Northern Anoka County River Crossing Study

June 2012

Prepared by:

BOLTON & MENK
Engineers & Surveyors

ANOKA COUNTY

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TECHNICAL ADVISORY COMMITTEE

REPRESENTATIVE	AGENCY	TITLE
Kate Garwood	Anoka County	Multimodal Transportation Manager
Andrew Witter	Anoka County	Assistant County Engineer
Jane Rose	Anoka County	Traffic Engineering Manager
Matt Hylen	City of St. Francis	City Administrator
Jared Voge	City of St. Francis	City Engineer, Bolton & Menk, Inc.
Rick Juba	City of Oak Grove	City Planner
Corrie LaDoucer	City of Nowthen	City Clerk
Shane Nelson	City of Nowthen	City Engineer, Hakanson-Anderson
Mark Lindeberg	Mn/DOT	Metro Area Engineer
Kate Drewry	MnDNR	Area Hydrologist
Tim Anderson	FHWA	Area Engineer
Gina Mitchell	Bolton & Menk, Inc.	Transportation Planner
Angie Bersaw	Bolton & Menk, Inc.	Transportation Planner
Bryan Nemeth	Bolton & Menk, Inc.	Traffic Engineer

EXECUTIVE SUMMARY

In 2008/2009, the cities of St. Francis and Oak Grove and Anoka County updated their comprehensive plans, including the consideration of future transportation needs. Each of these plans identified the potential future need for additional Rum River crossing capacity, either through additional capacity on existing crossings along County State Aid Highway (CSAH) 22 (Viking Blvd) and CSAH 24 (Bridge St) and/or through the development of an additional river crossing connection in this portion of northern Anoka County. Knowing more information was needed to assess the need for additional river crossing capacity, Anoka County, in partnership with the local communities initiated the Northern Anoka County Rum River Crossing Study in late 2010.

The purpose of the Northern Anoka County Rum River Crossing Study is to determine if additional river crossing capacity is needed, and if so, what general corridor locations should be considered, what type of facility is needed, and who should be the responsible agency for the facility. The study area focused on the communities of St. Francis, Oak Grove and Nowthen, from CSAH 22 on the south to the northern county border on the north; however, the study also included a more broad consideration of how the transportation system in this area ties into the larger regional system such as Sherburne County and United States (US) Highway 169 to the west, the north and east to Isanti County, Trunk Highway (TH) 65 and Interstate 35 (I-35) and to the south to US Highway 10.

In order to fully understand the future transportation needs in the study area, a comprehensive analysis of the following was conducted:

- Existing and future land use – documentation of where communities within and surrounding the study area are planning for land use changes to occur by 2030 and how land use changes may impact the demand for east-west travel across the Rum River.
- Existing arterial route spacing – identification of existing roadway network connectivity deficiencies based on a comparison of the functional classification of roadways in the study area, the Metropolitan Council's arterial route spacing guidelines, cities' future land use plans, and known environmental constraints in the area.
- Environmental issues/constraints – documentation of a social, environmental and economic (SEE) scan conducted for the study area to identify existing built and natural resources and potential fatal-flaws to roadway improvements.
- Existing and future traffic operations – documentation of the traffic operations under existing conditions and projected no-build and build conditions in the study area.
- Existing safety and pedestrian issues – evaluation of pedestrian movements along and near the CSAH 24 corridor in St. Francis to identify existing pedestrian volumes, specific crossing locations and available gaps for crossing; documentation of existing safety conditions within the study area.

These analyses helped shape the context of existing issues, as well as needs and constraints within the study area, particularly at and/or along the CSAH 22 and CSAH 24 river crossing corridors. Key findings from these analyses include:

1. The study area and surrounding communities are projected to continue to grow with a large portion of this growth planned to occur in St. Francis, East Bethel and Elk River. These three communities are projected to nearly double their populations by 2030. Modest growth is anticipated in Nowthen and Oak Grove as these communities are planned to remain largely rural residential through 2030.

