APPENDIX D

AIRPORT SOUTH TRAFFIC STUDIES

- July 31, 2000 Mall of America Expansion EIS Travel Forecasting Methods and Results Memorandum
- August 8, 2001 AUAR Traffic Operations Technical Memorandum

SRF CONSULTING GROUP, INC.

Transportation ▪ Civil ▪ Structural ▪ Environmental ▪ Planning ▪ Traffic ▪ Landscape Architecture ▪ Parking

SRF No. 0003008.8

MEMORANDUM

TO: Clark Arneson, City of Bloomington
Jim Gates, City of Bloomington

FROM: Steve Wilson
Senior Associate

DATE: July 31, 2000

SUBJECT: MALL OF AMERICA (MOA) EXPANSION – MET CENTER SITE DRAFT EIS: TRAVEL FORECASTING METHODS AND RESULTS

This memorandum describes the travel forecasting process used for the Draft Environmental Impact Statement (DEIS) for the Mall of America Expansion and the resulting forecast volumes. It also includes an assessment of general levels of service for regional roadways in the vicinity of the Airport South District in Bloomington.

PROJECT SUMMARY

The proposed Mall of America (MOA) expansion is located in the Airport South District of the City of Bloomington, bordered by the I-494 to the north, TH 77 to the west and the Minnesota River to the south and east. Several redevelopment projects are planned in this area by 2006, including:

- Construction of the second phase of the Mall of America, including related retail, office, hotel and residential development;
- Development or redevelopment of several office/hotel complexes; and,
- Building removal in the safety zone of a new north-south runway at the airport.

The Mall of America expansion will be constructed near the existing Mall of America site. Two alternative locations and two development intensities at each location are being considered: one north of the existing MOA (Met Center Site) and one east of the existing site (Adjoining Lands site). Development/redevelopment is anticipated to occur at the following locations through year 2006 (the EIS study period): existing Ceridian/Health Partners lot (the "Olnick" property), Metro Office Park property, and Robert Muir property. Because of the development of a new north-south runway at the Minneapolis-St. Paul International Airport, the RPZ block (at the northeast quadrant of 24th Avenue and 80th Street) is assumed to be vacant by 2006. Figure 1 shows the study area. Table 1 summarizes the proposed Mall of America expansion alternatives and the "background" development assumed to occur in the area through year 2006.

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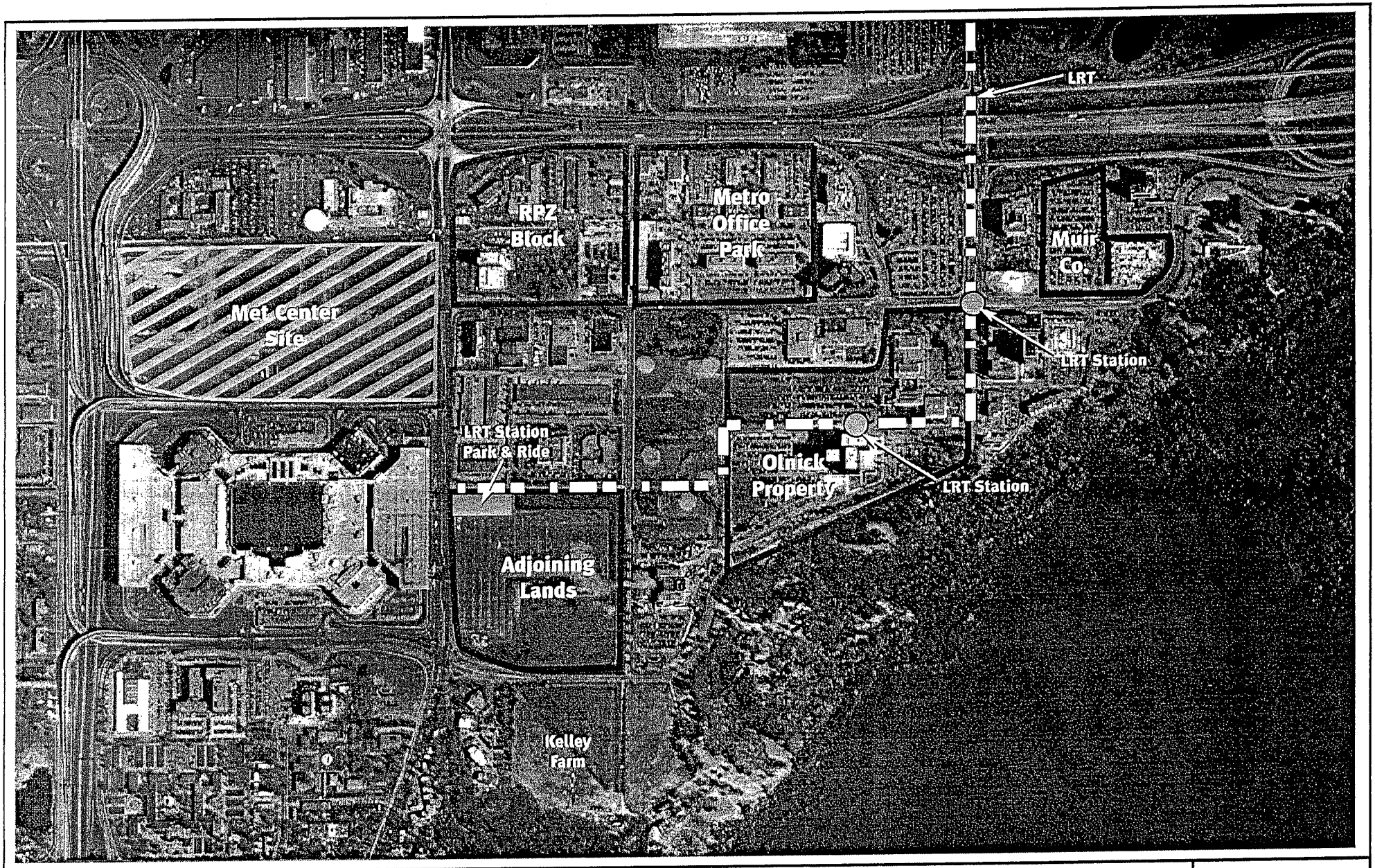
TABLE 1
LAND USE ASSUMPTIONS FOR EIS ALTERNATIVES

PARCEL	NO BUILD	BUILD ALTERNATIVE 1	BUILD ALTERNATIVE 2	BUILD ALTERNATIVE 3A	BUILD ALTERNATIVE 3B
MET CENTER SITE	– Existing airport-related auto rental, MAC contract parking and other parking uses: approximately 7,500 spaces	– 5.6 msf mixed uses • 1,650 hotel rooms • 3,425,000 sf retail/ entertainment • 600,000 sf office • 300 residential units – 13,154 parking spaces	– 4.5 msf mixed uses (app. 80% of Alt. 1 uses) • 1,320 hotel rooms • 2,740,000 sf retail/ entertainment • 480,000 sf office • 240 residential units – 10,523 parking spaces	– 1.0 msf hotel/office (i.e. 700 hotel rooms and 750,000 sf office) – 3,000 parking spaces	– 1.0 msf hotel/office (i.e. 700 hotel rooms and 750,000 sf office) – 3,000 parking spaces
BACKGROUND SITES Adjoining Lands	– Existing parking: 1,775 spaces (including 200 spaces for LRT lot) – Existing storm water pond	– 1.0 msf retail – Parking: 7,500 spaces (includes 200 spaces for LRT)	– 1.0 msf retail – Parking: 7,500 spaces (includes 200 spaces for LRT)	– 4.3 msf (75% of 5.6 msf uses described for Alternative 1 Met Center Site) • 456,000 sf office • 1,235 hotel rooms • 2.6 msf retail/ amusement • 230 residential units • Parking: 9,300 spaces	– 5.3 msf (Phase 2 expansion as approved under ISP 92-1 and MOA/FEIS including 1,000 hotel rooms on existing MOA site – see below) • 7,500 parking spaces • 700,000 sf office • 1,500 hotel rooms • 1.7 msf retail/ amusement • 1,200 residential units
Federal RPZ Block	– No parking, no development (11 parcels)	– No parking, no development	– No parking, no development	– No parking, no development	– No parking, no development
Mall of America Site	– Existing Mall of America uses	– Existing Mall of America uses	– Existing Mall of America uses	– Existing Mall of America uses plus up to 1,000 additional hotel rooms	– Existing Mall of America uses plus up to 1,000 additional hotel rooms (included in 5.3 msf total of mixed-use development described above for Adjoining Lands)
Decathlon Club	– Land uses and parking as described in site ISP	– Land uses and parking as described in site ISP	– Land uses and parking as described in site ISP	– Land uses and parking as described in site ISP	– Land uses and parking as described in site ISP
Ceridian Corp Bluff Site	– Land uses and parking as described in site EAW [207,000 sf office, 610 parking spaces]	– Land uses and parking as described in site EAW [207,000 sf office, 610 parking spaces]	– Land uses and parking as described in site EAW [207,000 sf office, 610 parking spaces]	– Land uses and parking as described in site EAW [207,000 sf office, 610 parking spaces]	Land uses and parking as described in site EAW [207,000 sf office, 610 parking spaces]

TABLE 1 continued
LAND USE ASSUMPTIONS FOR EIS ALTERNATIVES

PARCEL	NO BUILD	BUILD ALTERNATIVE 1	BUILD ALTERNATIVE 2	BUILD ALTERNATIVE 3A	BUILD ALTERNATIVE 3B
Olnick	2 Options: – Option A= 1,907,500 sf office 550 room hotel (381,000 sf) 8,002 parking spaces (including existing) – Option B= 2,237,500 sf office 8,065 parking spaces (including existing)	2 Options: – Option A= 1,907,500 sf office 550 room hotel (381,000 sf) 8,002 parking spaces (including existing) – Option B= 2,237,500 sf office 8,065 parking spaces (including existing)	2 Options: – Option A= 1,907,500 sf office 550 room hotel (381,000 sf) 8,002 parking spaces (including existing) – Option B= 2,237,500 sf office 8,065 parking spaces (including existing)	2 Options: – Option A= 1,907,500 sf office 550 room hotel (381,000 sf) 8,002 parking spaces (including existing) – Option B= 2,237,500 sf office 8,065 parking spaces (including existing)	2 Options: – Option A= 1,907,500 sf office 550 room hotel (381,000 sf) 8,002 parking spaces (including existing) – Option B= 2,237,500 sf office 8,065 parking spaces (including existing)
Robert Muir/Park 'N Fly 3700 / 3750 E. 80th Street ramp	– 750,000 sf office; 3,000 parking spaces	– 750,000 sf office; 3,000 parking spaces	– 750,000 sf office; 3,000 parking spaces	– 750,000 sf office; 3,000 parking spaces	– 750,000 sf office; 3,000 parking spaces
Metro Office Park (8 parcels outside of Federal RPZ area)	– 1,680 hotel rooms or 1.25 msf office – 2,478 spaces (hotel) or 5,625 spaces (office)	– 1,680 hotel rooms or 1.25 msf office – 2,478 spaces (hotel) or 5,625 spaces (office)	– 1,680 hotel rooms or 1.25 msf office – 2,478 spaces (hotel) or 5,625 spaces (office)	– 1,680 hotel rooms or 1.25 msf office – 2,478 spaces (hotel) or 5,625 spaces (office)	– 1,680 hotel rooms or 1.25 msf office – 2,478 spaces (hotel) or 5,625 spaces (office)
State Runway Safety Zones District I (A)	– Existing land uses	– Existing land uses (except Adjoining Lands- see above)	– Existing land uses (except Adjoining Lands- see above)	– Existing land uses (except Adjoining Lands- see above)	– Existing land uses (except Adjoining Lands- see above)
District II (A)	– Existing 175,435 sf office/-industrial plus 263,800 sf mfg. to be added soon at VTC property (2820 Old Shakopee Road) – Ceridian "Diamond" property uses will include the relocated NSP east Bloomington sub-station (permanent) as well as the existing airport-related auto rental facilities (through year 2005) – Existing land uses for all other parcels	– Same as No Build	– Same as No Build	– Same as No Build	– Same as No Build
District III (B)	– Existing land use	– Existing land use	– Existing land use	– Existing land use	– Existing land use
Proposed LRT Corridor	– Rail corridor and station	– Rail corridor and station	– Rail corridor and station	– Rail corridor and station	– Rail corridor and station



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AIRPORT SOUTH - DEVELOPMENT SITES (THROUGH 2006)

FIGURE

1

TRAVEL FORECASTING PROCESS

The travel forecasts were prepared using the Twin Cities regional travel forecasting model, modified to improve responsiveness to issues relating to the specific study. These models are computerized procedures for systematically predicting travel demand changes in response to development and transportation facility changes.

The models, used primarily for major project planning efforts, are calibrated and validated at a level of accuracy sufficient for planning regional facilities such as freeways and major arterials. This provides sufficient accuracy for most regional and corridor-level planning. The models were completed in 1994 using data from an extensive regional Travel Behavior Inventory conducted by the Metropolitan Council and Mn/DOT in 1990.

The eight main components of the travel forecasting process are shown in Figure 2 and described below. Detailed discussion of assumptions specific to the Mall of America Expansion EIS are described in a subsequent section.

Highway Network Representation

All of the freeways, expressways, and major arterial roadways in the Twin Cities area are compiled into a computer representation of the region's highway system. In addition, most minor arterials and many collector roads and other local streets are included. The attributes of the roadways are described in terms of area type, facility type, distance, free-flow speed, number of lanes and capacity.

Additional roadways in and near the Airport South area were added to the regional model to better estimate the effects of different development and highway network assumptions for the AUAR. Specific future-year highway improvements are discussed in a subsequent section of this report.

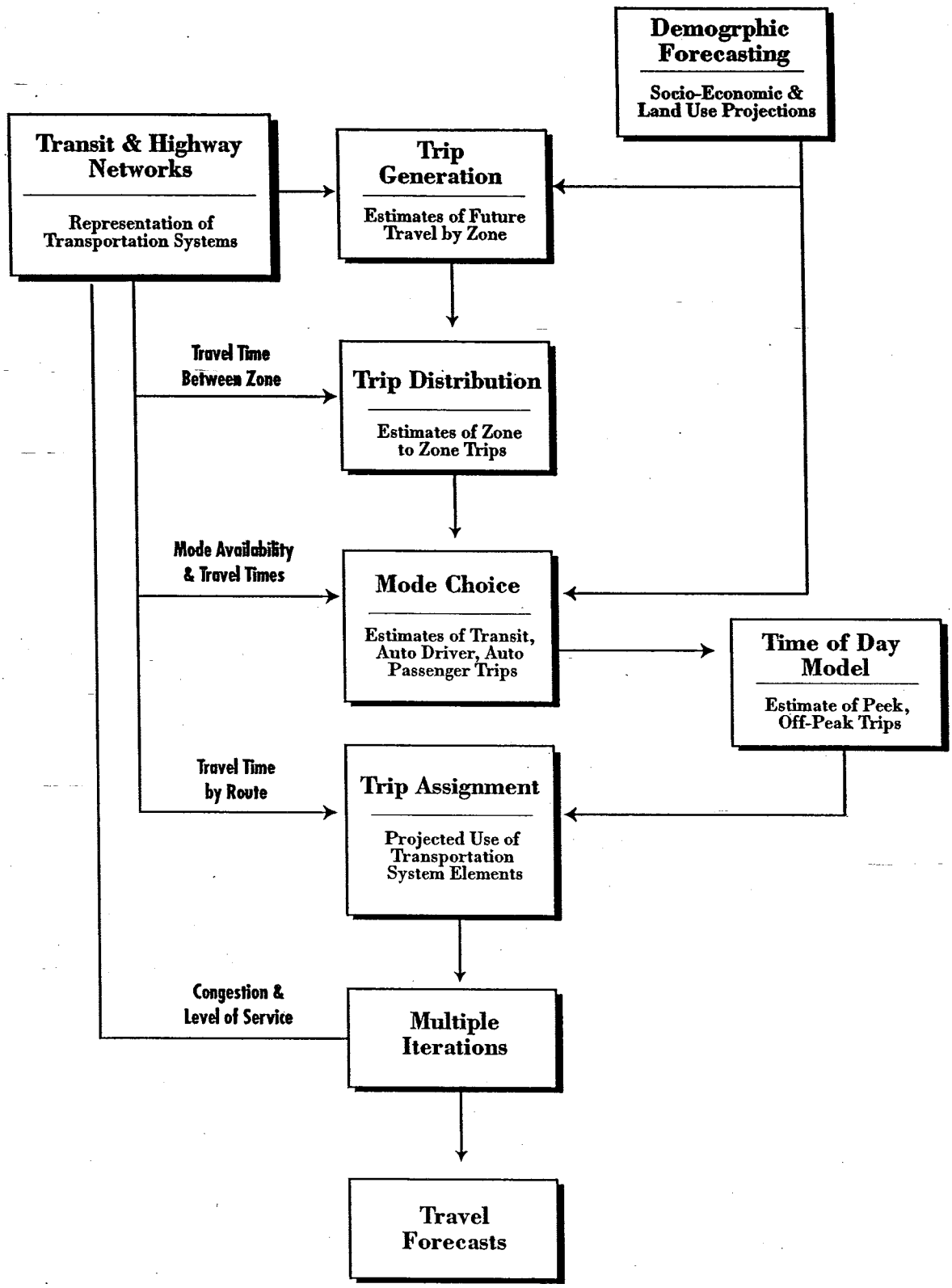
Transit Network Representation

All regional transit routes are included in a computer representation of the transit system. The transit network looks at the transit system in terms of links (which represent the highway system) and lines (which define a transit route's frequency and path). Data in the transit network include link speed, link distance, route frequency and route type.

