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SEA-TAC INTERNATIONAL AIRPORT IMPACT MITIGATION STUDY

Initial Assessment and Recommendations
February 1997

Prepared Under a Grant from the State of Washington administered by Washington State's Department of Community, Trade and Economic Development for the:

*City of Burien, Washington
City of Des Moines, Washington
City of Federal Way, Washington
City of Normandy Park, Washington
Highline School District
Highline Community Hospital*

Prepared by:

Helmuth, Obata + Kassabaum, Inc. - Dallas, Texas
Raytheon Infrastructure Services, Inc. - Denver and Philadelphia

In Association With:

Thomas/Lane & Associates, Inc. - Seattle, Washington
Michael J. McCormick, AICP - Olympia, Washington

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**SECTION 9
POTENTIAL SOCIO-ECONOMIC IMPACTS AND MITIGATION**

9.01 - EXPECTED CHANGES IN LAND VALUES, LAND USES, HOME OWNERSHIP TENURE, LOCAL GOVERNMENT REVENUE AND SOCIAL SERVICE NEEDS RESULTING FROM CONSTRUCTION OF THE THIRD RUNWAY AND RELATED FACILITIES

Aircraft operations at Sea-Tac International Airport impact the value of close-by properties in two ways.

First, the Airports operations depress property values below the level that real estate markets would produce if the Airport did not exist. If a single-family residential house located in, for example, Burien could be physically transported to an identical location on an identical lot in another part of King County, its value would be increased, and the amount of its increase is the depression in value caused by proximity to the Airport. Section 9.02 estimates the average loss in value of real estate located in close proximity to Sea-Tac International Airport by comparing a large sample of comparable single-family housing units in Northwest and Southwest King County holding constant the non-Airport factors that also influence real estate values.

A second way in which Sea-Tac International Airport operations impact the value of real estate is in the variation in value among properties caused by their proximity to the flight paths of arriving and departing aircraft. Such changes are the "shadow" effects (noise pollution, visual pollution, possible air quality pollution, and a generally degraded environment for human habitat) caused by living under low-flying aircraft. Section 9.03 uses a statistical technique known as regression analysis to estimate Sea-Tac International Airport's shadow affects by measuring the difference in value of a property, holding other things the same, when it is located at different distances from directly under one of Sea-Tac International Airport's arrival/departure flight paths.

The remaining subsections provide information on the changes in land use produced by Airport-induced depressions in adjacent land values, and the alteration in the demographic profile of persons living in jurisdictions where depressed land values result in altered land uses.

It is important to remember that the following analysis addresses the issue of depressed but not declining land values. All parts of the Puget Sound Region have experienced population growth in the recent past, and the entire Puget Sound Region is expected to experience rates of population growth above the national average in the foreseeable future. This means that the Puget Sound Region is expected to have significant net in-migration. As a result, average real estate values in the region will undoubtedly rise. Real estate located in close proximity to the Airport will participate in these growth trends and will also experience rising land values.

Section 9
Potential Socio-Economic Impacts and Mitigation
February 1997
Page 9-1

Because of the Airport, however, the rate of appreciation in the value of close-by real estate is expected to be less than it otherwise would have been. The correct measure of the Airport induced depression in land values, consequently, is the price difference between comparable properties located close to and distant from the Airport. Neither a simple calculation of whether or not property values have increased nor a comparison of properties inside or outside any specific LDN contour line provides an appropriate basis for comparison.

9.02 - AIRPORT IMPACTS ON AVERAGE PROPERTY VALUES

The impact of proximity to the Airport was evaluated using average property values for comparable housing units in ten Census Tracts in Southwest King County immediately around Sea-Tac International Airport and ten Census Tracts in Northwest King County - the area that generally conforms to the City of Shoreline.

Northwest King County was chosen for comparison based on the following criteria:

The Census Tracts are all located in King County and are equally affected by County and State land use and development policies.

The Census Tracts are all bordered by Puget Sound to the west and Lake Washington to the east.

Both clusters of Census Tracts contain commercial areas bordering Highway 99, and both have a mix of residential areas ranging from low/moderate income to high/ upper income.

Both clusters of Census Tracts contain racially and ethnically diverse populations.

The cluster of ten Census Tracts around the Airport contained 17,046 housing units in 1990, of which 11,526 (67.6%) were single-family. The cluster of ten Census Tracts in Northwest King

County contained 19,523 housing units in 1990, of which 12,683 (65.0%) were single-family.

The following parameters were used to screen housing units in the two clusters of Census Tracts for comparability:

- * Only units rated as being in "Very Good" condition by the King County Assessors office were included.
- * All units with a "View" were excluded.
- * All units were in "Single-Family" zoned areas and were classified as single-family land uses.
- * All units had an above ground structure of 1,000 square feet or more.
- * All units were located on lots of between 10,000 and 14,999 square feet
- * All units had three or more bedrooms.
- * All units had two or more bathrooms.

Section 9
Potential Socio-Economic Impacts and Mitigation
February 1997
Page 9-2

These screening criteria excluded the top and the bottom of the distribution of housing units in both areas and resulted in a total of 739 of the 11, 526 single-family properties (6.4%) in the ten Census Tracts around the Airport (Southwest King County) and 760 of the 12,683 single-family properties (6.0%) in ten Census Tracts in Northwest King County being used for comparison of real estate values. Summary statistics from the King County Assessors Office for these units are contained in Table 9.01.

(Source: King County Assessor's Office)

The two groups of properties compared closely in terms of their physical attributes. The difference in average lot size between the Southwest and Northwest King County properties was 3.3 %. The difference in size of structure was 2.0%, in number of bedrooms 1.4%, and in number of baths 0.6%. In terms of property values however the differences were more pronounced. Average assessed value of land was 14.1% higher in Northwest King County than it was in areas immediately surrounding the Airport, and assessed value of structures was 7.7% higher. The assessed value of land and structures combined was 10.1 % higher.

Standardized for view, condition of structure, size of structure, lot size, number of bedrooms, number of baths, zoning, land use, county/state development policies, and similarity of neighborhoods, a housing unit selling for \$141,400 in the immediate vicinity of the Airport would sell for \$155,700, or \$14,300 (10.1%) more, if it were located elsewhere.

Section 9
Potential Socio-Economic Impacts and Mitigation
February 1997
Page 9-3

The average difference of 10.1% in the assessed value of real estate (property plus structure) when all other factors are adjusted for is attributable to the impact of low flying aircraft in the immediate vicinity of Sea-Tac International Airport. The resulting depression of property values as of 1993, taking account of community differences is shown in Table 9.02.

**Table 9.01
Comparison of Housing Units in Northwest and Southwest King County - 1993**

	SW mean value	NW mean value	Difference (SW-NW)	Percent Difference
Size				
Lot size	11,914 sq.ft.	11,522 sq.ft.	+392 sq.ft.	3.3 %
Above ground structure size	1,538 sq.ft.	1,507 sq. ft.	-31 Sq. ft.	-2.0 %
Rooms				
Number of bedrooms	3.6	3.6	0	-1.4 %
Number of bathrooms	2.0	2.0	0	0.6 %
Value				
Assessed value of land	\$52,734	\$60,181	-\$7,447	-14.1 %
Assessed value of structure	\$88,703	\$95,550	-\$6,847	-7.7 %
Total assessed value	\$141,438	\$155,731	-\$14,294	-10.1 %

**Table 9.02
Estimated Average Depression in Single-Family Residential Property Values, by Community - 1993**

Community	Actual Average Assessed Value of Housing Unit	Estimated Assessed Value Without Airport	Difference
Burien	\$129,000	\$143,900	-\$13,100
Des Moines	\$136,100	\$149,800	-\$13,700
Federal Way	\$142,900	\$157,300	-\$14,400
Normandy Park	\$173,600	\$191,100	-\$17,500
Tukwila	\$122,400	\$134,800	-\$12,400

Between 1993 and the Year 2000, operations at Sea-Tac international Airport are forecast to increase by 39,700, or 11.7%. Between the Years 2000 and 2020, operations are forecast to increase by an additional 62,400, or 16.5%. Applying these same rates of change to the estimated 1993 difference in single-family residential property values caused by aircraft operation at Sea-Tac International Airport produces the depressed values shown in Table 9.03. The next to the last column of Table 9.03 contains the expected reduction of value for the average single-family residential housing unit between the Years 2000 and 2020. The last column shows the average difference in value experienced over the entire 20-year period 2000 through 2020.

There will be no reduction in property value attributable to the Sea-Tac International Airport expansion until the Year 2000. The decline will be small the first year since there will be few operations over the Airport's annual service volume (ASV). As operations over the ASV threshold increase, the relative decline in property value will increase, reaching, in the case of Burien, \$36,356 in the Year 2020. Averaged over the entire 20-year period, the yearly decline is \$13,179, as shown in the last column of Table 9.03.

This loss of value occurs after Sea-Tac International Airport would have reached its ASV capacity limit had the Third Runway and related facility improvements not been built.

Section 9
Potential Socio-Economic Impacts and Mitigation
February 1997
Page 9-4

Table 9.03 Forecast of Average Depression in Single-Family Residential Property Values Caused by Aircraft Operations at Sea-Tac

Community	1993	2000	2020	Change 2000-2020	Average Yearly Difference 2000-2020
Burien	-\$13,100	-\$29,831	-\$56,187	-\$26,356	-\$13,179
Des Moines	-\$13,700	-\$31,227	-\$58,835	-\$27,609	-\$13,804
Federal Way	-\$14,400	-\$32,804	-\$61,795	-\$28,991	-\$14,496
Normandy Park	-\$17,500	-\$39,859	-\$75,079	-\$35,221	-\$17,610
Tukwila	-\$12,400	-\$28,172	-\$53,016	-\$24,844	-\$12,422

9.03 - FLIGHT TRACK IMPACTS ON AVERAGE PROPERTY VALUES

The impact on a parcel's value of its location under, or in close proximity to, the approach/departure flight track of aircraft operating at Sea-Tac International Airport was estimated using the linear regression model:

$Y = (a + B1X1 + B2X2 + B3X3 + B4X4 + B5X5 + B6X6 + B7X7 + B8X8 + B9X9 + B10X10)$ where:

Y = assessed value of land and structures

X1 = lot size (sq. ft.)

X2 = structure size (sq. ft.)

X3 = number of bedrooms

X4 = number of baths

X5 = distance from center of a jet flight track (east of runway 16/34R or west of runway 16/34L), measured in tenths of a mile.

X6 = a binary variable representing the City of Des Moines

X7 = a binary variable representing the City of Normandy Park

X8 = a binary variable representing the City of SeaTac

X9 = a binary variable representing Unincorporated King County

X10 = a binary variable representing the City of Tukwila

The model's parameters were estimated from Assessor's data on 3,026 properties in ten Census Tracts in the immediate vicinity of the Airport. The regression coefficient (adjusted R²) was 0.65.

Section 9
Potential Socio-Economic Impacts and Mitigation
February 1997
Page 9-5

The model initially contained variables for the Cities of Federal Way and Kent, but these places had too few cases to be meaningful and were dropped from the final model. The distance from each parcel to the center of the Airport was also initially used as a variable but its coefficient was not statistically significant and it was also dropped from the final model. The following housing units were excluded in estimating the regression model - units with fewer than three bedrooms; units whose condition was less than "good" or "very good"; units with a view; and units not in single-family residential zoned areas. The ratio of the regression's standard error to the standard deviation of the dependent variable was 0.59. The log likelihood ratio was 35,379, and the F-statistic was 566. The Durbin-Watson statistic was 1.44.

