

REPORT

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CITY OF BURNSVILLE

Center Village Traffic Study

PREPARED FOR:



PREPARED BY:

Kimley»Horn



CENTER VILLAGE TRAFFIC STUDY

BURNSVILLE, MINNESOTA

REPORT CERTIFICATION

I hereby certify that this report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

Brandon J. Bourdon
Brandon J. Bourdon

Date: 03/06/2020

License No. 43709



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EXECUTIVE SUMMARY

Following the completion of the successful Center Village Redevelopment Vision in 2018, the City of Burnsville is moving forward to understand the transportation improvements needed to support the redevelopment of the Burnsville Center area. This study includes analysis on the most congested corridor in the area, County Road (CR) 42. This study also explores innovative multimodal solutions needed to mitigate existing congestion on the roadway network as well as the anticipated traffic impacts of the redevelopment.

Burnsville Center has unique transportation challenges compared to other malls in the Minneapolis-St. Paul metropolitan area. Burnsville Center does not have direct access from either the I-35W interchange or the I-35E interchange and its main connecting roadway is CR 42, which is an arterial with close to 50,000 vpd. All of the other regional malls in the area have considerably more balanced traffic volumes on the surrounding roadways.

In the Intermediate Year (2030) No Build scenarios, the PM and Saturday Peak Hours are projected to have poor operations along the CR 42 corridor and will require mitigation. By the Horizon Year (2040) No Build, all scenarios will require mitigation and the PM and Saturday Peak Hours will have excessive delays and queues throughout the study area. Significant mitigation will be required along the CR 42 corridor without the anticipated Center Village Redevelopment.

The existing Burnsville Mall generates 18,400 trips per day and the Center Village Redevelopment is anticipated to generate 38,975 trips per day. This is an increase of 20,575 daily trips. The Center Village Redevelopment will focus on providing multimodal options such as enhanced pedestrian facilities and a transit station for the Orange Line BRT extension.

Based on the results of the Horizon Year (2040) Build analysis it was determined that significant mitigation along CR 42 would be required to accommodate the projected background growth and the complete redevelopment of the Center Village site. The concept layout showing the recommended mitigation measures is shown in **Appendix B**.

For the Intermediate Year (2030) Build analysis it was determined that less mitigation would be required than the Horizon Year (2040) Build analysis. However, because of the level of mitigation required for the Horizon Year (2040) Build analysis, it is recommended to complete the full mitigation to avoid multiple impacting CR 42 multiple times and to minimize throw away costs.

The mitigation could be split into three separate phases depending on when development happens on the Center Village site. The total concept level estimate of the improvements required along CR 42 is \$36.6 million. The Aldrich Avenue extension through the Center Village Site is estimated to cost between \$3.4 million and \$4.2 million and it would likely be one of the first components of the redevelopment.

All of the concept development as part of this study are at a planning level and will require further refinement and approval from the FHWA, MnDOT, Dakota County, and the City of Burnsville.



PROJECT UNDERSTANDING

Following the completion of the successful Center Village Redevelopment Vision in 2018, the City of Burnsville is moving forward to understand the transportation improvements needed to support the redevelopment of the Burnsville Center area. This study named the Center Village Traffic Study, includes analysis on the most congested corridor in the area, County Road (CR) 42, in addition to analysis of CR 38 (McAndrews Road) to the north, Portland Avenue to the east, Southcross Drive to the south, and CR 5 to the west. This study also explores innovative multimodal solutions needed to mitigate existing congestion on the roadway network as well as the anticipated traffic impacts of the redevelopment.

CENTER VILLAGE REDEVELOPMENT VISION

The redevelopment vision for Center Village is focused into two sections. The north neighborhood which is bounded by CR 38 (McAndrews Road) to the north, Aldrich Avenue to the east, CR 42 to the south, and Burnhaven Drive to the west. The south neighborhood encompasses the existing Burnsville Mall area. The south neighborhood is anticipated to redevelop first with a refreshed mall and walkable mixed-use environment, and the north neighborhood developing with smaller blocks of mixed-use developments. One of the key components of the Center Village Redevelopment is improving connections between the Center Village Districts and the surrounding region for all modes of transportation including transit, bikes/pedestrians, and vehicles. The focus of this study will be on the south neighborhood as it is planned to be completed by 2040, while the north neighborhood is anticipated to redevelop after 2040.

TRAFFIC OPERATIONAL ANALYSIS

There is significant congestion and crash history along CR 42, as a result of heavy traffic volumes (nearly 50,000 vehicles per day west of I-35W), eleven signalized intersections in less than two miles, and two major interchanges (I-35W and I-35E) in close proximity to each other. It is critical to improve the CR 42 experience in order for the Center Village District to thrive in the future.

The traffic operations analysis will help guide the concept development, so it is critical that traffic operations build off the Center Village Redevelopment Vision and fit within the vision's parameters. This analysis builds off that vision and will help determine the extent of the roadway network improvements required to provide adequate capacity for the Center Village Redevelopment.

CONCEPT DEVELOPMENT

The outcome of the traffic analysis was a list of potential infrastructure improvements required to adequately serve the area after Center Village is redeveloped. Roadway concepts drawings were developed to show these improvements. These drawings were used to obtain input from the project management team (PMT) and other stakeholders. The concept drawings were then used to develop concept level cost estimates to help better inform future phases of project development.



STAKEHOLDER ENGAGEMENT

Stakeholder engagement was another element of this study as agency coordination was important given that the roadways in the study area are under the jurisdiction of the City of Burnsville, Dakota County, and MnDOT. The following is a summary of PMT members and stakeholder engagement activities that occurred.

PMT Members

City of Burnsville

- Jen Desrude
- Ryan Peterson
- Regina Dean

Dakota County

- Doug Abere
- Kristi Sebastian
- John Sass

Minnesota Department of Transportation

- Almin Ramic
- Molly Kline

Project Management Team (PMT) Meetings

A PMT was formed at the beginning of the study to assist in making decision and advancing the study. The team included representative from the City of Burnsville, Dakota County, and MnDOT.

Over the course of the study, PMT meetings were held on the following dates:

- June 6th, 2019
- June 27th, 2019
- August 1st, 2019
- September 17th, 2019
- October 29th, 2019
- November 15th, 2019
- December 18th, 2019
- January 22nd, 2020

Public Outreach

- December 14th & 16th, 2019: City and Dakota County representatives were at a booth in the Burnsville Center Mall to provide information, take feedback, and answer questions about the Center Village Traffic Study
- December 11th, 2019 – January 31st, 2020: The City website had an interactive map to obtain feedback on traffic concerns and potential transportation improvements
- Winter 2020 Burnsville Bulletin, Volume 30, No. 1: The City newsletter contained an article regarding the traffic study and directing feedback to the interactive website or City Engineer
- Social Media: City Communications staff posted links to the interactive website to attract the public to provide feedback



Joint Planning and Economic Development Commission Meeting

An update was provided to the City of Burnsville Joint Planning and Economic Development Commission Meeting on November 13th, 2019.

City Council Update

Updates were provided to the Burnsville City Council on the following dates:

- December 10th, 2019 (work session)
- February 11th, 2020 (work session)



EXISTING CONDITIONS

STUDY AREA

The study area for the Center Village Redevelopment is bounded by CR 38 (McAndrews Road) to the north, Portland Avenue to the east, Southcross Drive to the south, and CR 5 to the west. Within this area, 36 intersections were analyzed. The following intersections were studied as part of the traffic analysis.

- County Road 42 & County Road 5
- County Road 42 & Irving Avenue
- County Road 42 & Burnhaven Drive
- County Road 42 & $\frac{3}{4}$ Access between Burnhaven Drive & Aldrich Avenue
- County Road 42 & Aldrich Avenue
- County Road 42 & Buck Hill Road/I-35W Southbound Ramp
- County Road 42 & I-35W Northbound Ramp
- County Road 42 & Nicollet Avenue
- County Road 42 & I-35E Southbound Ramps
- County Road 42 & I-35E Northbound Ramps
- County Road 42 & Portland Avenue
- County Road 5 & County Road 38 (McAndrews Avenue)
- Irving Avenue & County Road 38 (McAndrews Avenue)
- 141st Street & County Road 38 (McAndrews Avenue)
- Burnhaven Drive & County Road 38 (McAndrews Avenue)
- Aldrich Avenue & County Road 38 (McAndrews Avenue)
- Nicollet Avenue & County Road 38 (McAndrews Avenue)
- Portland Avenue & County Road 38 (McAndrews Avenue)
- County Road 5 & Southcross Drive
- Burnhaven Drive & Southcross Drive
- Buck Hill Road & Southcross Drive
- Portland Avenue & Southcross Drive
- Burnhaven Drive & 140th Street
- Aldrich Avenue & 140th Street
- Burnhaven Drive & 141st Street
- Aldrich Avenue 141st Street
- County Road 5 & 143rd Street
- 143rd Street & Irving Avenue
- Burnhaven Drive & 143rd Street
- Nicollet Avenue & Nicollet Boulevard
- Portland Avenue & Nicollet Boulevard
- Nicollet Avenue & Cobblestone Court/Fairview Drive
- Burnhaven Drive & Executive Boulevard
- Buck Hill Road & Mall North access
- Buck Hill Road & Mall Middle Access
- Buck Hill Road & Mall South Access

All the study intersections in the network are shown in **Exhibit 1** in **Appendix A**.



EXISTING ROADWAYS

The major roadway corridors within the study network are CR 42, CR 38, CR 5, Southcross Drive, Nicollet Avenue, Burnhaven Drive, Aldrich Avenue, and Buck Hill Road. Following provides a detailed description of these roadways.

County Road 42 is a six-lane, divided, east-west roadway with turn lanes at accesses and roadway connections. The Dakota County 2040 Comprehensive Plan classifies CR 42 as a Principal Arterial. The MnDOT Traffic Mapping Application reports an annual average daily traffic (AADT) range from 51,000 vehicles per day (vpd) between I-35W and I-35E to 28,500 vpd on the east side of the study area. The posted speed limit on CR 42 is 40 miles per hour (mph).

County Road 38 (McAndrews Avenue) is a four-lane, divided, east-west roadway with turn lanes at accesses and roadway connections. The Dakota County 2040 Comprehensive Plan classifies CR 38 as a Minor Expander. The MnDOT Traffic Mapping Application reports an AADT of 17,100 vpd in the study area. The posted speed limit on CR 38 is 40 mph.

County Road 5 is a four-lane, divided, north-south roadway with turn lanes at accesses and roadway connections. The Dakota County 2040 Comprehensive Plan classifies CR 5 as a Minor Expander. The MnDOT Traffic Mapping Application reports an AADT of 15,100 vpd in the study area. The posted speed limit on CR 5 is 45 mph.

Southcross Drive is a four-lane, divided and undivided, east-west roadway with turn lanes at accesses and roadway connections. The Dakota County 2040 Comprehensive Plan has Southcross Drive classified as a Major Collector to the east of Portland Avenue while the rest is classified as a local street. The MnDOT Traffic Mapping Application reports an AADT of 6,400 vpd in the study area. The posted speed limit on Southcross Drive is 35 mph.

Nicollet Avenue is a four-lane, divided, north-south roadway with turn lanes at accesses and roadway connections. The Dakota County 2040 Comprehensive Plan classifies Nicollet Avenue as a Minor Reliever. The MnDOT Traffic Mapping Application reports an AADT of 19,300 vpd in the study area. The posted speed limit on Nicollet Avenue is 40 mph.

Burnhaven Drive is a four-lane, divided, north-south roadway with turn lanes at accesses and roadway connections. The Dakota County 2040 Comprehensive Plan classifies Burnhaven Drive as a local street. The MnDOT Traffic Mapping Application reports an AADT between 10,100 vpd (at CR 42) and 5,500 vpd (at CR 38) in the study area. The posted speed limit on Burnhaven Drive is 35 mph.

Aldrich Avenue is a four-lane, divided, north-south roadway with turn lanes at accesses and roadway connections. The Dakota County 2040 Comprehensive Plan classifies Aldrich Avenue as a local street. The MnDOT Traffic Mapping Application reports an AADT of 11,900 vpd north of CR 42. The posted speed limit on Aldrich Avenue is 30 mph.

Buck Hill Road is a four-lane, undivided, north-south roadway with turn lanes at roadway connections. The Dakota County 2040 Comprehensive Plan classifies Buck Hill Road as a local street. The MnDOT Traffic Mapping Application reports an AADT of 9,800 vpd in the study area. The posted speed limit on Buck Hill Road is 45 mph.



EXISTING ROADWAY COMPARISONS TO OTHER REGIONAL MALLS

Burnsville Center has unique transportation challenges compared to other malls in the Minneapolis-St. Paul metropolitan area. Burnsville Center does not have direct access from either the I-35W interchange or the I-35E interchange and its main connecting roadway is CR 42, which is an arterial with close to 50,000 vpd. The other roadways surrounding the site: Burnhaven Drive, Buck Hill Road, and Southcross Drive, as described above, have around 10,000 vpd or less. There is a large imbalance of traffic volumes on the surrounding roadways, and the majority of traffic to/from Burnsville Center uses CR 42 in some capacity. This creates operational challenges at the intersections along CR 42.