Specific future-year transit improvements are discussed in a subsequent section of this report.

Zonal Socio-Economic and Demographic Data

The regional travel forecast models divide the seven county Twin Cities Metropolitan area into 1165 geographic transportation analysis zones (or TAZ). Various demographic and socio-economic data are allocated into these zones for the purposes of the forecast models. The zones also serve as the beginning and end locations of travel in the region. In addition to the 1165 zones, the 35 most important points of entry into the region are identified and included as "external" zones. The zonal system was determined primarily on the basis of physical boundaries and major roadways.



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TRAVEL FORECASTING PROCESS

FIGURE

2

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For the purpose of this study, the three TAZs in and near the Airport South district were split into a total of 23 TAZs so that more refined trip estimation and traffic impact analysis could be conducted.

The Metropolitan Council's demographic database dated July 1999 was used as the source of zonal-level information. This database includes socio-economic data provided by the City of Bloomington, reflecting their planned development through year 2020. This base assumes implementation of the 1996 "Regional Blueprint" of the Metropolitan Council. Communities are in the process of refining their comprehensive plans based on the policy direction of the Blueprint.

Trip Generation

Trip generation is the process by which the number of trips attributed to a zone are estimated based on the amount and type of activity in that zone. Trips are either "produced" by or "attracted" to a zone, depending on the type of trips. The end result of trip generation estimation is a total number of trips produced by and attracted to each zone. The trips at this point are called "person-trips", and do not have any association with a given mode of travel.

The determinants of household trip production are household size, the number of automobiles owned and location. Several factors contribute to trip attractions, depending on the trip purpose. The main variables are retail employment, non-retail employment, amount of activity within a given proximity and area type.

The trip generation phase of the forecasting process uses trip rates (i.e., number of trips per person, household or employee) based on the 1990 regional TBI applied to each zone to calculate the number of trips taken, by purpose. This study uses the regional trip generation model, supplemented with site-specific information

Trip Distribution

The trip distribution process converts the person-trips estimated in the generation step to movements between pairs of zones based on the amount of travel activity in a zone and the generalized travel time proximity of the producing zone to other zones. The resulting trip tables provide the number of trips between zones.

Most standard models consider only highway time in the distribution function. The non-work models in the Twin Cities are based on this method. However, the work trip distribution models in the Twin Cities region employ a composite impedance function, which treats distribution based on overall time and cost, including that of alternate modes. Trips beginning or ending outside of the Twin Cities area are modeled using a growth-rate model based on TBI trip distribution patterns.

Mode Choice

The mode choice phase of forecasting uses mode choice models to identify the number of person-trips between each pair of zones and determine whether the trips are made by single-occupant vehicles, carpools, or transit riders. The models are further used to determine whether the trip is a candidate for a high occupancy vehicle lane.

Time of Day Estimation (Temporal Distribution)

Time-of-day, or "temporal distribution" models, take the estimated trips and distribute them across periods of time for the purposes of more accurately reflecting peaking conditions on roadway and transit systems. The basis for the temporal distribution is the 1990 regional TBI. The time periods considered are:

- A.M. peak hour
- A.M. peak shoulders
- First P.M. peak hour
- Second P.M. peak hour [generally used for operations analysis]
- P.M. peak shoulders
- Off peak time periods

Differentiation among peak hours enables better estimates of congested conditions on an hourly basis.

Highway and Transit Assignment

The trip assignment models choose the route between zones for any given trip. The highway assignment process chooses routes based on travel times that reflect the appropriate traffic volume, roadway capacity and speed relationship. It is an equilibrium model, which uses multiple iterations to balance demand with capacity.

The models will permit a demand in excess of the designated capacity. Capacity in the Twin Cities area is generally defined at Level of Service D, therefore assignment of additional demand indicates Level of Service E or F. The default congestion functions in the model are link-based, meaning the effect of intersection and ramp-meter queues are not fully accounted for in the modeling process.

AIRPORT SOUTH AREA-SPECIFIC ASSUMPTIONS

Roadway System

The planned road improvements may be classified into regional system improvements and local improvements. The most important regional development in the vicinity of the Airport South District is the proposed I-494 reliever arterial plan and the reconstruction of I-494 in Bloomington and Richfield. The ring-road system is assumed to be complete by the time the land developments are in place (2006). The freeway reconstruction is assumed to be in place by the year 2020. Near the proposed Mall of America expansion, the most significant road network development is the proposed connection between East 79th Street and East 80th just west of 24th Avenue, as part of the ring-road system. Consequently, the existing intersection of 79th Street (east of 24th) and 24th Avenue will be eliminated, and the intersection of 80th and 24th will become a four-legged intersection. The complete list of planned road improvements assumed in the forecast modeling, completion dates and lead agencies can be found in Table 2.

Development Assumptions

Five development scenarios for the year 2020 are considered. The "No Build" alternative assumes that the Mall of America (MOA) expansion will not be built and the Met Center and Adjoining Lands parcels remain in their current use (parking), while the other proposed "background" developments in the area (see Table 1) will still take place. In Alternatives 1 and 2, it is assumed that the second phase of the MOA will be located at the site of the former Met Center, and a 1.0 msf office/hotel development will be built on the Adjoining Lands parcel immediately east of the MOA. In Alternative 3A and 3B, it is assumed that second phase of the mall will be located at the Adjoining Lands, and 1.0 msf of office and hotel development will take place at the Met Center site. All "background" developments assumed for the No Build alternative are also assumed in the alternatives 1, 2, 3A and 3B. These land use assumptions are summarized in Table 3.

The background traffic assumptions for the No Build and all Build development alternatives include the expansion of the HHH Terminal facility at MSP International Airport, including a parking facility with an assumed peak parking demand of 7,800 spaces.

For the 2007 (one year after project completion) analysis, it is assumed that the planned "background" development sites in the Airport South area will be fully developed and occupied by 2006. Regional and Airport South Area developments beyond those assumed as "background" growth were prorated based on expected growth patterns between 1999 and 2020.

TABLE 2
SUMMARY OF ROADWAY IMPROVEMENTS TO BE INCLUDED IN TRAFFIC FORECASTING AND OPERATIONAL ANALYSIS

ROADWAY		SCHEDULED TO BE COMPLETED BY	LEAD AGENCY
Regional System Improvements[1]			
• Longfellow Avenue	– Reconstruct	2002	MAC
• 77th Street	– Complete to 24th	2003	Richfield
• 66th Street	– Reconstruct Interchange	2003	MAC
• 77th Street	– Add north ramps, close Diagonal Boulevard	2005	Richfield
• 24th Avenue	– Modify westbound to northbound free right	2002	MAC/Mn/DOT
• 79th/80th Street	– Construct bridge at I-35W	2003	Bloomington
• Lyndale Avenue	– Reconstruct interchange	2003	Richfield
• Nicollet Avenue Ramps	– Close (subject to completion of I-494 upgrades Penn to Portland)	>2010	Mn/DOT
• 12th Avenue Ramps	– Close (subject to prior completion of Portland Interchange)	>2010	Mn/DOT
• I-494	– 34th to TH 100	>2006	Mn/DOT
• 34th Avenue	– LRT	2004	Mn/DOT
Local System Improvements[2]			
• I-494/34th Avenue north side off-ramps	– Provide up to five lanes at ramp, as needed (dual left-turn, two through, one right-turn lane)	2006	MAC/Mn/DOT
• I-494/34th Avenue south-side off-ramps	– Provide up to minimum of four lanes at ramp, as needed (dual left-turn, left/through shared lane, right-turn lane)	2006	Mn/DOT/Bloomington
• East 79th Street (TH 77 to 24th Avenue)	– Reconstruct/realignment/ geometric improvements	2003	Bloomington
• East Old Shakopee Road/28th Avenue	– Signalize intersection, improve geometrics	2006	Bloomington
• 24th Avenue/Lindau Lane	– Modify Lindau Lane/TH 77 to 24th Avenue	2006	Bloomington
• 24th Avenue Operational Upgrade	– I-494 to Lindau Lane (geometrics)	2006	Hennepin County/ Bloomington/Mn/DOT
• 24th Avenue ITS Information Signs	– I-494 to 86th Street	2006	Hennepin County/ Bloomington/ Mn/DOT
• 80th Street Upgrade	– Upgrade of 80th Street between 24th and 34th Avenues to provide five approach and three departing lanes at critical intersections	>2006	Bloomington
• E. Old Shakopee Road between Killebrew Drive and Cedar Ave.	– Capacity Improvement (3 lanes in each direction)	>2010	Hennepin County/ Bloomington

(1) Summary provided by Mn/DOT (9/7/99).
(2) Summary provided by City of Bloomington Public Works (8/17/99).

TABLE 3
SUMMARY OF LAND USE DEVELOPMENT ALTERNATIVES

SITE	LAND USE	DEVELOPMENT ALTERNATIVE						
		Existing (1998)	No Build 2020	Alt. 1 2020	Alt. 2 2020	Alt 3A 2020	ALT. 3B 2020	Units
Met Center	General Office	-	-	600	480	750	750	ksf [1]
	Hotel	-	-	1,650	1,320	700	700	room
	Residential	-	-	353	278	-	-	ksf
	Retail	-	-	3,425	2,740	-	-	ksf
	Parking	7,500	7,500	13,154	10,523	3,000	3,000	stall
Adjoining Lands	Shopping Center	-	-	1,000	1,000	-	-	ksf
	General Office	-	-	-	-	456	700	ksf
	Hotel	-	-	-	-	1,235	1,500	room
	Residential	-	-	-	-	264	1,200	ksf
	Retail	-	-	-	-	2,600	1,700	ksf
	Parking	1,775	1,775	7,500	7,500	9,300	7,500	stall
Mall of America	Shopping Center	4,200	4,200	4,200	4,200	4,200	4,200	ksf
	Hotel	-	-	-	-	1,000	1,000	room
Olnick	General Office	865	2,237	2,237	2,237	2,237	2,237	ksf
Metro Office Park	Office Park	466	1,250	1,250	1,250	1,250	1,250	ksf
Ceridian – Bluff site	Corporate Headquarters	-	207	207	207	207	207	ksf
RPZ Block	General Office	790	-	-	-	-	-	ksf
	1 Hotel	28	-	-	-	-	-	room
Robert Muir	General Office	-	750	750	750	750	750	ksf
	Airport Park-N-Fly	2,000	-	-	-	-	-	stall
VTC Plant (Lucent)	Manufacturing	175	439	439	439	439	439	ksf
Rest of Airport South	Mixed	3,265	3,265	3,265	3,265	3,265	3,265	ksf
	Hotel	2,563	2,563	2,563	2,563	2,563	2,563	room
	Parking	1,250	1,250	1,250	1,250	1,250	1,250	stall

[1] ksf: 1000s square feet gross leasable area

Transit System

As of October 1999 the Airport South area is served by 21 transit routes, including several different providers: Metro Transit Minnesota Valley Transit Authority, Southwest Metro and the B-E line contract route. Nearly 400 public transit buses depart the Mall of America between the hours of 6:00 a.m. and 8:00 p.m., as shown in Table 4, an average of about 28 buses per hour.

TABLE 4
EXISTING TRANSIT SERVICE IN AIRPORT SOUTH AREA
(Buses Departing Mall of America: 6 a.m. to 8 p.m.)

Route	Number of Buses	Route	Number of Buses
BE Line	27	440	6
M-15	19	441	2
M-19	41	442	16
445	13	444	16
M-5	38	446	2
52A	3	590	10
M-7	44	880	14
M-72M	3	890	14
80	42	S-4	30
428	11	415	6
		S-54	29
		Total	386

Source: Metro Transit, SRF analysis

2007 and 2020 forecasts assume completion of the Hiawatha Corridor Light Rail Transit line from downtown Minneapolis to the Mall of America. LRT service is assumed at 7-1/2 minutes frequency in the peak periods and 10 minutes frequency during off-peak times. Three LRT stations are planned in the Airport South area: 1) a station in the southeast quadrant of the intersection of 82nd Street South and 24th Avenue South serving the Mall of America area; 2) a station along 34th Avenue South near 80th Street serving the eastern end of the study area; and 3) a station within the proposed Olnick Development.

Trip Generation

ITE trip generation rates (6th edition) and other external sources were used to develop traffic estimates for new developments in the Airport South District. These rates include both weekday and peak hour trips. Where necessary, trip rates were modified to match the current volumes produced by the Airport South Area. In general, the ITE rates produced a better replication of existing traffic than rates based on the Twin Cities regional forecast model.

Trips generated by the Mall of America, including phase 1 and 2, were based on information prepared by the Mall of America *(Mall of America Phase 2 Expansion Traffic Study*, prepared by BRW, a consultant to MOAC Inc, June 1999). For the purposes of this analysis, peak hour traffic was determined using a "design hour" based on historic mall use. The design week for the existing mall is in August, which yields the second-highest traffic (after the Christmas shopping season) with 2.2 percent of the annual trips. The August design week is 16 percent higher than the annual average of 1.9 percent. The design day approximates weekday (not weekend) traffic conditions, including the combination of shopping and work trips. The peak hour was considered to be between 5 p.m. and 6 p.m., representing 8 percent of the daily traffic and coincides with the peaking on the adjacent local and regional roadway system.

The estimated number of trips are detailed in Table 5. If the Mall of America expansion is not built, new trips will still be generated from other new ("background") development proposed in the Airport South Area. Under the No Build alternative, the total number of trips for the Airport South Area is estimated to be 189,225 per day. If Phase 2 of the MOA is built, trips will be generated by the MOA as well as by other office, retail, hotel and residential generators. The number of trips generated by MOA Expansion Alternative 1 is estimated to be 52,750 per day, based on the previously mentioned study.

The total number of year 2020 Build alternative trips generated within the Airport South District will range between 256,350 to 275,950 trips per day. The current number of daily trips generated within the Airport South District is 172,000 per day. The existing Mall of America generates approximately 82,000 (47.7 percent) of these trips. Table 6 shows the estimated p.m. peak hour traffic generation for the alternatives. Not shown in the tables are the estimated 125 outbound peak hour trips assumed from the LRT parking facility.