All of the independent variables in the model were statistically significant at the 90% level and seven were statistically significant at the 99% level. The variable measuring a property's distance from a flight track was significant at the 99% level.

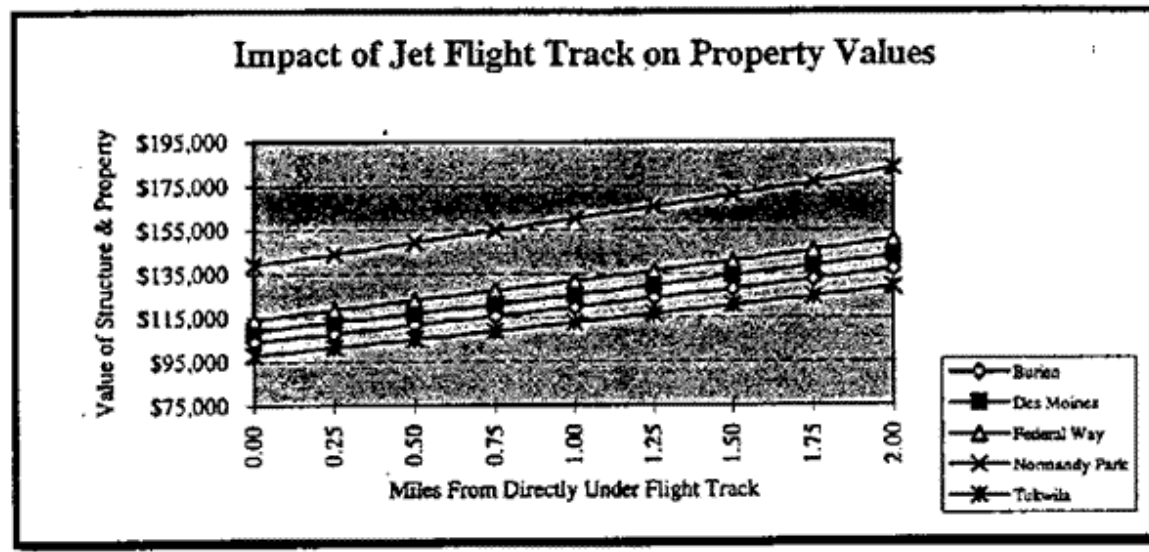
The coefficient on the variable for distance from a jet aircraft flight track was 17,784, meaning that, all other things remaining equal, the value of a house and lot increases by about 3.4% (\$4,450 on the average valued house of \$129,900) for every quarter of a mile the house is farther away from being directly underneath the flight track of departing/approaching jet aircraft. This relationship is shown in Table 9.04 and illustrated in Figure 9.01.

Table 9.04

Model Estimated Impact of Jet Flight Track on Average Property Values

Miles from Flight Track	Burien	Des Moines	Federal Way	Normandy Park	Tukwila
0.00	\$104,151	\$109,122	\$114,574	\$139,189	\$98,138
0.25	\$107,843	\$112,990	\$118,636	\$144,123	\$101,617
0.50	\$111,666	\$116,996	\$122,841	\$149,232	\$105,210
0.75	\$115,625	\$121,143	\$127,196	\$154,522	\$108,949
1.00	\$119,724	\$125,438	\$131,705	\$160,000	\$112,811
1.25	\$123,822	\$129,732	\$136,214	\$165,478	\$116,673
1.50	\$128,062	\$134,174	\$140,878	\$171,143	\$120,668
1.75	\$132,446	\$138,767	\$145,701	\$177,002	\$124,799

Figure 9.01



9.04 - OPERATIONS IMPACTS ON RESIDENTIAL PROPERTY TAX REVENUES

The Sea-Tac Master Plan Update Final EIS's estimate of reduced residential property tax revenues caused by construction of the Third Runway and related facility improvements is shown in Table 9.05.

The only cause of reduced revenues identified in the Final EIS is the acquisition of property now on the tax rolls of the Cities of Burien and SeaTac. The EIS assumes there will be no impact on land located in the immediate vicinity of the Airport or under the flight track of the Airports increased traffic volumes. In other words, the Final EIS assumes that unless land is acquired it will not be affected.

Table 9.05
EIS Estimate of Third Runway Induced Decline in Residential Property Tax Revenues

Jurisdiction	Property Tax Rate Per \$1,000 Assessed Value	Reduction in Residential Property Tax Revenues
City of Burien	\$3.00838	\$45,867
City of SeaTac	\$3.02811	\$181,687
Total		\$227,554

(Source: US Department of Transportation, Federal Aviation Administration, and Port of Seattle, February 1996, Final EIS, page IV.8-12)

As discussed earlier, construction of the Third Runway and related facilities improvements will allow aircraft operations at the Airport to increase after the Year 2000 - when it reaches its ASV capacity limit - by 62,400, or over 16%. A statistical analysis of comparable properties in King County demonstrates that these increased operations will:

- On average, depress all property values around the Airport below levels they would have had if the aircraft didn't expand; and,
- Specifically, cause a depression of value for properties directly under, and up to two miles on either side of, jet aircraft approach/departures tracks.

The depression of property values below the market levels that would otherwise occur also depresses the flow of property tax revenues to local, county, special purpose, and state governments.

The methodology used to estimate the reduction in single-family residential property tax revenues resulting from Airport impacts that depress property values is as follows. The number of single-family residential housing units in each impacted community was multiplied by the average loss (depression) of value per unit for each community between the Years 2000 and 2020 to estimate the aggregate loss of property value. Each city's total levy rate (regular and ire) was multiplied by its aggregate loss of property value to estimate the loss of single family residential property taxes. The number of single-family housing units in each city was obtained from the Office of Financial Management's Forecasting Division. The average yearly increase in each city's single-family residential housing units between 1990 and 1995 was used to trend forward its stock of single-family housing.

Levy rates for each city were obtained from the King County Assessors Office's Accounting

Division. The estimated property value loss by community for the Years 2000, 2010 and 2020 and the cumulative property losses between 2000 and 2020 are shown in Table 9.06.

In the Year 2000, after which the increase in aircraft operations at Sea-Tac International Airport will be the result of construction of the Third Runway and related facilities improvements, the five impacted cities will experience depressed property values for single family residential housing units estimated of approximately \$1.7 million. As Sea-Tac International Airport operations increase, the depression of property values in the impacted communities will grow each year, reaching \$2.2 million in the Year 2020. Over the 20-year period, 2000 through 2020, the cumulative loss of property tax revenues in the five impacted cities is estimated at approximately \$38.8 million (expressed in constant value 1995 dollars), distributed among the cities as follows:

- * Burien - \$14.2 million
- * Des Moines - \$6.4 million
- * Federal Way - \$11.6 million
- * Normandy Park - \$2.8 million
- * Tukwila - \$3.7 million

Section 9
Potential Socio-Economic Impacts and Mitigation
February 1997
Page 9-8

Table 9.06
Single-Family Residential Property Tax Revenue Losses by Housing Units in Five Impacted Cities in Immediate Proximity of the Airport

Community	Forecast Year 2000	Forecast Year 2010	Forecast Year 2020
Burien			
Number of impacted housing units	15,890 DU	17,890 DU	19,890 DU
Average loss of value per DU	-\$13,179	-\$13,179	-\$13,179
Estimated total loss of value	-\$209,411,749	-\$235,769,426	-\$262,127,104
City property tax levy rate	0.003009969	0.003009969	0.003009969
Yearly revenue loss	-\$630,264	-\$709,593	-\$788,921
Cumulative revenue loss	-\$630,264	-\$6,699,287	-\$14,191,858
Des Moines			
Number of impacted housing units	5,179 DU	6,179 DU	7,179 DU
Average loss of value per DU	-\$13,804	-\$13,804	-\$13,804
Estimated total loss of value	-\$71,492,950	-\$85,297,343	-\$99,101,736
City property tax levy rate	0.00374534	0.00374534	0.00374534
Yearly revenue loss	-\$267,765	-\$319,468	-\$371,170
Cumulative revenue loss	-\$267,765	-\$2,936,165	-\$6,389,351
Federal Way			
Number of impacted housing units	10,992 DU	12,392 DU	13,792 DU
Average loss of value per DU	-\$14,496	-\$14,496	-\$14,496
Estimated total loss of value	-\$159,334,980	-\$179,628,737	-\$199,922,493
City property tax levy rate	0.00323195	0.00323195	0.00323195
Yearly revenue loss	-\$514,963	-\$580,551	-\$646,138
Cumulative revenue loss	-\$514,963	-\$5,477,569	-\$11,611,022
Normandy Park			
Number of impacted housing units	2,417 DU	2,577 DU	2,737 DU
Average loss of value per DU	-\$17,610	-\$17,610	-\$17,610
Estimated total loss of value	-\$42,564,077	-\$45,381,724	-\$48,199,371
City property tax levy rate	0.00310000	0.00310000	0.00310000
Yearly revenue loss	-\$131,949	-\$140,683	-\$149,418
Cumulative revenue loss	-\$131,949	-\$1,363,160	-\$2,813,667
Tukwila			
Number of impacted housing units	3,466 DU	4,866 DU	6,066 DU
Average loss of value per DU	-\$12,422	-\$12,422	-\$12,422
Estimated total loss of value	-\$45,539,453	-\$60,445,984	-\$75,352,516
City property tax levy rate	0.00310000	0.00310000	0.00310000
Yearly revenue loss	-\$141,172	-\$187,383	-\$233,593
Cumulative revenue loss	-\$141,172	-\$1,642,774	-\$3,747,651
Yearly Revenue Loss All Cities	-\$1,686,113	-\$1,937,677	-\$2,189,239
Cumulative Revenue Loss All Cities	-\$1,686,113	-\$18,118,955	-\$38,753,759

(Source: Office of Financial Management, King County Assessor's Office)

Section 9
Potential Socio-Economic Impacts and Mitigation
February 1997
Page 9-9

In addition to the loss of value resulting from aircraft operations that will affect all single housing units in immediate proximity to the Airport, single-family housing units that will be under the flight track of approaching/departing aircraft using the proposed Third Runway will suffer additional value losses from having low flying aircraft pass directly overhead. The magnitude of these types of impacts were described and analyzed in Section 9.03 above. The methodology used to estimate the flight track impacts on the property tax revenues of the affected cities was as follows.

Approaches/departures using the Third Runway will create a flight track approximately half a mile to the west of the flight track on existing runway 16/34L. A new set of single-family housing units will lie directly under the flight track (defined as 1/8th of a mile on either side) and a new set of units will fall within the quarter mile and half mile bands to the west of the Third Runway's new flight track. To the south, the affected single-family housing units will be in Des Moines Federal Way and Normandy Park (only the half mile band will impact Normandy Park). To the North, the new Third Runway flight track will pass over the City of Burien. The City of Tukwila lies entirely to the east of the Airport and will not be impacted by the flight track generated by the Third Runway.

The linear north-south distance of the new flight track for the Third Runway was calculated for each of the impacted cities. Each flight track "impact band" used in the regression model (Section 9.03) was a quarter-mile wide.

The linear distance of the Third Runway's flight track over each impacted city multiplied by a quarter mile therefore generated an estimate of the area of each impact band within each city. The average lot size of single-family residential housing units used to calibrate the regression model was 12,950 square feet. Using this average lot size produces an estimate of 538 single family housing units for each linear mile of the new flight track.

