Economic Impacts of the Alternative Airport Development Scenarios

Prepared for:

The Metropolitan Airports Commission

February 1996

MINNEAPOLIS SAINT PAUL METROPOLITAN AIRPORTS COMMISSION
MAC

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Part I

Executive Summary

Executive Summary

Introduction

The team of Economics Research Associates (ERA) and Dahlgren, Shardlow & Uban (DSU) prepared an economic and fiscal impact analysis to compare and contrast alternative scenarios for airport development in the Twin Cities. The dual objective was to define any important differences between the scenarios, and provided a decision-making tool for state officials, the Metropolitan Airports Commission, and community leaders. The full report upon which this summary is based contains detailed information to support each of the objectives. This summary focuses specifically on contrasts between the two expansionary scenarios: MSP expansion and new airport construction in Dakota County. The third airport development scenario, referred to as the no-build option, covers the opportunity costs to the region which are likely to occur without additional airport passenger capacity in the future. The no-build impacts are discussed separately in the text.

The following pages summarize the key elements of our analysis, which focuses on several aspects of economic and fiscal impacts:

- **Direct Impacts:** -- jobs and wages tied to on-site airport flight activity and passenger services;
- **Indirect Impacts:** -- secondary jobs and wages which are created in the state as a result of the income paid to airport workers (defined by a multiplier);
- **Construction Impacts** -- jobs, wages, indirect impacts, and taxes linked to the construction of airport facilities under MSP expansion or new airport development;
- **Tourist/Visitor Impacts** -- jobs, wages, and indirect impacts which are created as a result of the dollars spent by tourists or visitors that come into the region via the airport for a hotel, restaurant, entertainment, and transportation expenditures;
- **Induced Impacts** -- real estate development that is linked to the airport and locates there because of the airport, including hotel, office, and industrial uses;
- **Fiscal Impacts** -- taxes created by airport operations, income taxes that result from jobs and wages, property taxes on development, and sales tax on retail and wholesale purchases;
- **Land Use Impacts** -- differences in land development patterns that result from implementing each option;
- **MSP Reuse** -- the range of impacts which are created by redevelopment of the ±3,000 acre MSP site if the airport is moved to Dakota County.

Our Approach

The key elements of our analysis and products which have enabled us to draw conclusions concerning impacts include the following:

1) Profile and characterization of the region, including the economic base, real estate markets, land development and controls, and public policy;
2) Description of trends in aviation, looking to probable future change and the implications for a Minneapolis/St. Paul airport facility;
3) Generation of case studies and/or reviews for ten airports in the U.S. Five studies were completed in detail and five in an overview format, in order to identify implications for real estate trends and land-development spin-offs (induced impacts) generated by airport development elsewhere;
4) Establish defensible industry measures for the relationship between passenger volume and direct employment as well as the identification of regional multipliers which are based on Bureau of Economic Analysis information;
5) Interview new businesses in the Denver metro area to determine their reasons for establishing a location at their present site.

DIRECT IMPACTS

ERA conducted research into accepted and tested industry measures which identify direct impacts of airport activity. Previously conducted research determined that ratios of origin/destination, connecting, and international enplanements to direct airport employment, when analyzed in a regression formula, can be used to forecast direct employment. The enplanement to direct jobs ratios vary by the three types of passengers, and enable economists to develop estimates of what the current employment should be at an airport as well as future forecasts. The enplanement to jobs ratios used by ERA to forecast direct employment were based on previous studies which looked at the relationship between enplanements and direct employment at 25 airports, corroborating earlier work on the topic by the Federal Aviation Administration. Application of the ratios to enplanement data provides figures for jobs which are related to on-site airport activity.

According to previously-published data, total current on-site employment at MSP is approximately 24,000 people. However, because Northwest Airlines is headquartered in the region, there are approximately 10,000 jobs on-site which are not directly tied to airport activity at MSP. In fact, figures provided by Northwest Airlines indicate these are jobs related to off-line/ongoing maintenance, reservations, and corporate administration. As a result, about 14,000 jobs are related directly to airport activity. This figure is consistent with the jobs one would expect using industry ratios; it tends to reinforce application of the ratios in our methodology.

ERA forecasted jobs and wages for both the MSP expansion and new airport options. Analysis is directly tied to the forecasts of passenger volumes for each of these scenarios; ERA utilized aviation demand forecasts generated by HNTB, as published in both the MSP long-term comprehensive plan and the draft environmental impact statement (EIS). The HNTB enplanement forecasts assume that unconstrained travel demand will be accommodated under MSP expansion or new airport construction through the year 2020. The end result is that the passenger base for both scenarios is the same for our forecasting analysis. The no-build scenario enplanement forecast assumes reduced connecting enplanements and aircraft operations activity resulting from capacity constraints.

The result, as can be seen on the tables on the facing page, shows that direct employment for each of the two scenarios is exactly the same during the 15-year forecast, assuming that the new airport in Dakota County would not open until 2005. In either scenario, there would be 1,628 new jobs created over the forecast period, growing an approximate annual rate of 0.52%. Aggregate wages are defined in a similar manner, applying wage and employment data to job forecasts. Here again, the forecast for direct income was exactly the same for each of the scenarios. Our full report shows that there are differences among the income allocations for the regional counties; if developed, the Dakota County facility would draw more of the region's airport-related employment and income to the south and east of the Twin Cities.

It is important to point out the job and wage issue related to the 10,000 Northwest Airlines positions. NW airline management has indicated that the 10,000 positions are not tied to air activity at MSP and could be moved elsewhere in the future, regardless of the chosen airport alternative. Discussions with NW officials indicated that the ultimate location of the 10,000 jobs will be tied to the incremental costs of building new facilities which duplicate existing improvements at MSP under either option. It is clear that the 10,000 positions generate a substantial impact to the metro area and state. Assuming a minimum salary of $35,000, the roughly 10,000 positions would generate in excess of $350 million in annual direct wages in the metro area.

Direct Employment

MSP Expand	
Year	Jobs
2000	14,973
2005	15,606
2010	16,041
2015	16,370
2020	16,601

New Airport	
Year	Jobs
2005	15,606
2010	16,041
2015	16,370
2020	16,601

Direct Wages

MSP Expand	
Year	Wages
2000	$524,067,798
2005	$546,205,519
2010	$561,445,353
2015	$572,967,064
2020	$581,018,224

New Airport	
Year	Wages
2005	$546,205,519
2010	$561,445,353
2015	$572,967,064
2020	$581,018,224

INDIRECT IMPACTS

To a great extent, the indirect impacts created by any business or industry are related to the character of the metropolitan economy -- its diversity, multi-faceted nature, and the extent of its self-containment. Jobs related to the airport itself generate income for the employees who then spend money for housing, services (medical, dental, repair, personal), entertainment, banking etc. These expenditures create business activity which in turn uses a portion of the revenue to create new jobs; and these employees also spend some of their income -- which again creates jobs. The cycle continues, but diminishes with each turn. The total number of jobs which are created in this indirect fashion are a function of the 1) initial direct wage levels and, 2) the character of the Twin Cities' economy. This churning effect is defined by a multiplier, which has been generated by the Bureau of Economic Analysis from an input/output model for the State of Minnesota. The multipliers, referred to as RIMS II; incorporate direct employment from the airport and related wages to estimate and forecast the indirect impacts.

Like the results of the direct impact analysis, the indirect impact generates the same results for each scenario. Initially, we have used the same numbers for our analysis -- that is, the direct jobs and wages of each of the alternative airport scenarios. Thus, each scenario reaches the same indirect impact conclusions. During the 15-year forecast period between 2005 and 2020, the number of indirect jobs grows from 18,382 to 19,554, nearly 1,200 new jobs. Likewise, wages increase from $443 million to $471 million during the same period. Clearly, as reflected by each case, the economic impact of the airport is a major factor in the regional economy and therefore a key asset to be maximized.

The multiplier which was utilized to calculate the indirect effects is a state-wide multiplier. The forecast, as well as other statistics, show that the largest number of direct airport jobs are held by residents who live in the Twin Cities metropolitan area. As a result, the indirect jobs (jobs and wages) are expected to be largely maintained within the region, somewhere in the order of 80% to 90% of the total. Here again, the 10,000 Northwest Airlines positions create a comparable indirect or secondary impact, creating roughly 11,800 indirect jobs and a minimum of $283 million in indirect wages across the state. If Northwest Airlines pursues a policy of work force relocation or reduction under either scenario, the lost direct employment would have a corresponding negative impact, reducing the overall indirect benefits to the region by a comparable order of magnitude.

Indirect Employment

MSP Expand	
Year	Jobs
2000	17,637
2005	18,382
2010	18,895
2015	19,283
2020	19,554

New Airport	
Year	Jobs
2005	18,382
2010	18,895
2015	19,283
2020	19,554

Indirect Wages

MSP Expand	
Year	Wages
2000	$424,914,171
2005	$442,863,435
2010	$455,219,892
2015	$464,561,695
2020	$471,089,576

New Airport	
Year	Wages
2005	$442,863,435
2010	$455,219,892
2015	$464,561,695
2020	$471,089,576

CONSTRUCTION IMPACTS

Like each of the other analyses, the forecasting of construction impacts is directly linked to already-established figures. In this case, the linkages are with the total dollar amount spent for construction. We are aware that construction cost forecasts have undergone fairly continual change and that the current figures do not reflect cost estimates that have been fully defined or detailed. While these figures are likely to change further, we have assumed that the order of magnitude and cost relationships will be largely the same. The current budgets also include some of the off-site infrastructure and highway costs. It is ERA's expectation that once the airport decision is made, the engineering estimates will be prepared thoroughly. Clearly, the cost of the MSP expansion and the new airport differ significantly -- both for jobs and material. The result is that the construction impacts differ, and reflect the differing levels of public investment for each. In reviewing the information on the facing page, it must be kept in mind that the construction period is expected to run approximately five years for a new airport option and possibly 20 years for MSP expansion; ultimately the direct and indirect job and wage impacts will totally phase out, and should be considered temporary. The following assumptions and data sources were used:

1) Construction and engineering experience shows that approximately 50% of development costs are typically comprised of labor;
2) Cost of property acquisition is excluded because it does not create job and wage impacts;
3) Salary levels used in the analysis are yearly Minnesota Department of Economic Security figures for 1993;
4) Approximately 80-90% of construction materials are purchased in the state (an ERA assumption);
5) Wages generate income tax and materials purchased create sales tax revenues.

Current estimates show that the total construction costs of MSP expansion are $2.78 billion, of which $2.72 billion remains after excluding property acquisition costs. Given the assumptions described above, MSP expansion will generate a total of 32,540 construction-person-years, which is equal to an average of roughly 1,620 construction jobs and $68 million in wages per-year over an assumed 20-year construction period. Like the direct jobs at the airport, these construction jobs also create indirect jobs and related wages, identified by applying the RIMS II multiplier again. Using this approach, we find there will be an average of 2,300 indirect jobs and $85 million in wages created per year over the same time frame. Total fiscal revenues generated by the MSP expansion include $54 million in income tax and between $70 and $80 million in sales taxes.

The new airport is expected to cost $4.58 billion of which $4.45 billion remains after property acquisition. The same methodology indicates that a total of 53,028 construction-person-years would be created, roughly equivalent to an average of about 10,600 construction jobs and $444.8 million in wages per year during an assumed five-year construction period. The multiplier analysis shows that average yearly indirect impacts include roughly 15,000 jobs and $556.8 million in wages. The total fiscal revenues that will be generated by this scenario are approximately $89 million in income taxes and tax on material falling in the range of $115 million to $130 million.

Again, we want to reiterate that these jobs are not long-term jobs. Based on the experience of Denver International Airport, the most recently built new airport facility in the county, employment activity for new construction will peak in about the fourth year of a five-year period. In looking at the current character of the labor force in the Twin Cities region, it is our expectation that both expansion and new airport construction will draw largely from the local employment base for between 90% and 99% of total construction jobs, employing primarily existing residents during the construction period. As some of the special expertise and other jobs will be drawn from outside the region, a small portion of the impacts will be lost.

Average Yearly Construction Employment

MSP Expand

Category	Yearly Jobs
Direct	1,620
Indirect	2,300
Total	3,920

New Airport

Category	Yearly Jobs
Direct	10,600
Indirect	15,000
Total	25,600

Average Yearly Construction Wages

MSP Expand

Category	Total Wages
Direct	$68,000,000
Indirect	$85,000,000
Total	$153,000,000

New Airport

Category	Total Wages
Direct	$444,800,000
Indirect	$556,800,000
Total	$1,001,600,000

Total Fiscal Impacts of Construction

MSP Expand

Category	Wages
Income taxes	$54,440,000
Tax on Materials	$70-$80 Million

New Airport

Category	Wages
Income taxes	$88,960,000
Tax on Materials	$115-$130 Million

VISITOR SPENDING IMPACTS

Tourism impacts can be particularly beneficial to the region. The dollars spent by visitors remain largely in the region; however, while they create direct and indirect jobs and wages, there are no commensurate demands for infrastructure, schools/education, public services, etc. Taking into account all of these factors, the net tourist impact is typically greater than any other economic activity. Visitors generate fiscal revenues as well. In our analysis, we have defined the visitor spending impacts that are related to air travel, basing our impact forecasts on origin and destination passengers who are non-resident visitors. The approach to defining these impacts is as follows:

1) Apply HNTB enplanement forecast data which shows that 45% of domestic and 60% of international origin/destination passengers are visitors;

2) Identify expenditures per person per trip based on previous impact studies for MSP;

3) Use existing, published data to allocate visitor expenditures among categories: hotel, retail, restaurant, entertainment, transportation -- showing the percentage shares of each;

4) Determine total spending in each category;

5) Apply published (U.S. Bureau of the Census) ratios of total sales to annual payroll for each visitor industry sector;

6) Divide regional wage levels into aggregate payroll estimates to determine jobs, also defined by category of expenditures;

7) Use passenger forecasts in analytic model to estimate jobs and wages between 2005 and 2020.

Here again, basing our analysis on the passenger forecasts developed by HNTB, the numbers show an identical visitation for both MSP expansion and the new airport scenarios. The impact assessment approach shows that in 2005, there will be approximately 49,000 direct jobs, which will grow to nearly 61,000 in 2020. Direct wages for the same time period increase from $486 million in 2005 to just over $603 million in 2020. Indirect jobs during the same time period are approximately 25,000 in the beginning, growing to nearly 31,000 by 2020. Indirect job wages increase from $484 million to $601 million in the 15-year period. As the facing tables show, the two airports have the same economic impact.

Comparison of the tourist impacts created by visitors flying to Minnesota with total state-wide tourist impacts indicates that air travel generates roughly 30% to 40% of tourist industry employment and expenditure. For this analysis, we have assumed that Northwest Airlines (or a comparable carrier) would continue to provide hubbing service in Minneapolis. In addition, we believe it is important to point out here that any change in Northwest Airlines employment levels would not likely affect visitation, and as a result there is no need to discuss an adjustment that relates to their forecast policy.

Direct and Indirect Visitor Jobs, MSP Expand and New Airport

Category	2000	2005	2010	2015	2020
Direct jobs	44,331	49,002	53,492	57,172	60,812
Indirect Jobs	22,506	24,877	27,157	29,025	30,873
Total Jobs	66,837	73,879	80,649	86,197	91,685

Total Visitor Industry Wages, MSP Expand and New Airport

Category	2005	2010	2015	2020
Direct Wages	$486,069,378	$530,602,314	$567,111,066	$603,218,467
Indirect Wages	$483,886,359	$528,219,290	$564,564,075	$600,509,312
Total Wages	$969,955,737	$1,058,821,603	$1,131,675,141	$1,203,727,779

Forecast Visitor Total Expenditure, MSP Expand and New Airport

Category	2005	2010	2015	2020
Hotel	$679,270,548	$741,504,281	$792,524,405	$842,983,651
Restaurants	$611,343,493	$667,353,853	$713,271,965	$758,685,286
Retail	$264,915,514	$289,186,669	$309,084,518	$328,763,624
Entertainment	$203,781,164	$222,451,284	$237,757,322	$252,895,095
Transportation	$38,491,998	$42,018,576	$44,909,716	$47,769,074
Total	$1,797,802,718	$1,962,500,600	$2,097,547,926	$2,231,096,729

INDUCED IMPACTS

The induced impact analysis is the most difficult to quantify. The definition of induced impacts are those spin-off real estate development projects that occur because of airport activity. Most obvious are the hotels which accommodate the overnight visitors to the airport. However, certain types of office and industrial space also fall into this category. ERA's approach to the induced impact analysis has been to define probable levels of development activity that could be expected. We conducted several case studies to determine experience at other airports in the U.S. Our focus has been on new airports, particularly those in remote locations, where the new facility has been developed apart from the existing urban fabric, and surrounding real estate markets began as a clean slate with clearer development trends. ERA determined that office development is not directly tied to passenger activities, while industrial projects are more linked to air cargo service.

The impact report summarizes our comprehensive case studies at airports in Dallas-Ft. Worth, Atlanta, Dulles (Washington, D.C.), and Kansas City where airports already existed. We also evaluated the forecasts prepared for the new airport in Denver. Five secondary case studies were completed, and conclusions were drawn using Kansas City and Dulles as well as secondary case studies, where there were similarities looking at the 15-year history that followed the completion or expansion of an airport. For office development, we found that the annual activity hovered around 70,000 square feet of new development per year, of which we assumed approximately 40-50% was airport induced. Thus industrial development fell in a range of approximately 100,000 to 180,000 square feet of new development per year, or say a median level of about 140,000 square feet. Industrial site location decisions are more linked to transportation facilities, therefore we assumed 50% of the space built around airports was induced. Hotel room demand is directly tied to passenger activity, both vacancy rates, and the share of visitors who stay in commercial accommodations. These assumptions drove our analysis.

For MSP expansion, we have forecast that approximately 30,000 square feet of office space will be built per year over our 15-year forecast, or between 400,000 and 450,000 square feet. We have concluded that approximately 65,000 to 70,000 square feet of industrial development is realistic per year; as a result, over the 15-year forecast period, just over 1 million square feet would be built. Construction of about 2,500 new hotel rooms is forecast (2005-2020), assuming an occupancy level of about 70%. Most induced development will be located along the I-494 Corridor as well as other existing vacant sites near the airport.

Induced development forecasts for the new airport were prepared by the Metropolitan Council and their consultant, taking into account local planning policy and zoning, the impact of the MUSA line, concentrated commercial and higher-density development into urban centers, etc. As shown on the opposite page, much of the land use and development is projected away from the airport.

ERA also identified various reasons why new businesses chose to locate in the Denver metro area, in order to ascertain the significance of new airport construction to new business location decision-making. The survey, covering 60 new businesses, determined that the majority of recent new business formations in the Denver area occurred primarily because of preferential economic or market conditions in the region. A small number of respondents indicated that transportation infrastructure, including highway accessibility and/or the availability of air service, were important factors. However, none of the surveyed firms indicated that construction of a new international airport was the sole reason for starting a new business in the Denver area. The survey respondents also indicated that specific proximity to a new airport was not a factor in their location decision-making.

Forecast Induced Real Estate Development, New Airport, 2005 to 2020

Land Use	Induced Development	Population/Jobs
Residential		
Rural Townships	380 households	1,025
City of Hastings	1705 households	4,615
Urban Townships	1,705 households	4,215
Retail		
City of Hastings	200,000 square feet	742
Dakota County	200,000 square feet	743
Lodging		
City of Hastings	770 rooms	385
Dakota County	770 rooms	385
Office		
City of Hastings	100,000 square feet	400
Dakota County	1,583,000 square feet	6,330
Manufacturing		
City of Hastings	266,500 square feet	590
City of Eagan	266,500 square feet	590
Source: Metropolitan Council		

15-Year Induced Development, MSP Expand and New Airport

Scenario	Office Space	Industrial Space	Hotel Rooms
MSP Expand	420,000	1,050,000	2,500
New Airport	1,683,000	533,000	1,540
Note: Office and industrial space is in square feet			

Forecast Property Taxes Generated by Induced Development, MSP Expand and New Airport

Category	2005	2010	2015	2020
MSP Expand	$5,400,000	$10,800,000	$16,200,000	$21,600,000
New Airport	- NA -	$4,077,150	$8,154,300	$12,231,450

FISCAL IMPACTS

The fiscal impacts include a wide variety of taxes generated by the economic impacts discussed in the previous pages. These include: direct and indirect wages, visitor-related jobs (salaries), hotel, auto, retail, sales taxes and rentals, jet fuel/airline tickets, and property development. Income taxes are generated by direct and indirect wages in two main categories: airport-related jobs and visitor spending-related jobs. As can be seen on the table on the facing page, these figures are the same for both airport scenarios where the base data was drawn from the previous analysis and jobs and wages and the visitor expenditures were the same. The figures in the table at the top assume an effective state income tax of approximately 4%. Total taxes generated by each of the four categories is fairly evenly distributed among them. Income taxes are forecast to grow from $78 million in 2005 to roughly $90 million in 2020. Because Minnesota and Wisconsin have established a taxation reciprocity agreement, people who live in Wisconsin and work in Minnesota pay taxes in Wisconsin; under the reciprocity agreement, Wisconsin is obliged to return collected tax revenue from individuals working in Minnesota to the Minnesota Treasury.

State retail sales taxes are currently at 6.5%. (We are aware that not all retail items are taxed in the state; for example, apparel.) Based on our past experience, we have assumed that 50% of total wages are spent on retail items by workers. Here again, the retail taxes generated by each of the two scenarios is equivalent: up to $64 million in 2005, increasing to $73 million in 2020. Sales taxes generated by visitor expenditures fall into categories of goods (restaurant, retail, entertainment), rentals (auto), and hotel rooms. Taxes applied to tourist expenditure estimates by category resulted in totals of $156 million in 2005 increasing to $194 million in 2020. Jet fuel tax, a relatively minor contribution, hovers around $2 million throughout the study period for each scenario.

Taxes on real estate differ between the two scenarios because there are two sets of induced impact forecasts. The analysis assumes a median or approximate 6% effective property tax rate which would be applied to hotel, office, and industrial development. These are applied to ERA's forecasts for MSP expansion, and the Metropolitan Council's Dakota County forecast. For MSP, the forecasts have concluded that the majority of the revenue will be generated by hotels (80% of the total), and that the incremental property taxes will grow from $5.4 million to $21.6 million in 2020. Figures for the new airport show that office and hotel tax revenues are approximately equivalent, and the total increment will grow from $4.1 million to $16.3 million in the 15-year period. Assuming that the current real estate tax redistribution program, Fiscal Disparities, will remain in force over the forecast period, a portion of induced property taxes generated in either scenario will be reallocated to other communities in the metro area which posses narrow tax bases.

State Income Taxes Paid by Airport and Visitor Industry Direct and Indirect Employment, MSP Expand and New Airport

Tax Category	2005	2010	2015	2020
Airport Direct	$21,848,221	$22,457,814	$22,918,683	$23,240,729
Airport Indirect	$17,714,537	$18,208,796	$18,582,468	$18,843,583
Visitor Direct	$19,442,775	$21,224,093	$22,684,443	$24,128,739
Visitor Indirect	$19,355,454	$21,128,772	$22,582,563	$24,020,372
Total Taxes	$78,360,988	$83,019,474	$86,768,156	$90,233,423

Forecast Jet Fuel Tax Collections, MSP Expand and New Airport Scenarios

Category	2005	2010	2015	2020
MSP Expand	$1,878,600	$1,937,113	$1,957,340	$2,003,540
New Airport	$1,878,600	$1,937,113	$1,957,340	$2,003,540

Sales Tax Revenue Generated by Total Wages, MSP Expand and New Airport Scenarios

Wages	2005	2010	2015	2020
MSP Expand	$63,668,302	$67,453,323	$70,499,127	$73,314,656
New Airport	$63,668,302	$67,453,323	$70,499,127	$73,314,656

Sales Taxes Generated From MSP Visitor Expenditure, MSP Expand and New Airport Scenarios

Category	2005	2010	2015	2020
Hotel	$81,512,466	$88,980,514	$95,102,929	$101,158,038
Restaurants	$39,737,327	$43,378,000	$46,362,678	$49,314,544
Retail	$17,219,508	$18,797,134	$20,090,494	$21,369,636
Entertainment	$13,245,776	$14,459,333	$15,454,226	$16,438,181
Transportation	$4,888,484	$5,336,359	$5,703,534	$6,066,672
Total	$156,603,561	$170,951,340	$182,713,860	$194,347,071

MSP Reuse

One issue of new airport construction in Dakota County is the redevelopment of the current airport. The issue of MSP reuse was first explored by a consultant team for the Metropolitan Council in 1993. The 1993 study, which forwarded several commercial and residential reuse options for the MSP site, was used by ERA and DSU as background for projection of economic impacts generated by the reuse of MSP. The range of economic impacts includes direct and indirect jobs and wages, construction impacts, as well as fiscal benefits. It is important to note that that complete absorption of the 3,100 acre property could take up to fifty years. Projection of future economic impacts generated by MSP reuse is based on several key assumptions.

- That average annual net absorption rates for commercial property achieved between 1985 and 1995 are indicative of expected demand for commercial space after 2005.
- That environmental mitigation and land ownership issues on the MSP site will be resolved in a timely fashion, allowing site preparation to begin after the Dakota County airport opens in 2005.
- That MSP redevelopment will be market driven.
- That surrounding vacant properties will be nearing built-out by 2010.
- That the airport property will be developed with appropriate zoning and land use controls.

Research conducted by ERA in Part II of this report focusing on real estate development trends in the Twin Cites was used as the basis for projections of future absorption rates for the MSP site. The primary submarket used for the analysis was the Southwest area, as defined by Towle Real Estate. It was assumed that between 25% and 50% of new commercial space in the southwest submarket would be developed on the MSP site through the forecast period. Projection of new residential construction on the MSP site was based on Metropolitan Council data on housing permits. The first table on the facing page indicates average annual absorption indices used in the analysis.

ERA projected the construction of new space captured by the MSP site, as shown in on the facing page. The rates of development are shown as ranges, to reflect uncertainty about demand for commercial space and residential units in 2010. The table shows that, by 2020, the site is forecast to contain up to 1.5 million square feet of office space, 3.2 million square feet of industrial space, 750,000 square feet of retail space, and up to 1,800 residential units.

Economic impacts generated by redevelopment of MSP include direct employment and wages associated with on-site uses, indirect employment in the region generated by re-spending of wages by on-site users, and property taxes. The facing table indicates that projected commercial development on the airport site will support potentially between 12,600 and 15,700 jobs by 2020. Using 1993 direct wages for retail sales, manufacturing, and finance, insurance and real estate (FIRE), the MSP site could generate a maximum of $53 million in 2010, growing to $533.8 million by 2020.

Indirect or multiplier effects in the regional economy, are also created by expenditure of direct wages on goods and services on the MSP site. Indirect employment generated by activity at the site will generate a range between roughly 20,000 indirect jobs and roughly $580 million in wages by 2020. Commercial development would also generate roughly $7.5 million property taxes in 2015, growing to roughly $15 million in 2020. The direct and indirect impacts are considered by ERA to be rough estimates; the absence of final development plans for the site as well as uncertainty over allowable on-site uses creates a potentially large margin of error.

Average Absorption in the Southwest Submarket for Indicated Years

Category	Time Period	Average. Absorption
Class A Office	1985 to 1995	300,000 Square Feet
Flex/Industrial	1987 to 1994	1,300,000 Square Feet
Retail	1987 to 1995	150,000 Square Feet

Forecast Total Commercial and Residential Inventory, in Five-Year Increments, Low and High Scenarios, MSP Reuse

Space Category	2010		2015		2020	
	Low	High	Low	High	Low	High
Office	120,000	150,000	600,000	750,000	1,200,000	1,500,000
Industrial	260,000	325,000	1,300,000	1,625,000	2,600,000	3,250,000
Retail	60,000	75,000	300,000	375,000	600,000	750,000
Residential	144	180	720	900	1,440	1,800
Note: All commercial space is in square feet; residential refers to living units						

Forecast Direct Employment, Low and High Scenarios, MSP Reuse

Space Category	2010		2015		2020	
	Low	High	Low	High	Low	High
Office	462	577	2,308	2,885	4,615	5,769
Industrial	578	722	2,889	3,611	5,778	7,222
Retail	222	278	1,111	1,389	2,222	2,778
Total	1,262	1,577	6,308	7,885	12,615	15,769

Regional Impact Allocations

As the aforementioned indices have shown, airport activity generates a considerable economic impact. While each impact category, including direct, indirect, induced, fiscal, construction, or visitor industry, is considerable, the separate regions (metro area, Minnesota, and multi-state area) do not all benefit equally from such activity. Specifically, the impacts of direct employment and wages are confined primarily to the metro area, in relation to where airport employees live. Although a certain percentage of airport employees live in Wisconsin, reciprocity agreements between Minnesota and Wisconsin ensure that revenue losses to Minnesota are minimal. While indirect jobs and wages are calculated with a state level multiplier, the majority of such impacts are concentrated at the metro area level, since the majority of airport employees live in the metro area. Although fiscal impacts of airport activity are generated primarily in the metro area, the revenue generated by taxes accrues at the state level for disbursement based on budgeted needs; as such, the fiscal impacts of airport activity benefit the entire state.

While induced real estate impacts will create additional property tax revenue for taxing jurisdictions in the metro area, the fiscal disparities program will insure that a proportion of taxes generated by induced commercial growth will be re-allocated in the metro area to municipalities which do not possess diverse tax bases. While the majority of construction impacts are aggregated at the state level, a small proportion of the total impact will be lost to the state and region, depending on the extent of out-of-state construction employment and materials necessary. Visitor industry impacts also occur state-wide, although the majority of impact is felt at the metro area level.

Although the multi-state area can expect minimal direct material or economic gains from either MSP expansion or new airport construction, the surrounding states could benefit as a whole, since either scenario will allow for unconstrained air service in the Twin Cites, providing the multi-state region with a hubbing airport alternative to Chicago-O'Hare, St. Louis, and Kansas City International Airports. The multi-state region would arguably be worse off under the no-build, since capacity constraints at MSP would reduce the availability of flights to and from smaller markets in the region.

Land Use Changes Around MSP

Land use changes are anticipated in each of the communities directly surrounding the airport, and are summarized below. See Figure E-1.

Minneapolis - The movement of the terminal from the existing site to the west side would induce pressure for commercial redevelopment of existing noise-impacted residential areas in the southern portion of Minneapolis. Continued use of the MSP site will help the city in its efforts to redevelop the Hiawatha Avenue Corridor.

Richfield - The acquisition of New Ford Town and Rich Acres (both located east of TH 77) by the Metropolitan Airports Commission has already begun. No additional land acquisition in Richfield would be necessary to expand MSP. Richfield expects redevelopment for office or office/warehouse uses along the west side of Ceder Avenue (TH 77), with redevelopment of the next block west for duplex or attached residential uses to buffer adjacent residential neighborhoods.

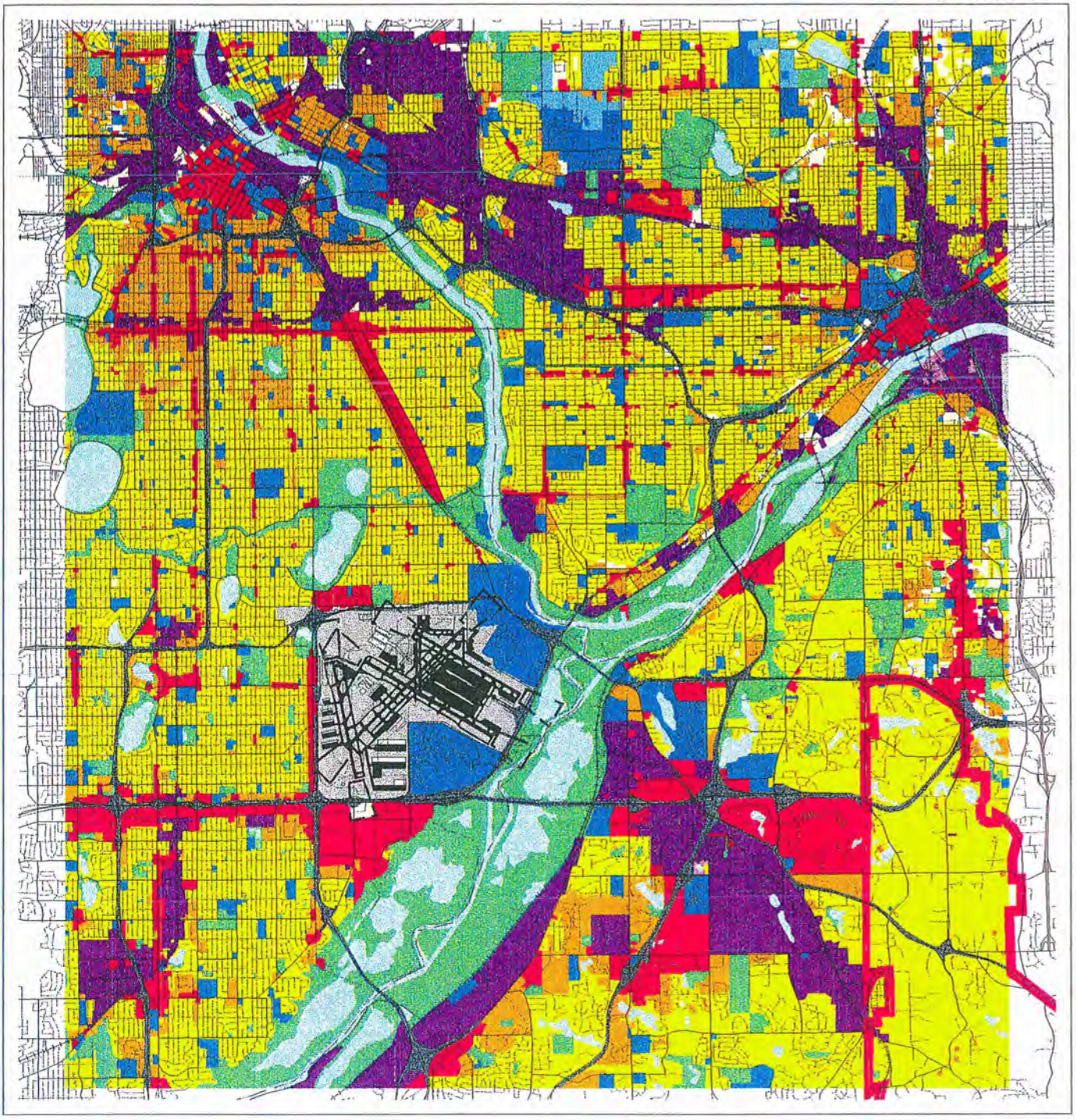
Bloomington - The expansion of MSP will require the acquisition of several properties that are in the runway protection zone of the new north-south runway. State Safety Zone restrictions would impact areas of the city that have not previously been under such restrictions. It is anticipated that Bloomington will continue to use the proximity of the airport and the attractiveness of the Mall of America to pursue commercial, office and hotel development opportunities in the Airport South area, whether the airport is expanded or not.

St. Paul - The Shepard Road corridor connecting the MSP site with downtown St. Paul is the major area in which land use changes may occur. Airport related uses are anticipated at the extreme southern end of the corridor. Re-use of older industrial sites in this corridor for housing and mixed use development is likely to occur, due to the proximity of the Mississippi River.

Eagan - Substantial vacant or underutilized industrial and commercial areas exist in the major roadway corridors of the City, and portions of the residential areas have yet to be developed. The continuing growth of the airport will help build out these portions of the City of Eagan.

Mendota Heights, Mendota and Lilydale - Mendota Heights has limited additional area for commercial and industrial development. This land can be expected to be built out in the near future. The Cities of Lilydale and Mendota are primarily residential in nature, and limited additional development is anticipated to occur.

FIGURE E-1



Land Use Categories

- Single Family
- Multi-Family
- Commercial
- Industrial
- Public/Semi-Public
- Airport
- Park
- Vacant
- Road
- Water
- Farmstead
- Vacant Industrial
- Vacant Public /Semi-Public
- 1992 MUSA

Scale In Feet

5000 2500 0 5000 15000

N

Future Land Use - MSP Expansion Alternative

Land Use Changes With New Airport

Substantial land use changes are anticipated in each of the communities in Dakota County if the new airport is built. These changes are illustrated graphically in Figure E-2. There will also be changes in the communities surrounding MSP, as well as re-use of the MSP site. These changes are illustrated in Figure E-3.

Dakota County

Most of the land in, and adjacent to, the proposed site is currently in agricultural use, with scattered rural residential uses. Communities near the site include the City of Hastings and the rural centers of Miesville, New Trier, Hampton and Vermillion. Very little growth is expected in the four rural centers, and in the absence of a new major airport, current land uses (primarily residential with some commercial and public uses) would not be expected to change significantly in the future. The City of Hastings is a freestanding growth center that has sustained modest growth over the past 20 years.

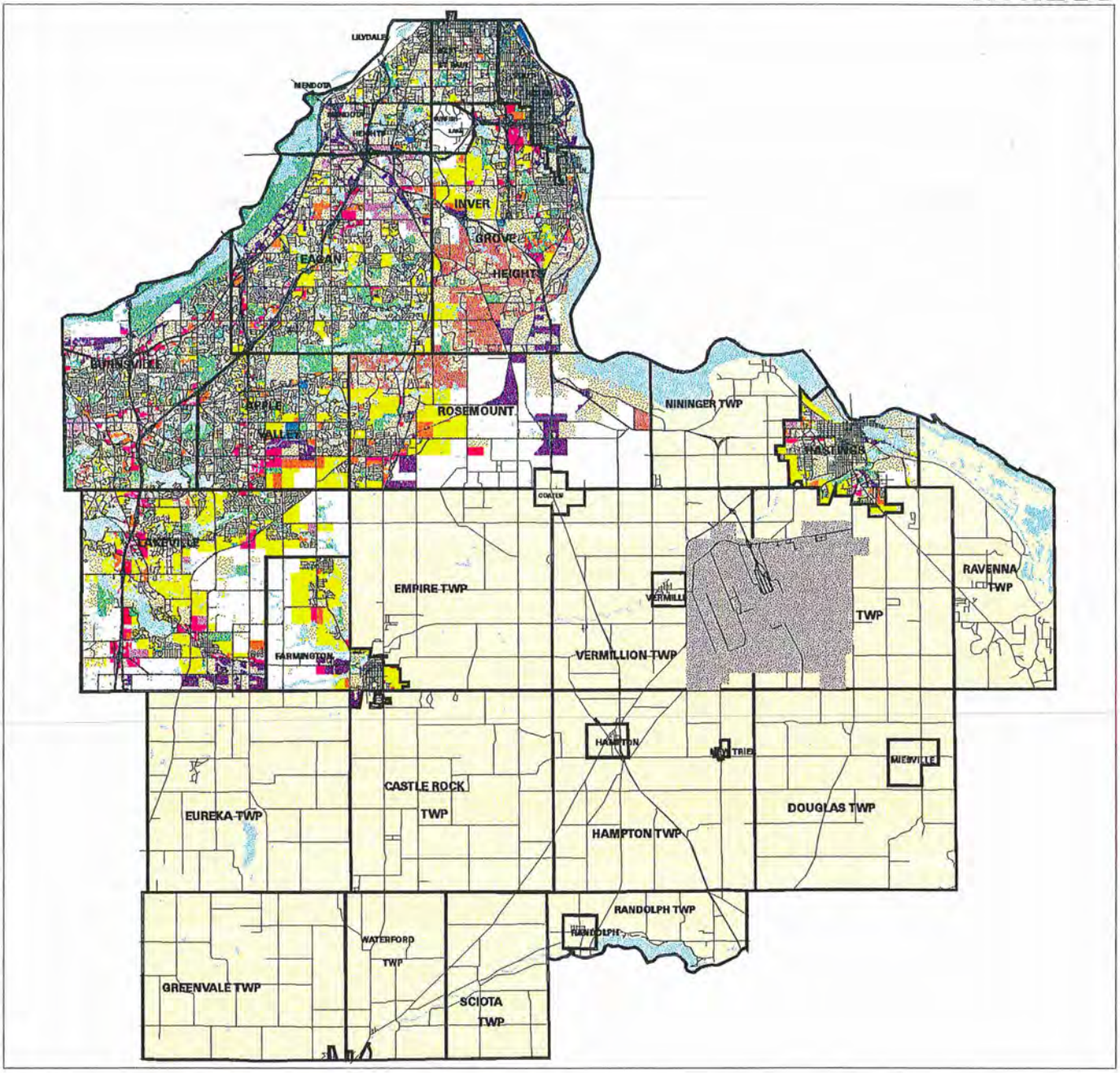
Development associated with the new airport is projected to occur within the existing communities served by metropolitan sewer and water systems, as well as the free-standing growth center of Hastings. Development in Mendota Heights and Eagan could continue to respond to the New Airport, although it can be anticipated that sites to the south would experience higher demand than would be anticipated without the development of the New Airport. Substantial residential and industrial development would be anticipated on the fringe of the City of Hastings.

Some rural residential development adjacent to the airport can be anticipated. The average size of residential lots within four inner townships (Vermillion, Douglas, Hampton, and Marshan) surrounding the Dakota County airport site is now approximately 5 acres. With the 1,075 new households forecast to be added to the four inner townships, a loss of between 6,000 and 10,000 acres of agricultural land would occur. If this loss of farm land were distributed equally across the four townships, approximately 20 to 25 percent of Hampton and Douglas Township agricultural land would be lost; the percentage of land dedicated to rural residential development in Vermillion and Marshan Townships would be much greater due to the airport site itself (approximately 14,100 acres). Experts in the sustainability of agricultural areas point out that the intrusion of non-agricultural uses on greater than 20 percent of the land area of an agricultural region threatens the long-term viability of agricultural uses. With well over 20 percent of the land in these Townships not engaged in agriculture, the transition point in Dakota County would be surpassed.

Land Use Changes at MSP Site with New Airport

The City of Bloomington, which has substantial development plans for the area that lies to the south of the existing airport, would be adversely affected by redevelopment of the airport site. Most of the redevelopment activity to the south of the airport is expected to be completed prior to moving the airport. Any further redevelopment activity can be presumed to be in direct competition with adjacent sites in Bloomington. In addition, efforts near the site in Richfield, Minneapolis, and St. Paul would suffer from the same competition.

FIGURE E-2

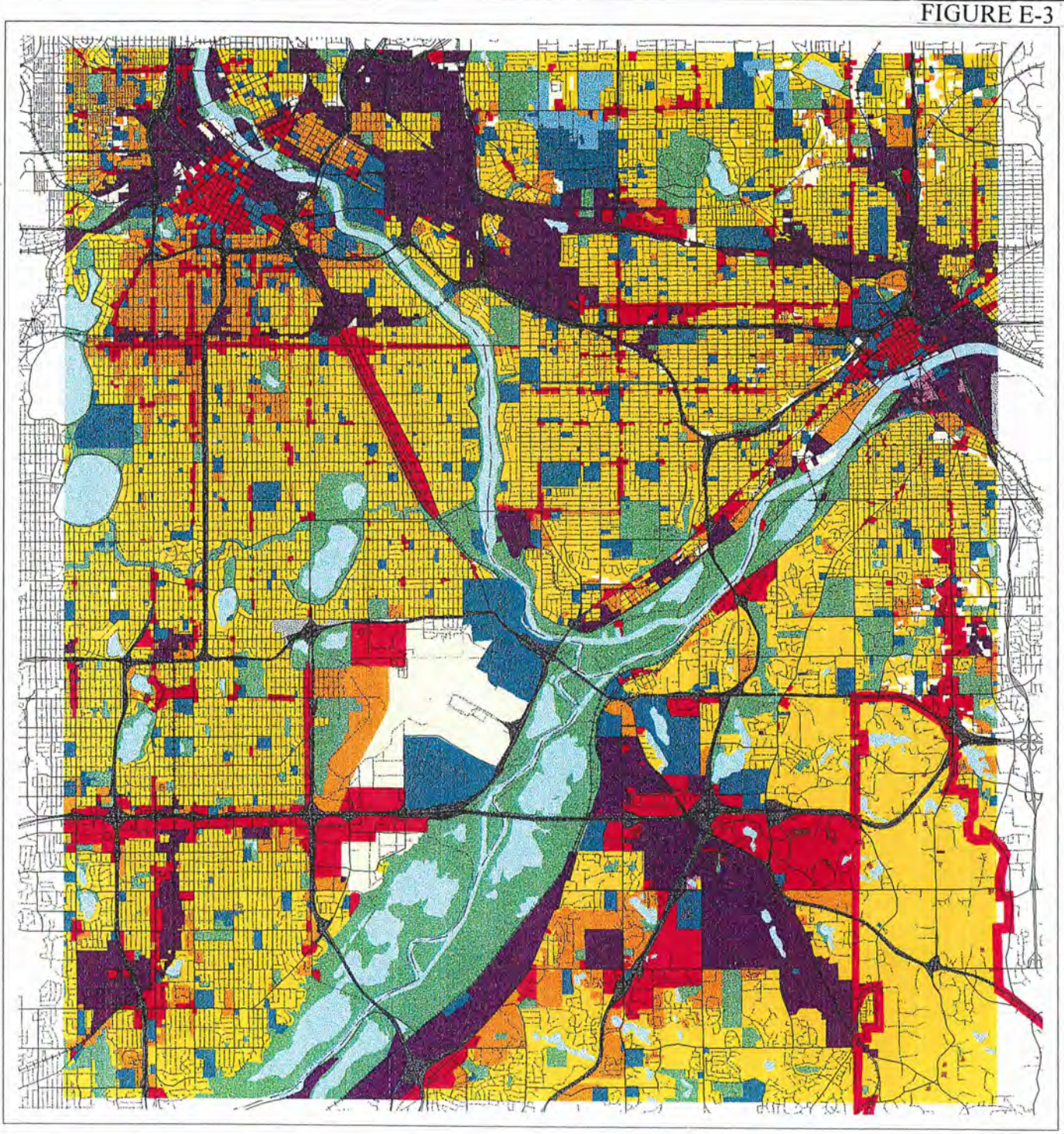


Land Use Categories

- Single Family (urban density)
- Single Family (rural density)
- Townhomes
- Apartments
- Retail
- Office
- Industrial
- Institutional
- Lake/Wetlands
- Developed or Undevelopable
- Parks
- Roads
- Ag and Vacant/Rural Area

Future Land Use - New Airport Alternative

FIGURE E-3



Land Use Categories

- Single Family
- Multi-Family
- Commercial
- Industrial
- Public/Semi-Public
- Airport
- Park
- Vacant
- Road
- Water
- Farmstead
- Vacant Industrial
- Vacant Public /Semi-Public
- 1992 MUSA

Scale In Feet

5000 2500 0 5000 15000

N

Future Land Use - MSP Re-Use Alternative

Part II

Regional Discussion

- Part II -
Regional Characterization

Introduction

Analysis of economic, political, land use, and demographic trends which have shaped real estate and economic development in the Minneapolis/St. Paul metropolitan area is an important step in the forecasting of impacts generated by the alternative airport development scenarios. Understanding the nature of past trends in the Twin Cities metro area will establish precedents necessary for projection of development impacts, as well as the specific role that airport development has in this context. Such analysis is critical, since planned investment for MSP expansion (±$2.8 billion) or new airport construction (±$4.5 billion) will require potentially dramatic changes in land use patterns and generate substantial short-term construction impacts in the region. Discussion of historic trends will focus initially on the state and regional levels, before moving to the 13-county Twin Cities MSA, the seven-county metro area, the seven communities in the localized impact areas around MSP and the Dakota County airport site. Maps of each area are provided on following pages.

The multi-state regional area served by MSP is defined, for the purposes of this report, as those states which 1) are neighboring Minnesota and/or 2) are dependent on the current airport for connecting airline flights. This region includes all or part of the states of Minnesota, North Dakota, South Dakota, Nebraska, Iowa, Illinois, and Wisconsin.

The region that encompasses most of the area affected by the airport is the MSA, or Metropolitan Statistical Area, as recognized by the U.S. Census Bureau. This region includes 11 counties in Minnesota: Anoka, Carver, Chisago, Dakota, Hennepin, Isanti, Ramsey, Scott, Sherburne, Washington, and Wright, plus two counties in Wisconsin: Pierce and St. Croix. The metropolitan area, as defined by the Metropolitan Council, a state mandated regional organization, is a seven-county region surrounding the Twin Cities. These counties are Anoka, Carver, Dakota, Hennepin, Ramsey, Scott, and Washington.

The area immediately surrounding MSP, referred to as a localized impact area, is defined by Economics Research Associates (ERA) as those communities proximate to the airport which are affected to some extent by induced, airport-related growth: Minneapolis, St. Paul, Richfield, Bloomington, Eagan, Mendota Heights, and Lilydale. The seven communities supply both employment and services to the airport and receive a substantial proportion of airport related jobs in freight forwarding, hotels, and other uses. The proposed site for new airport development in Dakota County is considered as a separate impact area. Discussion of growth indices relevant to Dakota County will be noted throughout the section as well.

Because MSP is centralized in the MSA roughly equidistant from downtown Minneapolis and St. Paul, and the proposed location for the Dakota County airport is

roughly 20 miles south of the current site and closer to Wisconsin, this section will evaluate socioeconomic and market factors for the entire 13-county region, and not limit the regional definition to the Metropolitan Council purview area. Where possible, comparisons of growth forecasts generated by state agencies and the Metropolitan Council will be made. The seven-county area will be used to assess office, industrial, and residential real estate development patterns and policy issues, since the majority of such growth in the state is concentrated within the Twin Cities metro area. Considering that growth trends are intertwined with government policies and public attitudes on growth and development, the seven-county discussion will incorporate an overview of development policies, issues, and public attitudes on growth, as well as a history of land use change in the Twin Cities metro area, generated by Dahlgren, Shardlow, and Uban (DSU).

Part II also establishes a context for evaluation of the effect on business growth in each localized impact area created by MSP expansion or new airport construction. MSP expansion will further solidify development patterns in the region; a new airport will alter land use patterns and lead to eventual commercial growth in Dakota County. A thorough characterization of the market areas defined above will describe past socioeconomic change and development in the environs of MSP and Dakota County, leading to establishment of parameters for prediction of future impacts resulting from each airport decision alternative.

ERA Economics Research Associates

DAHLGREN SHARDLOW AND UBAN Consulting Planners Landscape Architects

Figure 1
Multi-State Airport Impact Region

Economics Research Associates

DAHLGREN SHARDLOW AND UBAN

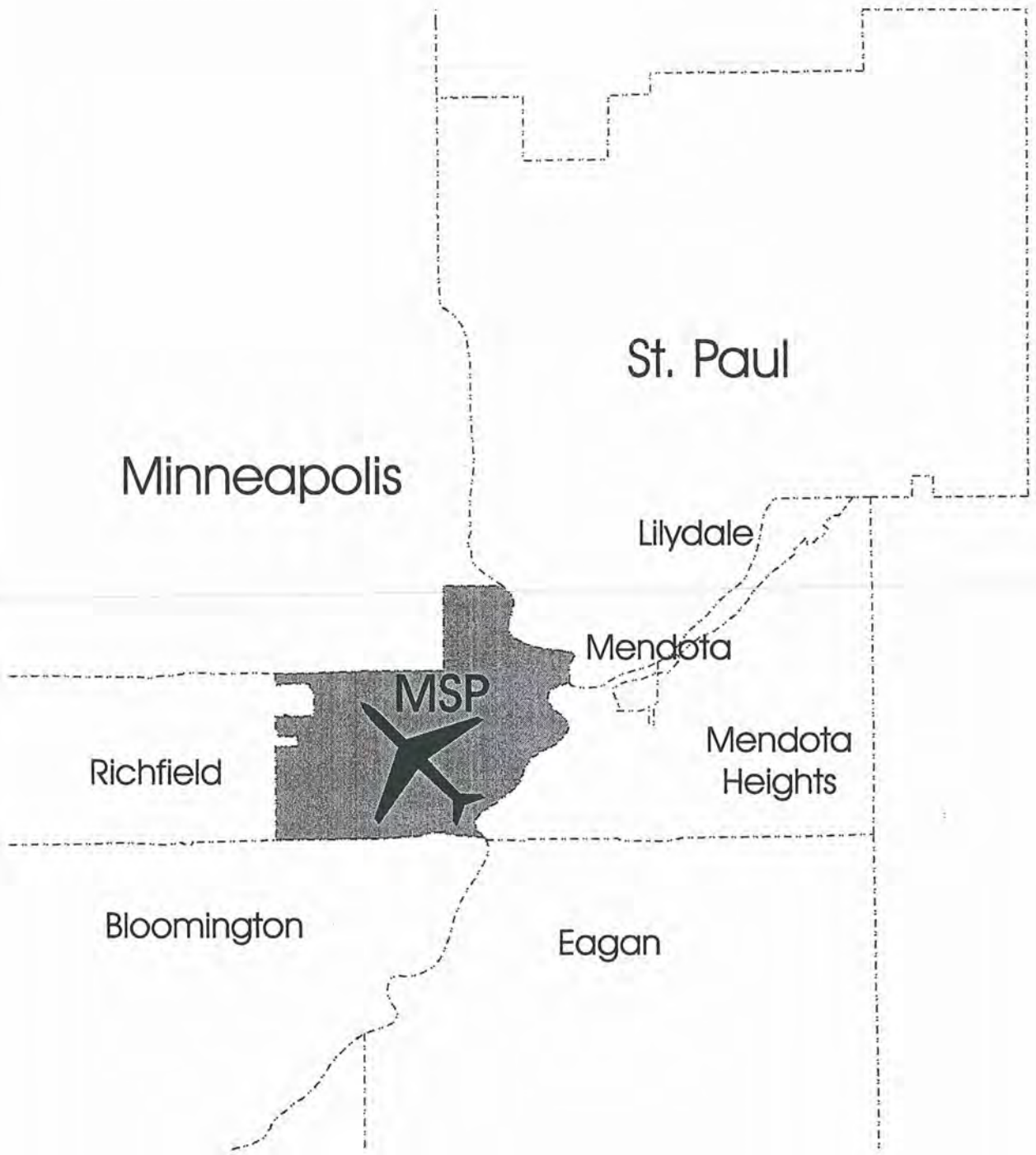
Consulting Planners
Landscape Architects

Figure 2
State of Minnesota Impact Region

Economics Research Associates

Consulting Planners
Landscape Architects

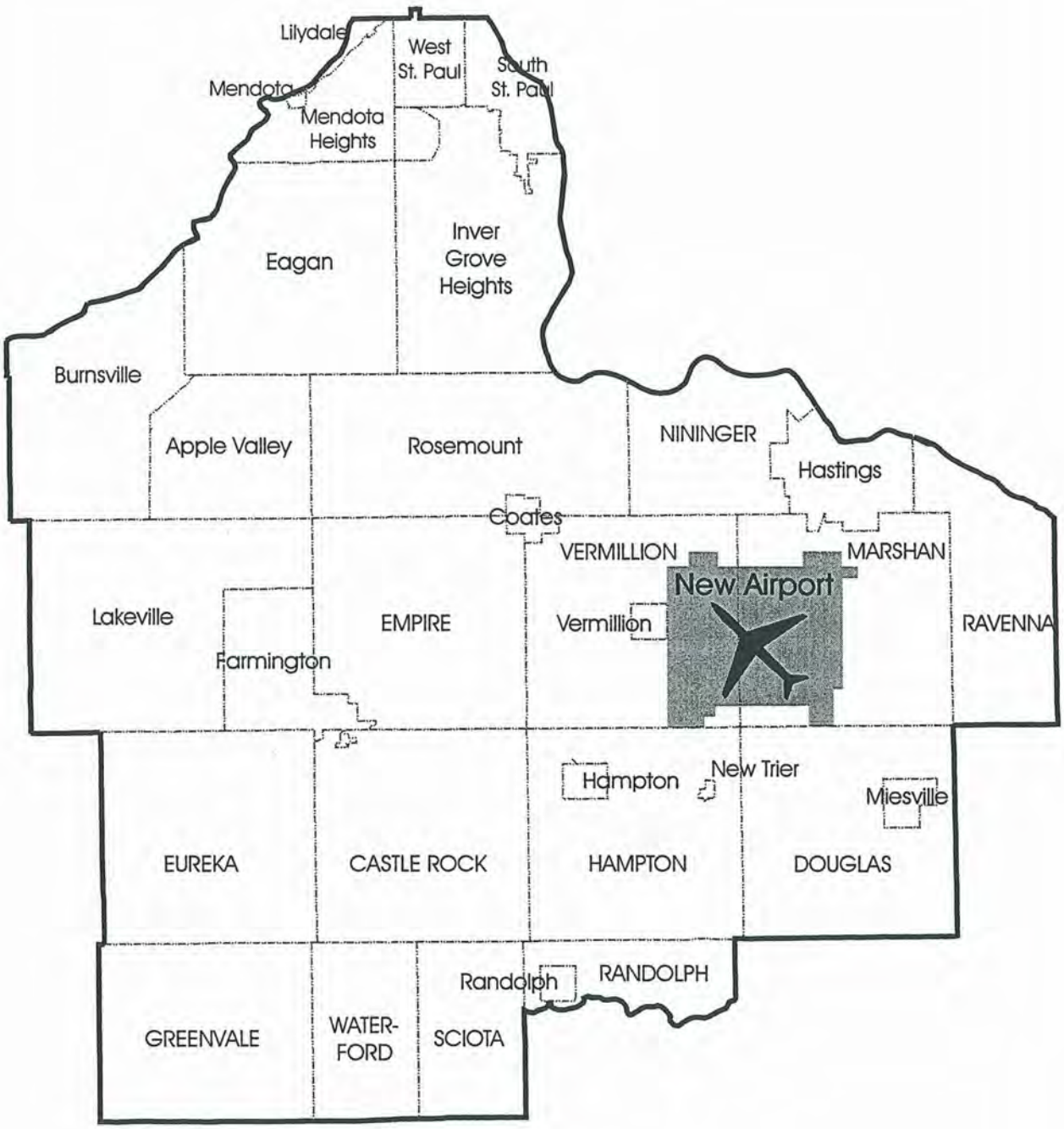
Figure 3
Twin Cities Airport Impact Region



ERA Economics Research Associates

DAHLGREN SHARDLOW AND UBAN Consulting Planners Landscape Architects

Figure 4
MSP Localized Airport Impact Area



ERA Economics Research Associates

DAHLGREN SHARDLOW AND UBAN Consulting Planners Landscape Architects

Figure 5
New Airport Localized Impact Area

Multi-State Region Discussion

Population

The multi-state region contained a total population of 26,843,123 persons in 1994, as shown in Table 2-1 below. Of the seven states covered in the region, Illinois contained roughly 11.6 million people, or about 43% of total population. Minnesota, with 4.5 million people in 1994, was just smaller than Wisconsin, which contained roughly 5 million people. Iowa was the largest of the remaining four states, with a reported 1994 population of roughly 2.75 million people. The following table outlines historic population trends for the region.