Other regional malls of similar size in the Twin Cities include: Southdale Mall, Ridgedale Mall, Rosedale Mall, and Eden Prairie Center. To provide a comparison of the traffic levels at those facilities, the AADT volumes for the surrounding roadways at Burnsville Center and those other malls are listed below.

Burnsville Center (Burnsville, MN)

- County Road 42: 49,500 vpd
- Burnhaven Drive: 10,100 vpd
- Buck Hill Road: 9,800 vpd
- Southcross Drive: 6,400 vpd

Southdale Mall (Edina, MN)

- France Avenue: 23,700 vpd
- York Avenue: 21,700 vpd
- 66th Street: 15,100 vpd
- 69th Street: 10,100 vpd

Ridgedale Mall (Minnetonka, MN)

- Direct ramp access from I-394: not available
- Plymouth Road: 21,500 vpd
- Ridgedale Drive: 11,400 vpd

Rosedale Mall (Roseville, MN)

- Fairview Avenue: 24,500 vpd
- County Road B2: 14,200 vpd
- Snelling Avenue: 38,000 vpd

Eden Prairie Center (Eden Prairie, MN)

- Flying Cloud Drive: 17,900 vpd
- Prairie Center Drive: 20,800 vpd

All of these malls have considerably more balanced traffic volumes on the surrounding roadways. One thing all the malls, including Burnsville Center, have in common is close proximity to at least two interchanges. However, all the regional malls have access to the interchanges from separate surrounding roadways except Burnsville Center. For example, at the Rosedale Mall, Fairview Avenue has an interchange with Highway 36 and County Road B2 has an interchange with Snelling Avenue. Burnsville Center has both interchanges located on CR 42 which results in the majority of traffic accessing the site from CR 42 rather than alternative surrounding roadways.



EXISTING TRAFFIC VOLUMES

To analyze the traffic operations at the study intersections, weekday peak period turning movement counts were collected in June 2019. Turning movements were collected for the AM and PM peak hours at all 36 intersections. **Exhibit 2** in **Appendix A** shows the study area and locations where traffic data was collected. For the Saturday peak hour, recent turning movement counts for the intersections along CR 42 were provided by Dakota County, while counts at the rest of the intersections were collected for the Saturday peak. **Exhibits 3A-3C** and **4A-4C** in **Appendix A** provides a summary of the weekday AM / PM and Saturday peak hour turning traffic volumes, respectively. The turning movement counts were collected on a typical weekday/weekend. In addition to the turning movement counts, 24 hour bi-direction counts were collected at the 10 locations shown in the exhibit. These counts were used to determine the peak periods throughout the study area. The turning movement count data is provided in **Appendix C**.

The network AM peak hour was determined to be 7:00 AM to 8:00 AM, the network PM peak hour was determined to be 4:30 PM to 5:30 PM, and the Saturday peak hour was determined to be 1:00 PM to 2:00 PM. The turning movement counts included crosswalk pedestrian counts at all the study intersections. The crosswalk volumes were included in the capacity analysis at the study intersections.

EXISTING CAPACITY ANALYSIS

A capacity analysis was performed to quantify the delay and level of service (LOS) at the study intersections during the weekday AM and PM peak hours and the Saturday peak hour. The capacity analysis was performed using Synchro/SimTraffic. Existing signal timings provided by Dakota County were used to complete the existing conditions analysis.

The capacity of an intersection quantifies its ability to accommodate traffic volumes and is measured in average delay per vehicle. It is expressed in terms of LOS which ranges from A to F, with LOS A as the highest (best traffic flow and least delay), LOS E as saturated or at-capacity conditions, and LOS F as the lowest (oversaturated conditions). The LOS grades shown below, which are provided in the Transportation Research Board's Highway Capacity Manual (HCM), quantify and categorize the driver's discomfort, frustration, fuel consumption, and travel times experienced as a result of intersection control and the resulting traffic queuing. A detailed description of each LOS rating can be found in **Table 1**. The range of control delay for each rating (as detailed in the HCM) is also shown in **Table 1**. Because signalized intersections are expected to carry a larger volume of vehicles and stopping is required during red time, higher delays are tolerated for the corresponding LOS ratings. For unsignalized intersections, the intersection LOS is reported as the worst side street movement.



Table 1 – Level of Service Information

Level of Service	Average Control Delay (seconds/vehicle)	Description
A	0-10 (Unsignalized); 0-10 (Signalized)	Minimal control delay; traffic operates at primarily free-flow conditions; unimpeded movement within traffic stream.
B	>10-15 (Unsignalized); >10-20 (Signalized)	Minor control delay at signalized intersections; traffic operates at a fairly unimpeded level with slightly restricted movement within traffic stream.
C	>15-25 (Unsignalized); >20-35 (Signalized)	Moderate control delay; movement within traffic stream more restricted than at LOS B; formation of queues contributes to lower average travel speeds.
D	>25-35 (Unsignalized); >35-55 (Signalized)	Considerable control delay that may be substantially increased by small increases in flow; average travel speeds continue to decrease.
E	>35-50 (Unsignalized); >55-80 (Signalized)	High control delay; average travel speed no more than 33 percent of free flow speed.
F	>50 (Unsignalized); >80 (Signalized)	Extremely high control delay; extensive queuing and high volumes create exceedingly restricted traffic flow.

The traffic volumes shown in **Exhibits 3A-3C** and **4A-4C** in **Appendix A** were used in the Existing Year (2019) analysis.

In the AM peak hour, all study intersections operated at LOS C or better. There are some side street movements along CR 42 with undesirable LOS, but this is expected along an arterial like CR 42. **Exhibit 5** show the movements that operate at LOS E or worse in the AM peak hour. It should be noted that only intersection movements with undesirable LOS are shown in the exhibit, all other movements are provided in the SimTraffic reports in **Appendix F**. The total network delay for the existing AM peak hour is 70.1 seconds per vehicle. There are no excessive queues during the AM peak hour.

In the PM peak hour, all study intersections operated at LOS D or better. Similar to the AM peak hour, side street and minor movements along the CR 42 corridor account for the majority of the undesirable LOS. Side-street left turns at the unsignalized intersections along CR 38 (McAndrews Road) also experience excessive delays in the PM peak hour. **Exhibit 6** shows the movements with LOS E or worse in the PM peak hour. The total network delay for the existing PM peak hour is 111.6 seconds per vehicle. Below is a list of queues that extend past their storage capacity.

- Westbound through movement at Nicollet Avenue & CR 42
- Southbound right turn at I-35E Southbound Ramps & CR 42 (the result of the westbound through queues at Nicollet Avenue & CR 42)
- Eastbound left turn at I-35E Northbound Ramps & CR 42
- Southbound left turn at CR 5 & CR 38 (McAndrews Road)

In the Saturday peak hour, all study intersections operated at LOS D or better. The intersection delay only considers vehicles once they've passed through adjacent intersections and does not add delays that extend through multiple intersections. Therefore, the intersection delay appears better than actual conditions. Side



street and minor movement operations along the CR 42 corridor are poor and queues along CR 42 are excessive. **Exhibit 7** shows the movements with LOS E or worse in the Saturday peak hour. The total network delay for the existing Saturday peak hour is 128.1 seconds per vehicle. Below is a list of queues that extend past their storage capacity.

- Southbound movements at Burnhaven Drive & CR 42
- Eastbound through movement at Aldrich Avenue & CR 42 (extend beyond the existing $\frac{3}{4}$ access)
- Westbound through movement at Aldrich Avenue & CR 42 (extend beyond the I-35W Southbound Ramp Exit/Buck Hill Road)
- Southbound left turn at Aldrich Avenue & CR 42
- Eastbound through movement at I-35W Southbound Ramp/Buck Hill Road & CR 42 (continuation of the eastbound queuing)
- Eastbound left turn at I-35W Northbound Ramp & CR 42
- Westbound through movement at Nicollet Avenue & CR 42
- Southbound right turn at I-35E Southbound Ramps & CR 42 (the result of the westbound through queues on CR 42 resulting in queues that extend back to I-35E mainline gore)
- Westbound through movement at I-35E Southbound Ramps & CR 42
- Westbound through movement at I-35E Northbound Ramps & CR 42

Based on the queuing analysis, the westbound queues on CR 42 are approximately 0.6 miles long from Nicollet Avenue & CR 42, and the eastbound queues are approximately 0.5 miles long from the I-35W northbound Ramp & CR 42. These queues extend beyond multiple intersections and result in poor operations at the surrounding intersections.

The results of the existing conditions operations were consistent with what was observed in the field review of the network. The SimTraffic reports are provided in **Appendix F**.

EXISTING CRASH ANALYSIS

A review of the crash data at all the intersections in the study area between 2011 and 2015 showed that there are 7 intersections that have a crash rate (CR) or fatal & serious injury rate (FAR) index greater than 1.0. The crash rate index is determined by using MnDOT's most current statewide averages provided in the 2015 "Green Sheets." Intersection crash rates were calculated and compared against statewide average values to develop a critical index value. This value is used to evaluate how an intersection's crash history compares to the statewide average for similar intersections. A critical index value over 1.0 means the intersection is outside of the normal range for comparable intersections. The main factors in calculating the crash rate is: the severity of the crash, the volume on the roadway, type of traffic control, and the speed limit.

Below is a list of intersections that have a CR index over 1.0 along with current CR index:

- County Road 42 & Aldrich Avenue – 1.13
- County Road 42 & Nicollet Avenue – 1.06
- County Road 38 & Irving Avenue – 1.00
- Burnhaven Drive & 140th Street – 1.38
- Aldrich Avenue & 140th Street – 1.25
- Nicollet Avenue & Nicollet Boulevard – 1.07

The intersection of Southcross Drive and Portland Avenue had a FAR index of 1.04, although the CR index was at 0.42.

Exhibit 8 summarizes the number of crashes, crash rate, critical rate, CR index, and FAR index for the 7 intersections that have a critical index over 1.0. The “Green Sheets” for all the study area intersections are shown in **Appendix D**.



BACKGROUND GROWTH

The south neighborhood of the Center Village Redevelopment was assumed to be completed by 2040. The Dakota County Travel Demand Model was used to determine the growth rates throughout the network. Growth rates for major roadways were used to more accurately project background traffic growth as compared to applying an overall growth rate to the network. Kimley-Horn worked with Dakota County and SRF Consulting Group, who is updating the County's travel demand model, to estimate the travel demand model growth for the Burnsville Mall (TAZ 575) with the development. Trip distribution patterns for these site trips were estimated using a select link analysis and then the anticipated growth in TAZ 575 trips were removed from the network. It was determined that the ITE Trip Generation estimates were more accurate based on a comparison of the actual existing trips that were generated by TAZ 575 and the volumes from the Travel Demand model associated with TAZ 575. The existing daily trip generation for TAZ 575 is approximately 18,400 vpd while the Travel Demand Model showed a trip generation rate of 10,800 vehicles. The 2040 Travel Demand Model showed TAZ 575 generation 20,000 trips per day. Therefore, 9,200 trips were removed from the background traffic. These trips were removed to avoid double counting the growth from TAZ 575 in the background growth since were also adding in the Center Village Redevelopment traffic calculated using trip generation rates. Removing the Travel Demand Model trips for TAZ 575 allowed for consistency prior to adding in the ITE Trip Generation projections.

Table 2 provides a summary of the 2016 and 2040 AADTs and calculated growth from the travel demand model without the traffic from TAZ 575. The growth along each segment of the roadway was then used to calculate a linear compound growth rate for each corridor. These growth rates were applied to the existing traffic counts to determine the background growth for the interim build-out year (2030) and the horizon build-out year (2040).