Multiplying this estimate by the dollar value of the average annual depression in single-family housing units for each city produced the estimated total value reduction in single-family residential housing units as a result of the Third Runway's value loss gradient. Multiplying the loss of value by each city's property tax levy rate produced the estimate of annual property tax revenue loss for each city. The results are summarized in Table 9.07

In the five impacted cities combined, tax collections from single-family residential units lying directly under or close to the Third Runway's jet flight tracks will be reduced by \$294,260 a year, or \$5.89 million (expressed in constant value 1995 dollars) over the 20-year period 2000 to 2020 as a result of depressed property values'. The distribution of these cumulative 20-year revenue losses by city are as follows:

- * Burien - \$0.97 million
- * Des Moines - \$2.73 million
- * Federal Way - \$1.78 million
- * Normandy Park - \$0.41 million
- * Tukwila - \$0.00 million

*Section 9
Potential Socio-Economic Impacts and Mitigation
February 1997
Page 9-10*

Table 9.07

Average Annual Single-Family Property Tax Revenue Losses Resulting from the Third Runway's Flight track Gradient

9.06 - SUMMARY OF IMPACTS ON SINGLE FAMILY RESIDENTIAL PROPERTY TAX REVENUES

The total cumulative reduction in single-family property tax revenues during the Years 2000 through 2020 caused by construction and operation of the proposed Third Runway and related Airport facilities in the five impacted cities is shown in Table 9.08. In this table, the flight track induced relative land value losses are deducted from the operations-induced relative land value losses to prevent double-counting.

Over the 20-year period 2000 through 2020, the five impacted communities will suffer a reduction in property tax revenues from single-family residential units of \$39.9 million (expressed in constant value 1995 dollars) as a result of construction of the Third Runway and related Airport improvements. The average annual revenue reduction will be almost \$2.0 million.

*Section 9
Potential Socio-Economic Impacts and Mitigation
February 1997
Page 9-11*

Table 9.08

Total Loss of Single-Family Residential housing Property Tax Revenue Caused by Construction and Operation of the Third Runway, Years 2000 through 2020

Community	Total Revenue Losses	Land Acquisition Induced Losses	Aircraft Operations-Induced Losses	Flight Track Gradient-Induced Losses
Burien	-\$15,338,533	-\$1,146,675	-\$13,224,644	-\$967,214
Des Moines	-\$6,389,351	\$0	-\$3,657,022	-\$2,732,329
Federal Way	-\$11,611,022	\$0	-\$9,833,668	-\$1,777,354
Normandy Park	-\$2,813,667	\$0	-\$2,405,364	-\$408,303
Tukwila	-\$3,747,651	\$0	-\$3,747,651	\$0
Combined Total Losses	-\$39,900,224	-\$1,146,675	-\$32,868,349	-\$5,885,196

The largest source of property tax losses (82.3%) will be depressions in property values caused by the increase in Sea-Tac International Airport's aircraft operations after the Year 2000, and made possible by construction of the Third Runway and related Airport improvements. A loss of \$32.9 million in local government revenues (expressed in constant value 1995 dollars) over the 20-year period will result. The second largest source of property tax losses (14.8 %) will come from the decline in single-family residential property values of units beneath the flight track of aircraft using

the proposed Third Runway. These property value reductions will cause a loss of an additional \$5.9 million in local government revenues over the 20-year period (again expressed in constant value 1995 dollars).

The smallest cause of local government property tax revenue losses will result from the acquisition of properties required for expansion of the Airport. These reduction (which are the only ones discussed in the Final EIS) will cause a cumulative loss of \$1.1 million. The acquisition of properties as part of the Airport's Third Runway related expansion will begin in 1996. Cumulative revenue losses are for a 25-year period 1996 through 2020, inclusive. Looked at in terms of the impacted communities, Table 9.09 contains the percentage distribution of total property tax revenue losses among the impacted cities.

Table 9.09
Distribution of Property Tax Revenue Losses Among Impacted Cities

Community	Cumulative Loss of Property Tax Revenues	Percent of Total
Burien	-\$15,338,533	38.4 %
Des Moines	-\$6,389,351	16.0 %
Federal Way	-\$11,611,022	29.1 %
Normandy Park	-\$2,813,667	7.1 %
Burien	-\$3,747,651	9.4 %

Section 9
Potential Socio-Economic Impacts and Mitigation
February 1997
Page 9-12

9.07 - IMPACTS ON OWNERSHIP OF SINGLE-FAMILY RESIDENTIAL HOUSING UNITS

Economic theory argues that the relative change (reduction) in single-family residential land values discussed above will lead to tenure changes in the affected single-family housing units. The major expected tenure change is a shift from owner occupied to renter occupied housing as relative housing prices fall. Table 9.10 compares housing tenure in the Sea-Tac International Airport impacted communities with housing tenure in the comparison Census Tracts in Northwest King County.

Table 9.10
Owner and Renter Occupied Single-Family Housing Units
Sea-Tac Impacted and Northwest King County Comparison
Communities

NW King County Comparison Communities	Number	Percent
Total single-family housing units	12,683	100.0%
Owner occupied units	12,254	96.6%
Renter-occupied units	9,618	83.4%
Sea-Tac Impacted Communities		
Total single-family housing units	11,526	100.0%
Owner occupied units	9,618	83.4%
Renter occupied units	1,908	16.6%

(Source: 1990 Census, STF-3)

As the data show, the expectations from economic theory hold true. Renter occupied units in areas immediately surrounding the Airport were 16.6% of total single-family housing. In the comparison areas in Northwest King County, they were only 3.4%. If past trends continue, the percent of single-family housing units in the impacted communities occupied by renters will rise to 20.6% in the Year 2020. About two-thirds of the increase in renter's housing tenure percentage will occur after the Year 2000, and is attributable to construction of the proposed Third Runway and related facilities improvements at Sea-Tac International Airport.

9.08 - IMPACTS ON COMMUNITY DEMOGRAPHIC PROFILES

In *Washington State Housing Needs and Market Trends: An Overview* Joshi, et. al., 1989) it was stated that (page 44):

"Most low income households are renters. ... Sixty percent of all Washington households with annual incomes below [75% of state median income] were renters ... The average renter is generally younger, more mobile, and has an income half that of the average homeowner."

Section 9
Potential Socio-Economic Impacts and Mitigation
February 1997
Page 9-13

Table 9.11 compares the income distribution of owner and renter households.

Table 9.11
Income Distribution of Household Owners and Renters - Washington State

Household Income Status	Total	Owner	Renter
Below 50% State median income	26.3%	17.9%	42.4%
50% to 100% State median income	28.4%	25.1%	34.6%
100% to 165% State median income	23.5%	27.6%	15.7%
Over 165% State median income	21.8%	29.4%	7.3%
Total	100.0 %	100.0 %	100.0 %

(Source: Washington State Housing Needs and Market Trends)

Among households that own their own home, 43% are below state median income and 18% are below half of the state's median income. Among households that rent their home, 76% are below state median income and 42% are below half the state's median income. Looked at from another perspective, renter households make up 66% of all households in the state but they account for only 17% of households with incomes below the State median.

A regression model developed by the consultant team that relates Washington State Department of Social and Health Services' (DSHS) "count/use rates" by county to per capita personal income levels in 1994 indicates that the relationship between income levels and need for public services is statistically significant and has a negative sign - meaning that the need for public services goes up as household incomes (and hence, the percent of owners) fall.

"Use rates" are derived by dividing a county's total DSHS clients, for all types of DSHS services, by the county's total population. Counties where a high percentage of seasonal or transient residents receive DSHS services will have overstated use rates. (Washington State Department of Social and Human Services, Office of Research and Data Analysis, April 1996). The regression models adjusted R² was 0.15785, the T-statistic for the per capita personal income variable was 2.6335, the regression's F-statistic was 6.9361.

Although a detailed analysis of the relationship between different types of public service needs and the growth of aircraft operations at Sea-Tac International Airport is beyond the work scope of the current socio-economic analysis, it appears from preliminary analysis of available data that such a relationship exists, and that it is statistically meaningful.

*Section 9
Potential Socio-Economic Impacts and Mitigation
February 1997
Page 9-14*

9.09 - THE THIRD RUNWAY'S IMPACT UPON COMMUNITY FACILITIES AND SERVICES

The Third Runway and related Airport facilities, will affect the need for community facilities and services by imparting community demographic profiles in the areas immediately surrounding Sea-Tac International Airport. Many of these communities already have a higher need for community services than other communities in King County - reflecting, in part, past Impacts of the Airport.

One way to compare community service needs is by using "service use rates" calculated by the Washington State DSHS for ninety-nine largest cities in the state, including 18 cities located (at least in part) in King County.

DSHS provides a variety of services and grants to individuals and families with one or more of the following difficulties:

- * Child neglect
- * Dependent elderly status
- * Alcohol/substance abuse
- * Developmental disabilities
- * Other long-lasting physical/mental disabilities
- * Poverty
- * Recent refugee status
- * Juvenile criminal offenses

DSHS also provides the services in the following administrative categories to individuals and families having these difficulties:

- * Aging & Adult Services Administration (AASA)
- * Division of Alcohol & Substance Abuse (DASA)
- * Division of Children & Family Services (DCFS)
- * Division of Developmental Disabilities (DDD)
- * Division of Vocational Rehabilitation (DVR)
- * Economic Services Administration (ESA)
- * Juvenile Rehabilitation Administration (JRA)
- * Medical Assistance Administration (MSA)
- * Mental Health Division (MHD)

Each fiscal year, DSHS calculates for each city for which it reports the number of clients served in each of its administrative service categories divided by the city's population. It calls these calculations "service use rates" The most recent rates calculated were for 1994 (Washington State Department of Social and Health Services, Office of Research and Data Analysis, May 1996)@ The total use rate and the programmatic rates for DCFS, DASA, JRA and ESA are presented in Figures 9.02- 9.06.

In terms of DSHS's rate for its total army of services, Normandy Park and Federal Way were below the average use rate for all DSHS rities in King County. The DSHS use rate for Burien, Des Moines and Tukwila was above the average.

*Section 9
Potential Socio-Economic Impacts and Mitigation
February 1997
Page 9-15*

Although Renton was below the county average and Lake Forest Park was above it, the general pattern was for cities in the south county to have rates above the average and cities in the north county to have use rates below the average Figure 9.02. In part this likely reflects past impacts of the Airport on the quality of life, property values, and the resulting land use's and demographics of south King County communities.