Table 2-1: Historic Multi-State Population Trends, 1960 - 1994

State	1960	1970	1980	1990	1994	Annual Change
Minnesota	3,413,864	3,804,971	4,075,970	4,375,099	4,502,452	0.8%
North Dakota	632,446	617,761	652,717	638,800	634,335	0.0%
South Dakota	680,514	665,507	690,768	696,004	711,546	0.1%
Nebraska	1,411,330	1,483,493	1,569,825	1,578,385	1,603,179	0.4%
Iowa	2,757,537	2,824,376	2,913,808	2,776,755	2,754,172	0.0%
Illinois	10,081,158	11,113,976	11,426,518	11,430,602	11,614,018	0.4%
Wisconsin	3,951,777	4,417,731	4,705,767	4,891,769	5,023,421	0.7%
Total:	22,928,626	24,927,815	26,035,373	26,387,414	26,843,123	0.5%

Source: U.S. Bureau of the Census, 1990

It is interesting to note that, although Minnesota is only the third largest state in the region, the state achieved the highest population growth rate in the region. Total population in Minnesota grew from 3.41 million in 1960 to 4.5 million in 1994, an increase of 1,088,588 persons over the thirty-four year period, or 0.8% on an average annual basis. Only Wisconsin achieved a comparable annualized population growth rate (0.7%) over the past 34 years. Although none of the seven states in the region experienced an overall decline in population, North and South Dakota experienced virtually flat growth, with total increases of 1,889 and 31,032, respectively, over the 34 year period.

Forecasts of population growth for the seven-state region were generated by the Federal Bureau of Economic Analysis to the year 2020. The regional population forecasts, outlined in the following table, are indicative of moderate growth activity over the next 25 years. The table indicates that forecasted population growth will occur primarily in Minnesota, North Dakota, Illinois, and Wisconsin. Minnesota is expected to grow by 580,000 residents over the 25 year period, or about 20,300 on an average annual basis.

Table 2-2: Forecasted Multi-State Population, 1995 - 2020						
State	1995	2000	2005	2010	2020	% Change 1995 - 2020
Minnesota	4,538,000	4,657,000	4,765,000	4,869,000	5,046,000	11%
North Dakota	669,000	698,000	708,000	719,000	743,000	11%
South Dakota	739,000	749,000	759,000	771,000	796,000	7.7%
Nebraska	1,657,000	1,686,000	1,715,000	1,748,000	1,809,000	9%
Iowa	2,933,000	2,961,000	3,030,000	3,084,000	3,202,000	9%
Illinois	12,086,000	12,362,000	12,625,000	12,863,000	13,345,000	10.4%
Wisconsin	5,055,000	5,159,000	5,258,000	5,360,000	5,553,000	9.9%
Total:	27,677,000	28,272,000	28,860,000	29,414,000	30,494,000	10.2%
Source: Bureau of Economic Analysis						

Wisconsin is forecasted to grow by less than 500,000 residents over the same period, adding roughly 19,920 additional residents on an average yearly basis through 2020. The forecasts predict that total regional population will expand by roughly 2.8 million residents between 1995 and 2020, or about 112,600 on an average annual basis.

Employment

As shown in Table 2-3 below, employment in the multi-state region grew from about 11.95 million in 1980 to 13.3 million in 1989. About 1.3 million jobs were created over the nine-year period, or about 150,000 on an average annual basis. Job creation was particularly strong in Illinois and Minnesota, which averaged 13% and 12% employment growth, respectively, over the same period. Employment growth in Wisconsin accounted for about 265,000 new jobs between 1980 and 1989, which is reflective of roughly 12% annual growth.

Table 2-3: Historic and Projected Multi-State Employment, 1980 - 2020						
	Actual		Projected			% Change
State	1980	1989	1995	2000	2010	1995 - 2010
Minnesota	1,996,000	2,241,000	2,772,600	2,905,000	3,025,900	9.1%
North Dakota	293,000	317,000	388,400	401,600	411,200	5.9%
South Dakota	322,000	346,000	409,400	424,600	436,000	6.5%
Nebraska	745,000	787,000	996,100	1,036,300	1,069,600	7.4%
Iowa	1,366,000	1,448,000	1,688,600	1,757,200	1,815,400	7.5%
Illinois	4,993,000	5,656,000	6,645,000	6,952,500	7,237,500	8.9%
Wisconsin	2,232,000	2,497,000	2,888,000	3,012,500	3,118,500	7.98%
Total:	11,947,000	13,292,000	15,788,100	16,489,700	17,114,100	8.4%
Source: Actual employment by U.S. Census, Projections by Bureau of Economic Analysis						

Projections of employment growth through the year 2010, generated by the Bureau of Economic Analysis in 1990, are outlined in Table 2-3 as well. The projections indicate that Minnesota will achieve the highest rate of employment growth by 2010 (9.14%), adding roughly 253,000 jobs over the 15-year period. Economic activity in Illinois and Wisconsin will create over 823,000 jobs by 2010, with Illinois accounting for 71% of the two-state total. The projections also indicate that employment growth rates for the Dakotas will be low, with less than 50,000 new jobs added by 2010. Overall, the regional economy is expected to add 1.3 million new jobs over the next 15 years.

Air Service

In discussing the impact of the alternative development scenarios to the multi-state region, it is important to note that roughly 146 cities are served by airlines operating out of MSP, according to the April 1995 Official Airline Guide (OAG), which includes non-stop, one-stop, and connecting flights. A total of 42 destinations are in the seven-state region, of which 40 are served exclusively by Northwest Airlines. A table, compiled from the April 1995 Guide is located in the appendix for reference. The significance of MSP as a connecting hub for regional and national air traffic is shown in Table 2-4, which outlines originations, connections, and total passengers for MSP between 1978 and 1984.

Table 2-4: Historical Passenger Enplanement Trends, MSP, 1978 - 1994

Year	Originations	Connections	Regional	International	Non-scheduled	Total
1978	2,714,940	1,141,837	35,226	372	145,939	3,892,375
1979	3,040,040	1,548,231	49,087	--	129,788	4,637,358
1980	2,839,620	1,445,597	42,547	28,731	113,793	4,356,495
1981	2,623,110	1,768,692	30,137	57,871	85,869	4,479,810
1982	2,864,730	2,206,665	75,774	50,574	82,278	5,197,743
1983	3,039,930	2,662,164	118,783	49,638	149,486	5,870,515
1984	3,599,610	2,386,678	130,610	73,014	187,076	6,189,912
1985	3,879,830	3,234,537	156,825	83,533	312,186	7,354,725
1986	4,089,850	3,755,644	290,700	81,700	238,972	8,217,894
1987	4,069,320	4,101,886	366,374	85,023	205,700	8,622,603
1988	4,185,580	3,837,541	397,835	65,265	266,344	8,486,221
1989	4,457,910	3,892,010	415,910	78,910	343,418	8,844,740
1990	4,512,740	4,096,898	495,439	102,673	387,320	9,207,750
1991	4,366,630	4,316,602	492,075	124,125	353,590	9,299,432
1992	4,580,060	4,970,926	566,186	144,255	419,060	10,261,427
1993	5,759,810	4,092,100	642,190	177,458	350,918	10,671,558
1994	5,697,800	4,426,000	640,900	177,200	460,200	10,941,900

Source: HNTB

The table indicates that the number of connecting passengers at MSP has risen faster then the number of originating since 1978. While originating traffic grew by 109% over the 16 year time period, connecting traffic grew by more than 285%. Also significant is the growth in regional/commuter emplanement activity, which rose from about 35,200 passengers in 1978 to 640,900 passengers by 1994, roughly equivalent to 20% average annual growth.

As the previous table shows, regional air travel grew tremendously after 1978, as airline deregulation opened up smaller short-haul markets to regional carriers. Deregulation allowed larger carriers, such as Delta, United, and Northwest, to withdraw from smaller short-haul markets which could not be efficiently served by jet aircraft. As a result, regional carriers developed a competitive advantage in servicing short-haul markets, due primarily to their lower operating cost structures. After 1985, increased cooperation between national and regional carriers through code sharing arrangements and other means allowed the national carriers to rationalize their route systems. As a result, regional carriers gained additional short-haul routes and experienced considerable additional enplanement growth.

The increasing significance of regional airlines serving the Twin Cities is significant for two related reasons. First, Northwest Airlines, which controls roughly 80% of the MSP market, relies extensively on the concept of "frequency dominance" where by smaller markets in the region are served with 3 to 5 daily flights on small, 100-seat, jet aircraft.[1] Second, assuming that future demand for air travel in the Twin Cities increases as forecasted, additional capacity at MSP may be required to ensure that smaller regional airlines' aircraft are not squeezed out in favor of larger jet aircraft.[2]

13-County Metropolitan Region Discussion

Population

Population growth levels in the 13-county metropolitan region began a dramatic upswing after 1970, as the following table indicates. In 1970, the MSA contained a population of 2,026,947. By 1993 the MSA population had grown to 2,649,177, which is representative of 31% growth over the 23 year period, or 1.2% on an average annual basis.. Population growth was particularly strong from 1980 to 1990, when the MSA population grew by almost 16% overall.

Table 2-5: 13-County Historic Population Trends, 1970 - 1993

County	1970	1980	1990	1993	Rate of Change
Anoka	154,712	195,998	243,641	261,814	2.3%
Carver	28,331	37,046	47,915	52,758	2.7%
Chisago	17,492	25,717	30,521	33,255	2.8%
Dakota	139,808	194,279	275,189	298,679	3.4%
Hennepin	960,080	941,411	1,032,431	1,051,426	0.4%
Isanti	16,560	23,600	25,921	27,567	2.2%
Ramsey	476,255	459,784	485,783	491,306	0.1%
Scott	32,423	43,784	57,846	64,242	3.0%
Sherburne	18,344	29,908	41,945	46,574	4.1%
Washington	83,003	113,571	145,858	163,500	3.0%
Wright	38,933	58,681	68,710	72,673	2.8%
St. Croix, WI	34,354	43,262	50,251	52,039	1.8%
Pierce, WI	26,652	31,149	32,765	33,344	1.0%
Total MSA:	2,026,947	2,198,190	2,538,776	2,649,177	1.2%

Source: Population Notes, April 1991, June 1995, U.S. Census

The populations of Hennepin and Ramsey counties, home to Minneapolis and St. Paul respectively, provide a good indication of the extent to which the urban counties have both lost and regained their viability. As the previous table shows, Hennepin and Ramsey Counties had populations of 960,080 and 476,225, respectively in 1970. By 1980, population in the two counties had fallen to 941,411 and 459,784 respectively. Overall, the two counties lost roughly 35,140 residents over that ten year period, as suburban growth activity increased. Even so, aggressive urban revitalization efforts in downtown Minneapolis and St. Paul in the late 1970's and 1980's maintained the viability of the urban centers; by 1990, the populations of Hennepin and Ramsey Counties had increased to 1,032,431 and 485,783 respectively. As the above table shows, the population growth trend in both counties has continued through 1993 as well.

Rates of population growth in the 11 suburban MSA counties began to increase dramatically after 1970 as new land was opened up for development. In 1970 the 11

suburban MSA counties had a population of 590,612, roughly 40% of total MSA population. In 1980, the suburban share of total MSA population had increased to almost 57%, or 796,995. By 1990 the 11 suburban counties contained roughly 1,020,562 residents, or 67% of total MSA population.

Four counties, Dakota, Scott, Sherburne, and Washington, achieved the highest average annual growth rates over the 23 year period. Sherburne County, located in a largely rural area between Minneapolis and St. Cloud, achieved the highest growth rate of all MSA counties with 4.1% average annual growth, increasing from a population of 18,334 in 1970 to 46,574 in 1993. Dakota County had the second highest average annual population growth rate (3.4%) in the MSA, increasing from about 139,000 residents in 1970 to about 298,600 residents in 1993. As the aforementioned data indicates, Dakota County is following an upward growth curve which would be further impacted if a new airport were built in the county.

Income

The distribution of per capita income in the 13-county MSA is outlined in Table 2-6, shown below. The table shows that dramatic income growth occurred in the 13 county MSA between 1969 and 1989. Between 1969 and 1979, average MSA per-capita income increased from $2,932 to $8,715, an increase of almost 200%.

Table 2-6: Historic Per-Capita Income Trends, 13 County MSA, 1969 - 1992

County	1969	1979	1989	1992	% Change 1969-1979	% Change 1979-1989	Annual Change
Anoka	3,055	8,656	16,578	17,913	183.3%	91.5%	8.0%
Carver	2,560	9,350	18,902	21,322	265.2%	102.2%	9.7%
Chisago	2,628	8,054	14,994	16,012	206.5%	86.2%	8.2%
Dakota	3,411	9,959	20,082	22,445	192.0%	101.6%	8.5%
Hennepin	3,852	11,564	22,584	27,197	200.2%	95.3%	8.9%
Isanti	2,511	7,488	13,812	16,132	198.2%	84.5%	8.4%
Ramsey	3,526	10,316	19,337	23,129	192.6%	87.4%	8.5%
Scott	2,886	9,374	18,180	19,657	224.8%	93.9%	8.7%
Sherburne	2,582	7,658	14,217	15,647	196.6%	85.6%	8.1%
Washington	3,110	9,501	19,886	20,758	205.5%	109.3%	8.6%
Wright	2,440	7,994	14,788	16,822	227.6%	85.0%	8.8%
St. Croix, WI	2,910	7,063	14,912	14,883	142.7%	111.1%	7.4%
Pierce, WI	2,645	6,315	12,203	11,873	138.8%	93.2%	6.7%
Total MSA	$ 2,932	$ 8,715	$ 16,960	$ 18,753	197.2%	94.6%	8.4%
Minnesota	$ 2,478	$ 9,226	$ 17,649	$ 20,503	272.3%	91.3%	9.6%

Source: Population Notes, Dec. 1995

State-wide per-capita income increased more dramatically over the same period, growing by 272%. By 1992, average per-capita income in the 13 county MSA was roughly $18,753, slightly below the state average of $20,503. The highest per-capita incomes are located in the downtown counties of Hennepin ($27,197) and Ramsey ($23,129). The counties with the fastest average annual income growth rate are Carver (9.7%), Hennepin (8.9%), and Wright (8.8%). Income growth in Carver was the strongest, showing a 272% increase between 1969 and 1979. Dakota County, site of the proposed new airport, experienced per capita income growth of over 550% over the 23 year period, growing from $3,411 in 1969 to $22,445 in 1992. The two MSA counties in Wisconsin, St. Croix and Pierce, have experienced declining income levels since 1989, falling by $29 and $330 respectively.

Employment

The Minneapolis/St. Paul MSA experienced considerable employment growth over the past 20 years. The following tables highlight employment trends by industry sector in the 13 county MSA between 1972 and 1992. Tables 2-7 and 2-8 are based on data from County Business Patterns and include employment sorted by two-digit SIC code into ten specific industry sectors: agricultural services, mining, construction, manufacturing, transportation, communications & utilities (T.C.U), wholesale trade, retail trade, finance, insurance, & real estate (F.I.R.E.), Services, and Other. Table 2-9, which summarizes changes in industrial sector employment between 1972 and 1992, is particularly useful in detailing how employment patterns evolved as the MSA economy changed over a 20-year period.

Service sector employment growth at the MSA level was the strongest, improving by 196.1%, reflecting an increase from 142,747 to 422,669 between 1972 and 1992, in line with national trends. Between 1972 and 1992, service employment grew from 20% to 33% of MSA employment. Although each of the 13 MSA counties recorded significant gains in service employment, growth was particularly strong in Anoka, Dakota, Hennepin, and Ramsey Counties, generating a total of 253,522 new service jobs. Service industry growth in the aforementioned counties equaled 91.97% of total MSA service employment in 1992.

Growth in manufacturing employment occurred in several counties, including Dakota (14,862 new jobs), Hennepin (15,193 new jobs), Anoka (12,401 new jobs), and Carver (7,905 new jobs). Pierce and St. Croix Counties in Wisconsin also gained roughly 3,600 manufacturing jobs over the 20 year period. Only Ramsey County lost manufacturing employment over the 20 year period, declining from 70,674 jobs to 65,451 jobs. Although manufacturing employment grew by roughly 30% over the 20 year period overall, the manufacturing share of total MSA employment declined from 29% to 20%.

Table 2-7: Employment by Industry Sector, Minneapolis/St. Paul MSA, 1972											
County	Agriculture Services	Mining	Construction	Manufacturing	T.C.U.	Wholesale Trade	Retail Trade	F.I.R.E	Services	Other	Total
Anoka	45	15	1,567	9389	1229	745	6,503	510	3,209	82	23,294
Carver	28	13	185	1,237	134	168	1397	526	882	107	4,677
Chisago	7	57	139	595	67	96	743	124	255	49	2,132
Dakota	53	117	1,216	6,922	1,057	1,815	6,524	731	3,336	62	21,833
Hennepin	528	224	22,301	97,827	25544	41,303	82,752	34,843	90,652	1,985	397,959
Isanti	2	31	83	373	163	61	698	118	687	9	2,225
Ramsey	312	71	7,588	70,674	15,838	12,918	33,963	14,177	38,022	587	194,150
Scott	26	24	439	2,356	456	378	1604	202	1286	108	6879
Sherburne	34	15	50	299	316	59	603	123	276	14	1,789
Washington	41	130	558	5162	782	360	2932	301	1467	42	11,775
Wright	15	2	264	945	287	213	1575	173	812	37	4,323
St. Croix, WI	9	5	180	1504	204	207	1978	171	1098	30	5,386
Pierce, WI	42	4	166	582	266	175	1472	191	765	4	3,667
Total MSA	**1,142**	**708**	**34,736**	**197,865**	**46,343**	**58,498**	**142,744**	**52,190**	**142,747**	**3,116**	**680,089**
Source: County Business Patterns, 1972											

Table 2-8: Employment by Industry Sector, Minneapolis/St. Paul MSA, 1992											
County	Agriculture Services	Mining	Construction	Manufacturing	T.C.U.	Wholesale Trade	Retail Trade	F.I.R.E	Services	Other	Total
Anoka	256	9	4,623	21,793	2,539	3,676	18,808	2,033	19,328	20	73,085
Carver	124	9	744	9,142	541	454	2,369	791	4,932	27	19,133
Chisago	41	6	401	1,635	186	204	1,613	257	2,598	7	6,948
Dakota	709	96	4,843	21,784	5,418	8,896	26,141	6,266	27,225	59	101,437
Hennepin	2,110	98	24,157	113,020	53,184	61,130	124,296	66,350	245,178	546	690,069
Isanti	11	1	238	1,243	237	169	1,354	144	1,925	0	5,322
Ramsey	662	9	8,913	65,451	11,071	15,024	50,236	21,654	97,010	74	270,104
Scott	184	29	1,771	4,715	765	1,434	3,935	541	4,599	12	17,985
Sherburne	20	26	479	1,523	1,134	273	2,006	409	1,380	2	7,252
Washington	276	30	1,758	8,387	1,660	1,390	10,706	2,104	8,281	107	34,699
Wright	135	0	941	2,988	1,246	914	4,570	590	4,604	4	15,992
St. Croix, WI	167	1	530	4,403	723	536	3,635	841	3,732	0	14,568
Pierce, WI	55	9	299	1,266	343	442	2,210	359	1,877	5	6,865
Total MSA	**4,750**	**323**	**49,697**	**257,350**	**79,047**	**94,542**	**251,879**	**102,339**	**422,669**	**863**	**1,263,459**
Source: County Business Patterns, 1992											

Table 2-9: Percent Change in County Employment by Industry Sector, Minneapolis/St. Paul MSA, 1972 - 1992											
County	Agriculture Services	Mining	Construction	Manufacturing	T.C.U.	Wholesale Trade	Retail Trade	F.I.R.E	Services	Other	Total
Anoka	468.9%	-40.0%	195.0%	132.1%	106.6%	393.4%	189.2%	298.6%	502.3%	-75.6%	213.8%
Carver	342.9%	-30.8%	302.2%	639.0%	303.7%	170.2%	69.6%	50.4%	459.2%	-74.8%	309.1%
Chisago	485.7%	-89.5%	188.5%	174.8%	177.6%	112.5%	117.1%	107.3%	918.8%	-85.7%	225.9%
Dakota	1237.7%	-17.9%	298.3%	214.7%	412.6%	390.1%	300.7%	757.2%	716.1%	-4.8%	364.6%
Hennepin	299.6%	-56.3%	8.3%	15.5%	108.2%	48.0%	50.2%	90.4%	170.5%	-72.5%	73.4%
Isanti	450.0%	-96.8%	186.7%	233.2%	45.4%	177.0%	94.0%	22.0%	180.2%	-100.0%	139.2%
Ramsey	112.2%	-87.3%	17.5%	-7.4%	-30.1%	16.3%	47.9%	52.7%	155.1%	-87.4%	39.1%
Scott	607.7%	20.8%	303.4%	100.1%	67.8%	279.4%	145.3%	167.8%	257.6%	-88.9%	161.4%
Sherburne	-41.2%	73.3%	858.0%	409.4%	258.9%	362.7%	232.7%	232.5%	400.0%	-85.7%	305.4%
Washington	573.2%	-76.9%	215.1%	62.5%	112.3%	286.1%	265.1%	599.0%	464.5%	154.8%	194.7%
Wright	800.0%	-100.0%	256.4%	216.2%	334.1%	329.1%	190.2%	241.0%	467.0%	-89.2%	269.9%
St. Croix, WI	1755.6%	-80.0%	194.4%	192.8%	254.4%	158.9%	83.8%	391.8%	239.9%	-100.0%	170.5%
Pierce, WI	31.0%	125.0%	80.1%	117.5%	28.9%	152.6%	50.1%	88.0%	145.4%	25.0%	87.2%
Total MSA	**315.9%**	**-54.4%**	**43.1%**	**30.1%**	**70.6%**	**61.6%**	**76.5%**	**96.1%**	**196.1%**	**-72.3%**	**85.8%**
Source: County Business Patterns, 1972 and 1992											

Employment in the F.I.R.E. sector, which includes finance, insurance, and real estate, also grew considerably over the 20-year period; roughly 50,000 new jobs were created, primarily in Hennepin, Ramsey, and Dakota Counties. As F.I.R.E. employment is typically associated with office use, the extent of growth in F.I.R.E. employment is an indicator of where office development has concentrated in the Twin Cities metro area.

Agricultural service employment in Dakota County grew from 53 jobs in 1972 to 709 jobs in 1992. Hennepin County has emerged as the center of agricultural service employment, growing from 528 jobs in 1972 to 2,110 jobs in 1992. Only Sherburne county lost agricultural service jobs over the 20 year period. It is important to note that the agriculture service category excludes agricultural production employment, which is covered in a different survey by the U.S. Bureau of the Census.

Government Employment

As County Business Patterns employment data does not differentiate federal, state, and local government employment activity, employment data from the State of Minnesota was obtained. The following table (2-10) outlines total employment for each level of government over the past 13 years. As the table indicates, local government employment increased by roughly 26%, adding almost 22,000 jobs to the seven-county area over the 13-year period. Overall, roughly 27,100 jobs were created by government hiring in the region. Growth in federal employment reached a plateau in 1980 after creation of 2,476 new jobs in the 1980's and then fell slightly by 1993.

Table 2-10: Local, State, and Federal Employment, Seven-County Region, 1980 - 1993

Category	1980	1990	1993	% Change 1980 - 1993
Local	83,588	96,549	105,419	26.1%
State	36,090	38,863	38,928	7.8%
Federal	18,511	20,987	20,952	13.2%
Total:	138,189	156,399	165,299	19.6%

Source: Research & Statistics Office, State of Minnesota Employment

Since federal, state, and local government agencies constitute an additional source of demand for office space in the metro area, it is important to review recent changes in government employment for the metro area. Assessing the future impact of government employment on the seven-county region will depend on the extent to which federal employment is reduced in coming years. Assuming that greater responsibilities are given to state governments for management of welfare, health insurance, and other programs, it is plausible that state and local government office space needs would increase.

13-County Metropolitan Region Growth Projections

Population projections for the 13-county metro area are shown in table 2-11 below. The forecasts, as developed by the Minnesota State Planning Office, show that Dakota County will grow by an estimated 183,000 residents by 2020. Hennepin County is expected to grow by roughly 166,400 over the same time period. Other counties projected to grow include Washington (62,534 new residents), Ramsey (64,655 new residents), Anoka (90,289 new residents), and St. Croix (30,634). Assuming projected growth levels hold true, the MSA is expected to add more than 725,000 residents between 1990 and 2020, as the following table shows. The projections also forecast that the metropolitan counties of Hennepin and Ramsey will contain a decreasing share of total population, falling from 59% in 1990 to 34% by 2020.

Table 2-11: MSA Population Trends, 1990 - 2020

County	1990	1995	2000	2005	2010	2015	2020	Percent Change
Anoka	243,641	264,570	281,870	29,683	310,660	323,440	333,930	37%
Carver	47,915	53,080	57,390	61,220	64,960	68,810	72,440	51%
Chisago	30,521	32,460	33,990	35,500	37,120	38,730	40,090	31%
Dakota	275,227	313,450	347,220	377,520	406,150	434,050	459,190	67%
Hennepin	1,032,431	1,076,410	1,110,300	1,136,140	1,157,890	1,178,830	1,198,860	16%
Isanti	25,921	26,840	27,470	28,140	28,930	29,690	30,260	17%
Ramsey	485,765	500,650	512,240	521,850	530,880	540,430	550,420	13%
Scott	57,846	644,400	69,770	74,500	79,190	83,980	88,300	53%
Sherburne	41,945	47,430	52,650	57,890	63,040	67,890	72,100	72%
Washington	145,896	160,510	172,110	182,160	191,730	200,840	208,430	43%
Wright	68,710	73,140	76,820	80,460	84,350	88,210	91,570	33%
St. Croix, WI	50,251	NA	59,474	NA	70,632	NA	80,885	61%
Pierce, WI	32,765	34,209	35,862	37,484	39,004	40,516	42,052	28%
Total MSA	**2,538,834**	**3,227,149**	**2,837,166**	**2,622,547**	**3,064,536**	**3,095,416**	**3,268,527**	**29%**

Source: Minnesota Planning, October, 1993

Population forecasts generated by the Metropolitan Council for the seven-county metro area were also reviewed to assess consistency with the aforementioned projections. The review determined that the Metropolitan Council population projections are higher then projections done by the state planning agency. As one example, the state forecasts that population for Dakota County will increase from 347,220 in 2000 to 434,050 in 2020; Metropolitan Council projections show an increase from 346,130 to 450,490 over the same period. Since the Metropolitan Council does not generate population forecasts beyond the seven-county metro area, and in order to maintain consistency with the forecasts used in the forecasting process, ERA chose to present the 13-county population projections. The state population forecasts assume that the St. Cloud-Twin Cities-Rochester Corridor will continue to the by the primary development area in the state.

Increased centralization of population from rural agricultural areas to urban areas will also occur.

Employment Projections

The following table outlines projections of total employment for the seven-county metropolitan area between 1990 and 2020. The employment forecasts through 2020 were generated by the Metropolitan Council for the seven-county metro area. Although the Minnesota Department of Economic Security generates employment forecasts for the metro area as well, the state forecasts currently run only through 1996. According to one official, a new set of state employment forecasts through 2000 are currently being developed.

Overall, the metro area is expected to add a total of roughly 353,700 jobs by 2020, with the majority created in Hennepin (157,500), Dakota (62,100), and Ramsey counties (54,506). However, the table also indicates that annual rates of employment growth will be strongest in the suburban counties through 2020. Carver, Dakota, and Scott Counties are forecast to experience the highest annual rates of employment growth.

Table 2-12: Seven County Employment Trends, 1990 - 2020

County	Census 1990	Projections 2000	2010	2020	Projected Change	Annual Change
Anoka	82,956	102,260	111,740	114,770	38%	1.09%
Carver	18,230	24,430	28,970	30,630	68%	1.74%
Dakota	107,257	143,876	161,936	169,366	58%	1.53%
Hennepin	725,836	815,365	861,025	883,405	22%	0.66%
Ramsey	294,884	328,690	343,340	348,940	18%	0.56%
Scott	20,035	26,330	30,160	31,280	56%	1.50%
Washington	43,923	57,940	65,790	68,450	56%	1.49%
Metro Area:	1,293,121	1,498,891	1,602,961	1,646,841	27%	0.81%

Source: Metropolitan Council Forecasts

Income

The distribution of recent and projected per capita income in the 13-county MSA is outlined in the table below. The table (2-13) shows that income growth is expected to occur in all 13 counties of the MSA between 1994 and 2000. The highest projected per capita incomes are located in the downtown counties of Hennepin ($31,489), Ramsey ($26,778), Dakota (26,974), and Carver (26,507).

Overall, the projections indicate that the 13-county MSA will continue to exhibit income growth rates stronger then the state or nation through 2000. The projections are based on expected growth patterns, and have not incorporated any growth forecasts which account for the alternative airport development scenarios. Should the airport be moved to

the proposed site in Dakota County, the aforementioned projections would require some revision to account for relocated jobs, businesses, freeway construction, and a general shift in focus for those sectors of the economy dependent on the airport.

Table 2-13: Recent & Projected Capita Income , 13 County MSA, 1989 - 2000 *(Constant 1994 Dollars)*

County	1989	1994	2000	% Change 1989-1994	% Change 1994-2000
Anoka	19,344	19,684	22,080	1.8%	12.2%
Carver	23,052	22,830	26,507	-1%	16.1%
Chisago	17,674	17,349	20,329	-1.8%	17.2%
Dakota	23,957	24,300	26,974	1.4%	11%
Hennepin	27,574	29,689	31,489	7.7%	6.1%
Isanti	16,835	17,650	20,646	4.8%	17%
Ramsey	22,865	25,164	26,778	10.1%	6.4%
Scott	20,667	21,362	24,235	3.4%	13.4%
Sherburne	17,136	16,841	19,549	-1.7%	16.1%
Washington	23,313	22,461	24,976	-3.7%	11.2%
Wright	15,197	18,257	21,383	20.1%	17.1%
St. Croix, WI	20,904	22,095	25,897	5.7%	17.2%
Pierce, WI	17,144	18,292	21,758	6.7%	18.9%
Total MSA	24,092	25,301	27,353	5%	8.1%
Minnesota	21,059	22,025	24,176	4.6%	9.8%

Source: Metropolitan Council, Regional Research Update, March 1995.

Seven-County Metropolitan Area Discussion

Real Estate Development Trends

The general objective of this section will be to review the history of real estate development in the Minneapolis/St. Paul metropolitan area. In the process, summary data on office and industrial space inventories, hotel room development, and residential housing construction will be provided. Discussion of real estate trends in the metropolitan area will focus initially on commercial office and industrial space in the central business districts of Minneapolis and St. Paul, as well as emerging suburban markets. The section will include a review of key issues which have impacted the course and rate of real estate development in the metropolitan area. Relationships between commercial development and MSP will be noted as well.

Statistics pertaining to development trends in office, industrial, hotel, and residential markets were obtained from four sources, The Towle Real Estate Company, the Metropolitan Council, the Minnesota Real Estate Journal, and the Urban Land Institute (ULI). Additional hotel development information was provided by Marquette Advisors, a consulting firm in Minneapolis. The real estate reports published by Towle Real Estate and ULI provide a general picture of development activity in different regions of the Twin Cities metropolitan area. Although both reports divide the metro area into slightly different regions which may or may not be different than those used in this report, the information provides necessary background for eventual discussion of airport related real estate development created by MSP expansion or new airport construction in Dakota County. The Metropolitan Council provided detailed real estate development histories on the seven-community localized impact area surrounding MSP and a listing of total office inventories (owner/user, single-tenant, and multi-tenant) in the metropolitan area. The Minnesota Real Estate Journal provided general background on real estate trends in the region.

Office and Industrial Development Trends

Real Estate market data generated by Towle Real Estate was used as the primary source for this section. Towle conducted surveys of the metropolitan office and industrial markets since 1986 for nine market sectors in the metropolitan area. The Towle office space survey includes multi-tenant buildings larger than 30,000 square feet; single-tenant, owner/user, medical, and government buildings are not included. The Towle industrial survey includes multi-tenant industrial developments only. For the purposes of this report, the market sectors which are most related to the airport and its related output are the Minneapolis and St. Paul sectors, the Southwest sector including the cities of Bloomington and Richfield, and the Dakota County sector, which includes the cities of Eagan and Mendota Heights. The years selected as representative of the market over the last nine years are 1986, 1989, and 1994.

Office Development Trends - Downtown Markets

Speculative office markets in the Minneapolis/St. Paul Metropolitan area contained roughly 25 million square feet of space in 1980, which was concentrated primarily in the central business districts of Minneapolis and St. Paul. The course and rate of office development prior to 1980 in the downtown districts was impacted by aggressive urban revitalization programs for retail and office development and pro-active city planning as well. Revitalization activity strengthened after construction of the Investors Diversified Services (IDS) Center was completed in 1973, adding over 2.5 million square feet of office and retail space in downtown Minneapolis.

The success achieved through urban revitalization was due in large part to comprehensive city planning, which encouraged high density development in the urban core areas. City planners in both Minneapolis and St. Paul designed a system of second-story, enclosed, pedestrian skyways to link city blocks together. The skyway system in Minneapolis, which linked 49 city blocks together in 1992, encouraged real estate development in the core by providing connected office towers with a competitive advantage in accessibility.[3] City planners in Minneapolis also used less restrictive parking requirements to encourage office development in the high-density urban core.

Office development in the metropolitan area accelerated rapidly between 1980 and 1989, when roughly 22.5 million square feet was delivered. New office construction slowed dramatically after 1990 as the national economy entered a recessionary cycle. Even so, between 1989 and 1994 an additional 5.34 million square feet of office space was delivered in the metro area. Table 2-14, which provides office inventory data for various submarkets, shows that total square footage of rentable office space in the metro area increased by 32% between 1986 and 1990, and by 11% between 1990 and 1994.

Table 2-14: Multi-Tenant Office Inventory Trends, in Square Feet, 1986 - 1994

Location	1986	1989	1994	1994 % of Total	% Change 86-90	% Change 90-94
Dakota Co.	143,000	238,792	382,028	1%	67.0%	60.0%
Minneapolis -CBD	13,512,963	17,880,786	21,338,021	40%	32.3%	19.3%
St. Paul - CBD	5,412,375	6,213,443	6,066,213	11.5%	14.8%	-2.4%
Southwest	10,090,000	11,940,728	12,529,021	24%	31.8%	4.2%
West	3,681,401	5,123,999	6,017,120	11.4%	39.2%	17.4%
Metro Area	35,991,409	47,557,737	52,841,213	100%	32.1%	11.1%

Note: Table includes only multi-tenant space larger than 30,000 square feet.
Source: Towle Real Estate, 1995

In downtown Minneapolis, the inventory of rentable office space grew from 13.5 million square feet in 1986 to 21.3 million square feet in 1994. Completion of four office towers in the CBD between 1991 and 1992 put considerable upward pressure on vacancy

rates, which hovered around 20% between 1991 and 1992. Lease rates, already depressed by high vacancy levels, were also impacted by a growing market for sublet space. By the end of 1992 the sublet market contained roughly 500,000 square feet.[4] Total net absorption over the same period amounted to 736,969 square feet.

The Minneapolis CBD office market has recovered considerably since 1992, with vacancy rates for Class A office space running less than 5% in 1995. According to Towle, the second quarter 1995 Minneapolis CBD class A office space vacancy rate is the lowest in the midwest and the third lowest in the country, behind Charlotte, NC and Washington, D.C. Total net absorption over the past two years has also improved significantly, with over 2.2 million square feet absorbed. Although the downtown market has recovered considerably, discussions with real estate brokers in Minneapolis indicated that downtown office rents are not yet high enough to support new multi-tenant office construction. The Minneapolis Real Estate Journal indicated that new downtown office construction could begin in 1996, depending on the amount of pre-leasing interest.

Office inventories in the St. Paul CBD grew from 5.4 million in 1986 to 6.06 million in 1994. Over the eight-year period, total rentable area in downtown St. Paul increased by 12% while the percent of office space left vacant increased by 112%. The result was an almost doubling of the vacancy rate to 22.5%. According to Towle, the St. Paul office market remains soft, with stagnant or slowly falling net rents. Downward pressure on rents has been created by reduced real estate tax assessments in the city. The St. Paul office market has recovered somewhat since 1994, with vacancy rates falling from 22.5% to 20.7% as of the second quarter of 1995. Increased leasing activity by state agencies is one reason behind the modest improvement in vacancy rates in St. Paul.

Since the office market surveys conducted by Towle Real Estate exclude owner/users, government, medical space, and all offices smaller than 30,000 square feet, Metropolitan Council data on total office inventories in the Twin Cities was used. According to the Metropolitan Council, the seven-county metro area contained roughly 110 million square feet of office space in 1992. Roughly 50% of the total area was concentrated in Minneapolis and St. Paul. The following table (2-15) highlights a range of twelve larger owner/users and government agencies in Minneapolis and St. Paul. The twelve listed private and public properties occupied almost five million square feet of office space in 1992.

Table 2-15: Sample of Owner/User and Single Tenant Office Space in the Twin Cities, 1992		
Property Name	**Location**	**Square Footage**
Federal Reserve Bank	Minneapolis	385,000
Honeywell	Minneapolis	470,000
Minnesota Dept. of Health	Minneapolis	185,000
City Hall and Courthouse	Minneapolis	480,000
Hennepin Co. Gov'ment Ctr.	Minneapolis	540,000
Northwestern Bell	Minneapolis	700,000
City Hall	St. Paul	214,000
Sperry-Rand	St. Paul	412,000
3M	St. Paul	451,000
Minnesota Highway Building	St. Paul	369,000
Federal Building	St. Paul	412,000
Department of Revenue	St. Paul	370,000
Note: Listed user is not necessarily the current user; Square footage may include multiple buildings. Source: Metropolitan Council		

Suburban Markets

Although the Minneapolis central business district emerged as the focal point for office development in the metro area, significant office development activity also occurred in the suburbs as well. Suburban office development concentrations emerged to the southwest and west of downtown Minneapolis, along Interstate 494 in Bloomington, immediately west of MSP. The I-494 market was in its infancy before 1980, with office development concentrated along I-494 at the intersections with Normandale Boulevard and Old Shakopee Road, adjacent to MSP. Office space construction within the two nodes was anchored before 1970 by two principle developments, one being a 580,000 square foot headquarters for Control Data Systems adjacent to MSP. The second development, Northwest Financial Center, was located adjacent to the Normandale Boulevard/I-494 interchange and included roughly 435,000 square feet of office space. Both developments occurred after construction of I-494 between Eden Prairie and MSP was completed.

Office construction in the Normandale Blvd. and Old Shakopee Road/MSP intersections with I-494 increased slowly during the early 1970's; by 1979, the two development nodes contained a total of 14 office developments. By 1982 a third node, at the intersection of France Avenue and I-494 emerged, anchored by the Northlands Executive Office Center, which contained roughly 440,000 square feet of office space by 1985. The high rate of office construction in the corridor after 1980 also placed increased pressure on vacancy rates, which edged up to 15% by 1992. The rate of new office

development to the south and west occurred faster then market demand, resulting in high vacancies during the early 1990's until over-built existing space was absorbed.

The Southwest sector in particular has shown dramatic improvement during recent years. Rentable area increased by one-third while the vacancy rate decreased from 21.7% in 1986 to 8.5% in 1994. As Table 2-14 showed, office space inventories in the southwestern submarket grew from roughly 10 million square feet in 1986 to 12.5 million square feet in 1994. Growth in class A office inventories was particularly strong in the Southwest area; total inventory grew from about 2.9 million square feet in 1986 to about 4.5 million square feet in 1994. Vacancy rates improved as well, decreasing from 37% in 1986 to about 5% in 1994.

Office inventories in Dakota County increased from 140,000 to 380,000 over the same period by comparison. Construction activity in Dakota County remains a small portion of the total metro office inventory, with only 1.031 million square feet delivered in 19 buildings. Although rentable area for the county increased more than 150% between 1986 and 1994, vacancy rates have remained around 20%.

There are several plausible explanations for the relative void of office development in Dakota County when compared to the I-494 corridor in Bloomington. First, the I-494 corridor was not extended into Dakota County until 1983, when a bridge over the Minnesota River was completed. Also, existing land uses south of I-494 in Eagan are primarily industrial in nature. The combination of MSP flight-path aircraft noise and industrial development east of the Minnesota River along I-494 in Dakota County has tended to inhibit commercial office development in that area..

Industrial Development Trends

The following table (2-16) outlines total inventories of multi-tenant industrial space in the metropolitan area over the past three years. The table shows that the southwest market currently holds the largest concentration of industrial space in the metro area, with more than 12 million square feet. In 1994, the combined square footage of industrial property in the metro area exceeded 42 million square feet. It is important to note that complete industrial inventory data for the entire region before 1992 was unavailable due to a change in Towle Real Estate's reporting methodology.

As Table 2-16 shows, industrial development has concentrated primarily in suburban areas of the metropolitan area. As of 1994, Minneapolis and St. Paul contained about 12% of total industrial space in the metro area. One primary issue regarding industrial development in the urban core is environmental contamination. One study conducted through the Center of Urban and Regional Affairs found that 13 out of 17 available sites in St. Paul were contaminated in 1991, requiring about $18 million to mitigate.[5]

Table 2-16: Metropolitan Area Multi-Tenant Industrial Inventory, in Square Feet, 1992 - 1994				
Submarket	**1992**	**1993**	**1994**	**% of 1994 Total**
Dakota County	5,953,180	5,947,618	5,947,618	14%
Minneapolis	1,898,170	1,898,750	2,110,215	5%
Southwest	12,005,281	12,004,003	12,050,353	29%
St. Paul	2,942,377	3,038,417	3,113,604	7%
West	6,878,290	6,998,409	6,999,409	17%
Northeast	5,701,247	5,779,602	6,186,911	15%
Northwest	4,579,505	4,577,402	4,821,037	11%
Other Areas	600,146	600,146	841,386	2%
Metro Area	**40,558,196**	**40,844,347**	**42,070,533**	**100.0%**
Source: Towle Real Estate Reports, 1995				

Towle Real Estate divides industrial space inventories in the metro area into three categories, office/warehouse, bulk warehouse, and office showroom/business center. Office show room/business center development was particularly strong in the southwest quadrant along I-494, with delivery of over 5 million square feet between 1980 and 1989. The Southwest Quadrant also contains the largest concentration of office/warehouse space in the metro area, roughly 5.3 million square feet or 31.3% of total metro area office/warehouse space. The distribution of bulk warehouse space is fairly even throughout the seven submarkets, with Dakota County containing the most space, 1.8 million square feet or 17.6% of total metro bulk warehouse space. Industrial development in Dakota County was aided by the construction of the I-494 bridge over the Minnesota River in late 1983, which improved access to Eagan and Mendota Heights.

It is notable that sales activity in the multi-tenant industrial space market has been particularly active, according to Towle Real Estate, with more than 10% of total multi-tenant industrial space transferring in the past 14 months to institutional investors and real estate investment trusts. Increased investor activity has occurred as a result of improved vacancy rates and higher rents. Vacancy rates for multi-tenant space have fallen considerably since 1990, from nearly 20% in 1991 to about 9% presently. Net absorption in 1993 amounted to 1.9 million square feet, improving to 2.134 million square feet in 1994.

According to a recent article in the Minneapolis Star Tribune, significant industrial development is also occurring in the three Wisconsin counties directly east of the Twin Cities: Polk, St. Croix, and Pierce.[6] According to the article, a minimum of 31 industrial parks have been developed in the three counties over the past 30 years. Industrial development has been particularly strong in recent history, particularly in the last year; Over the 12 months ending in July of 1995, Polk, St. Croix, and Pierce Counties increased non-farm employment by almost 1,500. The level of industrial development activity has been driven by a combination of lower taxes and worker

compensation rates, which have encouraged firms in Minnesota to relocate to Wisconsin. According to the Star Tribune article, more than 30 Minnesota companies have moved to Wisconsin since 1987. The extent of recent industrial development in Polk, St. Croix, and Pierce Counties raises several issues:

- The apparent majority of industrial development in Wisconsin is resulting from transfer demand from Minnesota; Although individual firms benefit from lower taxes and labor cost, the metropolitan economy as a whole gains little, if any, from transfer demand.
- Since the principle regional planning agency for the region, the Metropolitan Council, has no direct influence over development beyond the seven-county metro area, there is currently no effective means to improve linkages between counties in both states.
- Research conducted by the Metropolitan Council, and corroborated by ERA and DSU, would suggest that construction of a new airport in Dakota County would serve as a catalyst for additional development in Wisconsin. In theory, airport development on the proposed Dakota County site could lead to the formation of a new growth area in Wisconsin.
- It is unclear that future, regional economic growth levels will support viable new development in Minneapolis, St. Paul, the redeveloped MSP site, the new airport site, and in Wisconsin.

Hotel Development

The current inventory of hotel rooms in the metropolitan area is outlined in Table 2-17, below. Of the 23,727 total rooms in the metro area, 33% are located along the I-494 corridor west of MSP. The table also shows that the I-494 corridor achieved the highest occupancy between January and June of 1995.

Table 2-17: Hotel Room Inventory and Occupancy in the Metropolitan Area, June 30, 1995

Submarket	Room Count	Occupancy
Minneapolis	5,380	65%
St. Paul	2,170	60.5%
I-494 Corridor	7,927	72.5%
North Suburban	5,000	66.5%
South Suburban	3,250	63%
Total Metro Area	**23,727**	**67%**

Note: Occupancy Data covers months 1-6 in 1995
Source: Hospitality Consulting Group, Marquette Advisors

In general, the metro hotel market grew dramatically in the 1980's as office and industrial development activity increased. Demand for hotel rooms has been influenced by several recent events, including development of a new convention center, the opening

of the Mall of America, and completion of the Target Center in the early 1990's. During the mid-1980's, closure of the Minneapolis convention center had a negative impact on hotel demand in the downtown area. A new convention center opened in downtown Minneapolis in 1990, and entertained its first large convention in April of 1991. An 816-room Hilton was built two blocks from the convention center.

Opening of the Mall of America in the early 1990's spurred additional hotel development and created a year-around source of demand for hotel rooms, primarily in the I-494 corridor. As indicated in Table 2-17, occupancy rates along the I-494 corridor are running at almost 73%, which is significantly higher than surrounding markets. The extent of demand created by the mall is significant; according to one confidential source, the mall attracted roughly 39 million visitors in 1994.

Discussions with hospitality consultants at Marquette Advisors in Minneapolis indicated that future demand for hotel rooms is expected to remain strong in the I-494 corridor due to the existence of the Mall of America. However, new hotel construction is not expected in the near future, as room rates are still recovering from over-building in the late 1980's. Demolition of three hotel properties in the flight path of the north-south runway at MSP is expected to occur if the MSP runway development plan is implemented. The lost hotel rooms are expected to be replaced over the next three to five years.

Housing

Table 2-18 highlights growth in housing units for the seven-county metro area. Although most of the residential construction by volume has taken place in the urban counties of Hennepin and Ramsey, the counties that are building at the fastest rate are again, Dakota, Scott and Washington.

Table 2-18: Housing Unit Development in Seven-County Region

County	1970	1980	1990	% Change 70-80	% Change 80 -90
Anoka	40,857	62,904	85,519	54.0%	36.0%
Carver	8,266	12,585	17,449	52.3%	38.6%
Dakota	39,224	66,872	102,707	70.5%	53.6%
Hennepin	320,479	379,503	443,583	18.4%	16.9%
Ramsey	153,649	176,995	201,016	15.2%	13.6%
Scott	8,789	14,187	20,302	61.4%	43.1%
Washington	22,765	37,182	51,648	63.3%	38.9%
Metro Area:	**594,029**	**750,228**	**922,224**	**26.3%**	**22.9%**

Source: Metropolitan Council Census Log, July 1993

In Dakota County, total housing units grew from about 39,000 in 1970 to 102,707 in 1990, which is roughly equivalent to 5% average annual growth. For Hennepin

County, although the average annual rate of growth was lower, roughly 1.6%, the absolute number of new housing permits was substantially higher, roughly 123,100, over the same year period. In a general sense, the previous table is useful in highlighting the fact that percentage increases in building permit activity were higher for all counties in the 1970's, as opposed to the 1980's. Overall, the seven-county region gained an average of roughly 16,400 new permits each year between 1970 and 1990.

Discussions with regional planners and other sources determined that the level of affluence associated with housing in different markets around the twin Cities was established, by in large, before 1900, when upper income families moved to suburban areas. ERA determined that one such area was to the southwest of downtown Minneapolis, in the present communities of Edina, Eden Prairie, and Minnetonka, where wealth concentrated due to the proximity of substantial recreational and natural amenities, including Lake Minnetonka. It is notable that the concentration of affluence to the southwest was tied to MSP by interstate in the 1960's, after which commercial development along the new corridor expanded rapidly.

Development Issues

The course, nature, and scale of development activity in the metropolitan area over the past 40 years has been influenced by a variety of economic, political, and location specific issues. ERA has identified three particular issues which are relevant in light of proposed airport development in the Twin Cities. Each issue will be discussed separately.

1. The Public-Private Partnership

The nature and style of government in the metropolitan area is significant in that it emerged as a partnership between the public and private sectors working for the greater good of the community. According to Adams and VanDrasek, cooperation between the public and private sectors in such areas as welfare, employment, industry, and education resulted from a history of relative isolation form other cities and relative ethnic homogeneity, which encouraged the development of local solutions to the area's problems. What emerged from the history of cooperation between the public and private sectors was a highly progressive and activist model of government, referred to by Adams and VanDrasek as the "Minnesota Model".[7]

Emergence of the "Minnesota Model" has had a profound impact on economic development activity on the state as a whole, and in the Twin Cities metro area particularly. The earliest public-private efforts resulted in the successful development of the sky-walk system and the Nicollet Mall, a retail development, in downtown Minneapolis in the 1960's. Development of the Nicollet Mall was a significant part of aggressive urban revitalization effort geared toward the maintenance of vitality in the downtown core areas of the Twin Cities.[8]

The public-private partnership also motivated the state government to provide public financial support to large state employers in need of financial assistance. Such a policy led the state government to fund substantial aid packages for Dayton Hudson Corporation in 1987 and Northwest Airlines in 1991.[9] The aid package for Northwest Airlines was designed to preserve roughly 35,000 direct, indirect, and induced jobs in the state. Roughly 50% of the loan amount went toward state revenue bonds for new Northwest hanger and repair facilities in Duluth and Hibbing. The remaining 50% was loaned to Northwest by the Metropolitan Airports Commission to cover operating and debt financing costs. Approval of the loan package was driven by concerns regarding reduced access and visibility to national and overseas markets if the Northwest Airlines hub operation in Minneapolis was shut down, as well as lost employment and wages.[10]

One additional facet of the partnership was a willingness on the part of government to provide an exceptional level of services to the community as needs arose. Although the state now provides above-average higher education, welfare, and public works improvements, the cost of such improvements has made Minnesota the fifth highest state in per capita public expenditure, the third highest in spending for health care and social services, and the seventh highest state in total governmental units per 1,000 people by 1992.[11] Even so, the Minnesota tax system is still considered highly equitable, ranked second in the nation by the Corporation for Enterprise Development. One program which works specifically to improve equity in the metro area is the fiscal disparities program, which redistributes a portion of growth in the metro area property tax base to communities which posses limited tax bases. The program is designed to ensure that all communities in the metro area benefit to a certain extent from major development projects, such as the Mall of America.

Although Adams and VanDrasek indicate that Minnesotans have historically been tolerant of higher taxes in exchange for improved services, the Minnesota Planning Department indicated that, as the state population gets older and as projected personal income growth slows over the next 20 years, current government spending levels will become more difficult to maintain without increased taxes or deficit spending. Projections by Minnesota Planning suggest that, unless public sector expenditures are reduced over the next 15 years, the state government will be increasingly unable to provide financial support for major development projects in the future.[12]

2. Direction of Growth

The Twin Cities location relative to other commercial centers in the midwest had a profound impact on the nature and direction of development in the metropolitan area. The direction of growth in the Twin Cities prior to World War II was focused to the south and west based on proximity to prime agricultural lands in northern Iowa, eastern South Dakota, and southern Minnesota. The Twin Cities emerged at this time as an agricultural processing center and transportation hub for the northern Midwest and Plains.

According to Adams and VanDrasek, the historic pattern of growth to the south and west was reinforced by the location of MSP south of the Twin Cities. Construction of the interstate system after 1950 improved accessibility to the south and west and provided a further catalyst for development in that area. Given the historic pattern of development in the region, it is ERA's belief that MSP expansion **would not** dramatically alter development in the region. However, construction of a new airport in Dakota County would lead to substantial changes in the transportation network, causing a shift in development patterns and a re-direction of growth in the region. On one level, the historic agricultural structure of Dakota County would be altered significantly. On a regional scale, new development would likely be pulled increasingly to the south and east, toward Wisconsin.

3. Urban Sprawl

The issue of urban sprawl emerged initially in the 1950's as new expressway development opened up new suburban areas for development. The extent of expressway development is highly significant; more highway miles were built per capita in the Twin Cities then any other city with a population greater than 1 million.[13] The new highway system improved access around the Twin Cities, reduced commuting time from distant suburban locations, and encouraged a low density pattern of development.

As housing demand increased after 1970, the location and density of new housing construction was driven primarily by either the need for higher density development on in-fill sites with sewer service, or the need to reduce land costs, requiring vacant land further removed from the urban core.[14] The extent of sprawl was slowly reduced after enactment of the 1976 Metropolitan Land Use Planning Act, which required municipalities to begin growth management planning.

The current policy for growth management, created by the Metropolitan Council, divides the metro area into two regions: a metropolitan urban service area (MUSA) and a rural service area. The goal of the new management plan is to encourage all development and redevelopment activity within the MUSA area. Because the rural service area is not connected to the metro sewer system, new development in rural areas is effectively constrained. Although it is assumed that the MUSA line will be extended after 2000, ERA has been informed that the new area opened to development will not include the proposed airport site in Dakota County. In the case study analysis, ERA noted that in two recent airport construction projects, Kansas City International and Dallas/Fort Worth International, the new facility was seen as a catalyst for development in new areas.

Twin Cities Regional Growth: Putting The Airport Into Context

Introduction

The effects of land use changes related to either the expansion or relocation of the Minneapolis/ St. Paul International Airport (MSP) are an important part of the economic analysis of these alternatives. To understand the nature and magnitude of these projected changes, Dahlgren, Shardlow, and Uban (DSU) undertook an analysis of historical development patterns in the region and the role the airport has played in that process. This section examines the growth of the Twin Cities region to provide the context for changes in the land use pattern anticipated under each future airport development scenario. A series of existing sources were used to create this "portrait" of the history of the region, and they are cited throughout, and listed in the attached addendum. The pair of maps included with each time period were developed using available data sources, as set forth below.

Generalized Population Pattern

In order to depict population changes for the metropolitan region, U.S. Census data has been portrayed using historic boundaries for each minor civil division (city or township). The lowest category, Rural, was created by using the area of the minor civil division, and testing whether or not the total population provided for less than one residential unit per forty acres. Minor civil divisions which did not fit this rural category were mapped according to their total population. In addition, the generalized developed area was portrayed on the population maps. This boundary was originally developed by the Metropolitan Council to describe a general boundary for the urban portion of the Twin Cities. It is a better depiction of the extent of the region, and has been used on the following map series as well. A dot approximating the amount of airport passenger traffic has been placed on the MSP site, to illustrate the change in airport volume over time. This data was obtained from the Metropolitan Airports Commission.

Generalized Development Pattern

In order to analyze the regional development pattern, select employment centers have been depicted on the historic roadway network as a generalized portrayal of the development pattern of the region. The historic roadway network was digitized from MnDOT state highway maps. Employment centers were gathered from a variety of sources. Office buildings offering over 100,000 square feet for lease, shopping centers offering more than 50,000 square feet for lease, and hotels of over 50 rooms in size are depicted. This select set does not include the entire public and private development story of the Twin Cities, but it does begin to show the patterns which are the basis of the conclusions set forth in the text of this report. For 1994, the Metropolitan Urban Service Area has been substituted for a more generalized developed area.

Historic Growth Of The Region

The 1940's

In the years prior to the 1940's, most of the region's population lived in the two central cities. However, suburbs with industry, such as North St. Paul, St. Paul Park, South St. Paul, St. Louis Park, and Hopkins were rising in importance. See Figure 6. By 1940, the cities of Minneapolis and St. Paul had coalesced into a single urban mass, and contiguous suburban residential development was well underway. Central city population was 79 percent of the total seven county metro area population. At the end of World War Two, no more than several dozen, mostly two-lane, paved roads extended out 10 miles from either central city (see Figure 7). In 1947, the City of Minneapolis had 700 miles of oiled dirt streets handed down from the horse and buggy days.[15] The streetcar system, which had historically served the region's mass transit needs, was shut down in the late 1940's. New streets were built, and highways were improved, bringing hundreds of previously inaccessible square miles of land into the urban real estate market

Prior to 1943, the cities of Minneapolis and St. Paul competed in regard to airport service, and planes often flew to both Wold Chamberlain Field in Minneapolis and Holman Field in St. Paul. In 1943, the Legislature mandated that an airport plan be prepared. The plan, adopted in 1944, recommended that Wold Chamberlain Field be upgraded substantially to serve as the major terminal for scheduled airline operations in the metropolitan region.[16] The original concrete runways, built by the WPA during the New Deal were upgraded. In 1947, Northwest Orient began its first trans-pacific service.

