve Harvey, Director  
Cowlitz-Wahkiakum Council of Governments  
  
Tim Baker, Associate Planner  
Cowlitz-Wahkiakum Council of Governments

*Kathy P.*

September 28, 1992

TO: RICK ARAMBURU  
FROM: DOUG GRAVES, LEN OEBSER  
RE: TOLEDO-WINLOCK AREA VISITATION

Doug Graves and Len Oebser visited the Toledo-Winlock, Washington, area on August 17, 1992 to examine a proposed site for an airport. They met with Mr. Gilbert Miller, C.E.O. of the Toledo-Winlock Port who conducted an all day tour of the area for them. He was a very strong proponent of siting a replacement airport in the Toledo-Winlock area.

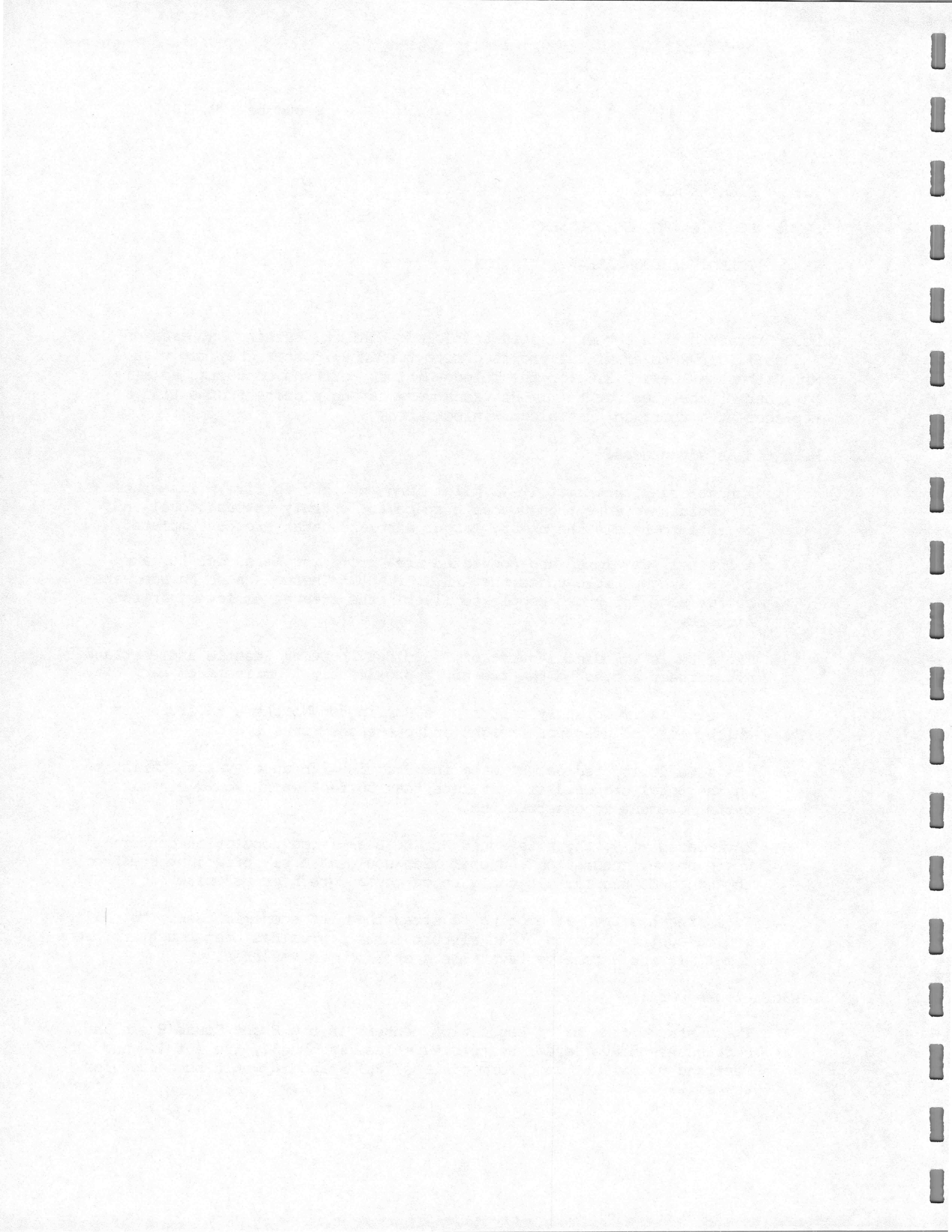
He cited as advantages:

1. A huge area approximately 12 miles long and four to five miles wide. It would have more than adequate space to be truly international and be able to handle the newer, larger airplanes that are contemplated.
2. A sparsely developed and populated area prompting less cost to make the area compatible under the A.S.N.A. Act. There is also an adequate buffer zone for those people to live in the area as employees of the airport.
3. The site is immediately west of I-5 midway between Seattle and Portland with direct access to the freeway approximately 95 miles from each city.
4. The site is immediately east of the Burlington Northern railroad track which could be used for freight and passenger transit.
5. The site is located on the Napavine Prairie with an elevation variation on the total proposed site of less than 50 feet which would minimize earth movement in construction.
6. Environmentally, the site would not be near large population centers where noise, congestion and pollution would adversely effect hundreds of thousands of people. It could be termed a "green grass" site.
7. This area has been attempting to strengthen its economic base. Mr. Miller indicated the location of an airport in this area has been sought for some time. It would receive favorable acceptance in the area.

Disadvantages were:

1. The distance from major population centers in the Puget Sound Basin and Portland-Vancouver area; Seattle 97 miles, Tacoma 67, Everett 124 and Portland 97 miles. Some form of mass/rapid transit would be needed for the site.





permission, after first completing a form available near the sign-in sheets at the entrance to the room and presenting the form to the Commission's Executive Director, Ken Reid. The Chair explained that the procedures are not intended to preclude public comment, but only to prevent unnecessary interruptions to the proceedings and enable Commissioners ample opportunity to participate in discussions and ask questions they may have. Questions not asked during the proceedings may be asked during the public comment periods. Chair Leventhal requested that any comments or questions be pertinent to the Commission's work.

#### Consent Agenda.

Chair Leventhal stated that the consent agenda consisted of action on the minutes of the Commission's August 26, 1992 meeting and ratification of the recommended consultant selection for Project VII (*mitigating the environmental and social costs arising from air transportation*).

It was moved, seconded, and unanimously passed to:

APPROVE THE CONSENT AGENDA, AS PRESENTED.

#### Moses Lake Area Perspectives.

Chair Leventhal asked Bodie to introduce the Moses Lake speakers. Bodie called upon Rick Jones, of the Port of Moses Lake, to introduce the speakers.

Jones first welcomed the Commission to Moses Lake and indicated that he would first present a video overview of the Port of Moses Lake, entitled "*Come Join Our Family*."

The video began: "Everything today that this high-tech world demands is located right here at the Port of Moses Lake. . . . Conveniently located in the heart of Grant County, right in the center of Washington state, its location alone makes the Port of Moses Lake a key player in industry from manufacturing products to exporting those products across the country and around the world. The Port of Moses Lake is less than an hour away by air and centrally located to three major northwest cities, making it a potential hub to serve the Pacific Rim market. In fact, the Port of Moses Lake owns and operates Grant County Airport, one of the nation's largest civil airports, covering over 4,600 acres. Grant County Airport has one of the longest runways of any airport in the western United States, measuring over 2 ½ miles in length. This is just one of the reasons why major aircraft corporations such as The Boeing Company and McDonnell Douglas have chosen to join the Port of Moses Lake family. In addition, aircraft carriers such as Japan Air Lines have selected Grant County Airport as a prime training facility. In fact, Japan Air Lines has been part of the Moses Lake family since 1968. In all, over 300 foreign and domestic air carriers have utilized Grant County Airport since 1966."