Figure 9.02
DSHS Total Service Use Rate

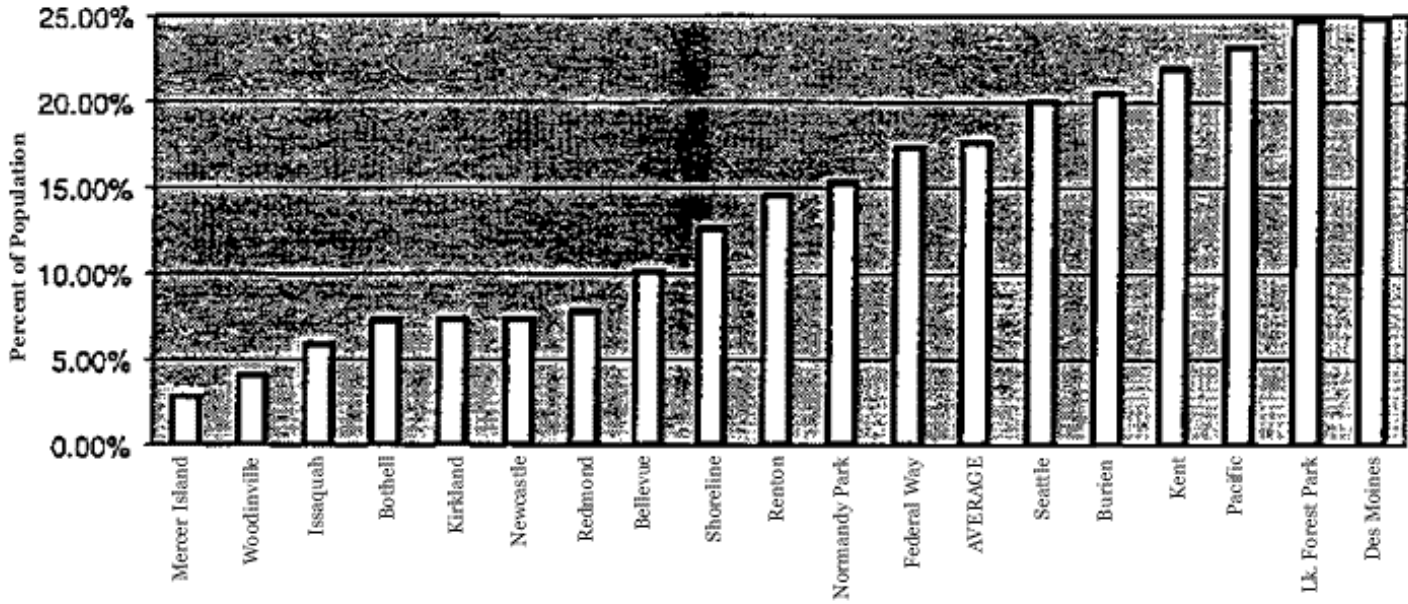
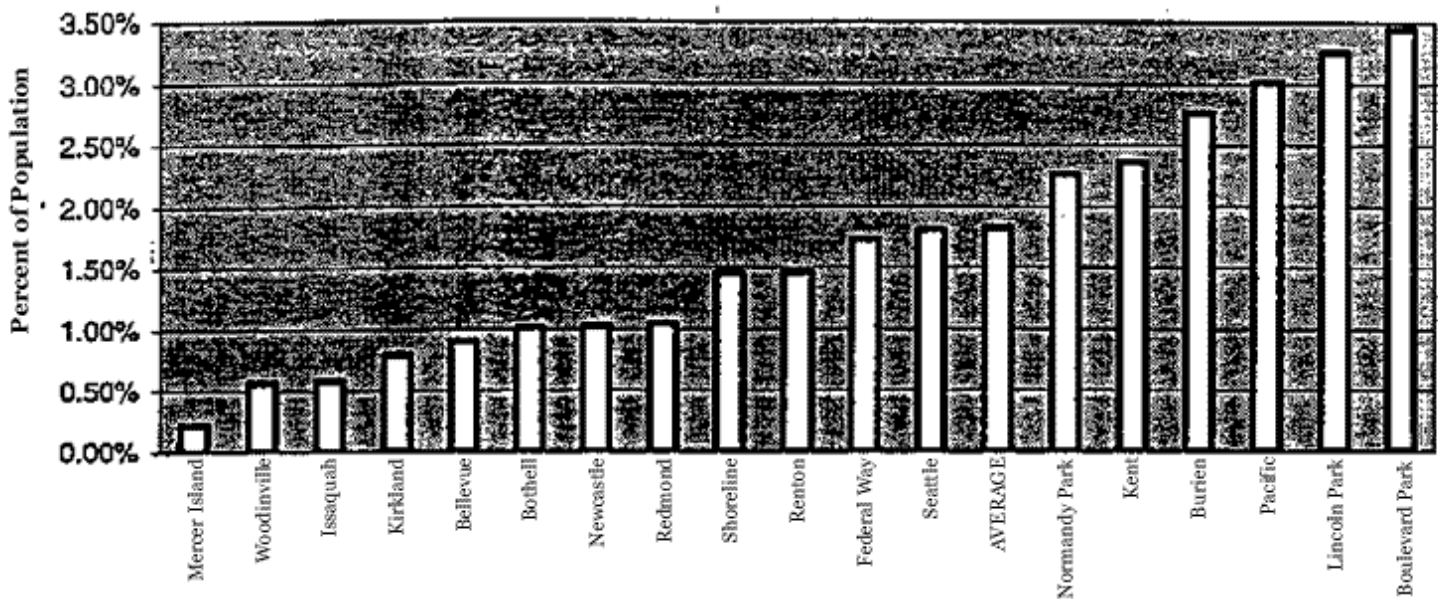


Figure 9.03 shows the use rate for children and family services among King County cities. Federal Way falls below the county average, while Burien, Des Moines, Normandy Park and Tukwila fall above the county's average use rate. Tukwila has the highest DCFS use rate in King County at 3.8 % (The county average was calculated by weighting each city by its population.) The weighted total use rate average, for example, was 17.64 % while the unweighted average was 16.19 %.

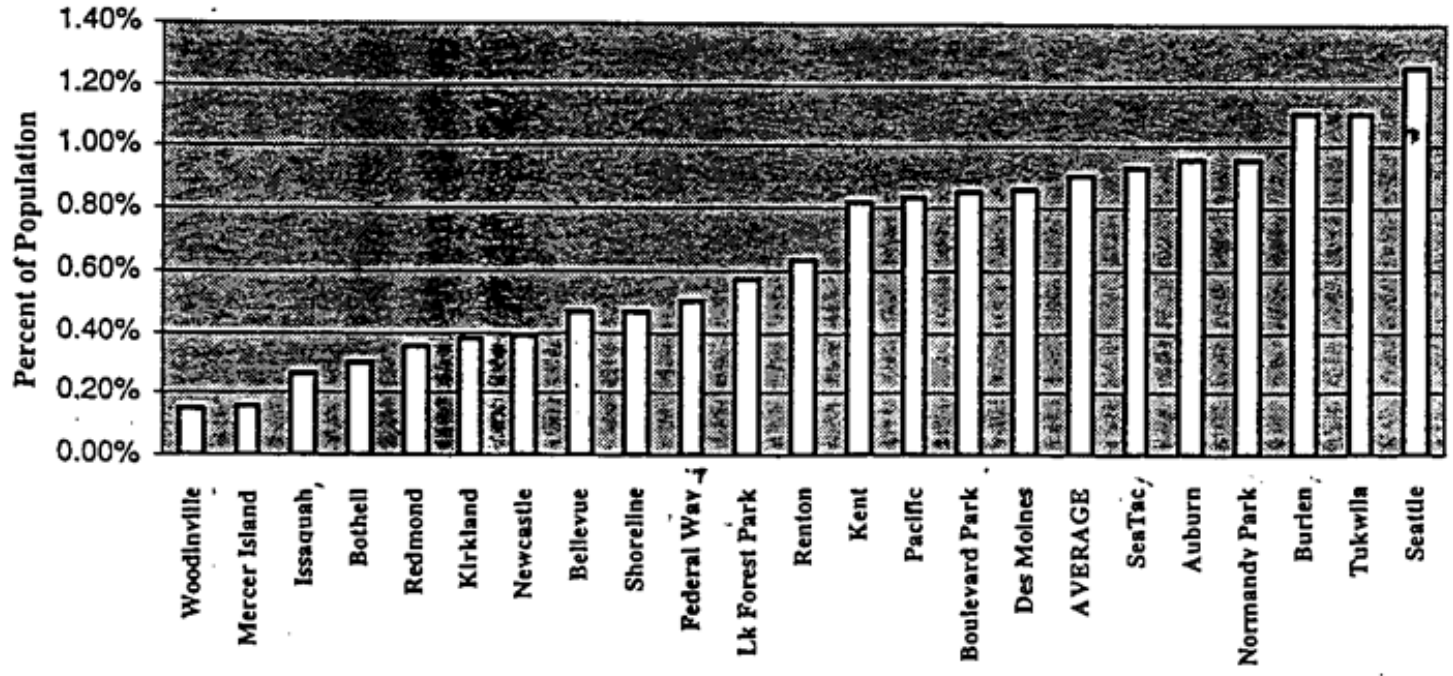
Section 9
Potential Socio-Economic Impacts and Mitigation
February 1997
Page 9-16

Figure 9.03
DSHS Child & Family Services Use Rates



The city alcohol and substance abuse rates are shown in Figure 9.04. Federal Way and Des Moines have rates below the King County average, and Burien, Normandy Park and Tukwila have rates above the county average. To some extent, the T)ASA use rates reflect the location of alcohol and substance abuse rehabilitation facilities - which probably accounts for Seattle having the highest DASA rate in the county.

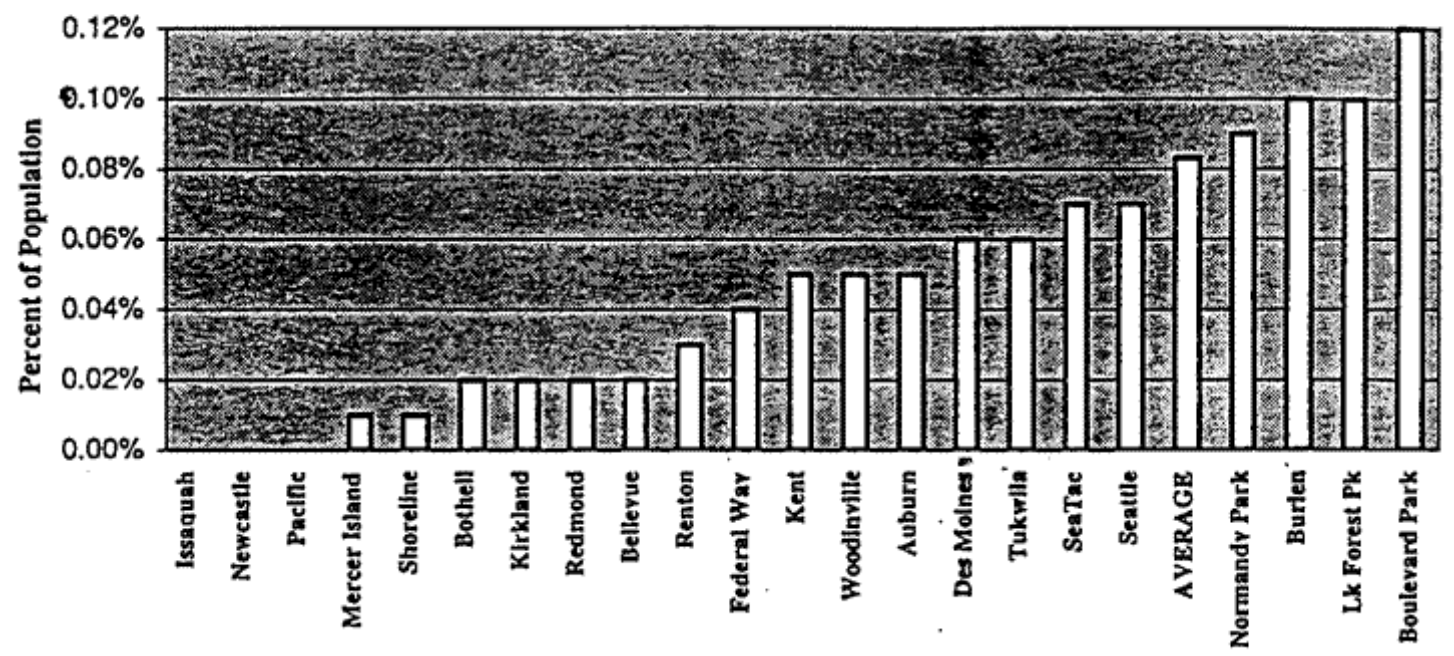
Figure 9.04
DSHS Alcohol & Substance Abuse Use Rates



Section 9
Potential Socio-Economic Impacts and Mitigation
February 1997
Page 9-17

The juvenile rehabilitation rate for King County cities is shown in Figure 9.05. Federal Way, Des Moines and Tukwila are all below the county average while Normandy Park and Burien are above it.