TABLE 5
DAILY TRIP GENERATION BY DEVELOPMENT ALTERNATIVES

SITE	LAND USE	DAILY TRIPS					
		Existing 1997	No Build 2020	Build 1 2020	Build 2 2020	Build 3A 2020	Build 3B 2020
Met Center	General Office	-	-	5,950	4,700	8,275	8,275
	Hotel	-	-	14,400	11,450	5,750	5,750
	Residential	-	-	1,225	975	-	-
	Retail	-	-	38,250	30,225	-	-
	Total	-	-	59,825	47,350	14,025	14,025
		-	-	-	-	-	-
Adjoining Lands	Shopping Center	-	-	20,975	20,975	-	-
	General Office	-	-	-	-	4,400	8,400
	Hotel	-	-	-	-	10,700	13,500
	Residential	-	-	-	-	900	7,200
	Retail	-	-	-	-	28,300	34,800
	Total	-	-	20,975	20,975	44,300	63,900
		-	-	-	-	-	-
Mall of America	Shopping Center	82,000	82,000	82,000	82,000	82,000	82,000
	Hotel	-	-	-	-	9,000	9,000
	Total	82,000	82,000	82,000	82,000	91,000	91,000
		-	-	-	-	-	-
Olnick	General Office	6,950	14,425	14,425	14,425	14,425	14,425
		-	-	-	-	-	-
Metro Office Park	Office Park	8,125	16,300	16,300	16,300	16,300	16,300
		-	-	-	-	-	-
Ceridian - Bluff site	Corporate Headquarters	-	1,600	1,600	1,600	1,600	1,600
		-	-	-	-	-	-
RPZ Block	Office	5,950	-	-	-	-	-
	Hotel	500	-	-	-	-	-
	Total	6,450	-	-	-	-	-
		-	-	-	-	-	-
Robert Muir	General Office	-	6,225	6,225	6,225	6,225	6,225
	Parking	800	-	-	-	-	-
		-	-	-	-	-	-
VTC Plant (Lucent)	Manufacturing	650	1,650	1,450	1,450	1,450	1,450
		-	-	-	-	-	-
Rest of Airport South District		67,025	67,025	67,025	67,025	67,025	67,025
Total Airport South District		172,000	189,225	269,825	257,350	256,350	275,950

TABLE 6
PM PEAK HOUR TRIP GENERATION

SITE	LAND USE	TRIPS TO AIRPORT SOUTH						TRIPS FROM AIRPORT SOUTH					
		Existing 1997	No Build 2020	Build 1 2020	Build 2 2020	Build 3A 2020	Build 3B 2020	Existing 1997	No Build 2020	Build 1 2020	Build 2 2020	Build 3A 2020	Build 3B 2020
Met Center	General Office	-	-	136	106	191	191	-	-	664	519	934	934
	Hotel	-	-	479	392	247	247	-	-	347	284	179	179
	Residential	-	-	80	64	-	-	-	-	45	36	-	-
	Retail	-	-	1,464	1,248	-	-	-	-	1,586	1,352	-	-
	Total	-	-	2,159	1,810	438	438	-	-	2,642	2,191	1,113	1,113
		-	-	-	-	-	-	-	-	-	-	-	-
Adjoining Lands	Shopping Center	-	-	960	960	-	-	-	-	1,040	1,040	-	-
	General Office	-	-	-	-	102	213	-	-	-	-	498	1,038
	Hotel	-	-	-	-	363	425	-	-	-	-	263	315
	Residential	-	-	-	-	48	512	-	-	-	-	27	288
	Retail	-	-	-	-	1,092	1,452	-	-	-	-	1,183	1,573
	Total	-	-	960	960	1,605	2,602	-	-	1,040	1,040	1,971	3,214
		-	-	-	-	-	-	-	-	-	-	-	-
Mall of America	Shopping Center	3,154	3,154	3,154	3,154	3,154	3,154	3,416	3,416	3,416	3,416	3,416	3,416
	Hotel	-	-	-	-	348	348	-	-	-	-	252	252
	Total	3,154	3,154	3,154	3,154	3,502	3,502	3,416	3,416	3,416	3,416	3,668	3,668
		-	-	-	-	-	-	-	-	-	-	-	-
Olnick	General Office	170	357	357	357	357	357	830	1,743	1,743	1,743	1,743	1,743
		-	-	-	-	-	-	-	-	-	-	-	-
Metro Office Park	Office Park	242	404	404	404	404	404	1,183	1,971	1,971	1,971	1,971	1,971
		-	-	-	-	-	-	-	-	-	-	-	-
Ceridian - Bluff site	Corporate Headquarters	-	55	55	55	55	55	-	270	270	270	270	270
		-	-	-	-	-	-	-	-	-	-	-	-
RPZ Block	Office	81	-	-	-	-	-	394	-	-	-	-	-
	Hotel	43	-	-	-	-	-	32	-	-	-	-	-
	Total	124	-	-	-	-	-	426	-	-	-	-	-
		-	-	-	-	-	-	-	-	-	-	-	-

TABLE 6 continued
PM PEAK HOUR TRIP GENERATION

SITE	LAND USE	TRIPS TO AIRPORT SOUTH						TRIPS FROM AIRPORT SOUTH					
		Existing 1997	No Build 2020	Build 1 2020	Build 2 2020	Build 3A 2020	Build 3B 2020	Existing 1997	No Build 2020	Build 1 2020	Build 2 2020	Build 3A 2020	Build 3B 2020
Robert Muir	General Office	-	149	149	149	149	149	-	726	726	726	726	726
	Parking	13	-	-	-	-	-	13	-	-	-	-	-
		-	-	-	-	-	-	-	-	-	-	-	-
VTC Plant	Manufacturing	26	68	58	58	58	58	99	257	217	217	217	217
		-	-	-	-	-	-	-	-	-	-	-	-
Rest of Airport South District	Mixed	4,309	4,309	4,309	4,309	4,309	4,309	4,991	4,991	4,991	4,991	4,991	4,991
		-	-	-	-	-	-	-	-	-	-	-	-
Total Airport South District		8,038	8,496	11,605	11,256	10,877	11,874	10,958	13,374	17,016	16,565	16,670	17,913

Highway Assignment Process

The regional forecast model uses link-based speed adjustments to account for congestion on the roadway system. This method does not typically provide a good replication of the effects of freeway ramp metering. Ramp-specific delays of three-to-eight minutes were added to the model to sufficiently control demand at the ramps. The implications of ramp metering are discussed in the section on analysis and results.

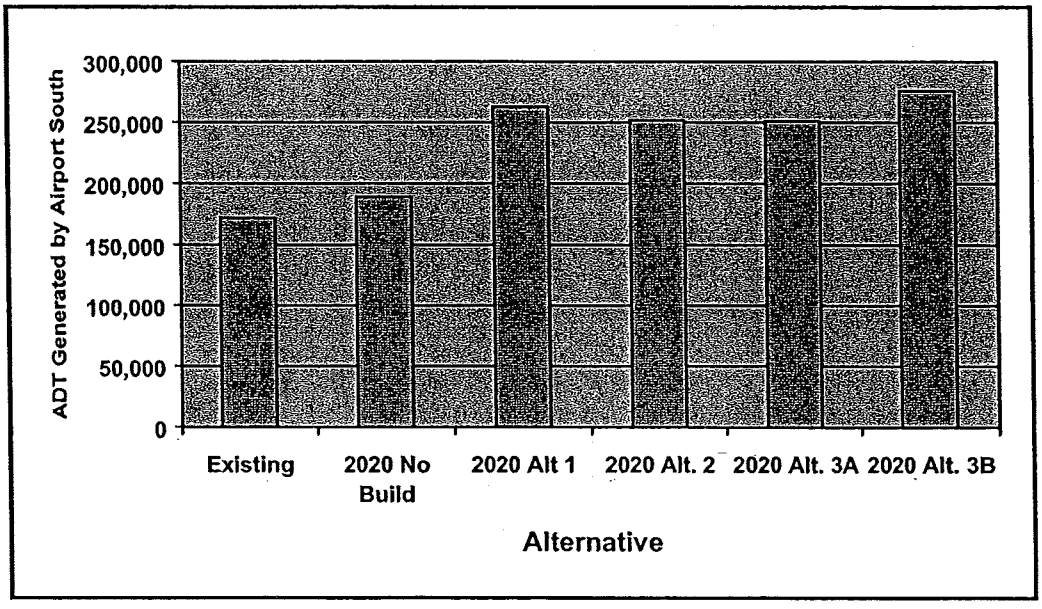
ANALYSIS AND RESULTS

Trip Generation

As discussed above, each combination of land uses generates a different volume of traffic. As Figure 5 shows, however, many of the alternatives are similar. The No Build generates 189,225 daily trips, 10.5 percent more than currently generated.

All of the development alternatives are fairly comparable in terms of trip generation. The lowest of the Build alternatives (Alternative 3A) generates 256,350 trips per day (35.5 percent more than the No Build). The highest alternative (Alternative 3B) generates 275,950 trips per day (45.8 percent higher than the No Build). Therefore while the alternatives generate significantly more traffic than the No Build, the differences among Build alternatives is not large, with a 7.6 percent difference between the highest and lowest.

FIGURE 3
COMPARISON OF DAILY TRAFFIC GENERATION



Trip Distribution

The effects of the proposed developments on the regional transportation system are linked not only to the amount of traffic produced and by the destination (or origin) of that traffic.

Figure 4 shows the direction of approach for trips to the Airport South area. Approximately 67 percent of the trips generated by the Airport South area are longer than five miles, compared to 60 percent of the region's trips as a whole (based on the 1990 regional Travel Behavior Inventory). A significant effect of longer trips is the need or desire of those trips to use regional highway facilities such as TH 77 and I-494. Conversely, the longer trips have a lesser desire or ability to use the local roadway system.

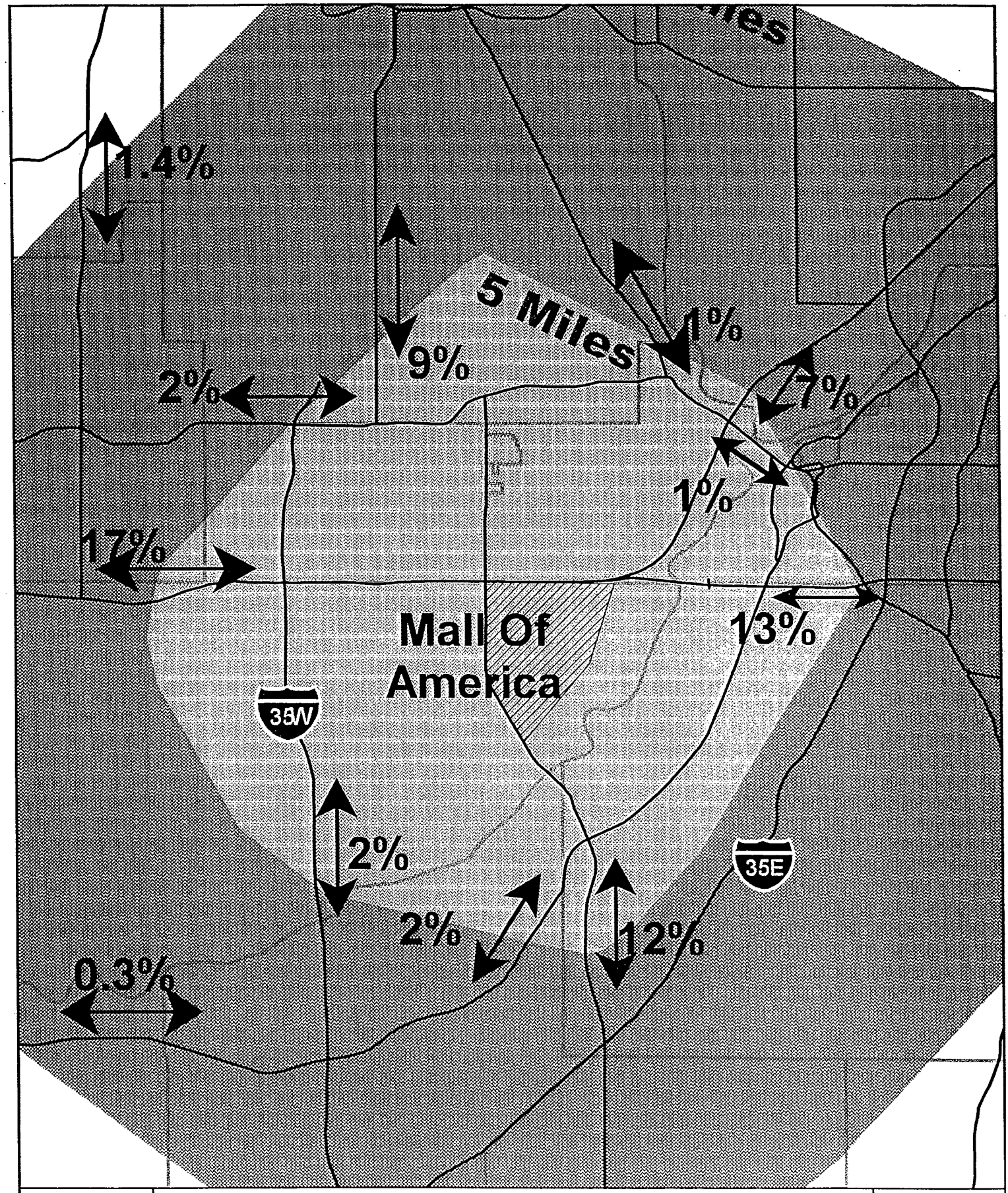
Figure 4 shows that overall directions of approach are generally consistent with the population distribution patterns in the region as a whole, and also reflect the sub-regional market that could be served by new commercial development. The dominant direction of approach is from the west/northwest along I-494 and TH 62 at 19 percent. Approximately 16 percent of the traffic approaches from the south in the TH 77/I-35W travelshed. The totals on Figure 6 do not add up to 100 percent because 34 percent of the trips begin and end within 5 miles of the site.

The internal-external-through trip pattern for the Airport South District alternatives is summarized in Table 7. The distribution of current trips generated within the Airport South District was determined by calibrating the trip distribution against available cordon counts. Traffic data was collected at the approach roads of the Airport South district in August and September 1999.

Out of the 172,000 trips currently generated within the district, 26,750 stay within the area. Because both ends of these trips are within the district, they represent 15.5 percent of the total trips generated by the study area. This is reasonably consistent with data from the 1990 Travel Behavior Inventory, which found approximately 13 percent of trips are less than one mile in length. Furthermore, the relationship between the hotels located in the Airport South area and the retail/dining opportunities at the Mall of America validates the reasonableness of 15 percent of trips staying within the study area. Similarly, 2020 modeling results projected that 15.8 to 16.5 percent of the trips (for all alternatives) stayed within the area.

The cordon total includes an estimated 12,200 through trips, with both trip ends outside the district. These trips, 7.7 percent of the total cordon crossings, can be attributable to the presence of the minor arterials through the study area: Old Shakopee Road/24th Avenue South and the 79th/80th arterial ring road. These roadways, depending on the time of day and trip origin-destination, can provide a more convenient travel option to using the freeway system.

The number of through trips is estimated at between 13,350 and 19,400 depending on alternative. In general, as the number of trips generated by the study area increases, the number of through-trips decreases. This is attributable to the increasing congestion on study area roadways, which lessens the attractiveness of those roadways for the through trips.



N

MOA EXPANSION DRAFT EIS

DIRECTION OF APPROACH TO THE MALL OF AMERICA

FIGURE
4
5/10/00

TABLE 7
SUMMARY OF AIRPORT SOUTH INTERNAL-EXTERNAL VEHICLE TRIP DISTRIBUTION

Alternative	Total Trips Generated by Study Area [1]	Trips That Stay Within Study Area [2]		Through Trips [3]	Total Study Area Trips [4]
		Number	Percent		
1998	172,000	26,750	15.5%	12,200	157,450
2020 No Build	189,230	29,880	15.8%	19,400	178,750
2020 Build 1	269,825	43,700	16.2%	13,350	239,475
2020 Build 2	257,350	42,460	16.5%	15,800	230,690
2020 Build 3A	256,350	41,270	16.1%	16,150	231,230
2020 Build 3B	275,950	45,000	16.3%	13,400	244,350

Notes:

(1) Measured in trip ends (trip origin or trip destination)
(2) Internal trips have both trip origin and trip destination and are counted twice: once for the trip origin and once for the trip destination
(3) Through trips have neither trip origin nor trip destination in study area – these trips pass through and are counted twice: once as they enter the study area and once as they leave the study area
(4) Sum of study area trips plus through trips minus trips that stay within study area

Mode Choice

Transit ridership is estimated to currently account for 4.5 percent of all person trips in the Airport Study Area, or 9,800 trips per day. Approximately 65 percent of those trips are on the S-54 and M-80 routes, the express services between the Mall of America and the downtowns of St. Paul and Minneapolis, respectively.

Table 8 shows the estimated transit ridership for each alternative. Transit ridership under the No Build is estimated at 13,625 riders per day (3,825 riders more than today). Under the Build alternatives, transit ridership would increase by 9,075 to 11,375 riders per day over current levels. The percent of Airport South area trips that are carried by transit is expected to rise to 5.6 percent by the year 2020 due to the construction of LRT in the Hiawatha Corridor. The build alternatives, which focus more activity near the Mall of America transit hub, would increase the transit market share to 5.9 percent overall.

TABLE 8
ESTIMATED YEAR 2020 TRANSIT RIDERSHIP IN THE AIRPORT SOUTH AREA

Alternative	Estimated Transit Trips (includes LRT)	Estimated Transit Percent	Estimated LRT Riders [1]
Existing	9,800	4.5%	N/A
No Build	13,625	5.6%	7,500
Alternative 1	19,700	5.9%	9,500
Alternative 2	18,875	5.9%	9,100
Alternative 3A	19,175	5.9%	9,200
Alternative 3B	21,175	5.9%	10,500

Source: SRF Consulting , Group, Inc.