The video continued: "In addition to its physical features, Grant County Airport is equipped with the latest state-of-the-art ASR-9 radar system and the airport offers uncongested airspace and ideal year-round weather conditions that are perfect for flying, averaging over 350 VFR days annually. In fact, Grant County Airport acts as a diversion landing site for Seattle, Portland, and Spokane when those airports are closed down due to adverse weather conditions. What is even more appealing about Grant County Airport is the availability of industrial land for development. More than 600 acres of land are available, some specifically for industrial development, including 100 acres with rail frontage serviced by the Burlington Northern and Washington Central railways. This makes the Port of Moses Lake extremely versatile, offering industrial clients immediate access to both air transportation and rail transportation. In addition, the Port of Moses Lake also offers convenient access to a modern interstate highway system. Moses Lake is located directly across Interstate 90, the major transportation route running coast-to-coast

across the United States from Seattle to Boston. This means that the Port of Moses Lake can truly offer everything in transportation—air, rail, and interstate highways. It is all right here . . . .”

The video continued: “In addition to the industrial park at Grant County Airport, the Port of Moses Lake also offers 11 other industrially-zoned areas that have been specifically designated for light or heavy industry. With over 2,000 acres of prime industrial property, complete with modern water and sewer facilities, the Port of Moses Lake is the right home for every industrial need from science and technology to food processing. That is why such companies as Sunstrand Data Control, . . . , Basic American Foods, Advanced Silicon Materials, Carnation, Willamette Industries, Sonico, and Midwest Agricommodities have joined the Port of Moses Lake family. To go along with a fully equipped, modern airport and thousands of acres of prime industrial land, the Port of Moses Lake offers the best power rates in the entire nation. The Port is supplied with electrical power from the Grant County Public Utility District, which owns and operates two hydroelectric dams . . . on the Columbia River. These two dams provide power at costs averaging slightly over one cent per kilowatt hour for industrial loads, as compared to eight cents for New York and 13 cents in Japan. . . . In addition, these two dams are capable of supplying power to all of Grant County well into the future. In addition to low-cost electrical power, natural gas is also available as a cost-efficient option. An abundant supply of natural gas is readily available from Cascade Natural Gas at very competitive industrial rates.”

The video continued: “Joining the Port of Moses Lake family means being able to call upon the skills of a well-trained workforce. Big Bend Community College, in cooperation with the State Employment Security Department, offers free employment training programs for local industry, with curriculums specifically tailored to the requirements of the employer. This allows participating companies to select from a pool of employees who are pretrained and ready to step onto the job. For example, Big Bend Community College works directly with area employers to provide training programs for students entering the aviation industry. This means that, once training is complete, graduates can step directly into the job with the necessary skills.”

The video continued: “Joining the Port of Moses Lake family also means enjoying a very special way of life. Along with the rural friendliness of a home town, the cost of land is inexpensive and the cost for housing is extremely competitive. The community is safe and family-oriented. Schools and medical facilities are excellent. These facts make it especially easy for personnel to relocate quickly and comfortably to Moses Lake. That is not all. Moses Lake also offers the best in recreational activities anywhere in the world. There are over 120 miles of shoreland along Moses Lake alone. That means you can cast your line with friends or cast your line without anyone in sight. With such a moderate climate, averaging over 300 days of sunshine each year, it is no wonder that people from across the country and around the world are joining the Moses Lake family. The Port of Moses Lake offers you a community with industrial growth . . . an internationally and nationally recognized airport, more than 2,000 acres of prime industrial land ready for development, a highly qualified, reliable workforce, major transportation links for air, rail, and interstate highways just outside your door, the lowest cost power rates anywhere in the country, and all the advantages of today’s high-tech expanding world. . . .”

Jones next introduced Jerry Walen, Executive Director, Grant County Economic Development Council.