2. Wetlands, lakes, rivers, parks and recreation areas divide the landscape in this region making land use concentration difficult in some areas, such as in Oak Grove and Nowthen. The Rum River is a natural barrier to east-west travel within the study area and designated is a State Wild and Scenic River.
3. State designated Wild and Scenic Rivers are managed by the Minnesota Department of Natural Resources (DNR). In general, Wild and Scenic Rivers are to be avoided by new construction or construction of roads or river crossings. To justify a new river crossing, it must first be proved that: 1) existing roads/river crossings cannot handle existing or projected traffic volumes, 2) expansion of the existing river crossings will not be able to handle future traffic volumes. If both of these tests show there is still a need, a river crossing in a new location may be considered, with restrictions.
4. Many residents in this portion of the county commute to the Twin Cities metro area. As a result, connections to important north/south highway corridors such as TH 47, TH 65 and US 10/US 169 are important. In addition, concentrations of employment, shopping and service opportunities are also located along these same corridors.
5. The CSAH 28 (Ambassador Blvd)/CSAH 24 corridor in St. Francis is one of two Rum River crossings in the study area and the corridor serves the downtown commercial area, the St. Francis School District campuses and is the main connection between the west and east sections of the city. The city is anticipated to continue to grow, with the majority of future commercial/industrial development planned on the west side of the Rum River and future residential development planned on both the west and east sides of the river.
6. CSAH 22 is a main artery supporting through traffic to important north/south roadways such as TH 47, TH 65, CSAH 7 (Rum River Blvd), CSAH 9 (Lake George Blvd), CSAH78 (Flamingo St) and to the Elk River area, as well as providing direct access for commercial/industrial developments within each community along the corridor.
7. The communities of St. Francis, Oak Grove and Nowthen are all considered rural areas in terms of the Metropolitan Council's arterial route spacing guidelines. These guidelines recommended principal arterial route spacing of six to 12 miles and minor arterial spacing of two to three miles for rural areas.
8. The application of functional classification and route spacing guidelines are used as the basis for identifying and evaluating a roadway network; however, land use and environmental resources must also be considered to ensure the network adequately serves population concentrations and avoids or minimizes impacts to the built and natural environment.
9. North-south connectivity within the study area appears adequate, although many of these routes currently serve a dual purpose of providing both east-west and north-south connectivity. As traffic demand increases in this area, the dual purpose nature of these routes may decrease mobility, thereby creating a need for separate east-west and north-south routes.
10. East-west arterial spacing conforms to rural minor arterial spacing guidelines of two to three miles between CSAH 24 and Isanti CSAH 10. However, planned future land use in northern St. Francis may suggest otherwise.
11. East-west arterial spacing between CSAH 24 and CSAH 22 is greater than the recommended two to three mile spacing. The rural residential nature of land use in Oak Grove, along with environmental constraints and natural features create challenges for an additional connection in this area.
12. East-west connectivity to principal arterials is lacking in this area (e.g. connections to US 169 to the west and TH 65 to the east).

13. The forecasted 2030 no-build condition projects CSAH 22 from CSAH 7 to CR78 will be nearing its capacity with an anticipated traffic volume of over 14,000 vehicles per day. With a capacity of 15,000 vehicles per day, the volume-to-capacity ratio for CSAH 22 will be acceptable; however, because the anticipated volumes are nearing capacity the roadway will be unable to effectively handle traffic fluctuations.
14. As the area along CSAH 22 develops, access management will be important to maintaining acceptable traffic flow as these volumes approach daily capacity thresholds.
15. The forecasted 2030 no-build condition projects CSAH 24 through downtown St. Francis (CSAH 28 to CSAH 9) will be over capacity, resulting in congestion and queues during the peak hours.

Because the 2030 no-build analysis showed CSAH 22 is projected to be near capacity and CSAH 24 is projected to be over capacity, a 2030 build analysis was completed to identify improvements to the existing river crossings to address these issues. Two build scenarios were tested to increase the capacities of CSAH 22 and CSAH 24 from two-lanes to four-lanes. Each build scenario was completed independent of the other. The purpose of the initial build analysis was to determine if the existing river crossings with capacity improvements, could handle future traffic volumes. If these improvements could not handle future traffic volumes, a new river crossing corridor would be tested.