The 1950's

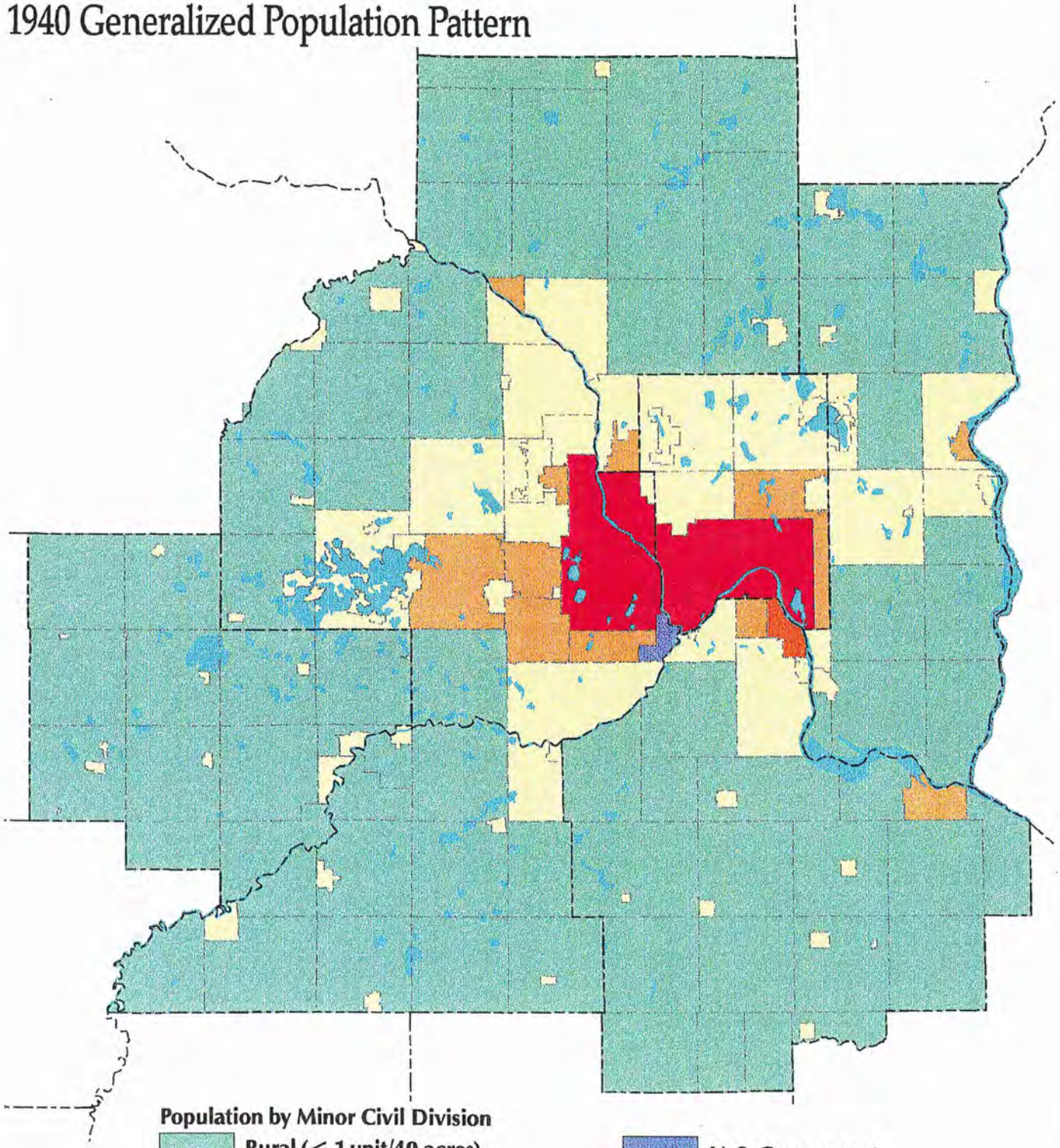
Most of the post-war growth occurred to the north of both Minneapolis and St. Paul, and to the west and south of Minneapolis, where large tracts of relatively flat land were available.[17] The residential areas immediately to the north of the airport were built out immediately during the post-war period. Small single-family houses dominated the area north of the airport, with few shopping strips or centers.[18] Suburban employment was roughly 90,000, or 20 percent of the metropolitan total. There were only 5 miles of freeways in 1950.[19] Suburban areas began their first boom, including the cities of Richfield, Bloomington, Brooklyn Center, Roseville, West St. Paul and Maplewood. Nearly 2,000 miles of new streets, usually dirt or gravel, were constructed in the post war period before 1956.[20]

Four major league sports arrived (the Lakers, Vikings, Twins, and North Stars), and the Met Center was built in 1958. The freeway system was laid out and construction begun. Southdale, one of the first enclosed shopping malls in the US, was opened in 1958. The University of Minnesota grew to over 40,000 students.[21] The Metropolitan Planning Commission was established by the Legislature in 1957.[22] MSP handled 610,000 commercial air passengers and 13,000 tons of air cargo in 1950. The airport served twenty cities with non-stop service.[23] A two hour trip in 1950 could take an air passenger as far as St. Louis or Indianapolis.[24]

FIGURE 6

Twin Cities Metro Area

1940 Generalized Population Pattern



22 February 1996

Source: DSU; Boundaries - Met Council, Data - U.S. Census Bureau; Metropolitan Airports Commission

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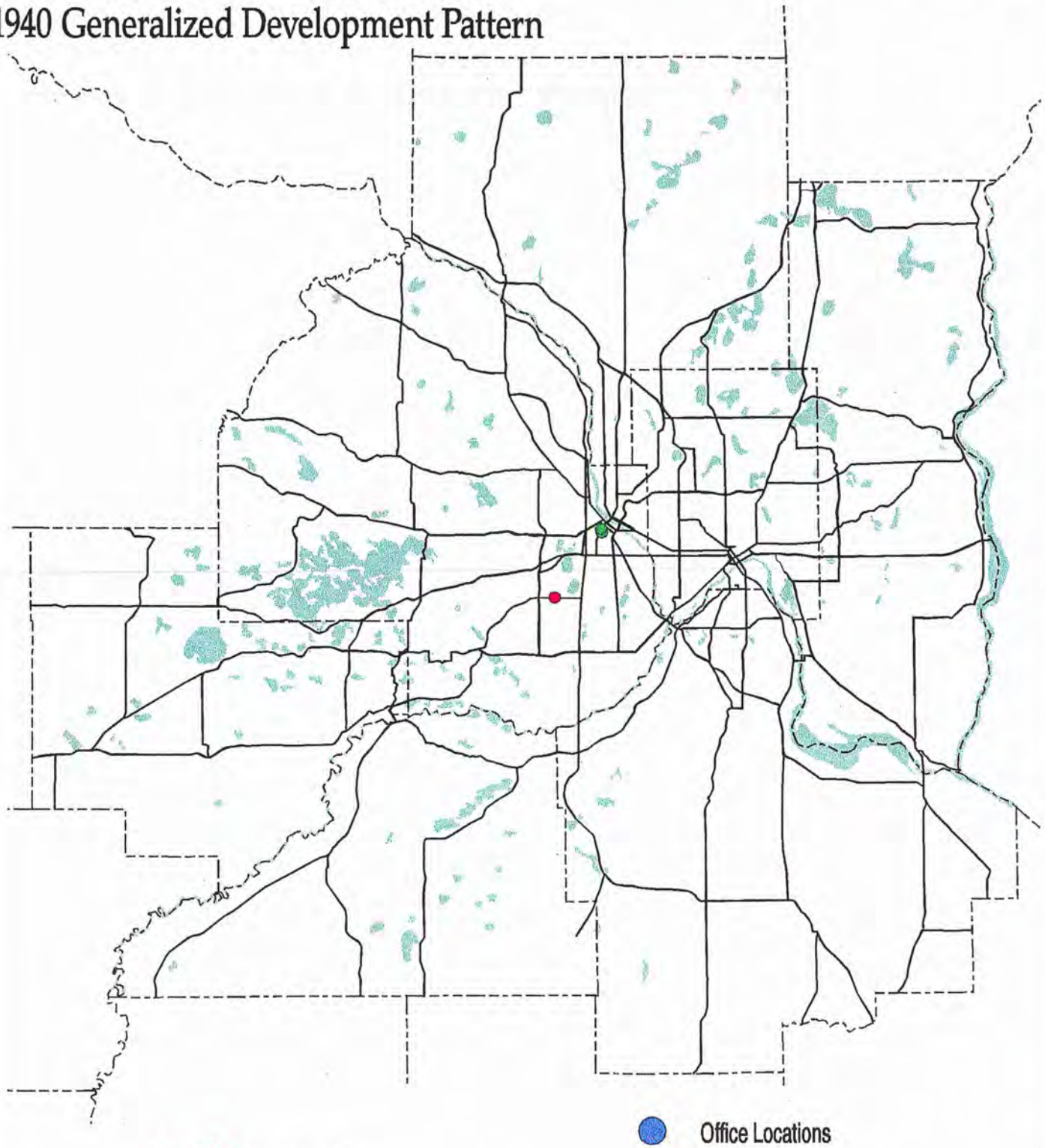
FIGURE 7

Twin Cities Metro Area

1940 Generalized Development Pattern



Interstates
Other Major Roads

Office Locations
Hotel Locations
Shopping Center Locations

Circle size varies with the useable space of the facility.

Source:
* Road Network - MnDOT

* Office and shopping center locations were gathered from: Minnesota Real Estate Journal Leasing Guide "Commercial Space", City Business/Twin Cities: Inc.
* Hotel locations were gathered from the "Greater Minneapolis Convention and Visitors Association".

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The 1960's

Suburban growth continued in the 1960's, although very little growth had crossed over the Minnesota River Valley into Dakota County.[25] In the late 1960's, an apartment boom lead to a concentration of multi-unit housing along the Crosstown Highway (62) near 35W and the airport.[26] Suburban population had grown to 50 percent of the total seven county metro area population. Significant growth occurred in the northern suburbs, including Coon Rapids, Anoka and Brooklyn Park. The Minneapolis suburbs of Bloomington, Richfield and St. Louis Park had the highest suburban populations in 1960. See Figure 8. Minneapolis and St. Paul both lost significant amounts of population during the 1960's, although they maintained their dominance as the central cities of the region.

By 1960, the first link in the I-35W system was completed from Bloomington through South Minneapolis. The Twin Cities built more miles of freeway per capita than any other metropolitan area of its size due to the need to serve the dual downtowns, which called for two sets of radial, rather than one. The radials also reinforced the traditionally easy movement between the central business districts, the Midway district, and suburban areas. This new road system radically increased the distance over which these activities could be linked to the surrounding countryside. The addition of sections of the circumferential ring road allowed access to voids which existed between the older radial spokes of growth. This roadway system served as a major decentralizing force, accentuated by new development nodes created at the intersection of radials and the ring road.[27] There were 100 miles of freeways in 1960.[28] See Figure 9.

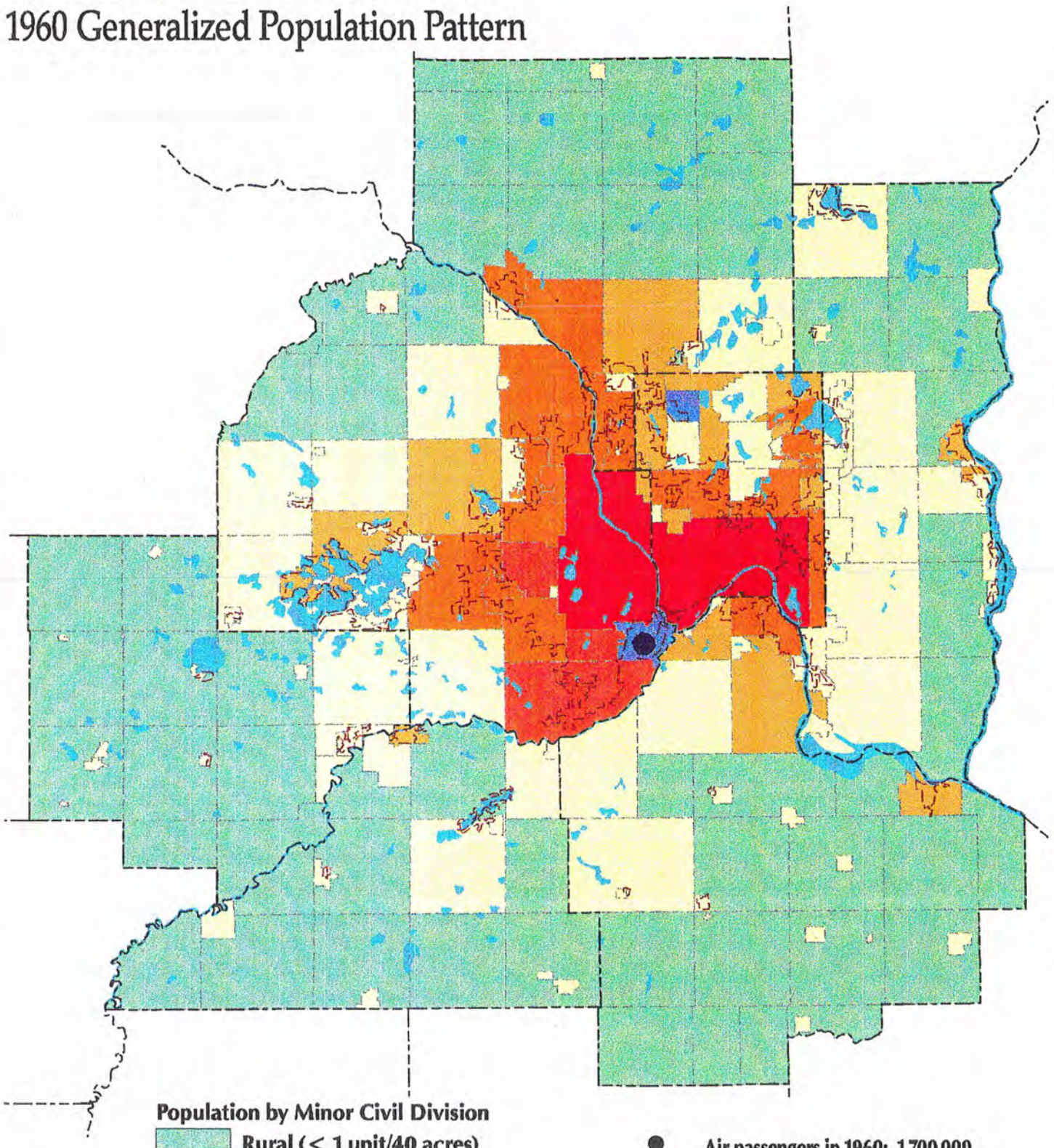
The Guthrie Theater opened in 1963. The Nicollet Mall was completed in 1967. The University of Minnesota expanded to the west bank of the Mississippi. The Metropolitan Council was formed in late 1960's.[29] Urban renewal began in downtown Minneapolis' Gateway District.

In 1960, MSP handled 1.7 million commercial air passengers and 22,000 tons of air cargo. The airport served 28 cities with non-stop service.[30] The Lindbergh Terminal (main) was constructed in 1961. Jet service was initiated at MSP in 1960. In 1969, following a march on the Minneapolis City Council be 400 citizens, the Metropolitan Aircraft Sound Abatement Council (MASAC) was formed. It soon became a model organization for groups concerned about airport noise and environmental issues across the country.

FIGURE 8

Twin Cities Metro Area

1960 Generalized Population Pattern



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Source: DSU; Boundaries - Met Council, Data - U.S. Census Bureau; Metropolitan Airports Commission

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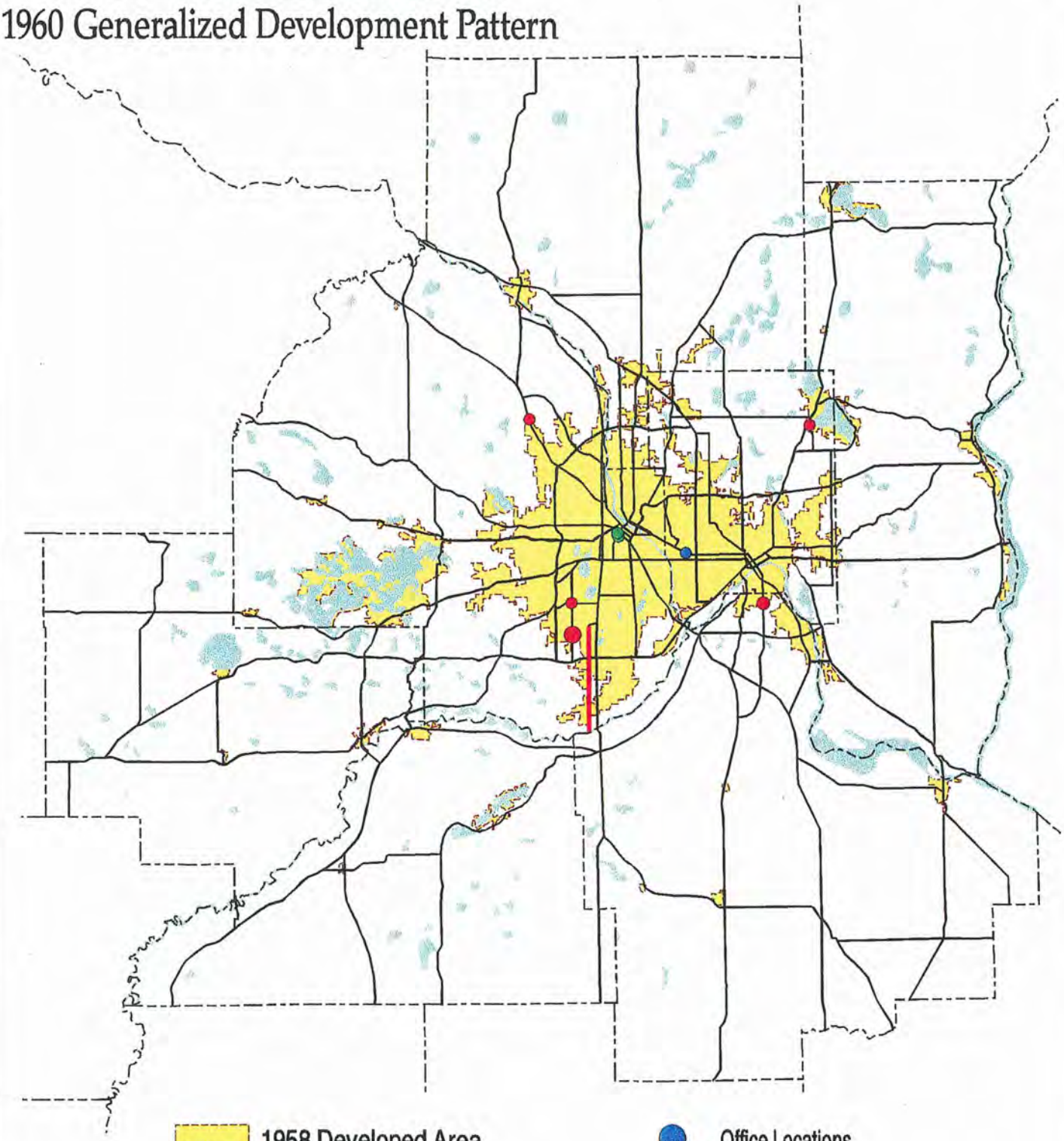
FIGURE 9

Twin Cities Metro Area

1960 Generalized Development Pattern



1958 Developed Area
Interstates
Other Major Roads

Office Locations
Hotel Locations
Shopping Center Locations

Circle size varies with the useable space of the facility.

Source:
* Developed Area - Metropolitan Council
* Road Network - MnDOT

* Office and shopping center locations were gathered from: Minnesota Real Estate Journal Leasing Guide "Commercial Space", City Business/Twin Cities: Inc.
* Hotel locations were gathered from the "Greater Minneapolis Convention and Visitors Association".

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The 1970's

In the 1970's, population continued to spread outward from the central cities. Additional substantial suburban communities, including Brooklyn Center and Minnetonka had emerged. The urban area was becoming contiguous with the suburban area surrounding Lake Minnetonka on the west, and was reaching out towards White Bear Lake on the northeast. See Figure 10.

By 1970, there were more than 350,000 jobs in the suburbs, more than 40 percent of the metropolitan total. Locational decisions by the Twin Cities major firms followed and reinforced the freeway development pattern. These included General Mills, Honeywell, and Gamble-Red Owl Stores west of Minneapolis; Control Data, Univac, and a number of trucking firms and suppliers moved north of the Midway district to Roseville and Arden Hills; and 3M built its new headquarters and research center east of St. Paul in Maplewood.

The area from Edina past the airport to the extreme southwest corner of St. Paul had coalesced into a third employment center, comparable to downtown St. Paul in retail sales and office floor space. There were over 350 miles of freeways in 1970, and the majority of the regional interstate ring road was complete, lacking only the southeastern portion across the Minnesota River, serving northern Dakota County.[31] See Figure 11.

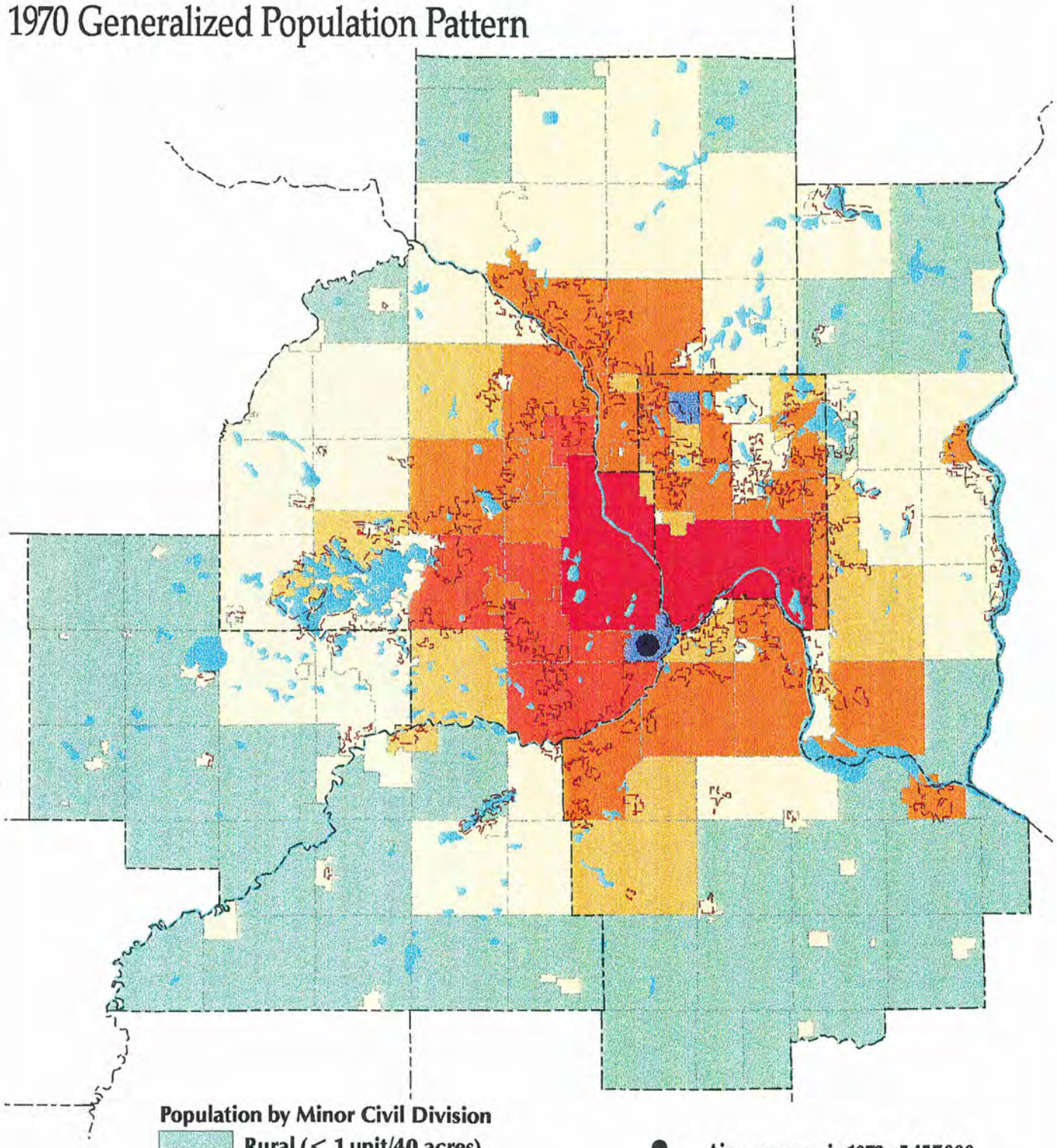
The fifty-seven story IDS Building in downtown Minneapolis, the first major office building constructed in the downtown since the 1920's, opened in 1972. In the suburbs, Ridgedale, Burnsville Center and Eden Prairie Center provided new major retail opportunities.

In 1970, MSP handled 5.1 million commercial air passengers and 102,000 tons of air cargo. The airport served 48 cities with nonstop service.[32] In 1976, there were approximately 25,000 international passengers at MSP. A two hour trip could take an air passenger as far as Dallas/Fort Worth, Atlanta or Washington DC.[33] In 1970, MSP began to provide 747 service for the first time. In 1979, North Central and Southern Airways merged to become Republic Airlines. This was the beginning of the hub and spoke system in the Twin Cities.

FIGURE 10

Twin Cities Metro Area

1970 Generalized Population Pattern



22 February 1996

Source: DSU; Boundaries - Met Council, Data - U.S. Census Bureau; Metropolitan Airports Commission

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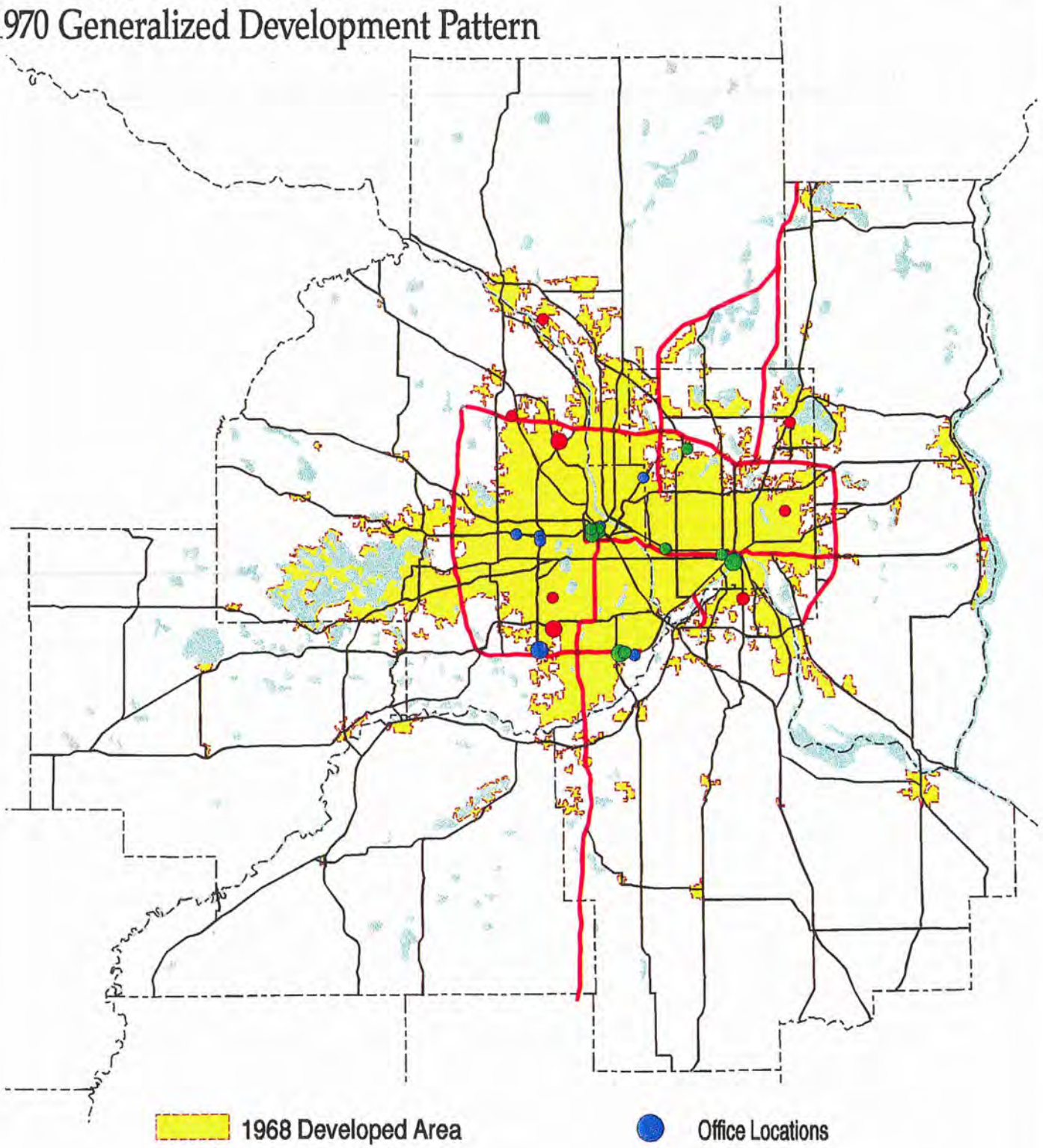
FIGURE 11

Twin Cities Metro Area

1970 Generalized Development Pattern



1968 Developed Area
Interstates
Other Major Roads

Office Locations
Hotel Locations
Shopping Center Locations

Circle size varies with the useable space of the facility.

Source:
* Developed Area - Metropolitan Council
* Road Network - MnDOT

* Office and shopping center locations were gathered from: Minnesota Real Estate Journal Leasing Guide "Commercial Space", City Business/Twin Cities: Inc.
* Hotel locations were gathered from the "Greater Minneapolis Convention and Visitors Association".

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The 1980's

By the 1980's, the list of suburbs with populations over 35,000 had risen to nine communities, adding Burnsville to the south (due in large degree to the extension of I-35W south across the Minnesota River). Additional communities in northern Dakota County also had substantial activity, including Eagan and Apple Valley. See Figure 12.

By 1980, the region had 460 miles of freeways.[34] The developed area had become contiguous in virtually every direction, connecting what were once historic recreation areas such as White Bear Lake and Lake Minnetonka with the central core cities. Growth south of the Minnesota River continued, as did growth to the northwest. See Figure 13.

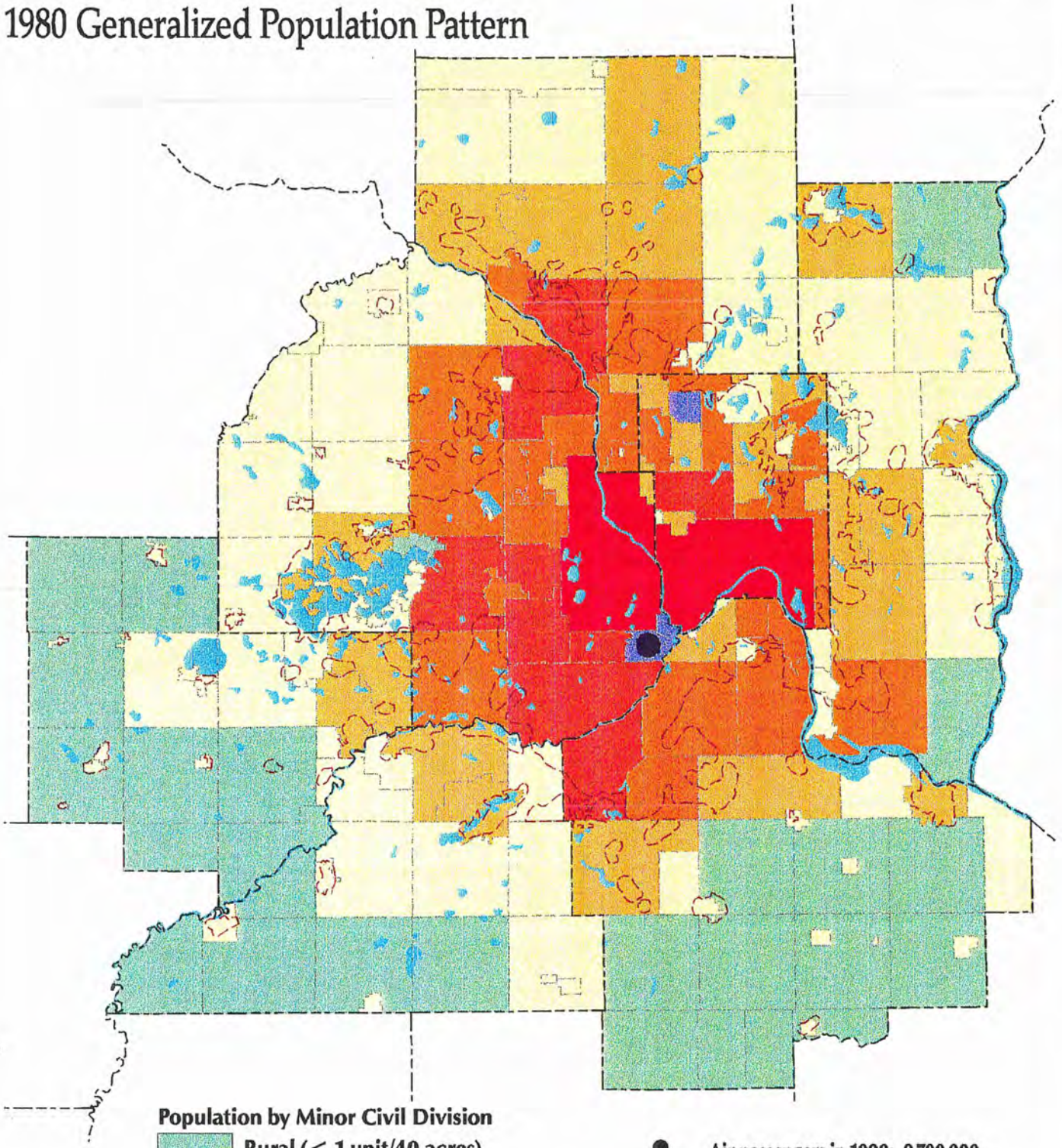
The 1980's were a boom era for speculative office construction in the Twin Cities region, both in the two downtowns, and along the I-494 strip. The loss of population from the central cities had slowed to a trickle, as new construction of housing near the downtowns spurred a residential renaissance of sorts, creating more mixed use adjacent to the downtowns. On the other hand, the 1980's also brought substantial growth in rural residential and estate development, spreading the region ever wider.

In 1980, the airport handled 8.7 million commercial air passengers. By 1984, MSP handled 11 million commercial air passengers and 160,000 tons of air cargo. By 1985, the airport handled 14 million air passengers.[35] Much of this rapid growth was due to deregulation of the airline industry in 1979. By 1984, 68 cities had nonstop service from MSP. Expansions to both the Gold and Red Concourses occurred from 1984 to 1986, adding fifteen additional gates (for a total of 65).[36] By 1984, there were 170,000 international passengers at MSP. In 1987, Republic Airlines, which had competed with Northwest Airlines for the use of MSP as a hub, merged with Northwest Airlines.

FIGURE 12

Twin Cities Metro Area

1980 Generalized Population Pattern



Population by Minor Civil Division

- Rural (< 1 unit/40 acres)
- Less Than 5,000
- 5,001 to 15,000
- 15,001 to 35,000
- 35,001 to 100,000
- More Than 100,000

- Air passengers in 1980: 8,700,000
- 1982 Generalized Developed Area
- U. S. Government

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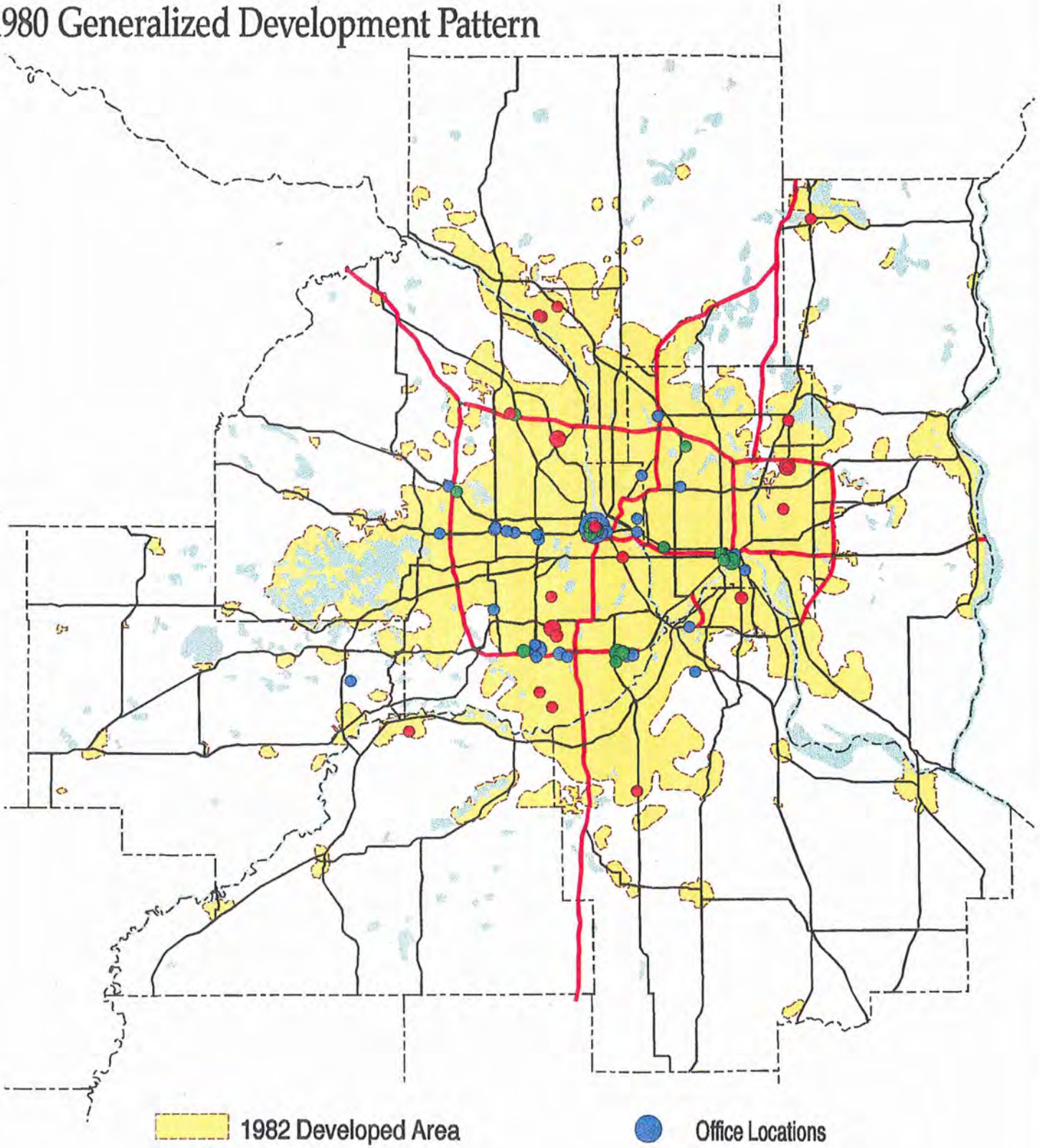
Source: DSU; Boundaries - Met Council, Data - U.S. Census Bureau; Metropolitan Airports Commission

FIGURE 13

Twin Cities Metro Area

1980 Generalized Development Pattern



1982 Developed Area
Interstates
Other Major Roads

Office Locations
Hotel Locations
Shopping Center Locations

Circle size varies with the useable space of the facility.

Source:
- Developed Area - Metropolitan Council
- Road Network - MnDOT

- Office and shopping center locations were gathered from: Minnesota Real Estate Journal Leasing Guide "Commercial Space", City Business/Twin Cities: Inc.
- Hotel locations were gathered from the "Greater Minneapolis Convention and Visitors Association".

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The 1990's

Figures 14 and 15 on the following pages depict the Twin Cities region at approximately the present time. Population has mostly built out the "second ring" suburbs, and is rapidly spreading even further out from the historic core of the central cities. There are now 14 communities with a population over 35,000. Jobs followed the move to suburban locations. By 1990, the central cities share of the region's jobs fell to 40 percent (from 56 percent in 1970).[37]

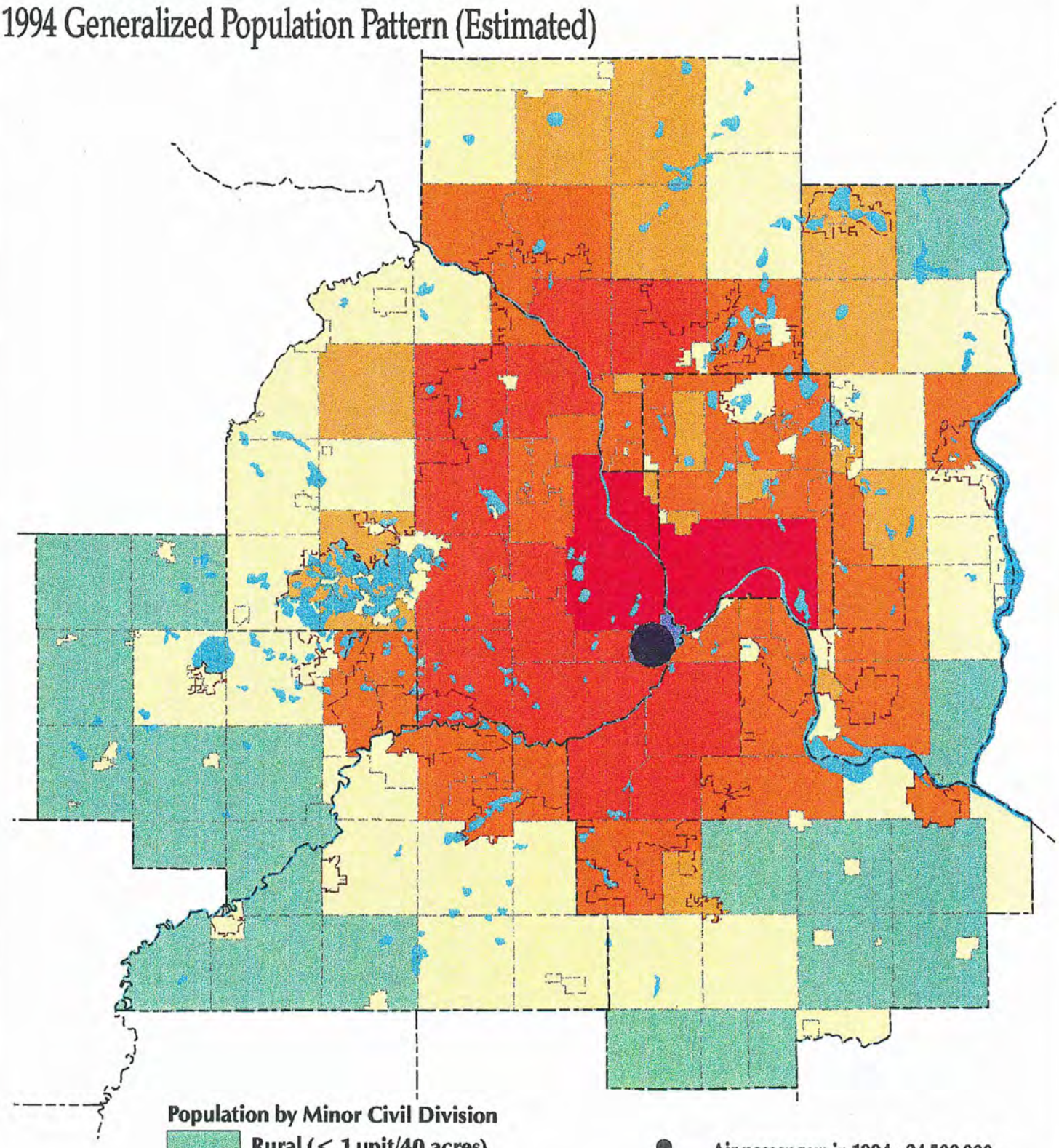
With the completion of I-494 in the southeastern portion of the metropolitan area, the interstate ring road was continuous around the entire area. See Figure 15. Population has followed this new infrastructure, expanding the cities of Eagan, Mendota Heights, and Inver Grove Heights. West Publishing Company left its downtown St. Paul location for Eagan. The pattern of employment centers hugs the radial roads and the ring road, following population and infrastructure.

Throughout the 1990's, downtown Minneapolis has continued to see new office construction, although a substantial portion has been devoted to expanding government offices. At MSP in 1989, there were 18 million air passengers and 242,000 tons of air cargo. MSP served 122 national and 12 international destinations with direct flights.[38]

FIGURE 14

Twin Cities Metro Area

1994 Generalized Population Pattern (Estimated)



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Source: DSU; Boundaries - Met Council, Data - U.S. Census Bureau; Metropolitan Airports Commission

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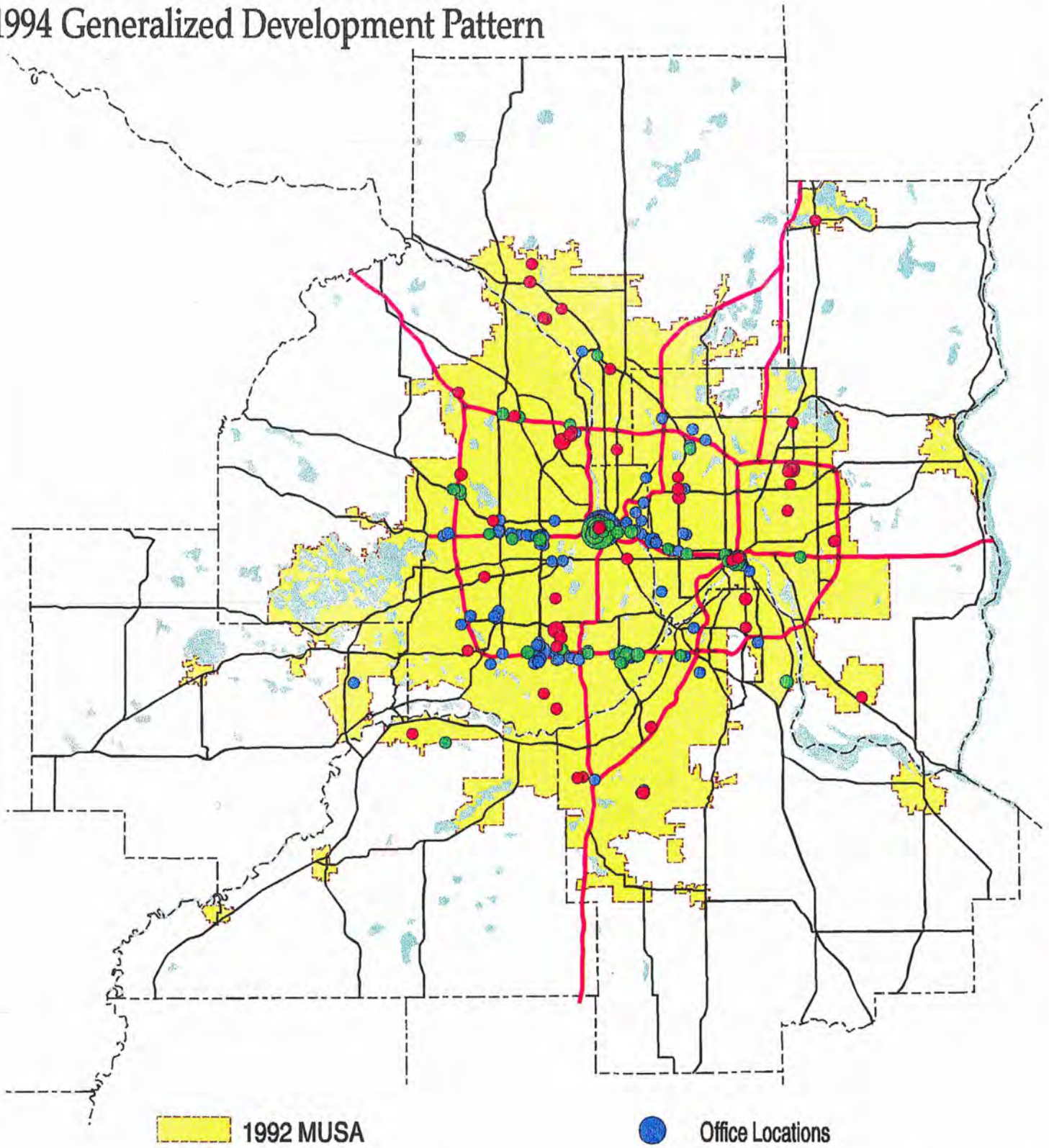
FIGURE 15

Twin Cities Metro Area

1994 Generalized Development Pattern



1992 MUSA
Interstates
Other Major Roads

Office Locations
Hotel Locations
Shopping Center Locations

Circle size varies with the useable space of the facility.

Source:
- Developed Area - Metropolitan Council
- Road Network - MnDOT

- Office and shopping center locations were gathered from: Minnesota Real Estate Journal Leasing Guide "Commercial Space", City Business/Twin Cities: Inc.
- Hotel locations were gathered from the "Greater Minneapolis Convention and Visitors Association".

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The Year 2020

Population estimates for the Twin Cities region are prepared and updated regularly by the Metropolitan Council. Estimates suggest the growth of the region by over 330,000 new households by the year 2020. The anticipated pattern of this new growth relies on existing growth trends, and therefore, the following map of the region can be considered correct if the airport remains in its current location. See Figure 16.

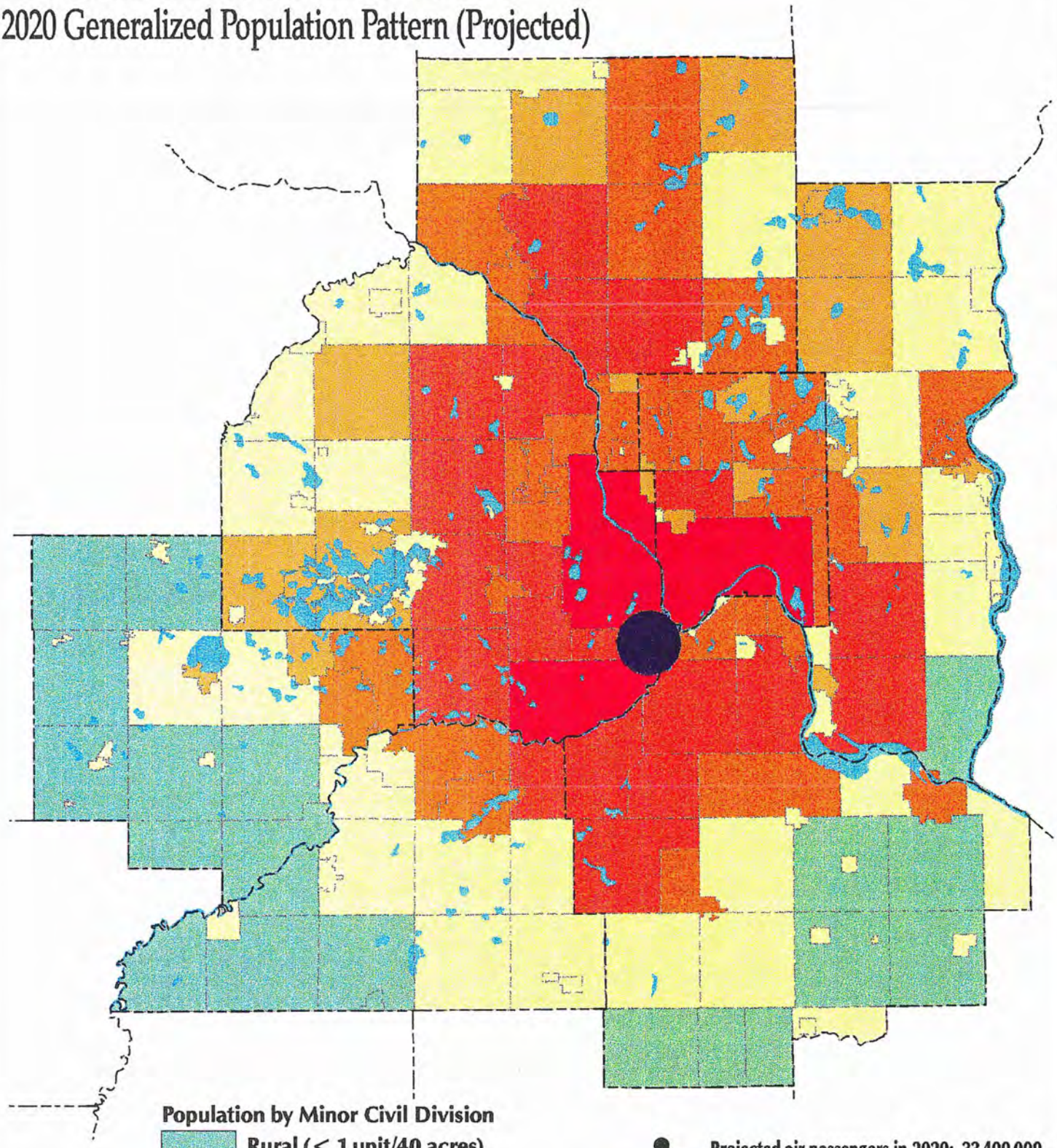
The growth areas include substantially spreading of the region in every direction, with residential growth extending northward along I-35 and Highway 169, eastward along I-94, south along I-35 and I-494, and westward as well. The number of communities expected to exceed 35,000 in population is up to 21. Bloomington is anticipated to exceed the 100,000 population threshold, as well.

There are a number of major regional infrastructure improvements planned, but the recent budget environment has meant that many cannot be projected to occur with any certainty prior to the year 2020. Substantial expenditures on replacing existing regional infrastructure are expected, with improvements to I-35W, the Crosstown Highway (62), and I-494 will require substantial expenditures of public funds. Expansion of Highway 212 west of the Twin Cities, construction of Highway 610 north of the Twin Cities, and construction of a new sewer interceptor to the northwest and a new regional treatment plant in the southeast will all function to reinforce this anticipated pattern of development. The Metropolitan Airports Commission forecasts over 33 million air passengers at MSP in the year 2020.

FIGURE 16

Twin Cities Metro Area

2020 Generalized Population Pattern (Projected)



Population by Minor Civil Division

- Rural (< 1 unit/40 acres)
- Less Than 5,000
- 5,001 to 15,000
- 15,001 to 35,000
- 35,001 to 100,000
- More Than 100,000

- Projected air passengers in 2020: 33,400,000
- U. S. Government

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Source: DSU; Boundaries - Met Council, Data - U.S. Census Bureau; Metropolitan Airports Commission

Localized Impact Area Discussion

Population

A clear picture of the real estate impact area surrounding the MSP requires a look at the cities in the immediate vicinity of the airport. Lilydale is too small to even be recorded in the U.S. Census, and Eagan was not incorporated until 1970. However, Minneapolis and St. Paul are also included in this local impact area. The difficulty with including data from these cities is determining which development effects are driven by MSP and which result from the interstate (I-494), the nearby Mall of America, or simply the effects of being located in a large city such as Minneapolis or St. Paul. Clearly, many cities in the region posses virtually no direct real estate impacts created by the airport (with the possible exception of hotels) even though the total regional economy relies on the availability of air service. The following table outlines population trends for the localized impact area.

Table 2-19: Historic Population Trends, Localized Impact Area, 1970 - 1993

City	1970	1980	1990	1993	% Change 70 - 80	% Change 80-90
Minneapolis	434,400	370,951	368,383	367,924	-14.6%	-0.7%
St. Paul	309,866	270,230	272,235	272,243	-12.8%	0.7%
Richfield	47,231	37,851	35,710	35,538	-19.9%	-5.7%
Bloomington	81,970	81,831	86,335	86,918	-0.2%	5.5%
Eagan	10,398	20,700	47,409	53,004	99.1%	129.0%
Mendota Heights	6,565	7,288	9,431	10,466	11.0%	29.4%
Lilydale	322	417	506	542	29.5%	21.3%
Localized MSA	**890,752**	**789,268**	**820,009**	**826,635**	**-11.4%**	**3.9%**

Source: The Business Source, 1994 Economic Profile of the Twin Cities Area

As the previous table shows, populations of Minneapolis and St. Paul decreased significantly in the 1970's by rates of 14.6% and 12.8% respectively. However, population loss in the downtown areas has slowed considerably since 1980, due in part to the success of urban revitalization plans. Population growth in the suburbs has been far more rapid, particularly in Eagan, which grew in size from 10,389 in 1970 to 53,004 in 1993. Although the impact area lost 101,484 residents between 1970 and 1980, population growth eventually started to occur after 1980 as the area population grew by 37,360 additional residents.

Income

Median household income statistics for the seven community area, taken from the 1980 and 1990 census, are shown in Table 2-20, below. The results show that the cities with the fastest growing incomes are Eagan, at 6.8% and Mendota Heights, at 6.0%. The median income in the community of Eagan grew from $24,106 in 1979 to $46,612 in

1989. Median income growth across the MSA amounted to 5.7%, growing from $22,475 in 1979 to $39,026 in 1989.

Table 2-20: Median Household Income of the Localized Impact Area

City	1979	1989	Average Growth Rate
Minneapolis	$ 14,351	$ 25,324	5.8%
St. Paul	$ 16,029	$ 26,498	5.2%
Richfield	$ 20,424	$ 32,405	4.7%
Bloomington	$ 26,083	$ 41,736	4.8%
Eagan	$ 24,106	$ 46,612	6.8%
Mendota Heights	$ 33,855	$ 60,514	6.0%
Lilydale	NA	$ 40,096	NA
Localized MSA	**$ 22,475**	**$ 39,026**	**5.7%**

Source: The Business Source, 1994 Economic Profile of the Twin Cities Area

The table also shows that Bloomington achieved the second highest median household income in the six community area ($41,736) in 1989. It is interesting to note that, while median income growth in Minneapolis and St. Paul increased by 5.8% and 5.2% respectively, the 1989 median incomes achieved by the two cities still fell at the tail end of the six community median income spectrum.