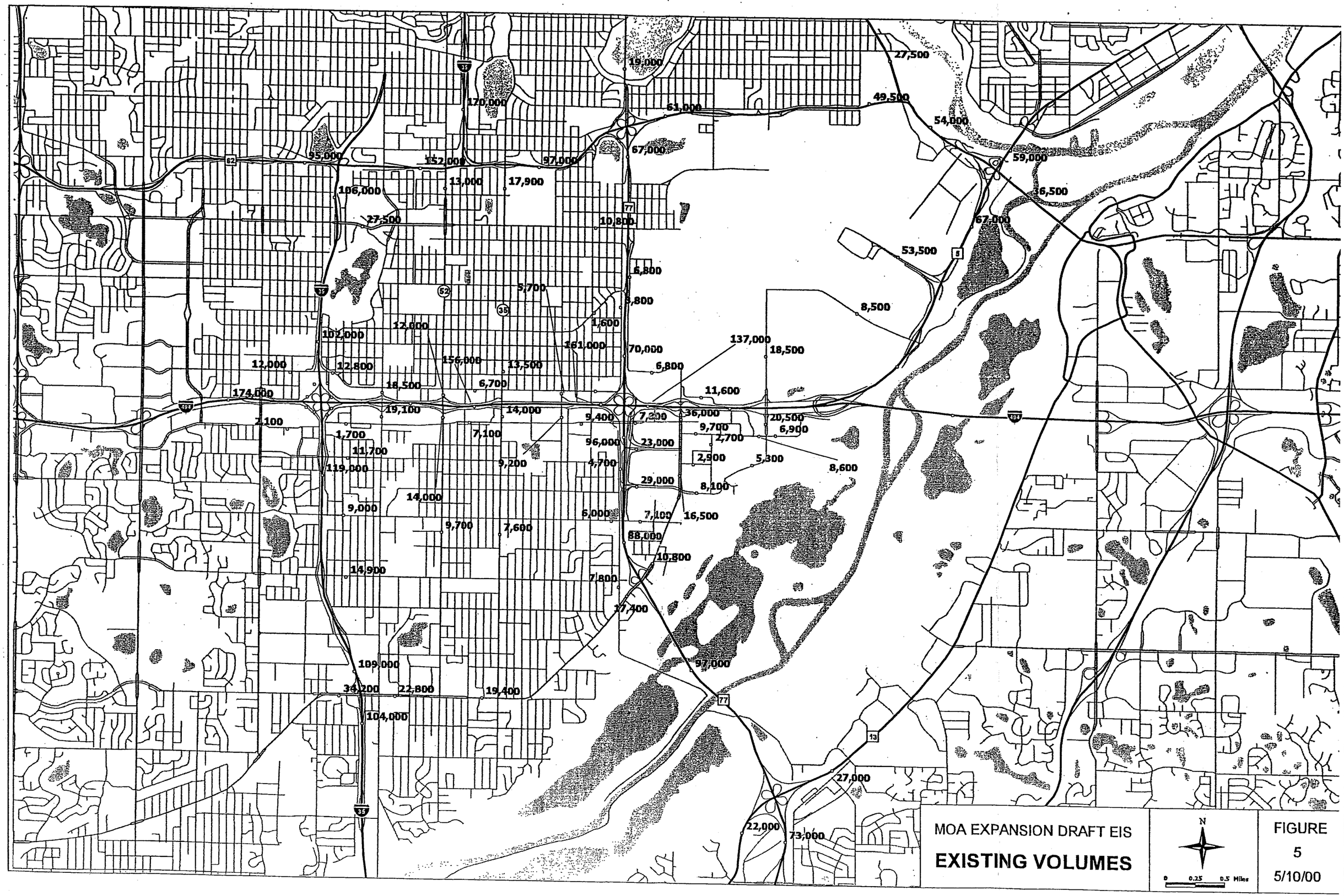
Forecasts of LRT ridership for the Hiawatha Avenue Corridor (August 1999) show a total of 9,500 daily trips generated by the LRT line at the stations in the Airport South area. That analysis assumed a 50 percent increase in development in the Airport South area, which is comparable to Alternative 1 and Alternative 2. Alternative 3B could increase the LRT ridership by nearly 1,000 passengers per day.

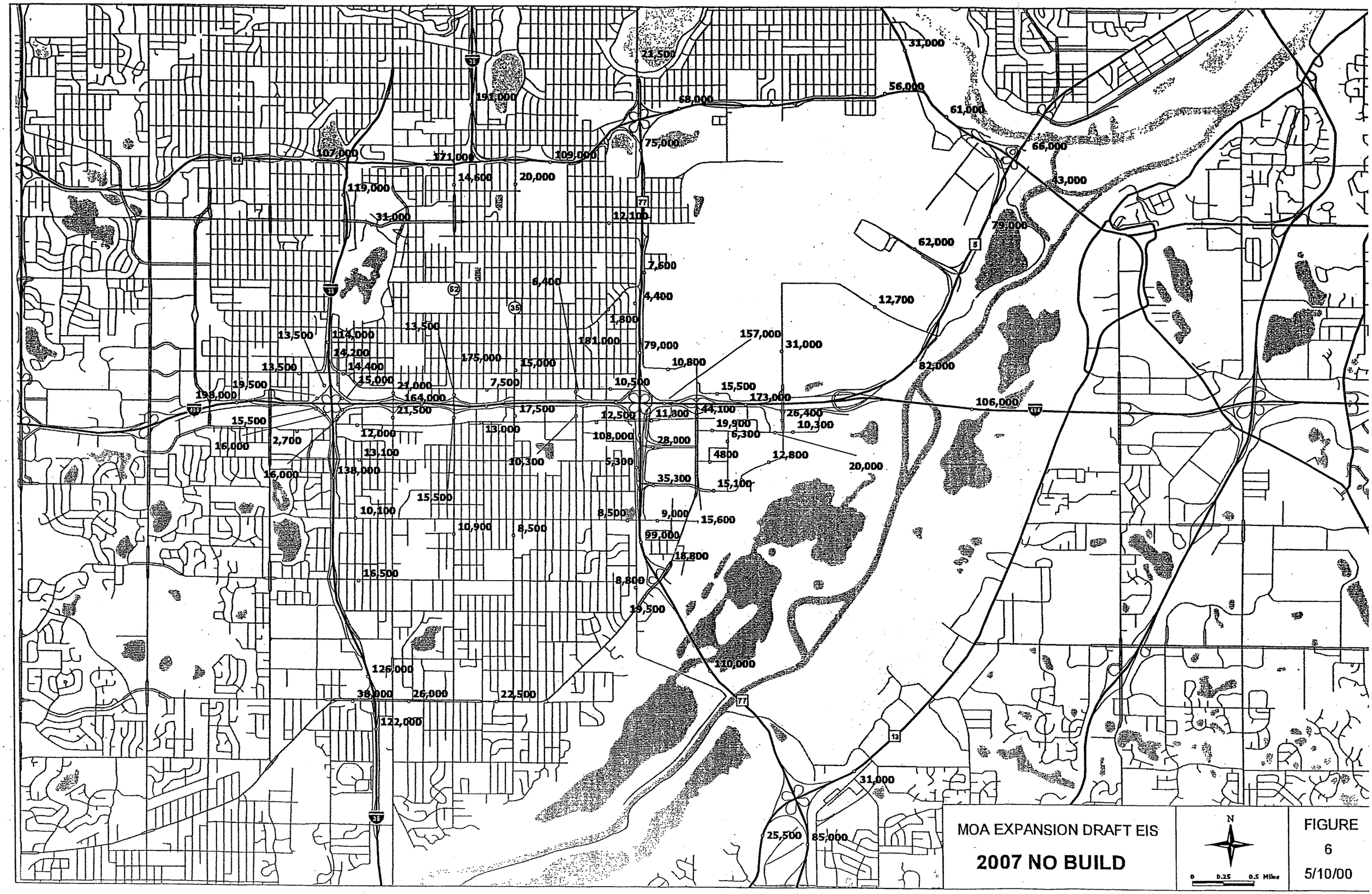
Forecast Daily Traffic Volumes

Estimates of future traffic volumes on the area roadways were prepared to determine the effects of the land use alternatives. Year 2007 and year 2020 forecasts were developed for the purposes of analyzing traffic, air quality and noise impacts. Two year 2020 assignments were prepared for each alternative: one assuming that the additional through lanes on I-494 would be constructed as HOV lanes and one assuming completion as mixed use lanes.

It was determined that a "worst case" condition existed if the lanes are constructed as HOV lanes, since I-494 would carry fewer vehicles per lane because the HOV lane would operate with fewer than the 2300 vehicle capacity of a mixed use lane. This resulted in more vehicles on the local roadway system as well as more congested conditions on I-494. A more detailed operations analysis of I-494, including a comparison of HOV versus mixed-use capacity will be conducted in 2000 and 2001 as part of the I-494 Final EIS. No improvements are scheduled for I-494 in the vicinity of Airport South by the year 2007.

Figures 5 through 11 show the existing and estimated future (2007 and 2020) average daily traffic on roadways in and near the study area. Traffic forecasts for future years in these figures include No Build, Alternative 1 and Alternative 3B conditions. Alternative 1 represents the highest level of proposed development for the Met Center site and Alternative 3B is the highest development proposed for the MOA expansion of the Adjoining Lands property. These two alternatives represent the two "worst case" Build alternatives.


19,000
27,500
170,000
61,000
49,500
54,000
95,000
152,000
97,000
67,000
59,000
13,000
17,900
106,000
36,500
27,500
10,800
67,000
53,500
6,800
5,700
8,800
8,500
12,000
1,600
102,000
161,000
137,000
70,000
18,500
12,000
12,800
156,000
13,500
6,800
18,500
6,700
174,000
11,600
19,100
14,000
9,400
7,200
36,000
20,500
2,100
9,700
6,900
1,700
7,100
2,700
96,000
23,000
11,700
2,900
5,300
119,000
9,200
4,700
8,600
29,000
8,100
14,000
9,000
6,000
7,100
16,500
9,700
7,600
88,000
10,800
14,900
7,800
17,400
97,000
109,000
34,200
22,800
19,400
104,000
27,000
22,000
73,000
MOA EXPANSION DRAFT EIS
EXISTING VOLUMES
N
0 0.25 0.5 Miles
FIGURE
5
5/10/00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61,000
66,000
13,000
79,000
62,000
68,000
75,000
191,000
107,000
171,000
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14,600
20,000
119,000
31,000
12,100
7,600
6,400
4,400
12,700
1,800
13,500
114,000
14,200
14,400
13,500
181,000
79,000
157,000
31,000
175,000
15,000
10,800
82,000
19,500
198,000
15,000
21,000
164,000
7,500
10,500
15,500
173,000
106,000
15,500
21,500
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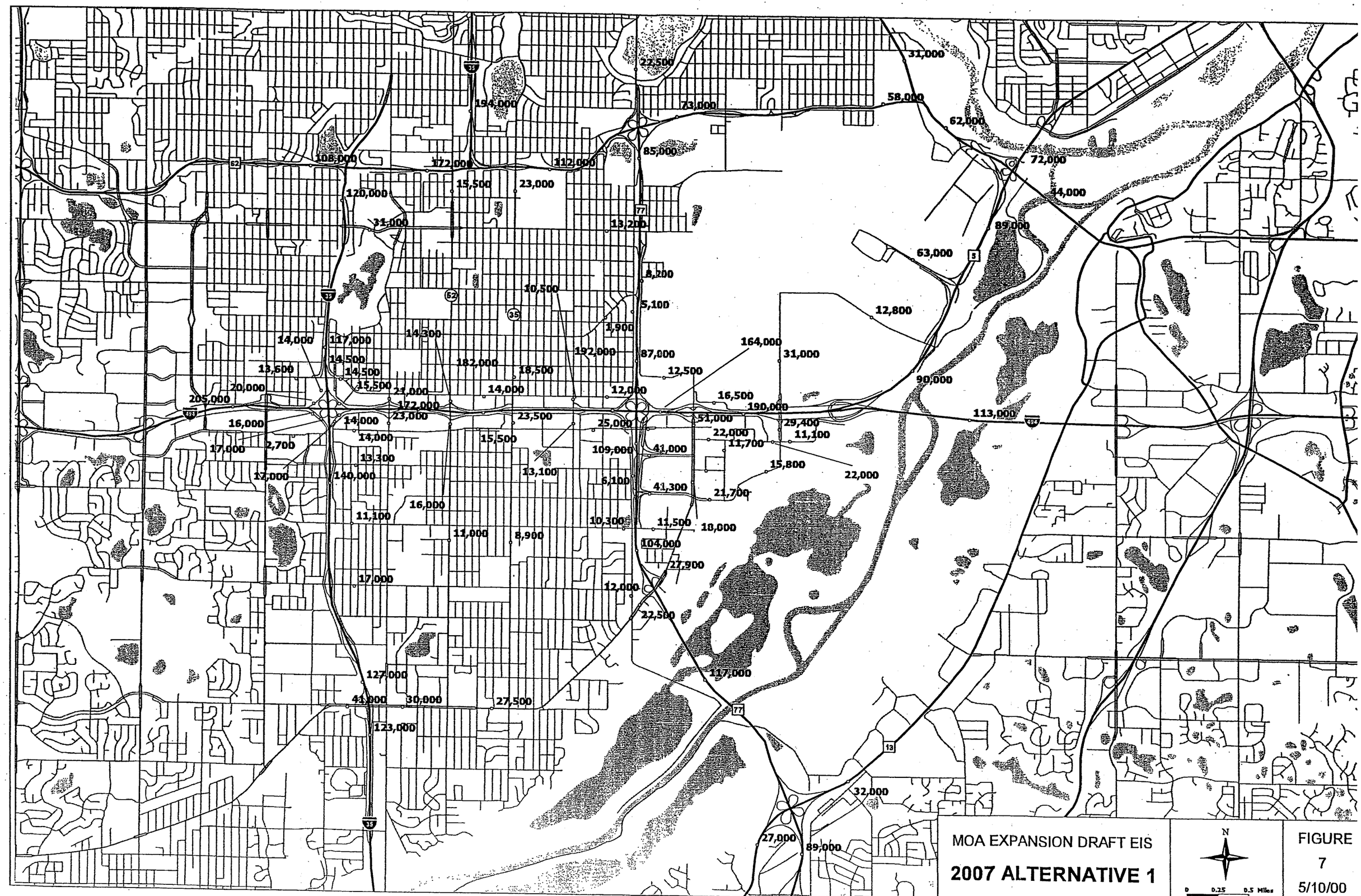
8,500
99,000
18,800
16,500
8,800
19,500
126,000
38,000
26,000
22,500
122,000
110,000
31,000
25,500
85,000
MOA EXPANSION DRAFT EIS
2007 NO BUILD
N
0
0.25
0.5 Miles
FIGURE
6
5/10/00