Three build scenarios were tested independently of one another and included:

1. CSAH 22 Expansion – expand CSAH 22 to four-lanes from TH 47 to TH 65
2. CSAH 24 Expansion – extension of CR 103/CSAH 13 east from CSAH 13 to TH 65 and expansion of CSAH 24 between CSAH 24/28 and TH 65 to a four-lane facility
3. CSAH 24 Expansion with Extension to TH 47 – extension of CR 103/CSAH 13 east from CSAH 13 to TH 65, expansion of CSAH 24 between CSAH 24/28 and TH 65 to a four-lane facility, and an extension to Pederson Drive from TH 47 to CSAH 24

Key findings and conclusions from the build analysis include the following:

1. Improvements to one corridor do not have much of an impact on the other. The majority of users are already using their preferred route and this does not change based on the congestion levels.
2. Capacity improvements do increase the volume of traffic using the expanded route (either CSAH 22 or CSAH 24).
3. The majority of roadways in the study area do not have a noticeable change in traffic volume between the no-build and build scenarios when considering the confidence range of the forecasts.
4. The CSAH 22 Expansion shows that if CSAH 22 is expanded, the need for additional capacity is located between TH 47 and CSAH 78.
5. The expansion scenarios most significantly change traffic patterns by shifting how traffic travels through the area.
    a. With the CSAH 22 Expansion, more traffic uses CSAH 22 and the routes to and from CSAH 22 such as CSAH 7, Nightingale Street and CSAH 78.
    b. With the CSAH 24 Expansion, more traffic uses CSAH 24 and the routes to and from CSAH 24 including CSAH 28, CSAH 24 and CR 72.
    c. The CR 103 Extension (part of the CSAH 24 Expansion) shifts traffic from the parallel routes of CSAH 24 through Bethel and 221st Avenue to the CSAH 24/CR 103/CSAH 13 alignment.
6. The local extension between TH 47 and CSAH 28, adjacent to the schools, is not projected to carry a significant traffic volume (4,600), but would shift trips from the other east-west routes

between TH 47 and Ambassador Boulevard, including 229th Avenue to the new local extension. Further study of this extension should take into account Mn/DOT access plans for TH 47.

7. All of the expansion scenarios decrease the traffic volume on Rum River Boulevard. This is due to route shifts that take advantage of the additional highway capacity. Any highway expansion in the area makes Rum River Boulevard a less attractive route for cut-through trips.

Consideration of such results suggests that capacity improvements could be accommodated at the existing CSAH 22 and CSAH 24 crossings to handle future traffic volumes. Since the purpose of this study was to determine whether additional Rum River crossing capacity is needed, the above indicates that there is no justification for evaluating a new river crossing location since improvements to the existing river crossings have demonstrated the ability to handle future traffic volumes.

CSAH 22 and CSAH 24 Future Improvement Needs

Since the analysis of existing river crossing improvement scenarios did not show a need to test an additional river crossing, the Technical Advisory Committee (TAC) suggested that the remaining study focus on identifying the future improvement needs on the existing river crossings at CSAH 22 and CSAH 24. The following briefly describes the additional analyses conducted for CSAH 22 and CSAH 24 future improvements.

- CSAH 22 – Currently, CSAH 22 is an A-Minor Arterial Connector roadway, but it is planned to be transitioned to a principal arterial under Mn/DOT's jurisdiction in the future. Projected 2030 traffic volumes on CSAH 22 are between 12,000 and 14,500 vehicles per day. The planning capacity threshold for CSAH 22 is approximately 15,000 vehicles per day. Therefore, this roadway is projected to be nearing congestion by 2030.