Table 2 – Annual Growth Rate Calculation

COMPREHENSIVE PLAN GROWTH		DAKOTA COUNTY			PROPOSED GROWTH RATE
ROADWAY	ROADWAY SEGMENT	AADT		ANNUAL GROWTH %	
		2016	2040		
CR 42	West of CR 5	39,000	45,700	0.66%	0.50%
	CR 5 to Burnhaven Drive	35,500	39,800	0.48%	
	Burnhaven Drive to I-35W	49,500	53,400	0.32%	
	I-35W to I-35E	51,000	56,700	0.44%	
	East of I-35E	26,000	32,100	0.88%	
	AVERAGE	40,200	45,540	0.52%	
CR 5	North of McAndrews Road	14,400	17,800	0.89%	1.00%
	McAndrews Road to CR 42	17,200	21,100	0.86%	
	CR 42 to Southcross Drive	15,100	18,500	0.85%	
	South of Southcross Drive	13,700	17,450	1.01%	
	AVERAGE	15,100	18,713	0.90%	
CR 38 (McAndrews Road)	CR 5 to Aldrich Avenue	16,000	17,300	0.33%	0.50%
	East of Portland Avenue	19,400	21,000	0.33%	
	AVERAGE	17,700	19,150	0.33%	

Southcross Drive	West of CR 5				
	CR 5 to Burnhaven Drive				
	Burnhaven Drive to Buck Hill Road	6,700	9,600	1.51%	1.50%
	Buck Hill Road to Portland Avenue				
	East of Portland Avenue				
	<i>AVERAGE</i>	<i>6,700</i>	<i>9,600</i>	<i>1.51%</i>	
Burnhaven Drive	McAndrews Road to CR 42	9,100	9,200	0.05%	0.50%
	CR 42 to Southcross Drive	9,500	11,900	0.94%	
	South of Southcross Drive				
	<i>AVERAGE</i>	<i>9,300</i>	<i>10,550</i>	<i>0.53%</i>	
Buck Hill Road	CR 42 to Southcross Drive	10,300	12,600	0.84%	0.75%
Aldrich Avenue	Between McAndrews Road and CR 42	11,300	10,300	-0.39%	0.25%
Nicollet Avenue	CR 42 to Nicollet Boulevard	22,800	24,300	0.27%	0.25%
	Nicollet Boulevard to McAndrews Road	8,100	8,600	0.25%	
	North of McAndrews Road	15,500	17,000	0.39%	
	<i>AVERAGE</i>	<i>15,467</i>	<i>16,633</i>	<i>0.30%</i>	
Portland Avenue	McAndrews Road to CR 42				0.50%
	CR 42 to Southcross Drive	7,500	8,500	0.52%	
	South of Southcross Drive				
	<i>AVERAGE</i>	<i>7,500</i>	<i>8,500</i>	<i>0.52%</i>	

In addition to the generic background growth in the area, developments in the study area that are planned or in the process of being built were added to the background growth that include:

- Silverstone Development (+/- 150 senior housing units and 20,000 SF medical office)
- Park Nicollet Expansion (85,000 SF medical office space)
- Prince of Peace (+/- 200 multi-family dwelling units)
- Twin Lakes Development (+/- 460 multi-family dwelling units)

Exhibits 9A-12C show the traffic volumes for the Intermediate Year No-Build (2030) and the Horizon Year No-Build (2040).



NO-BUILD CAPACITY ANALYSIS

INTERMEDIATE YEAR NO-BUILD (2030) CONDITIONS

A capacity analysis was performed to quantify the delay and level of service at the study intersections during the weekday AM and PM peak hours and the Saturday peak hour. The capacity analysis was performed using Synchro/SimTraffic. No geometric changes were assumed for the no-build scenario. Signal timings were optimized, although CR 42 was still the prioritized corridor.

In the AM peak hour, all study intersections operated at LOS C or better. There are more side street movements along CR 42 with undesirable LOS than under existing conditions, but operations are still acceptable and the worse LOS for the side street movements are expected along an arterial like CR 42. **Exhibit 13** shows the movements that operate at LOS E or worse in the AM peak hour. It should be noted that only intersection movements with an undesirable LOS are shown in the exhibit, all other movements are provided in the SimTraffic reports. The total network delay for the 2030 No-Build AM peak hour is 82.8 seconds per vehicle. The eastbound left turn at I-35E Northbound Ramps & CR 42 queues extend beyond the storage capacity.

In the PM peak hour, all study intersections operated at LOS D or better. Similar to the AM peak hour, side street and minor movements along the CR 42 corridor account for the majority of the undesirable LOS. The intersection delay only considers vehicles once they've passed through adjacent intersections and does not add delays that extend through multiple intersections. Therefore, the intersections delay appears better than they actually are. Side-street left turns at the unsignalized intersections along CR 38 (McAndrews Road) also experience long delays in the PM peak hour. **Exhibit 14** shows the movements with LOS E or worse in the PM peak hour. The total network delay for the 2030 No-Build PM peak hour is 212.7 seconds per vehicle. Below is a list of queues that extend past their storage capacity.

- Eastbound through queues on CR 42 extend from Nicollet Avenue & CR 42 to the west edge of the study area, a distance of 1.4 miles.
- Westbound through queues on CR 42 extend from Nicollet Avenue & CR 42 to the I-35E Northbound Ramps, a distance of 0.25 miles.
- Side street queues at all intersections along CR 42 between Burnhaven Drive and the Southbound I-35E Ramps are impacted by the through queues on CR 42.
- The queues for both the I-35W Southbound Exit Ramp and the I-35E Southbound Exit Ramp are expected to extend back to the gore area of the interstate.

In the Saturday peak hour, all study intersections operated at LOS D or better. The intersection delay only considers vehicles once they've passed through adjacent intersections and does not add delays that extend through multiple intersections. Therefore, the intersections delay appears better than actual conditions. Side street and minor movement operations along the CR 42 corridor are poor and queues along CR 42 are excessive. **Exhibit 15** shows the movements with LOS E or worse during the Saturday peak hour. The total network delay for the 2030 No-Build Saturday peak hour is 239.3 seconds per vehicle. Below is a list of queues that extend past their storage capacity.

- Eastbound through queues on CR 42 extend from Nicollet Avenue & CR 42 to the west edge of the study area, a distance of 1.5 miles.



- Westbound through queues on CR 42 extend from Nicollet Avenue & CR 42 past Plymouth Avenue, a distance of 0.5 miles.
- The queues for both the I-35W Southbound Exit Ramp and the I-35E Southbound Exit Ramp are expected to extend back to the gore with the mainline of the interstate.
- Side street queues at all intersections along CR 42 between Burnhaven Drive and the Northbound I-35E Ramps are greatly impacted by the through queues on CR 42.

Based on the queuing analysis, in both the PM peak hour and the Saturday peak hour, westbound queues on CR 42 are approximately 1.5 miles long extending from Nicollet Avenue & CR 42. The eastbound queues are approximately 0.25 miles long in the PM peak and 0.5 miles long in the Saturday peak extending from I-35W Northbound Ramp & CR 42. These queues extend beyond multiple intersections and result in negative operations at the surrounding intersections.

The traffic volumes shown in **Exhibits 9A-9C** and **10A-10C** in **Appendix A** were used for the Intermediate Year No-Build (2030) analysis. The SimTraffic reports are provided in **Appendix F**.

HORIZON YEAR NO-BUILD (2040) CONDITIONS

A capacity analysis was performed to quantify the delay and level of service at the study intersections during the weekday AM and PM peak hours and the Saturday peak hour. The capacity analysis was performed using Synchro/SimTraffic. No geometric changes were assumed for the no-build scenario. Signal timings were optimized, although CR 42 was still the prioritized corridor.

In the AM peak hour, all study intersections operated at LOS D or better. There are side street movements along CR 42 with undesirable LOS, but this is expected along an arterial like CR 42. **Exhibit 16** shows the movements that operate at LOS E or worse in the AM peak hour. It should be noted that only intersections with undesirable LOS are shown in the exhibit, all other movements are provided in the SimTraffic reports. The total network delay for the 2040 No-Build AM peak hour is 145.5 seconds per vehicle. Below is a list of queues that extend past their storage capacity.

- Eastbound through queues on CR 42 extend from Nicollet Avenue & CR 42 to Burnhaven Drive, a distance of 0.6 miles.
- Northbound right turn queues on Buck Hill Road at CR 42 extend 750 feet.

In the PM peak hour, all study intersections along CR 42 operate at LOS E or F, with the remaining intersections in the study area operating at LOS D or better. The majority of movements along the CR 42 corridor operate at an undesirable LOS. Side-street left turns at the unsignalized intersections along CR 38 (McAndrews Road) also experience long delays in the PM peak hour. **Exhibit 17** shows the movements with LOS E or worse during the PM peak hour. The total network delay for the 2040 No-Build PM peak hour is 235.4 seconds per vehicle. Below is a list of queues that extend past their storage capacity.

- Eastbound through queues on CR 42 extend from Nicollet Avenue & CR 42 beyond the west edge of the study area, a distance of 1.75 miles.
- Westbound through queues on CR 42 extend from Nicollet Avenue & CR 42 past Plymouth Avenue, a distance of 0.5 miles.



- Side street queues at all intersections along CR 42 between Burnhaven Drive and the Southbound I-35E Ramps are impacted by the through queues on CR 42.
- The queues for the I-35E Southbound Exit Ramp are expected to extend back to the gore with the mainline of the interstate.

In the Saturday peak hour, all study intersections along CR 42 operate at LOS E or F while the remaining intersections in the study area operate at LOS D or better. The majority of movements along the CR 42 corridor operate at an undesirable LOS and have excessive delays. Side-street left turns at the unsignalized intersections along CR 38 (McAndrews Road) also experience long delays in the PM peak hour. **Exhibit 18** shows the movements with LOS E or worse during the Saturday peak hour. The total network delay for the 2040 No-Build Saturday peak hour is 239.7 seconds per vehicle. Below is a list of queues that extend past their storage capacity.

- Eastbound through queues on CR 42 extend from Nicollet Avenue & CR 42 to the west edge of the study area, a distance of 1.6 miles.
- Westbound through queues on CR 42 extend from Nicollet Avenue & CR 42 past Portland Avenue, a distance of 1.0 miles.
- The queues for both the I-35W Southbound Exit Ramp and I-35E Southbound Exit Ramp are expected to extend back to the gore with the mainline of the interstate.
- Side street queues at all intersections along CR 42 between Burnhaven Drive and Portland Avenue are greatly impacted by the through queues on CR 42.

Based on the queuing analysis, the eastbound and westbound queues on CR 42 extend through the majority of the study area during the PM and Saturday peak hours. These queues extend beyond multiple intersections and result in unacceptable operations at the surrounding intersections.

The traffic volumes shown in **Exhibits 11A-11C** and **12A-12C** in **Appendix A** were used for the Horizon Year No-Build (2040) analysis. The SimTraffic reports are provided in **Appendix F**.



PROPOSED DEVELOPMENT

SITE TRIP GENERATION

The trip-generating potential of the proposed development was calculated using the Institute of Transportation Engineers (ITE) *Trip Generation Manual, Tenth Edition*. The land use density of the site determined in the Center Village Redevelopment Vision planning process was utilized. Standard ITE trip rates were used to develop the total trips generated by the site for all land uses except for the shopping center land use. As part of the data collection, all of the site accesses to the Burnsville Mall were counted, and from these counts a trip generation rate for the existing mall was determined. The rate was based on the amount of leased space in the mall at the time of the count (June 2019). Burnsville Mall has approximately 1,100,000 square feet of leasable space, however, one of the anchor tenant spaces was vacant so the trip generation rate was based off of 876,000 square feet. The observed rate is significantly lower than the ITE Trip Generations rate, but it would more accurately represent the existing and anticipated trips on site. The proposed land uses for the site are listed below.

- 1,600 apartment units
- 200 hotel rooms
- 315,000 square feet of general office
- 315,000 square feet of medical office
- 75,000 square feet of institutional
- 1,100,000 square feet of retail

It should be noted that the retail space is not all additional retail as it will include reconfiguring the mall spaces in addition to providing more retail spread throughout the site. The total square footage of existing retail is comparable to the Center Village Redevelopment Plan. The average rate for ITE land uses were used to calculate the trip generation potential of the site during the AM and PM peak hours.

For the Saturday peak hour, the ITE trip generation rates were adjusted for each land use. The ITE trip generation manual reports the peak hour for each individual land use and using these numbers results in an overly conservative trip generation numbers because not all the land uses will have the same peak hour on a Saturday. The ITE Trip Generation Manual has hourly trip generation percentages for all the land uses in the Center Village Redevelopment. These hourly breakdowns for trips generated were used to determine the percentage of their respective Saturday peak hour trips during the projected Center Village peak hour between 1:00 PM to 2:00 PM on Saturday. The breakdowns are listed below.

- Apartments would generate 60% of their Saturday peak hour
- Hotel would generate 43% of their Saturday peak hour
- General office would generate 28% of their Saturday peak hour
- Medical office would generate 42% of their Saturday peak hour
- Institutional would generate 66% of their Saturday peak hour
- Shopping center would generated 100% of their Saturday peak hour



Table 3 provides a summary of the trips anticipated to be generated during the weekday AM and PM peak hours and the Saturday peak hour. **Table 3** also shows the comparison to the existing trip generation and the net increase in trips to the area. Internal capture rates were determined based on the ITE Trip Generation Manual.

Center Village is anticipated to be built-out by the Horizon 2040 analysis year. It was assumed that development would happen linearly, and that half of the development would be completed by the Intermediate 2030 horizon year.

Table 3 – Site Trip Generation

Land Use	Intensity	Trip Gen Source	DAILY		AM Peak		PM Peak		SAT Peak ¹	
			Rate	Trips	Rate	Trips	Rate	Trips	Rate	Trips
Retail	1,100,000 SF	Local Rate	21.00 ²	23,100	0.41 ²	450	2.12 ²	2,350	3.32 ²	3,650
Residential	1,600 Units	ITE Rate	5.44	8,700	0.36	575	0.44	700	0.27	430
Hotel	200 Rooms	ITE Rate	8.36	1,675	0.47	100	0.60	125	0.31	60
General Office	315,000 SF	ITE Rate	9.74	3,075	1.16	375	1.15	325	0.15	50
Medical Office	315,000 SF	ITE Rate	34.80	10,950	2.78	875	3.46	1,100	1.30	410
Institutional	75,000 SF	ITE Rate	22.59	1,700	3.34	250	1.71	125	1.12	85
Subtotal			--	49,200	--	2,600	--	4,750	--	4,690
Internal Capture Reduction				-10,225		-350		-950		-610
Projected Center Village Trip Generation			--	38,975	--	2,250	--	3,800	--	4,080
Existing Burnsville Mall Trip Generation				18,400		350		1,850		2,900
<i>Net Increase in Traffic</i>			--	<i>20,575</i>	--	<i>1,900</i>	--	<i>1,950</i>	--	<i>1,180</i>

Note 1: The ITE trip generation Saturday peak hour rates were adjusted to reflect the 1PM – 2PM peak hour.

