

## PROGRAM IDEAS

1. DISCONTINUE USE OF REVERSE THRUST OPERATIONS UPON LANDING AT SEA-TAC DURING NIGHT HOURS

Technically feasible from a safety standpoint. Would be a policy decision at the Airport. 752 of 707 - run

- Comment:

Comment:

Comment:

Comment:

Technically feasible (high technical payoff and possible to implement immediately). Being followed at other airports in the country.

rise level gain  
means quiet

technical payoff and possible to  
ing followed at other airports in

6. PROP PLANES AND GENERAL AVIATION SHOULD FOLLOW THE SAME PROCEDURES AND FLIGHT PATHS AS DO THE COMMERCIAL CARRIERS *MILITARY, also*

Comment:

*2* Not currently used because of safety problems (wind currents, speed and capacity requirements at the Airport). In the total picture, the prop planes and general aviation do not have any impact on the composite noise values.

7. INITIATE THRUST CUTBACKS AFTER TAKE OFF, REDUCE FLAP SETTING

Comment:

*3* Same as No. 5.

8. COMBINE APPROACH TECHNIQUES, EXISTING EQUIPMENT (HIGH INTERCEPT, REDUCE FLAPS, TWO-SEGMENT APPROACH)

Comment:

*3* See individual techniques.

9. DELAYED FLAP AND GEAR EXTENSION, IMPLEMENTED AT SEA-TAC

Comment:

*3* Never seriously studied for noise reduction. Considerable benefit from changes with some existing equipment, a pilot option now. Potential benefit in high noise areas.

10. TWO-SEGMENT APPROACH, IMPLEMENTED AT SEA-TAC, 6 DEGREES TO 3 DEGREES AT FROM 1 TO 3 MILES FROM THE AIRPORT

Comment:

*3* Technically feasible at this time, however, not FAA-approved. No existing instrumentation is now available, although VFR conditions allow the two-segment approach currently.

11. INSTITUTE HIGHER HOLDING AND MANEUVERING ALTITUDES

Comment:

*3* Already in use at Sea-Tac. Keeps planes higher per FAA policy.

12. INITIATE A STEEPER GLIDE SLOPE

Comment:

*3* Some noise level gains are available from enforcing the minimum glide slope already at Sea-Tac (2.75 and ~~2.0~~ 3.0 degrees).

*optimum for today's plane - fed. law - being enforced.*

13. A SYNCHRONIZATION OF INSTRUMENT LINES ON BOTH RUNWAYS MUST BE CARRIED OUT

Comment:

*2 rewrite*  
Instrument systems on both runways at Sea-Tac are now coordinated. This procedure has been in operation since the initiation of the two runway systems.

*no way because of wind change.*

TECHNOLOGICAL CHANGE

13 AIRCRAFT FRAME CHANGES, WIDE BODY, AND V/STOL AIRCRAFT BUILT TO MAKE MORE EFFICIENT USE OF CURRENT AIRPORT FACILITIES

Comment:

*elim*

Make use of V/STOL aircraft more attractive to airlines by restricting number of flights. Varying rate schedules are also possible. The feasibility is good because this seems to be the current trend towards wide body and more economical aircraft.

*DC 10 quiet  
DC 8 2707*

2. MODIFY AIR TRAFFIC DEMAND TO REQUIRE V/STOL OPERATION

Comment:

*0*

These aircraft would have to replace existing planes now in service. Sensitive to demand changes.

3. INITIATE RETRO-FIT PROGRAMS WITH NACELLE LINING

Comment:

*3*

Available soon. Requires federal action. High cost of implementation. 727, 737, and DC-9 first to be equipped.

4. QUIET ENGINES INSTALLED ON PLANES TODAY

Comment:

*3*

*NOT YET ECONOMICALLY*  
~~Not~~ technically feasible. Possible FAR36 + 10 reduction in noise. Very high implementation cost.

AIRPORT GROUND OPERATION AND LAND USE

1. INSTITUTE PREFERENTIAL RUNWAY SYSTEM

Comment:

*0*

No technical payoff at Sea-Tac. Presently being implemented to some extent at the Airport.

*land to 70  
90% land on 34 right*

*spacing of west runway  
from 500 ft. apart  
light more complaints*

*have runway - incl apart would have made better*

2. SHIFT RUNWAY THRESHOLD

Comment:

0 No technical feasibility. A very low payoff. Problems requiring additional runway extension.

3. REGULATE TIME AND PLACE OF GROUND OPERATIONS

ENFORCE  
Comment:

3 Have run-ups at north or south end of Airport depending on winds. Perhaps investigate regulations and operations and see if further regulation is needed for enforcement of maintenance activities at Sea-Tac.