  Although CSAH 22 is anticipated to be nearing congestion by 2030, additional analysis was conducted to establish a long-term access vision along this corridor to be implemented as land use changes occurs. Executing this vision may help reduce and/or delay the need for roadway expansion. A long-term access vision has been developed for CSAH 22 between approximately CR 66 (in the City of Nowthen) on the west and the BNSF Railroad (in the City of Oak Grove) on the east. The access vision includes the application of Anoka County's access guidelines where feasible and also provides flexibility to address locations where strict application of the guidelines may not be possible due to existing land use, topography and/or natural features. The access vision considers the 2030 land use plans for the Cities of Oak Grove and Nowthen. As part of this process, areas where land use changes are likely to occur were discussed with the communities with the understanding that different segments of the corridor have different characteristics (e.g., undeveloped, potential for redevelopment, redevelopment not likely). Different access considerations and tools for guiding/permitting access within these areas have been developed and are included in Section IV of this report.

  The overall goal of the CSAH 22 long-term access vision is to provide a vision to transition the corridor over time, including direction on how to guide access decisions and potential locations for future supporting roadway systems to allow existing accesses to transition off of the CSAH 22 corridor.

- CSAH 24 – CSAH 24 is an A-Minor Arterial Connector running through downtown St. Francis and serving as a critical connection between the St. Francis Elementary, Middle and High School campuses. Projected 2030 traffic volumes on CSAH 24 are 12,100 to 15,000 vehicles per day. The planning capacity threshold for CSAH 24 is approximately 10,000 vehicles per day. Therefore, CSAH 24 is projected to be over capacity by 2030.

  The additional analyses conducted as part of the river crossing study for CSAH 24 included the consideration of an expansion of CSAH 24 from CSAH 24/28 to CSAH 9 as either a three-lane or

four-lane roadway, along with the development of a long-range access management plan. After reviewing the right-of-way impacts of a four-lane roadway section compared to a three-lane section on CSAH 24, the TAC recommended the expansion to a four-lane be dropped from further consideration due to the extensive impacts to existing homes, businesses, historic properties and park/natural areas. Therefore, the analysis continued with the consideration of an expansion of CSAH 24 between CSAH 24/28 and CSAH 9 as a three-lane roadway, utilizing the existing two-lane bridge.

A long-term access vision has also been developed for the CSAH 24 corridor, assuming a three-lane roadway section and is included in Section IV of this report. The goal of the access management plan is to establish a vision for city leaders to use to guide/permit access along the corridor as land use changes occur over time. Similar to the CSAH 22 access vision, the Anoka County access management guidelines are applied where feasible and flexibility is provided at locations where strict application of the guidelines was not feasible due to existing land uses, topography and/or natural features. The goal of the long-term access vision is to provide a tool to transition the corridor over time, including direction on how to guide access decisions and potential locations for future supporting roadway systems to allow existing accesses to transition off the corridor.

I. INTRODUCTION & BACKGROUND

The Anoka County 2030 Transportation Plan and the 2030 comprehensive plans of the Cities of St. Francis and Oak Grove suggest a need for additional Rum River crossing capacity in the northern portion of Anoka County. This is the result of projected future capacity issues identified on existing river crossings at County State Aid Highway (CSAH) 22 (Viking Boulevard) and CSAH 24 (Bridge Street) due to the planned growth in St. Francis, Oak Grove and Nowthen.

The existing river crossings at CSAH 22 and CSAH 24 within this area of northern Anoka County cross the Rum River, a state designated Wild and Scenic River. In general, Wild and Scenic Rivers are to be avoided by new construction or reconstruction of roads or river crossings. Understanding there was a high threshold to prove the need for a new crossing of the Rum River in this area, Anoka County, in partnership with the local communities, initiated the Northern Anoka County River Crossing Study to study in more detail and assess the need for additional river crossing capacity, whether on existing crossings or a new alignment.

A. Study Location

The Northern Anoka County River Crossing Study focuses on a study area that includes the communities of Oak Grove, St. Francis and portions of Nowthen, from CSAH 22 on the south to the northern county border. However, the study also includes a more broad consideration of how the transportation system in this area ties into the larger regional system, including how this area connects to the west to Sherburne County and US Highway 169, to the north and east to Isanti County, Trunk Highway (TH) 65 and Interstate 35 (I-35) and to the south to US Highway 10. In addition, consideration of how local and regional freight traffic moves through the study area and to draws between Sherburne and Chisago/Washington Counties will also be reviewed. Figure 1 illustrates the Study Area.