Note 2: The ITE trip generation rate for a shopping mall is 37.75 for Daily, 0.94 for AM, 3.81 for PM, and 4.5 for Saturday

TRANSIT

There are currently four Minnesota Valley Transit Authority (MVTA) routes in the study area.

- Route 426: a shuttle route that has 3 stops in the study area and connects riders to the Burnsville Transit Station. In the morning and afternoon peak hours there is service every 30 minutes.
- Route 442: a local route that connects Burnsville Center and Apple Valley Transitway Station. There is service every 60 minutes throughout the day.
- Route 444: a local route that connects Burnsville Center, Burnsville Transit Station, and the Mall of America Transit Station. There is service every 30 minutes in the morning and afternoon peaks and service every 60 minutes throughout the day.

- Route 464: an express route that connects the south metro to downtown Minneapolis. Service is every 10 minutes to a half hour in the morning and afternoon peak hours.

After discussions with MVTA staff, it was determined that total daily ridership for these four routes is roughly 1,150 riders per day while the combined daily vehicle traffic in the area is 95,000 vehicles. This results in transit making up approximately 1.5% of mode share.

It is anticipated that the Orange Line Bus Rapid Transit (BRT) line will be extended to a new Burnsville Transit Station at Center Village. **Figure 1** below shows potential locations of the transit station based on the Center Village Redevelopment Vision. Metro Transit provided guidance when determining the projected ridership for the new BRT line. With that increase in ridership, the mode share for the site is anticipated to increase from 1.5% to 3%. Therefore, a 3% reduction to the trip generation was used to reflect the new transit ridership in the study area.

Figure 1 – METRO Orange Line Extension





SITE TRIP DISTRIBUTION AND ASSIGNMENT

The site trips were distributed to adjacent roadways based on a StreetLight data analysis and the current traffic patterns in the area. StreetLight Insight is a web-based tool that uses crowdsourced GPS navigation and location-based services data to provide transportation analytics. StreetLight was used for this project to investigate the characteristics of vehicles in the study area. As a part of this study, origin and destination studies for the Burnsville Mall were analyzed to determine the existing trip distribution. It was assumed that the future land uses would have a similar trip distribution. The StreetLight results can be found in **Appendix E**. Using the StreetLight results, the following global trip distribution was assumed for the development:

- 15% to/from the west on CR 42
- 7% to/from the north on CR 5
- 20% to/from the north on I-35W
- 8% to/from the north on CR 38 and Nicollet Avenue
- 20% to/from the north on I-35E
- 15% to/from the east on CR 42
- 12% to/from the south on I-35
- 3% to/from the south on CR 5

The trip distribution for the site-generated traffic is shown in **Exhibit 19** in **Appendix A**.

Based on the Center Village Vision concepts, it was assumed that access to the site would remain at the same locations as the existing Burnsville Center. Because the Center Village Vision is in the conceptual stage at this point, with no defined site plan, it was also assumed that the trip generation would be assigned to the site accesses similarly to existing conditions. As the development plan becomes more defined, additional traffic analysis will need to be complete because changes to the internal roadway network and the location and size of individual redeveloped parcels will impact these trip distributions. The site trips were assigned to the study intersections and added to the no-build scenarios to create the build volumes. The build volumes for the Intermediate Year (2030) Build Conditions and the Horizon Year (2040) Build Conditions are shown in **Exhibits 20A – 23C** in **Appendix A**.



POTENTIAL IMPROVEMENTS

Based on the results of the no-build analysis, improvements have to be made to roadway network without the redevelopment. An increase in site trips from 18,400 vpd to 38,975 vpd under build conditions will also have a considerable impact on traffic operations. The majority of the operational issues occur along the County Road 42 corridor so that is the corridor where most mitigation is required. Typically, improvements are made based on the typical weekday analysis, although, consideration was given to the Saturday peak due to the heavy Saturday peaking characteristics under existing and build conditions. Although the goal is not to mitigate for every operational concern that exists for one peak hour on one day of the week, it was important to make sure the corridor included the required mitigation so there was not congestion at levels that would significantly impact I-35W or I-35E.

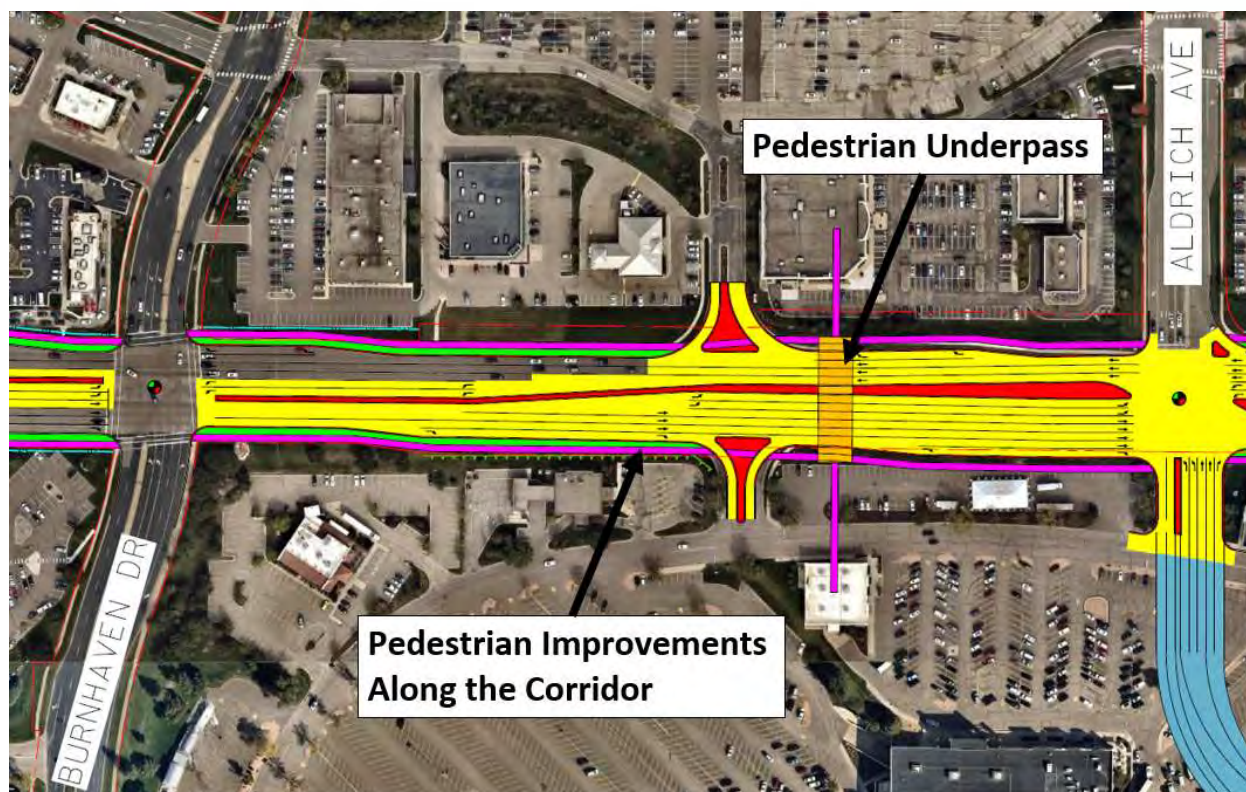
Pedestrian Improvements:

There are several mitigations measures that were assumed to be completed in the study area that were discussed in the Center Village Redevelopment Vision. The Vision determined the need for pedestrian improvements along CR 42. Pedestrian improvements running parallel with CR 42 don't have a large impact on the traffic operations along the corridor, however, improving pedestrian and bicycle facilities helps promote alternate modes of transportation, ultimately reducing vehicular trips that would create a more multimodal area. The implementation of a pedestrian underpass west of CR 42 & Aldrich Avenue will provide added connectivity between the proposed transit station on the Center Village site and the businesses on the north side of CR 42. Given the volume of traffic and the width of CR 42, it is not ideal for pedestrians to cross the roadway. The underpass would help increase the number of pedestrians in the area because of its ease of use, by creating a more enjoyable experience, and providing an additional and improved connection between transit, residential, and commercial land uses. **A pedestrian underpass is recommended and will be included in the future concepts developed. (Figure 2)**

Along both sides of CR 42 in the study area there are generally 6-foot-wide sidewalks with 10-foot boulevards between the roadway and sidewalks. While these sidewalks may be adequate for pedestrians, it limits the use of the facilities for both pedestrians and cyclist. **Widening existing sidewalks to 10-foot trails is recommended on both sides of CR 42 because they will improve the functionality and user experience.** These trail improvements are included in the future concepts developed.



Figure 2 – Pedestrian Improvements



Mitigation Methodology:

The no-build capacity analysis showed that the majority of the operational issues in the study area were located along CR 42 or were related to queuing and delays for minor approaches to CR 42 that negatively impacted adjacent intersections. The initial focus of the mitigation was to determine solutions that addressed the operations on CR 42 and then review the remaining areas that would require further mitigation. Determining the required mitigation at the study intersections along the CR 42 corridor was an iterative process. The following steps were taken to determine the recommended mitigation measures along CR 42:

1. Update and coordinate signal timings along the corridors.
2. Determine the intersections that have a significant impact on the surrounding intersections along CR 42.
3. Consider additional turn lanes for movements with poor levels of service.
4. Limit access at intersections.
5. Provide additional through lanes on CR 42.
6. Consider new interstate connections.
7. Other intersection improvements in the study area.
8. Provide dynamic message sign to encourage alternative routes.



Update Signal Timing:

Signal timings and offsets along the CR 42 corridor were updated when future build scenarios were analyzed. Updating the timings had a minimal impact on operations because they are optimized under existing conditions. **Signal optimization as traffic volumes change is recommended.** It was assumed in the analysis that signal timing will continue to prioritize through movements on CR 42.

Critical Intersection:

The intersection of Nicollet Avenue & CR 42 had the worst operations in the study area. This is due to the high through volume along CR 42 and the amount of turning traffic on and off Nicollet Avenue north of CR 42. With the existing geometry, Nicollet Avenue has to operate as split phase, which takes green time away from the movements on CR 42, causing queues along CR 42 up to 1 mile long in both the eastbound and westbound directions. This intersection was the top priority for mitigation, as it impacted operations at all the adjacent interchange intersections.

One way to resolve some of that congestion was remove the CR 42 crosswalk on the east side of the intersection. The reasoning behind removing that pedestrian crossing is that the minimum crossing time given to pedestrians approaches 40 seconds because the CR 42 crossing is approximately 130 feet long. The northbound leg does not need 40 seconds of green time to clear vehicular traffic so being able to reduce the minimum time for that approach allows more green time for the through movements on CR 42. Removing the east pedestrian crossing improved the queues along CR 42 significantly, however, the major movements are still over capacity and further mitigation is required. Maintaining at least one pedestrian crossing at the intersection is required because the adjacent interchange intersections do not provide crosswalks across CR 42. The nearest pedestrian crossing to the west is at Aldrich Avenue and the nearest pedestrian crossing to the east is at Plymouth Avenue. **Removing this pedestrian crossing is recommended as a solution to achieve better operations while still maintaining split phase timings which allows for the current lane configurations on Nicollet Avenue to remain in place.**

Additional Turn Lanes:

With limited green time for left turn movements at intersections along the CR 42 corridor, it is beneficial to have an additional left turn lane at locations having capacity challenges to allow more vehicles through the intersection in the same amount of time. There are multiple locations in the study area where expanding the left turn lane capacity is beneficial and would have minimal impact on the roadway geometry due to a wide existing median that could be modified. **Below is a list of recommended turn lane expansions:**