Figure 9.05
DSHS Juvenile Rehabilitation Service Use Rates

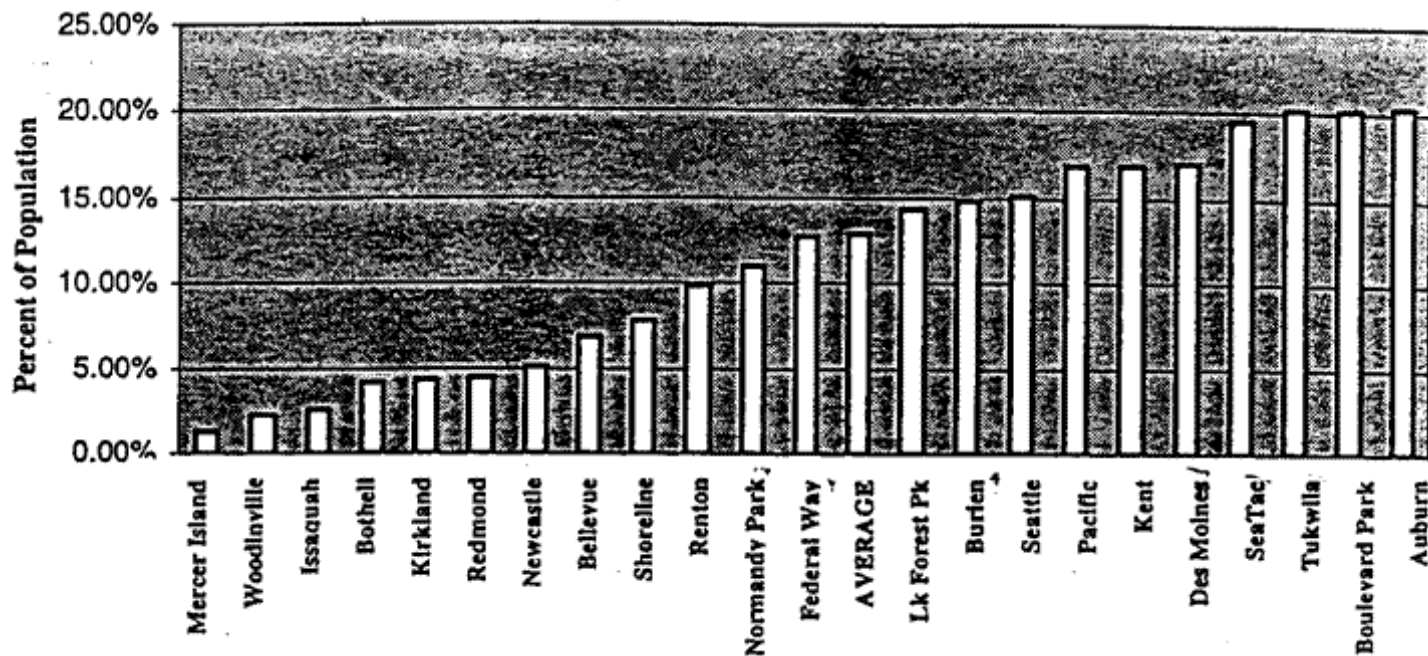


The economic security, services use rate for county cities is shown in Figure 9.06. Normandy Park and Federal Way have rates below the county average, and Burien, Des Moines and Tukwila have rates below the county average.

Overall, Normandy Park and Federal Way have the lowest use rates among the five cities covered by the Sea-Tac International Airport Impact Mitigation Study. This may reflect Federal Way's relatively greater distance from the Airport and both Federal Way's and Normandy Park locations to the west of the Airport's flight tracks. Since the Third Runway will locate a flight tract to the west, these communities will likely have a greater impact from the Third Runway than they did from Sea-Tac International Airport's first or second runways. The highest social service use rates currently are in Tukwila and Des Moines.

Section 9
Potential Socio-Economic Impacts and Mitigation
February 1997
Page 9-18

Figure 9.06
DSHS Economic Security Services Use Rates



The Third Runway and related Airport facilities will impact community services and facilities in numerous ways. Environmental and transportation impacts during construction will include the movement of construction vehicles over the road system contained within the District, and will likely affect the movement along, and possibly safety, of public streets and parking places. After construction, environmental impacts will mainly be generated by noise from the growth of aircraft operations from the Third Runway and related Airport facilities will allow Sea-Tac International Airport to exceed its ASV of 380,000 operations after the Year 2000. The impacts of noise on the ability of churches, hospitals, nursing homes, community centers and libraries to function normally is analyzed in the environmental impact sections of this Sea-Tac International Airport Impact Mitigation Study.

As discussed previously, the growth of operations at Sea-Tac International Airport after its 380,000 ASV capacity has been reached around the Year 2000, will mean that the value of residential properties surrounding the Airport will not appreciate as fast as they otherwise would have. The market adjustment to such a relative decline in residential property values will be an alteration in land uses away from owner occupied homes toward renter occupied homes. Since renters have a profile that is younger, more mobile and lower income than owners, communities experiencing the impacts of the Third Runway will have to offer expanded social services if they are to maintain the quality of life achieved in the past.

Section 9
Potential Socio-Economic Impacts and Mitigation
February 1997
Page 9-19

9.10 - COMMUNITY FACILITIES IMPACTED BY THE THIRD RUNWAY'S FLIGHT TRACK

Employing the DSHS use rates discussed earlier as a guide to the types of impacts the Third Runway and related Airport facilities development will have, the most likely impacts will be generated by the changes in the demographic profile of the population living to the west of the current Sea-Tac International Airport flight tracks. The proportion of renter occupied housing units will likely rise after the Year 2000, and will result in a population needing more child care services, community social services, counseling services and employment assistance services than is either true today or would be true if the Airport were not expanded. Existing facilities at local churches, community centers, schools and libraries will most likely be inadequate to cope with these increased needs and will have to be expanded.

Additional facilities required by Sea-Tac International Airport's Third Runway impacts can be

calculated by applying current service use rates per 1,000 of the population, for specific services, to the forecast populations for the impacted cities and subtracting the derived service levels from service requirement levels independently forecast based on the cities' expected demographic shifts. This type of analysis should be reviewed for "reasonableness" by working professionals in both the functional service areas and the agencies/organizations now providing the services in the impacted cities,

The most likely communities to suffer major facility impacts from the Third Runway and related Airport facilities development will be Burien, Des Moines, Normandy Park and Federal Way, Tukwila appears to have suffered the community facility and service need impacts from Sea-Tac International Airport's existing approach/departure flight tracks, but it is to the east of Sea-Tac International Airport and will likely not face the same magnitude of impacts from the approach/departure tracks of the proposed Third Runway. The growth of surface traffic on Pacific Highway South (SR 99) however could easily generate a business environment that gives rise to anti-social and criminal behavior and will require an expansion of Tukwila's public safety personnel and facilities.

No analysis of the community facility requirements was contained in the EIS for the Third Runway and related Airport facilities. The resources and time available under this Sea-Tac International Airport Master Impact Mitigation Study were not sufficient to allow such an analysis to be made using quantifiable research techniques. It is recommended that such a research based analysis be conducted.

Effects of the Third Runway's Flight Track

Community services and facilities in the five impacted communities will be affected by the Third Runway and related Airport facilities in different ways. These include demographic factors, economic factors and psychological factors. None of these factors was considered in the Port of Seattle's Master Plan Update EIS, as a result the information available about these factors only allows for informed speculation and analysis - based on judgments about likely impacts. Additional research should be conducted on each of these factors to determine its statistical significance and magnitude.

Section 9
Potential Socio-Economic Impacts and Mitigation
February 1997
Page 9-20

Demographic Factors

These factors have already been discussed as an outcome of the land use changes resulting from the growth of operations after the Year 2000 when the Third Runway and related Airport facilities become operational. The increased proportion of rental housing units in the area will produce a resident population that is younger, more mobile and lower income than today's. Given the established correlation between income and the need for community services and facilities, it is likely that future populations in the impacted communities will require higher service levels per capita and more facilities per capita than does the current population.

Economic Factors

The factors adversely impacting the impacted communities will primarily be the reduction in residential property values that will reduce city tax revenues below what they otherwise would have been.

The decline in relative residential property values between 1995 and the Year 2000 due to the Airport is attributed to a growth of enplanements within the Airport's ASV capacity limit. But the relative property value declines that will reduce revenues after the Year 2000 are attributed to construction of the Third Runway and related Airport facilities.

In addition to the revenue losses to the impacted communities, local home owners will face a relative decline in the value of their property. At the same time that the cities would be faced with a need to increase expenditures per thousand persons residing in the cities in order to maintain its quality life, it would face growing voter resistance to raising local tax rates. The resulting financial squeeze will be a major economic impact on the cities, and it will rival in importance the impact on home owners of the relative decline in the value of their properties.

The calculation of quantitatively probable, rather than illustrative, economic impacts on the impacted communities requires a research effort not possible within the resources available under the current Sea-Tac International Airport Impact Mitigation Study. The entire topic of economic impacts of the Third Runway and related Airport facilities on the community facilities and services (a topic which was not addressed at all in the EIS) needs additional research.

Psychological Factors

The factors impacting the cities' needs for community services and facilities as a result of the Third Runway could come from several sources. The interruption of normal family functioning at home by aircraft noise could increase stress on affected families. Also, parents and children unable to engage in normal outdoor activities such as playing games or sports, enjoying park lands, or having outdoor barbecues may suffer the psychological stress associated with the disruption of normal neighborhood-based activities. Additional psychological impacts may be the consequence of living in neighborhoods where household turnover is high and interpersonal relationships are unstable; or from living in households with only one parent and/or which is under severe economic and financial pressure.

Section 9
Potential Socio-Economic Impacts and Mitigation
February 1997
Page 9-21

The current study was not able to quantitatively investigate psychological factors, but the association of such factors with the Types of demographic shifts that will be accentuated by construction of the Third Runway and related Airport facilities is highly probable and warrants further research and analysis.

Need for Additional Community Services/Facilities

The noise Impacts on community facilities to the west of Sea-Tac International Airport caused by the increase in approaching/departing aircraft after the Year 2000, and which are attributable to the Third Runway, related Airport facilities, and expansion of the Airport's ASV capacity, may require remodeling, rebuilding, or other structural alterations. The mitigation of these Third Runway impacts relate to the need to attenuate noise at existing facilities. These requirements are analyzed and their mitigation requirements presented in the environmental part of the Sea-Tac International

Airport Impact Mitigation Study.

The impact of the Increase in approaching/departing air-craft after the Year 2000 attributable to the Third Runway, related Airport facilities, and expansion of the Airport's ASV capacity on the value of residential properties surrounding the Airport - and as a result, the cities' needs to increase expenditures for community services and facilities - is addressed later in this Section where the mitigation of individual property value losses and community property tax reductions are discussed. Any action that mitigates property losses to individual homeowners or reduces the loss of property tax revenues to communities will also increase the city and School District tax base.

The optimum methods of providing community services as a way to mitigate the demographic shifts that will be caused by the increase in approaching/departing aircraft after the Year 2000 attributable to the Third Runway, related Airport facilities, and expansion of the Airport's ASV capacity will require additional analyst First, quantitative research needs to be conducted on the affects of the population's shifting demographic profile on the community service needs of affected families.

After which, appropriate mitigation policies need to be formulated by community service professionals within each of the impacted cities. Some of these policies will likely include increased community centers, increased child care, expanded levels of police and fire services, and creation of additional community facilities.

Regardless of which or how many of these types mitigation actions will be determined as both needed and appropriate, it is evident that the impacted cities will require additional resources to mitigate the socioeconomic impacts of the Third Runway and related Airport facilities.