B. Study Purpose

The purpose of the Northern Anoka County River Crossing Study is to determine if additional Rum River crossing capacity is needed, and if so, what general corridor locations should be considered, what type of facility is needed, and who should be the responsible agency for the facility. The study will also identify the timing of a new crossing, the area where additional capacity is most needed, impacts associated with the additional capacity, and the next steps in selecting a preferred alignment and funding the improvement(s).

The study will provide recommendations on the need for future transportation improvements, whether that is expansion of an existing river crossing at CSAH 24 or CSAH 22, or an additional crossing in a new location, or a combination of both. Although the study will not identify a specific river crossing alignment, if a need is shown to exist, it will help set the framework for more detailed future studies. It will also help position the county and/or the cities to compete for future federal and/or state funding for future construction if additional crossing capacity is needed.

In addition, the study will note some long-term improvements that can be made on CSAH 24 and CSAH 22 to help traffic flow and safety on the existing river crossings.

ISANTI COUNTY

SAINT FRANCIS

NOWTHEN

OAK GROVE

Pederson Drive

Norris Lake

Mud Lake

Lake George

Benjamin Lake

Hickey Lake

CR 103

221st Street

Sims Road

Raven Street NW

Nightingale Street

Grass L

0 0.6 Mile

Legend

Roadway Functional Classification

- A Minor Expander
- A Minor Connector*
- B Minor
- Major Collector
- Minor Collector

- Study Area
- City Boundary
- Rum River
- Lake/Pond/River
- Stream
- Local Road

Source: Anoka County, MET Council, MnDOT, MnDNR

NORTHERN ANOKA COUNTY RIVER CROSSING STUDY

Study Area

Figure 1

March, 2011

Map Document: H:\AKCO\T42102757\ESRI\T42102757\ESRI\Maps\102757 Study Area 11x17.mxd
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C. Agency Coordination and Public Involvement Process

Agency coordination and public involvement were key components to the successful development of the Northern Anoka County River Crossing Study. Making timely, accurate and usefully information available to both key decision-makers and the general public promotes effective decision-making by fostering a cooperative spirit and building trust and relationships among state, regional and local partners, and the public. This required the early and continuous involvement of all affected interests identified during the initial stages of study planning.

A **Technical Advisory Committee** (TAC) was organized consisting of representatives from Anoka County, the Cities of St. Francis, Oak Grove and Nowthen, the Minnesota Department of Transportation (Mn/DOT), the Minnesota Department of Natural Resources (MnDNR), and the Federal Highway Administration (FHWA). The responsibilities of the PMT included:

- Guide the overall study direction
- Discuss study progress
- Review and provide input on technical analysis
- Review and discuss public input
- Review and consider study recommendations

An **Open House Meeting** was held to provide a forum for the public to participate with local communities and the TAC on the review of issues and needs within the study and to consider long-term improvement alternatives. Notice for the meetings was provided to residents and businesses by means of press releases, newspaper articles, and the Anoka County website. The open house meeting was held on April 5, 2011. The objective of the meeting was to introduce the study, explain the study objectives, present existing information regarding regional and local transportation problems and needs, present opportunities and challenges that may help determine potential transportation improvements, and receive public input on other issues.

Focus Group Meetings. A set of focus group meetings were held on February 28, 2011 in St. Francis with the following groups:

- School Districts – St. Francis and Anoka-Hennepin
- St. Francis Chamber of Commerce
- Business/Freight Companies – Bjorklund Companies, Northland Screw Products, Temperature Specialists
- Public Safety – Anoka County Central Communications (911), Anoka County Sheriff's Office, St. Francis Fire Department, Allina Medical Transportation
- Environmental Agencies – MnDNR, Anoka Conservation District, US Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS)

The purpose of the focus group meetings was to gather key stakeholder input from these selected groups related to transportation, land use and environmental issues and needs within the study area.