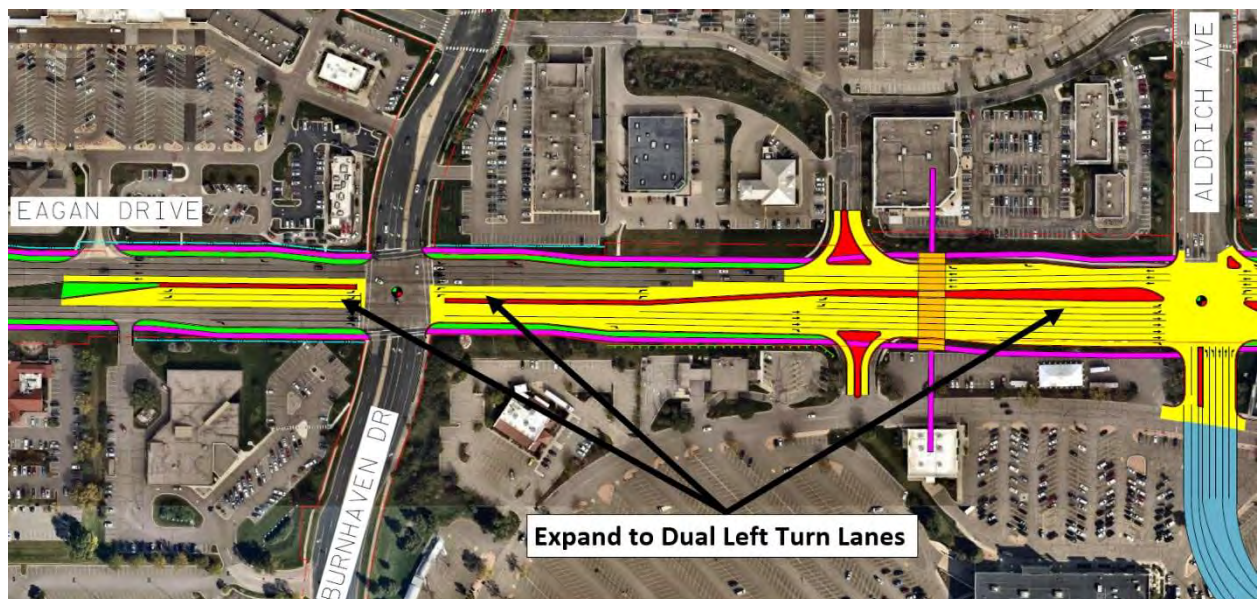
- CR 5 & CR 38 (McAndrews Road) – expand the southbound left turn lane to dual lefts (**Figure 3**)
- CR 42 & Burnhaven Drive – expand both the eastbound and westbound left turn lanes to dual lefts (**Figure 4**)
- CR 42 & Aldrich Avenue – expand the eastbound left turn lane to dual lefts and the northbound leg of Aldrich Avenue will be reconstructed to provide dual northbound left turn lanes that are 300 feet long, two through lanes, and a northbound right turn lane that is 300 feet long. (**Figure 4**)



Figure 3 – CR 5 & CR 38 Left Turn Lane Expansion Location



Figure 4 – CR 42 Left Turn Lane Expansion Locations



Limited Access:

Limiting access along the CR 42 corridor could provide operational benefits along the corridor. At CR 42 & Nicollet Avenue, reducing the northbound leg to a right-out approach was analyzed. This improved operations greatly because it allowed for the removal of one phase from the signal operations, ultimately allowing for more green time for the other movements. One obstacle with limiting access at this location is

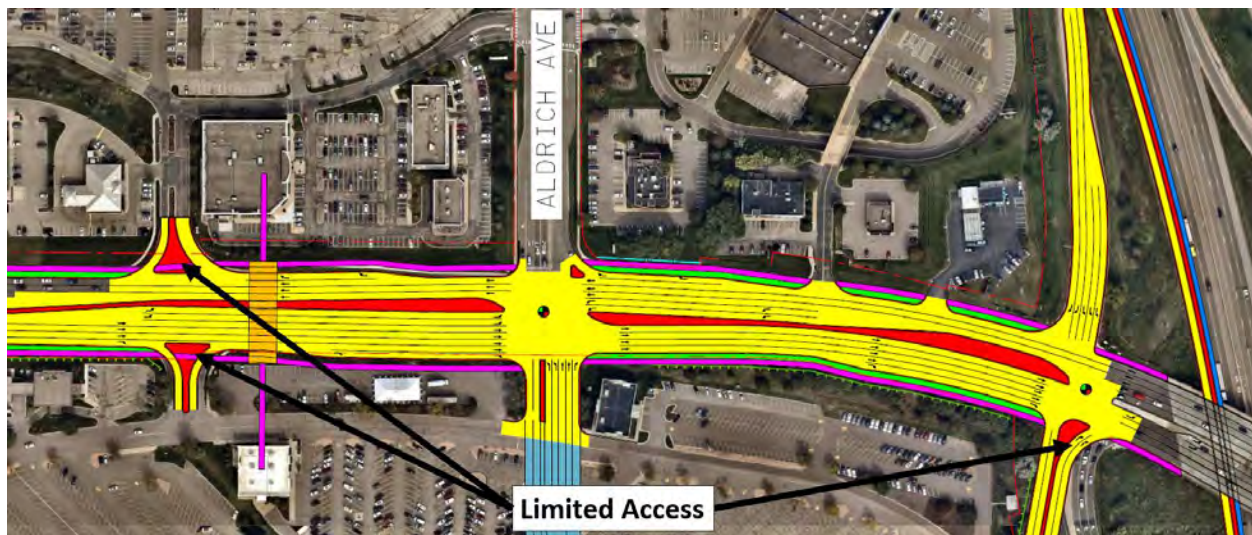
that this signal is the only access from the businesses on the south side of CR 42. This would also create a more circuitous route for vehicles heading westbound as they would have to head east and make a U-turn at the CR 42 & I-35E Northbound Ramp intersection. This option is not ideal and was not considered further as a part of this study.

The pedestrian underpass previously discussed (located west of CR 42 & Aldrich Avenue) is proposed to be a bridge structure to provide a more welcoming experience for pedestrians and bicyclist. The possibility of having the underpass open to vehicle traffic was also reviewed to determine if it could reduce some mitigation measures by allowing for less traffic at the CR 42 & Aldrich Avenue and CR 42 & Burnhaven Drive intersections. After comparing the northbound and southbound through volumes at Aldrich Avenue and Burnhaven Drive, it was determined that allowing traffic through the underpass would not provide a significant operational benefit to these intersections because there weren't that many northbound and southbound through trips that would want to use the underpass. Therefore, allowing vehicles to use this underpass is not recommended at this time.

Restricting access at the proposed reconfigured CR 42 & I-35W Southbound Exit Ramp/Buck Hill Road intersection (see Interchange Modifications and Connection on the next page) was also analyzed. With the addition of a bypass lane under CR 42 that connects to Buck Hill Road, there no longer needs to be a through lane at the intersection with CR 42. In addition, the northbound left turns were removed. Removing the northbound left turns from the intersections allows for the northbound signal phase to be removed. The northbound right turns would only get a green light as an overlap phase that run concurrently with the westbound left turn phase. The removal of this phase allows for more green time for the through movements along CR 42. **This is a recommended mitigation measure. (Figure 5)**

The existing $\frac{3}{4}$ Access on CR 42 between Burnhaven Drive and Aldrich Avenue could be restricted to right-in/right-out. During peak periods the high through volumes on CR 42 results in inadequate gaps for the left turning vehicles off of CR 42. Removing the $\frac{3}{4}$ Access left turn lanes has another benefit of providing additional space in the median for the dual left turn lane expansions at Aldrich Avenue and Burnhaven Drive. **This is a recommended mitigation measure. (Figure 5)**

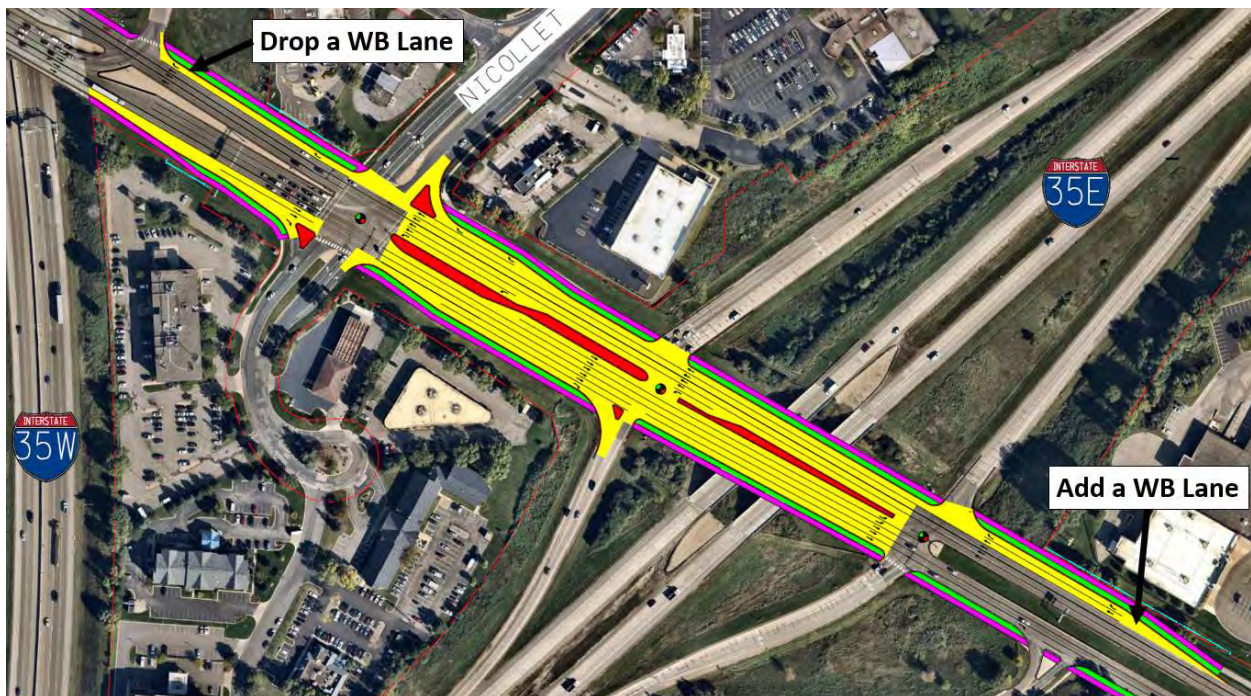
Figure 5 – CR 42 Limited Access Locations



Additional Through Lanes on CR 42:

Additional through lanes were considered on CR 42 for segments where intersection operations were still unacceptable after including the recommended mitigation options discussed above. Expanding CR 42 from three lanes in each direction to four lanes was analyzed between Burnhaven Drive and Plymouth Avenue. For both the PM and Saturday peak hour, the eastbound and westbound through lanes experience poor operations. The westbound through movements experience excessive queues between the I-35E Northbound Ramp to the I-35W Northbound Ramp. **A fourth westbound through lane on CR 42 was added east of the I-35E Northbound Ramp intersection. The additional lane then drops at the westbound right turn lane onto northbound I-35W. (Figure 6)**

Figure 6 – CR 42 Westbound Through Lane Expansion



The eastbound through movements on CR 42 between Aldrich Avenue and the I-35E Northbound Ramp experience excessive queues. **A fourth eastbound through lane on CR 42 was added from the northbound right at the former ¾ access west of Aldrich Avenue. The far-left lane drops into the eastbound left turn lane onto northbound I-35W. (Figure 7) A fourth eastbound through lane is then added after the bridge across I-35W and the far-left lane drops into the left turn lane to northbound I-35E. (Figure 8)**