4. PROVIDE RUN-UP SHELTERS FOR MAINTENANCE ACTIVITIES

Comment:

3 Technically feasible and being done primarily in Europe. Costs will be high but portable systems, as well as permanent systems, may be established to keep costs low and utilization high.

5. REQUIRE DUMPING OF ALL OF OIL SUMPS AT THE FIELD AND NOT IN THE AIR

Comment:

3 Could be done while loading. Time factor seems minimal. (This idea should be separated from the noise abatement list and be put on the airport development list.)

6. ESTABLISH AN AIRPORT MASTER PLAN TO INCLUDE THE IMPACT AREA OF THE AIRCRAFT OPERATIONS

3  
Comment:

Airport authority may not be legally empowered to acquire land for other than Airport use. Could be local political opposition and removal of land from tax rolls. The Sea-Tac/Communities Plan is establishing guidelines for this sort of program.

7. ESTABLISH AN AIRPORT MASTER PLAN FOR THE MAINTENANCE AREAS

3  
Comment:

Would separate run-ups and maintenance activities and access from general airport traffic.

11 pm.  
96 am.  
3 min. if necessary

threshold width -  
wider runway for wide body craft

8. DEVELOP THE WEST SIDE AREA OF SEA-TAC FOR A BUFFERING EFFECT

Comment:

3

Airport-related development on west side with runway and taxiway access. Airport Master Plan currently shows the west side area developed for cargo and maintenance activities. These activities would, in effect, buffer residences on the west side from some Airport operations.

9. ESTABLISH AN AIRCRAFT MONITORING SYSTEM AT SEA-TAC

Comment:

3

Must have legal powers to control aircraft in order to be useful. Used to check individual flights incoming to make sure they do not exceed the established noise levels. In operation at Los Angeles and in Europe. Technically feasible now.

10. ESTABLISH A LAND USE PLAN AND MANAGEMENT OF LAND AROUND THE AIRPORT

Comment:

3

Conditional leases or sale of excess property. Effectiveness limited by site size. Federal planning assistance needed. Initiated at Sea-Tac by the Sea-Tac/Communities Plan.

11. CONSTRUCTION OF BARRIERS AROUND THE AIRPORT

Comment:

2

High massive barriers best. Trees limited in reduction capacity. Technically feasible now.

AIRLINE INDUSTRY POLICIES

1. ESTABLISHMENT OF ECONOMIC INCENTIVES FOR NOISE REDUCTION

Comment:

Fines, variable landing fees, passenger taxes, adjusting airlines' license fees. True, if local government tries to impose regulations on Airport.

2. TRAFFIC ALLOCATION AMONG AIRPORTS AND AIRCRAFT

Comment:

Limited feasibility at Sea-Tac for the lack of other airports with facilities able to carry commercial loads.

- 8 Ave. 10. - 1300 ft. - 4 min.

3. RELY ON OTHER MODES OF TRANSPORT

Comment:

Buses or rapid transit from Portland and Vancouver are possibilities. It transfers the environmental impact rather than reducing or negating it. Very few locations have the volume sufficient for a major separate system.

4. NO SST EXCEEDING FAR36 REGULATIONS AT SEA-TAC

Comment:

Needs enabling legislation at federal level to allow the SST to land at any U.S. airport.

5. ENCOURAGE THAT NOISE LEVELS BE REDUCED EACH YEAR

Comment:

FAA and EPA guidelines, as well as state and local regulations, may well encourage or require reduced noise levels over time. Standards must be set and a measurement system must be defined.

6. ONE DAY WITHOUT AIRPLANES EACH WEEK TO SAVE GAS

Comment:

Minimal reduction effects shown at Phoenix. Technically feasible, although not practical because of scheduling difficulties.

7. CLOSE OPERATION OF SEA-TAC ON DAYS OF EXTREME TEMPERATURE INVERSIONS

Comment:

Air quality information does not regard this as a problem serious enough to enact closures.

8. RESTRICT AIRCRAFT TYPES

Comment:

Limiting aircraft to only those who meet FAR36 regulations during specific hours of operation at the Airport is conceivable.

9. SHIFT FLIGHT CORRIDORS BY TIME OF DAY AT SEA-TAC

Comment:

Monitoring useful. May be helpful in unusual land use situations where day/night shift is appropriate. Combined with other operational change to reduce noise impact area.