22,500
194,000
73,000
31,000
58,000
62,000
85,000
72,000
108,000
172,000
112,000
15,500
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63,000
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31,000
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12,500
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21,000
14,000
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190,000
113,000
16,000
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11,000
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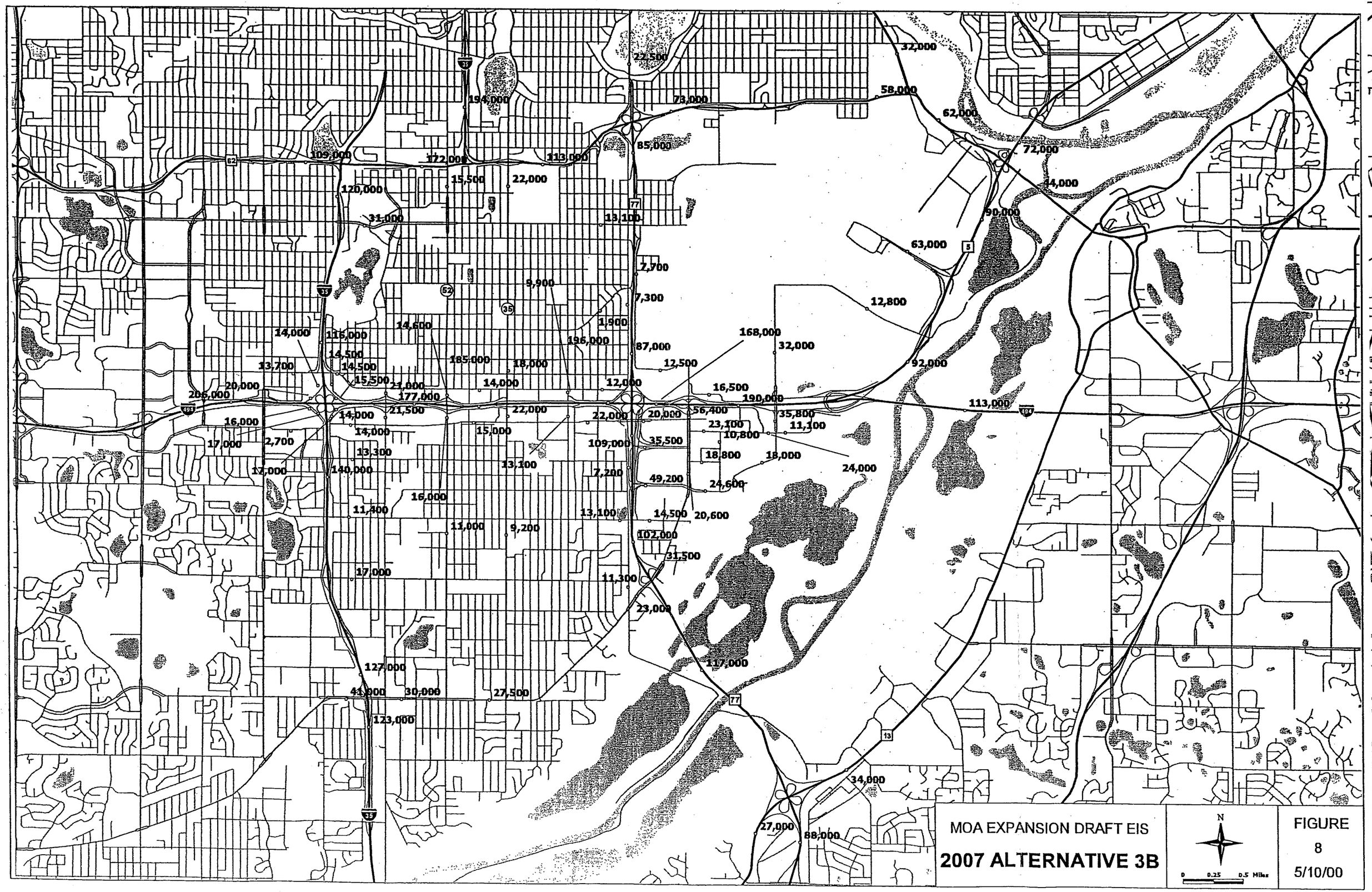
27,900
17,000
12,000
22,500
127,000
41,000
30,000
27,500
117,000
123,000
32,000
27,000
89,000
62
35
77
13
MOA EXPANSION DRAFT EIS
2007 ALTERNATIVE 1
N
0
0.25
0.5 Miles
FIGURE
7
5/10/00



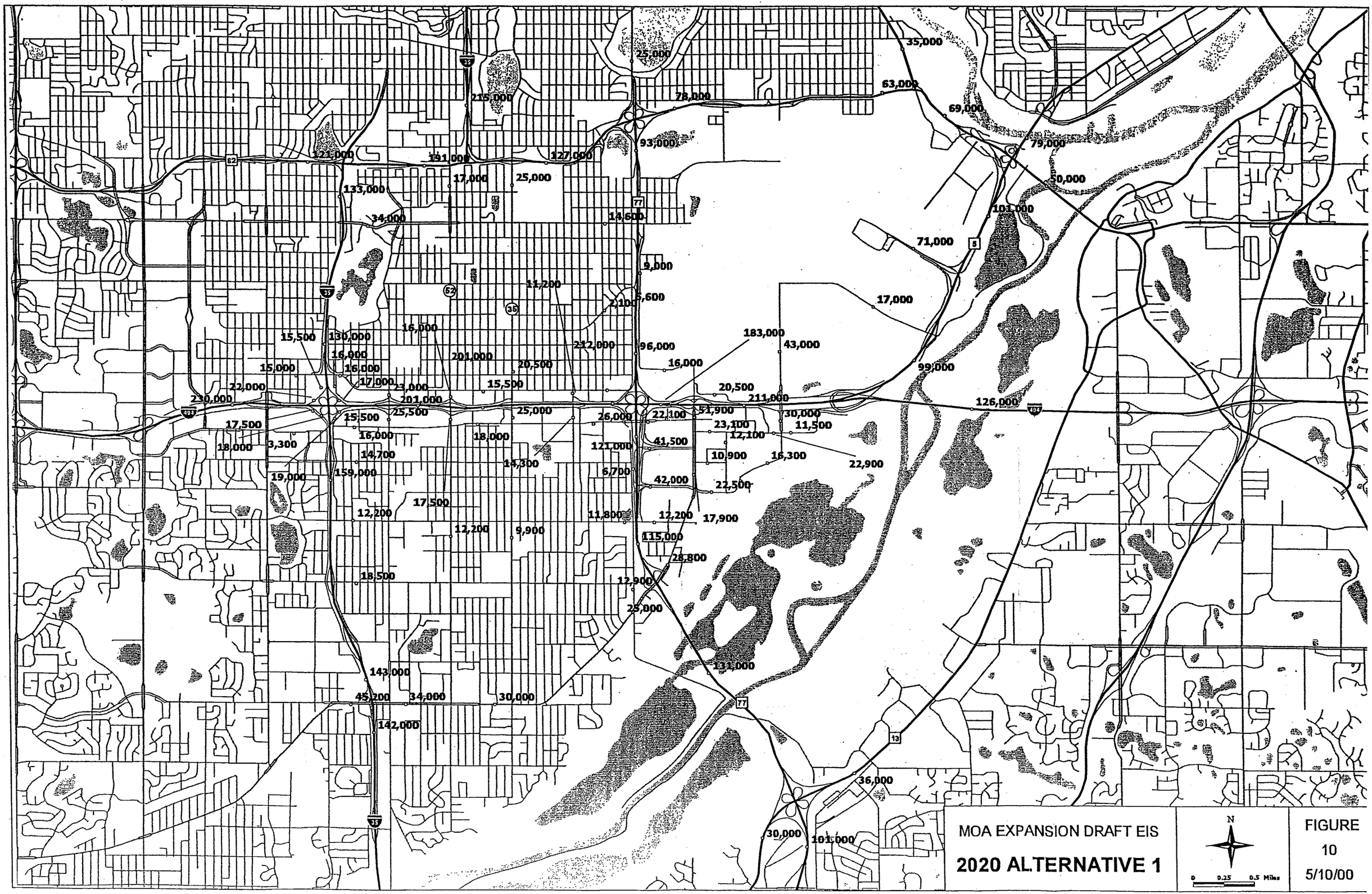
MOA EXPANSION DRAFT EIS

2007 ALTERNATIVE 3B

N

0 0.25 0.5 Miles

FIGURE 8 5/10/00



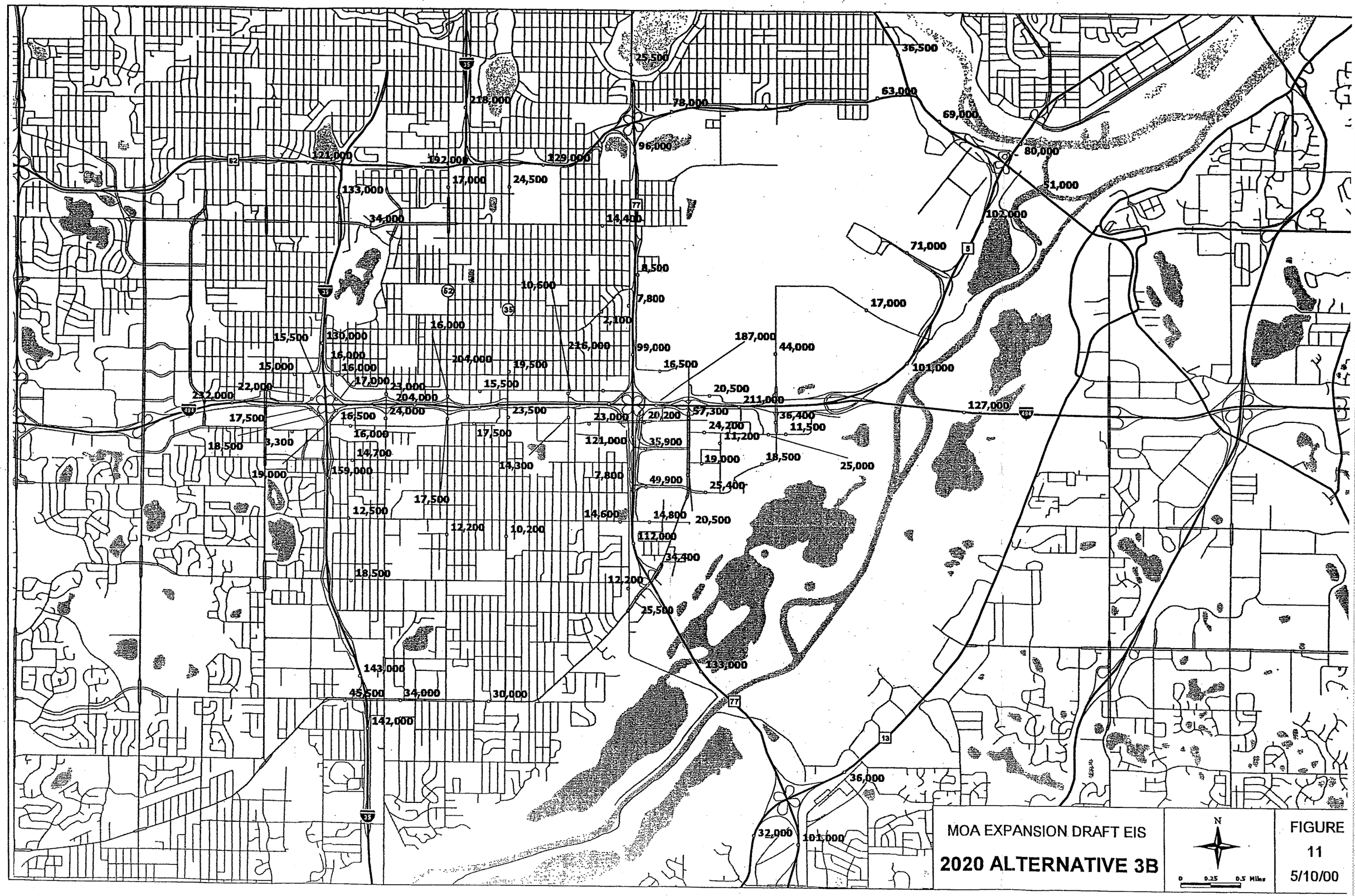
MOA EXPANSION DRAFT EIS

2020 ALTERNATIVE 1

N

0 0.25 0.5 Miles

FIGURE 10 5/10/00


25,500
36,500
63,000
69,000
78,000
218,000
96,000
80,000
121,000
192,000
129,000
17,000
24,500
133,000
51,000
34,000
14,400
102,000
71,000
8,500
10,600
7,800
17,000
16,000
2,100
15,500
130,000
187,000
44,000
216,000
99,000
16,000
16,000
204,000
19,500
16,500
101,000
15,000
16,000
17,000
23,000
15,500
20,500
22,000
232,000
204,000
211,000
127,000
17,500
16,500
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23,000
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11,200
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10,200
112,000
34,400
18,500
12,200
25,500
143,000
133,000
45,500
34,000
30,000
142,000
36,000
32,000
101,000
MOA EXPANSION DRAFT EIS
2020 ALTERNATIVE 3B
N
0
0.25
0.5 Miles
FIGURE
11
5/10/00

Impacts on Regional System

Roadway Segments

Table 9 shows the estimated current levels of service in the p.m. peak hour. The analysis reflects a comparison of the projected traffic volume demand to the carrying capacity of each roadway facility. For example, a mixed use lane can carry 2,300 vehicles per hour, but an auxiliary lane carries traffic only exiting and entering nearby interchanges and therefore has a lower capacity (assumed at 50 percent of a full lane, or 1,150 vehicles per hour). HOV lanes are assumed to carry 1,400 vehicles per lane at capacity. (As a "worst case" condition, the modeling used in this analysis assumes the planned lane addition to I-494 will be an HOV lane.)

This level of analysis is adequate for planning purposes and for the purpose of comparing alternatives. Roadway segments operating at or near capacity, resulting in unacceptable levels of service E or F ("slow-and-go" or "stop-and-go"), are highlighted in Tables 9 through 15.

The following segments currently operate at LOS E or F:

- I-35W and TH 62 Common Segment
- I-35W north of 60th Street
- TH 55 north of TH 62 (Hiawatha Ave.)
- I-494 west of TH 77
- TH 77 River Bridge
- I-494 west of Portland Avenue
- I-494 west of Penn Avenue

As shown in Table 10, improvements planned for construction by the year 2007 will alleviate congestion problems on I-35W and TH 62 (Common Section), I-35W North of 60th Street and TH 55 north of TH 62. These segments would not be overly congested under a No Build case. However, TH 62 east of Portland becomes congested by year 2007 for No Build conditions, along with the remaining four segments that are currently congested:

- I-494 west of TH 77
- TH 77 River Bridge
- I-494 west of Portland Avenue
- I-494 west of Penn Avenue

Table 11 shows that traffic generated by Alternative 1 would add to No Build traffic volumes, resulting in undesirable levels of congestion in these additional segments in Year 2007:

- I-35W north of 60th Street
- I-494 west of 24th Avenue South

Table 12 shows that the same segments would be congested in 2007 under Alternative 3B.

TABLE 9
EXISTING PM PEAK HOUR LEVEL OF SERVICE

Location	Lanes (1)	Average Annual Daily Traffic (2)	PM Peak Hour % (3)	Peak Direction %	One-Way Peak Hour Volume	Hourly Volume per Lane	Capacity per Lane (4)	Level of Service
TH 62 East of Penn Ave	6	95,000	6.7%	55.4%	3525	1175	1900	C
I-35W and TH 62 Commons	**6**	**152,000**	**6.8%**	**52.2%**	**5400**	**1800**	**1900**	**E**
I-35W North of 60th Street	**6**	**170,000**	**7.5%**	**50.7%**	**6475**	**2150**	**2300**	**E**
TH 62 East of Portland Ave	4	97,000	7.7%	51.4%	3850	1925	2300	D
TH 62 East of TH 77	4	61,000	8.5%	55.6%	2875	1450	2300	C
TH 62 West of TH 55	4	49,500	8.5%	54.8%	2300	1150	2300	C
TH 55 North of TH 62	**4**	**27,500**	**8.5%**	**52.5%**	**1225**	**625**	**650**	**E**
TH 55 South of TH 62	4	54,000	9.0%	52.5%	2550	1275	2300	C
TH 5 River Bridge	4	59,000	7.9%	51.7%	2425	1225	2300	C
TH 55 River Bridge	4	36,500	9.5%	66.0%	2275	1150	2300	C
TH 5 South of TH 55	6	67,000	8.8%	52.5%	3100	1025	1900	C
TH 5 South of Post Rd	6	73,000	8.8%	52.5%	3375	1125	1900	C
I-494 River Bridge	6	94,000	9.5%	55.9%	4975	1650	2300	C
I-494 West of 34th Ave	10	152,000	8.7%	55.7%	7325	1475	2050	C
I-494 West of 24th Ave	6	137,000	7.9%	51.2%	5575	1850	2300	D
TH 77 North of Old Shakopee Rd.	8	88,000	9.2%	72.0%	5825	1450	2000	C
TH 77 North of I-494	6	70,000	8.7%	55.2%	3375	1125	1900	C
I-494 West of TH 77	**8**	**161,000**	**8.0%**	**56.0%**	**7225**	**1800**	**2000**	**E**
TH 77 River Bridge	**6**	**96,000**	**10.0%**	**66.0%**	6325	2100	**2300**	**E**
I-35W South of 94th Street	6	109,000	7.3%	60.5%	4825	1600	2000	D
I-35W South of 82nd Street	6	119,000	7.1%	53.0%	4475	1500	2000	D
I-494 West of Penn Ave	**6**	**174,000**	**7.5%**	**52.9%**	6925	2300	**2300**	**F**
I-494 West of Portland	**6**	**156,000**	**8.0%**	**56.0%**	7000	2325	**2300**	**F**
I-35W North of 76th Street	4	102,000	6.9%	50.7%	3550	1775	2300	D
I-35W South of TH 62	6	106,000	7.5%	50.0%	4000	1325	2000	C

Notes:
(1) Total of through, HOV and auxiliary lanes
(2) Annual Average Daily Traffic (MnDOT 1998)
(3) Peak factors from MnDOT Traffic Management Center *All Detector Report* (4/99), adjusted to reflect average weekday peak conditions
(4) Weighted at 2300 vehicles per lane for through lanes, 1400 vehicles per hour HOV lanes and 1150 vehicles per lane auxiliary (less than one mile long)

