

**EXECUTIVE SUMMARY**

The intersection of Dakota County State Aid Highway (CSAH) 50/Kenwood Trail and CSAH 60/185<sup>th</sup> Street located within Lakeville, MN. Both roadways are functionally classified as minor arterials and provide essential connections to Interstate 35, north of the intersection on CSAH 50 and west of the intersection on CSAH 60. Both highways are currently one lane in each direction with turn lanes at the intersection. Current traffic volumes are 17,000 vehicles per day on CSAH 50 and 14,000 vehicles per day on CSAH 60. The roadways are projected to carry over 25,000 vehicles per day at full planned growth of the area. The intersection is signalized and is currently facing operational challenges.

This study was initiated by Dakota County, in participation with the City of Lakeville, to provide a detailed analysis of the intersection needs and evaluation of intersection alternatives to ensure the most appropriate design. The most appropriate intersection design increases mobility and safety of all users now and into the future, is cost effective, and minimizes environmental impacts. The two primary alternatives considered were signalized intersection improvements and a double-lane roundabout.

In March of 2011, an Open House meeting was held with the community. This meeting displayed evaluation criteria and included figures of the alternative intersection options being considered. Citizens reviewed the alternatives and provided various concerns and provided comments. Comments received included support for a roundabout and support for an expanded signal. Comments in support of one alternative or the other were approximately equal. The most significant conclusion out of the meeting was that given the nature of a large roundabout and the lack of familiarity with driving a roundabout, additional education is needed if a roundabout alternative were to move forward.

Evaluation of the intersection alternatives focused on four primary criteria: operations, safety, environment (right-of-way), and financial impacts. Operations include delay to traffic due to the intersection traffic control and the capacity of the intersection. Safety includes crashes, crash severity, and pedestrian safety. Right-of-way includes the analysis of additional property needed to construct the intersection alternative. Financial impacts not only include project costs for the design and construction of the alternative, but also operating costs and safety benefits of intersection improvements.

The current intersection is close to capacity and motorists experience unacceptable delay for some movements during the peak hours. All movements are anticipated to have unacceptable operations as traffic volumes increase within the next few years (over 55 seconds delay per vehicle and LOS E to F). Both of the proposed alternatives reduce delay to acceptable levels, through Full Planned Growth although the roundabout alternative reduces delay further as shown in Table A. Both alternatives have the ability to handle traffic fluctuations.

**TABLE A. OPERATIONAL ANALYSIS SUMMARY**

<b>Alternative</b>	<b>Intersection Delay</b>	<b>Intersection LOS</b>
Signal Improvements	50 to 55 sec. per veh.	LOS D
Multi-Lane Roundabout	14 to 17 sec. per veh.	LOS B/C

**CSAH 50 AND CSAH 60 INTERSECTION STUDY**

Data from the past five years indicates that the current intersection does not have significant safety issues. The number of crashes for the type of traffic control, roadway speed, and traffic volume is below the statewide average. As traffic increases, delay and crashes are anticipated to increase, especially as the intersection can no longer handle the traffic volumes. As delays get unacceptable, motorists tend to make decisions that are unsafe to reduce travel times. Both of the alternatives are anticipated to reduce the number of crashes as compared to the base condition with no improvements. While property damage collisions may increase from existing conditions initially, analysis and review of other locations indicates the roundabout alternative is anticipated to have a lower number of crashes per year (20 year assessment). The roundabout alternative also reduces the severity of crashes due to the angles of incidence and lower vehicle speeds. The lower speeds also increase pedestrian safety.

Both intersection alternatives impact approximately the same number of properties. The alternatives provide vehicle cost savings and safety benefits as compared to the project cost, resulting in a positive benefit-cost ratio as shown in Table B. The roundabout provides a greater delay benefit over the 20-year project life than the signal alternative. The roundabout alternative also provides a greater cost benefit over the signal improvement alternative.

**TABLE B. 20 YEAR COST AND BENEFIT SUMMARY (IN 2011 DOLLARS)**

	<b>Signal Improvements</b>	<b>Multi-Lane Roundabout</b>
<b>Vehicle Operating Cost Savings</b>	\$49,024,000	\$73,300,000
<b>Safety Benefit</b>	\$1,916,000	\$5,106,000
<b>Total Benefit</b>	\$50,940,000	\$78,406,000
<b>Total Project Cost</b>	\$8,300,000	\$3,500,000
<b>Benefit-Cost Ratio</b>	<b>6.1</b>	<b>22.4</b>

Both options are acceptable and could alleviate the recognized traffic control issues at the intersection. The best intersection control option:

- minimizes delay to traffic,
- produces a low crash potential,
- is low cost, and
- is compatible with the roadway and community.

The intersection at Full Growth volume is one of the highest volume proposed or built double-lane roundabouts at the intersection of two high speed corridors in the State of Minnesota. Additional analysis was completed to understand how the proposed roundabout alternative would compare to the capacity of double-lane roundabouts throughout the United States. This state of practice review indicated that the proposed roundabout alternative can operate well and manage the future traffic volumes.

Based on the considerations of operations, safety and right-of-way (environment), financial impacts, and public input, implementing the double-lane roundabout alternative is recommended for this intersection to accommodate current and future traffic volumes.