Section 9
Potential Socio-Economic Impacts and Mitigation
February 1997
Page 9-22

9.11 - THE IMPACT OF SEA-TAC'S EXPANSION ON PUBLIC SCHOOLS

The Third Runway and related Airport facilities will impact Highline School District's public schools in numerous ways. Environmental and transportation impacts during construction will include the movement of construction vehicles over the road system contained within the District, and will likely affect the movement, scheduling and possibly safety of school busses. After construction, environmental Impacts will mainly be generated by noise from the growth of aircraft operations associated with the Third Runway and related Airport facilities which allow Sea-Tac International Airport to exceed its ASV of 380,000 operations.

The impacts of noise on the ability of teachers to teach and students to learn is documented in a variety of ways. A Highline School District study of noise impacts on classroom performance was conducted at Sunset junior High School, located about six blocks from the end of one of Sea-Tac International Airport's runways, in 1973 (*Aircraft Noise Study.- Remedial Construction/Schools, Highline School District, 1973*). Four classrooms were selected, two adjacent rooms on the junior high school's first floor and two on its second floor, where each of the classrooms was estimated to experience five or more minutes of high level aircraft noise per 50-minute classroom period. One of the first floor rooms and one of the second classrooms was insulated while the other two rooms were not. Students in all four classrooms were given a math test which evaluated their "concentration and attention-to-task." As shown in Table 9.12, the test scores of students in the insulated classrooms where aircraft noise had been attenuated appear to be significantly higher than the scores of students in the non insulated classrooms. (The measured statistical significance of the difference in test scores between the insulated and non-insulated classrooms was not reported.)

**Table 9.12
Math Test Scores of Students in Insulated and Non-Insulated Classrooms**

Classrooms	Sound Proofed Rooms	Non-Sound Proofed Rooms
First-floor classrooms	75.6	64.2
Second-floor classrooms	75.9	57.6

Additional information on the importance of attenuating aircraft noise for learning comes from the experience of classroom teachers. The Highline News recently reported a teacher at Cedarhurst Elementary School as follows (Steffens, "No Peace for Students", 23 October 1996):

"I just stop class completely when there's a plane going over. Students just stop themselves and took at me and wait until the [aircraft] noise is gone."

Section 9
Potential Socio-Economic Impacts and Mitigation
February 1997
Page 9-23

A *Seattle Times* supplement designed to be "a comprehensive guide to public and private high schools in the greater Seattle area" contained the following statement as part of its evaluation of the Highline School District ("Guide to High Schools", 20 November 1996): I

"A Perennial challenge to the District has been its proximity to Seattle-Tacoma International Airport. Some classrooms lie directly beneath the flight path of roaring jets, which disrupts classes, assemblies and outdoor physical education. ... Now, with plans for the Third Runway in .the works, school officials worry about the problems worsening."

As discussed previously, the growth of operations at Sea-Tac International Airport after its 380,000 ASV capacity has been reached around the Year 2000, will mean that the value of residential properties surrounding the Airport will not appreciate as fast as they otherwise would have. The market adjustment to such a relative decline in residential prop" values will be an alteration in land uses away from owner occupied homes toward renter occupied homes. Since renters have a profile that is younger, more mobile and lower income than owners, a higher proportion of students attending District schools will require enhanced educational services if the District is to maintain the educational outputs (graduation levels, Comprehensive Test of Basic Skills (CTBS) scores, SAT scores, college admission rates) that it achieved in the Past.

Whether measured by student test score, educational attainment, or post-school earnings, a wide spread professional consensus exists that the educational attainment of parents, the existence of single parent-headed households, female labor force participation, child poverty, and low household income are important influences on the quality of student outcome (Hanushek, 1996). Consequently, if the District is to maintain its historic quality of educational; outcomes, it will have to compensate for the demographic changes associated with increased renter-occupied housing by

providing additional resources per student.

At the same time, the Highline School District will find itself under increased financial pressure as a result of construction of the Third Runway and related Airport facilities. Under Washington State law, State resources are distributed through funding formulas that, when combined with local and Federal resources, equalize educational opportunities throughout the State. Local property tax levies to support schools are determined by local School District needs and the resulting tax rates are submitted for approval to local District voters. The relative reduction in residential property values caused by the Third Runway and related Airport facilities will mean that higher tax rates will be required to generate the same level of resources; and the higher the rates, the more difficulty the District will have in obtaining voter approval.

Thus, at the same time the District's shifting demographic profile will require additional resources to prevent education outcomes from falling, declining relative property values will make it increasingly difficult to obtain voter approval for needed revenues. Both sides of the interaction between District needs for additional resources and voter resistance to approving school levies are traceable to the expansion of aircraft operations at Sea-Tac International Airport made possible by the Third Runway and related Airport facilities, and constitute the socioeconomic impacts investigated in this section,

Section 9
Potential Socio-Economic Impacts and Mitigation
February 1997
Page 9-24

Impacts on School Age Children Living Under the Third Runway's Approach/Departure Flight Tract

The Third Runway will be to the west of Sea-Tac International Airport's existing 16R/34L runway. The school children most affected consequently will live in areas served by the following elementary schools:

- Beverly Park at Glendale
- Cedarhurst
- Des Moines
- North Hill
- Olympic
- Southern Heights
- Sunnydale

The characteristics of students attending these schools are shown in Table 9.13. All of the Third Runway impacted elementary schools had a higher percentage of non-white students in 1993 than the District average, but they had few other similarities. Three of the seven schools (North Hill, Southern Heights, and Olympic) had a higher percentage of students enrolled in special education classes/programs. Three (Beverly Park, North Hill and Olympic) had a larger percentage enrolled in ESL classes. Four (Beverly Park, Sunnydale, Cedarhurst and Olympic) had a larger percentage than the District average receiving free/reduced cost lunches; but only two (Cedarhurst and Beverly Hills) were below the District average percent of students living in two-parent households.

In terms of their fourth grade Comprehensive Test of Basic Skills (CTBS) test scores compared to the entire District, the six impacted schools were mixed in their relative standings. (North Hill Elementary only has grades K through 3, and consequently does not report CTBS scores.) Beverly Park and Cedarhurst both had scores below the District average in all three test components: reading, math and language. Des Moines had test scores above the District average in all three test components. The remaining three elementary schools were above the District average in at least one of the components and below it in at least another.

In summary, children living in the elementary school service areas immediately west of Sea-Tac International Airport's existing boundaries will be the group most directly impacted by the westerly shift of the Airport's approach/departure flight tracks that results from construction of the Third Runway and related Airport facilities. As property values in these areas exhibit a relative decline caused by the growth of Airport operations and at increasing number of single-family residences shift from owner occupancy to renter occupancy, the number of students amying at school with educational deficits will likely rise. To maintain the quality of educational outcome in the District, classrooms and curriculum will have to be enriched.

Highline High School lies immediately to the west of Sea-Tac International Airport's existing boundaries and it also will be significantly impacted by the Third Runway.

Section 9
Potential Socio-Economic Impacts and Mitigation
February 1997
Page 9-25

**Table 9.13
Student Characteristics at Third Runway Impacted Elementary Schools**

		Non-White Students	Special Education/Program Students	ESL Students	Free/Reduced Lunch Students	Living With Two Parents Students
District Average	1990/1991	N/A	N/A	N/A	27.0%	65.0%
District Average	1993	21.3%	8.9%	4.1%	35.0%	57.0%
Cedarhurst	1990/1991	27.4%	8.0%	9.0%	21.0%	70.0%
Cedarhurst	1993	37.3%	7.0%	10.0%	39.0%	56.0%
Beverly Park	1990/1991	18.1%	10.0%	0.0%	28.0%	53.0%
Beverly Park	1993	26.4%	8.0%	0.0%	44.0%	51.0%
Des Moines	1990/1991	24.6%	5.0%	8.0%	23.0%	69.0%
Des Moines	1993	24.5%	2.0%	0.0%	24.0%	58.0%
North Hill	1990/1991	23.4%	9.0%	16.0%	27.0%	70.0%
North Hill	1993	23.1%	10.0%	12.0%	34.0%	68.0%

Olympic	1990/1991	31.5%	14.0%	20.0%	40.0%	73.0%
Olympic	1993	28.4%	30.0%	16.0%	51.0%	64.0%
Southern Heights	1990	22.2%	7.0%	0.0%	27.0%	71.0%
Southern Heights (1991)	1993	24.4%	13.0%	0.0%	31.0%	63.0%
Sunnydale	1990	14.7%	3.0%	0.0%	19.0%	54.0%
Sunnydale (1991)	1993	33.5%	3.0%	0.0%	43.0%	61.0%

Notes.

1) 1990 data = percent non-white, percent with free/reduced lunch, percent living with two parents.
1991 data = percent special education classes/programs, percent in ESL classes

2) North Hill has grades K-3 only; Olympic has grades 4-6.

(Source: Highline School District, 1993-94)

Table 9.14
Student Characteristics at Highline High School

Student Characteristic	Highline High School	District Average
Non-white students	25.8 %	21.3 %
Special education/program students	6.0 %	8.9 %
ESL students	6.0 %	4.1 %
Free/reduced lunch students	17.0 %	35.0 %
Living with two parents students	54.0 %	57.0 %

(Source: Highline School District, 1993-94)

Section 9
Potential Socio-Economic Impacts and Mitigation
February 1997
Page 9-26

Importance of Elementary School Impacted Children

The seven elementary schools which will be most impacted by the Third Runway had a combined enrollment in 1993 of 2,807 students, and represented almost one-third (29.5%) of the District's total elementary school enrolled children. Students from Des Moines and Olympic elementary schools matriculate to Pacific Middle School and go on to Rainier High School. Students at Sunnydale and Cedarhurst elementary schools matriculate to Sylvester Middle School and then go on to Highline High School. Students from Beverly Park and Southern Heights elementary schools matriculate to Cascade Middle School and then to Evergreen High School. Thus, the socio-economic impact of the Third Runway on the demographic profile of enrolled students in elementary schools immediately to the west of the Airport's current boundary will be spread from the seven directly impacted schools to the entire District school system. (Only Chinook Middle School and Tyee High School, both located on the east side of the Airport, will likely not be affected by induced demographic shift attributable to the Third Runway and related Airport facilities.)