Walen welcomed the Commission to Moses Lake. He indicated that the Port video which had been shown closely parallels one produced by the Grant County Economic Development Council. The Council is a relatively new agency and has been working closely with the communities to set the infrastructure needs to facilitate and accommodate growth in the county. “It is a very large undertaking. There has been a lot of commitment, both private as well as public, in trying to adjust to that growth. Growth management over here—depending upon the circles in which you are—is not a particularly popular subject, but they are doing a fine job of accommodating their communities to play a much stronger future

role in growth in this state. We have found that public-private partnership beginning to work. . . ."  
Another company, which will produce automobile airbag cartridge units, is relocating to the area. It will occupy three complexes, represents an investment of approximately \$60 million, and will employ nearly 80 to 100 new employees. According to Walen, the area boasts "a very unusual and diverse group of industries." He indicated that it is difficult to comprehend the size of the airport and industrial properties from the ground, without being in an airplane overhead.

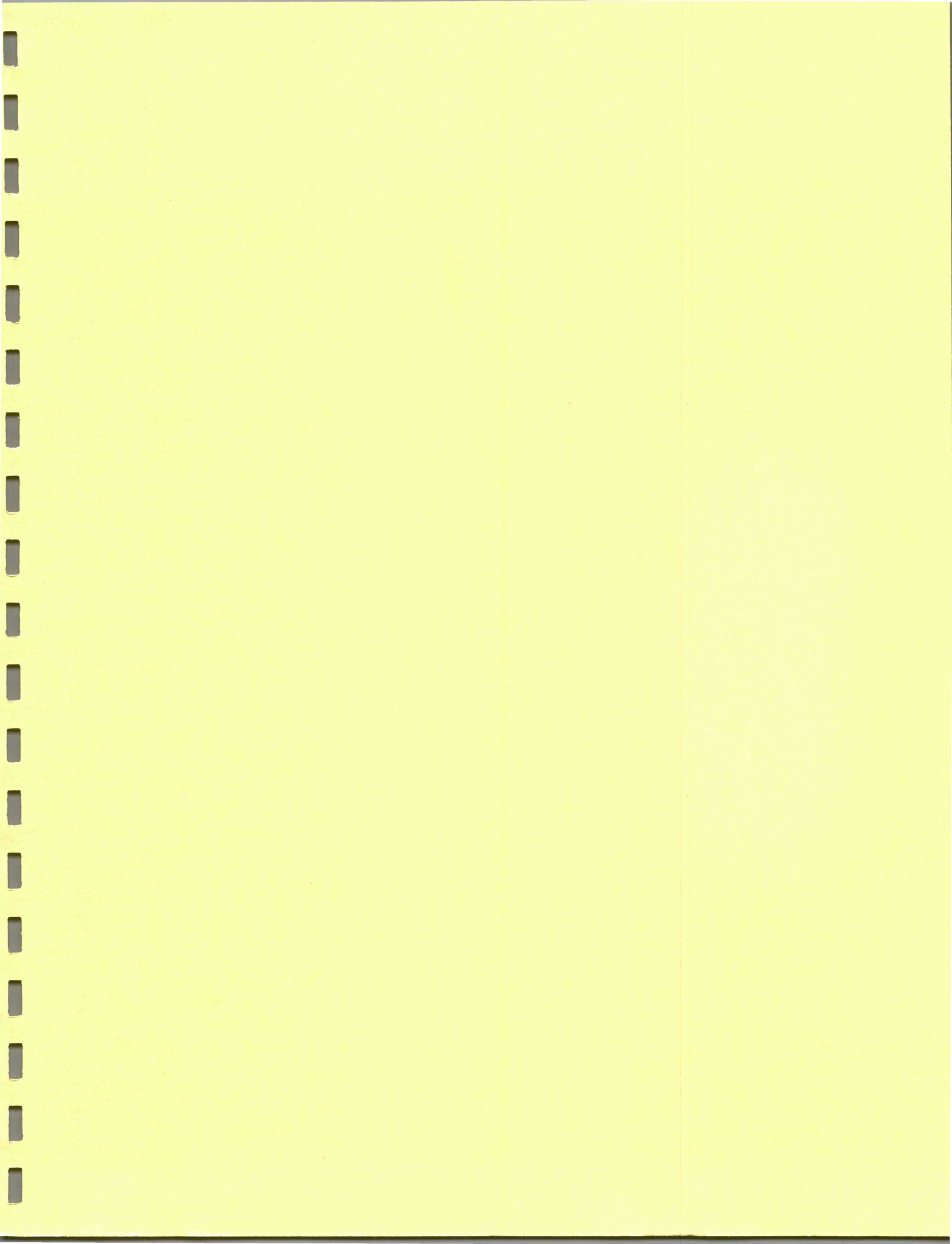
Jones next called upon Helen Fancher, Chair, Grant County Board of Commissioners.