Employment

Employment data for the localized impact area is shown in the following two tables. Table 2-21 provides information on employment by industry sector for the Cities of Minneapolis and St. Paul, while Table 2-22 covers the communities of Bloomington, Richfield, Eagan, Lillydale, and Mendota Heights. Table 2-21, below, outlines employment trends for the Cities of Minneapolis and St. Paul between 1987 and 1993. The table, which breaks down employment by industry sector, highlights several interesting trends in the twin Cites.

In Minneapolis, employment increased by 3,720 between 1987 and 1990 before falling by 4,962 between 1990 and 1993 as a result of the national recession. Employment growth between 1987 and 1990 was robust however, with seven out of eleven sectors showing an improvement. Between 1990 and 1993 however, nine out of eleven sectors declined. The strongest job creation sectors in Minneapolis between 1987 and 1993 included services, which grew by 11% and local government employment, which grew by almost 18%. Over the eight year period, the service sector percentage of total employment increased from 30.2% to 33.7%.

Table 2-21: Average Annual Employment by Industry Sector, Minneapolis & St. Paul, 1987 - 1993						
	Minneapolis			St. Paul		
Industrial Category	1987	1990	1993	1987	1989	1993
Agriculture & Mining	389	336	360	329	435	360
Construction	6,827	5,826	5,334	6,308	5,516	4,799
Manufacturing	40,174	39,290	35,895	49,896	44,819	39,457
T.C.U	14,934	15,004	13,043	5,700	6,229	5,798
Wholesale Trade	17,339	14,917	12,559	6,868	6,702	6,584
Retail Trade	40,365	40,652	38,031	24,340	23,457	21,673
F.I.R.E.	33,029	33,516	32,819	15,375	13,786	13,509
Services	85,195	90,347	94,652	49,651	54,669	59,740
Federal Government	6,054	6,407	6,349	4,846	4,926	4,833
State Government	16,588	17,129	16,766	11,939	12,910	13,028
Local Government	21,368	22,558	25,212	15,613	16,493	17,136
Total Employment	282,262	285,982	281,020	190,865	189,942	186,917
Retail % of Total	14.3%	14.2%	13.5%	12.8%	12.3%	11.6%
Services % of Total	30.2%	31.6%	33.7%	26.0%	28.8%	32.0%
Government % Total	15.6%	16.1%	17.2%	17.0%	18.1%	18.7%
Source: Minnesota Department of Economic Security, Form ES-202						

As stated above, growth in services and local government employment over the 1987-1993 period mitigated the overall effect of the national recession on Minneapolis. Although the service sector in St. Paul expanded by over 10,000 jobs between 1987 and 1993, the city still lost 4,000 overall jobs. The hardest hit sectors included manufacturing and retail trade, which lost a total of 10,439 and 2,667 jobs respectively, over the eight year period. By 1993, service employment had grown to 32% of total employment in St. Paul, increasing from 26% in 1987. Although manufacturing employment fell considerably over the eight year period, the sector still contained roughly 21% of total employment in 1993. Considering that the state capitol is in St. Paul, it is interesting to note that the majority of state government employment in the Twin Cities is concentrated in Minneapolis. Even so, government employment occupies a greater share of total employment in St. Paul (18.7%) then in Minneapolis (17.2%), as of 1993.

The following table (2-22) outlines employment trends for the five smaller communities in the localized impact area. The five communities, ranging in size from Lillydale (the smallest) to Bloomington (the largest), had a total employment of roughly 132,800 in 1994.

Table 2-22: Employment by Industry Sector, Localized Impact Area, 1990 - 1994

Category	Bloomington			% Change	Mendota Heights			% Change	Eagan			% Change
	1990	1992	1994	1990-1994	1990	1992	1994	1990-1994	1990	1992	1994	1990-1994
Manufacturing	14,893	11,947	11,368	-23.7%	2,224	2,555	1,216	-45.3%	4,964	8,064	8,928	79.9%
Construction	2,072	2,238	2,010	-3.0%	169	74	110	-34.9%	611	676	788	29.0%
T.C.U.	1,890	2,025	2,398	26.9%	226	152	86	-61.9%	2,282	2,460	3,047	33.5%
Wholesale Trade	8,553	7,094	8,323	-2.7%	747	861	1,068	43.0%	2,239	2,596	4,527	102.2%
Retail Trade	12,121	12,550	19,261	58.9%	421	361	304	-27.8%	3,094	3,121	3,902	26.1%
F.I.R.E	5,147	8,342	10,483	103.7%	184	212	649	252.7%	3,150	3,208	3,604	14.4%
Service	23,287	23,869	28,981	24.5%	1,064	1,261	1,456	36.8%	2,863	4,051	3,849	34.4%
Government	3,305	3,295	3,504	6.0%	230	607	642	179.1%	1,502	1,914	2,049	36.4%
Total Employment	**71,268**	**71,360**	**86,328**	**21.1%**	**5,265**	**6,083**	**5,531**	**5.1%**	**20,705**	**26,090**	**30,694**	**48.2%**
Services % Total	**32.7%**	**33.4%**	**33.6%**		**20.2%**	**20.7%**	**26.3%**		**13.8%**	**15.5%**	**12.5%**	

Category	Lilydale/Mendota			% Change	Richfield			% Change	Six Community Totals			% Change
	1990	1992	1994	1990-1994	1990	1992	1994	1990-1994	1990	1992	1994	1990 -1994
Manufacturing	0	100	0	0.0%	581	221	169	-70.9%	22,662	22,887	21,681	-4.3%
Construction	0	0	0	0.0%	575	252	240	-58.3%	3,427	3,240	3,148	-8.1%
T.C.U.	0	0	0	0.0%	327	375	279	-14.7%	4,725	5,012	5,810	23.0%
Wholesale Trade	0	0	0	0.0%	687	1,242	861	25.3%	12,226	11,793	14,779	20.9%
Retail Trade	191	166	95	-50.3%	4,534	3,818	3,961	-12.6%	20,361	20,016	27,523	35.2%
F.I.R.E	0	0	0	0.0%	944	782	746	-21.0%	9,425	12,544	15,482	64.3%
Service	27	0	147	444.4%	2,918	2,810	2,526	-13.4%	30,159	31,991	36,959	22.5%
Government	0	0	0	0.0%	1,171	1,082	1,149	-1.9%	6,208	6,898	7,344	18.3%
Total Employment	**301**	**557**	**332**	**10.3%**	**11,737**	**10,582**	**9,931**	**-15.4%**	**109,276**	**114,672**	**132,816**	**21.5%**

Source: Metropolitan Council

Employment growth in the five communities was particularly strong, with over 23,500 new jobs created between 1990 and 1994. The strongest performing sectors over the 1990 - 1994 period included retail trade, services, and finance, insurance, and real estate (F.I.R.E.). Manufacturing and construction were the only sectors to decline over the four year period. Bloomington and Eagan contained roughly 88% of 1994 total employment in the five communities.

Employment growth in Bloomington was particularly strong over the four-year period, increasing from 71,268 in 1990 to 86,328 in 1994. Job creation in the retail trade and F.I.R.E sectors between 1990 and 1994 accounted for 82% of the roughly 15,000 new jobs created. The Mall of America, which opened in August of 1992, was primarily responsible for the creation of 7,140 new retail trade jobs over the four year period. Growth in F.I.R.E. employment was primarily attributed renewed office leasing activity in the I-494 corridor since 1990. Manufacturing was the only sector to exhibit significant decline, falling from 14,893 to 11,368 by 1994.

Job creation was also strong in Eagan, which added almost 10,000 jobs by 1994. The majority of job growth in Eagan was concentrated in wholesale trade and manufacturing, which grew by 2,288 and 3,964 respectively, between 1990 and 1994. The share of total Eagan employment occupied by manufacturing and wholesale trade increased from 34.8% in 1990 to 43.8% in 1994. Employment creation in the communities of Lillydale and Richfield was minimal over the four year period. Mendota Heights lost employment between 1990 and 1994, falling from 11,737 to 9,931.

Housing

Housing unit growth in the seven community impact area is reported in Table 2-23. The table indicates that Eagan, Lilydale, and Mendota Heights have grown at rates of 545%, 167% and 105%, respectively. The number of housing units in Eagan grew by almost 15,600 over the 20 year period. Total housing units in Minneapolis and St. Paul grew by roughly 15,300 over the same period..

Table 2-23: Localized Impact Area Growth in Housing Units

City	1970	1980	1990	% Change
Minneapolis	167,214	168,859	172,666	3.3%
St. Paul	107,715	110,902	117,583	9.2%
Richfield	14,983	15,434	16,094	7.4%
Bloomington	22,254	29,569	35,815	60.9%
Eagan	2,859	7,206	18,450	545.3%
Mendota Heights	1,657	2,292	3,410	105.8%
Lilydale	128	239	342	167.2%
Localized MSA	**316,810**	**334,501**	**364,360**	**15.0%**

Source: Metropolitan Council Census Log, July 1993

The dramatic difference in housing development rates between city and suburbs is due primarily to the fact that residential development in the urban areas is limited to existing vacant infill sites and unused buildings. Such developments typically require higher development costs, relative to new housing projects on larger tracts of vacant land in suburban areas. Overall, new housing construction in the localized impact area added roughly 47,550 units to supply between 1970 and 1990.

Localized Impact Area Growth Projections

Projections for the localized impact area through 2020 were generated by the Metropolitan Council. The forecasts, which cover population, households, and total employment, are contained in the following three tables. Population forecasts for the six communities, contained in Table 2-24 below, indicate that population in the six communities will increase from 820,006 in 1990 to 885,750 in 2020, an 8% overall increase. The forecasts project that Minneapolis will experience slight population increases through 2020, increasing from 368,383 in 1990 to 375,000 in 2020. Population growth in St. Paul is expected to be slightly stronger, increasing from 272,235 in 1990 to 285,500 in 2020. Overall, population in Minneapolis and St. Paul is expected to grow by roughly 3.1% over the next 25 years.

Table 2-24: Population Forecast for Localized Impact Area

City	Census 1990	Projected 2000	Projected 2010	Projected 2020	Projected Change	Annual Change
Minneapolis	368,383	370,500	373,000	375,000	2%	0.06%
St. Paul	272,235	275,000	280,000	285,500	5%	0.16%
Richfield	35,710	36,500	38,100	38,300	7%	0.23%
Bloomington	86,335	91,500	97,500	102,000	18%	0.56%
Eagan	47,409	63,500	68,500	71,000	50%	1.36%
Mendota Heights	9,381	10,800	12,150	13,300	42%	1.17%
Lilydale	553	600	650	650	18%	0.54%
Localized MSA	**820,006**	**848,400**	**869,900**	**885,750**	**8%**	**0.26%**

Source: Metropolitan Council, Population, Household and Employment Forecasts, Sept. 1, 1994

Population growth rates in the suburban communities of Mendota Heights and Eagan are expected to be the strongest in the impact area, with overall increases of 42% and 50% respectively. Eagan is expected to grow from 47,049 in 1990 to 71,000 in 2020, while Mendota Heights is expected to grow from 9,381 to 13,300 over the same time period. As a result of significant growth in the 1980's, Bloomington emerged as Minnesota's third largest municipality, and is now defined by the U.S. Department of the Census as a "central city" of the Minneapolis-St. Paul MSA. Population growth in Bloomington is forecast to increase from 86,335 to 102,000 over the 25 year period. Adams and VanDrasek noted that Bloomington had less than 1% of its land base

available for new residential development in 1990, implying that population growth will slow as remaining housing sites are developed.

Shown below in Table 2-25 are household projections for the localized impact area. The forecasts indicate that household growth will be strongest in Eagan, which will expand by roughly 14,500 households by 2020. St. Paul and Bloomington are expected to achieve comparable amounts of absolute household growth, with forecast increases of roughly 5,751 and 5,512 households by 2020, respectively. Minneapolis is forecasted to experience the lowest percentage increases in household growth, improving by 2% over the forecast period. Although Lilydale is forecasted to achieve 38% household growth by 2020, the community will grow by only 113 households over the time period.

Table 2-25: Projected Households of Localized Impact Area

City	Census 1990	Projected 2000	Projected 2010	Projected 2020	Projected Change	Annual Change
Minneapolis	160,682	161,500	162,500	163,500	2%	0.06%
St. Paul	110,249	112,000	114,000	116,000	5%	0.17%
Richfield	15,551	16,000	16,200	16,300	5%	0.16%
Bloomington	34,488	36,500	39,000	40,000	16%	0.50%
Eagan	17,427	25,000	29,000	32,000	84%	2.05%
Mendota Heights	3,302	4,150	5,000	5,850	77%	1.92%
Lilydale	297	400	410	410	38%	1.08%
Total:	**341,996**	**355,550**	**366,110**	**374,060**	**9%**	**0.30%**

Source: Metropolitan Council, Population, Household and Employment Forecasts, Sept. 1, 1994

Employment forecasts for the six community impact area, shown below in table 2-26, indicate that the area's employment base will grow from 569,259 in 1990 to 623,100 in 2020. Future employment growth is forecast to be concentrated in three communities, Bloomington, Eagan, and Minneapolis, accounting for 46,600 new jobs, or roughly 86% of forecasted total employment by 2020. Forecasted job creation in St. Paul through 2020 is expected to be about 6,500. Richfield is forecasted to experience minimal job creation over the same period, amounting to roughly 750 new jobs through 2020. The community of Lilydale is not forecasted to emerge as a significant employment concentration. As stated previously, the localized impact area forecasts for population, households, and employment do not assume relocation of MSP to Dakota County.

Table 2-26: Employment Forecast for Localized Impact Area						
City	Census 1990	Projected 2000	Projected 2010	Projected 2020	Projected Change	Annual Change
Minneapolis	278,314	282,500	285,500	287,000	3%	0.10%
St. Paul	172,504	176,500	178,000	179,000	4%	0.12%
Richfield	10,844	10,900	11,600	11,600	7%	0.22%
Bloomington	75,742	88,800	93,500	95,000	25%	0.76%
Eagan	26,000	36,300	40,300	41,800	61%	1.60%
Mendota Heights	5,805	7,550	8,400	8,650	49%	1.34%
Lilydale	50	50	50	50	0%	0.00%
Localized MSA	**569,259**	**602,600**	**617,350**	**623,100**	**9%**	**0.30%**
Source: Metropolitan Council, Population, Household and Employment Forecasts, Sept. 1, 1994						

Tourism

The existence of substantial natural, recreational, and entertainment amenities in Minnesota generates substantial tourist revenue from Minnesota residents and out-of-state visitors. Since there are a multitude of leisure travel destinations in the world, ease of access, cost, and unique attractions are primary factors in choosing a tourist destination. To the extent that out-of-state visitors use MSP to enjoy tourist amenities in Minnesota, their economic impact is tied to the alternative development scenarios in one critical fashion, relating to the cost of air travel. If the construction of the Dakota County airport results in landing fees, passenger facility charges (PFC's), and other charges that are higher then those currently being paid at MSP, the resulting higher cost of air travel could reduce the potential for Minnesota to expand its tourism based revenue. This section of the report demonstrates the substantial and diverse impacts of tourism in Minnesota

Table 2-27, below, shows that statewide tourism has provided an erratic, but increasing, number of jobs over the past four years. The majority of tourist related employment growth has occurred in the southwestern and northeastern sections of the state, with employment growth rates of 28.4% and 22%, respectively. The Twin Cites metro area is the primary source of tourist employment in the state accounting for roughly 51% of total tourist related employment in the state. Metro tourist related employment reached a high of 59,882 in 1989, then fell by 1990 as the national recession reduced travel activity. Since 1991, the metro share of statewide tourist employment has ranged between 49% and 51%. Between 1992 and 1993 only the southwest sector was able to increase tourist employment, improving from 7,735 to 7,898. The northwest sector lost a significant proportion of its tourist related employment base between 1992 and 1993, losing roughly 22%, or 1,500 jobs.

Table 2-27: Tourism Related Employment, Minnesota, 1989 - 1993						
Region	**1989**	**1990**	**1991**	**1992**	**1993**	**% Change**
Metro	59,882	57,295	59,326	64,014	63,423	5.9%
Northcentral	13,457	13,454	15,686	16,785	15,603	15.9%
Northeast	11,215	10,705	12,395	14,085	13,677	22.0%
Northwest	5,786	6,339	6,064	7,152	5,556	-4.0%
Southeast	12,570	12,221	13,110	14,147	13,918	10.7%
Southwest	6,149	6,217	6,722	7,735	7,898	28.4%
Other	3,060	3,391	4,032	4,591	3,465	13.2%
Statewide	**112,119**	**109,622**	**117,335**	**128,509**	**123,540**	**10.2%**
Source: Minnesota Office of Tourism						

The Minnesota Office of Tourism has estimated employment, wages, and output (using a multiplier effect) resulting from domestic travel in Minnesota. Results for the metropolitan counties can be found in Table 2-28, shown below. Naturally, the largest counties of Hennepin and Ramsey are responsible for the largest number of jobs connected with tourism. Overall, tourism generates a demand for 63,692 jobs and creates $1.3 million in wages and $3.2 million in overall output in the 11 county metropolitan area.

Table: 2-28: Economic Impact of Travel in Minnesota			
County	**Total Employment**	**Wages *(thousands)***	**Output *(thousands)***
Anoka	638	$ 12.0	$ 32.2
Carver	351	6.6	17.7
Chisago	190	3.5	9.5
Dakota	3,676	75.2	191.1
Hennepin	46,679	906.5	2,374.3
Isanti	94	1.7	4.7
Ramsey	9,066	177.8	463.9
Scott	876	16.5	44.1
Sherburne	175	3.2	8.8
Washington	1,148	21.5	57.8
Wright	799	15.0	40.2
Total MSA	**63,692**	**$ 1,239.5**	**$ 3,244.3**
Source: Minnesota Office of Tourism			

The Minnesota Office of Tourism estimates that 2/3 of spring and summer travelers in Minnesota spend seven or more nights away from home while 20% of fall and winter visitors spend six or more nights away from home.

The gross receipts generated by tourism state-wide was equal to roughly $6.3 billion 1993, with the seven county metro area accounting for 51% of total gross receipts. Assuming that future trends continue to follow following past history, impacts to the rest of the state, as shown below in Table 2-29, will grow more rapidly than the metro area. Of special note are the Northeast and the Southwest regions, which experienced revenue growth rates of 40.4% and 46.8%, respectively, between 1989 and 1993.

Table 2-29: Gross Receipts From Tourism In Minnesota, 1989 - 1993
(in $ millions)

Region	1989	1990	1991	1992	1993	% Change
Metro Area	$ 2,669.1	$ 2,658.9	$ 2,826.2	$ 3,162.6	$ 3,230.9	21.0%
Northcentral	608.0	633.1	755.6	837.4	804.0	32.2%
Northeast	499.8	496.8	589.9	700.3	701.5	40.4%
Northwest	254.8	290.5	285.5	349.3	279.7	9.8%
Southeast	560.1	566.7	623.8	698.1	708.2	26.4%
Southwest	271.0	285.1	316.3	377.7	397.8	46.8%
Other	124.8	145.1	181.8	214.4	161.8	29.6%
Statewide	**$ 4,987.6**	**$ 5,076.2**	**$ 5,579.1**	**$ 6,339.8**	**$ 6,283.9**	**26.0%**

Source: Minnesota Office of Tourism

The Greater Minneapolis Convention and Visitors Bureau also commissioned a survey to estimate the economic impact of convention business on the metropolitan area. The survey, conducted by Delloite and Touche, estimated that the average conventioneer spent just over $770 dollars per visit in both 1993 and 1994. Table 2-30 depicts the breakdown of these expenditures, the largest share going to hotel rooms (49%), restaurants (24%), and retail stores (15%). Each visit lasted 4.1 days and generated expenditures of $187.90 per day. In 1994, the Twin Cities metropolitan area hosted 283 conventions with 235,000 delegates for total expenditures of $180.1 million.

Table 2-30: Minneapolis Convention Expenditures *(average per person expenditures over 4 days)*		
Expenditure Category	**Total Expenditures**	**Percent of Total**
Hotel Rooms	$ 378.72	49.16%
Hotel Restaurants	$ 93.06	12.08%
Other Restaurants	$ 93.37	12.12%
Hospitality Suites	$ 12.87	1.67%
Admission to Shows	$ 7.86	1.02%
Recreation	$ 6.01	0.78%
Sporting Events	$ 2.16	0.28%
Retail Stores	$ 115.17	14.95%
Local Transport	$ 17.87	2.32%
Auto Rental	$ 19.88	2.58%
Gasoline	$ 8.94	1.16%
Other	$ 14.48	1.88%
Total	**$ 770.38**	**100.00%**
Source: Greater Minneapolis Convention & Visitors Bureau		

[1] Interview, Richard Anderson, Northwest Airlines, November 20, 1995.
[2] Dual Track No-Build Forecasts, HNTB, July 27, 1995.
[3] Adams and VanDrasek. Minneapolis-St. Paul: People, Places, and Public Life. University of Minnesota Press, 1993.
[4] Lukerman, Snyder, and Luce. An Examination of the Factors Controlling Location of Commercial and Industrial development in the Metro Area. University of Minnesota, Center for Urban and Regional Affairs, 1993, page 40
[5] Ibid., page 41.
[6] Minneapolis Star Tribune, November 12, 1995, page D1.
[7] Ibid., page 120.
[8] Adams and VanDrasek, page 120.
[9] Minneapolis Star Tribune, March 28, 1994.
[10] Minneapolis Star Tribune, June 21, 1992.
[11] Minnesota Planning, Within our Means: Tough Choices for Government Spending, January 1995, p 5.
[12] Ibid., page 4.
[13] Adams and VanDrasek. Minneapolis-St. Paul: People, Places, and Public Life. University of Minnesota Press, 1993, page 186.
[14] Ibid., page 192.
[15] Abler, Adams and Borchert, St. Paul/Minneapolis: The Twin Cities, Ballinger Publishing Company, 1976.
[16] Metropolitan Council, Minneapolis/St. Paul International Airport Reuse Study, Document #559-92-131.
[17] Ibid.
[18] Judith A. Martin and David A. Lanegran, Where We Live: The Residential Districts of Minneapolis and St. Paul, Univ. of Minn. Press, 1983.
[19] Metropolitan Council, Minneapolis/St. Paul International Airport Reuse Study, Document #559-92-131.
[20] Abler, Adams and Borchert, St. Paul/Minneapolis: The Twin Cities, Ballinger Publishing Company, 1976.
[21] Ibid.
[22] Ibid.
[23] Airports System Plan/Development Guide, Metropolitan Council, 1978, 1983 and 1986.
[24] Ibid.
[25] Metropolitan Council, Minneapolis/St. Paul International Airport Reuse Study, Document #559-92-131.
[26] Judith A. Martin and David A. Lanegran, Where We Live: The Residential Districts of Minneapolis and St. Paul, Univ. of Minn. Press, 1983.
[27] Abler, Adams and Borchert, St. Paul/Minneapolis: The Twin Cities, Ballinger Publishing Company, 1976.
[28] Metropolitan Council, Minneapolis/St. Paul International Airport Reuse Study, Document #559-92-131.
[29] Abler, Adams and Borchert, St. Paul/Minneapolis: The Twin Cities, Ballinger Publishing Company, 1976.
[30] Airports System Plan/Development Guide, Metropolitan Council, 1978, 1983 and 1986.
[31] Metropolitan Council, Minneapolis/St. Paul International Airport Reuse Study, Document #559-92-131.
[32] Airports System Plan/Development Guide, Metropolitan Council, 1978, 1983 and 1986.
[33] Ibid.
[34] Metropolitan Council, Minneapolis/St. Paul International Airport Reuse Study, Document #559-92-131.
[35] Twin Cities Major Airport Planning: A Citizen's Guide, Metropolitan Council/Metropolitan Airports Commission, December 1990.
[36] Airports System Plan/Development Guide, Metropolitan Council, 1978, 1983 and 1986.
[37] Metropolitan Council, Minneapolis/St. Paul International Airport Reuse Study, Document #559-92-131.
[38] Twin Cities Major Airport Planning: A Citizen's Guide, Metropolitan Council/Metropolitan Airports Commission, December 1990.

Part III

Case Studies

- Part III -
Case Studies

Introduction

Quantification of the various economic impacts of alternative development scenarios for aviation development in the Twin Cities is based on a variety of assessment methods. One unique method utilizes case studies to define the economic impacts resulting from new airport development and expansion in other cities across the U.S. The economic impacts, possibly including changes in employment, or office, hotel, and industrial space inventories, resulting from airport expansion or new construction in other parts of the country are significant in that they establish a range of likely economic impacts for the alternative airport scenarios, with particular focus on the 'induced' real estate development impacts.

Selection of relevant airport case studies was based on several criteria, which included facility size, distance from a central business district (CBD), and date of construction. The initial goal of the selection process was to locate airports which had a ten to twenty year operating history, in order to judge the progression of airport linked real estate development around each facility. Only Denver International, which opened in February of 1995, has been built in the last 20 years. As a result, airport facilities older than 20 years were considered as well. The following table highlights ten airports which were initially considered for the case study approach.

Airports Considered for Case Study Approach

Airport	Year Built	New or Expand	Miles to CBD	Connecting Passengers	O/D Passengers	Total [1] Passengers
Kansas City	1972	New	17	0	8,923,456	8,923,456
Washington Dulles	1962	New	26	0[2]	11,647,020	11,647,020
Cincinnati	1947	Expand	12	8,211,809	5,474,539	13,686,349
Salt Lake City	1926	Expand	5	7,372,970	10,191,179	17,564,149
Pittsburgh	1952	Expand	12	13,643,496	4,847,212	19,490,709
Seattle-Tacoma	1944	Expand	15	5,243,204	15,729,615	20,972,819
Phoenix Sky Harbor	1936	Expand	5	15,375,679	10,250,453	25,626,132
Denver International [3]	1995	New	23	15,572,711	17,560,000	33,133,428
DFW	1974	New	17	36,820,000	15,780,337	52,601,125
Atlanta	1940's	Expand	12	27,046,525	27,046,525	54,093,051

Notes: [1] Data on total passengers is for 1994
[2] Dulles connections by United are part of total
[3] DIA total passengers are 1994 Stapleton figures
Source: Airport Marketing Departments

The ten airports listed above were identified as preliminary candidates for the case study analysis. After initial data gathering for each airport was complete, airports in Atlanta, Washington, Dallas-Fort Worth, Denver, and Kansas City were chosen as

primary case studies based on the quality and quantity of available data. Although limited data availability precluded the generation of complete case studies for the five additional airports (Salt Lake City, Cincinnati, Phoenix, Pittsburgh, and Seattle-Tacoma), ERA conducted limited case reviews of each facility to the extent that data was available.

The case studies and reviews are based on a compilation of data from a variety of sources, including airport marketing departments, regional planning agencies, and private development firms. Each study begins with a historical introduction of the airport, its facilities, development history, location, and capacity. Relevant statistics, including yearly flights, cargo, and passenger traffic are also discussed.

Assessment of historic commercial real estate development patterns around each of the selected facilities emphasizes office and industrial space inventories, hotel rooms, and related employment in five or ten year increments, depending on data availability. Each case study will conclude with a review of past economic impact assessment studies to categorize the economic importance of each airport facility to the local and regional economy. An assessment of the applicability of each case study or review to the alternative development scenarios follows at the end of this section.

Washington Dulles International Airport

Introduction

Washington-Dulles International Airport is located in Northern Virginia about 26 miles west of Washington, D.C. The airport, completed in 1962, was the first such facility in the country designed to operate jet-powered passenger aircraft. Funding for the project was provided by the U.S. Congress based on a perceived need for expanded airport capacity in the Washington, D.C. metropolitan area in the future. The Federal Aviation Administration had determined that existing runway facilities at Washington National Airport in 1950 were inadequate for jet operations.

Washington-Dulles was built on a 10,000 acre site on the border between Fairfax and Loudon Counties in northern Virginia. In buying the site, the federal government also acquired a 16-mile right-of-way for eventual construction of an airport access road. Although the site was in an agricultural area, the existence of rock outcroppings on the property significantly reduced its utility for agricultural uses.

The airport improvements included three runways, 11,500 feet, 11,500 feet, and 10,500 feet in length. Two of the runways were oriented in such a fashion to allow for simultaneous take-off and landing operations. The airport terminal, containing about 295,000 square feet of space, was designed to handle 1,800 passengers per hour. Mobile passenger lounges were used to transport passengers from the terminal to their aircraft. At the time of construction, use of the mobile lounges was a significant innovation which reduced both the amount of airport sprawl and the cost of aircraft-taxiing.

Despite the modern airport innovations found at Dulles, the facility remained severely underutilized throughout the 1960's and 1970's. The airport was seen by many as a "white elephant" based on the perception that it was too far from downtown Washington, D.C. Passengers were apparently used to the convenience of Washington National, and found the mobile passenger lounges at Dulles to be inconvenient. More significant was the airlines decision to use smaller aircraft at National. According to TAMS Consultants, the airlines believed that the Washington, D.C. market was not large enough to support non-stop, long-haul service provided by Boeing 747 aircraft, which could only land at Dulles. The impact of airline deregulation and a national recession in the late 1970's further damaged the airport's bottom line and image.

The year 1982 is significant in that it marked the onset of economic expansion in the Washington, D.C. region in general and northern Virginia in particular. Economic expansion across the region was fueled primarily by increases in federal government spending. Northern Virginia captured the majority of expansionary activity in the region for several perceived reasons:

- Counties in northern Virginia adopted a variety of pro-growth policies for zoning and land-use planning which encouraged office and industrial development.

- Expanding federal defense budgets in the 1980's increased demand for office space by government contractors, who chose to locate in northern Virginia, primarily, based on proximity to the Pentagon and other government offices.

- Increasing crime and the expense of maintaining offices in Washington, D.C. encouraged national associations, professional service firms, and government agencies to move space intensive operations to lower cost facilities in suburban areas, including northern Virginia.

Although increased use of Washington-National was creating considerable congestion and delays, the airlines were still refusing to increase utilization of Dulles. In response, the FAA enacted a perimeter rule to restrict airlines from originating flights longer then 1,000 miles at National Airport. The FAA also placed National under the High Density Rule, effectively capping the total number of potential operations at that facility.

The combined effect of FAA rulings and dramatic economic growth in the Washington, D.C. area resulted in a dramatic increase in passenger activity at Washington-Dulles, with total passengers increasing from about 2.6 million in 1980 to over 10 million in 1990. Comparable levels of growth also occurred in international and domestic traffic as well as cargo deliveries. The following table (3-1), which lists passenger and cargo activity at Dulles between 1980 and 1990, provides an indication of the extent to which usage of the airport increased during the 1980's as economic growth in the D.C. metropolitan area accelerated. The table shows that average passengers per

flight increased from about 16 in 1980 to about 43 in 1990, a 186% increase. Freight traffic growth during the 1980's was more dramatic, with an increase of more than 400%.

Table 3-1: Cargo and Passenger Activity at Washington-Dulles International, 1980 - 1995

Category	1980	1985	1990	1995*
Total Flights	165,420	208,333	242,209	293,747
Total Passengers	2,624,398	5,237,277	10,438,089	11,882,700
Cargo: Mail	47,388,500	48,060,600	89,677,800	106,150,000
Cargo: Freight	54,737,500	105,754,200	295,892,000	521,705,724

Notes: 1995 data is for 12 months ending June, 1995; cargo data is in pounds.
Source: Metropolitan Washington Airports Authority

It is important to consider that Washington-Dulles is one of three airports serving the Washington, D.C. metropolitan area. National Airport, located about five miles from downtown Washington, D.C., handled 15,700,825 total passengers in 1994. Baltimore/Washington Airport, located about 30 miles northeast of Washington, D.C., handled 12,914,967 passengers in 1994. Combined, the three airports served a total of 40,262,812 passengers in 1994.

As utilization of Washington-Dulles increased since 1982, a capital improvements program was initiated to maintain and improve the efficiency of airport operations. When Washington-Dulles was planned during the 1950's, the designers used considerable foresight which allowed the facility to be expandable as demand levels increased. The earliest improvements came in 1984 when United Airlines enlarged their facilities to create a regional hub and international gateway at Dulles. Other significant completed or planned capital improvements include expansion of the terminal building to double its original length, more parking facilities, expanded baggage handling capacity, two new midfield concourses, two additional runways, a new international arrivals building, 281,000 square feet of warehouse space for air freight, and taxiway upgrades. These improvements will allow Dulles to operate efficiently in the future as forecasted passenger counts rise past 20 million by the year 2000.

Economic Development Trends

Office Development

Washington-Dulles International has been in operation roughly 33 years. Discussions with real estate professionals and county officials in the Washington, D.C. metropolitan area indicated that significant economic development around Dulles began after 1980, almost 20 years after the airport was built. Initial development was hamstrung by speculation, which placed land in the airport environs at a competitive disadvantage compared to sites much closer to the Capitol Beltway (I-495). Commercial development activity occurred first along the southeastern portion of the airport environs in western

Fairfax County. As the tempo of economic growth in northern Virginia increased, development activity commenced along the northwestern portion of the Dulles Airport environs in southeastern Loudon County.

Office development in the airport environs remained a very small proportion of the total supply of office space in Fairfax County throughout the 1970's and early 1980's. However, as office development activity in Fairfax County increased exponentially between 1980 and 1992, going from roughly 20.5 million square feet in 1980 to 57.1 million in 1990, the submarkets around Dulles International saw rapid increases in office construction, as is indicated in Table 3-2 below.

Table 3-2: Office Inventory Trends for Washington-Dulles Submarkets, by Time Period, Fairfax and Loudon Counties, 1960 to Present *(in square feet)*

Time Period	Herndon	Reston	Route 28 South	Route 28 North	Rt. 7 Loudon	Totals
Before 1960	16,280	45,836	400,000	25,000	0	487,116
1960-1969	16,280	252,384	400,000	25,000	0	693,664
1970-1979	62,339	1,125,794	400,000	331,856	0	1,919,989
1980-1987	1,549,316	7,001,527	1,600,731	918,401	0	11,069,975
1988-1990	2,575,717	9,865,968	4,233,147	1,995,599	185,752	18,856,183
1991-1992	2,751,833	9,875,968	4,571,547	2,149,067	390,752	19,739,167
1993-1995	2,751,833	9,875,968	4,571,547	2,149,067	529,352	19,877,767

Source: Thorne Consultants, Inc.

Before Dulles opened in 1962, the airport environs contained less than 500,000 square feet of office space, which was concentrated along Route 28, south of the airport site. Over the next ten years an additional 206,500 square feet was built in the environs. By 1980 the environs contained almost 2 million square feet of office space.

Between 1980 and 1988 however, office space deliveries in the environs grew tremendously, expanding by roughly 9.6 million square feet. The extent of new development in the environs was driven in part by the availability of sewer and water service, as well as the existence of large agricultural land tracts ideally suited for office development. Demand for office space in the environs was fed initially by companies involved with the federal government. New office construction was concentrated primarily in Reston, a planned community about five miles east of Dulles International.

Completion of the Dulles Toll Road in the mid-to-late 1980's along a route parallel to the Dulles Airport Access Road greatly improved access to the airport environs. Between 1988 and 1990, an additional 7.7 million square feet of Class A office space was delivered in the environs of Dulles International. The airport environs contained 27% of Fairfax County's office inventory by 1990, which is significant when considering that the environs contained less than 10% of county office inventory in 1980.

Although it is unclear that improved highway access was the primary motivation for office inventory growth over the three year period, it is clear that, by 1990, the airport environs had emerged as a highly diversified office market. A Fairfax County Economic Development survey, conducted in 1990, indicated that a majority (55%) of 712 surveyed office users in the Fairfax County airport environs were involved in research & development or business services. The surveyed firms indicated a total employment of almost 45,000 persons in 1990. Firms including Lockheed Martin Corp., Oracle Government, Mitre, UNISYS, AT&T, EDS, and GTE are now located in the airport environs.

It is important to note that the majority of new office construction around Dulles was speculative in nature, meaning that construction began without pre-leasing requirements, and was not owner-occupied. Discussions with real estate executives familiar with northern Virginia indicated that initial multi-tenant speculative office construction was driven by considerable demand through 1988 and 1989. Speculative construction continued into 1990 and 1991 despite indications that tenant demand was faltering as the national economy entered a recessionary period. Although overall vacancy rates increased during the recession, the diversified nature of office tenants in the environs and the presence of increasing federal government employment between 1989 and 1992 mitigated the overall negative impact of the recession.

Industrial Development

Table 3-3, shown below, provides an indication of industrial space inventory trends in the airport environs between 1960 and 1995. The table shows that industrial development in the airport environs amounted to roughly 940,000 square feet in 1969, eight years after Dulles opened. Beginning in the 1970's, however, industrial inventories began to increase dramatically, growing from 4.1 million square feet in 1979 to 11 million square feet in 1987. The table indicates that the submarkets along Route 28, north and south of Washington Dulles now contain roughly 45% of roughly 18.6 million square feet of flex and industrial space in the environs in 1995.

Although the existence of highly accessible cargo facilities at Dulles was an early incentive for industrial development in the environs, completion of the Dulles Access Road in the mid-1980's and creation of a foreign trade zone on the airport property in 1987 encouraged further industrial development.

Table 3-3: Industrial Inventory Trends for Washington-Dulles Submarkets, by Time Period, Fairfax and Loudon Counties, 1960 to Present *(in square feet)*

Category	Herndon	Reston	Route 28 South	Route 28 North	Route 7 Loudon	Totals
Before 1960	107,000	223,913	235,561	120,600	0	687,074
1960-1969	127,000	457,823	235,561	120,600	0	940,984
1970-1979	1,260,241	1,666,378	694,466	458,221	40,000	4,119,306
1980-1987	1,435,372	1,687,128	5,043,761	2,636,809	231,700	11,034,770
1988-1990	1,425,372	1,687,128	7,961,672	5,876,525	488,948	17,439,645
1991-1992	1,435,372	1,687,128	8,208,598	6,101,967	693,948	18,127,013
1993-1995	1,435,372	1,687,128	8,250,598	6,363,480	832,548	18,569,126

Source: Thorne Consulting, Inc.

Overall, construction of office and industrial space in Fairfax County slowed after 1991 as a national economic recession took hold. Although the national recession was categorized as mild by historic standards, the recession had a significant impact on real estate markets across the U.S. and in the D.C. metropolitan area in particular. By 1990, banks and other lending institutions recognized how seriously over-built the regional office and industrial space markets were, and reacted by tightening construction financing requirements for new projects. As new construction all but ceased between 1990 and 1993, the regional economy slowed further. Vacancy rates in Reston, the primary office submarket in the Dulles environs, ranged between 17% and 19% during the recessionary period.

New development activity in office and industrial markets in the airport environs and across the region have remained sluggish since 1993, partly due to a general unwillingness among banks to make construction loans for speculative projects. Discussions with commercial real estate brokers indicated that construction financing is becoming available from non-traditional sources, including real estate investment trusts, insurance companies, and overseas investors for projects which have credit-worthy lead tenants signed up prior to construction. Further discussion of the 1980's real estate boom and its relevance to the case study conclusions will follow at the end of this section.

Hotel Development Trends

One consequence of rapid office development in the Fairfax County environs of Dulles International was a demand for hotel rooms and meeting space. Before 1980, hotel development had occurred either on the Dulles airport property, or in Tyson's Corner, a commercial area adjacent to the Capital Beltway in Virginia. Hotel construction was spurred by the opening of the Dulles Toll Road in the mid-1980's, which improved access to the airport environs. By 1990, the environs contained almost 2,400 hotel rooms and approximately 92,000 square feet of meeting space. The table below outlines changes in hotel room and meeting space supply in the Fairfax County

environs of Dulles International between 1989 and 1991. The table indicates that, while Reston and Herndon have the most rooms in the environs, Chantilly and Dulles have the most meeting space.

Table 3-4: Hotel Room and Meeting Space for Submarkets in the Dulles Environs

Submarket	1989	1990	1991	1994
Reston/Herndon				
Total Rooms	1,095	1,812	1,812	1,812
Meeting Space	25,110	57,110	57,110	57,110
Chantilly/Dulles				
Total Rooms	1,301	1,247	1,359	1,583
Meeting Space	67,416	68,916	71,178	73,440
Environs Total				
Total Rooms	2,396	3,059	3,171	3,395
Meeting Space	92,526	126,026	128,288	130,550
County Total				
Total Rooms	9,128	9,773	10,362	11,018
Meeting Space	263,071	296,571	317,188	337,805
Environs % of County				
Total Rooms	26%	31%	31%	30.8%
Meeting Space	35%	43%	41%	38.7%

Notes: Includes hotels with more than 75 rooms; meeting room area is in square feet
Source: Fairfax County Economic Development

Loudon County Economic Development

Significant economic activity in eastern Loudon County began in the mid-to-late 1980's as prime vacant land in western Fairfax County became scarce. According to Loudon County Economic Development, about 75% of all commercial space in the county was built after 1983. The following table (3-5) outlines expansionary activity of business establishments by industry for Loudon County between 1985 and 1991. The table shows that more than 1,020 new commercial establishments were started in Loudon County between 1985 and 1990 which is equal to an average annual change greater than 11% over the five year period.

The table also shows how overall economic activity slowed considerably after the national recession in 1990. Of the eight industry sectors, only government grew more (by 16.6%) after 1990 rather than before 1990. Between 1990 and 1994 the number of Loudon County establishments increased by 610. Establishment creation in the construction sector between 1985 and 1994 is particularly significant in that it highlights the boom in construction activity before 1990 followed by the resulting economic slowdown between 1990 and 1992. Creation of new construction firms increased by almost 12% since 1992 as the regional economy re-started.

Table 3-5: Business Establishments by Industry Sector, Loudon County, 1985-1994								
Sector	1985	1987	1989	1990	1992	1994	% Change 1985 - 1990	% Change 1990 - 1994
Agriculture	73	95	100	124	128	142	69.8%	14.5%
Construction	258	348	455	480	428	477	86%	-0.6%
Manufacturing	45	60	79	98	100	108	117%	10.2%
T.C.U.	73	82	103	117	110	138	60%	17.9%
Trade	367	419	480	582	599	719	58.6%	23.5%
F.I.R.E	83	122	153	193	185	253	132.5%	31.1%
Services	482	599	733	800	935	1,155	65.9%	44.4%
Government	54	58	56	60	49	70	11.1%	16.6%
Total:	**1,438**	**1,787**	**2,163**	**2,458**	**2,539**	**3,068**	**70.9%**	**24.8%**
Source: Virginia Employment Commission								

Between 1985 and 1994, new construction activity for office and industrial uses occurred primarily in two subareas of Loudon County adjacent to Dulles International. The two subareas, Dulles North and Eastern Loudon, attracted 81% of office construction and 93% of research and development construction. The following table outlines commercial development activity by subarea in Loudon County between 1985 and 1994.

Table 3-6: Non-Residential Construction Activity, Loudon County, 1985 to 1994					
Subarea	Office	R & D	Warehouse	Total	% Total
Dulles North	385,546	841,285	485,989	1,712,820	21%
Dulles South	0	0	62,220	62,220	0.7%
E. Loudon	1,509,430	443,750	3,449,839	5,403,019	67%
Leesburg	426,274	91,117	372,364	889,755	11%
Total:	2,321,250	1,376,152	4,370,412	8,067,814	100%
% in Environs:	81%	93%	92%	88.97%	
Note: Includes sq. footage of permitted construction between 1985 and 1994. Source: Loudon County Economic Development					

The table indicates that the Dulles North subarea, located directly west of Dulles International, received 21% of all office, R&D, and warehouse space in Loudon County. The East Loudon Subarea, located northwest of Dulles International, received 67% of all office, R&D, and warehouse space construction in the county. It is important to note that the submarkets outlined in the table below include areas outside the Dulles environs.

As a result of extensive economic growth in the late 1980's, Loudon County moved beyond its past reputation as a bedroom community to Washington, D.C. The county has attracted several international high technology firms, including British

Aerospace, Fairchild, Xerox, and Orbital Sciences Corporation. However, rapid economic growth in the 1980's also left Loudon County over built by 1990. Although vacancy rates for office and industrial space in 1993 were still hovering around 20%, the regional economy has since improved, with 1994 vacancy rates for office space falling to about 13%. The supply of excess space is expected to fall as new tenants are attracted to the county's quality of life, cultural amenities, expanding retail districts, and up-scale housing. County planners indicate that extension of the Dulles Greenway, a privately owned toll road, westward from the Dulles Toll Road into Loudon County will improve access in the county and generate new economic development activities.

Economic Impact Discussion

As economic expansion in northern Virginia accelerated throughout the mid-1980's, Washington-Dulles evolved into a major employment center with a substantial economic impact on the region. An economic impact study was conducted for Dulles International by Martin O'Connell Associates in 1993. The study conclusions focused on direct economic impacts of employment created by the airport itself, the induced impact of spending in the region by people employed due to airport activity, and the indirect impacts generated by firms dependent on airport activity, such as in the hospitality industry. The study also quantified the economic impact created by firms in the airport environs which benefit economically from airport proximity, and would likely move elsewhere if air service were reduced. The study generated four measures of final economic impact: total employment, employee earnings, business revenue, and taxes (federal, state, and local). The following table summarizes the various economic impacts.

The study determined that 11,289 persons were employed at Dulles International, and that 4,022 persons were employed in the region as a result of spending by Dulles employees in 1993. The visitor industry, which includes hotels, restaurants, and other entertainment, employed an additional 20,386 persons as a result of passenger traffic at Dulles. The study determined that approximately 78,400 related jobs are generated by firms in the D.C. metropolitan area which use Dulles for freight shipments. The level of employment generated by airport related firms is a function of demand for their products.

The personal income received by Dulles airport employees was $384 million. Income generated from re-spending of airport employee income was $314 million. Employees in the visitor industry received $212.5 million in income. Expenditures by tourists using Dulles amounted to about $806 million. Economic activity at Dulles International generated about $2.1 billion in business revenue, which is divided between several categories. Airlines and airport businesses generated about 66%, while freight transportation services generated about 25%. Ground transportation and construction services generated the remainder of business revenue.

Table 3-7: Summary of 1994 Washington-Dulles Economic Impacts			
Category	**Airport Generated**	**Visitor Industry**	**Total Impact**
Direct Employment	11,289	16,913	28,202
Induced Employment	4,022	3,473	7,495
Total Employment	15,311	20,386	35,697
Related Employment	78,400	NA	78,400
Personal Income	$384 Million	$212 Million	$596 Million
Re-spending Effect	$314 Million	$174 Million	$488 Million
Total Income	$698 Million	$386 Million	$1.08 Billion
Business Revenue	$2.07 Billion	$806 Million	$2.88 Billion
State and Local Taxes	$62 Million	$82 Million	$144 Million
Federal Aviation Taxes	$133 Million	NA	$133 Million
Source: Metropolitan Washington Airports Authority			

As the aforementioned impact estimates indicate, airport activity at Washington-Dulles generated substantial economic activity for the region. Taxes received by local and state governments, as well as the federal government, from economic activity generate an additional economic impact in the region. The study determined that local and state governments derived $62 million in taxes from economic activity at Dulles. The federal government derived about $133 million from specific taxes on cargo and passenger departures. Each of the aforementioned economic impact values are inter-related, and cannot be totaled for a single measure of economic impact. The significance of the Dulles case study to the MSP alternative development scenarios will be discussed at the conclusion of this section.

Sources: *Fairfax County Economic Development, Loudon County Economic Development, Washington Airports Taskforce, Thorne Consulting, Inc., TAMS Consultants, Inc., and the Metropolitan Washington Airports Commission.*

Kansas City International Airport

Introduction

Planning for a new international airport in Kansas City began in the mid-1960's out of a need for a state-of-the-art airport facility capable of handling modern jet aircraft. The existing runways at the airport in downtown Kansas City were not long or strong enough for jet use, nor could the existing airport site be expanded for use by heavier and larger jet aircraft. Construction financing for a new airport was approved by the Kansas City voters in 1966, and the new airport, named Kansas City International (KCI), opened on November 11, 1972.

The new facility was located north of the Missouri River, 17 miles northwest of the Kansas City CBD on a 9,500 acre site adjacent to Interstate 29. The airport improvements included three semi-circular passenger terminals with a total of about 995,000 square feet of floor space and 60 gates. The terminals had a designed capacity of 12 million annual passengers. Two runways, 10,800 and 9,500 feet in length, were originally built. A third runway, 9,500 feet in length, was recently completed. Airport cargo facilities included 170,000 square feet of warehouse space and about 714,000 square feet of airplane ramp area for cargo loading and unloading.

The general layout of KCI was significant in that it incorporated the first use of a decentralized terminal design geared primarily to the convenience of origin and destination passenger traffic (O&D). The unique terminal design allowed passengers to drive and park in close proximity to their respective departure or arrival gate. Although the terminal design now wins praise from O&D airport users in terms of convenience, it constrains use of the facility as a hub, which would generate higher traffic volumes.

By 1975, KCI was recording roughly 4.2 million enplanements and deplanements per year. Use of the airport remained fairly consistent during the 1970's and early 1980's, with an average of about 4.9 million total passengers per year. Use of the airport increased significantly after 1985, when 7,238,789 passengers used the facility. Table 3-7, below, provides an indication of recent trends in passenger and cargo activity at KCI..

Table 3-8: Cargo and Passenger Activity at KCI, 1987 - 1994

Category	1987	1989	1991	1993	1994
Total Passengers	9,433,030	9,351,284	6,946,615	7,932,018	8,923,456
Cargo: Mail	84,692,000	60,214,000	64,983,000	83,655,000	91,980,000
Cargo: Freight	96,707,000	110,475,000	119,802,000	170,162,000	216,028,000

Notes: Total passengers include enplanements and deplanements; Mail and cargo is in pounds.
Source: KCI Airport Marketing

The previous table shows that, between 1989 and 1991, passenger traffic at KCI declined. The loss in passenger traffic was caused by the closure of hub facilities at KCI

for Braniff and Eastern airlines, both of which ceased operations at KCI by 1990. The loss of Braniff was significant; the region lost over 100 daily flights and service to 14 cities as a result. By 1994, increases in passenger traffic allowed the airport to nearly regain 1989 passenger activity levels. The improvement in passenger traffic at KCI was brought about in part by the arrival of three low-cost airlines, Southwest, Vanguard, and Western Pacific, which have steadily increased their daily operations from KCI. A fourth low-cost carrier, MarkAir, also operated from KCI until its recent bankruptcy. Daily departures by the low-cost carriers amounted to 33% of 187 daily departures by large aircraft operators in June of 1995. It is important to note that, although KCI is "international" in name, the airport currently does not directly serve any international destinations.

The previous table also highlights KCI's increasing significance in domestic freight transportation. Between 1987 and 1993, the quantity of freight passing through KCI increased by about 76%, or about 11% on an average annual basis. One international air express delivery company, DHL Worldwide Express, recently established a mini-hub distribution center at KCI to provide express freight service for the central U.S. DHL is one of eleven dedicated national or international freight carriers that use KCI for freight shipments. The dedicated freight carriers handled 85% of the 216,028,941 pounds of freight that passed through KCI in 1994. The table shows that, between 1987 and 1994, freight traffic increased by almost 125%.

When KCI entered its 20th year of operations in 1992, the Airport Authority began an assessment of future airport capital improvements, which were incorporated in the 1994 airport master plan. Proposed capital improvements include an expanded taxiway system, a 2,000 foot runway extension, closure of runway 9-27, construction of a new north/south runway, construction of Terminal D, more parking, and construction of a rail spur to the airport cargo area. Most of the aforementioned improvements will begin as passenger and cargo activity levels reach the airport's designed capacities.

Economic Development Trends

Office and Industrial Development

When it opened in 1972, KCI was viewed as a catalyst for new development in the Northlands, an area northwest of downtown Kansas City, Missouri. Historically, commercial activity in Kansas City followed a path to the south and southwest toward Overland Park. Construction of the airport to the north was seen as a way to redirect development activity and expand the economic base of the Kansas City area beyond the Missouri River, which had previously acted as a barrier to development of the Northlands.

In the 15 years after KCI opened however, limited new development occurred in the airport environs. The lack of new development was caused in part by a public perception that the airport, due to its location 17 miles north of the Missouri River, was too far away. Early development was also hamstrung by rough topography as well as

land speculation in the airport environs, which increased development costs and placed property in the environs at a competitive disadvantage in attracting new development. Extension of Interstate 435 to the north and west of downtown in the early 1980's improved access to KCI from the eastern suburbs of Kansas City, but did not generate appreciable economic development, according to the Platt County Economic Development Council.

Office development in the airport environs became concentrated in two planned office and industrial parks: Airworld Center and Executive Hills. Limited development began at the Airworld Center, a build-to-suit project, in 1976 when 75,000 square feet of office space was delivered. Executive Hills, a 3,700 acre speculative commercial and residential development, was also planned during the late 1970's but failed to attract initial development activity. Of the two parks, the Airworld Center was considered superior due to the existence of landscape buffering requirements, building design standards, and other amenities.

By 1980 the airport environs contained about 123,000 square feet of office space. Over the next four years, the office inventory around KCI increased by an additional 175,000 square feet. Beginning in 1985, however, office development in the airport environs accelerated as roughly 1.3 million square feet of speculative office space was delivered, mostly in the Executive Hills development. The following table outlines office space delivery trends for the airport environs over the past 20 years.

Table 3-9: Office Space Inventory Trends, KCI Airport Environs, 1972-1995

Development	Before 1980	1980 - 1984	1985 - 1990	1991 - 1995
Executive Hills	0	37,545	777,133	0
Tech Center	0	0	303,327	0
Air World	75,000	0	154,000	414,700
Other	48,500	136,500	60,000	0
Totals:	123,500	174,045	1,294,460	414,700

Note: All values are in square feet; Also, the Tech Center is part of Executive Hills
Source: Mid-America Regional Council

Office development in the environs came to a sudden halt in the late 1980's as the national real estate boom ended and the economy slipped into a recessionary period. According to real estate professionals in the Kansas City area, a large proportion of the speculative office construction built after 1985 in the environs was foreclosed on by the FDIC/RTC between 1989 and 1992.

Construction activity in the environs has only recently re-started, with delivery of 318,000 square feet of space for Citicorp Credit Services and 96,700 square feet for Boatman's National Bank of St. Louis. Other national firms, including AT&T, America West Airlines, and Electronic Data Systems have recently located to the KCI environs

and expanded the local employment base by roughly 2,000 and improved vacancy rates from about 50% in 1990 to about 5% in 1995.

Industrial development activity in the KCI environs was concentrated primarily in the Executive Hills and Airworld Center developments. However, the nature of development at both parks differed substantially, according to real estate professionals familiar with the Northlands. Industrial development at the Airworld Center was geared toward distribution-oriented owner-users with unique needs. Industrial tenants which have located at the Airworld Center include Sony, Mazda, Toyota, and Alfa Laval. Speculative industrial space in Executive Hills suffered from generally poor quality and an inflexible design and could not achieve a tenant mix comparable to the Airworld Center, according to brokers familiar with the area.

Sony Corporation's distribution center for consumer electronics and spare parts was built in 1976, making it one of the first developments in the airport environs. Discussions with management at the distribution facility indicated that a site in the KCI environs was chosen to benefit from proximate interstate access and the existence of a foreign trade zone in the environs. Although flights to and from KCI were originally used by Sony for distribution, semi-trailers are now used almost exclusively for movement of products and parts from the West Coast to Kansas City for eventual distribution in the region.

Other international firms, including Mazda and Toyota, chose to locate near Sony's operation to benefit from proximate interstate access as well. In addition, a Toyota manager indicated that the convenience of proximity to KCI was important for a Toyota regional sales office at the Air World Center. It is interesting to note that the environs now contain a concentration of international companies despite the fact that KCI has never operated scheduled direct international service.

The two developments (Executive Hills & Airworld) contained roughly 95% of total industrial space in the KCI environs in 1987, which amounted to 1.4 million square feet. The inventory of industrial space grew from 83,000 square feet in 1977 to 840,000 in 1982 before reaching 1.4 million square feet in 1987. Although ERA was unable to obtain industrial inventory data more recent than 1987, discussions with area real estate professionals indicated that the tenant demand in the airport industrial market has only recently absorbed most of the space originally built in the 1980's. The professional noted that rent levels are currently too low to support new speculative industrial construction.

The notable amount of recent development and leasing activity in the KCI environs office and industrial markets has resulted from a combination of factors.

- Because the FDIC/RTC aggressively marketed foreclosed properties at Executive Hills after 1993, downward pressure was placed on lease rates for office space in the airport environs.

- As the airport environs also contained the most recently built office and industrial space in the Kansas City area, the environs attracted a significant amount of transfer demand from tenants in older space elsewhere in Kansas City.
- As retail development and upper-income residential construction in the Northlands area began, the airport environs marketability and appeal to office and industrial users increased. It is interesting to note that expansion of office and industrial markets in the airport environs came prior to significant up-scale residential development.

Hotel Development Trends

Hotel development in the airport environs occurred in several stages following the opening of KCI in 1972. Initial hotel properties were developed by Marriot, Hilton, Holiday Inn, Ramada, and Royal Inn. These properties delivered 1,223 rooms to the airport environs by 1980. Over the following ten years, additional hotel developments were completed by Embassy Suites, Residence Inn, and Hampton Inn. As of 1995, the airport environs hotel market contained roughly 2,000 rooms. Discussions with hotel sales directors in the environs indicated that the airport hotel market is strong, with a Holiday Inn Express slated for completion by the end of 1995 and two other hotel projects awaiting approval.