City Council Meetings. Two city council meetings were held for each community (St. Francis, Oak Grove and Nowthen) throughout the course of the study. The initial meetings were held in April 2011 to review and solicit input on the study objectives and issues identified through early technical analysis and the public open house and focus group meetings. The second set of city council meetings will be held in Spring 2012 for final study adoption.

Community Educational Workshop. This workshop was held on March 24, 2011 at the St. Francis Elementary School with planning commission and elected officials from the Cities of St. Francis, Oak Grove and Nowthen. The purpose of the educational workshop was to review the study purpose and to provide a general overview of transportation planning and engineering basics such as roadway function, jurisdiction and the connection between land use and transportation. The workshop also focused on keys for elected officials to understand study information and findings.

Agency Coordination Meetings. Agency coordination for this study included coordination with local communities on land use and federal and state agencies on environmental considerations. In addition, a critical piece to agency coordination for this study included close communication with the MnDNR who is responsible for managing the state Wild and Scenic Rivers program. Several opportunities for communication and coordination were provided throughout the study with the local, state and federal agencies as well as the MnDNR.

Property Owner Meetings were held in February/March 2012. Property and business owners immediately adjacent to the corridors were invited to provide comments on long-term improvement plans for CSAH 24 and CSAH 22.

County Website. The Anoka County website was utilized as a means to provide study information, progress and next steps, as well as to advertise public involvement opportunities. This provided the opportunity for the public to keep abreast of the study's progress.

II. ISSUES IDENTIFICATION

An important element of the study was the identification of key land use, transportation, and environmental issues. In order to fully understand the future transportation needs in the study area, a comprehensive analysis of the following was conducted:

- Existing and future land use – documentation of where communities within and surrounding the study area are planning for land use changes to occur by 2030 and how land use changes may impact the demand for east-west travel across the Rum River.
- Existing arterial route spacing – identification of existing roadway network connectivity deficiencies based on a comparison of the functional classification of roadways in the study area, the Metropolitan Council's arterial route spacing guidelines, cities' future land use plans, and known environmental constraints in the area.
- Environmental issues/constraints – documentation of a social, environmental and economic (SEE) scan conducted for the study area to identify existing built and natural resources and potential fatal-flaws to roadway improvements.

- Existing and future traffic operations – documentation of the traffic operations under existing conditions and projected no-build and build conditions in the study area.
- Existing safety and pedestrian issues – evaluation of pedestrian movements along and near the CSAH 24 corridor in St. Francis to identify existing pedestrian volumes, specific crossing locations and available gaps for crossing; documentation of existing safety conditions within the study area.

These analyses helped shape the context of existing issues, needs and constraints within the study area, particularly at and/or along the CSAH 22 and CSAH 24 river crossing corridors.

A. Land Use and Demographics

An important nexus exists between land use and transportation. To put it simply, every land use decision has transportation implications and every transportation action affects land use. Land use is shaped by the infrastructure that serves it, through the provision of access and mobility. Land development in turn generates travel and travel generates the need for new facilities, which then increases accessibility and attracts further development. Therefore, determining which comes first, land use or transportation, is a debatable topic, similar to the chicken versus egg debate. However, the purpose of the land use analysis conducted as part of this study was not to argue which factor, land use or transportation, comes first but instead to document where communities are planning for land use changes to occur by 2030 and how land use changes may impact the demand for east-west travel across the Rum River.

1. Existing Conditions

The summary of existing and future land uses in this section and the next will be organized into a discussion of study area communities (St. Francis, Oak Grove and Nowthen) and surrounding communities (Elk River, Bethel, East Bethel, and Stanford and Athens Townships). Figure 2 illustrates a generalized existing (2005) land use patterns for study area communities that was developed by the Metropolitan Council.