10. RELOCATION OF TAKE OFF AND APPROACH ROUTES

Comment:

Opportunity limited by development pattern. High density of air traffic in the Puget Sound regions may limit relocation possibilities. Covered by other alternatives within the suggestion group.

11. CONCENTRATION OF AIRCRAFT IN CORRIDORS, DELAYS BEFORE TURNING

Comment:

Monitoring helpful. Once established, should remain stable to be useful in adjusting land use patterns to noise impact. "The shotgun approach."

12. DIRECT PLANES AWAY FROM PUBLIC PARKS AND OTHER PUBLIC ACTIVITIES SUCH AS SCHOOLS, LIBRARIES, AND HOSPITALS

Comment:

Not feasible because of the number of facilities involved. A "bumper pool" approach pattern would result.

13. HAVE HEAVIER FLIGHTS LEAVE DURING PEAK HOURS: THEREFORE, THEY WOULD BE HIDDEN DURING A GENERALLY NOISY TIME

Comment:

Not totally feasible because of time zones and activity levels during peak hours. See No. 15.

14. RUN INCREASED LOAD FACTORS AND DECREASE THE NUMBER OF FLIGHTS TO SPECIFIC CITIES FROM SEA-TAC

Comment:

Decrease of flights reaps obvious benefits. Coordination necessary between airlines, CAB.... "Fuel Crisis" may initiate action toward this goal.

15. SCHEDULE RESTRICTIONS (ELIMINATE NIGHT FLIGHTS) TO EASE NOISE IMPACT

Comment:

Does not help schools or day uses...could increase impact. Considerable benefit in residential areas. Schedule and time conflicts as well as CAB interference could hamper implementation.

## LAND USE PLANNING POLICIES

### 1. LEGISLATIVE ESTABLISHMENT OF RESPONSIBILITY AND PAYMENT MECHANISM

#### Comment:

High cost to airport operator and airlines. Administrative difficulties. Problem with this lies in that powerful airline, airport, and air frame manufacturer lobbies will oppose. Limited by federal pre-emption of airline regulation and prohibition against state interference with interstate commerce. There are legal questions about the use of noise contours of the basis of legislative strategy.

### 2. ALTERNATIVE DECISION STRUCTURES, METROPOLITAN COORDINATING MECHANISMS

- A. Cooperation
- B. Joint authority
- C. Supervening authority

#### Comment:

The benefit is that there is easier implementation of land use related strategies and a drawback is that there are administrative difficulties. Simple information may be sufficient to achieve considerable control. Strong local objections to giving up any significant decision power to metropolitan authority. Needs to be combined with other measures, such as tax sharing to encourage local participation.

### 3. PUBLIC HEARINGS ON AIRPORT DEVELOPMENT

#### Comment:

The benefits and the drawbacks vary. There is a low level of public information which makes the process one-sided. Public hearings could be required for larger number of noise impact factors, including operational changes, as well as location and design. However, there is little incentive to adopt public recommended changes.

### 4. PUBLIC INVOLVEMENT IN AIRPORT PLANNING

#### Comment:

Meaningful citizen involvement in decision making expensive and time consuming. Needed earlier in decision process and design process. May only reach certain socio-economic groups. Needs some means to require joint solution. Sea-Tac/Communities Plan is a beginning.



5. PUBLIC ACQUISITION AND DEVELOPMENT OF VACANT LAND

Comment:

A benefit is that it reduces sensitive areas exposed from what would occur without public action. A drawback is that acquisition site preparation is difficult. There are carrying costs, administrative difficulties, and possible tax losses during holding period. The airport authority is not likely to want to get involved. Local government may object to controls, business objections to government in the development business. Limited by demand for compatible use in impact areas. Significant percent of impact area only at a very few airports. This alternative was considered beyond the scope of what we are now dealing. Interim land acquisition deals only with some of the identified problems.

6. RELOCATION OF INCOMPATIBLE USES WITHIN CLEAR ZONES AT AN AIRPORT

Comment:

This alternative would reduce sensitive area exposed and costs are very high - per purchase of developed land, demolition, assembly, and preparation, relocation (Federal aid may be available for parts of program). The Airport authority is not authorized and on its own and would not want to undertake. Generally, very large areas are involved. Local opposition is probably strong and existing development may not have sufficient other "blight" to justify. Noise as an impacting influence in itself sufficient to justify redevelopment only in the most extreme cases. Some relocation may be done in private sector if market evaded, i.e. alternatives provided, relocation loans, etc. This alternative is now being implemented to some extent and because of incompatibility of uses will ultimately have to be defined more clearly.

