

In order for all of the key intersections to operate at acceptable levels of service during the year 2012 build Thursday conditions, the following improvements will be needed:

American Boulevard/24th Avenue

- Extend the southbound left most left-turn lane to 500 feet
- Extend the eastbound left-turn lanes to 500 feet
- Extend the westbound left-turn lanes to 500 feet
- Construct an additional westbound right-turn lane to provide three westbound right-turn lanes
- The westbound approach should have four approach lanes that begin at 28th Avenue, two of these lanes would be trap right-turn lanes at the intersection

Additional Operations Analysis

Similar to year 2012 Saturday build conditions, an additional analysis was conducted to determine how the key intersections would operate if a larger percentage of traffic would use American Boulevard to the west. With a 10 percent distribution to the west, approximately 250 new trips during the Thursday p.m. peak hour would use American Boulevard to the west.

With the increase of traffic using American Boulevard to the west, the intersection delay at American Boulevard/24th Avenue will be reduced by approximately 35 seconds/vehicle. However, the following improvements will still be needed to achieve acceptable operations at the intersection of American Boulevard/24th Avenue during the Thursday p.m. peak hour:

American Boulevard at 24th Avenue

- Extend the southbound left most left-turn lane to 500 feet
- Extend the eastbound left-turn lanes to 500 feet

V. 2030 BUILD CONDITIONS

Future traffic operations analyses were conducted for the year 2030 build conditions. The land use, street network assumptions, and operations results are discussed in this section of the report.

A. Assumed Land Use

Land use assumptions and trip generation for Phase II and adjacent developments are also included in the Appendix (Tables A-2 and A-3). Year 2030 build conditions includes additional adjacent developments and background growth beyond year 2012 to year 2030. Approximately 47 percent of the new development trips generated for the Saturday peak hour are associated with the MOA Phase II development and 53 percent are associated with other adjacent land use developments. For the Thursday peak hour, 25 percent of the new development trips are associated with the MOA Phase II development and 75 percent of the new development trips are associated with other adjacent land use developments.

B. Assumed Roadway Improvements

All roadway improvements included in the year 2012 no build and build analyses are assumed in the year 2030 build analysis. In addition, the following additional improvements with optimized signal timing were assumed:

American Boulevard/34th Avenue (listed in the Bloomington Central Station Traffic Study)

- Eliminate the southbound free right-turn lane
- Construct southbound dual right-turn lanes that extend from the I-494 South Ramps

24th Avenue/82nd Street

- On the north approach, convert the rightmost through lane into a trap right-turn lane. This improvement will create better lane utilization upstream at the single-point interchange.

Old Shakopee Road

- Reconstruction of Old Shakopee Road between Cedar Avenue and Killebrew Avenue

C. Year 2030 Build Traffic Operations Analysis – Saturday

To determine how well the existing and assumed roadway improvements will accommodate year 2030 build traffic forecasts (see attached Figures 18 and 19), an operations analysis was conducted for Saturday peak conditions. Results of the analysis shown in Table 8 indicate that all of the key intersections are expected to operate at acceptable levels of service for year 2030 build Saturday conditions, with the exception of the 24th Avenue/I-494 Single-Point Interchange. The 24th Avenue/I-494 Single-Point Interchange is expected to operate near the LOS D/E threshold with an average vehicle delay of 60 seconds.

Figure 18

Figure 19

Table 8
Year 2030 Build Peak Hour Capacity Analysis – Saturday
Level of Service Results

Intersection	Level of Service
	Saturday Peak
Lindau Lane/TH 77 Ramps/IKEA Way	C
Lindau Lane/22nd Avenue	D
Lindau Lane/24th Avenue	C
Killebrew Drive/TH 77 Ramps/20th Avenue	C
Killebrew Drive/22nd Avenue	D
Killebrew Drive/24th Avenue	D
24th Avenue/I-494 Single-Point Interchange	E ⁽¹⁾
24th Avenue/82nd Street	C
American Boulevard/IKEA Driveway *	A/B
American Boulevard/Thunderbird Road	C
American Boulevard/24th Avenue	D
American Boulevard/28th Avenue	B
American Boulevard/34th Avenue	C
34th Avenue/I-494 North Ramps	D
34th Avenue/I-494 South Ramps	C
28th Avenue/82nd Street	D
Old Shakopee Road/86th Street	B
Old Shakopee Road/TH 77 East Ramp	B

* Indicates an unsignalized intersection. The overall LOS is shown followed by the worst approach LOS.