Economic Impact Discussion

Kansas City International Airport has been in operation for roughly 23 years. When the airport opened in 1972, the Northlands area of Kansas City contained less than 10% of the metropolitan area's total employment and population. Economic activity in the Northlands increased dramatically over the following 18 years, primarily in Platt County where employment increased by almost 270%. Employment in Clay County, located directly east of Platt Co., increased by 44% over the same period. Percent changes in population for Clay and Platt Counties were comparable to their respective percent changes in employment. The following table outlines changes in employment for Platt and Clay Counties between 1970 and 1990.

Table 3-10: Employment Trends, Northlands Region, 1970 - 1990

Category	1970	1980	1990	% Change 1970 - 1990	Avg Annual Change
Platt County	6,897	16,317	25,496	269.66%	13.5%
Clay County	45,708	50,780	65,841	44.04%	2.2%
8 County Region	534,784	606,244	771,141	44.2%	2.21%
Northlands % Region	9.8%	11.06%	11.84%		
Source: Mid-America Regional Council					

The previous table highlights the increasing significance of Platt County to the Kansas City area over the past 20 years. Only Johnson County, located to the southwest

of the CBD, managed a comparable level of employment growth (217%) over the same period. As the following table indicates, employment growth in Platt County was tied initially to the construction of KCI, which occurred in 1972. The four 1990 census tracts listed below, airport (303.04), East (302.01), Southeast (302.06), and South (302.03), were selected because they closely approximate boundaries of the KCI environs.

Table 3-11: Employment Trends, KCI Environs of Platt County, 1970 to 1990

Census Tract	1970 Total	1980 Total	1990				% Change 1970 - 1990
			Indust.	Manuf.	Services	Total	
Airport	2,645	7,400	1,687	4,438	1,575	8,102	206.3%
East	129	2,745	4,007	594	1,477	6,139	4,658.9%
South	104	850	85	12	753	1,260	1,111.5%
South East	187	89	46	0	558	692	270%
Total:	3,065	11,084	5,825	5,044	4,363	16,193	428.3%

Notes: 1990 total employment includes retail plus industrial, manufacturing, and services.
Source: Mid-America Regional Council

The table indicates that the KCI environs experienced a 428% increase in total employment over the 20 year period, which is indicative of 21% average annual employment growth. If the airport census tract is excluded, total environs employment increased by more than 1,800% over the 20 year period, going from 420 in 1970 to about 8,100 in 1990. The four selected census tracts contained 63.5% of 1990 total employment in Platt County. It is important to note that TWA maintains an administrative and maintenance hub at KCI, employing roughly 1,500 administrative personnel and about 1,000 maintenance personnel.

The overall economic impact of KCI was estimated in 1983 by the Mid-America Regional Council. The study, done in part to calculate the overall impact of aviation activity in the Region, determined that KCI generates total expenditures of about $619 million. The study concluded that TWA, which maintains corporate offices, aircraft overhaul facilities, and other operations in and around KCI, accounted for $525 million of total expenditure. Discussions with the KCI Aviation Department indicated that a new economic impact study is currently underway, and will hopefully be completed by the Spring of 1996.

Sources: *Mid-America Regional Council, Platt County Economic Development, Coley/Forrest, Inc., Rule & Associates, Inc, and KCI Airport Marketing*

Dallas/Fort Worth International Airport

Introduction

The concept of a central airport for Dallas and Fort Worth was first discussed in the 1940's. However, according to research conducted by TAMS Consultants, Inc., Dallas and Fort Worth seemed unwilling to work together on development of a new airport, and proceeded to develop separate facilities at Love Field and Great Southwest International Airport, respectively. By 1961, however, the FAA and Civil Aeronautics Board indicated that federal funds would no longer be provided for both facilities.

As a result, construction of Dallas/Fort Worth International Airport (DFW) began in 1969. The DFW facility, which opened on January 13, 1974, was centrally located 17.5 miles from the central business districts of Dallas and Fort Worth. The facility was built on 17,637 acres, making it currently the second largest airport site in the U.S. In allocating so large an area for airport development, DFW is considered to have unlimited expansionary ability for all practical purposes.

The airport improvements at DFW cover 9,642 acres of the total site, and include almost 2 million square feet of space in four primary terminals, with 117 gates. The site was designed to support 13 terminals and 234 gates at final build-out. A total of six runways are currently in operation, three 11,400 feet in length, one 13,400 feet in length, one 9,000 feet in length, and one 9,300 feet in length. A seventh runway is under construction with completion scheduled for 1997. The airport also maintains extensive cargo handling facilities, which include a 2,500 acre foreign trade zone and about 2.1 million square feet of warehouse space.

Use of DFW did not increase significantly until after 1978, when the airline industry was deregulated. Although DFW was originally designed for origin and destination traffic, the economics of deregulation eventually converted the facility into a hub for Delta, Eastern, and American Airlines. Use of the airport has increased steadily since 1979 to the point where the facility is now considered the second or third busiest airport in the world, behind Chicago-O'Hare. As an indication of DFW's stature, the facility established a new single-day activity record with 2,645 takoffs and landings on December 22, 1994. The following table outlines total passengers, flights, and cargo for DFW between 1989 and 1993. The table indicates that total passengers per flight decreased between 1989 and 1993. The decrease was apparently due to an American Airlines flight attendant strike which occurred in the fall of 1993.

Table 3-12: Cargo and Passenger Activity at DFW, 1989 - 1993				
Category	**1989**	**1991**	**1992**	**1993**
Total Passengers	47,579,046	48,189,208	51,981,267	49,654,730
Total Flights	504,855	550,494	572,861	599,926
Cargo: Mail	311,028	371,098	385,718	429,066
Cargo: Freight	796,136,000	853,648,000	934,010,000	1,021,030,000
Notes: Mail and cargo are in pounds. Source: DFW Airport Marketing				

Freight traffic at DFW increased by almost 30% over the five year period, with dedicated freight carriers handling an ever increasing share of freight activity. The dedicated freight carriers, 14 in all, increased their percentage of total freight from 38% in 1989 to 57% in 1993. One of the primary dedicated freight carriers, United Parcel Service, recently opened a 250,000 square foot hub for the southwest region at DFW, which generates significant freight traffic.

In 1994, DFW handled a total of 52,601,125 passengers, which was a 6% increase over 1993. By the year 2000 projected passenger activity is expected to reach 60 million. In order to provide the necessary capacity for future demand, the airport is working on several significant projects, including construction of a seventh and eighth runways as well as air traffic control enhancements. When these and other infrastructure improvements are completed, the airport will be able to land four aircraft simultaneously in poor weather. The FAA believes that, given the extensive undeveloped site area at DFW, the facility can be expanded to create sufficient capacity to become the busiest airport in the world by 2000.

Economic Development Trends

Office and Industrial Development

Although DFW commenced operations in 1974, commercial real estate development activity in the airport environs pre-dated DFW by almost 35 years. Initial development activity occurred in the southern periphery of the environs in the Great Southwest Industrial Park, a 5,000 acre industrial development owned in-part by the Rockefeller Family. Great Southwest emerged as one of the largest industrial developments in the region due primarily to its location equidistant between Dallas and Fort Worth. The park also benefited from proximity one of the first airports in Texas, the Ammon Carter Airport, built in 1935 adjacent to the future site of DFW. By 1960, the environs contained over 1.2 million square feet of industrial space. Industrial development activities in the environs increased as planning for construction of DFW proceeded through the 1960's, which enabled the local industrial inventory to climb above 12 million square feet by 1970. Completion of DFW in 1974 enhanced the competitive advantage of industrial firms in the airport environs by opening up new

markets for industrial products and improving access to the interstate transportation network.

Expansion of industrial space occurred more rapidly after 1974, as new areas were opened up for development in three master-planned communities: Centreport, DFW Freeport, and Las Colinas. Centreport was developed on 1300 acres of the Ammon Carter Airport site, adjacent to DFW, and currently has about 800 acres remaining for new development. The project includes office, light industrial, residential, and retail development, and currently has a tenant list which includes Johnson & Johnson, and Panasonic, as well as the world headquarters for American Airlines. The DFW Freeport is a 500 acre development north of DFW which has attracted office users including Allstate, Nissan, and Honda. The Las Colinas development was planned in 1973, before DFW opened, as a mixed use development on 12,000 acres. The project is currently improved with about 5,000 single-family homes, 8,000 condominium residences, over 20 million square feet of office, industrial, and flex space, and significant recreational amenities. Current tenants include Microsoft, Kodak, TIG Holdings, Exxon, GTE, NEC, Hitachi, Sony, and Cannon.

The success achieved by each of the planned developments was due in part to the use of zoning requirements, land use planning, and building design criteria, which insured that a high standard of quality would be maintained. The following table, which outlines deliveries of industrial space since 1960, divides all industrial space in the environs into two submarkets: DFW-Freeport and Great Southwest-Centreport. The DFW-Freeport market includes industrial space in Dallas County and the Las Colinas Development east of DFW, while the Great Southwest-Centreport market covers Tarrant County, west of DFW.

Table 3-13: Industrial Space Delivery Trends, DFW Submarkets, 1960 to Present

Time Period	DFW - Freeport		Great Southwest - Centreport	
	Square Feet	# of Buildings	Square Feet	# of Buildings
Before 1960	326,858	4	885,754	7
1960 - 1969	2,156,578	15	7,969,022	64
1970 - 1974	1,002,320	9	4,790,225	52
1975 - 1979	1,994,284	19	7,325,546	65
1980 - 1984	4,117,663	49	6,934,216	63
1985 - 1989	2,913,627	29	4,757,161	38
1990 to Present	1,356,088	9	3,311,242	6
Total:	**13,367,418**	**134**	**35,973,166**	**295**

Note: Table excludes about 4,503,183 square feet of industrial space without a construction date. The excluded space is divided about even between submarkets
Source: Greater Dallas Chamber 1995-1996 Industrial Real Estate Guide

The previous table shows how deliveries of new industrial space have been distributed over the past 50 years. In the DFW-Freeport market, the largest concentration of new space was delivered between 1980 and 1989, when roughly 7 million square feet was delivered, primarily in Las Colinas and the DFW Freeport. The Great Southwest-Centreport Market has received the majority of new industrial space over the past 40 years, and continues to attract the majority of new industrial development, with 3.3 million square feet delivered since 1990.

The following table outlines the total inventory trends for industrial space in the DFW environs over the past 50 years. Although the table includes space in both of the aforementioned submarkets, it excludes about 50 buildings and 4.5 million square feet of industrial space which did not report dates of construction.

Table 3-14: Industrial Inventory Trends, DFW Environs

Year	Total Square Feet	# of Buildings
1970	12,671,190	107
1975	18,460,659	158
1980	29,860,080	266
1985	39,181,080	362
1990	46,264,096	420
1995	49,840,584	429
Uncounted:	4,503,183	57
Total:	54,343,767	486

Source: Greater Dallas Chamber 1995 Industrial Guide.

According to the above table, the total inventory of industrial space in the DFW environs increased by about 45% between 1970 and 1975, when DFW was under construction. Total inventories of industrial space increased by an additional 55% between 1980 and 1990, when the national real estate boom was at its height. Since 1990 the environs industrial market has slowed as excess space built in the 1980's was absorbed. Speculative and build-to-suit construction activity restarted in 1994 with about 4.1 million square feet designed or under construction in the DFW submarkets. Discussions with real estate brokers familiar with the DFW industrial markets indicated that increased demand for industrial space in 1993 and 1994 placed enough upward pressure on rents to make new construction economically viable.

Office development activity in the airport environs was slow to occur after DFW opened in 1974. In the five years after the airport opened, roughly 1.1 million square feet of office space was delivered, primarily in Las Colinas. After 1980 however, the rate of office construction in the environs increased dramatically, expanding in size by 625%, or 65% on an average annual basis, as the Dallas-Fort Worth Metroplex economy developed. The following table, which highlights multi-tenant office inventory trends in

the DFW environs since 1970, provides a good indication of how quickly the DFW office market developed.

Table 3-15: Office Inventory Trends, DFW Environs		
Year	Total Square Feet	Number of Buildings
1970	32,000	1
1975	341,371	4
1980	2,081,194	17
1985	12,555,526	81
1990	15,661,074	125
1995	15,661,074	125
Source: Greater Dallas Chamber 1995 office Guide		

By 1990, the environs contained 15,661,074 square feet in 125 buildings. The boom in office construction in the airport environs ended around 1990 as the national recession took hold. Although no new office buildings have been built since 1990, about 23 existing office buildings in the environs have been renovated. The significant amount of renovation activity is tied to the necessity of older office buildings to re-position themselves in the highly competitive local office market in order to attract new tenants. Since 1994, leasing activity in the environs has picked up considerably, allowing the area to achieve office vacancy rates lower than 10%. Rent levels, although improving, have are still too low to support speculative construction without substantial pre-leasing.

Hotel Development Trends

As use of DFW increased after airline deregulation in 1979, demand for hotel rooms increased as well. The following table illustrates the level of expansion in the DFW hotel market over the past 15 years.

Table 3-16: Hotel Development Trends, DFW Environs			
Time Period	Existing Hotel Inventory	New Construction	Total Room Inventory
Before 1982	14	0	2,242
1982 - 1983	18	4	3,613
1983 - 1984	21	3	3,872
1985 - 1986	29	8	5,534
1987 - 1988	31	3	6,074
1989 - 1990	35	4	6,694
1991 - 1994	37	2	6,878
Source: Irving Convention and Visitors Bureau, 1994			

Construction of hotel properties in the airport environs occurred most dramatically in the years between 1982 and 1989, when 21 hotel properties containing 4,452 rooms were developed. Between 1982 and 1990, the number of rooms in the DFW hotel market grew by almost 200%, or 14.7% on an average annual basis. The number of hotel properties increased by 150% over the same time period. It is important to note that the previous table excludes two hotels built on the DFW site. The two properties, managed by Hyatt and Hilton, have a total of 2,370 rooms and were built in 1975 and 1982, respectively.

The Irving Convention and Visitors Bureau indicated that 1995 hotel development activity in the airport environs has increased as DFW passenger traffic levels surged past the 50 million mark in 1994. According to the bureau, there are at least 4 hotels presently under construction in the environs, and an additional seven in various planning stages awaiting development approval. The 1995 hotel properties are generally either suites or budget class properties with less than 200 rooms.

Economic Impact Discussion

As economic activity in the Dallas/Fort Worth Metroplex accelerated during the 1980's, the amount of passenger traffic and cargo passing through DFW international airport increased dramatically. An economic impact survey, covering 2,500 passengers and 2,100 area businesses, was conducted for DFW in 1994 to assess employment, personal income, economic activity, and taxes generated by the facility. It is important to note that each of the impacts are interrelated, and cannot be summed for a single measure of total economic impact. The employment, personal income, and economic activity results were divided four categories: Passenger related, airport influenced, DFW related, and cargo related. The following table outlines each of the impacts.

Table 3-17: DFW Employment, Personal Income, & Economic Activity Impacts

Category	Total Jobs Created	Personal Income	Economic Activity
Passenger Related	129,100	$3.1 Billion	$6.16 Billion
Airport Influenced	26,400	$950 Million	$1.37 Billion
DFW- Related	6,300	$160 Million	$560 Million
Cargo Related	5,800	$150 Million	$340 Million
Total Impact:	167,600	$4.3 Billion	$8.4 Billion

Source: DFW Marketing Department

The airport related employment impacts include jobs in several categories, including lodging, transportation, construction, communications, retail, and financial services. The airport itself is believed to employ about 20,000, which is the sum of cargo and DFW related employment plus a percentage of passenger related employment. The personal income estimates include original spending by employees and subsequent re-

spending in the regional economy. The economic activity category is a measure of regional business activity which is related in some fashion to the airport. In addition to the impact of job creation and personal income, DFW also generates considerable income to communities and local governments. The following table outlines the tax revenue impacts.

Table 3-18: Summary of DFW Tax Revenues

Category	Amount
State Sales Tax Rebate	$203 Million
Hotel Tax	$28.8 Million
Franchise Tax	$7.6 Million
Property Tax	$47.2 Million
Local State Taxes	$27.9 Million
Liquor Taxes	$2.1 Million
Other Revenue	$5.2 Million
Source: DFW Airport Marketing	

The largest single tax revenue impact of DFW is the rebate of sales tax revenue from the State of Texas to communities in the DFW Metroplex. When added together, the tax revenue created by DFW is roughly $322 million.

The regional economic impact of DFW is expected to increase as regional growth continues. Already, the Dallas - Fort Worth Metroplex contains the largest amount of industrial space, 436 million square feet, in the U.S. The area is also home to the third largest concentration of Fortune 500 firms in the U.S. Considering that the Metroplex is expected to become the fourth largest metropolitan area by 2005, it is anticipated that DFW will become the busiest airport in the world by the year 2000.

Sources: *North Texas Commission, DFW Marketing, Greater Dallas Chamber of Commerce, Fort Worth Chamber of Commerce, Irving Convention and Visitors Bureau, and Ernst & Young LLP.*

Atlanta Hartsfield International Airport

Introduction

The site on which Hartsfield International Airport now sits was developed as an airport by the City of Atlanta back in the 1920's. The airfield, located about 12 miles south of the Atlanta CBD, was developed into a commercial airport in the late 1930's. By 1949 the airport was handling 162 daily departures and emerging as a regional hub for the southeastern United States. The airport was given a modern terminal in 1962, equipped with 48 gates and a state-of-the-art air traffic control system. As passenger traffic at the new facility reached 3.8 million within one year, however, it became apparent that the facility was still too small.

Over the following 15 years, the City of Atlanta reviewed several alternative airport development sites, and ultimately chose to further expand the existing site 12 miles south of downtown Atlanta, which was renamed Hartsfield International. Construction of the new terminal complex began in 1977, and was completed in three years. When completed on September 21, 1980 the airport site covered 3,750 acres and was improved with a new terminal and four midfield concourses with 5.7 million square feet of space. The concourses contain a total of 24 international gates and 158 domestic gates. Extensive cargo facilities, including roughly 1.14 million square feet of warehouse space, were also built.

Use of the new terminal facility increased rapidly after 1980 as the impact of airline deregulation was increasingly felt. By 1985 passenger traffic at Hartsfield was approaching 43 million persons. The following table portrays recent trends in passenger and cargo traffic at Hartsfield since 1986.

Table 3-19: Cargo and Passenger Activity at Hartsfield International, 1986 - 1994

Category	1986	1988	1990	1992	1994
Total Flights	569,587	550,495	596,438	430,828	514,281
Total Passengers	45,191,480	45,900,098	48,024,566	42,032,988	54,093,051
Cargo: Mail	373,969,613	359,681,213	324,039,139	333,994,752	391,843,267
Cargo: Freight	535,119,178	725,990,429	783,561,341	844,084,282	1,069,835,558

Notes: Total flights include take-offs and landings; Cargo is in pounds.
Source: Hartsfield Airport Marketing

The previous table shows that passenger traffic at Hartsfield increased between 1986 and 1990, then fell dramatically in 1992 before reaching a new record in 1994. The decline in passenger traffic in 1992 was caused by the closure of Eastern Airlines, which had operated a regional hub from Hartsfield. Despite the 1992 reduction in passenger activity, passenger traffic grew by almost 20% between 1986 and 1994. Growth in the freight sector was more impressive, increasing by 100% over the same period. Freight

traffic was driven primarily by Delta Airlines, which has more than 700,000 square feet of warehouse space for its domestic and international cargo operations on site.

Since 1980, the airport facility has been given several significant improvements, including direct subway access from downtown, lengthening of a third runway to 11,900 feet, completion of a fourth runway, and expansion of cargo ramp and storage facilities. Although the old terminal area, which covers 28 acres, is planned for hotel and office development, redevelopment of the site has yet to occur.

Hartsfield is an interesting case study because it represents expansion of an existing airport as opposed to construction of a new airport. A primary reason for choosing expansion at Hartsfield was the site's close proximity to downtown. Although the City of Atlanta considered building a second airport in the 1970's, the reality that 75% of passenger traffic at Hartsfield was connecting rather than originating made the logistics of transferring connecting passengers between two distant sites unfeasible. The city did acquire two 10,000-acre properties north and northwest of the CBD during the 1970's for possible development of a second airport. Although the two sites are still owned by the city, both sites are apparently for sale at the right price.

Significant relocation of residential neighborhoods around Hartsfield has also occurred, primarily to mitigate noise problems. Over 1,000 homes located within the highest noise contours were relocated, at considerable cost. In relocating several residential neighborhoods, the City of Atlanta also created several new areas for industrial development. Discussions with planning officials in Forest Park, a community east of the airport, indicated that excessive noise also drove away long-term residents in several stable neighborhoods along the airport flight path, and encouraged the development of rental properties.

Economic Development Discussion
Office and Industrial Development

Historically, the focus of new commercial development activity in the Atlanta area occurred to the north of the CBD inside a triangular shaped area bounded by two Interstate highways, I-75 and I-85. The northern area, referred to as the "Golden Triangle" attracted the majority of office and industrial activity in the Atlanta area, particularly during the 1980's. Although the City of Atlanta had the option to reinforce regional growth patterns by building a new airport to the north in the 1970's, they chose to expand at the existing site in southern Atlanta, which created significant demand for industrial and office development in the airport environs.

The focus of commercial development activity in the airport environs has been directed primarily toward industrial space, probably since 1947 when Ford Motor Company located a 2.3 million square foot assembly plant in the environs. Since then, a significant number of industrial users have located in the environs to take advantage of convenient access to Hartsfield and the regional transportation network. The following

table outlines the delivery of industrial space in the airport environs since 1977, when construction of Hartsfield's present terminal began.

Table 3-20: Industrial Inventory Trends, Hartsfield Airport Environs, 1977 - 1995

Year	Total Square Feet	% Change over Prior Year
1977	14,928,815	--
1980	15,721,286	5.3%
1985	17,100,299	8.7%
1990	23,734,083	38.8%
1995	31,358,214	32%

Note: Table includes flex and warehouse space >10,000 sqft, developed by speculators and owner-users.
Source: Dorey's Atlanta Industrial Guide

The table shows that, by 1980, the airport environs contained roughly 15.7 million square feet of owner-user and speculative industrial space. Over the next 15 years, the environs industrial market grew in size by roughly 100%, increasing to roughly 31.4 million square feet. Although most of the nation was entering a recessionary period in 1990, industrial development in the environs was robust by comparison, increasing by 32% between 1990 and 1995.

In the last five years, the inventory of industrial space grew by about 7.6 million square feet, or 1.5 million square feet on an average annual basis. The considerable amount of industrial space delivered over the past five years is due in large part to the construction of several larger distribution centers for such firms as Kelly-Springfield (710,000 square feet), Goodyear (570,000 square feet), Nestle foods (784,000 square feet), and Ford Motor Company (875,000 square feet).

The significance of industrial development activity in the environs of Hartsfield overshadowed the amount of office space delivered over the same period. Growth in office deliveries between 1980 and 1990 was still significant however, with an increase of almost 100% over the 10 year period. Between 1985 and 1990 the environs office market grew by more than 1 million square feet. Even so, the airport environs did not emerge as a primary office market for the Atlanta area, due in part to the historic industrial nature of the environs. Also, office markets in the "Golden Triangle" to the north of Atlanta attracted a far greater majority of office development. Office development in the environs tended to focus primarily on smaller office/flex developments, according to several brokers familiar with the airport office market. According to Dorey's office guide, office vacancy rates in the airport environs are currently running slightly under 20%. The following table outlines the history of office space delivery trends in the Hartsfield environs.

Table 3-21: Office Inventory Trends, Hartsfield Airport Environs, 1970 - 1995		
Year	Total Square Feet	% Change over Prior Year
1970	537,224	--
1975	1,181,497	119.9%
1980	1,301,795	10.2%
1985	1,479,061	13.6%
1990	2,498,380	68%
1995	2,588,140	3.6%
Source: Dorey's Atlanta Office Guide		

Hotel Development

Since airport activity has been occurring on the present site of Hartsfield International since the 1940's, the airport environs attracted hotel development early on. By 1975 the airport environs contained roughly 1,700 hotel rooms. In expectation of the new airport terminal opening in 1980, the hotel room count expanded by roughly 700, to about 2,390. Over 4,100 additional rooms were delivered between 1980 and 1987, as passenger traffic at Hartsfield surged toward the 50 million point. Hotel room deliveries increased by 175% over that period, which is reflective of 15.3% average annual growth.

Economic Impact Discussion

The evolution of Hartsfield International Airport into a regional generator of economic development for the region occurred after 1980, when the 5.7 million square foot terminal was completed. By 1994, the terminal was handling over 54 million passengers and one billion pounds of cargo per year.

An economic impact study was conducted for Hartsfield International by Martin Associates in 1994 to assess employment, personal income, economic activity, and taxes generated by the facility. The study also focused on the economic impact generated by the visitor industry. It is important to note that each of the impacts are interrelated, and cannot be summed for a single measure of economic impact.

The study determined that Hartsfield International employs a total of 32,530 people, including airline employees, who spend a total of $1.45 billion of personal income in the local economy. Subsequent re-spending of airport employee income generated an additional $1.3 billion dollar impact. Spending by airport employees in the local economy created an additional 14,012 jobs, and spending by firms dependent on airport activity created 1,335 jobs. The visitor industry, including hotels, restaurants, and entertainment companies, employees 159,782 direct and induced persons as a result of airport activity. Manufacturing companies involved in air cargo who use Hartsfield

employ over 180,000 additional workers. The following table summarizes the employment, personal income, business revenue, and taxes created by activity at Hartsfield International.

Table 3-22: Summary of 1994 Hartsfield Economic Impacts

Category	Airport Generated	Visitor Industry	Total Impact
Direct Employment	32,530	136,220	168,750
Induced Employment	14,012	23,562	37,574
Indirect Employment	1,355	NA	1,355
Total Employment	47,897	159,782	207,679
Related Employment	181,000	NA	181,000
Personal Income	$1.45 Billion	$1.59 Billion	$3.039 Billion
Re-spending Effect	$1.3 Billion	$1.428 Billion	$2.729 Billion
Total Income	$2.75 Billion	$3.02 Billion	$5.77 Billion
Business Revenue	$7.8 Billion	$7.2 billion	$15.02 Billion
State and Local Taxes	$213 Million	$731 Million	$944.9 Million
Federal Aviation Taxes	$355 Million	NA	$355 Million
Source: Hartsfield International Airport Marketing Department			

Business revenue created by economic activity at Hartsfield generated $7.8 billion, a portion of which is returned to the area in salaries, benefits, subsequent re-spending, and taxes. The remainder is lost to the region as each company distributes expenses and profit in other parts of the country or world. The visitor industry generates additional business revenue, which is distributed primarily between hotels and restaurants in the Atlanta area.

As a result of personal income spending, re-spending, and business revenue the local, state, and federal governments receive substantial tax revenues. The state and local governments received about $945 million in taxes, and the Federal government gained an additional $355 million. As was stated above, each of the aforementioned economic impact values are inter-related, and cannot be totaled for a single measure of economic impact. Significance of the Hartsfield International case study to the MSP alternative development scenarios will be discussed at the conclusion of this section.

Sources: *Atlanta-Hartsfield Marketing, Clayton County Planning and Development, City of Forest Park, Atlanta Economic Development, Dorey Publishing & Information Services, Coley/Forrest, Inc., and the Atlanta Convention and Visitors Bureau.*

Denver International Airport

Initial planning for a new international airport in Denver began in the mid 1970's when the City of Denver determined that existing facilities at Stapleton Airport were inadequate to meet projections of future aviation demand. Although the existing airport site was close to downtown Denver, surrounding residential uses, as well as the Rocky Mountain Arsenal, made substantial expansion of airport facilities unrealistic.

The Denver Regional Council of Governments commissioned a site selection study in 1979 to evaluate possible locations for a new airport. By 1985, the city entered into a Memorandum of Understanding with Adams County to build a new airport on land east of the Rocky Mountain Arsenal, 23 miles from downtown Denver. The agreement between Denver and Adams County is notable in that it established noise limits, stipulated allowable uses, and allowed both municipalities to share in the economic benefits generated by the new facility. The decision also resolved a 1991 lawsuit filed by homeowners in Denver and Aurora for damages stemming from airport noise at Stapleton. A final decision to build the airport was made by Denver voters in a referendum in May of 1989, with about 62% endorsing the new airport plan at an original cost of roughly $1.5 billion. Ground breaking for the new facility occurred the following September.

Since Denver International (DIA) was the first new airport built in the past 20 years, its design incorporated a variety of state-of-the-art systems, some of which proved to be unreliable. The new baggage handling technology in particular proved to be a major problem, which delayed the opening of DIA considerably. Problems with the baggage handling system as well as cost overruns tended to obscure other innovations at DIA, which included the ability to land three aircraft simultaneously in poor weather. The final cost of DIA was roughly $4 billion.

When DIA opened in February of 1995, the airport improvements included five non-intersecting 12,000 foot long runways, a modern terminal with extensive retail shopping, and three concourses with 94 gates. The cargo facilities included 256,244 square feet of warehouse space and 952,000 square feet of aircraft ramp area. The cargo facility is fully leased, which recently encouraged the City of Denver to make a request for third party construction of leased cargo facilities on 72 additional acres. Construction has also begun on a sixth runway, 16,000 feet in length, for international passenger and cargo traffic.

The primary generator of passenger traffic is United Airlines, which operates its second largest hub at DIA. The airport has also added two new carriers, Vanguard and Frontier airlines, in the past year. For the month of June 1995, there were 2,797,863 passenger enplanements, 20,250,869 pounds of mail, and 46,192, 262 pounds of freight passing through DIA. By December of 1995, the facility is expected to handle a total of about 15.8 million enplanements, increasing to 18.16 million by the year 2000.

One primary concern about the new airport are increased per-passenger costs; at Stapleton, the cost per passenger was roughly $5.25, while DIA now charges roughly $18 per passenger by comparison. The increased cost of operations is one reason why new airlines are slow to begin service from DIA. Initially higher fares at DIA have also encouraged people to drive to Colorado Springs and fly back to DIA for their connections, or use non-stop service from Colorado Springs offered by Western Pacific and other carriers, in order to save money. United Airlines has been profitable at DIA despite high operating costs, primarily because Continental Airlines has reduced its daily flight level from 175 to 13.

The City of Denver has prepared a six-year capital improvement plan for improvements at DIA and redevelopment of Stapleton. The plan includes $140 million in planned projects at DIA, an additional $187 million of demand responsive projects at DIA, and $25 million for environmental cleanup and infrastructure improvements at Stapleton. Redevelopment efforts at Stapleton over the short term include infrastructure improvements and short term leasing activity, which will lead eventually to complete redevelopment of the site. Although the city expects to run deficits while redeveloping Stapleton, they feel the site may eventually be worth more than $75 million.

Economic Development Projections

As construction of DIA began in 1989, the surrounding communities in Adams County initiated a new 20-year master plan to act as a development guide for the DIA environs, which are sparsely populated at present. The master plan focused on development projections that would likely occur between 1993 and 2010. The development projections were based primarily on future population and employment trends in the environs. The master plan also incorporated a review of development activities at KCI, DFW, and Atlanta-Hartsfield as a standard of comparison. The development projections, outlined below, include employment and households, as well as the amount of office, industrial, and hotel square footage.

Table 3-23: Projected Development Trends, DIA Environs, 1993 - 2010

Category	1993	2000	2010
DIA Employment	24,800	27,500	33,800
Environs Employment	3,000	20,700	68,600
New Households	500	6,100	25,300
Office Space (Sq. Ft.)	10,600	1,305,700	4,801,900
Industrial Space (Sq. Ft.)	956,500	4,346,000	13,818,600
Retail Space (Sq. Ft.)	34,000	414,800	1,720,400
Hotel Rooms	600	2,800	5,600

Note: Conservative master plan estimates are shown
Source: DIA Airport Environs Plan, 1990

The master plan expects development to occur slowly at first, with industrial development occurring first, due in part to the airport's proximity to existing industrial developments along the I-70 corridor. The projections are viewed conservatively as they assume that high-quality mixed use development, such as Las Colinas near DFW, will not occur until after 2000. The plan stressed the importance of establishing a quality development pattern, which would lead to increasingly diverse and value added development beyond 2010. It is important to note that the master plan projections assumed a 1993 opening of DIA; as the facility opened in 1995 however, the extent of projected initial development between 1993 and 2000 may be over stated.

Since the aforementioned projections were generated in 1990, an effort was made to locate recent real estate development information. According to several articles in the Denver Post, there have been two significant land transactions, as well as announcements concerning two potential hotel developments. In one transaction a German firm paid $6.92 million for 320 acres near DIA, which is the highest known price for land in the area. The 320 acre site is zoned for 6.4 million square feet of hotel, industrial, and office development. A second land deal involved the transfer of 1,200 acres at a cost of between $15 and $20 million for eventual development of a planned community with residential, office, and industrial uses. Planning is currently under way for a Westin Hotel to be developed adjacent to the DIA terminal. The new hotel would contain 500 rooms, about 40,000 square feet of meeting space, and employ about 400 people. A second hotel project, currently in the site selection process, may involve construction of a 400 room luxury hotel with a conference center and golf course.

The most significant development is already occurring on 450 acres near the airport entrance. Known as the Denver International Business Center, the property is master planned for development of 2,600 hotel rooms, 1,300 residential dwellings, and 4.5 million square feet of commercial space over the next thirty years. Hotel development on the site has already occurred, with the imminent delivery of 161 rooms in a Fairfield Inn, and 191 rooms by January of 1997 in a Marriot Courtyard Inn.

Overall, rampant land speculation has yet to occur, primarily because most property in the DIA environs is controlled by a small number of landowners. One real estate broker indicated that the overall value of land transactions has actually declined in the airport environs over the past 10 years because there is a large supply of vacant land, more than 250 square miles, in the environs which can be developed. The broker also indicated that several large tracts, still owned by the FDIC, will likely sell below market rates, placing additional downward pressure on land values in the environs.

Sources: *Denver International Airport Public Affairs, Fuller & Company, Adams County Planning, Denver Planning, and the Denver Post.*

Pittsburgh International

Commercial aviation activity in Pittsburgh began in 1952 with the opening of the Greater Pittsburgh Airport on 6,000 acres of land about 12 miles west of downtown Pittsburgh. Originally designed in the age of propeller aircraft, the existing terminal facility became increasingly inadequate as passenger activity in the region increased; between 1960 and 1970 total passengers increased from roughly 2.2 million to roughly 6 million. It became clear that a new terminal was necessary, as the existing terminal was hemmed in by surrounding hangers, parking facilities, and an air force base. An additional 6,000 acres of land was purchased by the early 1970's, bringing the total airport property to roughly 12,000 acres.

One primary issue in the process to build a new terminal was the primary airline tenant, USAir, who was concerned primarily about the increasing cost of a new terminal. Ultimately, USAir acquiesced after state and county governments agreed to finance a portion of construction costs for the new terminal. According to the Urban Land Institute, financial contributions by state and local governments to the project were in excess of $300 million. Groundbreaking for the new terminal occurred in 1987; construction of the new facility was completed in 1992 at a cost of roughly $700 million. Related infrastructure improvements brought the final cost to roughly $1 billion. It was assumed that revenue generated from property taxes on new development in the airport environs would repay a portion of the $780 million bond issue.

The new terminal complex included a landside terminal building for ticketing and baggage handling, connected by people-mover to an airside concourse with 75 gates and over 100,000 square feet of retail space. The substantial retail component is particularly significant in that tenants are required to maintain prices competitive with off-airport retail operations in the region. One major selling point for the new facility was shorter taxiing distances between gate and runway, which reduced fuel consumption and operating costs when compared to the previous terminal. In 1994, the facility handled 19.4 million passengers, 413,424 operations, and 150,000 metric tons of cargo. Roughly 90% of total passenger activity was handled by USAir, which controls 50 of the facility's 75 gates.

According to real estate developers familiar with in the environs of Pittsburgh International Airport, commercial office and industrial development has been slow to occur. The slow rate of new construction has occurred for several reasons which relate to transportation infrastructure in the region. Historically, office development tended to concentrate in downtown Pittsburgh due in part to urban revitalization programs designed to maintain the viability of the CBD. Commercial development in suburban areas was minimized by a conscious decision not to build a circumferential interstate loop around the metro area, reducing the potential for suburban development. As a result, suburban office and industrial development tended to concentrate along interstate spokes radiating

from the CBD. According to the Urban Land Institute (ULI), the primary concentration of suburban office space has emerged along Interstate 79, a north/south route west of downtown Pittsburgh, about 12 miles east of Pittsburgh International.

Commercial development in the airport environs, in particular, has been hamstrung by limited transportation infrastructure. According to one developer in the area, the primary issue is a lack of primary and secondary roads in the environs, which has restricted accessibility and new development. One recent development in the environs has been Roadway Package Service, which recently built a facility which will generate roughly 1,000 jobs. The developer indicated that the south/west submarket and the airport environs are expected to emerge as a primary suburban concentration of office and industrial space in the region when accessibility issues are resolved.

Phoenix Sky Harbor International

Development of commercial aviation facilities in Phoenix began in 1935 when Sky Harbor Airport, comprising roughly 400 acres, was purchased by the city. The airport was given its first major upgrade in 1952 with a new terminal. Total passenger activity at Sky Harbor in 1952 was roughly 296,000. By 1961 passenger activity was nearing the million mark, paving the way for construction of a second terminal in 1962. In 1971 total passenger activity exceeded the three million point, requiring a third terminal which opened in 1976. A fourth terminal was completed in 1990 which dramatically increased total gate capacity; by 1994, the airport was serving roughly 25.6 million passengers, 70% of which passed through Terminal 4. Two airlines, America West and Southwest, operate hub facilities from Terminal 4.

The current airport property covers 2,232 acres, with three operational terminal buildings, 90 gates, and two runways, 10,300 and 11,000 feet long. Roughly 200,000 square feet of warehouse space is maintained on-site; the City of Phoenix also maintains a 300 acre foreign trade zone adjacent to the airport property. In 1989 the FAA recommended a third runway for Sky Harbor. Preliminary construction for the third runway has started, with a forecast completion date of 1999. Over the long term, the City expects to demolish Terminals 1 and 2 to make way for further expansion of Terminals 3 and 4. The airport property is located roughly 6 miles south of downtown Phoenix.

An economic impact study for Sky Harbor International was conducted in 1995. The study showed that the airport employs over 21,373 with a payroll of roughly $900 million. When indirect jobs and wages are factored in, the airport generates a total of 114,130 jobs and $2.58 billion in wages. The visitor industry is a primary beneficiary of air activity at Sky harbor, generating almost 50,000 jobs in the Phoenix area.

Discussion of real estate development trends associated with the environs of Sky Harbor International Airport was based on office data provided by Coopers & Lybrand. General information on industrial development was provided by the Urban Land Institute.

According to Coopers & Lybrand, the Phoenix Metro area contained roughly 38 million square feet of office space in 1994 with a vacancy rate of roughly 13%. Of the total square footage, 24.3 million square feet is located in central Phoenix, and 13.7 million square feet is in the suburbs. The 44th Street/Sky Harbor submarket contained roughly 1.4 million square feet of space, with a vacancy rate of roughly 9%.

Analysis of data provided by Coopers & Lybrand indicated that roughly 990,000 square feet, or about 70% of total current inventory in the Sky Harbor submarket, was delivered between 1985 and 1989. The airport environs contained only about 65,000 square feet of office space in 1980. According to the Urban Land Institute, industrial development has occurred in the airport environs, primarily to the south and west. Overall, the Phoenix area experienced considerable growth in industrial space between 1980 and 1990, with total inventories growing from 22 million square feet to 63.7 million square feet.

Seattle-Tacoma International

Airport development in Seattle began at the current site of Sea-Tac in 1944, about 15 miles south of downtown Seattle. It the first year of operations only 130,000 passengers used the facility. By 1954 the annual passenger count had exceeded the one million mark, paving the way for new terminals and a second parallel runway, which were completed by 1968. Additional facilities expansion has since occurred at Sea-Tac; by 1994 the facility included a primary terminal, four primary concourses, two satellite concourses, 75 gates, and a 436 acre foreign trade zone. Total activity in 1994 included 20.9 million passengers and 320,027 metric tons of air cargo. According to a 1994 economic impact study, Sea-Tac and the Port of Seattle support roughly 26,000 jobs directly and 27,000 indirect jobs in the region. The study also determined that roughly 41% of enplaned passengers are visitors to Washington, generating roughly $3.4 billion in expenditure and supporting roughly 64,000 jobs in the region.

One recurring theme in the development of Sea-Tac is aircraft noise mitigation. As early as 1976 the airport established the first national off-site land acquisition program to reduce impacts of aircraft noise. In 1985 the program was expanded to include $140 million for expanded land acquisition and home sound-proofing. By the end of 1993, 1,326 homes and 103 vacant lots were purchased at a cost of roughly $103 million. An additional 2,309 homes were sound-proofed by the end of 1994. One aspect of the noise control program at Sea-Tac is a "noise budget", which allocates a maximum amount of allowable noise to each airline. The noise budget is slowly reduced every year; compliance is monitored by the port authority and the Sea-Tac Noise Advisory Committee. The port authority also indicated that more than 80% of aircraft using Sea-Tac in 1994 were stage III aircraft, a percentage higher then the national average in 1994.

According to Cushman & Wakefield of Washington, Inc., there has been minimal commercial office and industrial development in the environs of Sea-Tac. In 1994 the

airport submarket contained a total of 663,000 square feet of office space and 1,829,000 square feet of industrial space. While 1994 vacancy rates for industrial space in the Sea-Tac submarket are very low, running about 2.5%, office vacancy rates are above 50%. The Sea-Tac office market is the smallest of the five suburban office markets, according to Cushman & Wakefield. Overall, the Seattle metro area contained roughly 30 million square feet of office space in 1994. Total industrial space in the Kent Valley, which includes Sea-Tac and four other sub-markets, was roughly 63.8 million square feet in 1994. The Sea-Tac industrial market is dominated by distribution and warehouse uses, concentrated primarily in the SeaTac Industrial park. The Sea-Tac office market is concentrated primarily in one development, the Sea-Tac Office Center, covering roughly 480,000 square feet of space.

Salt Lake City International Airport

Airport development in Salt Lake City began at the current site in 1911, about 5 miles west of downtown. By 1927, the facility covered 400 acres, with 11 hangers and two gravel runways. In 1933 the facility was renamed Salt Lake Municipal Airport; terminal facilities and a third runway were also built. Over the next 38 years, the airport grew in size to 7,500 acres as passenger activity increased. Two new terminal buildings were built, one operating as a regional hub for Delta Airlines. A fourth runway, 12,000 feet in length, is also nearing completion; the new runway cost roughly $120 million to complete. In 1994 the facility served a total of 17,654,000 passengers and 211,245 tons of cargo. A 1993 economic impact study determined that roughly 11,000 people are employed at the airport, and receive roughly $450 million in annual wages. The study noted that Delta Airlines hub operation occupies almost 40% of airport employment.

Discussion of real estate development in the environs of Salt Lake City International is complicated by the fact that the airport is only five miles from downtown. According to ULI, the Salt Lake City metro area contained roughly 26 million square feet of office space and almost 70 million square feet of industrial space by 1992. While the majority of office space is concentrated in downtown Salt Lake City, the majority of industrial space is concentrated to the northwest, in the proximate vicinity of the airport. Two major industrial developments in the northwest sector, the Salt Lake International Center and Centennial Park, contain roughly 8.8 million square feet of industrial space. Rates of industrial space construction have occurred fairly consistently since 1975 in both industrial parks. According to ULI, roughly 75% of recent industrial construction has been concentrated in the northwest sector. Discussions with brokers in Salt Lake City revealed that the focus of development in the metro area is to the south, where a combination of recreational amenities, up-scale housing, and office development are concentrated. According to the Salt Lake City Convention and Visitors Bureau, the airport environs contain roughly 1,200 hotel rooms.

Cincinnati/Northern Kentucky International Airport

Commercial airport development in the greater Cincinnati area began in 1947 on an air strip developed by the U.S. Military for pilot training south of the Ohio river in Kentucky. In 1947 the commercial facility handled roughly 303,000 total passengers. Although Cincinnati also possessed an airfield of its own, the northern Kentucky site possessed a superior location on a plateau, with favorable weather conditions and greater expansion room.

The northern Kentucky airport increased in size after 1970 with the addition of three new terminals, as well as hub operations for Delta Airlines and DHL Worldwide Express. Terminal Three was built by Delta Airlines at a cost of roughly $375 million. Two concourses were also built, providing 51 gates for Delta's hub operation. The new Terminal also incorporated a sizable retail component, including several national retailers. In 1994 the airport handled roughly 13.6 million passengers and about 260,000 tons of cargo, while employing 10,000 people.

The airport authority has also taken an aggressive stance on aircraft noise mitigation, allocating all of the revenue generated from passenger facility charges to noise mitigation activity. The airport authority has also purchased 190 homes in high noise areas as of 1993. According to the 1994 annual report, roughly 60% of all aircraft using Cincinnati/Northern Kentucky are now classified as stage III aircraft.

Historically, real estate development in the environs of Cincinnati/Northern Kentucky International has been slow to occur. Although the airport opened in 1947, the focus of growth in the region has flowed to the north and east. The environs became increasingly attractive due in part to the major expansion at the airport, as well as lower land costs in northern Kentucky and significant transportation infrastructure improvements. After 1980 the environs began to attract an increasing share of industrial and office development. By 1990 the airport environs contained roughly 900,000 square feet of office space concentrated in Florence and Erlanger, east of the airport. The airport environs also contained an additional 1.5 million square feet of office/warehouse space. The airport environs are expected to receive an increasing share of suburban growth in the future.

Case Study Conclusions

Washington-Dulles

- Although designed as a completely modern facility, Dulles was perceived as a white elephant for many years after its 1962 opening, partially due to its distance from downtown Washington, D.C.

- Dulles was built in response to a perceived need for greater passenger capacity in the future, which could not be met by National Airport in downtown Washington, D.C., which today serves the highest volume of traffic, roughly 15 million annual passengers, in the region.

- The designers used considerable foresight in creating an expandable terminal on a site with considerable growth capacity.

- Passenger activity at Dulles increased after the FAA instituted both the high-density rule and a prohibition against long-haul originations at Washington-National.

- Construction of Dulles extended water and sewer service into primarily agricultural areas to the west of Washington, D.C., thereby establishing a likely corridor for future growth and development.

- Office development in the environs of Dulles concentrated primarily in Reston, a planned community designed in the 1970's. The rate of office development was slow until the 1980's, after which it increased rapidly. Industrial development in the environs occurred at a faster rate then office development before 1980.

- Construction of the Dulles Toll Road in 1987 substantially improved access to the airport environs from downtown Washington, D.C., and provided a further impetus for commercial and residential development.

- Extension of the Dulles Toll Road into Loudon County is expected to dramatically improve access to Fairfax County and Washington, D.C. and generate additional economic growth for Loudon County.

Kansas City International

- KCI was built to satisfy a need for a modern airport facility in Kansas City.

- A site was chosen to the north of the downtown in an effort to redirect economic development efforts in that direction.

- Although two significant planned developments were started soon after KCI opened in 1972, the airport environs failed to attract significant development activity for a minimum of 10 years.

- Development activity was hamstrung by several factors, including a perception that anything north of the Missouri River was much further away then the actual distance would indicate. Land speculation and rough topographic conditions in the airport environs were primary economic reasons for the lack of initial development activity.

- According to an employment survey conducted by the City of Kansas City in 1978, between 1,200 and 2,500 airport employees moved to Platt or Clay Counties over a four year period. (the airport is in Platt County).

- When development in the environs began after 1982, speculation was the driving force behind new office and industrial development, funded primarily by savings & loan institutions.

- In general, office and industrial development in the environs came before up-scale residential development.

- Despite the lack of direct international air service at KCI, several international firms, including Sony, Mazda, and Toyota, chose to locate distribution centers in the airport environs due to proximate interstate access, a foreign trade zone, and convenient access to air travel.

- According to Site Selection Magazine, several national firms, including Transamerica Life, New York Life, and TIE Communications made location and/or expansion decisions in the Kansas City area based on the convenience of KCI. These firms did not necessarily locate in the airport environs, however.

- When Braniff closed its hub operation at KCI, the city lost about 100 daily flights and direct access to 14 cities.

Dallas-Fort Worth International

- One impetus for construction of DFW was a decision by the FAA and CAA to no longer fund separate airports in Dallas and Fort Worth.

- DFW was developed on a 17,630 acre site, giving it the distinction of possessing considerably more expansion room then Atlanta-Hartsfield and Chicago-O'Hare.

- The airport environs, located equidistant between Dallas and Fort Worth, were seen as the next logical area of development in the Metroplex, with or without the airport, given the trend of growth in Dallas to the north and west.

- While industrial development activity in the airport environs pre-dated construction of DFW by almost thirty years, office development was slow to occur.

- Industrial users were attracted to the environs due to its central location relative to Dallas and Fort Worth, as well as proximity to the airport and a well developed interstate road network.

- Office development activity, which began in earnest after 1980, was concentrated primarily in the planned community of Las Colinas, a 10,000 acre commercial, residential, and recreational development adjacent to DFW.

- The success achieved by Las Colinas in attracting office and industrial users was tied in part to the community's use of zoning, planning, and design specifications for new buildings, which maintained the development's image as a prestigious community.

Atlanta-Hartsfield International

- The present site of Hartsfield International, located 12 miles south of downtown Atlanta, was originally developed as an airport in the 1920's.

- The historic role of Atlanta as a primary distribution node for the southeast encouraged the development of industrial development, which first emerged in the airport environs by 1947.

- During the 1970's when planning for a new terminal at Hartsfield began, the City of Atlanta purchased two 10,000 acre sites for possible development of a second airport. One source indicated that the city is interested in selling both sites.

- As roughly 75% of passenger traffic at Hartsfield was connecting rather than originating, a second airport was not feasible because there was no convenient way to transfer connecting passengers over the long distance between two distant airports.

- The decision was made to further expand Hartsfield in 1977 due to its close proximity to downtown Atlanta.

- Over 1,000 homes within the highest noise contours around Hartsfield were bought and demolished as part of the new terminal construction project.

- Although office and industrial activity became concentrated primarily to the north and west of Atlanta, the airport environs emerged as a viable industrial market due to proximity to Hartsfield and the interstate road network.

Denver International Airport

- Initial planning for DIA was begun almost 15 years before the airport was ever built.

- An inter-governmental agreement between the City of Denver and Adams County was created to ensure that costs and benefits of the new airport would be shared between jurisdictions.

- Although several studies determined that Stapleton did not have sufficient capacity to meet future demand projections, Denver voters approved the new airport by only a narrow margin. There was substantial concern about the 23 mile distance to DIA as well as its cost.

- According to the Airport Environs Master Plan, approved by Adams County, the DIA environs can expect to contain roughly 1.3 million square feet of office space, 4.3 million square feet of industrial space, and 6,100 new households by the year 2000.

- It is anticipated that industrial activity will predominate the environs, due to the proximity of DIA to existing industrial developments along the I-70 corridor.

- Initial development activity in the environs has been hindered by uncertainty over land value and the very large supply of developable land (about 250 square miles) in the environs. Proximity to the Rocky Mountain Arsenal has also indirectly contributed to the slow pace of development.

- At present there are three planned developments in the airport environs. Of these, only one development has experienced limited hotel development activity.

- Redevelopment efforts at Stapleton are presently concentrating on infrastructure improvements and short term leasing activity. Although the City of Denver expects to run short term operating deficits while redeveloping the site, they anticipate that it may ultimately be worth in excess of $75 million.

Conclusions from the Case Reviews

- At Pittsburgh, a new terminal was built on the original airport property at a cost of roughly $1 billion, including road improvements. Roughly $300 million of the cost was paid by public funds. Financing for the project assumed that property taxes on private, commercial development in the airport environs would provide an increasing source of revenue to offset construction costs. Construction of the new airside terminal included about 100,000 square feet of retail space for national retailers and food service operations. The retail operation, referred to as the Airmall, offers goods and services at prices competitive with other malls in the region.

- Sea-Tac airport, which currently serves about 21 million passengers a year, is currently trying to build a third runway, although noise issues are delaying the process. The airport is expected to experience increased competition for air travelers from Vancouver International, which will open up a new international terminal in 1996. Currently, the Sea-Tac environs real estate market real estate market is predominated by industrial uses.

- Real estate development in the environs of Cincinnati/Northern Kentucky International has occurred primarily since 1980. Although the airport was built on a high plateau ideal for airport operations, the airport was also built opposite the general direction of growth in the Cincinnati area, which was to the north and east.

- Although substantial expansion of terminal facilities occurred at both Pittsburgh International and Cincinnati/Northern Kentucky International airports, limited transportation infrastructure in the environs of both facilities was identified as a reason for minimal real estate development.

Overall Conclusions

Significance of planned developments to real estate development

- In the situations where a new airport was built a significant distance from the CBD, development in the environs tended to concentrate in larger planned developments.

- The level of development activity attracted to planned developments was driven in part by the existence of recreational amenities and up-scale residential development. Restrictive building design standards and zoning codes were also important in that they created high standards of development and value in the development. Planned communities, such as Las Colinas, were able to attract considerable development activity over the long term as a result.

Real Estate Development Patterns

- Analysis of industrial and office development trends at KCI, DFW, Atlanta, and Dulles suggests that initial development around a new airport is closely tied to airport activity; later waves of development occur due to improved transportation links, labor availability, housing supply, recreational amenities, and economic linkages. Once such qualities emerge, the airport environs evolves into a distinct market area with reduced direct linkage to airport activity.

- Office development activity in the environs of the four older airports was driven substantially by speculation during the 1980's real estate boom. The glut of office space built in the 1980's has only recently been absorbed. Financing for office construction in the near future will be dependent on substantial pre-leasing by credit-worthy tenants. Discussions with real estate professionals in several cities indicated that the magnitude of office development seen in the 1980's was unique in recent history, and is unlikely to happen again.

- While speculation fueled by the real estate boom was a consistent overall trend behind new development in the studied airport environs, ERA noted that local market conditions were primarily responsible for shaping the course and rate of new development around each airport.

- Real estate development activity at KCI, DFW, and Dulles tended to include greater levels of industrial rather then office development. In the environs of DFW, where substantial office construction occurred, development was concentrated in a large planned community, Las Colinas, along with attractive amenities, including golf and high-income housing.

- Considering that both Atlanta and Dallas-Forth Worth have emerged as regional distribution nodes for the southeastern and south central U.S. as well as Central America, the existence of substantial industrial development in their airport environs is logical.

PART IV

AVIATION INDUSTRY TRENDS & FORECASTS

- Part IV -
Aviation Industry Trends and Forecasts

Introduction

The assessment of future economic impacts generated by the MSP alternative development scenarios is largely based on forecasts of enplanement activity under each scenario. As the MSP enplanement forecasts are inexorably tied to judgments of airline industry competitiveness in the future, it is critically important to understand the implications of airline industry economic trends and issues which have emerged since 1978, when deregulation transformed the nature of air travel in the U.S.

This section will include a review of salient economic trends in the airline industry which have emerged since the onset of deregulation in 1978. Discussion of these trends and associated implications for the airline industry will create a necessary backdrop against which the assessment of historic and forecasted enplanement activity at MSP will be based. Particular attention will be focused on the assumptions used by HNTB to generate enplanement forecasts for each airport in light of recent trends in the airline industry at the conclusion of this section.

Economic Issues and Trends

Airline industry issues and trends from 1978 to 1985 were dominated by two early issues: industry deregulation and rising fuel prices. Deregulation allowed individual airlines to make route and fare decisions on the basis of economics and competitive advantage. As a result, national carriers were able to withdraw from short-haul markets which could not be efficiently served by jet aircraft. The extent to which national carriers withdrew from short haul markets after deregulation was intensified by escalating fuel prices generated by conflict in the Persian Gulf in 1979. Since the average cost of fuel used per mile for all aircraft decreases as distance traveled increases, the rapid increase in jet fuel costs, primarily after December 1978, made short-haul flights in smaller markets increasingly unprofitable.[1] More importantly, as fuel prices increased, operating costs for older, fuel-inefficient aircraft increased substantially, rendering almost 25% of jet aircraft capacity in the country obsolete by 1980.[2]

It can be argued that deregulation had two primary impacts. First, it allowed national airlines to benefit from increased economies of scale by centralizing their operations at larger airport hubs in major markets. Second, deregulation allowed regional carriers to emerge as national carriers withdrew from smaller and perceived less profitable markets.

The 1985 to 1989 period was marked by additional refinement of the airport hub concept. One innovation was code-sharing, which allowed regional airlines to associate themselves with a national carrier by sharing computer reservation codes, which streamlined the reservation process. The national carriers further integrated themselves with regional carriers through acquisition of equity positions or outright purchase. As a

result, national carriers were able to improve efficiency by allocating a greater share of their short-haul markets to associated regional carriers. Re-allocation of air routes to regional carriers, particularly after 1985, allowed the regional airlines to grow rapidly as travel demand increased.

Overall, the first 12 years after deregulation were marked by dramatic growth in the airline industry as demand for air travel expanded rapidly in response to increased personal income and strong overall economic growth nationwide. According to the FAA, scheduled airport enplanements increased from around 300 million in 1980 to roughly 450 million in 1990, with the strongest enplanement growth occurring between 1980 and 1987. Growth in regional carrier enplanements was more dramatic, increasing from roughly 13 million in 1980 to almost 38 million by 1990. The dramatic increase in enplanement activity drove demand for both new aircraft and increased market share. By 1990 the eight largest national carriers (United, Delta, American, Northwest, Continental, USAir, TWA, and Pan Am) had placed orders for over 2,700 new aircraft at a cost of roughly $141 billion. Several airlines, including Northwest, were also purchased by investment groups during the late 1980's as airline industry expansion continued.

Even as travel demand increased over the 12-year period, the airline industry was slowly consolidating and adjusting to market forces. Consolidation among regional airlines was strongest as national carriers integrated operations with short-haul regional carriers. According to the FAA, of the 250 regional carriers operating in 1981, only about 159 were operating by 1989. Two national carriers, Braniff and Republic, also fell victim to consolidation and market forces by 1990. Republic was absorbed by Northwest Airlines in 1986, and Branniff went bankrupt in late 1989.