Affect of Increased Operations on School Children

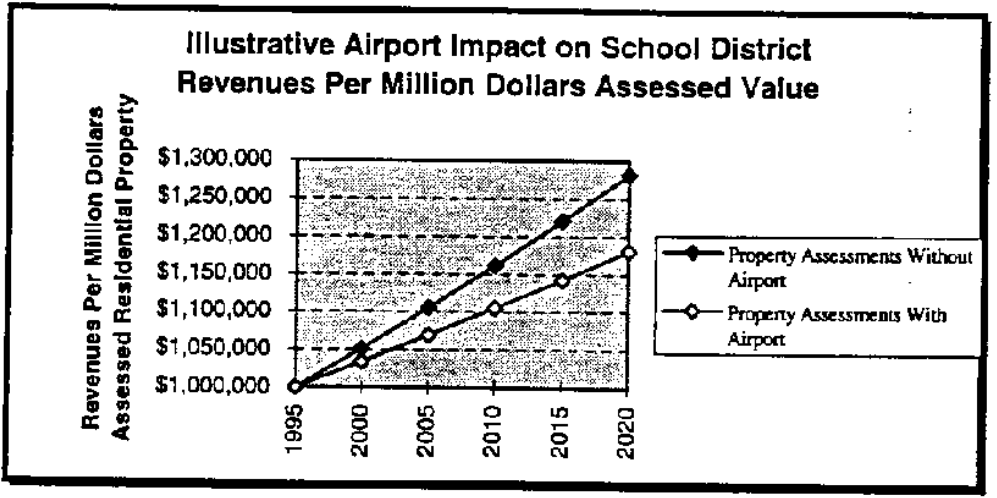
The educational performance of children attending school in the Highline School District will be affected by the Third Runway and related Airport facilities in different ways. These include demographic factors, economic factors and psychological factors. None of these factors was considered in the Port of Seattle's Master Plan Update EIS, as a result the information available about these factors only allows for informed speculation and analysis-based judgments about likely impacts. Additional research should be conducted on each of these factors to determine its statistical significance and magnitude. Demographic Factors have already been discussed as an outcome of the land use changes resulting from the growth of operations after the Year 2000 when the Third Runway and related Airport facilities become operational. The increased proportion of rental housing units in the District will produce a resident population that is younger, more, mobile and lower income than today's. Given the established correlation between income and educational-I attainment, it also is likely that the District's future population will have attained lower educational levels than today's population if the Third Runway and related Airport facilities are built. Economic Factors adversely impacting the Highline School District will primarily be the reduction in residential property values that will require higher special levy rates. For example, the District's most recent special levy rate was 3.015 cents per \$1,000 of assessed value. Each million dollars of residential property therefore generates \$3,015 of special levy revenue. Assume property values in equivalent areas in King County increase at a rate of 1% per year on average but as a result of increased Sea-Tac International Airport operation property values in the District's residential housing stock increase at only two-thirds of a percent per year. The results of this example are shown in Table 9.15 and Figure 9.07 .

Section 9
Potential Socio-Economic Impacts and Mitigation
February 1997
Page 9-27

Table 9.15
Illustrative Impact of Airport on Highline School District Revenues

Year	Highline Property Assessments Without Airport (assumed 1.005 per year property value growth)	Property Assessments With Airport (assumed 0.67% per year property value growth)
1995	\$1,000,000	\$1,000,000
2000	\$1,051,010	\$1,033,781
2005	\$1,104,622	\$1,068,703
2010	\$1,160,969	\$1,104,804
2015	\$1,220,190	\$1,142,125
2020	\$1,282,432	\$1,180,707

Figure 9.07



In the above illustrative example, the decline in residential property values between 1995 and the Year 2000 are attributed to a growth of enplanements within the Airport's existing ASV capacity limit. The relative property value declines after the Year 2000, however, are attributed to construction of the Third Runway and related Airport facilities. In the illustrative example, the School District would have had to increase its levy rate in 2020 from \$3.015 to \$3.275 per \$1,000 of assessed residential property value to equalize the two revenue streams.

Local home owners faced with a relative decline in the value of their property would be asked to approve higher special school levy rates than would otherwise be necessary, and the ability of the District to get voter approval would almost certainly become more difficult. At the same time, the District would be faced with a need to increase expenditures per student in order to maintain the quality of its educational outcomes, it would face growing voter resistance to raising levy rates.

*Section 9
Potential Socio-Economic Impacts and Mitigation
February 1997
Page 9-28*

The resulting financial squeeze will be a major economic impact on the School District that results from construction of the Third Runway and related Airport facilities.

The calculation of probable, rather than illustrative, economic impacts on the School District requires a research effort not possible within the resources available under the current Sea-Tac International Airport Impact Mitigation Study. The illustrative differential of one-third of a percent per year in the growth of residential property values with and without the Third Runway appears low on the basis of the property value finding reported previously, and the entire topic of economic impacts of the Third Runway and related Airport facilities on the School District (a topic which was not addressed at all in the EIS) needs additional research.

Psychological Factors

impacting the School District's children as a result of the Third Runway could come from several sources. The Interruption of classroom teaching by aircraft noise could increase stress on students in affected classrooms. Also, student learning could be impaired in affected west-side elementary schools; and after matriculating to the middle schools in the District these students may suffer the psychological stress associated with an Inability to educationally perform with grade-level peers.

Additional psychological impacts may be the consequence of living in neighborhoods where household turnover is high and interpersonal relationships are unstable; or from living in households with only one parent and/or which is under severe economic and financial pressure,

The current study was not able to investigate the psychological factors, but the association of such factors with the types of demographic shifts that will be accentuated by construction of the Third Runway and related Airport facilities is highly probable and warrants further research and analysis.

The Need for Additional School Services/Facilities

The noise impacts on the seven elementary schools and high school immediately to the west of Sea-Tac International Airport caused by the increase in approaching/departing aircraft after the Year, 2000, and which are attributable to the Third Runway, related Airport facilities, and expansion of the Airport's ASV capacity, will require remodeling, rebuilding, or other structural alterations.

The mitigation of the Third Runway impacts are over and above the structural requirements needed to attenuate noise at such schools as Hilltop, Riverton Heights, Midway and Parkside Elementary Schools, Pacific Middle School and Mount Rainier High School that were caused by the second runway and have still not been fully addressed (Highline School District, November, 1992; and Heigh, 24 August 1994). These noise induced structural impacts are analyzed and their mitigation requirements presented in the environmental part of this Sea-Tac International Airport Impact Mitigation Study.

*Section 9
Potential Socio-Economic Impacts and Mitigation
February 1997
Page 9-29*

The optimum methods of enriching the classroom learning experience as a way to mitigate the District's demographic shift caused by the Increase in approaching/departing aircraft after the Year

2000 attributable to the Third Runway, related Airport facilities, and expansion of the Airport's ASV capacity will require additional analysis. Quantitative research needs to be conducted on the affects of the population's shifting demographic profile on students' classroom performance. After which,

appropriate mitigation policies need to be formulated by educational professionals within the District. Some of these policies will likely include reduced student/teacher ratios, increased teacher support staff in classrooms, creation of enriched curricula, and use of additional teaching materials.

Regardless of which or how many of these types of mitigated actions will be determined to be appropriate for maintaining the Highline School District's traditional quality of education outcomes, it is evident that the District will require additional resources to mitigate the socioeconomic impacts of the Third Runway and related Airport facilities.

9.12 - MITIGATION OF SEA-TAC'S ADVERSE IMPACTS

The expansion of Sea-Tac International Airport will produce adverse socio-economic impacts on both households and communities in its immediate environment. Section 9.12 discusses appropriate mitigation measures for both types of impacts in three categories of mitigation: mitigation based on tax base change, mitigation based on service level changes, and mitigation based on other changes.

Mitigation measures are divided into the following types:

- Tax Base Changes
 - Depressed Property Values
 - Reduced School Revenues
 - Reduced Local Government Revenues
 - Land Use Changes
- Service Level Changes
 - Public Safety
- Community Cultural Services
- Community Social Services
 - Educational Services
 - Health Services
- Other Socio-Economic Impacts
 - Environmental justice
 - Quality of Life
 - Economic Development

*Section 9
Potential Socio-Economic Impacts and Mitigation
February 1997
Page 9-30*

9.13 - TAX BASE CHANGES

Depressed Property Values

The primary impact on households will be the decline in the relative value of residential property caused by Sea-Tac International Airports expanded operations after the Year 2000 as will result from construction of the Third Runway and related Airport facilities. Table 9.16 reports the average relative decline in housing values for each of the five impacted cities for the Years 2000 to 2020. (the data in Table 9.16 are derived from Table 9.03.)

Between the Years 2000 and 2020, the average residential housing unit (land plus structure) in Burien is expected to experience a relative decline of \$26,356 (expressed in constant value 1995 dollars). For the City of Des Moines the comparable number is \$27,609; for Federal Way it is \$28,891; for Normandy Park it is \$35,221; and for Tukwila it is \$24,844.

To make residents of the five impacted cities whole, each household would receive the equivalent of a 20-year annuity where the sum of the annuity's payments equals the relative loss of the property value. In Burien, for example, each affected household would receive an annual payment such that the sum of the payments from the Year 2000 to 2020 discounted for real time preference would equal \$26,356,

Having the Port of Seattle contribute an amount equal to the above described annual annuity payment toward the payment of a householder's annual property taxes would have the same effect as giving each householder an annuity. It would have the additional benefit of attaching the mitigating action to the property that's being impacted rather than to the householders residing on the property. Further, market forces should increase the value of the property by the discounted present value of the annuity's payment stream (the Port's contribution to the property's tax obligations), and this increase in property values will increase revenues to the five impacted cities - thus mitigating the cities' revenue shortfalls at the same time.

As mitigation for the loss of relative residential property values by homeowners, it is recommended that the Port of Seattle make a partial payment of property taxes for homeowners in the five impacted cities, the amount of the partial payment equal to an annuity the present value of whose payments equals the property's loss of relative value caused by expansion of the Airport.

*Section 9
Potential Socio-Economic Impacts and Mitigation
February 1997
Page 9-31*

**Table 9.16
Average Housing Unit's Relative Decline in Value
Caused by Sea-Tac's Expansion**

Year	Burien	Des Moines	Federal Way	Normandy Park	Tukwila
2000	- -	- -	- -	- -	- -

2001	-\$1,318	-\$1,380	-\$1,450	-\$1,761	-\$1,242
2002	-\$2,636	-\$2,761	-\$2,899	-\$3,522	-\$2,484
2003	-\$3,954	-\$4,141	-\$4,349	-\$5,283	-\$3,727
2004	-\$5,271	-\$5,522	-\$5,798	-\$7,044	-\$4,969
2005	-\$6,589	-\$6,902	-\$7,248	-\$8,805	-\$6,211
2006	-\$7,907	-\$8,283	-\$8,697	-\$10,566	-\$7,453
2007	-\$9,225	-\$9,663	-\$10,147	-\$12,327	-\$8,696
2008	-\$10,543	-\$11,044	-\$11,596	-\$14,088	-\$9,938
2009	-\$11,861	-\$12,424	-\$13,046	-\$15,849	-\$11,180
2010	-\$13,179	-\$13,804	-\$14,496	-\$17,610	-\$12,422
2011	-\$14,497	-\$15,185	-\$15,945	-\$19,371	-\$13,664
2012	-\$15,815	-\$16,565	-\$17,395	-\$21,132	-\$14,907
2013	-\$17,133	-\$17,946	-\$18,844	-\$22,893	-\$16,149
2014	-\$18,450	-\$19,126	-\$20,294	-\$24,654	-\$17,391
2015	-\$19,768	-\$20,707	-\$21,743	-\$26,416	-\$18,633
2016	-\$21,086	-\$22,087	-\$23,193	-\$28,177	-\$19,875
2017	-\$22,404	-\$23,468	-\$24,642	-\$29,938	-\$21,118
2018	-\$23,722	-\$24,848	-\$26,092	-\$31,699	-\$22,360
2019	-\$25,040	-\$26,228	-\$27,542	-\$33,460	-\$23,602
2020	-\$26,356	-\$27,609	-\$28,891	-\$35,221	-\$24,844
Average	-\$13,179	-\$11,804	-\$14,496	-\$17,610	-\$12,422

The approximate amount of such payments is shown in Table 9.17 along with the estimated average annual cost to the Port. The numbers in Table 9.17 are a mitigation guideline and will have to be modified to account for differences between the average value of all housing units in a city and the actual value of specific properties and adjustment for inflation during the 20-year period between the Years 2000 and 2020. The table uses a real interest rate of 4% for its calculations. During 1995, the interest rate on a 30-year government bond was around 6.5% and the rate of inflation was around 2.5%, yielding a real rate of interest for long term assets of around 4%.