⁽¹⁾ Average delay of 60 seconds

The following improvements are not needed from a level of service perspective, but are recommended to improve overall operations and reduce queues:

Killebrew Avenue at 22nd Avenue

- Add overlap signal phasing for the southbound right-turn movement

Killebrew Avenue at 24th Avenue

- Extend the eastbound left-turn lanes to 400 feet

Additional Operations Analysis

Similar to year 2012 build conditions, an additional analysis was conducted to determine how the key intersections would operate if a larger percentage of traffic would use American Boulevard to the west. With a 10 percent distribution to the west, approximately 300 new trips during the Saturday peak hour would use American Boulevard to the west.

With the increase of traffic using American Boulevard to the west, the 24th Avenue/I-494 Single-Point Interchange is expected to improve to LOS D during the Saturday peak hour. In addition to routing traffic to the west on American Boulevard, traffic traveling to the mall from the east on I-494 could be directed to 34th Avenue. This could also provide relief to the single-point interchange.

D. Year 2030 Build Traffic Operations Analysis – Thursday

To determine how well the existing and assumed roadway improvements will accommodate year 2030 build traffic forecasts (see attached Figures 20 and 21), an operations analysis was conducted for Thursday peak conditions. Results of the analysis shown in Table 9 indicate that nine intersections will operate at unacceptable levels of service during the Thursday peak hour.

Table 9
Year 2030 Build Peak Hour Capacity Analysis – Thursday
Level of Service Results

Intersection	Level of Service
	Thursday Peak
Lindau Lane/TH 77 Ramps/IKEA Way	C
Lindau Lane/22nd Avenue	D
Lindau Lane/24th Avenue	E ⁽¹⁾
Killebrew Drive/TH 77 Ramps/20th Avenue	D
Killebrew Drive/22nd Avenue	C
Killebrew Drive/24th Avenue	E (D)
24th Avenue/I-494 Single-Point Interchange	E ⁽²⁾
24th Avenue/82nd Street	D
American Boulevard/IKEA Driveway *	A/C
American Boulevard/Thunderbird Road	F ⁽¹⁾
American Boulevard/24th Avenue	F ⁽³⁾
American Boulevard/28th Avenue	C
American Boulevard/34th Avenue	F (D)
34th Avenue/I-494 North Ramps	F (D)
34th Avenue/I-494 South Ramps	F (C)
28th Avenue/82nd Street	F (D)
Old Shakopee Road/86th Street	C
Old Shakopee Road/TH 77 East Ramp	D

* Indicates an unsignalized intersection. The overall LOS is shown followed by the worst approach LOS.

⁽¹⁾ Poor intersection operations caused from vehicle queues from American Boulevard/24th Avenue

⁽²⁾ Average vehicle delay of 60 seconds

⁽³⁾ Average vehicle delay of 260 seconds

Note: Parentheses indicate LOS with assumed improvements listed below.

Figure 20

Figure 21

As shown in Table 9, four key intersections are expected to operate at unacceptable levels of service with the following recommended improvements. The combination of peak hour trips from redevelopment sites to the east and south with the proposed MOA 2 peak hour trips traveling through the 24th Avenue intersections exceed the capacity of their at-grade design.

Killebrew Avenue at 24th Avenue

- Extend the westbound left-turn lanes to 500 feet
- Extend the third westbound through lane back to the intersection of Old Shakopee Road/28th Avenue

28th Avenue/82nd Street

- Construct an additional westbound left-turn lane

American Boulevard/34th Avenue

- Eliminate the westbound free right-turn lane
- Construct westbound dual right-turn lanes

34th Avenue/I-494 North Ramps and South Ramps (Figure 22)

- Reconstruct the interchange to include loops in the northwest and southwest quadrants. These improvements will eliminate two major traffic conflicts with LRT operations, the westbound to southbound movement, and the southbound to eastbound movement. Improvements at the 34th Avenue/I-494 Ramps are a result of increased traffic volumes due to background growth, adjacent developments, and LRT operations.