Beginning in 1990 however, more fundamental change was forced upon the airline industry. The precursor of change was the national recession, which slowed economic activity and reduced demand for air travel beginning in 1990. The invasion of Kuwait by Iraq in the fall of 1990 was far more significant in that it quickly drove jet fuel prices up from a relatively consistent fifty-five cents per gallon during the late-1980's to roughly $1.40 a gallon in mid-October of 1990.[3] Although the airlines tried to pass the 150% increase in fuel costs onto the consumer via higher ticket prices, a recessionary economy and the fear of terrorism made such increases unrealistic, since the public was generally unable or unwilling to travel. Although individual airline companies responded by sharply reducing ticket prices in order to induce greater travel activity, the initial result was to plunge the industry into serious debt.

As a result of rapid increase in jet fuel prices and resulting airfare wars between 1990 and 1993, Pan American, Eastern, and Midway Airlines dissolved, while Continental, America West, and Trans World Airlines declared bankruptcy. The five largest carriers listed above were particularly vulnerable to increasing costs; each carrier had increased its share of long-term debt as a percentage of total capitalization to roughly 80% due to over expansion in the late-1980's.[4] The major full-service carriers, Delta, American, and United, survived primarily because their larger size allowed for increased

resiliency against economic downturns. Even so, all carriers were forced to cut costs and delay or cancel new aircraft orders to some extent after 1990.

It has been suggested that the dramatic onset of decline in the airline industry caught analysts by surprise, as the airline industry had grown continuously since the 1960's, even during the 1979-1982 energy crisis. Increasing fuel costs and airfare wars proved to be only the first of several closely related challenges that the industry would face by 1995. The new challenges, including overcapacity and significant changes in the public's air travel tendencies, combined to alter the economics of air travel to a large extent and allowed a new type of airline to enter the marketplace: the "low cost" carrier.

In general, the concept of overcapacity describes a condition where demand for air travel is substantially lower then the number of available seats, resulting in lower yields and profits. Overcapacity first emerged in the 1970's when the introduction of wide-body aircraft dramatically increased the number of available seats in relation to actual demand. This early from of overcapacity was solved as demand for air travel increased rapidly after deregulation. The problem of overcapacity re-emerged by 1990 for several reasons:

- Between 1990 and 1993, the three largest airlines (Delta, United, and American) increased capacity by 35%, and smaller carriers on generally less stable financial ground increased capacity by roughly 10%, despite the recession and efforts to delay or cancel new aircraft orders.

- The impact of rapid oil price increases and airfare wars forced several airlines to seek Chapter 11 bankruptcy protection. One source estimated that roughly one-fourth of total industry capacity was under Chapter 11 by 1993.[5] The existence of substantial capacity in Chapter 11 placed considerable downward pressure on fares, since Chapter 11 airlines could suspend repayment of long-term debt and offer below market fares to generate necessary revenue.

- A recommendation by the National Transportation Safety Board against increased structural fatigue testing for older aircraft. The ruling allowed older aircraft to operate beyond their predicted 75,000 flight life expectancy.

- The surplus of aircraft on the market after 1991 drove acquisition and lease prices for older aircraft down considerably. According to one source, lease rates for older Boeing 737's had fallen to roughly $60,000 per month by 1994, a decrease of roughly 50% over previous years.[6]

The problem of overcapacity was magnified by a basic change in the public's air travel tendencies. Historically, the airlines relied on business travelers paying full fares to subsidize leisure travelers using discount fares. According to the Economist, such "high-yield" passengers would typically make up only about 20% of passengers on any given plane but provide about 66% of total revenue.[7] By 1990, however, the business travel market was getting consistently smaller as the recession forced companies to down-size

and cut costs. New advances in teleconferencing and fax communications also reduced the number of overall business trips. The full-service airlines' financial state began to deteriorate as the costs of providing full service were increasingly unsupported by the lower fares paid by price sensitive leisure travelers.[8]

Although the number of leisure travelers as a percentage of total airline traffic increased to fill the gap after 1990, the increased price sensitivity of leisure travelers did not allow established airlines the flexibility to increase fares, because competitive forces in the industry had strengthened. Increased competition in the industry after 1991 was fostered by the interaction of overcapacity and increased leisure travel price sensitivity, which created a conducive environment for "low cost" airlines to emerge.

The "low cost" airlines emerged primarily because they could achieve operating costs of roughly 7.5 cents per available seat mile (ASM) against an industry average of 10.77 cents per ASM.[9] By reducing the level of on-board service to a minimum, using inexpensive older aircraft, electronic ticketing, and providing a large number of daily flights in specific markets, the low cost carriers were able to offer substantially lower fares than established airlines. The FAA concluded that that recent success achieved by "low cost" entrants has shown that the only way to realistically improve airline profitability is by improving labor productivity and reducing operating costs.[10]

Studies done by the FAA suggest that the impact of introducing service by a "low cost" carrier on any given route can reduce fares by half and double enplanement activity.[11] One example of the increasing economic strength of "low cost" carriers also suggests that their profitability is more than a short-term trend. Atlanta based ValuJet Airlines started up in 1993 and recently became the most profitable scheduled airline in the U.S. The extent of ValuJet's profitability is evidenced by the carrier's recent agreement with McDonnell Douglas to purchase 50 new MD-95 jets at roughly $20 million each. The success achieved by ValueJet in Atlanta is also notable in that it has occurred in the face of heated competition with Delta Airlines, which controls roughly 80% of the Atlanta air travel market. A review of "low cost" carrier operations at hub airports around the U.S. has revealed three plausible issues which will effect the long-term profitability and growth of "low cost" carrier operations.

- Since the low cost carriers' competitive advantage is directly tied to their ability to offer cheap airfares, increases in the cost of landing fees, fuel costs, labor, taxes, and maintenance will likely have a substantial effect on their profitability.

- To the extent that full-service carriers are able to reduce their operating costs or create "low cost" operations in specific markets, "low cost" carriers will face increased competition.

- The ability of existing, "low-cost" operations to resist over-expansion, while still trying to increase market share.

In the case of MSP, a "low cost" carrier, Reno Air, began service from Reno to MSP in 1993 with connections to major markets on the West Coast. The new service, offered with low fares, was immediately copied by Northwest, which retaliated with even lower fares. The Justice Department saw the case as an anti-trust issue and ruled against Northwest, forcing the airline to drop the lower fares on connections to the West Coast. According to the Economist, the example is made more relevant given that Northwest had previously withdrawn from the Reno to MSP route in 1991 because it was unprofitable.[12]

The full-service carriers have responded in a variety of ways to the reality that cost reduction and productivity improvement are considered the most realistic means of restoring profitability in the industry. The responses have come in several forms, including labor concessions, employee ownership, diversification, airline mergers, foreign equity involvement, and international multi-lateral agreements. Airlines including Delta, United, and USAir extracted concessions from their unions in order to improve productivity. United and Northwest Airlines offered employee ownership in exchange for labor concessions to improve competitiveness. Several airlines are developing modified "low cost" service in particular markets in response to gains made by Southwest.

Airline mergers have recently become an active topic as well. Although merger activity has previously centered on the regional carrier industry, recent news stories are indicating that the scale of mergers may increase significantly. According the Chicago Tribune, United Airlines studied the feasibility of merging with USAir or Continental Airlines. Other national carriers, including American, Northwest, and KLM/Royal Dutch have also emerged as potential merger candidates. A variety of sources suggested that current economics in the airline industry need further improvement before large-scale mergers become viable.

International commercial airline activity is one area where a great deal of airline interest is focused. At present, international commercial airline and cargo operations are governed by bilateral agreements between countries which allocate market share between airlines in each market. The U.S. government is currently trying to negotiate a multi-lateral open skies agreement with the European Community which would increase competition. However, the European airline industry remains regulated, fragmented, and partially subsidized, which limits short-term likelihood that U.S. carriers will be able to improve market share. The recent acceptance of open skies agreements with the Netherlands and Canada are positive steps for the industry. According to the FAA, initiation of multilateral access agreements between the U.S. and Europe would create substantial new growth and profit opportunities for U.S. carriers.

There have been three notable efforts to improve access between the U.S. and Europe. Each effort has involved a foreign airline purchasing equity interest in a U.S. airline. Three "European" airlines, KLM, British Airways, and Air Canada have acquired equity interest in Northwest, USAir, Continental, respectively. In the case of Northwest and KLM, both airlines benefit from reservation code sharing, and jointly set fares and divide revenue throughout their route networks. Currently, federal law restricts foreign

investors (airlines) from holding greater than 25% voting equity in a U.S. airline. Discussions are underway to increase the voting equity percentage to 49%.

Airline industry growth in the Pacific Rim countries, including South Korea, China, Taiwan, Singapore, Japan, and Thailand, is expected to outpace all other markets in the near future. One source indicated that the share of world air travel in Asia is forecast to increase from a current level of about 25% to roughly 40% by 2010. The American domestic market share of total air travel is expected to shrink by about 10% over the same period.[13] Expected growth in Asian traffic is significant for Northwest Airlines; the carrier is already serving roughly one of every ten international passengers originating in Japan and providing extensive all-cargo service as well.

Federal Regulatory Policy and the Airline Industry

Although recent financial difficulties endured by commercial airlines in the U.S. are largely a result of economics, changes in federal aviation policy with regard to aircraft noise and airport development funding have also impacted the industry. The significance of each policy decision to MSP will also be noted.

Aircraft Noise

Aircraft noise has become an increasingly contentious issue for communities in the flight path of large hub airports. In 1991, the FAA issued a national noise policy requiring U.S. cargo and passenger airlines to use quieter aircraft by January 1, 2000. The new aircraft, designated as stage III, use an engine design which reduces both fan and exhaust noise by increasing the amount of air which by-passes the engine combustion chamber. Acoustically absorbent material is also used in each engine to further control noise emissions.

According to HNTB, the high by-pass engines on stage III aircraft are superior because they substantially reduce engine noise and produce substantially greater thrust when compared to stage II aircraft. Most airlines are currently using a majority of stage II aircraft, which do not posses the high by-pass technology. The new policy allows engines on stage II aircraft to be modified so as to reduce engine noise to an extent comparable to stage III engines. Early estimates of the cost to comply with the legislation ranged from $870 million to $1.6 billion.[14]

The new law has forced airlines to take a hard look at the costs and benefits of older aircraft in particular. As the cost to modify stage II engines on older aircraft with "hush-kits" is considerable, between $1.5 and $2 million per plane, it is estimated that older aircraft would need to remain in service for about 10 additional years to insure a positive return on the initial investment.[15] Although good maintenance practices have allowed older aircraft to operate beyond their estimated 25 year life span, the incremental cost of engine modification would theoretically require some aircraft to generate revenue for an additional ten years, to age 35.

Since maintenance costs increase with age, the noise legislation is forcing carriers which use older aircraft to consider purchasing new aircraft. Both ValueJet, which recently purchased 50 new MD-95 jets from McDonnell Douglas, and Southwest, which agreed to be the launch customer for the Boeing 737-700, are good examples. What is not clear is how the purchase of new aircraft by "low cost" carriers will impact their profitability; while new aircraft are expensive, they are also have improved fuel efficiency and lower maintenance costs compared to older aircraft.

The issue of aircraft noise at MSP is of particular concern due to the concentration of people, roughly 22,100, living within the 65 DNL noise contour surrounding MSP in 1994, according to Howard, Needles, Tammen, & Bergendoff (HNTB). Although increased usage of stage III aircraft is forecast to reduce the 65 DNL contour by 2005 under the MSP expansion scenario, the reduced noise contour will still contain roughly 7,600 residents, according to HNTB. The projected shape of the 65 DNL contour in 2005 incorporates the impact of an extended cross-wind runway at MSP. Although site preparation for the cross-wind runway extension has begun, legal challenges by Richfield have yet to be fully resolved.[16] The case study analysis has shown that anti-noise sentiment was a contributing factor in the decision to close Stapleton and build Denver International. Noise issues are also delaying new runway construction at Seattle-Tacoma International and Chicago-O'Hare International.

Airport Development Funding

The primary source of funding for new airport construction in the U.S. is the federal government, which provides entitlements tied to passenger activity and discretionary funds from the Airport Improvement Program (AIP), through the larger Aviation Trust Fund. AIP entitlements and discretionary funds began in 1982 by act of congress; funding was generated by a federal tax on airline tickets. A major change to the program came in 1991 when Congress allowed individual airports to institute a passenger facility charge (PFC) as new source of revenue above direct AIP entitlements and discretionary funding.

The new arrangement allows airports to apply a PFC of up to $3 per enplaning passenger. In accepting the PFC, however, the direct entitlement received by each airport is reduced by 50% of total revenue collected by the PFC; the 50% reduction is returned to the government for discretionary airport uses. In 1994, MSP received $30 million in PFC charges, $3.6 million in AIP entitlements, and $23.2 million in discretionary funding for noise mitigation and other uses, according to the MAC Finance office. Several sources indicated that the PFC will ultimately replace all direct entitlements.

Aviation Industry Conclusions

The previous discussion of airline industry trends noted a range of economic issues, including over-expansion, rising fuel costs, overcapacity, and the emergence of "low cost" carriers, which have impacted the economics of air travel since deregulation in 1978. The airline industry has also been influenced by policy issues, including aircraft noise and government funding for airport construction. Although the airline industry had grown consecutively since the 1960's, the combined impact of economic and policy issues has placed increasing strain on airline profitability; since 1990, two national carriers have closed and four others have been forced into bankruptcy.

In hindsight, the occurrence of substantial change in the industry since 1990 was not unexpected, as the U.S. economy as a whole was suffering through an extended period of stalled growth at the same time. The proliferation of "low cost" entrants in the airline industry is logical, in light of economic restructuring which occurred throughout the U.S. economy after 1990.

However, the aviation industry review also suggested that the impact of economic and policy issues was intensified by a structural change in the price sensitivity of business travelers. Although the airline industry had historically relied on business travelers to pay the highest fares, corporate downsizing and restructuring after 1990 increased the price sensitivity of business travelers even as new communication technologies further reduced the need for business travel. As such, it would be unrealistic to argue that dramatic changes in the economics of air travel since 1990 are merely cyclical.

It is ERA's contention that airline industry profitability in the future will continue to be tied to cost control. Emphasis on cost control will greatly benefit the airline industry over the long-term, particularly as anticipated growth in international air travel and air cargo markets occurs, enabling U.S. carriers to compete effectively in international markets. The following section will outline historic and forecast aviation activity at MSP, as a prelude to assessment of forecast economic impacts generated by each of the alternative development scenarios.

Historic and Forecast MSP Enplanement Activity

The following table, which outlines enplanement activity at MSP since 1972, highlights the impact of airline deregulation in 1978. Between 1972 and 1978 enplanement activity at MSP increased slowly from roughly 2.7 million to 3.8 million. After deregulation, total enplanements increased by almost 190%, improving from roughly 3.8 million in 1978 to 10.9 million in 1994. Regional enplanement activity grew by a annual compound rate of 19.6% since 1978, while international activity grew by a more dramatic annual compound rate of 37.9% over the same period.

Table 4-1: Historical Enplanement Trends, MSP, 1972 - 1994

Year	Originations	Connections	Regional	International	Non-scheduled	Total
1972	1,867,860	860,838	15,137	--	--	2,743,835
1973	2,030,540	1,038,617	14,402	--	--	3,083,559
1974	2,250,550	974,475	16,155	--	--	3,241,180
1975	2,209,110	1,019,454	21,255	--	--	3,249,819
1976	2,370,230	1,189,698	26,484	--	--	3,586,412
1977	2,502,170	1,266,057	28,021	--	130,439	3,796,248
1978	2,714,940	1,141,837	35,226	372	145,939	3,892,375
1979	3,040,040	1,548,231	49,087	--	129,788	4,637,358
1980	2,839,620	1,445,597	42,547	28,731	113,793	4,356,495
1981	2,623,110	1,768,692	30,137	57,871	85,869	4,479,810
1982	2,864,730	2,206,665	75,774	50,574	82,278	5,197,743
1983	3,039,930	2,662,164	118,783	49,638	149,486	5,870,515
1984	3,599,610	2,386,678	130,610	73,014	187,076	6,189,912
1985	3,879,830	3,234,537	156,825	83,533	312,186	7,354,725
1986	4,089,850	3,755,644	290,700	81,700	238,972	8,217,894
1987	4,069,320	4,101,886	366,374	85,023	205,700	8,622,603
1988	4,185,580	3,837,541	397,835	65,265	266,344	8,486,221
1989	4,457,910	3,892,010	415,910	78,910	343,418	8,844,740
1990	4,512,740	4,096,898	495,439	102,673	387,320	9,207,750
1991	4,366,630	4,316,602	492,075	124,125	353,590	9,299,432
1992	4,580,060	4,970,926	566,186	144,255	419,060	10,261,427
1993	5,759,810	4,092,100	642,190	177,458	350,918	10,671,558
1994	5,697,800	4,426,000	640,900	177,200	460,200	10,941,900

Source: HNTB

Three significant events in the operating history of MSP occurred since 1978, all of which revolve around Northwest Airlines. The first event occurred in 1986 when Republic Airlines was absorbed by Northwest. The second event occurred in 1989 when Northwest was purchased by an investment group in a leveraged buyout for roughly $3.6 billion. The purchase straddled Northwest with a large debt load, which forced the airline to restructure debt, give partial ownership to labor in exchange for concessions, and

rationalize costs and routes. Northwest also received a controversial state loan of $270 million to cover operating costs. Although the airline lost over $1 billion between 1989 and 1993, a combination of labor cost savings, route rationalization, and debt restructuring allowed Northwest to become consistently profitable by 1993, which is the third notable event in the history of MSP.

MSP Activity Forecasts Through 2020

The following activity forecasts were generated HNTB in 1993 for use in the dual track airport planning process. The forecasts were originally generated in 1990 using 1988 as a base year, and revised in order to compensate for significant changes in the airline industry which have occurred in the past five years. The nature of such changes, including growth of regional and "low-cost" carriers, as well as continued shaking out of the airline industry following deregulation in 1978, have been particularly significant. The revised forecasts also excluded data prior to 1979, when the federal government deregulated the airline industry and allowed market forces to determine demand for air travel.

The HNTB forecasts were derived in part from traditional indicators, including historical and forecasted population, employment, and non-farm income data for 11 counties in the metro area. The seven-county metro area covered by the Metropolitan Council was considered less appropriate for forecasting. In using the eleven-county metro area definition, HNTB noted that the metro area was recently expanded to 13 counties, with the addition of Sherbourne in Minnesota and Pierce in Wisconsin. HNTB chose to remain with the 11-county area for consistency.

Two sets of forecasts were prepared for the three alternative airport development scenarios of the dual-track planning process. The first forecast assumes unconstrained enplanement and operations activity under the MSP expansion and new airport options. The second forecast assumes constrained airport activity under the no-build option for MSP. Both forecasts include actual enplanement and operations activity by category from 1990 through 1992, and forecast enplanement and operations activity through 2020 based on FAA projections of airline industry yields. HNTB utilized a variety of assumptions to generate the MSP expansion and new airport forecast; the HNTB assumptions are outlined in detail in the Long-Term Comprehensive Plan Technical Appendix. The no-build scenario is a constrained forecast, and serves as a base line from which the impact of expansion or new construction at MSP will be judged. The no-build option assumes that existing facilities at MSP will remain, and planned investment through the 1996 capital improvement program will be completed. Assumptions used by HNTB for the no-build forecast are outlined in a separate working paper, noted in the bibliography. The following tables outline forecasted annual enplanements and operations for the alternative development scenarios through 2020. Tables 4-2 and 4-3 outline enplanement and operations forecasts under the MSP expansion and new airport development scenarios. Tables 4-4 and 4-5 cover forecasted enplanements and operations under the no-build scenario.

Table 4-2: Summary Of Actual And Forecast Enplanement Activity, MSP Expansion & New Airport Scenarios , 1990 - 2020								
	Actual			Projected				
Category	1990	1991	1992	2000	2005	2010	2015	2020
National Enplanements	8,609,638	8,683,232	9,550,986	10,966,000	11,873,000	12,729,000	13,293,000	13,845,000
International Enplanements	102,673	124,125	144,255	238,000	335,000	432,000	552,000	672,000
Regional Enplanements	495,439	492,075	566,186	954,000	1,088,000	1,219,000	1,340,000	1,479,000
International - Charter	79,563	62,532	75,179	111,000	122,000	132,000	136,000	139,000
National - Charter	307,757	291,058	343,881	435,000	477,000	518,000	532,000	546,000
Non-Passenger Cargo (Tons)	67,996	63,948	71,030	112,400	147,900	190,500	243,800	308,100
Total Passenger Enplanements	**9,595,070**	**9,653,022**	**10,680,487**	**12,704,000**	**13,895,000**	**15,030,000**	**15,853,000**	**16,681,000**
% Change Over Prior Period	**NA**	**0.604%**	**10.644%**	**18.946%**	**9.375%**	**8.168%**	**5.476%**	**5.223%**
Source: Long-Term Comprehensive Plan Revised Activity Forecasts, Volume 6, prepared by HNTB, March 1994								

Table 4-3: Summary of Actual and Forecast Operations Activity, MSP Expansion & New Airport Scenario, 1990 - 2020								
	Actual			Projected				
Operations	1990	1991	1992	2000	2005	2010	2015	2020
Domestic Scheduled	223,884	225,390	242,670	267,000	272,800	281,800	285,800	291,600
Regional	74,446	75,856	85,926	111,600	112,800	115,000	115,000	116,000
International - Scheduled	860	1,078	1,222	2,200	3,200	4,000	5,000	6,200
All Non-Scheduled	4,538	5,046	5,824	7,000	7,200	7,600	7,600	7,600
All-Cargo	18,526	20,280	18,900	24,200	28,000	32,200	36,400	41,400
General Aviation	58,864	55,702	60,929	58,800	57,800	56,300	55,600	54,600
Military	2,804	2,534	3,003	3,000	3,000	3,000	3,000	3,000
Total Operations	**383,922**	**385,886**	**418,474**	**473,800**	**484,800**	**499,900**	**508,400**	**520,400**
% Change Over Prior Period	**NA**	**0.512%**	**8.445%**	**13.221%**	**2.322%**	**3.115%**	**1.700%**	**2.360%**
Source: Long-Term Comprehensive Plan Revised Activity Forecasts, Volume 6, prepared by HNTB, March 1994								

Table 4-4: Summary of Actual and Forecast Enplanement Activity, No-Build Scenario, 1990 - 2020								
	Actual			Projected				
Category	1990	1991	1992	2000	2005	2010	2015	2020
National Enplanements	8,609,638	8,683,232	9,550,986	10,966,000	11,873,000	12,729,000	13,254,000	13,239,000
International Enplanements	102,673	124,125	144,255	238,000	335,000	432,000	552,000	672,000
Regional Enplanements	495,439	492,075	566,186	954,000	1,085,000	1,144,000	1,237,000	1,318,000
International - Charter	79,563	62,532	75,179	89,000	89,000	89,000	89,000	89,000
National - Charter	307,757	291,058	343,881	435,000	475,000	475,000	475,000	475,000
Non-Passenger Cargo (Tons)	67,996	63,948	71,030	112,400	147,900	190,500	243,800	308,100
Total Passenger Enplanements	**9,595,070**	**9,653,022**	**10,680,487**	**12,682,000**	**13,857,000**	**14,869,000**	**15,607,000**	**15,793,000**
% Change Over Prior Period	**NA**	**0.604%**	**10.644%**	**18.740%**	**9.265%**	**7.303%**	**4.963%**	**1.192%**
Source: No - Build Forecasts, Table 13, prepared by HNTB, March 1994, July 27, 1995								

Table 4-5: Summary of Actual and Forecast Operations Activity, No-Build Scenario, 1990 - 2020								
	Actual			Projected				
Category	1990	1991	1992	2000	2005	2010	2015	2020
Domestic Scheduled	223,884	225,390	242,670	267,000	272,800	274,400	275,400	273,800
Regional	74,446	75,856	85,926	111,600	109,000	106,400	104,800	102,200
International - Scheduled	860	1,078	1,222	2,200	3,200	4,000	5,000	6,200
All Non-Scheduled	4,538	5,046	5,824	6,800	7,000	7,000	7,000	7,000
All-Cargo	18,526	20,280	18,900	24,200	28,000	32,200	34,200	30,800
General Aviation	58,864	55,702	60,929	51,300	50,500	50,000	49,800	50,500
Military	2,804	2,534	3,003	3,000	3,000	3,000	3,000	3,000
Total Operations	**383,922**	**385,886**	**418,474**	**466,100**	**473,500**	**477,000**	**479,200**	**473,500**
% Change Over Prior Period	**NA**	**0.512%**	**8.445%**	**11.381%**	**1.588%**	**0.739%**	**0.461%**	**-1.189%**
Source: No - Build Forecasts, Table 12, prepared by HNTB, March 1994, July 27, 1995								

Under the no-build forecast, total enplanements are forecast to increase from 12,682,000 in 2000 to 15,793,000 by 2020. If airport expansion or new construction is approved, total enplanements will rise from 12,704,000 in 2000 to 16,681,000 in 2020, which represents an increase of 888,000 total enplanements over the no-build option by 2020. The effect of constrained operations activity under the no-build option is shown in Table 3-5, where total operations increase slowly through 2015 to 477,000 then decline by 2020 to 473,500 as capacity constraints at MSP take hold.

The following two summary tables (4-6 and 4-7), which highlight the percentage improvement in enplanement and operations activity over the no-build forecast, were derived from tables 4-2 through 4-5. The two summary tables are useful in that they highlight the categories of enplanement and operations activity which stand to lose the most from constrained airport activity.

Table 4-6, below, shows that regional and charter enplanements would increase by 12.2% through 2020 under the expansion/new construction forecast, which equates to growth of 161,000 enplanements over the no-build option. Charter enplanements would increase relatively, by 121,000 over the same period. International enplanements and cargo would remain unchanged. Although the national airlines are forecasted to avoid initial decreases in enplanement activity due to congestion at MSP under the No-Build option, they would stand to lose roughly 606,000 enplanements by 2020 if new airport construction or expansion is not approved.

Table 4-6: Percent Improvement in Enplanements Over the No-Build Option, 2000 - 2020

Category	2000	2005	2010	2015	2020
National Enplanements	0.00%	0.00%	0.00%	0.29%	4.58%
International Enplanements	0.00%	0.00%	0.00%	0.00%	0.00%
Regional Enplanements	0.00%	0.28%	6.56%	8.33%	12.22%
International - Charter	24.72%	37.08%	48.31%	52.81%	56.18%
National - Charter	0.00%	0.42%	9.05%	12.00%	14.95%
Non-Passenger Cargo & Mail	0.00%	0.00%	0.00%	0.00%	0.00%
Source: ERA analysis of HNTB forecasts					

According to Table 4-7, all-cargo operations are forecasted to slow by 2015 without airport expansion or new construction, although total tonnage will still increase as remaining departures are loaded to greater capacity. Regional operations will decrease steadily through 2020 as available ramp area is used to capacity and regional jet gates are re-allocated to national carriers. Domestic national operations will decline under the no-build as larger aircraft are used; by 2020 a total of 17,800 operations will be lost.

Table 4-7: Percent Improvement in Operations Over the No-Build Option, 2000 - 2020					
Category	**2000**	**2005**	**2010**	**2015**	**2020**
Domestic Scheduled	0.00%	0.00%	2.70%	3.78%	6.50%
Regional	0.00%	3.49%	8.08%	9.73%	13.50%
International - Scheduled	0.00%	0.00%	0.00%	0.00%	0.00%
All Non-Scheduled	2.94%	2.86%	8.57%	8.57%	8.57%
All-Cargo	0.00%	0.00%	0.00%	6.43%	34.42%
General Aviation	14.62%	14.46%	12.60%	11.65%	8.12%
Military	0.00%	0.00%	0.00%	0.00%	0.00%
Source: ERA analysis of HNTB forecasts					

Conclusions

The base-case and no-build enplanement forecasts, generated by HNTB in 1993, were based on a variety of assumptions. Since 1993, the airline industry has undergone evolutionary changes in response to increasing competition in the marketplace. As the enplanement forecasts supplied by HNTB are a critical component of economic and fiscal impact analyses for the alternative development scenarios, ERA reviewed trends in the airline industry since deregulation to better understand the long term significance of assumptions used by HNTB. The ERA review of airline industry trends, outlined in the preceding section, highlighted a range of salient issues, three of which are particularly relevant to this discussion: industry sensitivity to increasing costs, the emergence of "low cost" carriers, and technological change. Each issue will be discussed in light of assumptions used by HNTB.

- **Sensitivity to Costs** - As a result of changes in the price sensitivity of air travelers, the airline industry been forced to place increased emphasis on cost control. While the airlines have achieved varying degrees of success in controlling labor costs, the airlines are unable to control the price of jet fuel, which may account for up to 25% of airline operating costs.[17] However, increased utilization of fuel-efficient stage III aircraft should reduce the influence of fuel cost on airline profitability. For the base-case enplanement forecasts, HNTB assumed that there would be no increases in fuel prices or taxes over the forecast period which would dramatically increase operating costs and ticket prices over the long-term.

- **Emergence of "Low Cost" Carriers** - Although research conducted by the FAA determined that the arrival of a "low cost" carrier in a new market tends to drive down fares and increase enplanements, recent evidence has shown that the "low cost" carrier impact is reduced in markets which are dominated by a single carrier, such as Atlanta, Denver, and Minneapolis. Research conducted by ERA indicates that the major carriers are able to compete more effectively from their primary hubs along

particular routes with "low cost" carriers. The HNTB forecasts assumed that no "low cost" carriers will achieve large-scale entry into the Twin Cities market.

- **Technological Change** - Development of reliable jet engine technology in the late 1960's proved to be the first of many technological innovations accepted by the airline industry. Since 1970, the industry has benefited from wide-body aircraft designs and quieter, more powerful jet engine systems, which have substantially impacted airline industry productivity and profitability. Research conducted by TAMS Consultants and the al-Chalabi Group for Chicago's third airport examined the issue of future technology, and concluded that only evolutionary changes are likely. The HNTB enplanement projections assume only evolutionary technological change over the forecast period.

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[1] Meyer et. al. Airline Deregulation: The Early Experience. Auburn House Publishing, 1981, page 169.
[2] Ibid., page 161.
[3] The Economist, June 12, 1993, page 11.
[4] Ibid., page 15.
[5] Ibid., page 15.
[6] Chicago Tribune, September 17, 1995.
[7] The Economist, June 12, 1993, page 5.
[8] Ibid., page 5
[9] FAA Aviation Forecasts - Fiscal Years 1995-2006, March 1995, page I-2.
[10] Ibid., page III-20.
[11] MSP Revised Activity Forecast Technical Appendix, completed by HNTB and associated firms, V.6, page B-6.
[12] The Economist, June 12, 1993, page 15.
[13] The Economist, June 12, 1993, page 10.
[14] *"Annual Contingency Assessment, Major Airport Strategy, 1991"*. MET Council Report to the Minnesota State Legislature, page 30.
[15] Aviation Week and Space Technology, September 14, 1992, page 41.
[16] Minneapolis Star Tribune, August 2, 1995.
[17] *"Annual Contingency Assessment, Major Airport Strategy, 1991"*. MET Council Report to the Minnesota State Legislature, page 11.

Part V

Economic & Fiscal Impacts

- Part V -
Economic and Fiscal Impacts

Introduction

The magnitude of economic activity created by each of the alternative development scenarios is highly significant, as airport expansion or new construction will inject between $2.7 billion to $4.5 billion into the regional economy for construction activity alone. Once completed, an expanded MSP or new airport will generate demand for commercial real estate, spur employment growth, and create tax revenues. In addition, construction of a new airport would, over the long-term, open up new areas for development and alter growth patterns in the region.

The range of economic and fiscal impacts created by the alternative development scenarios are generated primarily by forecast enplanement activity under each scenario. The MSP expansion and new airport scenarios allow for unconstrained air service in the region during the forecast period through 2020; the no-build scenario reduces operations and enplanement activity at MSP after the year 2015, generating economic opportunity costs for the region. Since the economic and fiscal impact associated with each airport development alternative will resonate throughout the local, metropolitan, and regional economy in different ways, we have divided the total impacts into individual categories, which are outlined as follows:

- **Direct Impacts** include employment and wages generated by on-site airport flight operations and passenger services.

- **Indirect Impacts** include employment and wages generated in the regional economy by subsequent re-spending of wages by airport direct employment.

- **Induced or Linked Real Estate Impacts** include the development of office, industrial, and hotel real estate which dependent on, or directly benefits from air service in the region.

- **Construction Impacts** include the direct and indirect impact of construction employment and wages on the region created by MSP expansion or new airport construction.

- **Visitor Industry Impacts** cover direct & indirect employment and wages in hospitality, entertainment, dining, and other related establishments tied to visitors arriving in the region by the airport.

- **Fiscal Impacts** cover the revenue returned to the State of Minnesota from taxes on retail sales, property, income, and other items related to air service, airport construction, and the visitor industry.

The economic and fiscal impacts of each alternative airport development scenario will be quantified in terms of the six impact categories listed above. The methodologies used to quantify impacts in each category are discussed as well. The induced or linked impact analysis will incorporate data from the case study analysis with land use data generated by Dahlgren, Shardlow, and Uban (DSU) to forecast demand for airport-linked office, industrial, and hotel development under each scenario. For the new airport scenario, the induced development analysis will draw from previous analyses prepared for the Metropolitan Council and findings of the case study analysis. The economic impact analysis will also cover three additional issues:

1. The extent of new jobs or business which are attracted to the Twin Cities as a result of new airport construction in Dakota County.

2. The current economic impact of Northwest Airlines operations at MSP as well as the implications if a portion of their employment base leaves Minnesota.

3. The current economic impact of military operations at MSP.

Forecast Direct Impact Methodology

ERA reviewed a total of 18 recent economic impact studies from ten major airports to survey current economic impact assessment methodologies. A bibliography outlining the 18 studies is in the appendix. The reviewed studies focused on impacts generated by existing airport activity, including direct employment, wages, total output, and multiplier effects. The studies generally applied existing airport direct employment with wage data to generate direct impacts; survey methods were used to estimate indirect and linked impacts of airport activity. Other analyses generally did not project future impacts, as only two of the ten airports noted above (Denver and Chicago) were studying projected impacts of new airport construction.

Studies completed for the third airport project in Chicago by the al-Chalabi Group (ACG) emerged as a valuable source of procedures for impact forecasting methods. Data and statistics developed by ACG for the Third Chicago Airport Study provided realistic evidence to support the use of ratios of origin/destination, connection, and international enplanements to direct employment for projection of future direct employment levels. Their studies employed an extensive and defensible technique using regression analysis to assess the relationship of direct employment to the three enplanement categories at 25 major airports across the United States.[1] Prior work done by the FAA first established the relationship between airport enplanement activity and direct employment.[2]

The methodology first developed by the FAA and later improved by ACG, incorporates two significant points. First, the model does not include regional enplanements in the regression analysis due to a wide variability in regional enplanement

activity at the studied airports.[3] Second, the model addresses the issue of airline headquarters employment on airport property at Atlanta-Hartsfield, Dallas-Fort Worth, and MSP. Statistical analysis conducted by ACG determined that inclusion or exclusion of headquarters employment at the three airports does not have a significant impact on forecast direct employment, when considering the aggregate results.[4]

The regression analysis, comparing O/D, connecting, and international enplanements with direct employment at 25 U.S. airports, generated the following set of jobs per enplanement ratios, which are shown below in Table 5-1.

Table 5-1: Jobs per Enplanement Ratios

Type of Enplanement	Jobs per Enplanement
Origin/Destination	0.001529
Connecting	0.001348
International	0.005459

When statistical analyses were used to compare the model results to actual direct employment at each studied airport, the R-squared measure was .911, indicating that about 91% of observed direct employment can be explained by the three enplanement categories shown in the table above.[5]

The model also incorporates an adjustment for airline industry productivity improvement over the next 25 years, as technological innovation reduces the number of jobs per enplanement. The following table outlines annual productivity adjustments between 2000 and 2020. The productivity adjustments are applied to the Jobs per Enplanement ratios in Table 5-1 to generate adjusted jobs per enplanement ratios for 2000, 2005, 2010, 2015, and 2020, which are shown below in Table 5-3.

Table 5-2: Annual Airline Productivity Adjustments

Type of Enplanement	1989-2001	2002-2010	2011-2020
Origin/Destination	1.71%	1.15%	0.82%
Connecting	1.71%	1.15%	0.82%
International	1.71%	1.71%	1.71%

The productivity adjustments, expressed as annual percentage rates in Table 5-2, are based on the assumption that airline industry productivity will continue, although at a rate slower then experienced during the 1970's and 1980's, when the industry made dramatic improvements in productivity. The table shows that productivity of airport employment related to origin/destination enplanements is forecast to improve by 1.71%

between 1989 and 2001, by 1.15% between 2002 and 2010, and by 0.82% between 2011 and 2020. The set of adjusted jobs per enplanement ratios can be applied to enplanement data from any airport to derive projections of direct airport employment. Table 5-3 highlights the adjusted jobs per enplanement ratios which will be used for direct employment forecasts under the alternative airport scenarios.

Table 5-3: Adjusted Jobs per Enplanement Ratios

Type of Enplanement	2000	2005	2010	2015	2020
O/D	0.001332	0.001257	0.001186	0.001139	0.001093
Connecting	0.001174	0.001108	0.001046	0.001004	0.000963
International	0.004755	0.004362	0.004002	0.003671	0.003368

Although the jobs per enplanement model was originally developed during the 1980's, a recent study by ACG tested and updated the methodology for the proposed south suburban airport project in Chicago.[6] As this 1995 study confirmed the validity of earlier studies using ratios of direct jobs to enplanements, that methodology will be used to forecast direct employment under the alternative airport development scenarios.

Direct and Indirect Economic Impacts - MSP Expansion Scenario

As stated in the methodology section above, projection of direct employment is based on enplanement activity forecasts. The MSP expansion enplanement forecast is shown below in Table 5-4.

Table 5-4: Forecast Enplanements: MSP Expansion, 2000-2020

Year	2000	2005	2010	2015	2020
O/D	6,118,000	6,625,000	7,105,000	7,421,000	7,731,000
Connection	4,848,000	5,248,000	5,624,000	5,872,000	6,114,000
International	238,000	335,000	432,000	552,000	672,000

The MSP expansion forecast is essentially the same as the new airport forecast; both scenarios assume unconstrained enplanement and operations activity during the forecast period and use identical projections of origin/destination, connecting, and international enplanements. Although the direct employment forecasts for the MSP expansion and new airport options are identical as a result, each will be discussed separately in the following analysis, primarily because each scenario projects different impacts on regional development patterns.

Application of the adjusted jobs per enplanement ratios in Table 5-3 to forecast enplanements under the MSP expansion scenario generates the following projection of total direct jobs through 2020 for the MSP expansion scenario. The table shows that direct airport employment will increase from 14,973 in the year 2000 to 16,601 in the year 2020. A total of 1,628 new jobs will be created over the 20 year forecast period, growing at roughly 0.52% on an annualized basis. Between 2005 and 2020, employment will increase by 995 individuals, or 0.4% on an annualized basis.

Table 5-5: Forecast Direct Employment, MSP Expansion

2000	2005	2010	2015	2020
14,973	15,606	16,041	16,370	16,601

Table 5-5 **excludes** roughly 10,000 Northwest Airlines employees in reservations, aircraft overhaul and maintenance, pilot training, management, information services, and administrative services on MSP property which are not directly tied to air operations. When the 10,000 positions are factored in, total airport employment would exceed 24,000. The reservation positions were located on-site after Northwest absorbed Republic Airlines in 1986. Employment for aircraft overhaul and maintenance includes the Northwest fleet maintenance facility for Boeing 747 aircraft, as well as general aircraft overhaul and over-night repair facilities. The economic impacts created by the 10,000 Northwest jobs are discussed in a separate, upcoming section, in light of indications by Northwest Airlines officials that the 10,000 jobs are not directly tied to passenger operations at MSP, and could be moved off-site at any time. A table, highlighting Northwest Airlines current employment at MSP, is in the appendix for reference.

Direct employment by Sector and County

Job titles associated with on-site airport operations include ground transportation, airline pilots, baggage handling, security, on-line aircraft maintenance, air cargo, and passenger services. Other positions, including air traffic control, administration, food service and retail sales are also considered part of direct employment. Allocations of current total direct employment by airport job sector, shown in Table 5-6 below, were obtained from a February, 1995 economic impact study for MSP conducted by Martin Associates; ERA was informed by Metropolitan Airports Commission officials that airport employment data contained in the 1995 economic impact study was considered reliable.[7]

Table 5-6: Adjusted Airport Direct Employment by Sector, 1995		
Category	**Jobs**	**% of total**
Airlines	7,361	50.45%
Airport Service	3,103	21.27%
Freight	1,696	11.62%
Ground transport	1,830	12.54%
Other	599	4.11%
Total:	14,589	100.00%

The employment data shown in Table 5-6 was adjusted downward by ERA to remove roughly 10,000 Northwest Airlines positions maintained on-site which are not associated directly with air operations, for reasons stated previously. The percent job distributions shown above in Table 5-6 are assumed to remain constant through the forecast period, as adjustments have already been applied to compensate for improved worker productivity. The following table (5-7) outlines forecast direct employment by airport sector.

Table 5-7: Forecast Direct MSP Employment by Job Sector, 2000 - 2020					
Job Category	**2000**	**2005**	**2010**	**2015**	**2020**
Airlines	7,554	7,874	8,093	8,259	8,375
Airport Service	3,185	3,319	3,412	3,482	3,531
Freight	1,741	1,814	1,865	1,903	1,930
Ground Transport	1,878	1,957	2,012	2,053	2,082
Other	616	642	660	673	683
Total:	14,973	15,606	16,041	16,370	16,601

Research conducted by Martin Associates for the 1995 MSP economic impact study also looked at the allocation of direct jobs by place of residence in the state. ERA assumes that the location of residence distribution for the separate 10,000 Northwest Airlines positions is essentially the same as the location of residence distribution for the 14,590 employees at MSP needed for flight operations. The following table outlines adjusted total employment by place of residence for MSP employees in February, 1995.

Table 5-8: Adjusted MSP Direct Employment by County, 1995		
County	**Jobs**	**Percent**
Anoka	769	5.3%
Carver	293	2.0%
Dakota	5,083	34.8%
Hennepin	4,848	33.2%
Ramsey	2,352	16.1%
Scott	471	3.2%
Sherburne	3	0.0%
Washington	343	2.4%
Wright	35	0.2%
Total Metro	**14,197**	**97.3%**
Other MN	246	1.7%
Out-of-state	146	1.0%
Total	**14,589**	**100.0%**

It is assumed that the distribution of jobs by place of residence in 1995, as shown above, **will not change** over the forecast period for the MSP expansion option. Application of the percentage allocations of jobs per county in Table 5-8 to forecasted direct employment in Table 5-5 creates the following table, which outlines forecasted direct jobs (Table 5-9) by county through 2020.

Table 5-9: Direct Employment by County of Residence, 2000 - 2020					
County	**2000**	**2005**	**2010**	**2015**	**2020**
Anoka	789	823	845	863	875
Carver	301	314	322	329	334
Dakota	5,217	5,437	5,589	5,704	5,784
Hennepin	4,976	5,186	5,331	5,440	5,516
Ramsey	2,414	2,516	2,586	2,639	2,676
Scott	484	504	518	529	536
Sherburne	3	3	3	3	3
Washington	352	367	377	385	390
Wright	36	37	38	39	40
Total Metro	**14,571**	**15,186**	**15,610**	**15,930**	**16,154**
Other MN	253	263	271	276	280
Out-of-state	150	156	160	164	166
Total	**14,973**	**15,606**	**16,041**	**16,370**	**16,601**

The table shows that Dakota County is forecast to house the greatest share of direct employment, roughly 35%, over the forecast period. Hennepin and Ramsey Counties are home to an additional 49% of MSP direct employment. The out-of-state category is assumed to include residents living in Wisconsin, primarily. As expected increases in travel time in the Twin Cities occur, small changes in the future distribution of direct employment by residence are probable. However, it is assumed that the overall distribution of direct employment by residence over the forecast period will not be influenced by airport expansion at MSP, primarily because expansion should not significantly alter regional development and growth patterns.

Direct Wages - MSP Expansion

The forecast of direct wages generated by airport employment is based on an average wage of $35,000 per employee, in 1993 constant dollars. This average wage was derived from the 1995 economic impact assessment conducted for MSP by Martin Associates. ERA determined that the $35,000 average wage compared favorably with 1993 wage and employment data generated by the Minnesota Office of Employment Security for transportation sectors in the Twin Cities, which indicated an average wage range between $34,000 and $36,000.

ERA is using the wage value of $35,000 over other data provided by Northwest Airlines which indicates an average salary of $58,328 for Northwest employees in Minnesota. The primary reason why ERA chose to remain with the lower, published value of $35,000 is that the NW figure does not break out average wages for specific job categories to indicate an average for on-site airport operations employees. It is important to note that any increase in the average wage will not substantially alter the relationship between direct and indirect impacts of MSP expansion or a new airport, since both options rely on the same unconstrained aviation (passenger) forecast generated by HNTB. As such, a higher wage will only create differences in the overall impact magnitude. Application of the average wage to direct employment data in Table 5-5 returns the following direct wage projections, in Table 5-10, below.

Table 5-10: Direct Wages, MSP Expansion

2000	2005	2010	2015	2020
$524,067,798	$546,205,519	$561,445,353	$572,967,064	$581,018,224

The table shows that wages generated by airport employment will rise from $546 million in 2005 to $581 million in 2020, an annualized increase of roughly $2.3 million over the forecast period. Table 5-11, below, allocates direct wages by place of residence, based on Table 5-8. The table indicates that Dakota and Hennepin Counties will continue to receive the majority of metro area direct wages, 35% and 34% respectively, from

airport employment. Also notable in Table 5-11 are direct wages out-of-state, which increase from $5.2 million in 2000 to roughly $5.8 million in 2020. It is assumed that out-of-state employment and wages are concentrated primarily in Wisconsin.

Table 5-11: Forecast Direct Wages by County, MSP Expansion, 2000 - 2020

County	2000	2005	2010	2015	2020
Anoka	$27,621,777	$28,788,578	$29,591,817	$30,199,086	$30,623,434
Carver	$10,528,671	$10,973,424	$11,279,597	$11,511,071	$11,672,821
Dakota	$182,589,321	$190,302,277	$195,611,954	$199,626,208	$202,431,296
Hennepin	$174,149,334	$181,505,767	$186,570,010	$190,398,710	$193,074,135
Ramsey	$84,485,126	$88,053,954	$90,510,772	$92,368,191	$93,666,121
Scott	$16,922,601	$17,637,447	$18,129,554	$18,501,600	$18,761,579
Sherburne	$106,565	$111,067	$114,166	$116,509	$118,146
Washington	$12,318,971	$12,839,351	$13,197,585	$13,468,419	$13,657,674
Wright	$1,257,473	$1,310,591	$1,347,158	$1,374,804	$1,394,122
Total Metro	$509,979,839	$531,522,456	$546,352,613	$557,564,598	$565,399,328
Other MN	$8,844,936	$9,218,565	$9,475,775	$9,670,232	$9,806,115
Out-of-state	$5,243,022	$5,464,499	$5,616,965	$5,732,234	$5,812,781
Total	$524,067,798	$546,205,519	$561,445,353	$572,967,064	$581,018,224

Indirect Economic Impact Methodology

Indirect impacts generated by the alternative airport development scenarios are created by the expenditure of wages by airport direct employment. The re-spending of direct wages by airport employees ripples through the regional economy, creating demand for additional goods and services. The review of recent airport economic impact studies conducted by ERA confirmed that multipliers, based on regional input-output modeling, are an accepted means of generating indirect economic impacts. Multipliers show the amount of interdependence between industries in a region; if local firms are more interdependent, they buy more goods and services from each other, minimizing leakage to other states in the region and country, resulting in a higher multiplier and relatively greater indirect impacts.

ERA utilized a set of RIMS II input-output multipliers for wages and employment generated for the State of Minnesota by the Bureau of Economic Analysis in 1992. The multipliers are applied to direct employment and wages to arrive at a measure of indirect jobs and wages created in the state economy. As one example, the direct-effect employment multiplier for new construction in Minnesota is 2.1473, indicating that for every direct job created, 1.1473 indirect jobs are created. Multipliers for transportation, new construction, hotels and amusements, as well as eating and drinking places were utilized in the analysis.

Indirect Economic Impacts - MSP Expansion

Quantification of the indirect economic impacts of direct employment and wages created by the MSP expansion scenario was based on Bureau of Economic Analysis 1992 RIMS II direct-effect multipliers for the transportation sector in Minnesota.[8] Multipliers reflect the extent of re-spending in the state economy generated by direct wages and employment. The following table outlines forecast indirect employment and wages generated by the RIMS II multipliers, under the MSP expansion scenario.

Table 5-12: State-Wide Indirect impacts, Employment & Wages, MSP Expansion

Category	2000	2005	2010	2015	2020
Employment	17,637	18,382	18,895	19,283	19,554
Wages	$424,914,171	$442,863,435	$455,219,892	$464,561,695	$471,089,576

The table shows that total indirect employment will increase from roughly 17,600 in 2000 to 19,500 in 2020, an increase of roughly 1,900 indirect jobs. Indirect wages are forecast to increase from roughly $425 million in 2000 to $471 million in 2020, an increase of roughly $46 million over the 20 year forecast period. Although the indirect impacts are aggregated at the state level by the RIMS II multipliers, it is assumed that the greater majority of indirect impacts (roughly 80% to 90%) are concentrated in the Twin Cities metropolitan area. Discussion of fiscal impacts generated by total wages will be covered in a separate, upcoming section.

Induced Economic Impacts - MSP Expansion

Background

Induced impacts, meaning real estate development that occurs because of an airport, are perhaps the most difficult to quantify. Such impacts are transferable from one location to another. Around MSP, induced impacts are already in evidence, including hotels, office, and industrial space. If MSP expands and passenger and cargo activity grows, additional induced growth will occur. However, if the new airport is built, some businesses that must be close to the airport facility will move away from MSP to the Dakota County airport environs; other new businesses and development will occur in the vicinity as well.

The situation in the Twin Cities is somewhat unusual now, with much of the existing, MSP-induced industrial development in the northern part of Dakota County in Eagan and Mendota Heights. This is essentially where induced development has been targeted for the new airport scenario. For this reason, we would not expect a massive

relocation of industrial uses under the new airport option. The bottom line is that induced growth will not be an increment of growth for the region which would not otherwise occur; rather, it is a shifting of exiting development. The key issue for the Twin Cities is that development locational decisions are dependent on the availability of appropriately zoned land within the MUSA line or free-standing growth centers.

Office and Industrial Space

Forecasts of real estate development induced by expansion of MSP were based on the case study analysis of other airports conducted by ERA; concurrent analysis of historical land use development trends in the Twin Cities was conducted by DSU. The case study analysis looked at changes in commercial office and industrial space inventories in the environs of Kansas City International (KCI), Dallas-Fort Worth International (DFW), Washington-Dulles, and Atlanta-Hartsfield, looking at both at historical trends, and a specific 15 year period after each airport was built or expanded.

Particular emphasis was placed on early development around KCI and Washington-Dulles, as both airports were built in undeveloped areas far afield from existing growth concentrations with limited in-place interstate accessibility, housing, and other amenities. It is assumed that, during the early years of operations, a large portion of development in the environs of KCI and Washington-Dulles was induced, since firms whose competitive advantage and profitability are tied to proximate airport access would have located in the environs prior to the arrival of housing and other amenities. ERA determined that business location decisions are tied to a variety of issues, including the existence of executive housing, labor force availability and cost, suburban versus urban preferences, and proximity to suppliers.

Office inventory data from the Atlanta-Hartsfield environs was also considered useful, as the airport is located in an industrial district to the southern end of Atlanta, while the primary office markets are to the north, in downtown Atlanta and the northern suburbs. Hartsfield is an interesting study because it involved expansion of an existing airport with a new terminal facility, rather then construction of an entire airport. Inventory data from the DFW environs was not relied on due to the fact that substantial commercial development had already occurred in the environs before DFW opened.

Analysis of 15 year office and industrial inventory growth at the three most appropriate airports revealed a range of average annual trends in the delivery of new space, with KCI at the low end and Atlanta at the high end, and Washington-Dulles in the middle. Table 5-13, on the following page, outlines 15-year average annual office and industrial space deliveries for the three identified airports. The table also highlights the year each facility was completed.

Table 5-13: Average Annual Office and Industrial Space Deliveries, in Square Feet			
Airport	Year Opened	15 year Avg. Annual Office	Industrial
KCI	1972	69,038	93,333
Dulles	1962	76,420	183,052
Atlanta	1980	85,756	1,042,462

Based on analysis of regional growth trends, population, and other socioeconomic indicators, ERA determined that MSP and the market characteristics of Minneapolis fit within the range of airport development activity identified for KCI and Washington-Dulles, as well as that identified by some of the case reviews. Other information used to forecast the level of induced real estate development for MSP were historical land use trends in the Twin Cites since the 1960's, profiled by DSU. Their analysis indicated that completion of Interstate I-494 in the 1960's was the primary impetus for commercial office and industrial growth in the environs of MSP, and along the interstate corridor to the west.

As a result, the ERA forecast of commercial development induced by activity at MSP was refined, in order to reflect the conclusions reached by DSU. ERA has estimated that expansion of MSP will create a demand for roughly 420,000 square feet of induced office space and 1,050,000 square feet of induced industrial space between 2005 and 2020. Between the present and 2005, induced development will create an additional 140,000 square feet of office space and 350,000 square feet of industrial space. Office development is anticipated primarily along the I-494 corridor in Bloomington, while industrial development is expected primarily in Eagan and Mendota Heights, consistent with current land uses. The forecast levels of induced office and industrial development will also include roughly 2,300 industrial jobs and 1,600 office jobs, using Metropolitan Council indices of employment per square foot for commercial space.

Hotel Rooms

Estimates of future hotel room demand are tied to HNTB forecasts of the incremental increase in non-resident O/D and international enplanements; connecting enplanements were not included because they normally do not leave the airport property. The following table highlights the incremental increase in the two selected enplanement categories over the forecast period.

Table 5-14: Incremental New Non-Residential Enplanements, 2000 - 2020				
Enplanement Type	**2000 - 2005**	**2005 - 2010**	**2010 - 2015**	**2015 - 2020**
Origin/Destination	238,290	225,600	148,520	145,700
International	58,200	58,200	72,000	72,000
Total	296,490	283,800	220,520	217,700

Projection of hotel room demand is based on two assumptions which are derived from data supplied by the Minnesota Department of Tourism and the 1995 economic impact study of MSP by Martin Associates. The first assumption is that 60% of non-resident enplaned passengers will stay in a hotel room; the second assumption is that domestic passengers stay an average of 2.5 days while international passengers stay an average of roughly 6 days in the region.[9] Based on the two assumptions, the following table shows the total number of forecast room nights demanded by non-residents using MSP over the forecast period.

Table 5-15: Total Room Nights Demanded by Non-Residents Using MSP					
Enplanement Type	**1992 - 2000**	**2000 - 2005**	**2005 - 2010**	**2010 - 2015**	**2015 - 2020**
O/D	637,538	210,172	198,979	130,995	128,507
International	137,693	142,474	142,474	176,256	176,256
Total	775,230	352,645	341,453	307,251	304,763

The total room night forecast shown in Table 5-15, above, was then converted to annual room night demand in order to derive the number of additional hotel rooms needed in five-year increments over the forecast period. Table 5-16, below, highlights the forecast of induced hotel room demand allocated by submarket over the forecast period. The forecast allocations of demand were based on current hotel development trends in the Twin Cities, following Table 2-17.

Table 5-16: Forecast Induced Hotel Room Demand, Visitor Industry					
Area	**2000 - 2005**	**2005 - 2010**	**2010 - 2015**	**2010 - 2020**	**Total Rooms**
Minneapolis	237.5	225	200	200	863
St. Paul	190	180	160	160	690
I-494 Corridor	237.5	225	200	200	863
Other	285	270	240	240	1,035
Total:	950	900	800	800	3,450

The induced hotel room forecasts are driven by increasing international and O/D enplanement activity through 2020. It is notable that the rate at which enplanements are projected to grow over the forecast period is expected to slow, resulting in slower demand for hotel rooms by 2015. The table indicates that roughly 950 additional hotel rooms will be demanded through 2005, then falling to 900 by 2010, and 800 by 2015. Based on the previous table, ERA expects that forecast enplanement increases through 2020 will create the need for one additional 240-room hotel in the I-494 corridor/MSP impact area every 4-5 years.

Because the 2005 - 2020 impact period shows an incremental demand for 2,500 rooms versus approximately 1,500 around the new airport, as noted in Table 5-25, there will be an unmet demand for about 1,000 hotel rooms in the Dakota County impact area. Unmet demand will be most effectively met by hotel construction in the existing MSP impact area. Therefore, ERA would not forecast a negative impact on the existing hotel network.

Construction Period Impacts - MSP Expansion

Quantification of projected construction period impacts generated by expansion of MSP are based on preliminary development cost estimates generated by HNTB. The cost estimate for MSP expansion is currently $2.778 billion, allocated between facilities construction, property acquisition, design, management, and contingencies. A table identifying current cost estimates for the MSP expansion scenario is in the appendix for reference. It is important to emphasize that the HNTB development cost estimates are based on **preliminary** calculations, and are expected to change as the date of construction nears. Given the uncertain nature of the construction cost estimates, quantification of the construction impacts will be based on several assumption by ERA, which are as follows:

1. Project costs of $2,722,000,000, excluding property acquisition cost of $56 million.
2. That labor and materials costs each comprise 50% of total construction expenditure.
3. A heavy construction salary of $41,940, effective income taxes of 4%, and sales taxes of 6.5%.
4. That between 80% and 90% of construction materials are purchased within Minnesota.
5. Construction for MSP expansion will occur over a 20 year period, with incremental new projects implemented.