Fancher welcomed the Commission to Grant County. "We are proud of our county. Our county as we see it today is very new, very young. . . . We have come a long way. Transportation issues, I think, are the most interesting and most current with which we must deal. The county is attempting to do its part. . . . We are working hard on our roads. A piece of legislation passed a few years ago permitted the Columbia Basin counties to utilize the State's bonding capacity to build our roads. . . . They are utilizing all of our gas tax dollars to repay that bonding, so we have very few dollars with which to work. . . . Until the year 2005, we are really strapped to get roads built to facilitate transportation in this county. . . . Many of these industries that have come into this county have been very good about a cost-share program. . . . We have had some tremendous cooperation. The county, the Port District, and the cities have worked together very closely to accommodate a lot of our growth."

Jones next called upon Karen Wagner, Moses Lake Chamber of Commerce Manager.

Wagner also welcomed the Commission. "We are very glad to have you with us here today. I have taken advantage of this opportunity to share with you some of our thoughts about the community and to share with you some of the things that are happening now. By virtue of our excellent weather conditions and our runways here at the Grant County Airport and the location of Moses Lake within the state of Washington, Grant County Airport is an excellent candidate to be considered for a regional wayport. . . . While such a proposal may be futuristic, the concept responds to one of the state's most pressing needs—the air and ground traffic congestion in the Puget Sound area. We hope that Moses Lake's future will include a high-speed transit system. . . . Through a coordinated effort, the issues of transportation and growth management can be answered, perhaps by this rapid-transit system. By connecting a wayport in eastern Washington to Puget Sound, a high-speed rapid-transit system would drop the Cascade Curtain about which we hear so much and would spread residential populations and prosperity across the state. I think that the equalization of the population explosion that we are seeing in the Puget Sound area might be well addressed in the future by some sort of proposal like [high-speed rail transit]."

She continued: "The Port of Moses Lake has taken many steps toward the future of our area. I would like to address free-trade zones. A free trade zone would make Moses Lake a port of entry. Grant County Airport is already internationally known . . . as a testing and training center. Available property, attractive electrical rates, and the ability to train workers at competitive wages make our area very appealing. Accessibility is also a great asset. Airport activities are fully supported by a comprehensive system that provides everything from ground support to advanced air traffic control systems. . . . Grant County Airport is uncongested and we have room to grow. . . . Moses Lake has recently created what we call a response team. This group is composed of business representatives, financial representatives, school districts, Big Bend Community College, the Port of Moses Lake, medical and emergency groups, the Grant County Economic Development Council, the city of Moses Lake, the Chamber of Commerce, the County Commissioners, and virtually everyone in a planning capacity. The prime purpose of that organization is to be ready to respond or to respond even before we are notified that something is going to happen. We have assessed our community and we are ready for development. We hope to be prepared to accept development in such a manner that it won't be detrimental to our residents or to the state of Washington. When planning—and you are a planning group—please do not forget us in Moses LK."