Figure 7 – CR 42 Eastbound Through Lane Expansion west of I-35W

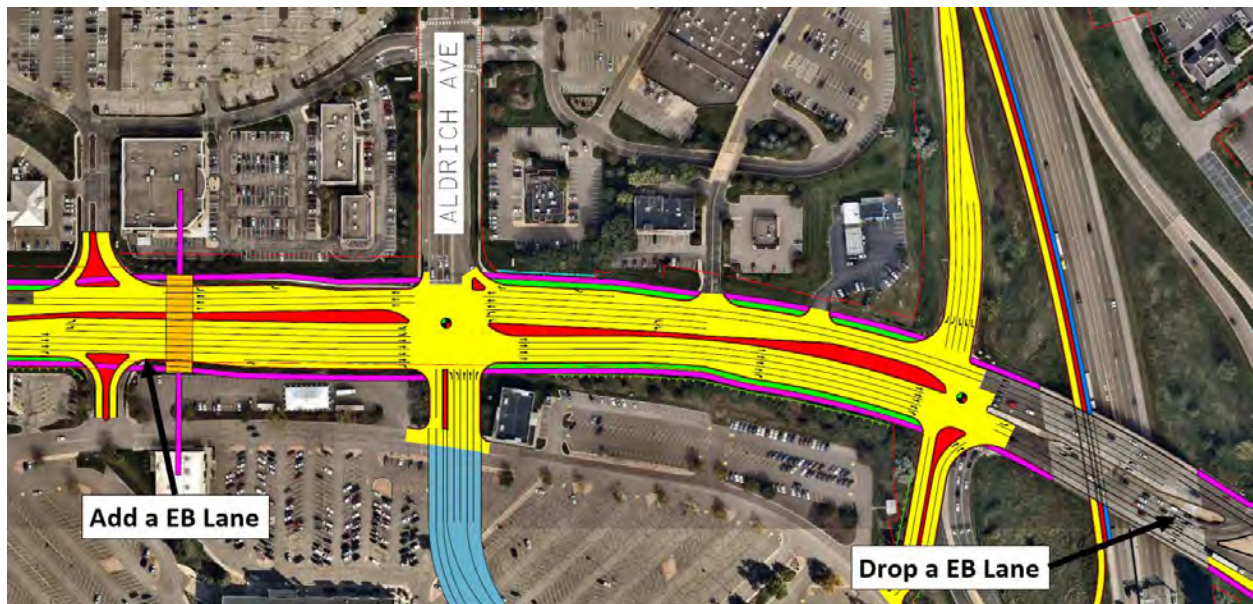
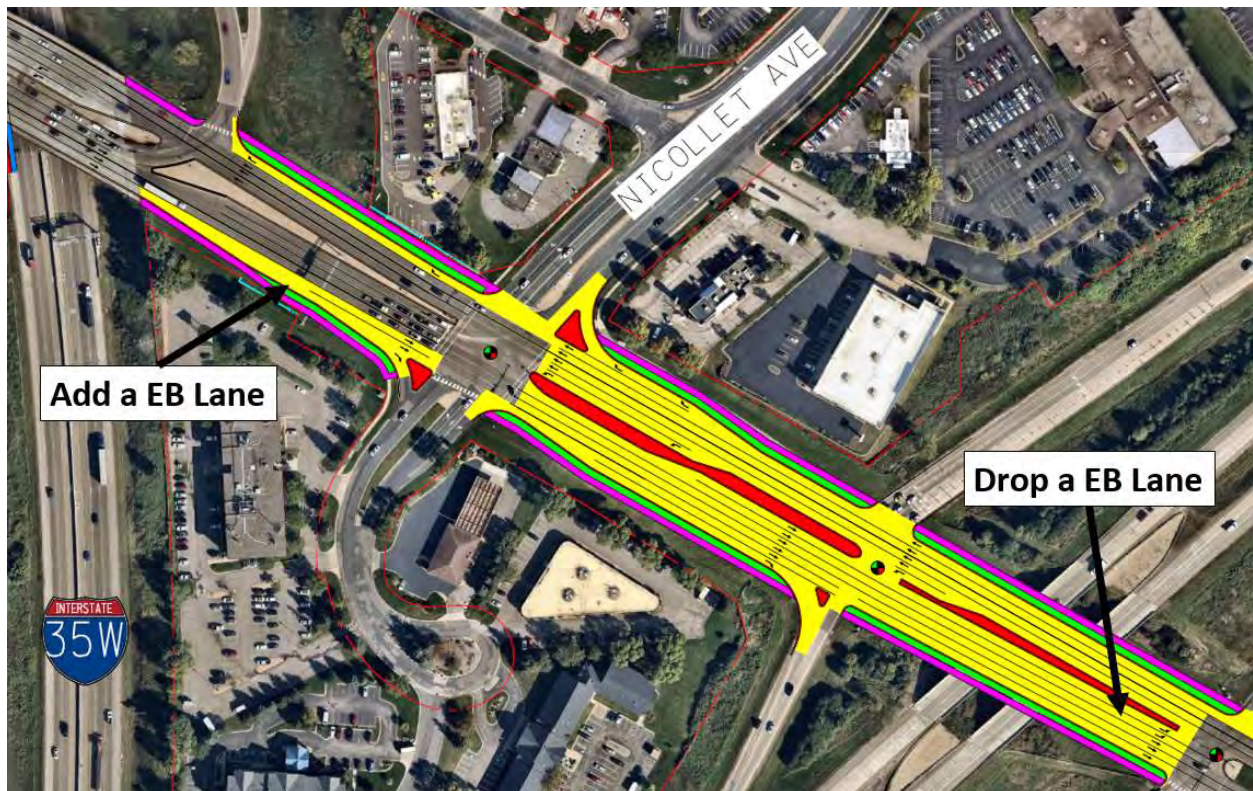


Figure 8 – CR 42 Eastbound Through Lane Expansion east of I-35W



Another factor that was considered was lane utilization. For the eastbound direction on CR 42, there are three high volume left turns in the span of 1/3 of a mile, they are the eastbound left onto I-35W, the



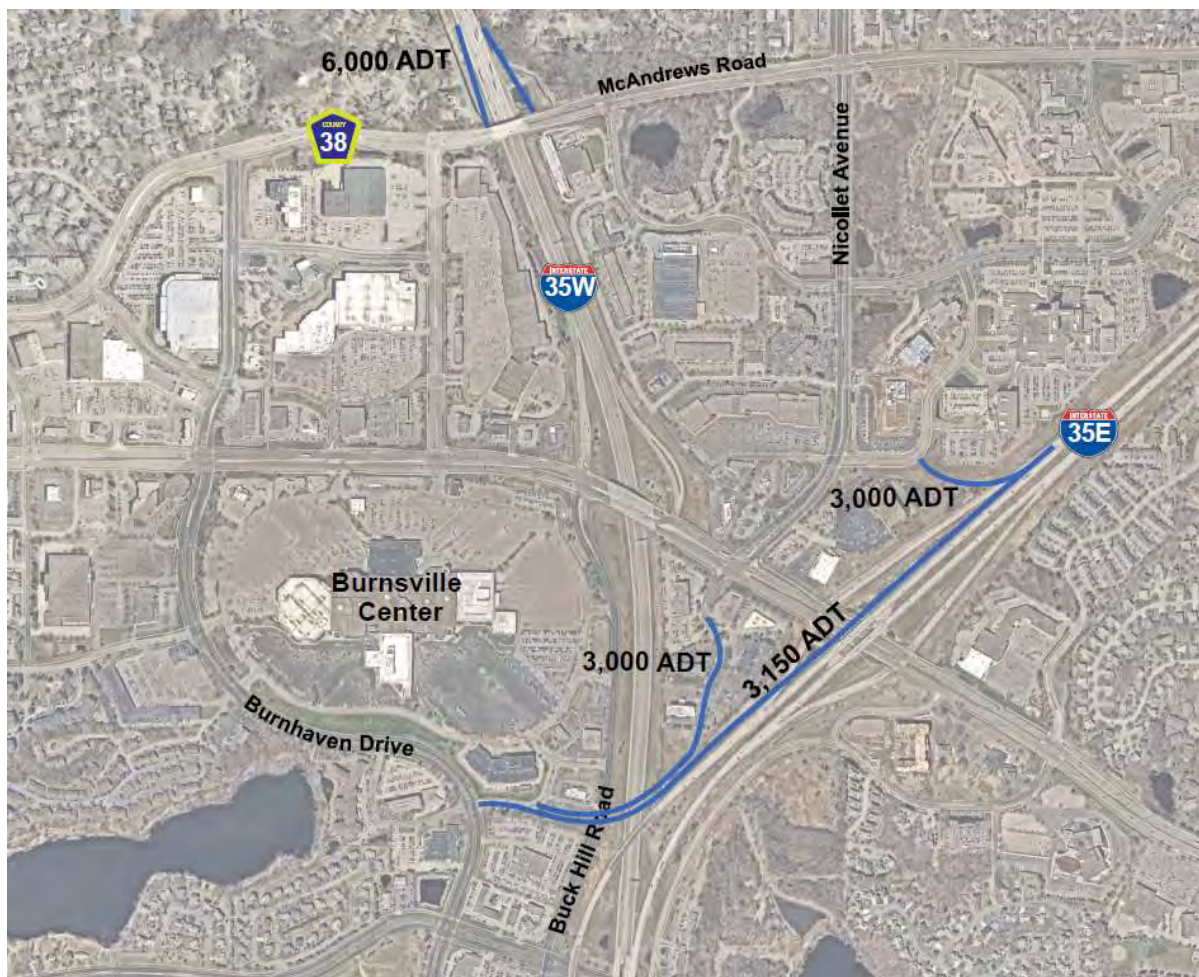
eastbound left onto Nicollet Avenue, and the eastbound left onto I-35E. Simply adding lanes does not solve the issues of vehicles wanting to be in the far-left lane. To address this issue, drop lanes were added for the eastbound left at I-35W and the eastbound left at I-35E as discussed above. Adding and dropping the lanes as stated, should help to more evenly disperse traffic across all the eastbound lanes.

Interchange Modifications and Connections:

With both the I-35E and I-35W interchanges in close proximity to each other there is a high concentration of vehicles trying to get to the same area. Additional interstate connections were investigated to reduce the amount of traffic on CR 42 at these interchanges. With the existing topography and the close proximity of the intersections along the corridor, there are few options that could feasibly be implemented without drastic changes to the study area. Options were investigated with the goal of improving the major movements that vehicles are trying to make through the network and ultimately minimizing the impact to the surrounding intersections and businesses. The options explored are discussed below and shown in **Figure 9**.

- An additional exit ramp from the I-35E Southbound Ramp to CR 42 that provides a direct connection to Fairview Drive. This option would remove approximately 3,000 vpd. However, the trips removed from CR 42 currently make a right turn onto CR 42 and then a right turn onto Nicollet Avenue, so it is anticipated that this option would have minimal impact on operations. This potential improvement is not recommended.
- An additional exit ramp from the I-35E Southbound Ramp that would run parallel to I-35E, cross over I-35W, and connect to Burnhaven Drive at Executive Boulevard. This option would remove approximately 3,150 vpd from the most congested stretch of CR 42 between the I-35E interchange and Burnhaven Drive. This option would provide convenient access to the Center Village development from I-35E without those vehicles having to utilize CR 42. However, this option would require almost half a mile of bridge to make the connection which would be a large investment for the low estimated number of vehicles using the connection. This potential improvement is not recommended.
- A new roadway extension from Nicollet Avenue & CR 42 to the south, bridging over I-35W, and connecting at Burnhaven Drive & Executive Boulevard. This connection would serve about 3,000 vpd. With this additional connection restricted access at the Nicollet Avenue & CR 42 intersection would be more feasible and would improve the operations at the intersection. However, this would not remove much traffic from CR 42, so this potential improvement is not recommended.
- A new partial diamond interchange at CR 38 (McAndrews Road) & I-35W. This would provide a southbound exit ramp and a Northbound Entrance Ramp onto I-35W. This connection would serve approximately 6,000 vpd based on the number of retail trips in the area. This connection could have more volume if commuters use it to bypass future congestion on CR 42. This option would provide the greatest improvement to operations along the CR 42 corridor since it would decrease the volume of southbound turning movements at most of the intersection along CR 42 in the study area. This option would have extensive impacts to the residential neighborhoods north of CR 38 (McAndrews Road). Due to the potential impacts to the residents adjacent to this proposed interchange, this option is not recommended for consideration at this time.

Figure 9 – Potential Interchange Modifications



Modifications to the existing interchanges were also evaluated. At CR 42 & I-35W, reconfiguring the Southbound I-35W Exit Ramp to include an auxiliary lane that runs parallel to I-35W, under the CR 42 bridge, and connects to Buck Hill Road was analyzed as discussed in the Limited Access section. This connection provides multiple benefits including that it allows for the Center Village development traffic to access the site without having to cross or turn onto CR 42, it would provide quicker access for the proposed Orange Line BRT, and it provides better connectivity to commercial and residential properties located south of the Center Village Redevelopment. This is because the next southbound exit off of I-35 is at the CR 46 interchange, located over 2 miles south of the CR 42 interchange. With this new connection, Buck Hill Road will be converted into a one-way southbound road between CR 42 and the North Mall Access. Vehicles traveling northbound on Buck Hill Road will either utilize Burnhaven Drive or the new Aldrich Avenue extension through the Center Village site to access CR 42. **This option is recommended. (Figure 10)** Interchange modifications will require the involvement of the Federal Highway Administration (FHWA) and MnDOT to determine the ultimate layout. Another potential option for the interchange connection could be a loop ramp for the southbound to eastbound movements at the I-35W Southbound Ramp & CR 42 interchange. **Figure 11** shows a potential configuration of a loop ramp at this location.

Figure 10 – Potential I-35W Southbound & CR 42 Interchange Modifications

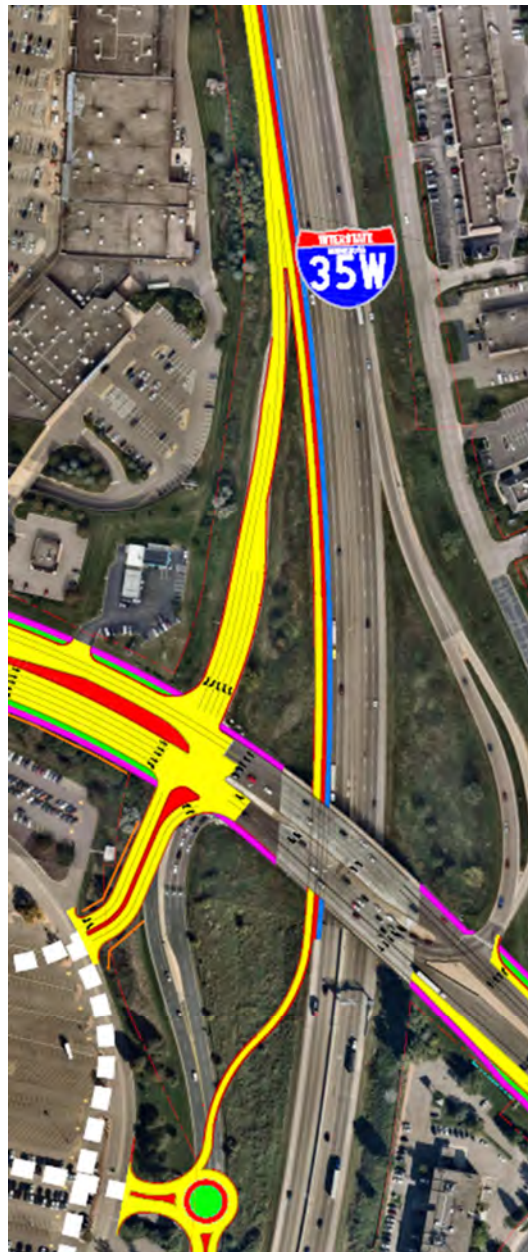


Figure 11 – Potential I-35W Southbound & CR 42 Interchange Loop Ramp



Another potential interchange modification reviewed was to convert the Northbound Entrance Ramp onto I-35E from a diamond configuration to a partial loop on ramp from CR 42 eastbound to I-35E northbound. This modification would move the high volume of left turns from eastbound CR 42 onto northbound I-35E into right turns. This modification would create better lane utilization for the eastbound direction of CR 42, however, it was determined that it would not decrease the number of eastbound through lanes on CR 42 and would have substantial right of way impacts on Grand Avenue and the newly constructed Burnsville Senior Living Facility. Therefore, this option is not recommended. **Figure 12** shows a potential configuration of a loop ramp at this location.