7. THE SOUND INSULATION OF STRUCTURES IN NOISE IMPACTED AREA

Comment:

10 to 25 EPNdb over normal construction. Varies with the type of existing construction and extent of modification. The costs vary with reduction (10 to 15 dB, about \$3.00 per sq. ft., 25 dB, about \$8.00 per sq. ft. residences). This does not change the outdoor environment. Air conditioning is required. Changes "feel" of being inside house and the ability to hear children and other neighborhood noises. Also, insulates against traffic and other ambient noise, legal limits on imposition of requirements through the zoning and building codes - state enabling legislation, model codes helpful. There is resistance from local community and increases in development costs.

## 8. PUBLIC USE OF IMPACTED AREAS

### Comment:

This reduces sensitive areas exposed from what would occur without public action. There is a differential, however, in capital and operating costs between airport site and alternate sites, and a resultant tax loss. Public uses are likely to be limited. Federal aids available for many uses. Many open space and recreation uses also sensitive to noise or other airport impact.

## 9. HOUSING CODE CHANGED TO SCREEN NOISE IMPACT

### Comment:

The housing code commonly applies to existing dwellings. Public concern legally questionable for requirements in single family dwellings. This would insure that up to 25 EPNdb over normal construction would be eliminated. There are administrative costs and there are the costs of code writing and increased development costs. The housing code commonly applies to existing dwellings. Public concern legally questionable for requirements in single family dwellings. Many jurisdictions involved. Local opposition to increased costs, model codes sometimes helpful. This might require that a special district around the Airport be formed which would have a different code.

## 10. INFORMATION PROVIDED FOR LOCAL COMMUNITIES DEVELOPERS AND HOME OWNERS

### Comment:

This may reduce sensitive area exposed from what would occur with no information. There is the cost of information and enforcement and this alternative leaves the decision on whether to use noise as a criterion to individual or community. Any social costs of noise impact not included in decisions.

## 11. PLANNING BY GOVERNMENT AND AIRPORT AUTHORITY OR A COORDINATION OF SUCH AGENCIES

### Comment:

This reduces sensitive area exposed. It has administration costs and data collection costs. This alternative must be based on accurate information for long time frames to be effective in land use planning. Needs implementation tools. Many local jurisdictions often are involved. We are now attempting implementation of this alternative.

12. EXISTING LEGAL CHANNELS USED TO EFFECT CHANGE OF IMPACTS

Comment:

This alternative offers no solution. Houses and people are still there to whom awards have been made following litigation. One problem is the difficulty of demonstrating the extent of damage. There must be a continuing threat in order to affect aircraft noise levels. The same people are often on both sides of the case when city versus Airport authority and the time for settlement is long. Court suits are now being filed against the Port.

13. BUILDING CODES REQUIRING INSULATION INITIATED IN A SPECIFIC AREA

Comment:

Inside up to 25 EPNdb over normal construction. This may require state-enabling legislation to use noise zones for building code restrictions. It is difficult to apply retroactively, model codes are helpful. Local opposition to increase development costs. Not likely to be legally applicable to single family residences. Many local jurisdictions are involved. Heat insulation often does not provide adequate sound insulation. There is a high cost to owner or buyer.

14. SUB-DIVISION REGULATIONS PROVIDED THROUGH ZONING

Comment:

Reduces the land use exposed but has administrative difficulties. This alternative requires large parcels for commercial/industrial development in impact area. There is little effect in itself in reducing conflicts and is dependent on zoning regulations.

15. ADVANCE ACQUISITION LAND IN IMPACT AREA FOR RESALE WITH CONTROLS

Comment:

This reduces the sensitive area exposed but may have very high initial costs, as well as carrying costs, and due to high costs, limited to undeveloped areas. Legal authority limited. State-enabling legislation required. Airport authority not likely to undertake unless required to. Political opposition from local government. Tax competition. Limited by financial resources. Income highly dependent on timing. Acquisition may be difficult because of speculative increases in value after the site selection. New airports only. Method to circumvent limitation on use of noise criteria in zoning and building codes through deep restrictions. Land banking is one problem that may occur. This could include reclamation with planning for compatibility. A lot of secondary objectives, however, such as retaining the tax base.

16. PUBLIC SERVICES PLANNING - COORDINATION OF COUNTY, PORT, LOCAL, P.U.D. AGENCIES

Comment:

Official map. Withhold services in impact area. Reduce sensitive areas exposed. Administrative problems. Tax income loss from undeveloped land. There may be legal restrictions on ability to withhold services. State-enabling legislation is required. May be followed as informal policy, but with much reduced effectiveness.