Additional Operations Analysis

Similar to year 2030 Saturday build conditions, an additional analysis was conducted to determine how the key intersections would operate if a larger percentage of traffic would use American Boulevard to the west. With a 10 percent distribution to the west, approximately 250 new trips during the Thursday p.m. peak hour would use American Boulevard to the west. Based on the results in Table 10, three key intersections are expected to operate at unacceptable levels of service for year 2030 build Thursday p.m. peak hour conditions with the increased traffic using American Boulevard to the west.

Figure 22

Table 10
2030 Build Peak Hour Capacity Analysis – 10% Distribution to American West
Level of Service Results

Intersection	Level of Service
	Thursday Peak
Lindau Lane/TH 77 Ramps/IKEA Way	C
Lindau Lane/22nd Avenue	C
Lindau Lane/24th Avenue	E ⁽¹⁾
Killebrew Drive/TH 77 Ramps/20th Avenue	D
Killebrew Drive/22nd Avenue	C
Killebrew Drive/24th Avenue	D
24th Avenue/I-494 Single-Point Interchange	D
24th Avenue/82nd Street	D
American Boulevard/IKEA Driveway *	A/C
American Boulevard/Thunderbird Road	F ⁽¹⁾
American Boulevard/24th Avenue	F ⁽²⁾
American Boulevard/28th Avenue	C
American Boulevard/34th Avenue	D
34th Avenue/I-494 North Ramps	D
34th Avenue/I-494 South Ramps	C
28th Avenue/82nd Street	D
Old Shakopee Road/86th Street	C
Old Shakopee Road/TH 77 East Ramp	D

* Indicates an unsignalized intersection. The overall LOS is shown followed by the worst approach LOS.

(1) Poor intersection operations caused from vehicle queues from American Boulevard/24th Avenue

(2) Average vehicle delay of 220 seconds

As previously stated, the combination of peak hour trips from redevelopment sites to the east and south with the proposed MOA 2 peak hour trips traveling through the 24th Avenue intersections exceed the capacity of their at-grade design during year 2030 build Thursday conditions. In order to improve operations to acceptable operations, the following comments are provided:

- Further review of the feasibility of a grade-separated intersection at American Boulevard/24th Avenue should be considered.
- Mn/DOT has recently selected a consultant for the Travel Demand Forecasting and Concept Development project for the I-494/TH 77 corridors. Results of this study will provide forecast traffic volumes for the area from a regional perspective to compare with the local traffic model and future volumes developed for the MOA Phase II Traffic Study and supplemental analyses. This will allow us to determine whether adjustments could be made. In addition, a new connection from Thunderbird Road or areas east of 24th Avenue to the CD roadway will be considered as part of this study.

- Based on the percent breakdown of traffic using the intersection of American Boulevard/24th Avenue during year 2030 build Thursday conditions, further review of the total amount of future development for the entire study area should be considered.

VI. OTHER ISSUES

A. Site Plan Review

As part of this study, SRF staff worked closely with the site design engineer to review and modify on-site intersection and roadway geometrics to provide the necessary lane configurations, turn lane lengths and intersection spacing to provide adequate on-site operations during peak hour conditions.

To determine how well the on-site intersections will accommodate year 2030 build traffic forecasts, an operations analysis was conducted for Saturday peak hour conditions. Results of the analysis shown in Table 11 indicate that all key intersections on-site are expected to operate at acceptable levels of service for year 2030 build Saturday conditions.

Table 11
Year 2030 Build Peak Hour Capacity Analysis - Saturday
Internal Intersection Level of Service Results

Intersection	Level of Service
	Saturday Peak
Northbound TH 77 CD Ramps/East Ramp Roundabout *	A ⁽¹⁾
East Ramp Roadway/Nordstrom's Access	A
IKEA Way/IKEA Driveway *	A/B
IKEA Way/North Ring Road *	B/B
Thunderbird Road/North Ring Road *	A/D
22nd Avenue/Main Parking Access	C
22nd Avenue/Large Vehicle Access *	A/A

* Indicates an unsignalized intersection. The overall LOS is shown followed by the worst approach LOS.

⁽¹⁾ Level of Service results are similar with both Synchro/SimTraffic and RODEL traffic models.

In addition to the intersection operations analysis, on-site plan review comments are summarized below:

- Queuing at all adjacent intersections along American Boulevard and Lindau Lane was reviewed and addressed for future peak conditions. Intersection geometrics and lane configurations will accommodate future traffic forecasts. Heavy vehicle queues are not expected to develop from the adjacent intersections, backing on-site to block internal intersections.