Review of

PUGET SOUND REGIONAL COUNCIL  
AND  
PORT OF SEATTLE

FLIGHT PLAN AIR TRAVEL DEMAND FORECASTS  
AND FORECAST ANALYSIS PAPERS

January 13, 1993

Prepared for  
Regional Commission on Airport Affairs

by

Gibson Economics, Inc.  
Seattle, Washington

PUGET SOUND AIR TRANSPORTATION COMMITTEE  
PORT OF SEATTLE  
FLIGHT PLAN PROJECT:

Air Travel Demand Forecast Review Summary Points  
=====

1. The air travel demand forecast is crucial to efficient air capacity and management planning
  - o The forecasted growth affects the timing of needed capacity expansion or demand management responses
  - o Changes in the timing of system expansion investments can make a very large cost difference
  - o Forecasted growth can affect the expected cost ranking or even the need for certain alternatives
2. The basic quantitative model underlying the Flight Plan forecast is based on data that might not be pertinent to the demand being forecasted, due to the shift toward commuter traffic.
3. The inputs and assumptions used in conjunction with the Flight Plan demand model produce baseline forecasts that might be overstated by as much as 20-25%. The major questions involve the use of very low price projections and high assumptions of ad hoc forecasted commuter traffic and connecting traffic.
4. The extent of uncertainty in air travel forecasts requires a much more extensive and careful evaluation of the range of demand uncertainty, relative to baseline forecasts, than has been performed to date, so that its effects on a preferred, contingency-oriented system flight plan can be assessed.
5. It is desirable to shorten lead times for major capacity expansion alternatives and demand management programs, to the extent that can be done without compromising review procedures. The effect could be very substantial cost savings.

PUGET SOUND AIR TRANSPORTATION COMMITTEE  
FLIGHT PLAN PROJECT:

=====  
AIR TRAVEL DEMAND FORECAST REVIEW  
=====

Introduction

Air travel demand forecasts indicate the extent of need for additional airport capacity, and the appropriate timing for such capacity. They also underlie the economic impact analysis of alternatives' relative benefits or costs. Thus, they are a very important component of the economic analysis and evaluation of Flight Plan alternatives.

The forecasts described in the Flight Plan Project and defined more thoroughly in the Phase I Report are based on a number of crucial assumptions. These include a few highly questionable assumptions and methodological inconsistencies, as indicated below.

Key documents prepared in support of, or in review of, the Flight Plan cover several aspects of the demand for air travel and associated Sea-Tac airport operations. These documents and their coverage include the following:

- \* "Flight Plan Study Phase 1 Forecasts": Description of the analytics, sources and assumptions behind the Flight Plan forecasts;
- \* "AIRTRAC Flight Plan Task 1.b. Report": Discussion and critique of airport demand management options;
- \* "AIRTRAC Project II.b: Review of Flight Plan Demand and Capacity Analysis": Dr. Richard de Neufville's review and evaluation of the role and appropriate approach to forecasting in the Sea-Tac Flight Plan context;
- \* "Puget Sound Regional Council (PSRC) Flight Plan Briefing Paper No. 3: Demand and Capacity": PSRC review memorandum critiquing the Flight Plan demand forecast; and
- \* "Flight Plan FEIS": Joint PSRC - Port of Seattle evaluation of the issues, including air travel demand forecasts, involved in the Flight Plan selection process.



These documents provide a wide range of information and perspectives on air travel demand forecasting. They differ dramatically on such basic questions as whether air travel demand forecasts are relevant and how air travel demand forecasts might affect the choice of a Sea-Tac Flight Plan preferred alternative. They do not resolve, or even thoroughly discuss, questions such as the best form of a forecast model or the appropriate assumptions to use to "drive" such a forecasting model.

These are the basic issues involved in air travel demand forecasting. Below, we discuss the rationales for different perspectives on forecasts' relevance, techniques, and specific forms. In doing so, we offer conclusions on the quality, significance and implications of the information that is available on Sea-Tac air travel demand forecasts.

- \* Section I discusses the appropriate role of forecasts in designing and evaluating Flight Plan alternatives;
- \* Section II addresses the specific forecast prepared and used in the Flight Plan documents, and identifies a few recommended modifications to it;
- \* Section III examines the role of forecast uncertainty in planning for Flight Plan alternatives, and the treatment of uncertainty in Flight Plan documents.