TABLE 10
2007 NO BUILD PM PEAK HOUR LEVEL OF SERVICE

Location	Lanes (1)	Average Annual Daily Traffic (2)	PM Peak Hour % (3)	Peak Direction %	One-Way Peak Hour Volume	Hourly Volume per Lane	Capacity per Lane (4)	Level of Service
TH 62 East of Penn Ave	6	107,000	6.0%	52.9%	3398	1133	1900	C
I-35W and TH 62 Commons	8	171,000	6.7%	53.8%	6194	1548	2100	C
I-35W North of 60th Street	8	191,000	7.5%	52.2%	7446	1862	2100	D
TH 62 East of Portland Ave	**4**	**109,000**	**7.5%**	**51.4%**	**4176**	**2088**	**2300**	**E**
TH 62 East of TH 77	4	68,000	8.2%	53.1%	2962	1481	2300	C
TH 62 West of TH 55	4	56,000	8.2%	54.8%	2519	1260	2300	C
TH 55 North of TH 62	4	31,000	8.3%	52.5%	1343	671	1100	C
TH 55 South of TH 62	4	61,000	8.8%	52.5%	2813	1407	2300	C
TH 5 River Bridge	4	66,000	7.7%	51.7%	2626	1313	2300	C
TH 55 River Bridge	4	43,000	9.2%	61.0%	2416	1208	2300	C
TH 5 South of TH 55	6	79,000	8.6%	52.5%	3561	1187	1900	C
TH 5 South of Post Rd	6	82,000	8.6%	52.5%	3696	1232	1900	C
I-494 River Bridge	6	106,000	9.2%	53.4%	5216	1739	2300	D
I-494 West of 34th Ave	10	173,000	8.4%	53.2%	7737	1547	2050	D
I-494 West of 24th Ave	6	157,000	7.7%	51.2%	6180	2060	2300	D
TH 77 North of Old Shakopee Rd.	8	99,000	8.9%	66.8%	5921	1480	2000	C
TH 77 North of I-494	6	79,000	8.5%	52.6%	3518	1173	1900	C
I-494 West of TH 77	**8**	**181,000**	**7.8%**	**53.4%**	**7498**	**1875**	**2000**	**E**
TH 77 River Bridge	**6**	**108,000**	**9.7%**	**61.0%**	**6401**	**2134**	**2300**	**E**
I-35W South of 94th Street	6	126,000	7.1%	55.4%	4937	1646	2000	D
I-35W South of 82nd Street	6	138,000	6.9%	53.0%	5014	1671	2000	D
I-494 West of Penn Ave	**6**	**198,000**	**7.3%**	**52.9%**	**7620**	**2540**	**2300**	**F**
I-494 West of Portland	**6**	**175,000**	**7.8%**	**53.4%**	**7250**	**2417**	**2300**	**F**
I-35W North of 76th Street	6	114,000	6.9%	52.8%	4143	1381	2000	C
I-35W South of TH 62	8	119,000	7.5%	51.5%	4590	1148	2100	C

Notes:
(1) Total of through, HOV and auxiliary lanes
(2) Annual Average Daily Traffic (MnDOT 1998)
(3) Peak factors from MnDOT Traffic Management Center *All Detector Report* (4/99), adjusted to reflect average weekday peak conditions
(4) Weighted at 2300 vehicles per lane for through lanes, 1400 vehicles per hour HOV lanes and 1150 vehicles per lane auxiliary (less than one mile long)

TABLE 11
2007 ALTERNATIVE 1 PM PEAK HOUR LEVEL OF SERVICE

Location	Lanes (1)	Average Annual Daily Traffic (2)	PM Peak Hour % (3)	Peak Direction %	One-Way Peak Hour Volume	Hourly Volume per Lane	Capacity per Lane (4)	Level of Service
TH 62 East of Penn Ave	6	108,000	6.0%	52.9%	3430	1143	1900	C
I-35W and TH 62 Commons	8	172,000	6.7%	53.8%	6230	1558	2100	C
I-35W North of 60th Street	**8**	**194,000**	**7.5%**	**52.2%**	**7563**	**1891**	**2100**	**E**
TH 62 East of Portland Ave	**4**	**112,000**	**7.5%**	**51.4%**	**4291**	**2145**	**2300**	**E**
TH 62 East of TH 77	4	73,000	8.2%	53.1%	3180	1590	2300	C
TH 62 West of TH 55	4	58,000	8.2%	54.8%	2609	1305	2300	C
TH 55 North of TH 62	4	31,000	8.3%	52.5%	1343	671	1100	C
TH 55 South of TH 62	4	62,000	8.8%	52.5%	2859	1430	2300	C
TH 5 River Bridge	4	72,000	7.7%	51.7%	2864	1432	2300	C
TH 55 River Bridge	4	44,000	9.2%	61.0%	2472	1236	2300	C
TH 5 South of TH 55	6	89,000	8.6%	52.5%	4012	1337	1900	C
TH 5 South of Post Rd	6	90,000	8.6%	52.5%	4057	1352	1900	C
I-494 River Bridge	6	113,000	9.2%	53.4%	5560	1853	2300	D
I-494 West of 34th Ave	10	190,000	8.4%	53.2%	8497	1699	2050	D
I-494 West of 24th Ave	**6**	**164,000**	**7.7%**	**51.2%**	**6456**	**2152**	**2300**	**E**
TH 77 North of Old Shakopee Rd.	8	104,000	8.9%	66.8%	6220	1555	2000	D
TH 77 North of I-494	6	87,000	8.5%	52.6%	3874	1291	1900	C
I-494 West of TH 77	**8**	**192,000**	**7.8%**	**53.4%**	**7954**	**1988**	**2000**	**E**
TH 77 River Bridge	**6**	**109,000**	**9.7%**	**61.0%**	**6460**	**2153**	**2300**	**E**
I-35W South of 94th Street	6	127,000	7.1%	55.4%	4976	1659	2000	D
I-35W South of 82nd Street	6	140,000	6.9%	53.0%	5087	1696	2000	D
I-494 West of Penn Ave	**6**	**205,000**	**7.3%**	**52.9%**	**7890**	**2630**	**2300**	**F**
I-494 West of Portland	**6**	**182,000**	**7.8%**	**53.4%**	**7539**	**2513**	**2300**	**F**
I-35W North of 76th Street	6	117,000	6.9%	52.8%	4252	1417	2000	C
I-35W South of TH 62	8	120,000	7.5%	51.5%	4629	1157	2100	C

Notes:
(1) Total of through, HOV and auxiliary lanes
(2) Annual Average Daily Traffic (MnDOT 1998)
(3) Peak factors from MnDOT Traffic Management Center *All Detector Report* (4/99), adjusted to reflect average weekday peak conditions
(4) Weighted at 2300 vehicles per lane for through lanes, 1400 vehicles per hour HOV lanes and 1150 vehicles per lane auxiliary (less than one mile long)

TABLE 12
2007 ALTERNATIVE 3B PM PEAK HOUR LEVEL OF SERVICE

Location	Lanes (1)	Average Annual Daily Traffic (2)	PM Peak Hour % (3)	Peak Direction %	One-Way Peak Hour Volume	Hourly Volume per Lane	Capacity per Lane (4)	Level of Service
TH 62 East of Penn Ave	6	109,000	6.0%	52.9%	3461	1154	1900	C
I-35W and TH 62 Commons	8	172,000	6.7%	53.8%	6230	1558	2100	C
I-35W North of 60th Street	**8**	**194,000**	**7.5%**	**52.2%**	**7563**	**1891**	**2100**	**E**
TH 62 East of Portland Ave	**4**	**113,000**	**7.5%**	**51.4%**	**4329**	**2164**	**2300**	**E**
TH 62 East of TH 77	4	73,000	8.2%	53.1%	3180	1590	2300	C
TH 62 West of TH 55	4	58,000	8.2%	54.8%	2609	1305	2300	C
TH 55 North of TH 62	4	32,000	8.3%	52.5%	1386	693	1100	C
TH 55 South of TH 62	4	62,000	8.8%	52.5%	2859	1430	2300	C
TH 5 River Bridge	4	72,000	7.7%	51.7%	2864	1432	2300	C
TH 55 River Bridge	4	44,000	9.2%	61.0%	2472	1236	2300	C
TH 5 South of TH 55	6	90,000	8.6%	52.5%	4057	1352	1900	C
TH 5 South of Post Rd	6	92,000	8.6%	52.5%	4147	1382	1900	C
I-494 River Bridge	6	113,000	9.2%	53.4%	5560	1853	2300	D
I-494 West of 34th Ave	10	190,000	8.4%	53.2%	8497	1699	2050	D
I-494 West of 24th Ave	**6**	**168,000**	**7.7%**	**51.2%**	**6613**	**2204**	**2300**	**E**
TH 77 North of Old Shakopee Rd.	8	102,000	8.9%	66.8%	6101	1525	2000	D
TH 77 North of I-494	6	87,000	8.5%	52.6%	3874	1291	1900	C
I-494 West of TH 77	**8**	**196,000**	**7.8%**	**53.4%**	**8119**	**2030**	**2000**	**F**
TH 77 River Bridge	**6**	**109,000**	**9.7%**	**61.0%**	**6460**	**2153**	**2300**	**E**
I-35W South of 94th Street	6	127,000	7.1%	55.4%	4976	1659	2000	D
I-35W South of 82nd Street	6	140,000	6.9%	53.0%	5087	1696	2000	D
I-494 West of Penn Ave	**6**	**206,000**	**7.3%**	**52.9%**	**7928**	**2643**	**2300**	**F**
I-494 West of Portland	**6**	**185,000**	**7.8%**	**53.4%**	**7664**	**2555**	**2300**	**F**
I-35W North of 76th Street	6	116,000	6.9%	52.8%	4215	1405	2000	C
I-35W South of TH 62	8	120,000	7.5%	51.5%	4629	1157	2100	C

Notes:
(1) Total of through, HOV and auxiliary lanes
(2) Annual Average Daily Traffic (MnDOT 1998)
(3) Peak factors from MnDOT Traffic Management Center *All Detector Report* (4/99), adjusted to reflect average weekday peak conditions
(4) Weighted at 2300 vehicles per lane for through lanes, 1400 vehicles per hour HOV lanes and 1150 vehicles per lane auxiliary (less than one mile long)

Tables 13-15 show projected regional system operations for year 2020 conditions for the three alternatives. Table 13 shows that planned roadway improvements continue to provide adequate capacity on I-35W and TH 62 (Common Section) and TH 55 north of TH 62 for 2020 No Build conditions. As a result, these segments would not be overly congested under 2020 No Build conditions. Congestion would continue to be a problem on the following (currently congested) segments in year 2020:

- I-35W north of 60th Street
- I-494 west of TH 77
- TH 77 River Bridge
- I-494 west of Penn Avenue
- TH 62 east of Portland Avenue

Note that the analysis of the I-494 segments includes planned capacity improvements, but these sections still have capacity problems by year 2020, due to increasing demand. Increasing development in the region would also cause congestion on the following additional segments relative to today:

- I-35W south of 82nd Street
- I-35W south of 94th Street

Table 14 shows the effects of Alternative 1 in 2020, with the following additional congested segments relative to the 2020 No Build:

- I-494 west of 34th Avenue
- I-494 west of 24th Avenue South
- I-494 west of Portland

Under Alternative 3B (Table 15), the following segment would also become congested in addition to the segments listed for Alternative 1:

- I-494 River Bridge

Table 16 summarizes the roadway segments where congested conditions currently exist or would exist under the No Build or Build alternatives. The Mall of America Phase 2 development would not contribute over six percent of the peak hour/peak direction demand on any segment of the regional highway system.

TABLE 13
2020 NO BUILD PM PEAK HOUR LEVEL OF SERVICE (I-494 HOV)

Location	Lanes (1)	Average Annual Daily Traffic (2)	PM Peak Hour % (3)	Peak Direction %	One-Way Peak Hour Volume	Hourly Volume per Lane	Capacity per Lane (4)	Level of Service
TH 62 East of Penn Ave	6	118,000	6.0%	52.9%	3747	1249	1900	C
I-35W and TH 62 Commons	8	189,000	6.7%	53.8%	6846	1711	2100	D
I-35W North of 60th Street	**8**	**212,000**	7.5%	52.2%	**8265**	**2066**	**2100**	**E**
TH 62 East of Portland Ave	**4**	**121,000**	7.5%	51.4%	**4635**	**2318**	**2300**	**F**
TH 62 East of TH 77	4	76,000	8.2%	53.1%	3310	1655	2300	C
TH 62 West of TH 55	4	62,000	8.2%	54.8%	2789	1395	2300	C
TH 55 North of TH 62	4	34,000	8.3%	52.5%	1473	736	1100	C
TH 55 South of TH 62	4	67,000	8.8%	52.5%	3090	1545	2300	C
TH 5 River Bridge	4	73,000	7.7%	51.7%	2904	1452	2300	C
TH 55 River Bridge	4	49,000	9.2%	61.0%	2753	1376	2300	C
TH 5 South of TH 55	6	91,000	8.6%	52.5%	4102	1367	1900	C
TH 5 South of Post Rd	6	91,000	8.6%	52.5%	4102	1367	1900	C
I-494 River Bridge	6	118,000	9.2%	53.4%	5806	1935	2300	D
I-494 West of 34th Ave	12	194,000	8.6%	54.2%	8998	1500	1750	D
I-494 West of 24th Ave	8	176,000	7.9%	52.7%	7339	1835	2100	D
TH 77 North of Old Shakopee Rd.	8	110,000	8.9%	66.8%	6579	1645	2000	D
TH 77 North of I-494	6	87,000	8.5%	52.6%	3874	1291	1900	C
I-494 West of TH 77	**10**	**200,000**	**7.9%**	**54.6%**	**8663**	**1733**	**1900**	**E**
TH 77 River Bridge	**6**	**119,000**	**9.7%**	**60.0%**	**6926**	**2309**	**2300**	**F**
I-35W South of 94th Street	**6**	**142,000**	**7.1%**	**55.4%**	**5564**	**1855**	**2000**	**E**
I-35W South of 82nd Street	**6**	**157,000**	**6.9%**	**53.0%**	**5705**	**1902**	**2000**	**E**
I-494 West of Penn Ave	**12**	**222,000**	**7.8%**	**56.7%**	**9814**	**1636**	**1750**	**E**
I-494 West of Portland	12	194,000	8.3%	57.3%	9232	1539	1750	D
I-35W North of 76th Street	6	127,000	6.9%	52.8%	4615	1538	2000	D
I-35W South of TH 62	8	132,000	7.5%	51.5%	5092	1273	2100	C

Notes:
(1) Total of through, HOV and auxiliary lanes
(2) Annual Average Daily Traffic (MnDOT 1998)
(3) Peak factors from MnDOT Traffic Management Center *All Detector Report* (4/99), adjusted to reflect average weekday peak conditions
(4) Weighted at 2300 vehicles per lane for through lanes, 1400 vehicles per lane for HOV and 1150 vehicles per auxiliary lane

TABLE 14
2020 ALTERNATIVE 1 PM PEAK HOUR LEVEL OF SERVICE (I-494 HOV)

Location	Lanes (1)	Average Annual Daily Traffic (2)	PM Peak Hour % (3)	Peak Direction %	One-Way Peak Hour Volume	Hourly Volume per Lane	Capacity per Lane (4)	Level of Service
TH 62 East of Penn Ave	6	120,000	6.0%	52.9%	3811	1270	1900	C
I-35W and TH 62 Commons	8	191,000	6.7%	53.8%	6918	1730	2100	D
I-35W North of 60th Street	**8**	**214,000**	**7.5%**	**52.2%**	**8343**	**2086**	**2100**	**E**
TH 62 East of Portland Ave	**4**	**124,000**	**7.5%**	**51.4%**	**4750**	**2375**	**2300**	**F**
TH 62 East of TH 77	4	80,000	8.2%	53.1%	3484	1742	2300	D
TH 62 West of TH 55	4	64,000	8.2%	54.8%	2879	1439	2300	C
TH 55 North of TH 62	4	35,000	8.3%	52.5%	1516	758	1100	C
TH 55 South of TH 62	4	69,000	8.8%	52.5%	3182	1591	2300	C
TH 5 River Bridge	4	77,000	7.7%	51.7%	3063	1532	2300	C
TH 55 River Bridge	4	50,000	9.2%	61.0%	2809	1404	2300	C
TH 5 South of TH 55	6	101,000	8.6%	52.5%	4553	1518	1900	D
TH 5 South of Post Rd	6	99,000	8.6%	52.5%	4462	1487	1900	D
I-494 River Bridge	6	125,000	9.2%	53.4%	6150	2050	2300	D
I-494 West of 34th Ave	**12**	**211,000**	**8.6%**	**54.2%**	**9787**	**1631**	**1750**	**E**
I-494 West of 24th Ave	**8**	**183,000**	**7.9%**	**52.7%**	**7631**	**1908**	**2100**	**E**
TH 77 North of Old Shakopee Rd.	8	115,000	8.9%	66.8%	6878	1720	2000	D
TH 77 North of I-494	6	96,000	8.5%	52.6%	4275	1425	1900	D
I-494 West of TH 77	**10**	**212,000**	**7.9%**	**54.6%**	**9183**	**1837**	**1900**	**E**
TH 77 River Bridge	**6**	**128,000**	**9.5%**	**57.0%**	**6931**	**2310**	**2300**	**F**
I-35W South of 94th Street	**6**	**143,000**	**7.1%**	**55.4%**	**5603**	**1868**	**2000**	**E**
I-35W South of 82nd Street	**6**	**159,000**	**6.9%**	**53.0%**	**5777**	**1926**	**2000**	**E**
I-494 West of Penn Ave	**12**	**228,000**	**7.8%**	**56.7%**	**10080**	**1680**	**1750**	**E**
I-494 West of Portland	**12**	**201,000**	**8.3%**	**57.3%**	**9565**	**1594**	**1750**	**E**
I-35W North of 76th Street	6	130,000	6.9%	52.8%	4724	1575	2000	D
I-35W South of TH 62	8	133,000	7.5%	51.5%	5130	1283	2100	C