Based on the aforementioned assumptions, MSP expansion would create roughly 32,540 construction-person-years, which is equal to roughly 1,620 average construction jobs and roughly $68 million in direct wages per year over a 20-year construction period.

The indirect effects of construction for MSP expansion were generated using BEA RIMS II employment and wage multipliers for new construction in Minnesota. Application of the RIMS II multipliers to estimates of direct employment and wages indicates that construction for MSP expansion will create an average of roughly 2,300 indirect jobs and $85 million in wages per year in the state economy over the 20 year construction forecast. If experience at Denver International is an indicator, the in-state employment component will be within the range of 90% to 99% of total construction employment in any given month during the construction period.

Construction for MSP expansion will also generate fiscal impacts; expenditures for materials as well as taxes on construction worker income will generate revenue for the State of Minnesota. ERA projects that MSP expansion will generate roughly $54 million in income taxes over the 20-year period, and between $70 million and $80 million in sales taxes on airport construction materials.

Direct and Indirect Economic Impacts - New Airport Scenario

As stated in the methodology section above, projection of direct employment is based on enplanement activity forecasts. The new airport enplanement forecast is shown below in Table 5-17.

Table 5-17: Forecast Enplanements
New Airport Scenario, 2005-2020

Year	2005	2010	2015	2020
O/D	6,625,000	7,105,000	7,421,000	7,731,000
Connection	5,248,000	5,624,000	5,872,000	6,114,000
International	335,000	432,000	552,000	672,000

Forecast enplanement activity under the new airport option is essentially the same as the MSP expansion forecast; both scenarios assume unconstrained enplanement and operations activity and use identical projections of origin/destination, connecting, and international enplanements. However, construction of a new airport 20 miles southeast of the current site will force changes in development and growth patterns in the region after 2005. Particularly, a new airport in Dakota County will increase commuting times for airport employees, forcing a certain percentage to move further east and south of their current residence. It is also assumed that the Dakota County airport will not be ready for operation until 2005. Application of the adjusted jobs per enplanement ratios from Table 5-3 to forecast enplanements under the new airport scenario returns the following projection of total direct jobs through 2020.

Table 5-18: Forecast Direct Employment,
New Airport Scenario

2005	2010	2015	2020
15,606	16,041	16,370	16,601

The previous table (5-18) shows that direct airport employment will increase from 15,606 in the year 2005 to 16,601 in the year 2020. A total of 1,628 new jobs will be created over the 20 year forecast period, growing at roughly 0.52% on an annualized basis. Table 5-18 **excludes** the roughly 10,000 Northwest Airlines employees for reasons stated previously (see the addendum for current list of Northwest employment on site).

Direct Employment by Sector and County - New Airport Option

Under the new airport option, it is assumed that the distribution of direct employment by airport sector, highlighted in Table 5-6, will remain constant through the forecast period, as adjustments have already been applied to compensate for improved worker productivity. Since the O/D, connecting, and international passenger enplanement forecasts under MSP expansion and new airport construction are identical, the forecast of direct employment by airport sector remains unchanged from Table 5-7. However, it is assumed that the distribution of direct employment by place of residence highlighted in Table 5-8, above, **will change** over the forecast period for the new airport option. As the new airport is roughly 20 miles southeast of the current airport, increased commuting times will encourage airport employees to move further south and east after 2005. Judgment of the number of employees that move in response to new airport construction was based on work conducted by the Metropolitan Council, ERA, and DSU.

In determining a rate of residential relocation, ERA reviewed a 1979 employment survey for Kansas City International Airport, which indicated that up to 25% of airport employment moved into the airport environs within four years of the facility's opening. Prior to the construction of KCI, northern Kansas City had experienced minimal residential development. ERA assumes that 10% of airport employment will re-locate after 2005 in order to improve commuting time. Justification for the lower rate of relocation is based on the fact that roughly 35% of current employment at MSP is already living in Dakota County. The following table highlights forecast allocations of direct employment by county of residence between 2005 and 2020 based on the assumed rate of airport employment relocation.

Table 5-19: Direct Employment Residence Allocated by County, New Airport Scenario, 2005 - 2020

County	2005	2010	2015	2020
Anoka	156	160	164	166
Carver	314	322	329	334
Dakota	6,679	6,866	7,007	7,105
Hennepin	4,838	4,973	5,075	5,146
Ramsey	2,185	2,246	2,292	2,324
Scott	468	481	491	498
Sherburne	0	0	0	0
Washington	468	481	491	498
Wright	0	0	0	0
Total Metro	15,108	15,529	15,848	16,071
Other MN	156	160	164	166
Out-of-state	343	353	360	365
Total	15,606	16,041	16,370	16,601

The table indicates that airport employees living to the north/northwest of the Twin Cities will move after 2005 in response to the new airport location in Dakota County. It is assumed that the out-of-state residential component of direct employment will increase, as more airport employees move to Wisconsin.

The following table forecasts counties which are **likely** to lose or gain residences of airport employment as a result of a new airport in Dakota County, versus MSP expansion. The table indicates that Anoka County is likely to lose roughly 665 residents beginning in 2005, as airport employees who currently live there will move further south and east to improve commuting time. At the same time, Dakota County is forecast to receive an increasing share of direct employment residences after 2005.

Table 5-20: Counties Forecast to Lose or Gain Residences of Airport Employment, New Airport Scenario, 2005 - 2020

County	2005	2010	2015	2020
Anoka	-666	-685	-699	-709
Carver	0	0	0	0
Dakota	1,242	1,277	1,303	1,321
Hennepin	-348	-358	-365	-370
Ramsey	-331	-340	-347	-352
Scott	-36	-37	-38	-38
Sherburne	-3	-3	-3	-3
Washington	101	104	106	108
Wright	-37	-38	-39	-40
Total Metro	-78	-81	-82	-83
Other MN	-107	-110	-113	-114
Out-of-state	187	192	196	199

Note: Table is generated from Tables 5-9 and 5-19.

Although it is assumed that a portion of airport employees will move further south and east after 2005, it is likely that some persons will probably move before 2005. The actual rate of relocation will be determined by several factors, including actual commuting times in 2005, the emergence of alternative commuting options, such as light rail, and the extent to which new development will be allowed in the Dakota County airport environs.

Direct Wages - New Airport Option

Forecast income generated by airport employment is based on an average wage of $35,000 per employee, as explained in the MSP expansion impact section. Application of the average wage to direct employment data in Table 5-18 returns the following direct income projections, in Table 5-21, below.

Table 5-21: Direct Wages, New Airport Scenario

2005	2010	2015	2020
$546,205,519	$561,445,353	$572,967,064	$581,018,224

The table shows that income generated by airport employment will rise from $546 million in 2005 to $581 million in 2020, an annualized increase of roughly $2.3 million. Table 5-22, below, which allocates direct wages by place of residence, is based on the re-allocation of airport employment after 2005. Table 5-22 shows that total wages earned in Dakota County will increase from $182.5 million in 2000 to $248.6 million in 2005 as result of the new airport location. Other counties, including Anoka, will lose airport wages as a result.

Table 5-22: Direct Wages Allocated by County, New Airport Scenario, 2000 - 2020

County	2005	2010	2015	2020
Anoka	$5,462,055	$5,614,454	$5,729,671	$5,810,182
Carver	$10,973,424	$11,279,597	$11,511,071	$11,672,821
Dakota	$233,775,962	$240,298,611	$245,229,903	$248,675,800
Hennepin	$169,323,711	$174,048,060	$177,619,790	$180,115,650
Ramsey	$76,468,773	$78,602,349	$80,215,389	$81,342,551
Scott	$16,386,166	$16,843,361	$17,189,012	$17,430,547
Sherburne	$0	$0	$0	$0
Washington	$16,386,166	$16,843,361	$17,189,012	$17,430,547
Wright	$0	$0	$0	$0
Total Metro	$528,776,256	$543,529,792	$554,683,848	$562,478,098
Other MN	$5,462,055	$5,614,454	$5,729,671	$5,810,182
Out-of-state	$12,016,521	$12,351,798	$12,605,275	$12,782,401
Total	$546,254,833	$561,496,043	$573,018,794	$581,070,681

Note: Total wages in this table are slightly different then indicated direct wages in Table 5-21, due to slight differences in rounding.

The following table (5-23) outlines the counties which are forecast by ERA to potentially gain or lose wages as a result of a new airport in Dakota County, versus MSP

expansion. In terms of additional wages, Dakota County is the leader, with almost $43.4 million in additional wages in 2005; Anoka County is expected to lose roughly $23 million over the same period. The extent of lost or gained wages needs to be put in context, as airport wages are not entirely spent within the county of residence; a certain proportion of wages are spent in other counties and other states.

Table 5-23: Counties Forecast to Lose or Gain Direct Wages Under New Airport Scenario, 2000 - 2020

County	2005	2010	2015	2020
Anoka	($23,326,523)	($23,977,363)	($24,469,415)	($24,813,252)
Carver	($0)	($0)	($0)	$0
Dakota	$43,473,685	$44,686,657	$45,603,695	$46,244,504
Hennepin	($12,182,056)	($12,521,951)	($12,778,920)	($12,958,486)
Ramsey	($11,585,181)	($11,908,423)	($12,152,802)	($12,323,569)
Scott	($1,251,281)	($1,286,194)	($1,312,588)	($1,331,032)
Sherburne	($111,067)	($114,166)	($116,509)	($118,146)
Washington	$3,546,815	$3,645,776	$3,720,593	$3,772,873
Wright	($1,310,591)	($1,347,158)	($1,374,804)	($1,394,122)
Total Metro	($2,746,199)	($2,822,822)	($2,880,750)	($2,921,230)
Other MN	($3,756,510)	($3,861,321)	($3,940,561)	($3,995,933)
Out-of-state	$6,552,023	$6,734,833	$6,873,042	$6,969,619

Assuming that 50% of total wages are spent within the county of residence, Anoka County would lose roughly $11.6 million in local expenditure, while Dakota County would gain roughly $21.5 million in local expenditure by 2005. The potential loss of local income and expenditure is mitigated by the fact that county allocations of revenue from state income and sales taxes are not directly linked to county population or other related indices, according to officials from the Minnesota Department of Revenue. As such, the re-allocation of direct employment would not impact state-wide sales and income tax revenues to any large extent. Even if a larger then forecast share of airport employment moves to Wisconsin, current reciprocity agreements between both states would ensure that Minnesota would reclaim a meaningful share of lost revenue.

Indirect Economic Impacts - New Airport Scenario

Quantification of the indirect economic impacts of direct employment and wages was based on Bureau of Economic Analysis 1992 RIMS II direct-effect multipliers for the transportation sector in Minnesota. Table 5-24 outlines forecast indirect impacts under the new airport scenario. The table shows that total indirect employment will increase from roughly 18,400 in 2005 to 19,500 in 2020, an increase of roughly 1,900 indirect jobs. Indirect income is forecast to increase from roughly $425 million in 2000 to almost $471 million in 2020, an increase of roughly $46 million over the 20-year forecast period.

As the indirect impacts shown in the table below are aggregated at the state level by RIMS II multipliers, it is assumed that the greater majority of indirect impacts (about 80% to 90%) are concentrated in the Twin Cities metropolitan area.

Table 5-24: Indirect impacts, Employment and Wages, New Airport

Category	2005	2010	2015	2020
Employment	18,382	18,895	19,283	19,554
Wages	$442,863,435	$455,219,892	$464,561,695	$471,089,576

A more thorough discussion of multipliers can be found in the indirect impact methodology under the MSP expansion section. Discussion of fiscal impacts generated by total wages will be covered in a separate, upcoming section.

Induced Economic Impacts - New Airport Scenario

Induced economic impacts created by a new airport in Dakota County were identified in a study conducted by Hammer, Siler, George Associates for the Metropolitan Council. The study generated induced impacts of residential, office, industrial, hospitality, and retail development which are outlined in Table 5-25, below.

Table 5-25: Forecast Induced Real Estate Development, New Airport, 2005 to 2020

Land Use	Induced Development	Population/Jobs
Residential		
Rural Townships	380 households	1,025
City of Hastings	1705 households	4,615
Urban Townships	1,705 households	4,215
Retail		
City of Hastings	200,000 square feet	742
Dakota County	200,000 square feet	743
Lodging		
City of Hastings	770 rooms	385
Dakota County	770 rooms	385
Office		
City of Hastings	100,000 square feet	400
Dakota County	1,583,000 square feet	6,330
Manufacturing		
City of Hastings	266,500 square feet	590
City of Eagan	266,500 square feet	590
Source: Metropolitan Council		

The projections indicate that airport construction in Dakota County will lead to roughly 1.7 million square feet of office space, 530,000 square feet of manufacturing space, and 1,540 hotel rooms between 2005 and 2020. The induced impact projections assume that significant real estate development will not be permitted in the immediate environs of the Dakota County site. The projections assume that development will concentrate primarily within the MUSA line in northern Dakota County and the City of Hastings.

ERA conducted a separate analysis of induced real estate development in the environs of other major airport facilities in the United States as part of the Case Studies in Part II. The analysis produced detailed real estate development information for Kansas City International, Washington-Dulles, Denver International, Dallas-Fort Worth, and Atlanta-Hartsfield. General real estate development information was also collected for Salt Lake City International, Pittsburgh International, Phoenix Sky Harbor, Seattle-Tacoma, and Cincinnati/Northern Kentucky International airports.

The case study analysis brought to light several issues which are relevant both to the Metropolitan Council's forecasts of real estate development induced by a new airport in Dakota County, and the larger issue of choosing between MSP expansion or new airport construction in Dakota County.

- For the cities which chose to build new airports, including KCI and DFW, selection of the airport site was part of conscious effort to redirect or strengthen economic development activity in the targeted airport sub-area over the long-term; both facilities were built about 17 miles from downtown areas.

- Real estate development activity at KCI, DFW, and Dulles tended to include greater levels of industrial rather then office development. In the environs of DFW, where substantial office construction occurred, development was concentrated in a large planned community, Las Colinas, along with attractive amenities, including golf and high-income housing.

- Analysis of industrial and office development trends at KCI, DFW, and Dulles suggests that initial development around a new airport is more closely tied to airport activity; later waves of development occur due to improved transportation links, labor cost, housing supply, recreational amenities, and economic linkages. Once such qualities emerge, the airport environs evolves into a distinct market area with reduced direct linkage to airport activity.

The three issues noted above form the basis for two significant conclusions about real estate development around the proposed Dakota County airport. First, the induced development forecasts for Dakota County assume substantial office development (1.5

million square feet) and minimal industrial development (266,000 square feet). Such an allocation does not correlate with data in the case studies, which indicate that industrial development has made up the majority of total induced development in the airport environs of Dulles, KCI, and Atlanta. The predominance of industrial uses in Dakota County, including the Koch Refinery, would suggest that industrial development will be the primary land use in the future airport environs.

Second, current planing for the Dakota County airport assumes that real estate development in the environs will be severely restricted by the Metropolitan Council, which will not permit new sewer lines beyond the Metropolitan Urban Service Area (MUSA) line. Although the Metropolitan Council's effort to restrict growth in the airport environs is logical in light of efforts to control urban sprawl in the region, the implications for induced development and the new airport are less clear:

- Real estate development induced by airport activity is usually proximity based, implying a link between business operations and airport proximity. However, current Metropolitan Council development policy will prevent substantial induced development from occurring between the MUSA line and the airport property, placing induced development some distance away.

- Dakota County government officials have suggested that, if the new airport is built, the county will allow real estate development to occur. If real estate development beyond the MUSA line is a foregone conclusion, then construction of a new airport in Dakota County would likely continue the pattern of urban sprawl in the region, and lead to a greater shift in the regional direction of growth to the south and east, toward Wisconsin.

Based on results of our case study analysis, as well as commercial development trends in the Twin Cities, a 15-year forecast of maximum, unconstrained induced development for the Dakota County airport development option was generated. In some cases, the maximum amount is a Metropolitan Council estimate, which may be higher then ERA would expect. ERA research indicates that Dakota County can expect roughly 420,000 square feet of induced office space, while the Metropolitan Council numbers are higher, at almost 1.7 million square feet; ERA's figure for 1,050,000 square feet of induced industrial space is higher than the Metropolitan Council's figure of 533,000 square feet. The Metropolitan Council's forecast shows 1,540 hotel rooms for the Dakota County airport area. ERA forecast 2,500 induced hotel rooms, but these would be built throughout the metro area; we believe it may be possible for Dakota County to capture the 1,540 Metropolitan Council forecast. The Metropolitan Council forecast of 3,800 residential units by 2020 is slightly higher then we would forecast. In summary, maximum development expected by 2020 (either Metropolitan Council or ERA forecasts) is as follows:

Office Space:	1,700,000 square feet,
Industrial Space:	1,050,000 square feet
Hotel Rooms:	1,540
Residential Units:	3,800

As was noted in the MSP expansion induced development section, ERA expects that most of the induced development for the new airport will overlap locationally with induced MSP development; thus, not a large amount of migration or transfer demand is expected. Overall, induced development will occur over a period of years; where some relocation occurs, forecast market demand levels in the region are expected to fill up space that is vacated. Again, this induced development is seen as a shifting from one location to another which has no overall positive or negative impact to the region, outside of the land use impacts that are viewed as positive or negative.

Construction Period Impacts - New Airport Scenario

Quantification of projected construction period impacts generated by new airport construction are based on preliminary development cost estimates generated by HNTB. The cost estimate for a new airport is currently $4.578 billion, allocated between facilities construction, property acquisition, design, management, and contingencies. A table identifying current cost estimates for the new airport scenario is in the addendum for reference. It is important to emphasize that the HNTB development cost estimates are based on **preliminary** calculations, and are expected to change as the date of construction nears. Given the uncertain nature of the construction cost estimates, quantification of the construction impacts will be based on several assumption by ERA, which are as follows:

1. Project costs of $4,448,000,000, excluding property acquisition cost of $130 million, with most of the construction occurring in a five year period, and some additional construction occurring in the following 2-3 years.
2. That labor and materials costs each comprise 50% of total construction expenditure.
3. A heavy construction salary of $41,940, effective income taxes of 4%, and sales taxes of 6.5%.
4. That between 80% and 90% of construction materials are purchased within Minnesota.

Based on the aforementioned assumptions, a new airport would create roughly 53,028 direct construction-person-years, or an average of about 10,600 direct jobs per year over a five-year construction period. Roughly $444.8 million in average yearly direct wages will also be generated each year during the construction period. The indirect effects of new airport construction were generated using BEA RIMS II employment and wage multipliers for new construction in Minnesota. Application of the RIMS II

multipliers to estimates of direct employment and wages indicates that new airport construction will create roughly 15,000 indirect jobs and $556.8 million in indirect wages per year in the state economy.

Considering that the potential impacts on wages generated by a new airport are forecast to exceed $5 billion, ERA researched construction employment activity for Denver International Airport (DIA), in order to ascertain the rate at which on-site construction employment grows over a multi-year construction period. Based on analysis of monthly on-site construction employment data from DIA, ERA determined that peak construction employment tends to occur in the fourth year of a five-year construction period. At DIA, peak employment of roughly 11,000 workers was maintained for a four month period during the fourth year of construction. This analysis suggests that the majority of economic and fiscal impacts generated by construction of a new airport in Dakota County will be felt in the fourth and fifth years of a five-year construction program. If experience at Denver International is an indicator, the in-state employment component will be within the range of 90% to 99% of total construction employment.

New airport construction will also generate fiscal impacts; expenditures for materials as well as taxes on construction worker income will generate revenue for the State of Minnesota. ERA projects that construction for the Dakota County airport will generate roughly $89 million in income taxes over the five year construction period, and between $115.6 million and $130 million in sales taxes generated by purchases of airport construction materials.

Direct and Indirect Economic Impacts - No-Build Scenario

The no-build option serves to point out the potential opportunity costs of maintaining existing facilities at MSP in the face of expected increases in passenger activity in the midwest. The scenario assumes that, after 2005, regional and commuter carrier landing slots will be re-allocated to international and national carriers using larger aircraft in order to meet expected demand for air travel. Although MSP airlines are expected to wring every efficiency from the existing facility in the future, passenger demand is forecast to exceed capacity by 2015. The opportunity cost of avoiding capacity improvement would become evident particularly after 2015, when the airport will be unable to serve all forecast passengers, resulting in lost wages, jobs, and revenue.

Direct Employment Forecasts

As stated in the methodology section above, projection of direct employment is based on enplanement activity forecasts. The no-build enplanement forecast is shown below in Table 5-26.

Table 5-26: Forecast Enplanements, No - Build Scenario, 2000-2020

Year	2000	2005	2010	2015	2020
O/D	6,118,000	6,625,000	7,105,000	7,421,000	7,731,000
Connection	4,848,000	5,248,000	5,624,000	5,833,000	5,508,000
International	238,000	335,000	432,000	552,000	672,000

Using the ratios of direct employment to enplanements generated in Table 5-3 to forecast enplanement activity under the no-build option, the following estimates of direct employment are returned. The table also indicates the extent of indirect jobs created by the multiplier effect. Indirect jobs were calculated with BEA RIMS II multipliers for the transportation sector in Minnesota, based on the indirect impact methodology outlined previously.

Table 5-27: Direct and Indirect Employment, No-Build Scenario

Category	2000	2005	2010	2015	2020
Direct Jobs	14,973	15,606	16,041	16,331	16,017
Indirect Jobs	17,637	18,382	18,895	19,237	18,866
Total Jobs	32,610	33,988	34,936	35,568	34,883

The previous table (5-27) shows that direct jobs will increase between 2000 and 2015 by 1,358. However, between 2015 and 2020 direct employment will decrease by

314 jobs, as existing facilities at MSP are increasingly unable to meet demand for passenger travel. The following table (5-28) highlights total direct and indirect wages created by direct and indirect jobs, from Table 5-27. The table shows that total wages will increase between 2000 and 2015 to $1.035 billion before falling to $1.015 billion by 2020.

Table 5-28: Direct and Indirect Wages, No-Build Scenario

Wages	2000	2005	2010	2015	2020
Direct	$524,067,798	$546,205,519	$561,445,353	$571,596,862	$560,586,124
Indirect	$424,914,171	$442,863,435	$455,219,892	$463,450,736	$454,523,229
Total	$948,981,969	$989,068,954	$1,016,665,246	$1,035,047,598	$1,015,109,353

Using current allocation of direct employment by county of residence from Table 5-8, ERA calculated the number of direct jobs and wages lost to the region, by county, over the forecast period. The following table highlights the extent of lost direct employment and wages if additional capacity at MSP is not created.

Table 5-29: Lost Direct Employment and Wages, By County, 2015 - 2020, Under No-Build Scenario

	Employment		Wages	
County	2015	2020	2015	2020
Anoka	2	31	$72,219	$1,076,904
Carver	1	12	$27,528	$410,487
Dakota	14	203	$477,389	$7,118,704
Hennepin	13	194	$455,322	$6,789,650
Ramsey	6	94	$220,891	$3,293,865
Scott	1	19	$44,245	$659,770
Sherburne	0	0	$279	$4,155
Washington	1	14	$32,209	$480,286
Wright	0	1	$3,288	$49,026
Total Metro	**38**	**568**	**$1,333,368**	**$19,882,846**
Other MN	1	10	$23,126	$344,842
Out-of-state	0	6	$13,708	$204,412
Total	**39**	**584**	**$1,370,202**	**$20,432,101**

Dakota county is forecast to be a primary loser without additional capacity at MSP; a total of 203 jobs and $7.1 million in wages are expected to be lost by 2020. Hennepin County would lose a comparable level of direct employment and wages. Overall, the metro area would lose roughly 570 jobs and $19.8 million in wages without new capacity. When indirect effects are factored in, the state could lose a total of roughly

$36 million in wages and 1,240 jobs by 2020 if new airport capacity at MSP is not created.

No Build Summary

The no-build scenario has direct and indirect impacts on the regional economy, as outlined above. The HNTB enplanement forecasts for the no-build scenario show about a 6% decline in connecting passengers, all of whom are coming from somewhere else. Assuming that many of these people are enplaning/deplaning at other airports in the Dakotas, Iowa, and the upper peninsula of Michigan, where no other travel choices exist, there will be two primary impacts: 1) Fewer flight options and diminished service, and 2) a decline in jobs in the respective cities proportional to the decline in passengers. Where passengers have other, nearly-as-convenient, airport options, they will transfer their flight activity accordingly. In the regions where flight activity diminishes, the job and related wage losses could approach 5% to 6% of their current airport employment. This would have some impact on local business activity, although it would be difficult to quantify, particularly if new airline service is initiated through other hubs in the region, primarily Chicago-O'Hare.

Visitor Industry Impacts - All Scenarios

Economic impacts generated by the visitor industry are significant; Analysis of MSP enplanement data by HNTB suggests that roughly 45% of O/D and 60% of international enplanements are visitors to the region. Applying the visitor percentages to enplanement data indicates that roughly 2.2 million people visited the Twin Cities metro area in 1992. Since O/D and international enplanements are identical under the no-build, MSP expansion, and new airport scenarios, there will be no difference in visitor industry impacts under each scenario. The first step in identifying visitor impacts involves determination of the amount spent by domestic and international visitors using MSP. The following table outlines expenditures per trip for non-residents visiting the state.

Table 5-30: Money Spent per Trip by Visitors Using MSP

	Domestic Travel		International Travel	
Category	Amount	% of Total	Amount	% of Total
Hotel	$331	50%	$497	50%
Restaurants	$179	27%	$269	27%
Retail	$78	12%	$116	12%
Entertainment	$60	9%	$90	9%
Transportation	$11	2%	$17	2%
Total	$659	100%	$989	100%

Note: International travel spending is assumed 1.5 times domestic spending

The previous table shows that domestic visitors spend $659 per trip while international visitors spend $989 per trip. The domestic visitor expenditures noted above were derived from survey research conducted by Martin Associates for a 1995 economic impact study of MSP; the study generated expenditures per visit as well as duration of visit data.[10] Expenditures for international travelers were assumed to be 1.5 times domestic travelers.[11] The 1.5 multiplier is based on industry experience which indicates that international travelers stay longer, on average, than domestic travelers. The following table shows forecast total expenditures generated by visitors using MSP.

Table 5-31: Forecast Total Expenditure Generated by Visitors Using MSP

Category	2005	2010	2015	2020
Hotel	$679,270,548	$741,504,281	$792,524,405	$842,983,651
Restaurants	$611,343,493	$667,353,853	$713,271,965	$758,685,286
Retail	$264,915,514	$289,186,669	$309,084,518	$328,763,624
Entertainment	$203,781,164	$222,451,284	$237,757,322	$252,895,095
Transportation	$38,491,998	$42,018,576	$44,909,716	$47,769,074
Total	$1,797,802,718	$1,962,500,600	$2,097,547,926	$2,231,096,729

Multiplying the dollar amounts spent by domestic and international visitors highlighted in Table 5-30 by the non-resident component of origin/destination and international enplanements noted previously, returns a forecast of total expenditure by visitors to Minnesota who use MSP. The table shows that total visitor industry sales will increase from roughly $1.8 billion in 2005 to almost $2.2 billion in 2020.

Determination of visitor industry employment associated with total sales in each category is based on actual 1992 ratios of total sales to annual payroll for each visitor industry sector, from the U.S. census. The ratios are applied to total visitor industry sales (Table 5-31) to determine the payroll content of total sales. Then, 1992 data covering average employment was divided into total 1992 wages to arrive at an estimate of average wages for each visitor industry sector. The average annual wage per employee was then divided by the payroll content of total sales to arrive at direct visitor industry employment, which is outlined in Table 5-32, below. The table indicates that visitor industry direct employment will increase from 49,002 in 2005 to 60,182 in 2020.

Table 5-32: Forecasted Direct Visitor Industry Jobs, 1992 - 2020, All Scenarios

Category	2000	2005	2010	2015	2020
Hotel	16,290	18,007	19,657	21,009	22,347
Restaurants	20,700	22,882	24,978	26,697	28,396
Retail	2,205	2,438	2,661	2,844	3,025
Entertainment	3,861	4,268	4,659	4,979	5,296
Transportation	1,274	1,408	1,537	1,643	1,748
Total	44,331	49,002	53,492	57,172	60,812

Application of average wage data from the U.S. Census was applied to direct jobs in the previous table in order to generate forecasts of direct wages through 2020, which are shown in the following table. Direct wages will increase from roughly $486 million in 2005 to $603 million in 2020.

Table 5-33: Direct Wages, Visitor Industry, All Scenarios

Category	2000	2005	2010	2015	2020
Hotels	$177,741,931	$196,472,469	$214,472,977	$229,230,057	$243,824,908
Restaurants	$159,046,684	$175,807,107	$191,914,287	$205,119,188	$218,178,924
Retail	$23,969,921	$26,495,884	$28,923,397	$30,913,507	$32,881,740
Entertainment	$64,746,741	$71,569,787	$78,126,902	$83,502,520	$88,819,043
Transportation	$14,225,084	$15,724,131	$17,164,752	$18,345,794	$19,513,852
Total	$439,730,361	$486,069,378	$530,602,314	$567,111,066	$603,218,467

Forecasts of indirect visitor industry employment and wages were generated from the direct employment and wage projections above, using multipliers appropriate to each visitor industry sector. Table 5-34, below, outlines indirect employment and wages generated by the visitor industry. The table shows that indirect jobs will increase from 24,877 in 2005 to 30,873 in 2020. Indirect wages will increase from $483 million in 2005 to $600.5 million in 2020.

Table 5-34: Indirect Jobs and Wages, Visitor Industry, All Scenarios

Category	2000	2005	2010	2015	2020
Indirect Jobs	22,506	24,877	27,157	29,025	30,873
Indirect wages	$437,755,458	$483,886,359	$528,219,290	$564,564,075	$600,509,312

Comparison of the tourist impacts created by visitors flying to Minnesota with total state-wide tourist impacts indicates that air travel generates roughly 30% to 40% of tourist industry employment and expenditure in the State of Minnesota.

When considering the extent of forecast visitor industry impacts outlined above, it is important to remember that visitor industry economic activity is a function of several diverse issues, including state marketing efforts, business cycles at the state and national levels, changes in visitor price sensitivity, and accessibility. The forecasts theoretically account for short-term changes created by business cycles and visitor price sensitivity. State marketing efforts and the question of accessibility are different issues, which cannot be accounted for implicitly in the forecasts. ERA feels that changes in state marketing expenditure over the long term are of minor concern with regard to air travel, since most visitors to the state use a car, according to state tourism surveys. Accessibility, as it relates to air travel, is particularly significant for Minnesota, which is dominated by Northwest Airlines.

The visitor industry forecasts specifically assume that Northwest will maintain a hub operation in the Twin Cities over the forecast period regardless of the airport development option used. For the no-build scenario, it should be noted that a forecast decline in connecting enplanements will not affect the extent of visitor industry impacts, since connecting passengers rarely leave the airport.

Fiscal Impacts - MSP Expansion and New Airport

Fiscal impacts generated by the MSP expansion and new airport construction scenarios cover a range of tax revenues. Taxable revenue sources include direct and indirect wages, visitor industry wages and total sales, hotel and car rentals, jet fuel usage, and airline tickets. The significance of additional taxes, collected for airline property and airport induced real estate development in Minnesota, will also be noted in the discussion.

According to officials responsible for revenue at state, county, and local government levels, county and community allocations of state revenue are not directly based on per capita indices. As a result, predicted changes in regional growth patterns created primarily by the new airport option will have little if any impact on local and county allocations of revenue. By implication, there should be almost no difference between the fiscal impacts of MSP expansion and new airport construction.

The following table (5-35) outlines forecast taxes received from direct and indirect wages of airport employees and the visitor industry, assuming a 4% effective state income tax rate over the forecast period. The table shows that the State of Minnesota will gain roughly $78.3 million in taxes beginning in 2005 if MSP expansion or new construction are approved, growing to $90.2 million through 2020.

Table 5-35: State Income Taxes Paid by Airport and Visitor Industry Direct and Indirect Employment, 2000 - 2020

Tax Category	2000	2005	2010	2015	2020
Airport Direct	$20,962,712	$21,848,221	$22,457,814	$22,918,683	$23,240,729
Airport Indirect	$16,996,567	$17,714,537	$18,208,796	$18,582,468	$18,843,583
Visitor Direct	$17,589,214	$19,442,775	$21,224,093	$22,684,443	$24,128,739
Visitor Indirect	$17,510,218	$19,355,454	$21,128,772	$22,582,563	$24,020,372
Total Taxes	$73,058,711	$78,360,988	$83,019,474	$86,768,156	$90,233,423

It is notable that Minnesota and Wisconsin have reciprocity agreements in place for state income taxes, which allow workers who live in Wisconsin and work in Minnesota to avoid filing tax returns in Minnesota. The State of Wisconsin reimburses Minnesota for lost revenue under the reciprocity agreement. The reciprocity agreement with Wisconsin is also significant in that it would mitigate the negative impact on state revenue resulting from predicted increases in airport employment relocation to Wisconsin under the new airport scenario.

State sales taxes, currently 6.5%, are applied to most items purchased by airport employees, indirect employment, and the total visitor industry. The current tax rate is assumed to continue through the forecast period. The following table, which outlines forecasted sales taxes generated by each employment category, assumes that 50% of

direct wages are spent on retail sales. The table shows that total tax revenue from expenditures by direct and indirect employment, as well as the visitor industry will increase from $63.6 million in 2005 to $73.3 million in 2020.

Table 5-36: Sales Tax Revenue Generated by Direct, Indirect, and Total Visitor Industry Wages

Wage Type	2000	2005	2010	2015	2020
Direct	$17,032,203	$17,751,679	$18,246,974	$18,621,430	$18,883,092
Indirect	$13,809,711	$14,393,062	$14,794,647	$15,098,255	$15,310,411
Total Visitor	$28,518,289	$31,523,561	$34,411,702	$36,779,442	$39,121,153
Total	$59,360,203	$63,668,302	$67,453,323	$70,499,127	$73,314,656

State sales taxes are also applied to most items purchased by visitors to the region. Additional taxes are applied for hotels and car rentals, which are taxed at roughly 12%. Current rates are assumed to continue through the forecast period. The following table, (5-37) which outlines forecasted sales taxes generated by visitors to the state, is based on Table 5-31. The table shows that total tax revenue from visitor industry expenditure will increase from $156.6 million in 2005 to $194.3 million in 2020.

Table 5-37: Sales Taxes Generated From MSP Visitor Expenditure, All Scenarios

Category	2000	2005	2010	2015	2020
Hotel	$73,741,543	$81,512,466	$88,980,514	$95,102,929	$101,158,038
Restaurants	$35,949,002	$39,737,327	$43,378,000	$46,362,678	$49,314,544
Retail	$15,577,901	$17,219,508	$18,797,134	$20,090,494	$21,369,636
Entertainment	$11,983,001	$13,245,776	$14,459,333	$15,454,226	$16,438,181
Transportation	$4,422,444	$4,888,484	$5,336,359	$5,703,534	$6,066,672
Total	$141,673,891	$156,603,561	$170,951,340	$182,713,860	$194,347,071

The State of Minnesota also maintains a tax on jet fuel used by aircraft at MSP. The tax, when charged to the roughly 354.6 million gallons of jet fuel used at MSP in 1994, generated roughly $1.7 million in 1994 for the state. Fuel usage by Northwest Airlines at MSP generates roughly 77% of the total revenue. The forecast is based on three assumptions:

- That a direct relationship exists between MSP operations and fuel usage.
- That increasing fuel efficiency will reduce the number of jet fuel gallons per operation over the forecast period.
- No change in jet fuel prices or rates of taxation; The current tax rate of 1/2 a cent per gallon is maintained over the forecast period.

The following table highlights the forecast of revenue generated by jet fuel taxes through 2020. The table shows that revenue from jet fuel taxes will increase from roughly $1.8 million in 2000 to more than $2 million by 2020.

Table 5-38: Forecast State Revenue From Jet Fuel Taxation at MSP, Unconstrained Air Service, 2000 - 2020

Category	2000	2005	2010	2015	2020
Total Operations	473,800	484,800	499,900	508,400	520,400
Gallons/Operation	780	775	775	770	770
Total Gallons	369,564,000	375,720,000	387,422,500	391,468,000	400,708,000
Tax Collected	$1,847,820	$1,878,600	$1,937,113	$1,957,340	$2,003,540

Property taxes are assessed on capital equipment used by commercial airlines in Minnesota; the tax generated a total of $8.2 million in revenue for the State Airports Fund in 1994. According to a source at the Minnesota Property tax Department, commercial aircraft operations at MSP generated 96.3% of the $8.2 million. Generating an accurate forecast of revenue generated from assessments on airline capital equipment is difficult for several reasons. First, the assessment is tied to budgeted capital improvements for airports in Minnesota; if the capital improvement budget increases, the tax is adjusted accordingly. In addition, the tax is calculated differently based on aircraft type (stage II or III), and engine type (turbo-prop or jet). Thus, it is premature to attempt a reasonable forecast of revenue generated by taxation of airline capital equipment, given our current lack of appropriate assumptions. ERA is aware that taxes are assessed on personal property at the airport as well. Since the amount of personal property utilized under either MSP expansion or new airport construction is expected to be roughly the same (both airports are designed to handle the same amount of passenger traffic), there should be no material differences in taxes generated from personal property in either scenario.

Induced Property Tax Implications - MSP Expansion

Although MSP expansion is not expected to dramatically alter commercial development patters in the metro area, expansion will still generate induced commercial office and industrial development. The timing of projections for future real estate taxes generated by induced commercial office, industrial and hotel development is complicated the nature of real estate markets, which tend to follow boom - bust cycles of growth and decline. In order to provide a reasonable quantification of property taxes created by induced development, ERA has made three assumptions about future real estate markets.

- That current market conditions in the Twin Cities, indicative of general recovery in real estate markets, provide a reasonable middle ground in terms of market value for office, industrial, and hotel property.

- That current effective property tax rates for Bloomington, Minneapolis, Mendota Heights, and Eagan are roughly comparable, and will remain so over the forecast period. Discussions with assessors in Minneapolis, Bloomington, and Dakota County indicated that current effective property tax rates range from about 5.6% to 6.6%. ERA will assume an effective tax rate of 6% over the forecast period.

- Although commercial real estate development tends to concentrate during upswings in the business cycle, the forecast of property taxes generated by induced development will assume average annual delivery of induced space over the forecast period, with final build-out in 2020.

The following table outlines forecast annual average real estate taxes generated by real estate development induced by MSP expansion. The table shows that total real estate taxes will grow from $5.4 million in 2005 to over $21 million at projected build-out in 2020.

Table 5-39: Forecast Property Taxes Generated by Induced Development, MSP Expansion, 2005 - 2020

Category	2005	2010	2015	2020
Hotel Rooms	$4,218,750	$8,437,500	$12,656,250	$16,875,000
Office Space	$630,000	$1,260,000	$1,890,000	$2,520,000
Industrial	$551,250	$1,102,500	$1,653,750	$2,205,000
Total:	$5,400,000	$10,800,000	$16,200,000	$21,600,000

It is assumed that the real estate taxes outlined above will accrue to Bloomington, Richfield, Eagan, and Mendota Heights, determined by the quality of available sites remaining (with better sites developing first), and the amount of total vacant and developable in each community. Even though each of the four communities will benefit directly in terms of an expanded tax base, the incremental benefit they receive will be minimized by a program unique to the Twin Cities, called fiscal disparities. The fiscal disparities program re-allocates 40% of commercial and industrial growth since 1971 into a metro-wide pool, which is then dispersed to other communities in the area which poses more narrow property tax bases.[12]

Induced Property Tax Implications - New Airport Scenario

Forecasts of property taxes generated by induced development resulting from construction of a new airport in Dakota County are based on research conducted by Hammer, Siler, George Associates and the Metropolitan Council. The property tax forecasts assume that induced growth will occur within designated growth areas of Dakota County, beginning in 2005. Projection of future real estate taxes generated by

induced commercial office, industrial and hotel development is complicated the nature of real estate markets, which tend to follow boom - bust cycles of growth and decline. In order to provide a reasonable quantification of property taxes created by induced development, ERA has made three assumptions about future real estate markets, which were noted on the previous page.

The following table outlines forecast real estate taxes generated by real estate development induced by new airport construction in Dakota County. The table shows that total real estate taxes will grow from roughly $4 million in 2010 to over $12.2 million by 2020.

Table 5-40: Forecast Property Taxes Generated by Induced Development, Dakota County, 2005 - 2020

Category	2010	2015	2020
Hotel Rooms	$1,687,500	$3,375,000	$5,062,500
Office Space	$2,250,000	$4,500,000	$6,750,000
Industrial	$139,650	$279,300	$418,950
Total:	$4,077,150	$8,154,300	$12,231,450

Even though Dakota County will benefit directly from induced development in terms of an expanded tax base, the incremental benefit received by the county will be minimized by a program unique to the Twin Cities, called fiscal disparities. The fiscal disparities program reallocates 40% of commercial and industrial growth since 1971 into a metro-wide pool, which is then dispersed to other communities in the metro area which poses more narrow property tax bases.[13]

Fiscal Impacts - No Build Scenario

Fiscal Impacts of the no-build scenario cover a range of tax revenues returned to local, state, and federal governments as a result of airport activity. Taxable revenue sources include direct and indirect wages, visitor industry wages and total sales, hotel and car rentals, jet fuel usage, and airline tickets. Additional taxes are collected for airline property and real estate development in Minnesota was well. This section will highlight lost fiscal impacts to the state resulting from constrained passenger capacity.

The following table (5-41) outlines forecast income taxes received from direct and indirect wages of airport employees and the visitor industry, assuming a 4% effective income tax rate over the forecast period. The table shows that the State of Minnesota will receive an increasing stream of income tax revenue between 2000 and 2020, growing from $73 million to $88.7 million.

Table 5-41: State Income Tax Impacts, No-Build Option, 2000-2020					
Category	**2000**	**2005**	**2010**	**2015**	**2020**
Airport Direct	$20,962,712	$21,848,221	$22,457,814	$22,863,874	$22,423,445
Airport Indirect	$16,996,567	$17,714,537	$18,208,796	$18,538,029	$18,180,929
Visitor Direct	$17,589,214	$19,442,775	$21,224,093	$22,684,443	$24,128,739
Visitor Indirect	$17,510,218	$19,355,454	$21,128,772	$22,582,563	$24,020,372
Total taxes	$73,058,711	$78,360,988	$83,019,474	$86,668,910	$88,753,485

Table 5-41 highlights forecast lost income tax revenue to the state over the forecast period. The table shows that revenue from airport direct and indirect employment will decline by roughly $1.48 million by 2020. No decline in tax revenue from the visitor industry is anticipated, as such impacts are tied to international and domestic enplanement activity, which are identical under the three scenarios.

Table 5-42: Lost Income Tax Revenue, No-Build Option, 2010-2020			
lost revenue	**2010**	**2015**	**2020**
Airport Direct	$0	$54,808	$817,284
Airport Indirect	$0	$44,438	$662,654
Visitor Direct	$0	$0	$0
Visitor Indirect	$0	$0	$0
Total Taxes Lost	$0	$99,246	$1,479,938

State sales taxes, currently 6.5%, are applied to most items purchased by airport employees, regional indirect employment, and the visitor industry. Current tax rates are assumed through the forecast period. The following table outlines forecasted sales taxes generated through 2020. The table shows that total tax revenue under the no-build option will increase to roughly $72 million by 2020. Although total sales tax revenue will increase through 2020, tax revenue from direct and indirect wages will fall after 2015.

Table 5-43: Sales Tax Revenue Generated by Total Wages, No-Build Option					
Category	**2000**	**2005**	**2010**	**2015**	**2020**
Direct	$17,032,203	$17,751,679	$18,246,974	$18,576,898	$18,219,049
Indirect	$13,809,711	$14,393,062	$14,794,647	$15,062,149	$14,772,005
Visitor	$28,518,289	$31,523,561	$34,411,702	$36,779,442	$39,121,153
Total	$59,360,203	$63,668,302	$67,453,323	$70,418,489	$72,112,207

State sales taxes, currently 6.5%, are applied to most items purchased by travelers. Additional taxes are applied for hotels and car rentals, which are taxed at roughly 12%. The current rates assumed through the forecast period. The following table outlines forecasted sales taxes generated by the visitor industry through 2020. The table shows that total tax revenue from visitor industry expenditure will increase from $141.6 million in 2000 to $194.3 million in 2020.

Table 5-44: Sales Taxes Generated From MSP Visitor Expenditure, All Scenarios

Category	2000	2005	2010	2015	2020
Hotel	$73,741,543	$81,512,466	$88,980,514	$95,102,929	$101,158,038
Restaurants	$35,949,002	$39,737,327	$43,378,000	$46,362,678	$49,314,544
Retail	$15,577,901	$17,219,508	$18,797,134	$20,090,494	$21,369,636
Entertainment	$11,983,001	$13,245,776	$14,459,333	$15,454,226	$16,438,181
Transportation	$4,422,444	$4,888,484	$5,336,359	$5,703,534	$6,066,672
Total	$141,673,891	$156,603,561	$170,951,340	$182,713,860	$194,347,071

Based on assumptions about the future price and usage of jet fuel indicated in the previous section, the following table highlights lost income to the state created by constrained capacity at MSP. The table shows that the state will lose an increasing amount of revenue over the 20 year period, increasing from $30,000 in 2000 to $180,000 by 2020.

Table 5-45: Forecast of Lost Jet Fuel Tax Revenue Resulting from Constrained Operations at MSP, No-Build Scenario

Category	2000	2005	2010	2015	2020
Total Operations	466,100	473,500	477,000	479,200	473,500
Gallons/Operation	780	775	775	770	770
Total Gallons	363,558,000	366,962,500	369,675,000	368,984,000	364,595,000
Tax Collected	$1,817,790	$1,834,813	$1,848,375	$1,844,920	$1,822,975
Lost Tax Revenue	$30,030	$43,788	$88,738	$112,420	$180,565

Land Use Changes Around MSP

Land use changes are anticipated in each of the communities directly surrounding the airport over the next 25 years. This section reviews land use changes anticipated with the continued use (no-build) or expansion of MSP. These changes are illustrated graphically on Figure 17 and 18 on the following pages.

The localized land use impacts were developed using base information from the Metropolitan Council, reviewing that data with the affected communities, and revising the GIS database to illustrate the anticipated changes.

The existing airport site lies to the south and approximately equidistant from the downtown areas of Minneapolis and St. Paul. The site itself abuts the Minnesota River valley, with historic Fort Snelling to the northeast of the site, and the National Cemetery to the southeast. Rich Acres Golf Course lies on airport property at the western edge of the site. The MSP site is basically bounded by major transportation arteries -- Highway 62 on the north, Cedar Avenue (TH 77) on the west, Interstate 494 on the south, and Highway 5 and the Minnesota River on the east.

The portions of Minneapolis (north of the site) and Richfield (west of the site) adjoining MSP are largely residential in nature, with some commercial concentrations scattered throughout the neighborhoods. These commercial uses are generally oriented along arterials, with larger concentrations found at the intersections of major roadways. This pattern has developed over many years, and some of this development predates the presence of the airport. However, the majority of the non-residential development occurred after the site began to be used for an airport.

To the south lies Bloomington. The portion of the City near the airport is primarily commercial in nature. Many hotels, business and office buildings are located in the area, with the Mall of America a predominant feature. The area also contains a major nature preserve along the Minnesota River. Residential areas in Bloomington are located to the west of the commercial uses.

The anticipated changes will occur primarily in those communities contiguous with the airport. They include southern Minneapolis, Richfield, northern Bloomington, northern Eagan, Mendota Heights, Mendota and Lilydale, and the western portion of St. Paul.

In an effort to assess the land use impact on each community contiguous to the airport, interviews with each community were conducted in order to examine existing mapped information and review community plans. Metropolitan Council projections for future growth were applied to existing land use information to determine the future land use changes which are anticipated to occur. Community impacts are summarized below.

Bloomington

The expansion of MSP will require the acquisition of several properties that are in the runway protection zone of the new north-south runway, all of which falls in the City of Bloomington. State Safety Zone restrictions would impact areas of the city that have not previously been under such restrictions. The new runway would cause the relocation of nine businesses. These businesses include three hotels -- the 4-story Sheraton Inn, the 2-story Excel Inn, and the 14-story Grand Hotel. In addition, two service stations, a VFW Post, a small office building, a small warehouse, and an NSP substation would all need to be relocated.

The land use pattern in Bloomington has developed in the absence of a north-south runway. Bloomington is currently conducting a master planning exercise for the area south of the airport and east of TH 77 called the "Airport South II Study", an update to an earlier plan. This study is being conducted in conjunction with the Metropolitan Council and the Metropolitan Airports Commission. The scenarios being studied cover both existing use at MSP and expansion with a new north-south runway and the related impacts on land use in Bloomington.

It is anticipated that Bloomington will continue to use the proximity of the airport and the attractiveness of the Mall of America to pursue commercial, office and hotel development opportunities in the Airport South area, whether the airport is expanded or not.

Minneapolis

The movement of the terminal from the existing site to the west side would add pressure for commercial redevelopment of existing noise-impacted residential areas in the southern portion of Minneapolis. The increased activity of a new terminal in the northwest corner of the site would negatively impact the existing residential uses in the area. However, this can be anticipated to provide additional impetus for the conversion of noise impacted land uses.

Continued use of MSP will help the City in its efforts to redevelop the Hiawatha Avenue corridor. Older industrial uses along the rail lines are expected to give way to mixed use development, incorporating higher density housing, commercial and other uses. This corridor is also a logical mass transit link between downtown and uses such as the airport and the Mall of America.

Richfield

The acquisition of New Ford Town and Rich Acres (both located east of TH 77) by the Metropolitan Airports Commission has already begun. No additional land acquisition in Richfield would be necessary to expand MSP.

If the airport is expanded, the proposed layout of land uses within the airport boundary will eliminate the Rich Acres Golf Course, which is currently leased by the City from the Metropolitan Airports Commission. The area would be converted to airport-related uses.

The City of Richfield's comprehensive plan calls for redevelopment along the west side of Cedar Avenue (TH 77). Conceptually, the City would like to see the first block west of Cedar redevelop as office or office/warehouse and office/showroom space. The next one-half block west of this area would be allowed to develop as attached single family and multifamily housing, buffering the adjacent neighbors from the new office uses along Cedar. The elimination of the existing buffer provided by the golf course may negatively affect the redevelopment potential of this area, while the movement of the terminal to the west side may create additional pressure for commercial redevelopment along Cedar Avenue.

St. Paul

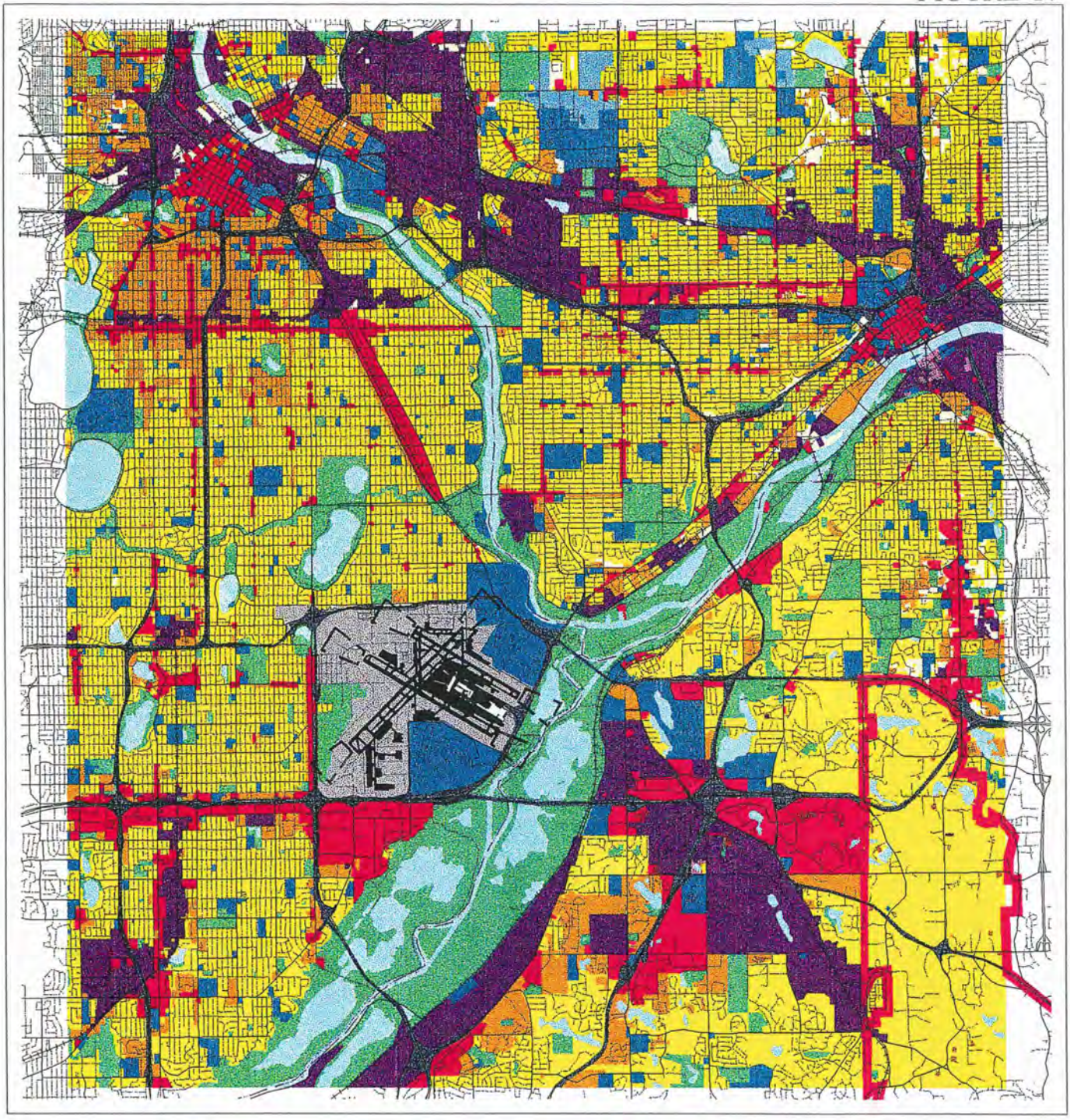
The Shepard Road Corridor connecting the MSP site with downtown St. Paul is the major area in which land use changes may occur. There is already a "park and fly" lot at the southern end of the corridor, and related uses may be built in the future. Re-use of older industrial sites in this corridor for housing and mixed use development is likely to occur, due to the proximity to the Mississippi River.

Eagan

The continuing growth of the airport will help build out the City of Eagan. Substantial vacant or underutilized industrial and commercial areas exist in the major roadway corridors of the City, and portions of the residential areas have yet to be developed. There are no specific land use changes anticipated beyond the continued growth of the community in accordance with its comprehensive plan.

Mendota Heights, Mendota and Lilydale

Mendota Heights has limited additional area for commercial and industrial development. This land can be expected to be built out in the near future. The Cities of Lilydale and Mendota are primarily residential in nature, and limited additional development is anticipated to occur.



Land Use Categories

- Single Family
- Multi-Family
- Commercial
- Industrial
- Public/Semi-Public
- Airport
- Park
- Vacant
- Road
- Water
- Farmstead
- Vacant Industrial
- Vacant Public /Semi-Public
- 1992 MUSA

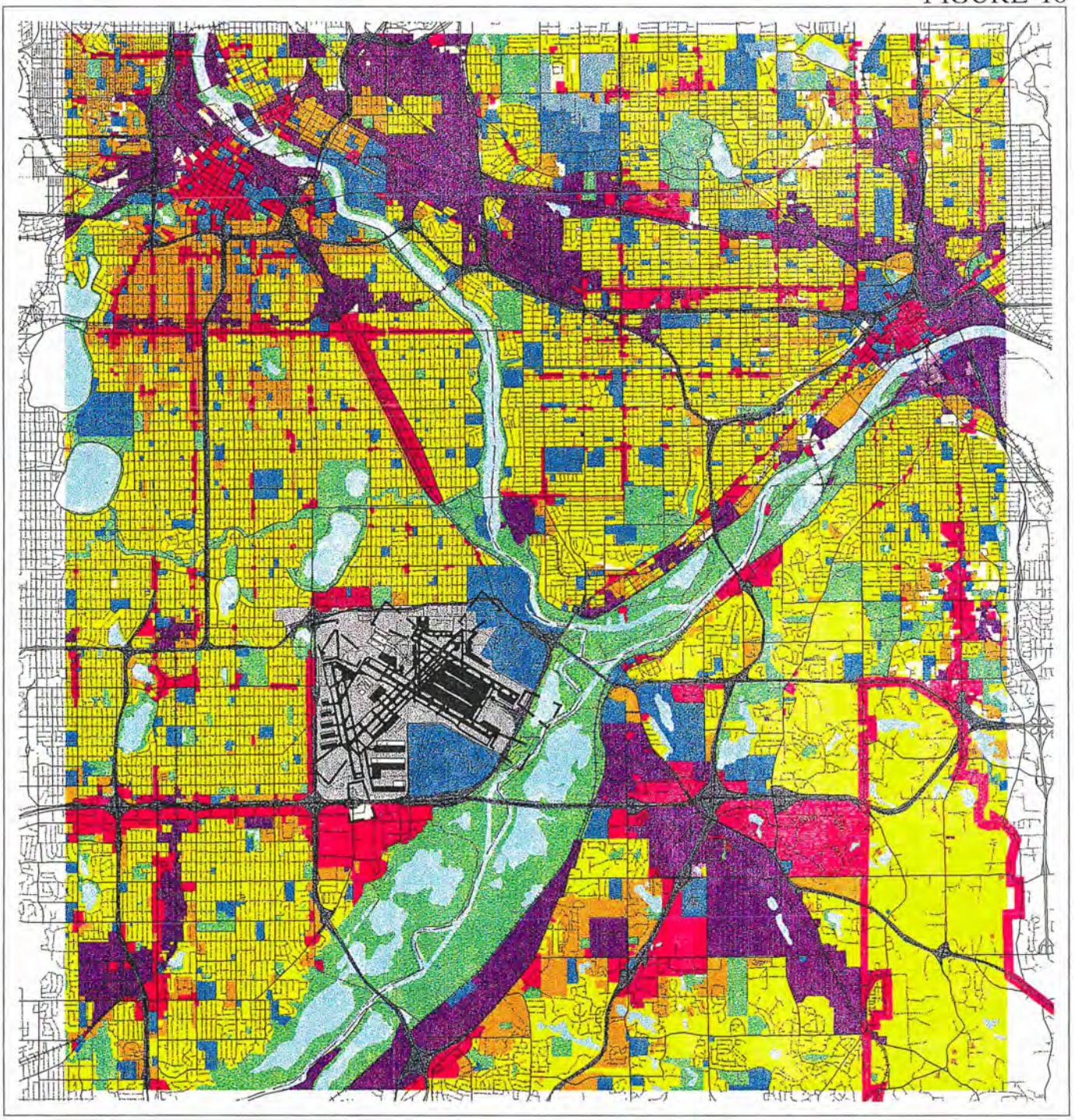
Scale in Feet

N

5000 2500 0 5000 15000

Future Land Use - No Action Alternative

FIGURE 18



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- Park
- Vacant
- Road
- Water
- Farmstead
- Vacant Industrial
- Vacant Public /Semi-Public
- 1992 MUSA

Scale in Feet

5000 2500 0 5000 15000

N

Future Land Use - MSP Expansion Alternative

Land Use Changes with New Airport

Substantial land use changes are anticipated in each of the communities in Dakota County if the new airport is constructed. These changes are illustrated graphically on Figure 19. There will also be changes in the communities surrounding MSP, as well as re-use of the MSP site. These changes are illustrated on Figure 20.