Figure 12 – I-35E Northbound & CR 42 Interchange Loop Ramp



Other Intersection Improvements:

Based on the results of the PM peak hour 2030 No-Build analysis, the unsignalized intersections along CR 38 (McAndrews Road) will require mitigation by 2030. These intersections are:

- CR 38 (McAndrews Road) & Irving Avenue
- CR 38 (McAndrews Road) & 141st Street
- CR 38 (McAndrews Road) & Burnhaven Drive

It is recommended that a corridor study be completed along CR 38 as all of the undesirable LOS movements are side-street stop controlled left turns. Potential improvement may include limiting access at intersections or installing an alternative form of intersection control such as a signal or roundabout. These improvements will need to be considered with or without the Center Village Redevelopment.

Variable Message Signing:

An intelligent transportation system (ITS) that includes variable message signs (VMS) could be used to provide information to motorists identifying the fastest way to reach the Center Village Redevelopment or for vehicles traveling along CR 42 trying to by-pass congestion near the I-35E and I-35W interchanges and Center Village Redevelopment area. A similar system is currently being used near the Mall of America in Bloomington. **Figure 13** is a photo of what was installed in Bloomington and is an example of what the VMS could look like. The VMS would be used to encourage traffic to use Southcross Drive rather than CR 42 to bypass CR 42 between Southcross Drive and CR 5. During the weekday PM and Saturday peak hour, the VMS system could also be used to encourage traffic on CR 42 to use Southcross Drive to enter the south neighborhood of the Center Village Redevelopment area from the south. This would be most beneficial for the traffic accessing the site from the east, as it would then decrease the amount of left turning traffic from CR 42 into the development. Eastbound CR 42 traffic destined for the Redevelopment area is not likely to divert because there is not as much delay to access the site given that they are turning right from CR 42 into the site. Using StreetLight data, it was determined that roughly 10% of traffic on CR 42 during the AM and PM peak hours uses CR 42 to travel the entire length of the study area. For this analysis it was assumed that 5% of the westbound through traffic on CR 42 would reroute to Southcross Drive to bypass CR 42 or to access the Center Village Redevelopment from the south. The signalized intersections that should be considered for VMS installation are shown in **Exhibit 24**.

The current signals along Southcross Drive are operating on a pretimed system and are not coordinated. To operate this type of VMS system, upgrades to the signals are required that would include fiber interconnect, signal cabinet replacement, and the variable message signs. The signals would also need to be retimed and coordinated. **This improvement is recommended to mitigate traffic operations during the peak periods.**

Figure 13 – Dynamic Signage near the Mall of America



Image from Google Maps



MITIGATION RECOMMENDATION

There were two goals that were considered when mitigation recommendations were developed: 1) limit impacts to the existing I-35W and I-35E interchanges and 2) do not significantly limit existing access serving the Center Village Redevelopment site along CR 42. The recommended mitigations to the transportation infrastructure will improve operations to a similar level as existing conditions. Although similar to existing conditions, there will still be some movements that will have longer delays along the CR 42 corridor. The recommended concept level mitigations are listed below and shown in **Appendix B**. All of the concepts developed as part of this study are at a planning level and will require further refinement and approval from the FHWA, MnDOT, Dakota County, and the City of Burnsville.

- Improve pedestrian facilities on both sides of CR 42 to 10' trails with 10' boulevard and install a pedestrian underpass west of Aldrich Avenue & CR 42
- Improve the I-35W Southbound Ramp/Buck Hill Road & CR 42 intersection by providing an auxiliary lane that runs parallel to I-35W, under the CR 42 bridge, and connects to Buck Hill Road, limiting the northbound leg to right-out only, and reconfiguring the southbound leg to provide dual right turn lanes and triple left turn lanes
- At CR 5 & CR 38 (McAndrews Road) expand the southbound left turn lane to dual lefts
- At CR 42 & Burnhaven Drive expand both the eastbound and westbound left turn lanes to dual lefts
- At CR 42 & Aldrich Avenue expand the eastbound left turn lane to dual lefts.
- At CR 42 & Aldrich Avenue reconstruct the northbound leg to provide dual northbound left turn lanes that are 300 feet long, two through lanes, and a northbound right turn lane that is 300 feet long.
- Limit the existing $\frac{3}{4}$ access on CR 42 between Burnhaven Drive & Aldrich Avenue to right-in/right-out.
- Add a fourth eastbound through lane on CR 42 from the proposed right-in/right-out west of Aldrich Avenue to the I-35W Northbound Ramp where one eastbound through lane will drop at the eastbound left turn onto northbound I-35W
- Add a fourth eastbound through lane on CR 42 between the east edge of the bridge deck over I-35W to the I-35E Northbound Ramp Intersection where the through lane will drop at the eastbound left turn lane to I-35E Northbound.
- Add a fourth westbound through lane on CR 42 from east of the I-35E Northbound Ramp Intersection that drops at the westbound right turn lane onto the I-35W Northbound Ramp.
- Optimize signal timings and remove the pedestrian walk phase on the east side of the Nicollet Avenue & CR 42 intersection.
- Provide an ITS system that includes signal coordination and retiming, signal upgrades, fiber interconnect, and VMSs along the CR 42 corridor and the Southcross Drive corridor.



CAPACITY ANALYSIS WITH IMPROVEMENTS

INTERMEDIATE YEAR BUILD (2030) CONDITIONS

In the Intermediate Year Build (2030) mitigation scenario that included fewer improvements than proposed for the full build-out was also considered. However, it was determined that partial improvements would result in considerable throw away costs since the ultimate build scenario would require that many of the interim improvements be removed to reconstruct the improvements in their ultimate configuration. Therefore, a scenario with fewer mitigation options is not recommended and the analysis for this scenario assumed all improvements required for the Horizon Year 2040 Build were completed by 2030. There is the potential to build the ultimate proposed improvements in several phases at different times to better accommodate available funding and increases in traffic as the Center Village site redevelops. A recommended phasing approach is discussed later in the report.

A capacity analysis was performed to quantify the delay and level of service at the study intersections during the weekday AM and PM peak hours and the Saturday peak hour. The capacity analysis was performed using Synchro/SimTraffic. The traffic volumes shown in **Exhibit 20A-20C** and **21A-21C** in **Appendix A** were used for the Intermediate Year Build (2030) analysis. The SimTraffic reports are provided in **Appendix F**. Signal timings were optimized, although CR 42 was still the prioritized corridor.

In the AM peak hour, all study intersections operated at LOS C or better. There are some side street movements along CR 42 with undesirable LOS, but this is expected along an arterial like CR 42. **Exhibit 25** show the movements that operate at LOS E or worse in the AM peak hour. It should be noted that only intersection movements with undesirable LOS are shown in the exhibit, all other movements are provided in the SimTraffic reports. The total network delay for the Intermediate Year 2030 Build AM peak hour is 73.8 seconds per vehicle which is comparable to the Existing AM peak hour network delay of 70.1 seconds per vehicle. There are no excessive queues during the AM peak hour.

In the PM peak hour, all study intersections operated at LOS D or better. Similar to the AM peak hour, side street and minor movements along the CR 42 corridor account for the majority of the undesirable LOS. Side-street left turns at the unsignalized intersections along CR 38 (McAndrews Road) also experience long delays in the PM peak hour, but queues are within their storage capacities. **Exhibit 26** shows the movements with LOS E or worse in the PM peak hour. The total network delay for the Intermediate Year 2030 Build PM peak hour is 105.5 seconds per vehicle which is better than the Existing PM peak hour network delay of 111.6 seconds per vehicle. Below is a list of queues that extend past their storage capacity.

- Eastbound queues at I-35E Northbound Ramps & CR 42 extend back though the I-35E Southbound Ramps intersection, a distance of 0.2 miles.

In the Saturday peak hour, all study intersections operated at LOS D or better. There are few side street and minor movement operations along the CR 42 corridor that are undesirable. **Exhibit 27** shows the movements with LOS E or worse in the Saturday peak hour. The total network delay for the Intermediate Year 2030 Saturday peak hour is 115.2 seconds per vehicle which is better than the Existing Saturday peak hour network delay of 128.1 seconds per vehicle. Below is a list of queues that extend past their storage capacity.

- Southbound left turn at Aldrich Avenue & CR 42
- Eastbound left turn at Nicollet Avenue & CR 42



- Westbound through movement at Nicollet Avenue & CR 42
- Westbound left turn at I-35E Southbound Ramps & CR 42

Operations during the Intermediate Year Build (2030) are acceptable with the mitigation shown in **Appendix B**. It is expected that all analysis scenarios will operate the same or better than existing conditions.

HORIZON YEAR BUILD (2040) CONDITIONS

A capacity analysis was performed to quantify the delay and level of service at the study intersections during the weekday AM and PM peak hours and the Saturday peak hour. Since all improvements required for the Horizon Year 2040 Build were included in the Intermediate Year 2030 Build scenario, the same geometry was used to complete the Horizon Year 2040 Build analysis. The capacity analysis was performed using Synchro/SimTraffic. The traffic volumes shown in **Exhibit 22A-22C** and **23A-23C** in **Appendix A** were used for the Horizon Year Build (2040) analysis. The SimTraffic reports are provided in **Appendix F**. Signal timings were optimized, although CR 42 was still the prioritized corridor.

In the AM peak hour, all study intersections operated at LOS C or better. There are some side street movements along CR 42 with undesirable LOS, but this is expected along an arterial like CR 42. **Exhibit 28** show the movements that operate at LOS E or worse in the AM peak hour. It should be noted that only intersection movements with undesirable LOS are shown in the exhibit, all other movements are provided in the SimTraffic reports. The total network delay for the Horizon Year 2040 Build AM peak hour is 59.7 seconds per vehicle which is better than the Existing AM peak hour network delay of 70.1 seconds per vehicle. There are no excessive queues during the AM peak hour.

In the PM peak hour, all study intersections operated at LOS D or better. Similar to the AM peak hour, side street and minor movements along the CR 42 corridor account for the majority of the undesirable LOS. Side-street left turns at the unsignalized intersections along CR 38 (McAndrews Road) also experience long delays in the PM peak hour. **Exhibit 29** shows the movements with LOS E or worse in the PM peak hour. The total network delay for the Horizon Year 2040 Build PM peak hour is 113.1 seconds per vehicle which is comparable to the Existing PM peak hour network delay of 111.6 seconds per vehicle. Below is a list of queues that extend past their storage capacity.

- Eastbound queues at I-35E Northbound Ramps & CR 42 extend back though the I-35E Southbound Ramps intersection, a distance of 0.2 miles.
- Northbound left turn at Irving Avenue & CR 38 (McAndrews Road)
- Northbound left turn at 141st Street & CR 38 (McAndrews Road)

Traffic operations under the Horizon Year 2040 Build Saturday peak hour conditions experience some operations and queuing issues. Similar issues also occur under existing Saturday peak hour conditions. In the Saturday peak hour, all study intersections operated at LOS D or better except for Aldrich Avenue & CR 42 and I-35W Southbound Ramp/Buck Hill Road & CR 42 which operates at LOS E. There are several side street and minor intersection movements along CR 42 near the Center Village Redevelopment that will operate at an undesirable level of service. **Exhibit 30** shows the movements with LOS E or worse in the Saturday peak hour.

As stated earlier, mitigation recommendations are usually based on the typical weekday peak hour analyses, although it is important to consider the Saturday peaking characteristics for this development. The goal is not to mitigate for every operational concern that is anticipated for one peak hour on one day of the week, but to assess whether the recommended mitigation will not result in significant impacts to I-35W or I-35E Ramps. The total network delay for the Horizon Year 2040 Saturday peak hour is 129.6 seconds per vehicle which is comparable to the Existing Saturday peak hour network delay of 128.1 seconds per vehicle. Below is a list of queues that extend past their storage capacity.

- Southbound left turn at Burnhaven Avenue & CR 42
- Eastbound through movement on CR 42 from Nicollet Avenue & CR 42, a distance of 0.5 miles
- Southbound left turn at Aldrich Avenue & CR 42
- Westbound left turn at I-35E Southbound Ramps & CR 42
- Northbound left turn at 141st Street & CR 38 (McAndrews Road)

The analysis shows that operations during the Horizon Year Build (2040) have similar operations to existing conditions the mitigation proposed in **Appendix B** provides for reasonable operation.