[Page 9-32]

Table 9.17
Estimated Cost of Mitigating Residential Housing Unit Property Losses

Community	Contribution by Port to Average Residential Property's Tax Obligation	Average Number of Impacted Single-family Housing Units	Total Cost to Port of Seattle
Burien	\$885	17,890 DU	\$15,832,650
Des Moines	\$927	6,197 DU	\$5,744,619
Federal Way	\$973	12,392 DU	\$12,057,416
Normandy Park	\$1,182	2,577 DU	\$3,046,014
Tukwila	\$834	4,866 DU	\$4,058,244
Total			\$40,738,143

Reduced School Revenues

Reduced school revenues will result from the relative decline in residential property values caused by expansion of Sea-Tac International Airport after the Year 2000. If the Port of Seattle undertakes a program of making partial property tax payment for residential properties in the affected cities, market forces will bid up the price of these properties and off-set the relative declines that would otherwise occur. Consequently, there would be no reduction in school revenues (increases in levy rates) and no additional mitigation would be required.

If the Port of Seattle does not mitigate the relative decline in residential property values caused by the Third Runway and related Airport facilities, the Highline School District will experience revenue shortfalls, compared to what would have occurred had the Airport not expanded. The estimation of these revenue shortfalls is complex and needs to account for both the business personal property tax receipts generated by the Airport to the School District and Washington State's educational funding formulas. It was beyond the budget and scope of this study, but the full effects should be calculated.

It is recommended that a detailed analysis of the likely shortfall in Highline School District's property tax base that will result from construction of the Third Runway and related Airport facilities be conducted.

Section 9
Potential Socio-Economic Impacts and Mitigation
February 1997
Page 9-33

Reduced Local Government Revenues

Reduced local government revenues will result from the relative decline in residential property values caused by expansion of Sea-Tac International Airport after the Year 2000. If the Port of Seattle undertakes a program of making partial property tax payment for residential properties in the affected cities, market forces will bid up the price of these properties and offset the relative declines that would otherwise occur. Consequently, there would be no reduction in local government revenues and no additional mitigation would be required.

If the Port of Seattle does not mitigate the relative decline in residential property values caused by the Third Runway and related Airport facilities, the city governments of Burien, Des Moines, Federal Way, Normandy Park and Tukwila will experience revenue shortfalls, compared to what would have occurred had the Airport not expanded. The cumulative revenue losses to all five impacted cities from all Third Runway related impacts will be \$38.8 million (in constant value 1995 dollars), ranging from an annual revenue loss of \$1.7 million during the first year after the Third Runway goes into operation to an annual revenue loss of \$2.2 million in the Year 2020.

If the Port of Seattle does not take action to mitigate the decline in relative residential property values by making partial property tax payments to homeowners, it is recommended that the Port of Seattle make annual offsetting payments to each of the five impacted cities to compensate them for the relative declines in residential property values caused by construction of the Third Runway and related Airport facilities.

The magnitude of the off-setting payments should be determined by each city's revenue losses.

Table 9.18 presents estimates of these revenue losses.

Table 9.18
Estimated Revenue Loss Off-Setting Mitigation Payments

Community	Total Revenue Losses from Average Annual Community Relative Declines In Yearly Decline Tax Revenue Loss Single Family in Single-Family Off-Setting Property Value Property Values Mitigation	Average Yearly Decline in Single-Family Property Values 2000-2009	Annual Tax Revenue Loss Off-Setting Mitigation Payments
Burien	-\$14,191,858	-\$709,592	\$709,592
Des Moines	-\$6,389,351	-\$319,468	\$319,468
Federal Way	-\$11,611,022	-\$580,551	\$580,551
Normandy Park	-\$2,813,667	-\$140,683	\$140,683
Tukwila	-\$3,747,651	-\$187,383	\$187,383

Section 9
Potential Socio-Economic Impacts and Mitigation
February 1997
Page 9-34

Land Use Changes

Land use changes in the form of a shift from owner occupied to renter occupied residential properties will result from the relative decline in residential property values caused by expansion of Sea-Tac International Airport after the Year 2000. If the Port of Seattle undertakes a program of making partial property tax payments for residential properties in the affected cities, market forces will bid up the price of the properties and off-set the relative declines that would otherwise occur. Consequently, there would be no market pressure for shifts in land use patterns and no additional mitigation would be required.

If the Port of Seattle does not mitigate the relative decline in residential property values caused by the Third Runway and related Airport facilities, there will be a need to mitigate the affects of having more transient residents living in the five impacted cities.

It is recommended a revolving "Home Ownership Loan Fund" be established to facilitate the movement of persons living in Burien, Des Moines, Federal Way, Normandy Park and Tukwila from renter to owner housing tenure status.

Additional analysis will be required to determine the size of the loan fund, but a rough estimate of assistance provided to approximately 500 households a year in achieving home ownership status would indicate the size of the fund should be in the range of \$15 million to \$25 million. It is assumed that the home ownership program would operate through loan guarantees and the majority of the funding would be provided through private financial institutions.

9.14 - SERVICE LEVEL CHANGES

Expansion of Sea-Tac International Airport through construction of the Third Runway and related Airport facilities will increase the proportion of renters among residents of the five impacted cities. As a result, the cities will experience a shift in population toward younger, lower income and more mobile households. This shift will require an increase in community services if the cities are to retain the quality of life they had in the past.

Public Safety

Public safety requirements will increase for all five of the impacted cities. The Cities of Burien, Des Moines and Tukwila will have the greatest requirements for additional neighborhood patrolling by uniformed police officers. The growth of operations at Sea-Tac International Airport after the Year 2000 will particularly impact the City of Tukwila where Airport-induced neighborhood decline is already advanced on Pacific Highway South and will continue to worsen.

Section 9
Potential Socio-Economic Impacts and Mitigation
February 1997
Page 9-35

It is recommended that as part of the mitigation of the Third Runway and related Airport facilities at Sea-Tac International Airport there be a program whereby the Port of Seattle reimburses the Cities of Burien, Des Moines and Tukwila for the additional public safety requirements they will experience.

Community Cultural Services

Given the demographic shift expected to occur in the five impacted cities as a result of construction of the Third Runway and related Airport facilities, the continuance of their quality of life will require an enrichment of the cultural resources available to their residents. In particular, it will be important to expand the availability of central meeting places such as parks, libraries and community centers where new residents can meet their neighbors and become integrated into their communities. The greatest needs will occur in The Cities of Burien, Des Moines and Tukwila, although significant, but lesser, pressure for additional community cultural resources will be experienced in the cities of Federal Way and Normandy Park.

It is recommended that each of the five impacted cities draw-up a cultural resources enhancement plan specifically directed toward meeting the quality of life challenge that the Third Runway and related Airport facilities, will impose, and that the actions identified as needed in each city's cultural resources enhancement plan be funded as part of the mitigation of the construction of the Third Runway and related Airport improvements.

Community Social Services

Community social services such as day care and after school care, elderly centers, family counseling services, work training and job search counseling will all be required in the five impacted cities that

were the focus of the Sea-Tac International Airport Mitigation Impact Study. Over and above the needs for such services that a growing population will require, the demographic shift caused by the increase in Sea-Tac International Airport operations that will be made possible by expansion of the Third Runway and related Airport facilities, will cause an expanded growth in demand for social services. If the impacted cities are only able to provide increased social services in proportion to their population growth, and are not able to provide for the additional social services made necessary by construction of the Third Runway and related Airport facilities, their quality of life will be progressively diminished after the Year 2000.

*Section 9
Potential Socio-Economic Impacts and Mitigation
February 1997
Page 9-36*

It is recommended that the five impacted communities develop a southwest King County integrated community social service resource and delivery plan and that the plan, once developed, be funded as part of the mitigation of the Third Runway's impacts.

Educational Services

There will be a need to enrich classroom learning experiences in order to mitigate demographic shift among the Highline School District students that will be caused by the Third Runway and related

Airport facilities. To determine the best mitigation measures, quantitative research needs to be conducted on the affects of shifting demographic profiles on student classroom performance. After which, appropriate mitigation policies need to be formulated by educational professionals within the District- Some of these policies will likely include reduced student/teacher ratios, increased teacher support staff in classrooms, creation of enriched curricula, and use of additional teaching materials.

Regardless of which or how many of these types of mitigation actions will be determined as appropriate for the task of maintaining the Highline School District's traditional quality of education outcomes, it is evident that the District will require additional resources to mitigate the socioeconomic impacts of the Third Runway and related Airport facilities.

It is recommended that additional research be undertaken to develop quantitative estimates of the relationship between demographic shifts in the Highline School District's student population, levels of student performance and appropriate mitigation measures to maintain the District's traditional quality of education outcomes; and that such measures be funded as part of the mitigation of the Third Runway's impacts.

Health Services

High levels of concern have been expressed by citizens and community leaders from the five impacted cities about the deleterious affects the Airport now has on the health of families living in its immediate environment. If such concerns are demonstrated as warranted, they would apply forcefully to the expansion of Airport operations that will occur as a result of building the Third Runway and related Airport facilities. A public health evaluation and assessment of the Airport was outside the scope and budget of this study.

*Section 9
Potential Socio-Economic Impacts and Mitigation
February 1997
Page 9-37*

It is recommended that the School of Public Health at the University be funded to conduct an Airport health impact assessment, and that if the assessment finds a positive correlation between adverse health impacts and levels of Airport operation, appropriate measures to mitigate these effects be funded.

9.15 - OTHER SOCIO-ECONOMIC IMPACTS

Environmental Justice

Parts of the City of Burien that are the home of an ethnically diverse population will be impacted by Sea-Tac International Airport's expansion that construction of the Third Runway and related facilities will allow.

It is recommended that a monitoring system be established and operated in the area to the north of the Airport which will be under the approach/departure flight track for the Third Runway to insure that the intent of federal Executive Order 12898, "Environmental Justice" are met.

Quality of Life

Most of the issues surrounding the socioeconomic impact of the Third Runway and related Airport facilities, on neighboring Communities involves their quality of life and the manner in which expansion of operations at the Airport will cause it to be degraded. The quality of life issue is central to understanding the socioeconomic impacts of the Third Runway and developing effective mitigation strategies. This issue needs to be approached in a straight forward manner, and the development of prototype quality of life indicator systems, both nationally and in the Puget Sound Region, should make this possible.

*Section 9
Potential Socio-Economic Impacts and Mitigation
February 1997
Page 9-38*

It is recommended that a quality of life indicator model be created for the five impacted cities and for areas in Northwest King County which are appropriate as a comparison area; the indicator model be estimated for data at least as far back as 1960 for both the impacted and comparison cities; that it be used to identify changes in the impacted cities' relative quality of life over time, the major quality of life indicators which contributed to the decline; and the quality of life indicator model become the basis for identifying needed socio-economic mitigation

measures for the Third Runway and related Airport facilities.

Economic Development

Many of the adverse impacts of the Third Runway and related Airport facilities have to do with the direct, indirect or induced relative declines in property values that occur when Airport operations increase. One strategy for mitigating these property value impacts is to direct to the maximum extent, feasible airport economic functions into the five impacted cities. For example, if Sea-Tac International Airport's proposed new hotel were located in Burien or Des Moines instead of on Airport lands there would be a positive (mitigating) result. Equally, if the Airport were to construct a haul road for all air cargo movements which exited on the west side of the Airport, it is highly likely that new warehousing and distribution facilities would spring-up; and the increased value of economic activity thus resulting would mitigate the Third Runway's otherwise adverse impacts. In many ways, a mitigation strategy which depends, at least in part, on economic development enhancing actions is preferable to alternative types of mitigation since it uses market forces rather than government spending or regulation as its implementing force.

It is recommended that an economic and engineering assessment of Airport operations be conducted to determine Airport functions which would have positive economic development benefits and could be shifted to the five impacted cities.

*Section 9
Potential Socio-Economic Impacts and Mitigation
February 1997
Page 9-39*