Notes:
(1) Total of through, HOV and auxiliary lanes
(2) Annual Average Daily Traffic (MnDOT 1998)
(3) Peak factors from MnDOT Traffic Management Center *All Detector Report* (4/99), adjusted to reflect average weekday peak conditions
(4) Weighted at 2300 vehicles per lane for through lanes, 1400 vehicles per hour HOV lanes and 1150 vehicles per lane auxiliary (less than one mile long)

TABLE 15
2020 ALTERNATIVE 3B PM PEAK HOUR LEVEL OF SERVICE (I-494 HOV)

Location	Lanes (1)	Average Annual Daily Traffic (2)	PM Peak Hour % (3)	Peak Direction %	One-Way Peak Hour Volume	Hourly Volume per Lane	Capacity per Lane (4)	Level of Service
TH 62 East of Penn Ave	6	121,000	6.0%	52.9%	3842	1281	1900	C
I-35W and TH 62 Commons	8	192,000	6.7%	53.8%	6955	1739	2100	D
I-35W North of 60th Street	**8**	**216,000**	**7.5%**	**52.2%**	**8421**	**2105**	**2100**	**F**
TH 62 East of Portland Ave	**4**	**129,000**	**7.5%**	**51.4%**	**4942**	**2471**	**2300**	**F**
TH 62 East of TH 77	4	78,000	8.2%	53.1%	3397	1699	2300	C
TH 62 West of TH 55	4	64,000	8.2%	54.8%	2879	1439	2300	C
TH 55 North of TH 62	4	36,500	8.3%	52.5%	1581	791	1100	C
TH 55 South of TH 62	4	69,000	8.8%	52.5%	3182	1591	2300	C
TH 5 River Bridge	4	79,000	7.7%	51.7%	3143	1571	2300	C
TH 55 River Bridge	4	51,000	9.2%	61.0%	2865	1433	2300	C
TH 5 South of TH 55	6	102,000	8.6%	52.5%	4598	1533	1900	D
TH 5 South of Post Rd	6	101,000	8.6%	52.5%	4553	1518	1900	D
I-494 River Bridge	**6**	**127,000**	**9.2%**	**53.4%**	**6249**	**2083**	**2300**	**E**
I-494 West of 34th Ave	**12**	**211,000**	**8.6%**	**54.2%**	**9787**	**1631**	**1750**	**E**
I-494 West of 24th Ave	**8**	**187,000**	**7.9%**	**52.7%**	**7797**	**1949**	**2100**	**E**
TH 77 North of Old Shakopee Rd.	8	112,000	8.9%	66.8%	6699	1675	2000	D
TH 77 North of I-494	6	99,000	8.5%	52.6%	4409	1470	1900	D
I-494 West of TH 77	**10**	**216,000**	**7.9%**	**54.6%**	**9356**	**1871**	**1900**	**E**
TH 77 River Bridge	**6**	**130,000**	**9.4%**	**57.0%**	**6965**	**2322**	**2300**	**F**
I-35W South of 94th Street	**6**	**143,000**	**7.1%**	**55.4%**	**5603**	**1868**	**2000**	**E**
I-35W South of 82nd Street	**6**	**159,000**	**6.9%**	**53.0%**	**5777**	**1926**	**2000**	**E**
I-494 West of Penn Ave	**12**	**230,000**	**7.8%**	**56.7%**	**10168**	**1695**	**1750**	**E**
I-494 West of Portland	**12**	**204,000**	**8.3%**	**57.3%**	**9707**	**1618**	**1750**	**E**
I-35W North of 76th Street	6	128,000	6.9%	52.8%	4652	1551	2000	D
I-35W South of TH 62	8	133,000	7.5%	51.5%	5130	1283	2100	C

Notes:
(1) Total of through, HOV and auxiliary lanes
(2) Annual Average Daily Traffic (MnDOT 1998)
(3) Peak factors from MnDOT Traffic Management Center *All Detector Report* (4/99), adjusted to reflect average weekday peak conditions
(4) Weighted at 2300 vehicles per lane for through lanes, 1400 vehicles per hour HOV lanes and 1150 vehicles per lane auxiliary (less than one mile long)

TABLE 16
SUMMARY OF REGIONAL IMPACTS -- 2020
(Segments with Existing or Future Level of Service E or F)

	PM Peak Level of Service				Percent of Demand Attributable to Mall of America Phase II (1)		
		2020					
	Existing	No Build	Alt. 1	Alt. 3B	Unconstrained (2)	Constrained (3)	Comments
I-35W and TH 62 Commons	E	D	D	D	~ 0%	~ 0%	Existing congestion alleviated by programmed improvements.
I-35W North of 60th Street	E	E	E	F	~ 0%	1%	Continued congestion, MOA-Phase 2 is a minimal contributor to traffic.
I-35W South of 82nd Street	D	E	E	E	~ 0%	~ 0%	Continued congestion, MOA-Phase 2 is a minimal contributor to traffic.
I-35W South of 94th Street	D	E	E	E	~ 0%	~ 0%	Continued congestion, MOA-Phase 2 is a minimal contributor to traffic.
I-494 River Bridge	C	D	D	E	6%	6%	MOA-Phase 2 is a minor contributor to traffic.
I-494 West of 24th Ave	D	D	E	E	2%	2%	MOA-Phase 2 is a minimal contributor to traffic.
I-494 West of 34th Ave	C	D	E	E	5%	5%	MOA-Phase 2 is a minor contributor to traffic.
I-494 West of Penn Ave	F	E	E	E	2%	3%	Congested under No Build and Build alternatives.
I-494 West of Portland	F	D	E	E	2%	4%	MOA-Phase 2 is a minimal contributor to traffic.
I-494 West of TH 77	E	E	E	E	2%	3%	Congested under No Build and Build alternatives.
TH 55 North of TH 62	E	C	C	C	1%	2%	Existing congestion alleviated by programmed improvements.
TH 62 East of Portland Ave	D	F	F	F	2%	3%	Congested under No Build and Build alternatives.
TH 77 River Bridge	E	F	F	F	5%	6%	Congested under No Build and Build alternatives.

Notes:
(1) Based on worst-case Alternative 3B
(2) Peak direction. Unconstrained represents demand for roadway regardless of congestion in region.
(3) Peak direction. Constrained represents estimated demand including congestion, which may reduce demand of through-trips in study area.

Freeway-to-Freeway Interchanges

Table 17 shows the effect of the developments on principal arterial interchanges near the study area. It can be seen that by 2020, interchanges will experience peak hour growth generally in the 20- to 30-percent range, even under a No Build condition. Ramps that would experience congestion are highlighted.

Freeway interchanges were first analyzed relative to their physical capacity. It can be generally assumed for planning purposes that a freeway ramp has a capacity of 1900 vehicles per lane, with an inside loop ramp having a capacity of 1200 vehicles per hour. Under that assumption, the following ramps would be above capacity in 2020 under the No Build alternative:

- SB I-35 to EB TH 62
- WB TH 62 to NB I-35W
- EB TH 62 to SB TH 77
- NB I-35W to WB I-494

Under both Alternatives 1 and 3B, the following interchange would also exceed capacity, although it should be noted the ramp would be near capacity under the No Build alternative:

- NB TH 77 to WB TH 62

The build alternatives would result in a volume increase at this ramp of 10 to 14 percent for Alternative 1 and Alternative 3B, respectively. The projected contribution of the build alternatives to the total ramp volume at this location would be less than the potential error in the travel forecast model.

A major factor in the freeway-to-freeway interchanges is the metering of the access ramps. Meters are used to control flow onto congested roadways, and metered ramps are frequently constructed with queue detectors to detect whether the queue will spill back onto the adjacent mainline freeway.

The metering rates for a given traffic demand greatly affect the average wait time at a ramp. Assume a ramp with a metering discharge rate of 6 vehicles per minutes and a demand of 500 cars in the peak hour, which would result in an average wait of approximately 10 minutes. Assume also that under the no build, this demand increases to 650 vehicles (a 30-percent increase) and under a build alternative increase to 750 vehicles with no corresponding increase in discharge rate. The resulting average wait would increase to approximately 23 minutes for the no build and 31 minutes for the build. However, if it is assumed that the discharge rate is increased by 33 percent to account for a 33 percent increase in mainline capacity (on I-494, for example) the average wait would drop back to nine minutes under the no build and 15 minutes under the build alternative.

The proposed I-494/I-35W interchange ring road, in combination with the 79th/80th Street arterial system (see Figure 12), will reduce the effects of the proposed development on the I-494/I-35W interchange by providing an alternate route along I-494 and an alternate access point on I-35W. This will serve demand for shorter trips along I-494 as well as potentially reducing demand in the I-494/I-35W interchange. This roadway system is covered through

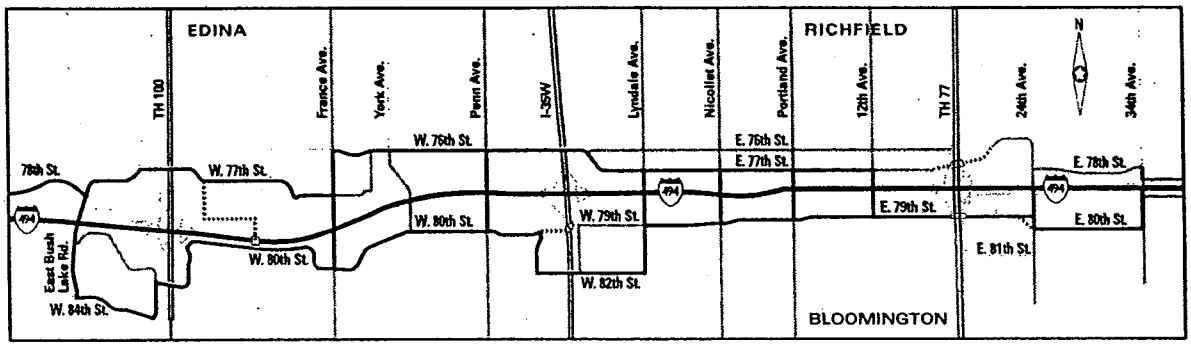
TABLE 17
2020 FORECAST VOLUMES ON SELECTED AREA FREEWAY RAMPS
System Interchanges Near Airport South

From:		To:		Existing Volume (1)	2020 Forecast					
					No Build		Alternative 1		Alternative 3B	
					Volume	Percent Change from Existing	Volume	Percent Change from No Build	Volume	Percent Change from No Build
SB	I-35W	EB	TH 62	2110	2625	24%	2725	4%	2800	7%
WB	TH 62	NB	I-35W	2047	2550	25%	2650	4%	2725	7%
NB	I-35W	WB	TH 62	480	600	25%	650	8%	650	8%
EB	TH 62	SB	I-35W	537	675	26%	725	7%	725	7%
SB	Cedar Ave.	EB	TH 62	106	125	18%	125	0%	125	0%
SB	Cedar Ave.	WB	TH 62	146	175	20%	175	0%	175	0%
WB	TH 62	SB	TH 77	551	675	23%	775	15%	825	22%
WB	TH 62	NB	Cedar Ave.	132	175	33%	175	0%	175	0%
NB	TH 77	WB	TH 62	1461	1825	25%	2000	10%	2075	14%
NB	TH 77	EB	TH 62	485	600	24%	700	17%	725	21%
EB	TH 62	NB	Cedar Ave.	139	175	26%	175	0%	175	0%
EB	TH 62	SB	TH 77	1615	2000	24%	2200	10%	2275	14%
SB	TH 5	EB	TH 55	399	525	32%	525	0%	525	0%
SB	TH 5	WB	TH 55	537	675	26%	675	0%	675	0%
WB	TH 55	SB	TH 5	140	200	43%	300	50%	325	63%
WB	TH 55	NB	TH 5	331	425	28%	425	0%	425	0%
NB	TH 5	WB	TH 55	799	1025	28%	1200	17%	1200	17%
NB	TH 5	EB	TH 55	276	375	36%	500	33%	525	40%
EB	TH 55	NB	TH 5	692	850	23%	850	0%	850	0%
EB	TH 55	SB	TH 5	851	1100	29%	1275	16%	1275	16%
SB	TH 77	EB	TH 13	243	300	23%	400	33%	425	42%
SB	TH 77	WB	TH 13	777	1000	29%	1125	13%	1175	18%
WB	TH 13	SB	TH 77	30	50	67%	50	0%	50	0%
WB	TH 13	NB	TH 77	508	650	28%	750	15%	775	19%
NB	TH 77	WB	TH 13	30	50	67%	50	0%	50	0%
NB	TH 77	EB	TH 13	186	250	34%	250	0%	250	0%
EB	TH 13	NB	TH 77	251	325	29%	425	31%	450	38%
EB	TH 13	SB	TH 77	29	50	72%	50	0%	50	0%
SB	TH 77	EB	I-494	224	275	23%	375	36%	425	55%
SB	TH 77	WB	I-494	184	225	22%	225	0%	225	0%
WB	I-494	SB	TH 77	790	1000	27%	1100	10%	1150	15%
WB	I-494	NB	TH 77	461	575	25%	675	17%	725	26%
NB	TH 77	WB	I-494	715	900	26%	1175	31%	1125	25%
NB	TH 77	WB	I-494 (HOV)(2)	64	75	17%				
NB	TH 77	EB	I-494	353	450	27%	550	22%	575	28%
EB	I-494	NB	TH 77	425	525	24%	525	0%	525	0%
EB	I-494	SB	TH 77	790	975	23%	1075	10%	1125	15%
SB	I-35W	EB	I-494	431	525	22%	650	24%	675	29%
SB	I-35W	WB	I-494	407	525	29%	525	0%	525	0%
WB	I-494	SB	I-35W	541	700	29%	800	14%	825	18%
WB	I-494	NB	I-35W	456	575	26%	675	17%	700	22%
NB	I-35W	WB	I-494	1071	1400	31%	1400	0%	1400	0%
NB	I-35W	EB	I-494	701	900	28%	1000	11%	1025	14%
EB	I-494	NB	I-35W	566	725	28%	725	0%	725	0%
EB	I-494	SB	I-35W	1334	1725	29%	1725	0%	1725	0%

Notes:
(1) MnDOT Traffic Management Center *All Detector Report* (April 1999 data, published 10/99)
(2) Existing HOV bypass assumed to be removed as part of I-494 reconstruction.

Mn/DOT's Integrated Corridor Management System (ICTMS), a coordinated freeway-arterial traffic management system along I-494.The effects of the development alternatives on the I-494/TH 77 interchange are somewhat mitigated by the presence of direct ramps to and from the Airport South area to and from I-494.

FIGURE 12
INTEGRATED CORRIDOR TRAFFIC MANAGEMENT PROJECT AREA



Source: ICTM, 1999
Project routes are solid dark lines. Dashed lines are proposed routes.

Local Access Ramps

Table 18 shows the existing and forecast demand at local access interchanges adjacent to the Airport South area. By the year 2020, traffic entering the freeway system from those interchanges is expected to increase by 51 percent over current conditions. The most significant increases are expected at the 34th Avenue interchange, where traffic will increase by 88 to 100 percent (westbound and eastbound, respectively). This increase can largely be attributed to the redevelopment of the MSP International Airport HHH Terminal area. Development from the Mall of America Phase 2 will contribute less than 10 percent to the increase at that interchange.