CONCEPTUAL COST ESTIMATES & PHASING

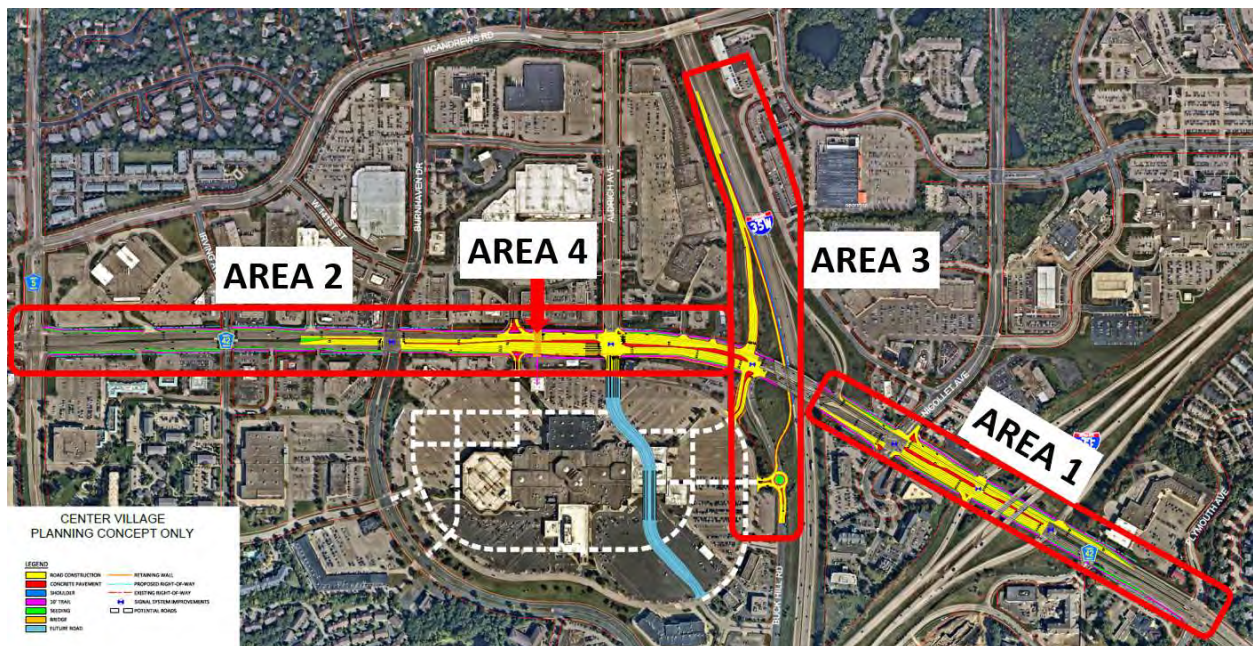
Preliminary cost estimates were prepared for the concept layout on and off the Center Village site. The cost estimates assumed complete reconstruction of CR 42 as shown in the concept layout. The infrastructure on site is also a critical part of the development, however, without a defined roadway layout on site, only a high-level estimate can be given for the Aldrich Avenue extension through the Center Village site.

The CR 42 improvements could be implemented in phases, so the cost estimates were split as follows:

- Area 1 – \$8.4 million (Improvements East of the I-35W bridge)
- Area 2 – \$14.8 million (Improvements west of the Southbound I-35W Exit Ramp intersection). The pedestrian underpass west of Aldrich Avenue is not included in this cost estimate (see Area 4 below).
- Area 3 – \$5.0 million (I-35W Southbound Ramp modifications with a connection to Buck Hill Road, CR 42 intersection improvements, and the Buck Hill Road roundabout)
- Area 4 – \$6.4 million (CR 42 pedestrian underpass west of Aldrich Avenue)
- ITS System - \$2.0 million (signal coordination and retiming, signal upgrades, fiber interconnect, and VMSs along the CR 42 corridor and the Southcross Drive corridor).

The total estimated cost for all improvement areas is \$36.6 million. The areas are shown in **Figure 14**.

Figure 14 – County Road 42 Concept Areas



Permanent right-of-way acquisition costs have been estimated based on the proposed right-of-way shown in the concept. The cost estimates assume that any right-of-way required from the Burnsville Center site would be dedicated at no cost as a part of the Center Village Redevelopment.

All cost estimates assume 2020 costs and include 20% contingency and 30% indirect costs for engineering, fiscal, administration and capitalized interest. The anticipated inflation per year is 3-5%. The conceptual cost estimates are provided in **Appendix G**.

The timing of the build-out for the four areas of the proposed improvements is largely dependent on how the Center Village Vision develops. However, based on the analysis in the 2030 No-Build and 2030 Build scenarios, Area 1 will have to be built first. This is because the poor operations at Nicollet Avenue & CR 42 will negatively impact the majority of the CR 42 corridor by 2030. After Area 1, it is likely that Area 3 would be built since the east side of the site is anticipated to be redeveloped first as part of the Center Village Vision Redevelopment. Areas 2 and 4 would be built at the same time and will be necessary by full build-out of the Center Village Redevelopment. As mentioned previously, the ITS system is recommended to mitigate traffic operations during the peak periods.

For the Aldrich Avenue extension south of CR 42 (light blue connection on **Figure 14**), an estimated cost per linear foot was determined based on a four-lane roadway section with a wide median and sidewalks on both sides of the roadway, and either a roundabout or signalized intersection on site. **Table 4** shows the projected range in price. The Aldrich Avenue extension estimates also assume 2020 costs and include 20% contingency and 30% indirect costs for engineering, fiscal, administration and capitalized interest. The Aldrich Avenue extension cost estimate does not include right of way acquisition costs.

Table 4 – Aldrich Avenue Extension Cost Estimate

Infrastructure	Units	Quantity	Unit Cost Range	Total Cost Range
Aldrich Avenue Extension	LIN FT	2000	\$1,700 - \$2,100	\$3,400,000 - \$4,200,000



CONCLUSIONS AND RECOMMENDATIONS

Following the completion of the successful Center Village Redevelopment Vision in 2018, the City of Burnsville is moving forward to understand the transportation improvements needed to support the redevelopment of the Burnsville Center area. This study includes analysis on the most congested corridor in the area, County Road (CR) 42. This study also explores innovative multimodal solutions needed to mitigate existing congestion on the roadway network as well as the anticipated traffic impacts of the redevelopment.

The redevelopment vision for Center Village is focused into two sections. The north neighborhood and the south neighborhood which encompass the existing Burnsville Mall area and the retail area to the north of Burnsville Mall. The focus of this study will be on the south neighborhood as it is planned to be completed by 2040, while the north neighborhood is anticipated to redevelop after 2040. The study area consists of 36 intersections that were analyzed during the AM, PM, and Saturday peak hours.

Burnsville Center has unique transportation challenges compared to other malls in the Minneapolis-St. Paul metropolitan area. Burnsville Center does not have direct access from either the I-35W interchange or the I-35E interchange and its main connecting roadway is CR 42, which is an arterial with close to 50,000 vpd. All of the other regional malls in the area have considerably more balanced traffic volumes on the surrounding roadways. One thing all the malls, including Burnsville Center, have in common is close proximity to at least two interchanges. However, all the regional malls have access to the interchanges from separate surrounding roadways except Burnsville Center. This creates a large imbalance in where traffic accesses the Burnsville Center Development.

In the Intermediate Year (2030) No Build scenarios, the PM and Saturday Peak Hours are projected to have poor operations along the CR 42 corridor and will require mitigation. By the Horizon Year (2040) No Build, all scenarios will require mitigation and the PM and Saturday Peak Hours will have excessive delays and queues throughout the study area. Significant mitigation will be required along the CR 42 corridor without the anticipated Center Village Redevelopment.

The existing Burnsville Mall generates 18,400 trips per day and the Center Village Redevelopment is anticipated to generate 38,975 trips per day. This is an increase of 20,575 daily trips. The Center Village Redevelopment will focus on providing multimodal options such as enhanced pedestrian facilities and a transit station for the Orange Line BRT extension. As part of the trip generation, a 3% reduction was included to account for the projected transit use in the Center Village site.

Based on the results of the Horizon Year (2040) Build analysis it was determined that significant mitigation along CR 42 would be required to accommodate the projected background growth and the complete redevelopment of the Center Village site. The concept layout showing the recommended mitigation measures is shown in **Appendix B**.

For the Intermediate Year (2030) Build analysis it was determined that less mitigation would be required than the Horizon Year (2040) Build analysis. However, because of the level of mitigation required for the Horizon Year (2040) Build analysis, it is recommended to complete the full mitigation to avoid multiple impacting CR 42 multiple times and to minimize throw away costs.

The mitigation could be split into three separate phases depending on when development happens on the Center Village site. Area 1 will need to be constructed first as a lot of the operational issues originated

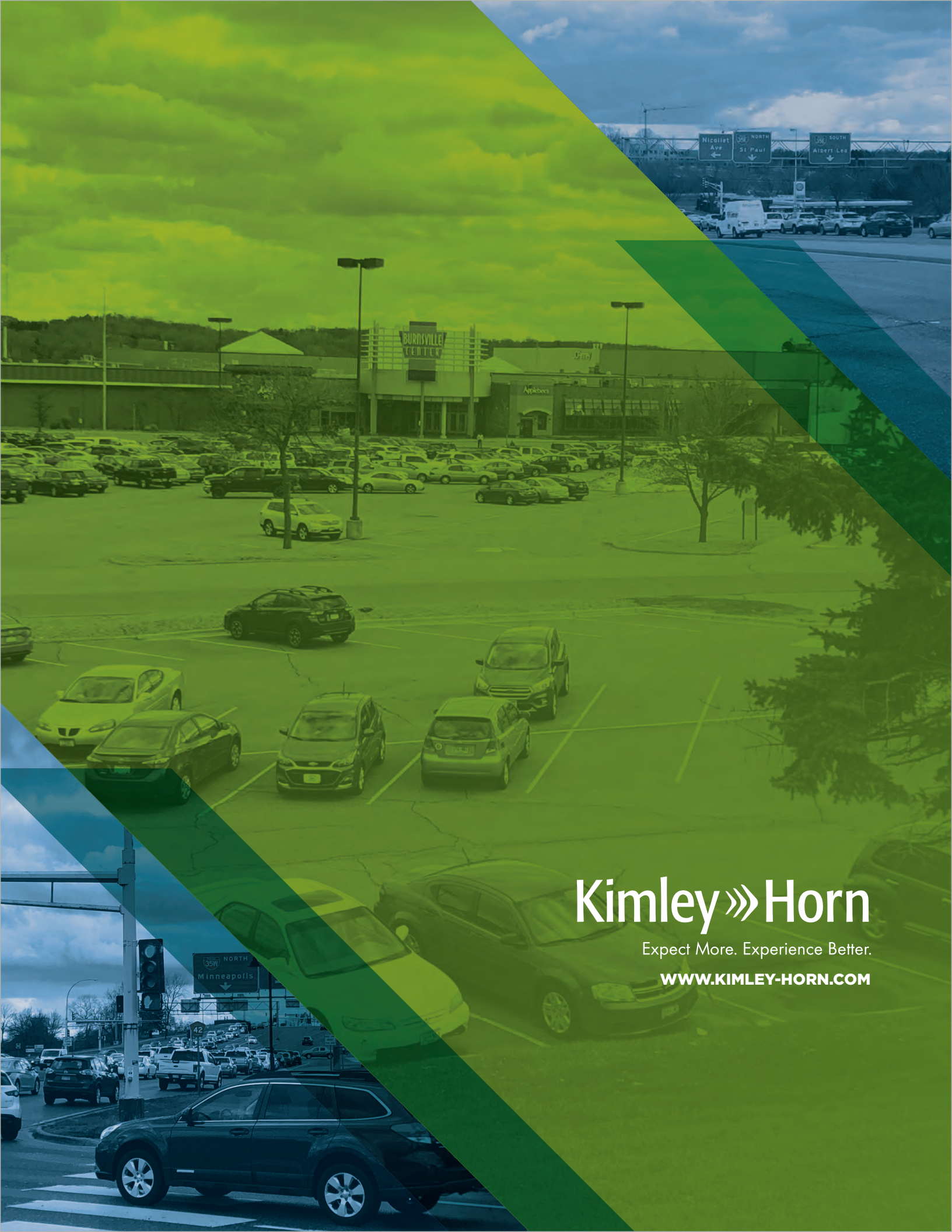
between the I-35W and I-35E interchanges on CR 42. After Area 1, it is likely that Area 3 would be built since the east side of the site is anticipated to be redeveloped first as part of the Center Village Vision Redevelopment. Areas 2 and 4 would ideally be built at the same time and will be necessary by full build-out of the Center Village Redevelopment. The total concept level estimate of the improvements required along CR 42 is \$36.6 million. The Aldrich Avenue extension through the Center Village Site is estimated to cost between \$3.4 million and \$4.2 million and it would likely be one of the first components of the redevelopment.

All of the concepts developed as part of this study are at a planning level and will require further refinement and approval from the FHWA, MnDOT, Dakota County, and the City of Burnsville.



APPENDIX

- A. Exhibits**
- B. Concept Layout**
- C. Turning Movement Counts**
- D. Green Sheets – Crash Analysis**
- E. StreetLight Results**
- F. SimTraffic Analysis Results**
- G. Conceptual Cost Estimates**



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