17. ZONING TO COMPATIBLE USES

Comment:

There are high administrative costs and this alternative slows the development if demand for forbidden use with resultant tax loss. Opportunity cost of land in other uses. Retroactive - compensation. Usually many jurisdictions have authority in impact area. Local government does not have resources to set and enforce complex standards. Easier with model codes. May require enabling legislation to use noise as criteria. Cannot restrict aircraft operations, federal pre-emption. Tax competition discourages restrictions. Not retroactive. Limited to undeveloped areas. Minnesota Airport Zoning Act provides for a combined authority for standards setting. Zoning-oriented land use classifications and noise sensitivity not always correlated. New standards may be required.

18. REVIEW THE TAX BASE OF ALL AIRLINES BUSINESS AND USE THOSE TAXES TO ABATE NOISE

Comment:

This alternative was deferred to the tax element of the study.

19. ESTABLISH THE ACTUAL INTERIM ACQUISITION BOUNDARIES OF THE AIRPORT

Comment:

This alternative will be accomplished. Final announcement on February 26 at Port Commission meeting.

20. ESTABLISH AN ENPLANING FEE FOR NOISE ABATEMENT

Comment:

This alternative was deferred for a combination with No. 18. Already ruled illegal by courts.

21. ESTABLISH TO DETERMINE CRITERIA OF "TAKING OF LAND OR AIR SPACE" AND LAND OWNERSHIP

Comment:

Basis of legal decisions necessary.

22. MOVE PEOPLE OUT BEFORE THE SST ARRIVES

Comment:

This was to be combined with No. 4 of the Airline Industry section. Wait for February 6 for trial run.

23. ESTABLISH DEFINITE CRITERIA FOR NOISE MEASURING SYSTEMS

Comment:

This was considered to be meaningless as stated. Encourage monitoring of the long-range type was brought up as a solution.

24. ESTABLISH SOME REGULATORY AGENCY, I.E. THE PORT, TO TIGHTEN UP AIRCRAFT OPERATIONAL PROCEDURES

Comment:

This alternative is in existence already, through FAA.

25. ESTABLISH CRITERIA SO A NOISE LIMIT COULD BE ESTABLISHED - PROPERTY RIGHTS OF PRIVACY

Comment:

The problem with this is we are unsure as to where the authority lies. No. 25, at the end, needs rewriting. City and county noise ordinances are being developed.

26. ESTABLISH NOISE CONTROL OTHER THAN AIRCRAFT

Comment:

State of Washington moving towards this type of control. See No. 25.

27. DEVELOP SUBJECTIVE PERCEIVED RESIDENTS' ATTITUDE

Comment:

Develop subjective residents' perceived attitude noise maps from around the Airport. Battelle survey will document some findings.

28. REMOVE ALL SCHOOLS FROM THE HIGH-NOISE IMPACT AREA

Comment:

This is a long-term trend. New ones are not to be built.

29. RETAIN SEA-TAC AS THE MAJOR AIR CARRIER AIRPORT IN THE NORTHWEST

Comment:

Preliminary study findings indicate capacity is OK through 2000. Future sites are being examined.

30. SEA-TAC BOUNDARIES MUST NOT BE EXPANDING FURTHER FOR OTHER THAN ENVIRONMENTAL REASONS

Comment:

Preliminary study findings indicate there is adequate land area for airport-oriented development. Environmental problems will be addressed by the Sea-Tac/Communities Plan.

31. BUY ALL HOMES THAT WISH TO BE SOLD IN NOISE IMPACTED AREA

Comment:

Supposed to be deferred for clarification. Spot living.

32. APPROVE ALL APPLICATIONS FOR COMMERCIAL ZONINGS ALONG WITH EDC GUIDELINES

Comment:

Unfeasible in light of overall plans. Generalized too much.

33. RECOMMEND THAT FHA AND VA CONTINUE GUARANTEES AT FULL MARKET VALUE IN ALL AREAS ON NORMAL TERMS ON EXISTING HOUSING

Comment:

This accentuates the exposed noise problem. Possible alternative solution possibilities.

34. UNDERTAKE A VIBRATION ANALYSIS AROUND THE AIRPORT

Comment:

If noise was eliminated, vibrations would be also. The vibrations are effects of noise. There is no standardization of vibration measurements and too many variables to consider. So this was considered technically infeasible. U of W studies will provide information.



### 35. SOUND MASKING

Comment:

This is untested in residential use. May be suitable for some commercial facilities. Similar to the sound insulation alternative. See FAA Building at Boeing Field.