Dakota County

Most of the land in and adjacent to the proposed site is currently in agricultural use, with scattered rural residential uses. There are several small, commercial sites within the 14,100 acre footprint of the proposed airport site. There are roughly 300 acres of land adjacent to the site designated for existing and future rural residential development. In addition, most of the land adjacent to the site has been designated for Agricultural Preserves in the affected communities' comprehensive plans. This planning designation represents a long term commitment to agriculture.

Communities near the site include the City of Hastings and the rural centers of Miesville, New Trier, Hampton and Vermillion. Very little growth is expected in the four rural centers, and in the absence of a new major airport, current land uses (primarily residential with some commercial and public uses) would not be expected to change significantly in the future. The City of Hastings is a freestanding growth center that has sustained modest growth over the past 20 years. Recent annexations have occurred south (from Marshan Township) and west (from Nininger Township) of the city.

Farmland Impacts

The following analysis of farmland impacts was generated by Robert Gray of Resource Management Consultants, Inc. The Metropolitan Council has provided a forecast of estimated urbanization of Dakota County and the thirteen rural townships due to the impact of the New Airport. The estimates go out to the year 2020, approximately fifteen years after the 2005 year completion of the airport date.

Additional Population/Households

- The Metropolitan Council forecasts that, without the New Airport, there will be 142,488 new residents in Dakota County by 2020, which represents a 46% increase in population over 1994. The New Airport, according to the Council, would add an additional total of 9,855 new residents to Dakota County by 2020. This represents a predicted increase of 3% over population growth without the New Airport.

- Of this total increase of 9,855 new residents in Dakota County from 1994 to 2020 attributable exclusively to the New Airport, only 1,025 will reside within the 13 rural townships. These new residents translate into 380 new households.

- The balance of new residents in Dakota County (7,830) translate into 3,410 households or residences. The Metropolitan Council forecasts that these residences will be located within the 2020 MUSA line and the 2020 Free Standing Growth Centers.

Additional Employees

- The Council estimates that 51,500 new employees, attributable to the New Airport, will be added in Dakota County by 2020. Of these, about 41,000 will work in the airport site itself.

- The remaining 10,500 employees will be elsewhere in Dakota County. The Metropolitan Council forecasts that none will be employed in the 13 rural townships.

Additional Non-Residential Development

- Office space, hotels, industrial development, and new commercial development are not anticipated to occur in the rural townships. The development in the rural townships predicted by the Metropolitan Council would consist of scattered low density growth of single family residences.

The Metropolitan Council predicts that approximately 380 new households would be scattered about the 13 rural townships of Dakota County as a result of the New Airport. These new residences would be supplemented by household and farming families currently situated in the site who will be displaced. There are now 259 households and farms which will be displaced, of which not less than 75% or 195, would seek to remain in the four inner townships (Vermillion, Hampton, Douglas, and Marshan). This is a conservative estimate considering the extensive historical and family ties that many homeowners within the site have with the area. Finally, normal residential growth in the inner four Townships by 2020 even without the New Airport is expected to be over 500 residences according to Dakota County estimates.

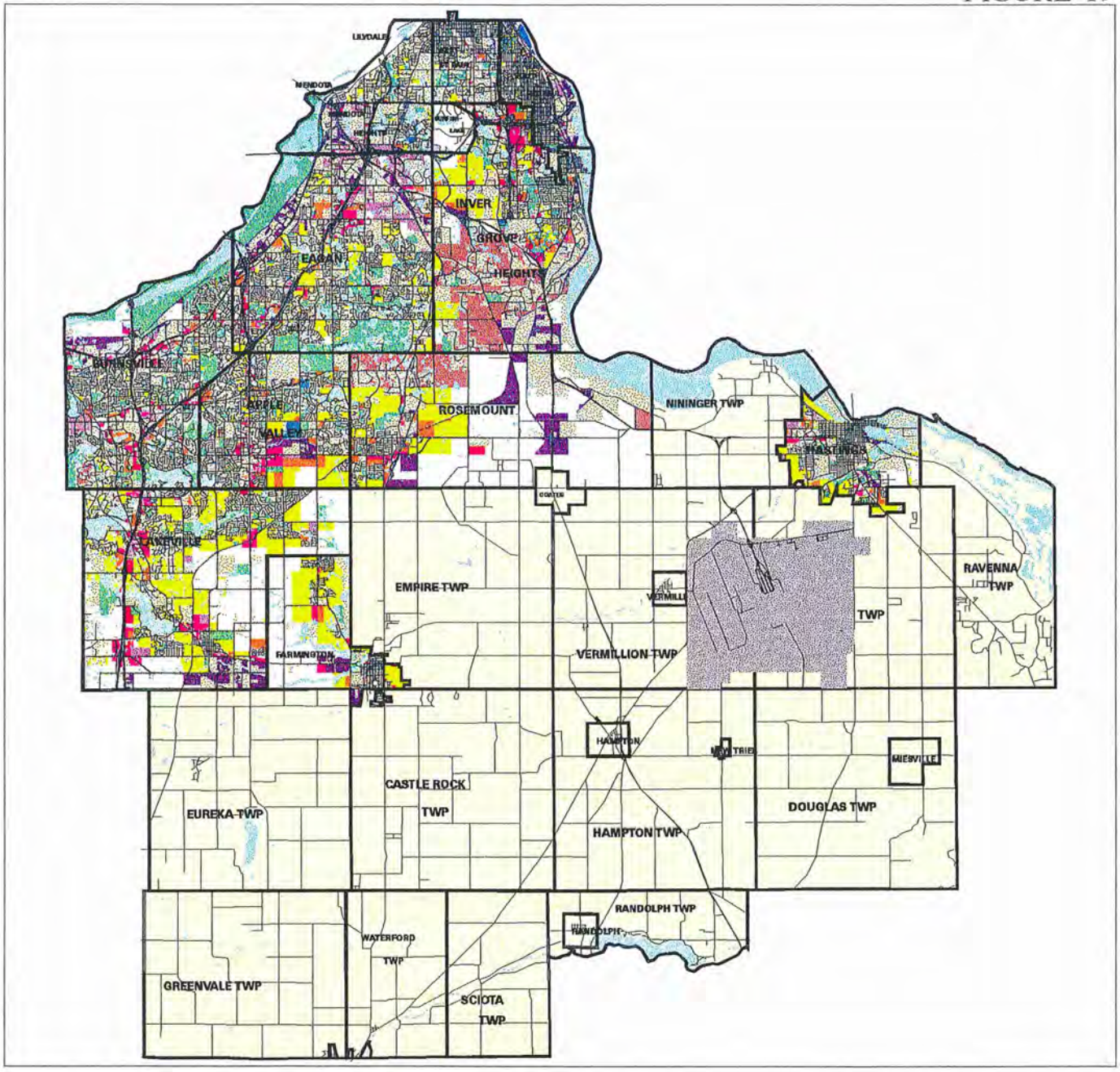
Current zoning in the inner four Townships is on the basis of one residence per forty acres. There are now approximately 680 unused developable lots available in the inner four Townships. It is evident that the expected growth in these townships (approximately 1,075 households) would saturate the area and zoning would have to be changed in order to accommodate the excess demand. Zoning changes would lead to fewer farms, and those remaining would find it increasingly difficult to expand or to conduct farming operations with rural residential units along roads and abutting fields.

The average size of residential lots built within the inner four Townships is now approximately 5 acres, and the Metropolitan Council does not plan to recommend any change in lot size. Zoning for the area requires a maximum of 1 unit per 40 acres. With the 1,075 new households, a loss of between 6,000 and 10,000 acres of agricultural land would occur in the inner four Townships due to new residential development alone. If this loss of farm land were distributed equally in the inner four Townships, approximately 20 to 25 percent of Hampton and Douglas Township agricultural land would be lost. The percentage of land dedicated to rural residential development in Vermillion and Marshan Townships would be much greater due to the airport site itself (about 14,100 acres).

Experts in the sustainability of agricultural areas point out that the intrusion of non-agricultural uses on greater than 20 percent of the land area of an agricultural region threatens the long-term viability of agricultural uses. With well over 20 percent of the land in these Townships not engaged in agriculture, the transition point in Dakota County would be surpassed. The New Airport Alternative would set the dynamics of urbanization in motion in Dakota County. No one can predict the exact consequences of that dynamic, but the direction it would take towards urbanization is manifest and well known. Once started, it would change the agricultural character of Dakota County, only the extent of the change is in doubt. At a minimum, the Townships of Vermillion, Hampton, Douglas, and Marshan would begin the irretrievable transformation to a rural residential form. The various elements of the urbanization dynamic interact with each other in no precise sequence, but there is definitely a causal relationship between the location of jobs and the demand for housing, as well as the location of commercial uses in response to the market created by new population. Some of these elements are:

- Zoning changed to less than 1 residence per 20 acres
- Significant increases in population and households
- Weaker political support for maintaining agricultural land uses
- Speculation on agricultural land for development, leading to rising land prices
- Change in county and township policy towards more development
- Pressure for the extension of water and sewer lines
- Belief that farming will not remain as the primary occupation in the community

The induced development projections incorporated here were developed by the Metropolitan Council based upon a prior study by Hammer, Siler, George Associates. Many of those interviewed during this process feel the rural residential projections are far lower than would actually occur, including Dakota County officials and the authors. There appears to be adequate support for this conclusion in the case studies of other similar airports, especially the Kansas City experience. If substantially more than 380 new residential units were induced to develop in this area, it would hasten the loss of agriculture as the core land use in this portion of Dakota County. In essence, the agricultural nature of the county is expected to change, and any increase in the number of rural residential units developed would simply hasten this conversion.



Land Use Categories

- Single Family (urban density)
- Single Family (rural density)
- Townhomes
- Apartments
- Retail
- Office
- Industrial
- Institutional
- Lake/Wetlands
- Developed or Undevelopable
- Parks
- Roads
- Ag and Vacant/Rural Area

Future Land Use - New Airport Alternative

Effect on Existing MSP Site

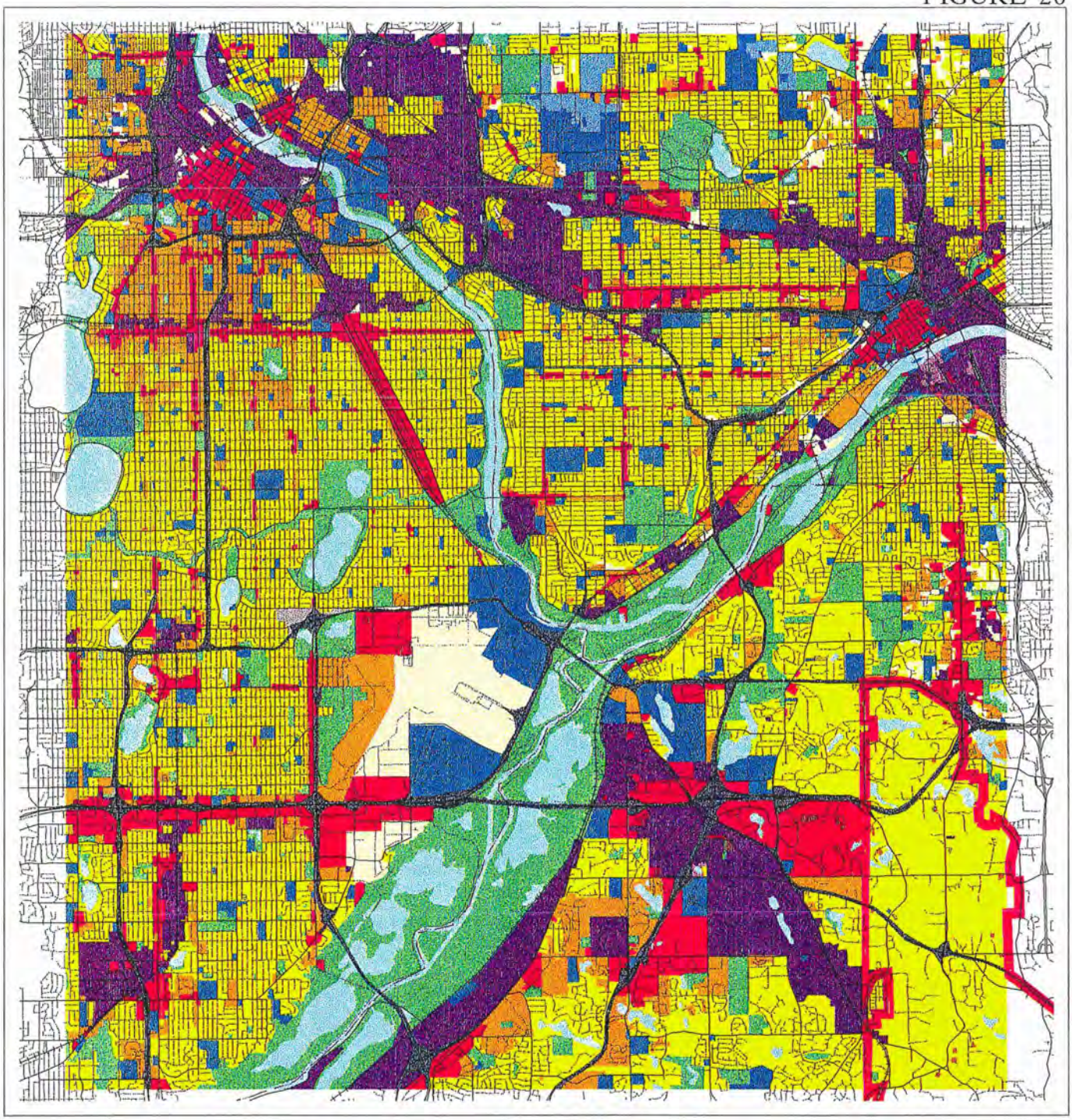
The development of the New Airport will also create land use changes at the existing MSP site. The Metropolitan Council has developed a series of master plan alternatives for the redevelopment of the MSP site.[14] These master plans were developed to provide a conceptual understanding of what was feasible under the constraints of the existing adjacent transportation network.

The extent to which these master plans can be achieved will rely heavily on a number of unanswered questions, including who will own the underlying land at MSP, who will be responsible for clean-up of the existing site, what funds might be available for demolition activity, etc. Using the portions of the site with the least environmental constraints, and connecting to the existing transportation network, a concept for changes which would occur on the site itself has been illustrated on Figure 20. This concept depicts generalized areas and amounts of activity -- the future re-use of the MSP site might follow different patterns. The redevelopment of the site is expected to occur over a period of decades.

The City of Bloomington, which has substantial development plans for the area that lies to the south of the existing airport, would be adversely affected by redevelopment of the airport site. While much of the build out of the airport south area is expected to occur prior to the airport relocation, the redevelopment activity can be presumed to be in direct competition with uses proposed for sites in Bloomington. In addition, efforts near the site in Richfield, Minneapolis and St. Paul would suffer from the same competition.

Finally, development in Mendota Heights and Eagan could continue to respond to the New Airport, although it can be anticipated that more southerly sites would experience higher demand than would be anticipated without the development of the New Airport.

FIGURE 20



Land Use Categories

- Single Family
- Multi-Family
- Commercial
- Industrial
- Public/Semi-Public
- Airport
- Park
- Vacant
- Road
- Water
- Farmstead
- Vacant Industrial
- Vacant Public /Semi-Public
- 1992 MUSA

Scale in Feet

5000 2500 0 5000 15000

N

Future Land Use - MSP Re-Use Alternative

Effect Of Airport On Existing Land Use Patterns

Historically, the central cities were the employment centers for the Twin Cities region. Regional land use patterns today reveal a series of nearly continuous, linear zones of economic and employment uses following the transportation network. These zones form a regional ring that functions as the employment core. The central business districts of Minneapolis and St. Paul, I-494 through Bloomington, Eden Prairie, Minnetonka and Plymouth, and I-394 through Golden Valley and St. Louis Park are part of this ring of economic development.[15]

The MSP site has a central position in this ring, and is well served by the regional transportation network. The site's central position has meant that historic growth of the region has not been skewed toward the airport (in the case of office and industrial development) or away from it (in the case of residential development). The airport has affected the concentration of some of the major employment centers, and has influenced the magnitude of development of the I-494 corridor, but the central location of the airport along the Twin Cities ring road system, with good access from all directions, has allowed the entire metropolitan area to grow, without skewing growth toward the airport site itself. This implies that the continued use of the MSP site will have limited effects on the existing land use pattern of region as a whole, except those directly related to the airport's expansion.

However, with the relocation of the airport to Dakota County come two significant influences on regional land use. The first is the economic "pull" of the new airport located southeast of its existing site. The second is the competition of both new airport development and redevelopment of the existing airport site, and its associated impacts.

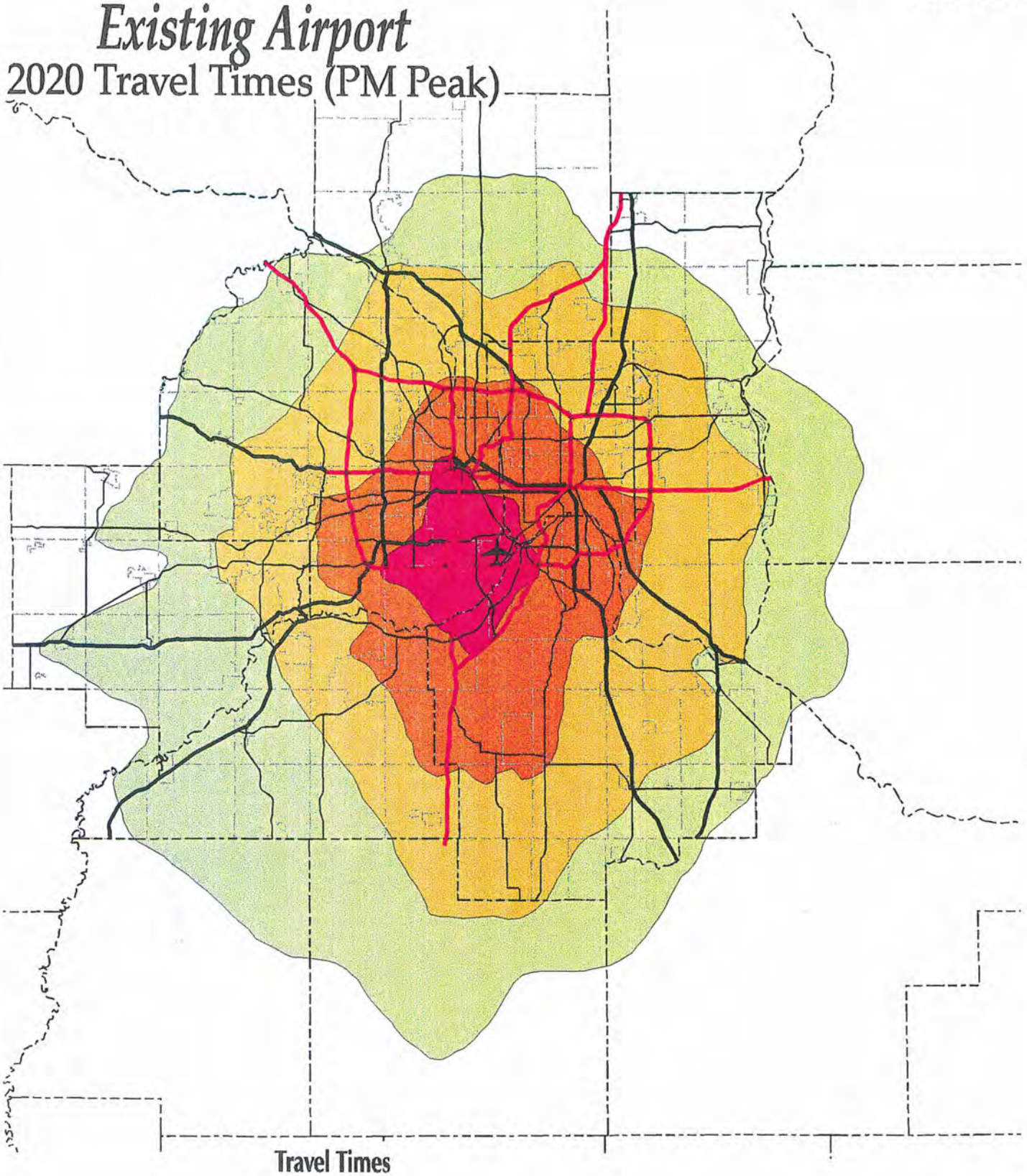
New Airport Attracts New Growth

If the Dakota County airport is built, with its associated roadway improvements, it can be anticipated that the traditional patterns of development in the region will be affected. Historically, one-half of the region's development occurred both north and south of a line drawn from east to west through the two downtown areas, and one-third of the development occurred to the east of a line drawn from north to south through the downtown areas, while two-thirds occurred to the west of that line. The infrastructure improvements in Dakota County alone can be expected to skew development from this traditional pattern -- with greater activity occurring south and east of the region than would normally be anticipated. In addition, longer travel times from existing communities in the northern portion of the region may discourage new activity which is related to the airport from occurring on the northern fringe of the metro area. See Figures 21 and 22.

The Metropolitan Council has long supported Dakota County's desire to maintain its agricultural areas. Even with the construction of the new airport, the Council has suggested that no substantial extension of the MUSA line, to provide urban services to accommodate new growth related to the airport, would occur. It is our opinion that this stance would take an unprecedented effort on the Council's part. However, the Council's recent work on future development scenarios for the region may provide additional impetus for this effort.

FIGURE 21

Existing Airport
2020 Travel Times (PM Peak)



DAHLGREN SHARDLOW AND UBAN
CONSULTING PLANNERS
LANDSCAPE ARCHITECTS
300 FIRST AVENUE NORTH
SUITE 214
MINNEAPOLIS, MN 55401

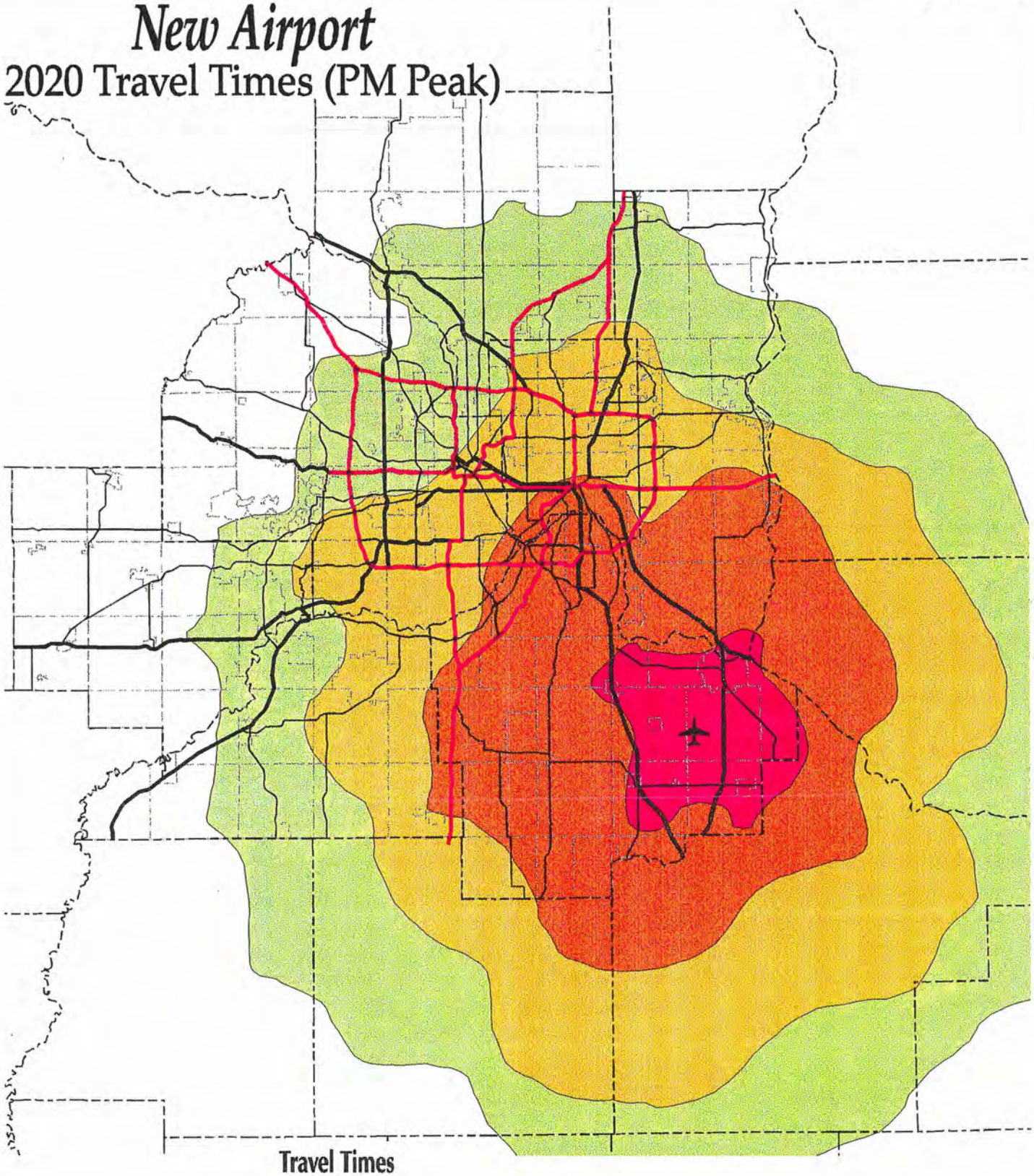
20 December 1995

Source: Metropolitan Council

FIGURE 22

New Airport

2020 Travel Times (PM Peak)



20 December 1995

Source: Metropolitan Council

DAHLGREN SHARDLOW AND UBAN
CONSULTING PLANNERS
LANDSCAPE ARCHITECTS
300 FIRST AVENUE NORTH
SUITE 210
MINNEAPOLIS, MN 55401

New Business Generation Under New Airport Option

One potentially large issue with respect to the new airport scenario is the extent to which a new, modern airport acts as a generator of new business activity in the region. In order to gain a clearer understanding of the potential relationship between new airport development and business creation, ERA surveyed a variety of new businesses in the Denver area which have opened in the past 12 to 15 months, corresponding to the opening of Denver International Airport (DIA) in February of 1995. Specifically, ERA conducted a telephone survey of new businesses in the Denver Metro area to find out what, if any, impact DIA had on the decision by new businesses to choose the Denver area.

The Denver Metro Chamber of Commerce provided ERA with a new business directory for Adams, Arapaho, Boulder, Denver, Douglas, and Jefferson Counties in the Denver metro area. The list covered a total of 450 new firms employing roughly 3,386 individuals, which have opened in approximately the past year; each firm employed an average of seven people. ERA surveyed by telephone approximately 120 businesses and received 60 responses. More businesses were called in Denver and Jefferson Counties, as both counties had the highest concentrations of new businesses in the metro area. The survey respondents were asked about their current employment, gross sales, if they expanded or re-located, their top reasons for considering the Denver area as a suitable business location, and their opinion of DIA. A copy of the survey is in the appendix for reference.

In selecting the sample of target firms, ERA focused primarily on high-technology, manufacturing, and business services firms. The sampled firms included a range of firm types, from single-employee firms working from home to multi-national corporations with new facilities in the Denver area. A random sample of new businesses was not attempted, as it would also include local retail operations which have no plausible links to airport activity.

Analysis of the telephone survey responses yielded the following information. Of the 60 responding firms, 73% indicated that their business was a new start-up. The vast majority of new start-up activity was generated by people living in the Denver metro area; only six respondents opened or relocated operations in the Denver area from other states. The respondents noted a variety of reasons why they chose the Denver area. Their reasons, in decreasing order of importance, included:

- Favorable market and economic conditions in the Denver area
- Transportation infrastructure
- Quality of life
- Proximity to home, or having grown up in the region
- Competitive costs (land, labor and capital) of doing business
- Agglomeration economies and linkages

Of the seven reasons noted above, two are particularly significant and require explanation: transportation infrastructure and agglomeration economies and linkages. The first reason refers to new businesses which indicated that proximity to interstate highways or the availability of air service were reasons for starting up a new business in Denver. A total of four firms indicated that proximity to interstate transportation was a primary factor. Although ten firms noted that the availability of air service was a factor, none indicated that proximity to an airport was a factor. Eight of the ten respondents noted that they were local in origin; the primary non-local respondent was Coleman, which relocated 30 headquarters positions from Wichita, Kansas.

Discussions with officials at Coleman indicated that air service was one of several factors, including quality of life and a pro-business environment, which motivated the firm to relocate employment to the Denver area. The official at Coleman indicated that several cities with exceptional air service, including Minneapolis, Chicago, and Dallas, were initially considered in the site selection process. Chicago was not selected because the city was perceived to be too big, while Minneapolis was seen as too cold.

It is interesting to note that one other multi-national, Merrill Lynch, also relocated substantial employment to the Denver area. Discussions with officials at Merrill Lynch indicated that competitive labor costs, existing, in-place employment in Denver, and an option to purchase the land on which their current start-up occurred, were primary factors in selecting the Denver area. The official noted that, although the new Merrill Lynch operation is only 15 miles from DIA, proximity to the airport was not a factor in the site selection process.

The second reason noted above deals with new businesses which chose the Denver area based on the principles of agglomeration economies or economic linkages. Agglomeration economies result from concentration of competing firms in a single region, providing a large, existing, and skilled labor supply for new start-up businesses. One excellent example of agglomeration economies is Silicon Valley, where a large concentration of computer related firms have located, creating a skilled labor force for new businesses to employ. Several respondents involved in high-tech noted that they chose Boulder, Colorado due to an existing concentration of high technology firms, in the city. Several respondents noted that economic linkages created by proximity to suppliers or distributors was a primary reason for locating in the Denver area.

Impact of Northwest Airlines Operations in Minnesota

Northwest Airlines is the primary carrier serving the Twin Cities; roughly 80% of all passengers going through MSP travel by Northwest Airlines. In addition, the airline maintains its international headquarters and substantial aircraft maintenance in Minnesota as well. ERA acquired estimates of 1994 total operating expenditures in Minnesota for the airline, which are shown below in Table 5-46, in order to quantify the extent of total expenditures made by Northwest in the State of Minnesota,

Table 5-46: Northwest Airlines Estimated 1994 Operating Expenditures in Minnesota

Operating Expenditure	1994
Wages & Benefits	$968,886,000
Fuel and Oil Usage & Taxes	$149,264,000
Food and Beverage	$39,639,000
Communications and Utilities	$59,900,000
Advertising	$94,792,160
Commissions	$355,470,600
Other Services	$142,188,240
Office Rentals	$996,000
Crew Room Rentals	$973,000
Airport Rentals	$24,350,000
Landing Fees	$14,636,000
State and Local Taxes	$22,235,000
Maintenance Materials	$138,862,000
Other Supplies	$42,839,000
Total Expenses	$2,055,031,000
Source: Northwest Airlines	

As the previous table shows, the level of expenditure maintained by Northwest Airlines in Minnesota is considerable, in excess of $2 billion in 1994. Generating a forecast of future expenditure levels by Northwest was not attempted, as only a portion of the listed expenditure categories can be tied directly to forecast enplanement activity. Expenditures for crew room rentals, ticket agent commissions, maintenance materials and other services are likely tied primarily to headquarters activity more so then flight operations.

As stated in the direct impact methodology section, Northwest Airlines maintains roughly 10,000 positions on MSP property which are not directly tied to air activity. The positions include aircraft overhaul mechanics, reservations, administrative staff, air and cargo support, as well as other job classifications. Discussions with officials at Northwest Airlines suggested that the airline could move the 10,000 positions off-site in

the future. The impact of this policy is somewhat undefined. For example, NWA has indicated that they would not develop new facilities to accommodate corporate activities at a new airport. Therefore, if the airport were to be relocated, then it is possible that the reservations and corporate administrative jobs could stay at the current MSP site or be relocated within the region. However, NWA has implied that the maintenance jobs could be targeted to other airport locations, either in Minnesota or elsewhere. If MSP expansion is the chosen alternative, then it is conceivable that all 10,000 of these jobs would remain in place. The bottom line, according to company officials, is the incremental cost of building new space at a new airport to duplicate facilities that are already in place at MSP.

Officials at MAC indicate that Northwest is contractually bound to maintain a significant proportion of their current employment base in the state as part of a 1991 loan agreement with the State of Minnesota. However, NWA officials believe this issue will be resolved with the state in some manner in the future, meaning that they would not be contractually obligated to maintaining a percentage of jobs in the state.

It is clear the 10,000 positions currently generate a considerable impact; assuming a minimum salary of $35,000 they are currently receiving roughly $350 million in wages. Northwest Airlines has estimated that their employees in Minnesota earn an average salary of roughly $58,000. Using this average wage, the 10,000 positions would generate roughly $580 million in direct wages. Using BEA RIMS II wage multipliers for the transportation sector in Minnesota, the 10,000 direct jobs would generate roughly 11,800 indirect jobs and between $633.7 million and $1.05 billion in direct and indirect wages at the state level. Sales tax revenues ranging from $20.5 million to $34 million and income taxes ranging from $25 million to $42 million would also be generated by direct and indirect wages.

It is assumed that economics will govern Northwest Airlines decision about the roughly 10,000 jobs, particularly in light of emerging economic trends in the airline industry concerning cost and debt control, as noted in the Aviation Section of this report. Northwest has stated that the 10,000 positions are not assured to remain in the region if a new airport is built in Dakota County. Airline officials also noted that the increased cost of airline operations at the Dakota County site would force them to reduce their labor force by roughly 15%, beyond the 10,000 jobs.

Military Impacts

The U.S. military maintains facilities at MSP for the air national guard, navy, and other services. However, the air force reserve operation involves the majority of military employment and wages on-site. According to current information, military activity at MSP employs roughly 1,670 air national guard personnel, allocated between active-duty, reserves, dependents, and civilian categories. Total annual payroll for the air national guard operation is roughly $25.8 million, and total annual expenditures for procurement

of local goods and services generate an additional $12.4 million. A study of the economic impact generated by the air national guard operation in fiscal year 1995 was recently conducted. The study determined that air force reserve operations at MSP generate roughly 600 jobs and $16.9 million in wages in the regional economy. When direct and indirect wages, and total expenditure are summed, the military operation generates roughly $55 million in the regional economy. Discussions with civilian officials at the air reserve indicated that the base has survived the most previous round of military base closures; it is unclear when or if additional rounds of base closures will become necessary. Projection of future impacts generated by military activity was not conducted, due to uncertainty over future levels of military operations activity at MSP.

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[1] The al-Chalabi Group, Inc. Primary Economic Impacts , Working Paper 15A, Illinois-Indiana Regional Airport Study, August, 1991.

[2] Ibid., page 4.

[3] Ibid., page 18.

[4] Ibid., page 27.

[5] Ibid., page 18.

[6] The al-Chalabi Group, Inc. and TAMS Consultants, Economic Impact Assessment, Build VS. No-Build. South Suburban Airport Master Plan and Environmental Assessment, April 3, 1995.

[7] Martin Associates, The Local and Regional Economic Impacts of the Minneapolis/St. Paul International Airport. February 28, 1995, page 2-4.

[8] U.S. Department of Commerce, Bureau of Economic Analysis, Regional Multipliers: A User Handbook for the Regional Input-Output Modeling System (RIMS II), May 1992.

[9] The first assumption is based on aviation data generated by HNTB; the second assumption is based on information supplied by Martin Associates in their 1995 economic impact study for MSP.

[10] Martin Associates, The Local and Regional Economic Impacts of the Minneapolis/St. Paul International Airport. February 28, 1995, page 4-3

[11] The al-Chalabi Group, Inc. and TAMS Consultants, Economic Impact Assessment, Build VS. No-Build. South Suburban Airport Master Plan and Environmental Assessment, April 3, 1995, page 17.

[12] Metropolitan Council Fiscal Disparities Discussion Paper, Document # 620-91-066, April 16, 1991, page 1.

[13] Ibid., page 1.

[14] Minneapolis/St. Paul International Airport Reuse Study, Metropolitan Council, Document #559-92-131.

[15] Ibid.

Part VI

MSP Reuse

- Part VI -
MSP Reuse

Introduction

One issue of new airport construction in Dakota County is the redevelopment of the current airport. The issue of MSP reuse was originally explored by a consultant team headed by UDA Architects and Hammer, Siler, George & Associates for the Metropolitan Council in 1992. The 1992 study forwarded several reuse options for the MSP site, each with varying amounts of commercial space, residential units, and open space.

The 1992 reuse study will be used by ERA and DSU as background for projection of economic impacts generated by the reuse of MSP. The range of economic impacts will include direct and indirect jobs and wages, construction impacts, as well as fiscal benefits. The impact forecasts for MSP reuse will be generated in five year increments beginning in 2010 and ending in 2020. It is important to note that the redevelopment of MSP will not be complete within the 10 year period; the 1992 reuse study noted that complete absorption of the 3,100 acre property could take up to fifty years.

Real Estate Development Forecasts

Projection of future economic impacts generated by MSP reuse is based on several key assumptions.

- That average annual net absorption rates for office, industrial, and retail property achieved in the period between 1985 and 1995 will provide an indicator of expected demand for commercial space after 2005.
- That environmental mitigation as well as land ownership issues for the MSP site will be resolved in a timely fashion, allowing site preparation to begin soon after the Dakota County airport opens in 2005.
- That the redevelopment of MSP will be market driven, requiring the site to attract development on a competitive basis.
- That surrounding vacant properties, specifically the Met Center site and Airport South, will be nearing built-out by 2010.
- That the airport property will be developed under a well-conceived, comprehensive plan, with appropriate zoning and land use controls, in order to achieve a high standard of quality, comparable to a "Las Colinas" level of development.

Research conducted by ERA in Part II of this report focusing on real estate development trends in the Twin Cites was used as the basis for projections of future absorption rates for the MSP site. Specifically, ERA analyzed historic net absorption rates for office, flex/warehouse, and retail space in key submarkets of the Twin Cities to arrive at reasonable estimates of future demand for the MSP site. The primary submarket used for the analysis was the Southwest area, as defined by Towle Real Estate, which includes the communities of Bloomington and Edina.

Table 6-1: Average Absorption in the Southwest Submarket for Indicated Years		
Category	**Time Period**	**Average. Absorption**
Class A Office	1985 to 1995	300,000 Square Feet
Industrial	1987 to 1994	1,300,000 Square Feet
Retail	1987 to 1995	150,000 Square Feet

It was assumed that between 25% and 50% of new commercial space, in the southwest submarket would be developed on the MSP site through the forecast period. It is important to note that the retail space absorption figure excludes roughly 2.8 million square feet of space in the Mall of America.

Projection of new residential construction on the MSP site was based on Metropolitan Council data on housing permits, which indicated that housing permit activity in Bloomington and Edina is relatively small in comparison with rapidly growing communities, such as Eagan. In 1991 Bloomington and Edina combined for 289 total housing permits; Eagan granted almost 800 residential permits by comparison. It is assumed by ERA that the MSP site is capable of capturing at least 1% of total metro housing permits in a given year. Based on recent yearly metro area housing permit activity levels, which indicated a range between 14,000 and 18,000 total permits, the site could expect to capture roughly 180 permits a year.

Based on analysis of annual average real estate data and discussions with local planners, ERA projected the construction of new space captured by the MSP site. The rates of development are shown as ranges, to reflect uncertainty about demand for commercial space and residential units in 2010. The following table outlines the forecast range of development anticipated for the MSP site between 2010 and 2020.

Table 6-2: Forecast Cumulative Commercial and Residential Inventory, in Five-Year Increments, Low and High Scenarios, MSP Reuse, 2010 - 2020						
Space Category	**2010**		**2015**		**2020**	
	Low	**High**	**Low**	**High**	**Low**	**High**
Office	120,000	150,000	600,000	750,000	1,200,000	1,500,000
Industrial	260,000	325,000	1,300,000	1,625,000	2,600,000	3,250,000
Retail	60,000	75,000	300,000	375,000	600,000	750,000
Residential	144	180	720	900	1,440	1,800
Note: All commercial space is in square feet; residential refers to living units						

The table shows that, by the year 2010, the 3,100 acre MSP site will attract up to 150,000 square feet of office space, 325,000 square feet of industrial space, 75,000 square

feet of retail space, and up to 180 residential units. By 2020, the site is forecast to contain up to 1.5 million square feet of office space, 3.2 million square feet of industrial space, 750,000 square feet of retail space, and up to 1,800 residential units. Although the table assumes that real estate development will begin by 2010, it is possible that initial commercial development could begin as early as 2005 in certain areas of the site.

Economic Impacts

Economic impacts generated by redevelopment of MSP include direct employment and wages associated with on-site uses, as well as indirect employment in the region generated by re-spending of wages by on-site users. A forecast of property tax revenue streams will also be provided. The following table outlines a range of forecast direct employment at the MSP site between 2010 and 2020.

Table 6-3: Forecast Direct Employment, Low and High Scenarios, MSP Reuse

Space Category	2010		2015		2020	
	Low	High	Low	High	Low	High
Office	462	577	2,308	2,885	4,615	5,769
Industrial	578	722	2,889	3,611	5,778	7,222
Retail	222	278	1,111	1,389	2,222	2,778
Total	1,262	1,577	6,308	7,885	12,615	15,769

The table indicates that projected commercial development on the airport site could support between 12,600 and 15,700 jobs by 2020. The table is based on judgments of employees per-square-foot of space used by the Metropolitan Council to generate induced impacts for Dakota County, as shown in Table 5-26. Total wages associated with the direct employment forecast were also generated using constant 1993 wage data for the Twin Cities metro area, as generated by the Minnesota Department of Jobs Security. Wages for retail sales, manufacturing, and finance, Insurance and real estate (FIRE) were used in the analysis. Based on 1993 average wages for the respective categories, direct employment on the MSP site would generate a maximum of $53 million in 2010, growing to $533.8 million by 2020.

Direct employment and wages associated with commercial activity on-site will also generate an indirect or multiplier effect in the regional economy, created by expenditure of direct wages on goods and services. The indirect impacts of on-site employment and wages were based on Bureau of Economic Analysis (BEA) multipliers for the State of Minnesota. Indirect employment generated by activity at the site will generate a range between 1,600 and 2,000 jobs and create roughly between $47 million and $58 million in wages in 2010. By 2020, commercial activity at the MSP site could generate roughly 20,000 indirect jobs and roughly $580 million in wages. Commercial

development would also generate roughly $7.5 million property taxes in 2015, growing to roughly $15 million in 2020.

Even though the MSP site offers a new location for development in the metro area, the real estate, employment, and wage impacts generated at the site should not be considered new impacts to the region. The site may attract a share of development that would not have come to the region but for unique site features. Most development should be activity that would have located elsewhere in the metro region. In addition, the forecasts of jobs and wages outlined above need to be put in perspective; costs associated with demolition of the existing airport improvements as well as site preparation must be measured against forecast benefits. More importantly, the direct and indirect impacts are considered by ERA to be rough estimates; the absence of final development plans for the site as well as uncertainty over allowable on-site uses creates a potentially large margin of error.

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Addendum

Regional Air Travel to Minneapolis/St. Paul Airport During Average Week in April, 1995

Destination	Common Airline	Weekly Flights	Estimated: Capacity	% of Total	Destination	Common Airline	Weekly Flights	Estimated: Capacity	% of Total	Destination	Common Airline	Weekly Flights	Estimated: Capacity	% of Total
Aberdeen, SD	Northwest	26	962	0.16%	Harrisburg, PA	American	7	595	0.10%	Phoenix, AZ	Northwest	57	10488	1.77%
Albany, NY	USAIR	19	2242	0.38%	Hartford CT	Northwest	21	2478	0.42%	**Pierre, SD**	Northwest	25	475	0.08%
Albuquerque, NM	Northwest	14	2072	0.35%	**Hibbing, MN**	Northwest	28	924	0.16%	Pittsburgh, PA	Northwest	39	4602	0.78%
Allentown, PA	United	7	231	0.04%	Honolulu, HI	Northwest	17	3570	0.60%	Portland, OR	Northwest	21	3150	0.53%
Anchorage, AL	Markair	7	0	0.00%	Houston, TX	Continental	40	4800	0.81%	Providence, RI	Delta	7	840	0.14%
Appleton, WI	Northwest	46	1518	0.26%	Huntsville, AL	Delta	7	1106	0.19%	Raleigh, NC	Delta	118	22184	3.75%
Atlanta, GA	Northwest	63	7434	1.26%	Indianapolis, IN	Northwest	39	4602	0.78%	**Rapid City, SD**	Northwest	19	2242	0.38%
Austin, TX	Northwest	19	2242	0.38%	**Intl Falls, MN**	Northwest	27	513	0.09%	Regina, SASK	CP	7	595	0.10%
Baltimore, MD	Northwest	28	3304	0.56%	Jacksonville, FL	TWA	7	826	0.14%	Reno, NV	Northwest	21	3150	0.53%
Bemidji, MN	Northwest	39	741	0.13%	**Kalamazoo, MI**	Northwest	7	1050	0.18%	**Rhinelander, WI**	Northwest	46	874	0.15%
Billings, MT	Northwest	21	2478	0.42%	Kansas City, MO	Northwest	40	4720	0.80%	Richmond, VA	USAIR	28	3360	0.57%
Bismarck, ND	Northwest	44	5192	0.88%	Kingston, JAM	Air Jamaica	21	2100	0.35%	**Rochester, MN**	Northwest	35	4130	0.70%
Bloomington, IL	Northwest	18	666	0.11%	**Lacrosse, WI**	Northwest	52	6136	1.04%	Rochester, NY	United	7	1036	0.18%
Boise, ID	Northwest	22	2596	0.44%	Lansing, MI	Northwest	14	2100	0.35%	Rockford, IL	USAIR	19	361	0.06%
Boston, MA	Northwest	42	7728	1.31%	La Paz, MEX	Aero California	22	2200	0.37%	Sacramento, CA	Northwest	14	2212	0.37%
Bozeman, MT	Northwest	21	2478	0.42%	Las Vegas, NV	Northwest	82	15088	2.55%	Saginaw, MI	United	21	3108	0.53%
Brainerd, MN	Northwest	27	513	0.09%	Leon, MEX	Mexicana	7	700	0.12%	**St. Cloud, MN**	Northwest	32	608	0.10%
Buffalo, NY	USAIR	26	3120	0.53%	Lincoln, NB	Northwest	26	494	0.08%	St. Louis, MO	Northwest	111	13098	2.21%
Burlington, VT	United	28	3360	0.57%	Little Rock, AK	TWA	63	7560	1.28%	Salt Lake City, UT	Northwest	56	8400	1.42%
Cancun, MEX	American	21	2100	0.35%	Long Beach, CA	America West	12	1668	0.28%	San Antonio, TX	American	42	3570	0.60%
Cedar Rapids, IA	Northwest	52	1716	0.29%	Los Angeles, CA	Northwest	94	14852	2.51%	San Diego, CA	Northwest	21	3150	0.53%
Champaign, IL	Northwest	18	666	0.11%	Los Cabos, MEX	America West	4	400	0.07%	San Francisco, CA	Northwest	67	10050	1.70%
Charlotte, NC	USAIR	18	2502	0.42%	Louisville, KY0	N0orthwest	20	1740	0.29%	San Jose, CA	Northwest	34	5100	0.86%
Chicago, IL	Northwest	398	46964	7.94%	**Madison, WI**	Northwest	46	5428	0.92%	San Juan, Puerto Rico	Northwest	2	368	0.06%
Cincinnati, OH	Northwest	67	5829	0.99%	Marquette, MI	Northwest	13	247	0.04%	Santa Barbara, CA	United	14	2100	0.35%
Cleveland,OH	Northwest	39	4602	0.78%	**Madison City, IA**	Northwest	45	855	0.14%	Seattle, WA	Northwest	56	8400	1.42%
Colorado Springs, CO	Northwest	14	1652	0.28%	Mazatlan, MEX	America West	6	600	0.10%	**Sioux City, IA**	Northwest	55	1045	0.18%
Columbus, OH	Northwest	19	3002	0.51%	McAllen, TX	American	7	595	0.10%	**Sioux Falls, SD**	Northwest	81	9558	1.62%
Dallas/Ft. Worth, TX	Northwest	94	11092	1.87%	Memphis, TN	Northwest	52	6136	1.04%	South Bend, IN	American	60	2700	0.46%

Regional Air Travel to Minneapolis/St. Paul Airport Arriving During Average Week in April, 1995

Destination	Common Airline	Weekly Flights	Estimated: Capacity	% of Total
Dayton, OH	Northwest	14	1652	0.28%
Denver, CO	Northwest	104	15600	2.64%
Des Moines, IA	Northwest	57	1083	0.18%
Detroit, MI	Northwest	106	22260	3.76%
Dubuque, IA	Northwest	21	399	0.07%
Duluth MN	Northwest	60	7080	1.20%
Eau Claire, WI	Northwest	46	1518	0.26%
Edmonton, ALB	Northwest	14	1652	0.28%
Escanaba, MI	United	19	361	0.06%
Fargo, ND	Northwest	75	11250	1.90%
Fergus Falls, MN	Northwest	19	361	0.06%
Fort Dodge, IA	Northwest	32	608	0.10%
Fort Lauderdale, FL	TWA	23	2714	0.46%
Fort Myers, FL	Northwest	15	2370	0.40%
Grand Forks, ND	Northwest	50	5900	1.00%
Grand Rapids, MI	Northwest	34	5372	0.91%
Grand Rapids, MN	Northwest	14	266	0.04%
Great Falls, MT	Northwest	14	1652	0.28%
Green Bay, WI	Northwest	27	3186	0.54%
Guadalajara, MEX	Mexicana	19	1900	0.32%
Hancock, MI	Northwest	20	380	0.06%
Merida, MEX	Aviateca	4	400	0.07%
Mexico City, MEX	Continental	70	9100	1.54%
Miami, FL	Northwest	64	11776	1.99%
Milwaukee, WI	Northwest	84	1596	0.27%
Minot, ND	United	38	722	0.12%
Missoula, MT	Northwest	14	1652	0.28%
Moline, IL	Northwest	28	1036	0.18%
Montego Bay, JAM	Air Jamaica	7	1050	0.18%
Nashville, TN	American	21	2478	0.42%
New Orleans, LA	Northwest	27	3186	0.54%
New York, NY	Northwest	154	28336	4.79%
Oakland, CA	United	19	2812	0.48%
Oklahoma City, OK	TWA	58	8700	1.47%
Omaha, NB	Northwest	61	7198	1.22%
Ontario, CA	Northwest	14	2212	0.37%
Orange Cty, CA	Northwest	21	3150	0.53%
Orlando, FL	Northwest	36	5400	0.91%
Palm Springs, CA	United	7	1050	0.18%
Pensacola, FL	Delta	7	1106	0.19%
Peoria, IL	Northwest	31	1023	0.17%
Philadelphia, PA	Northwest	45	7110	1.20%
Spokane, WA	Northwest	28	4088	0.69%
Springfield, MO	TWA	76	7600	1.28%
Tampa, FL	Northwest	29	4582	0.77%
Thief River Falls, MN	Northwest	14	266	0.04%
Thunder Bay, ONT	Northwest	21	399	0.07%
Toronto, ONT	Delta	7	840	0.14%
Tucson, AZ	Northwest	14	2100	0.35%
Tulsa, OK	TWA	7	595	0.10%
Vancouver, BC	Northwest	14	2100	0.35%
Washington, DC	Northwest	103	12154	2.05%
Waterloo, IA	Northwest	40	760	0.13%
Watertown, SD	Northwest	20	740	0.13%
Wausau, WI	Northwest	40	1760	0.30%
Westchester Cty. NY	Northwest	20	2360	0.40%
West Palm Beach, FL	USAIR	7	1050	0.18%
Wichita, KS	United	23	3404	0.58%
Winnipeg, MAN	Northwest	28	4200	0.71%
TOTAL		5282	591694	100.00%

Source: OAG Guide April 1995 and corresponding airline

Northwest Airlines' MSP Employment

	Total Employees Current	"New Airport" Future Implication	Projected Dimunition (-15% Schedule Red.)
Building A			
-Management and Clerical Support	1,161	0	0
Building B			
-Mechanics (overnight line maintenance)	1,656	210	179
-Technicians	50	20	17
-Equipment Service	22	14	12
-Management and Support	1181	0	0
-Stock Clerks/Stores	133	46	39
-Other	112	0	0
	3,154	290	247
Building C			
-Mechanics (heavy maintenance)	1,762	0	0
-Technicians	49	0	0
-Reservations and related	966	0	0
-Cargo/Management and Support	918	0	0
-Equipment Service/Cleaners	180	0	0
-Stock Clerks	102	0	0
	3,877	0	0
Building D (Airport)			
-Pilots	2,123	2,123	1805
-Flight Attendants	2,273	2,273	1932
-Equipment Service	1,242	1,242	1056
-Customer Service Agents/Sky Caps	669	669	569
-Cleaners	295	295	251
-Stock Clerks	52	52	44
-Mechanics	194	194	165
-Management and Support	157	157	133
	7,005	7,005	5954
Building F			
-Management	223	0	0
-Mechanics/Technicians	110	0	0
-Dispatchers	146	0	0
-Other	314	0	0
	793	0	0
Building J			
-Information Services	701	0	0
Building N			
-Natco (Pilot Training)	380	0	0
NWA Total MSP Employment (Oct95)	17,071	7,295	6,201
Necessary NWA Air Operation Employees	7,295		
Remaining employees in MSP if the airport moves to Dakota County (-15% schedule)	6,201		

Northwest Airlines, Inc.

State of Minnesota
Estimated Economic Impact

Expanded MSP Alternative | **Dakota County Impact**

	1994 (Estimated)	1995* (Estimated)	2020 (1.5% annual growth)	1995 (Estimated)	2020 (1.5% annual growth)
Number of Employees	16611	17071	24769	6201	8997
Operating Expenses					
Wages, Fringes, and Benefits	$968,886,000	$995,716,869	$1,444,730,765	$361,691,776	$524,795,002
Fuel and Oil - Usage and Taxes	$149,264,000	$158,667,632	$230,218,063	$134,867,487	$195,685,354
Food, Beverage, and Catering	$39,639,000	$42,136,257	$61,137,406	$35,815,818	$51,966,795
Communications and Utilities	$59,900,000	$63,673,700	$92,387,059	$23,129,320	$33,559,379
Advertising, Commissions and Other Services	$592,451,000	$629,775,413	$913,769,710	$535,309,101	$776,704,253
Office Rentals	$996,000	$1,058,748	$1,536,185	$899,936	$1,305,758
Crew Room Rentals	$973,000	$1,034,299	$1,500,711	$879,154	$1,275,605
Airport Rentals	$24,350,000	$25,884,050	$37,556,342	$22,001,443	$31,922,891
Landing Fees	$14,636,000	$15,558,068	$22,573,906	$13,224,358	$19,187,821
State and Local Taxes (S&U, Property, Liquor)	$22,235,000	$23,635,805	$34,294,261	$8,585,650	$12,457,309
Maintenance Materials	$138,862,000	$147,610,306	$214,174,488	$125,468,760	$182,048,315
Other Supplies	$42,839,000	$45,537,857	$66,072,942	$38,707,178	$56,162,001
Total Operating	$2,055,031,000	$2,150,289,004	$3,119,951,840	$1,300,579,980	$1,887,070,480

*1994 Avg. Departures at MSP - 293
1995 Avg. Departures at MSP - 313
+ 6.3% which was used for 1995 operating expense estimates
Average salary per employee (1994)- $58,328
Increase of employees 1994 to 1995- 460

Assumed same average salary
1995 estimates assume -15% in operations
1995 est. assume -64% in employee rel.

Greetings

I'm calling from the consulting firm Economics Research Associates and we are doing work for the Minneapolis Airport Commission. Minneapolis is thinking of expanding their current airport or building a new facility and is interested in finding out what kind of impact a new airport has on the locational decisions of businesses.

The Denver Metro Chamber of Commerce identified your company as a new business.

1) We were wondering if you are a start-up business or did you relocate or move to your current location?

- if relocation or move: from where?

- did you move the whole company or a branch?

2) How many employees do you have? _____

3) What is your approximate level of gross sales and gross payroll?

4) What do you think are the top four to five reasons you located where you are now (also rank in order of importance)?

5) *If they named the airport*: Why was the airport a factor in your business location decision?

If not: How does the new Denver International Airport affect your business?

- what are your attitudes about it?

Thanks for your help -- I appreciate you taking the time to talk to me.