The loop from westbound Old Shakopee Road to southbound TH 77 will have a demand exceeding its capacity under the both build alternatives. In particular, Alternative 3B centers the increases in demand to the south on Old Shakopee Road and Killebrew Drive, whereas Alternative 1 focuses demand more on the Lindau Lane interchange. The three southbound accesses to southbound TH 77 will be subject to significant ramp metering and therefore experience increasing peak hour delay and require additional storage capacity.

The interchange at I-494 and 24th Avenue South will have a peak demand of approximately 1,350 vehicles per hour under the No Build. This would require a metering discharge rate of approximately one vehicle every 5.3 seconds per each of two metered lanes. This rate of discharge would be high for a congested facility, where cycle lengths tend to be in the one vehicle per 15 to 20 seconds or more. Under the Build alternative, the required discharge would be 4.4 seconds. Adequate storage capacity at the interchange or traffic management via the ICTMS network would reduce the effect of longer vehicle queues at the interchange.

TABLE 18
2020 FORECAST VOLUMES ON SELECTED AREA FREEWAY RAMPS
Local Access Interchanges Adjacent to Airport South Site

From		To	Existing Volume [1]	2020 Forecast					
				No Build		Alternative 1		Alternative 3B	
				Volume	% Change from Existing	Volume	% Change from No Build	Volume	% Change from No Build
Entrance Ramps [2]									
24th Avenue So.	EB	I-494	890	1,350	52%	1,475	9%	1,650	22%
24th Avenue So.	WB	I-494	552	875	59%	1,100	26%	1,150	31%
34th Avenue So. [3]	EB	I-494	1,459	2,925	100%	3,125	7%	3,175	9%
34th Avenue So.	WB	I-494	1,075	2,025	88%	2,125	5%	2,150	6%
Lindau Lane	EB	I-494	117	150	28%	275	83%	225	50%
Lindau Lane	NB	TH 77	352	450	28%	850	89%	675	50%
Lindau Lane	SB	TH 77	209	275	32%	500	82%	400	45%
Killebrew Drive	NB	TH 77	508	725	43%	825	14%	1,075	48%
Killebrew Drive	SB	TH 77	641	925	44%	1,050	14%	1,225	32%
Old Shakopee Rd.	NB	TH 77	294	525	79%	675	29%	800	52%
Old Shakopee Rd. (loop from WB)	SB	TH 77	873	1,600	83%	1,875	17%	1,925	20%
Old Shakopee Rd. (ramp from EB)	SB	TH 77	201	250	24%	300	20%	300	20%

Source: SRF Consulting Group, Inc.
Notes:
[1] MnDOT Traffic Management Center *All Detector Report* (April 1999 data, published 10/99)
[2] Includes HOV Bypass ramps where appropriate
[3] Includes combined TH 5 and I-494 movements

SRF CONSULTING GROUP, INC.

Transportation ▪ Civil ▪ Structural ▪ Environmental ▪ Planning ▪ Traffic ▪ Landscape Architecture ▪ Parking

SRF No. 0003008

MEMORANDUM

TO: Mr. Clark Arneson, Planning Manager
Mr. Jim Gates, P.E., Deputy Director of Public Works
CITY OF BLOOMINGTON

FROM: Patrick Corkle, P.E., Associate
Adrian Potter, Engineer

DATE: August 8, 2001

SUBJECT: TRAFFIC STUDY FOR THE AIRPORT SOUTH DISTRICT AUAR

Introduction

As you requested, we have completed a traffic study for the planned development anticipated to occur through the year 2006 in the Airport South District, located in the southeast quadrant of the intersection of Trunk Highway 77 (TH 77) and Interstate 494 (I-494) within the City of Bloomington. The purpose of this study is to assess the local roadway traffic operations for the proposed AUAR development assumptions. This proposed development includes a mix of retail, office, hotel, and residential land uses. This study considers the traffic impacts of future conditions during the p.m. peak hour for year 2007, one year after anticipated development completion for the land uses defined in the AUAR.

The Airport South District was analyzed previously for the Mall of America Expansion – Met Center Site EIS. Much of the analysis in this study is based on this previous analysis and its assumptions, with changes that reflect the AUAR land uses. Specifically, the modifications in land use/trip generation from the EIS analysis include:

- The addition of trips from the proposed Kelley property development.
- The planned extension of 28th Street from its present terminus to 86th Avenue (through the Kelley property).
- The Metro Office Park site (outside of the Runway Protection Zone [RPZ] area) will not be redeveloped.
- The updated traffic analyses at the 34th Street/I-494 intersections related to the Metropolitan Airports Commission's HHH parking facility.

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Existing Conditions

Existing p.m. peak hour traffic operations were analyzed at the following key intersections in the Airport South District (see Figure 1) to determine how traffic currently operates within the study area:

- 24th Avenue and I-494 Ramps
- 34th Avenue and I-494 North Ramps
- 34th Avenue and I-494 South Ramps
- Thunderbird Drive and East 79th Street
- 24th Avenue and East 79th Street
- 24th Avenue and East 80th Street
- 28th Avenue and East 80th Street
- 34th Avenue and East 80th Street
- 20th Avenue and Lindau Lane
- 22nd Avenue and Lindau Lane
- 24th Avenue and Lindau Lane
- 20th Avenue and East 82nd Street
- 20th Avenue and Killebrew Drive
- 22nd Avenue and Killebrew Drive
- 24th Avenue and Killebrew Drive
- 28th Avenue and Old Shakopee Road

Current traffic controls include signalization at all of the key intersections, with the exception of 28th Avenue and Old Shakopee Road, which has side-street stop control on 28th Avenue. All signalized intersections were modeled and examined using SYCHRO, while the unsignalized intersection was analyzed using the Highway Capacity Software. Traffic volumes were primarily based on 1998 and 1999 intersection peak hour turning movement counts. Results of the analysis indicate that all of the key intersections during the p.m. peak hour currently operate at an acceptable Level of Service (LOS) C or better, with existing traffic controls and geometric layouts.

Table 1
Existing P.M. Peak Hour Capacity Analysis

INTERSECTION	LEVEL OF SERVICE
24th Avenue and I-494 Ramps	B
34th Avenue and I-494 North Ramps	B
34th Avenue and I-494 South Ramps	A
Thunderbird Drive and East 79th Street	A
24th Avenue and East 79th Street	C
24th Avenue and East 80th Street	B
28th Avenue and East 80th Street	A
34th Avenue and East 80th Street	C
20th Avenue and Lindau Lane	B
22nd Avenue and Lindau Lane	B
24th Avenue and Lindau Lane	A
20th Avenue and East 82nd Street	A
20th Avenue and Killebrew Drive	B
22nd Avenue and Killebrew Drive	B
24th Avenue and Killebrew Drive	B
28th Avenue and Old Shakopee Road*	A

* Indicates an unsignalized intersection.
Graphic 1

Proposed Development

This study focuses on future conditions during the p.m. peak hour for the AUAR conditions and development scenario described in Table 2 below.

Table 2
Development Scenario/Land Use Changes for the Airport South District AUAR

Site	Existing Land Use	AUAR Development Scenario
Met Center Site	7,500 surface parking spaces	5.6 msf mixed use [1] · 1,600 hotel rooms · 3,425,000 square feet retail/ entertainment · 600,000-square-foot office · 300 residential units
Adjoining Lands	1,775 surface parking spaces and a storm water pond	1.0 msf of retail and 7,500 parking spaces (including 200 spaces for LRT)
Federal RPZ Block (includes 11 parcels)	Hotel, a meeting hall, gas stations, car rental, offices, and an electrical substation	No parking, no development
Olnick	865,094 square feet of office space	2,250,500-square-foot office/hotel **or** 2,189,500-square-foot office[2]
Robert Muir property	996-stall parking ramp, 1,220 surface parking spaces and a 430-square-foot structure	750,000-square-foot office; 3,000 parking spaces
Proposed LRT Corridor	Streets and parking areas	Rail corridor and station
Kelley Property	Agriculture/open space	650,000-square foot office 931 residential units
Remainder of Airport South District	Existing land uses	Existing land uses

[1] The proposed Mall of America Expansion on the Met Center site development was also studied in an environmental impact statement process completed in early 2001.

[2] Two development concepts are being considered for redevelopment of this property. The "worst case" impacts will be considered in each impact analysis in the AUAR (i.e., office-only concept for traffic impacts)

Year 2007 Traffic Volumes

The traffic volumes utilized in the 2007 operations analysis are based on site trip generation data and local street volumes obtained from the regional forecast model. Distribution of turning movements was allocated based on available intersection turning movement counts and directional distributions derived from the regional forecast model. Trips generated by the Kelley property development were allocated throughout the area roadway network using a different directional distribution that better corresponded to its proposed land use description and location.

Site Access

The proposed development traffic operations analyses included assumptions regarding changes to access to three parcels slated for development: 1) Met Center site, 2) Adjoining Lands and 3) Kelley property. The Met Center site currently has access provided at the following locations:

- Two driveways on Lindau Lane at 20th Avenue and 22nd Avenue, directly across from the current Mall of America driveways
- Two locations along East 79th Street, east and west of Thunderbird Drive
- One access provided on 24th Avenue at East 80th Street

As described in the Mall of America Expansion Final EIS, access to the Met Center site from Lindau Lane will include the existing driveways across from the existing Mall of America development, plus a grade-separated left-turn for eastbound Lindau Lane traffic coming from southbound TH 77. The access to the Met Center site on 24th Avenue at East 80th Street will be eliminated with the roadway realignment planned on 79th/80th Street and 24th Avenue. An additional access to the old Met Center site is also proposed on East 79th Street, which will provide three access driveways to the site along 79th/80th Street.

The Adjoining Lands site access is assumed to be at one location on East 82nd Street and one location on Old Shakopee Road, both of which would be centrally located between East 24th Avenue and East 28th Avenue. Additionally, two access points to the site are proposed on 28th Avenue.

Access to the Kelley property is assumed to occur via the planned extension of 28th Avenue south of Old Shakopee Road, continuing southwest through the site to connect to 86th Street at Old Shakopee Road.

To reflect these access changes, intersection operations analysis was completed for the following key site access intersections (in addition to the existing intersections listed in Table 1) for year 2007.

- 79th Street East Driveway and 79th/80th Street
- 82nd Street and Adjoining Lands North Driveway
- Old Shakopee Road and Adjoining Lands South Driveway
- 28th Avenue and Old Shakopee Road (assuming the extension of 28th Avenue south through the Kelley property)

Local Street Improvements

Based on discussions with City staff, the following local intersection improvements are planned for implementation by the year 2007 and are included in the AUAR operations analysis for the Airport South District.

- I-494/34th Avenue North Ramps:

  Maximum of 3 lanes: Left-turn lane, shared through/left-turn lane, and a right-turn lane

  Maximum of 5 lanes: Dual left-turn lanes, two through lanes, and a right-turn lane

- I-494/34th Avenue South Ramps:

  Maximum of 3 lanes: Left-turn lane, shared through/left-turn lane, and a right-turn lane

  Maximum of 4 lanes: Dual left-turn lanes, shared through/left-turn lane, and a right-turn lane

- East 79th Street from TH 77 to 24th Avenue is scheduled for reconstruction and partial realignment. East 79th Street will intersect 24th Avenue at 80th Street, and the existing signal at East 79th Street/24th Avenue will be removed. The geometrics on the west approach of the realigned East 79th Street will consist of dual left-turn lanes, three through lanes, and a right-turn lane. The geometrics on the east approach of East 80th Street will also consist of a dual left-turn lane, three through lanes, and a right-turn lane.

- East Old Shakopee Road/28th Avenue will be signalized. The west approach will include a left-turn lane and three through lanes (this could be modified to dual-left-turn lanes and two through lanes if needed). The east approach will consist of three through lanes and a right-turn lane.

- The intersection of 24th Avenue and Lindau Lane may be improved by adding a southbound to westbound free right-turn lane.

- 24th Avenue will be upgraded from I-494 to Lindau Lane to provide an additional southbound through lane. This additional through lane will lead into the southbound-to-westbound free right-turn lane on Lindau Lane.

- Lindau Lane will be upgraded west of 24th Avenue to provide three lanes eastbound and westbound.

- 80th Street will be upgraded between 24th Avenue and 34th Avenue to include five total lanes of approach and three departing lanes at each of the critical intersections.

- 28th Street will be extended to the southwest from its present terminus to connect with 86th Avenue.

Future Traffic Operations Analysis

In order to determine how well existing roadways would accommodate the proposed development with planned roadway improvements, a traffic operations analysis was conducted for the year 2007 (one year after development completion) using SYNCHRO for the aforementioned key signalized intersections. The level of service analysis was completed for the p.m. peak hour, since this was considered the worst-case scenario. Future level of service results for the year 2007 are shown in Table 3 on the following page.

All key intersections are expected to operate at an acceptable level of service in the year 2007 for post-AUAR development conditions. All of the intersections analyzed operated at LOS C or better, with the exception of the 24th Avenue and I-494 Ramps intersection, which functioned at an acceptable LOS D. In addition to the local roadway modifications previously mentioned, the following improvements were also assumed for the analysis:

- 28th Avenue and East 80th Street – Protected/permissive left-turn phasing is recommended on the south approach of 28th Avenue.

- 34th Avenue and East 80th Street – Adequate storage is needed for the dual left-turn lanes on the west approach of 80th Street for stacking vehicles. Based on the analysis approximately 400 feet of storage is needed without the traffic generated by the new parking facility at HHH. With the additional traffic, 500 feet of storage is needed.

- 20th Avenue and Killebrew Drive – Dual left-turn lanes are recommended on the west approach of Killebrew Drive due to queuing.

Table 3
Year 2007 P.M. Peak Hour Capacity Analysis [3]

INTERSECTION	LEVEL OF SERVICE
24th Avenue and I-494 Ramps	D
34th Avenue and I-494 North Ramps [4]	C
34th Avenue and I-494 South Ramps [4]	C
Thunderbird Drive and East 79th Street	A
79th Street East Driveway and East 79th/80th Street [1]	B
24th Avenue and East 79th Street	--
24th Avenue and East 80th Street	C
28th Avenue and East 80th Street	C[6]
34th Avenue and East 80th Street [7]	C
20th Avenue and Lindau Lane	C
22nd Avenue and Lindau Lane	C
24th Avenue and Lindau Lane	B
24th Avenue and East 82nd Street	A
82nd Street and Adjoining Lands North Driveway [1]	A
20th Avenue and Killebrew Drive	C[8]
22nd Avenue and Killebrew Drive	C
24th Avenue and Killebrew Drive	B
Old Shakopee Road and Adjoining Lands South Driveway [1]	B
28th Avenue and Old Shakopee Road [2]	C[5]

[1] These intersections do not currently exist.

[2] This intersection currently exists as an unsignalized intersection but was analyzed as a signalized intersection for year 2007 conditions. The analysis of this intersection also considers that 28th Street will be extended to the southwest from its present terminus to connect with 86th Avenue. This new roadway will help accommodate the addition of the Kelley Farms property development and relieve Old Shakopee Road.

[3] Traffic operations analysis includes additional traffic resulting from the Kelley Farms development and removal of traffic contributed by the Metro Office Park that is no longer projected to be built.

[4] Analysis includes updated forecasted traffic volumes for a new parking ramp terminal facility at HHH terminal.

[5] Analysis assumes a signalization at this intersection with one left-turn lane, one through lane, and one right-turn lane on the south leg of the intersection. Analysis also assumes the re-routing of some forecasted traffic volumes due to the proposed 28th Avenue/86th Street connector road.

[6] Analysis assumes protected/permissive left-turn phasing on the south approach of 28th Avenue.

[7] Adequate storage is needed for the dual left-turn lanes on the west approach of 80th Street for stacking vehicles. Based on the analysis approximately 400 feet of storage is needed without the traffic generated by the new parking facility at HHH. With the additional traffic, 500 feet of storage is needed.

[8] Dual left-turn lanes are recommended on the west approach of Killebrew Drive due to queuing.

Summary and Conclusions

Based on the analysis performed, it is concluded that the AUAR development proposed for the Airport South District can be supported by the adjacent roadway system if the following roadway improvements are implemented (in addition to the local intersection improvements planned for implementation by the City of Bloomington).

28th Avenue and East 80th Street – The installation of protected/permissive left-turn phasing is needed on the south approach of 28th Avenue.

34th Avenue and East 80th Street – Adequate storage is needed for the dual left-turn lanes on the west approach of 80th Street for stacking vehicles. Based on the analysis, approximately 400 feet of storage is needed without the traffic generated by the new parking facility at HHH. With the additional traffic, 500 feet of storage is needed.

20th Avenue and Killebrew Drive – The addition of a left-turn lane is needed on the west approach of Killebrew Drive to provide dual left-turn lanes due to queuing.

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