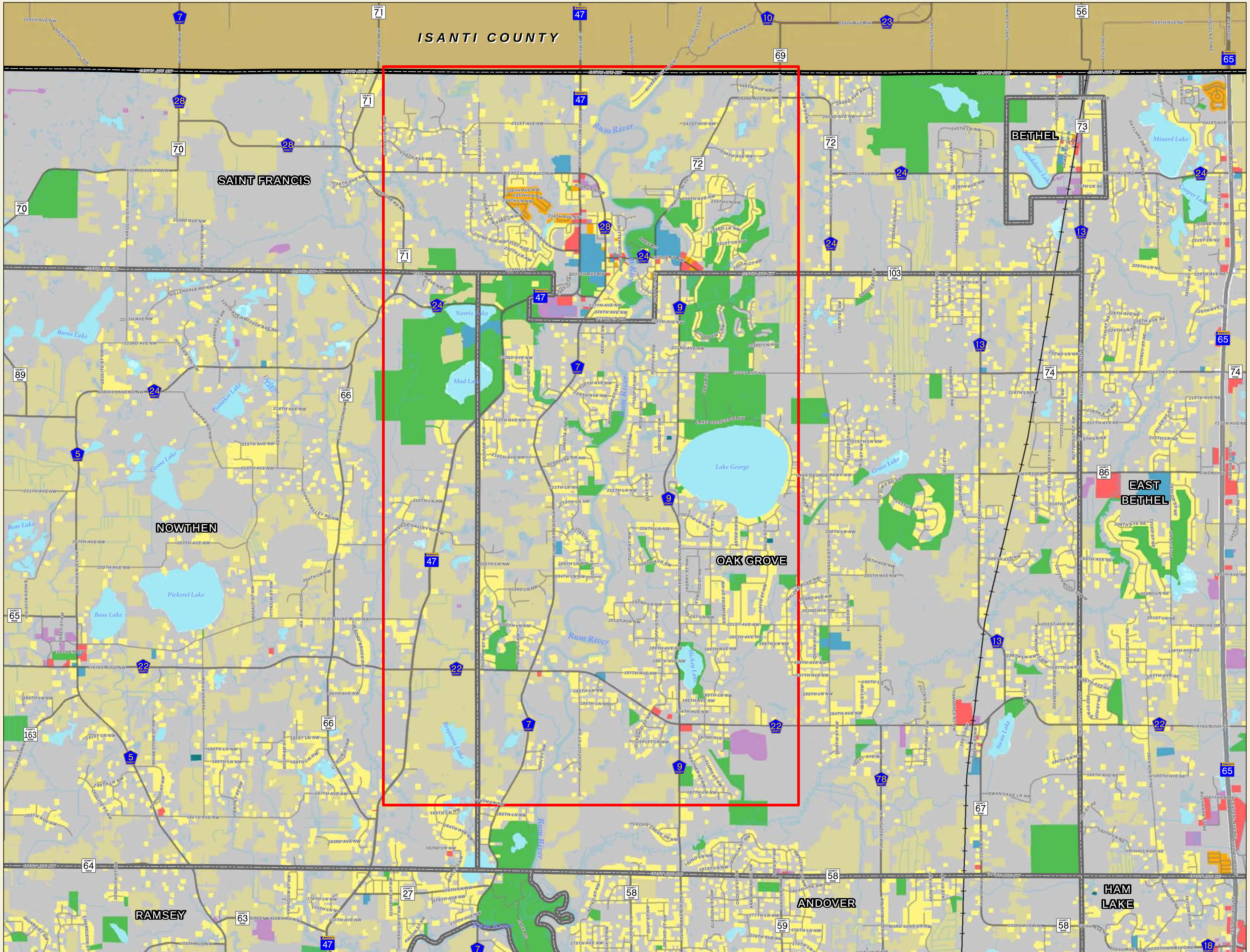
Study Area Communities

St. Francis –There are three primary environments in St. Francis which have defined the community's identity:

- Urban-style development, around the traditional downtown and TH 47 and CSAH 28 (Ambassador)/CSAH 24 corridors (includes both residential and commercial/business park uses)
- Rural residential development at the outskirts of urbanized areas
- Agriculture and other rural uses comprising the remainder (more than half) of the existing land cover

Oak Grove – The majority of existing land uses in Oak Grove are rural residential (single-family homes on lots larger than two acres) and agricultural land uses. There is a small amount of concentrated commercial and industrial land uses focused along CSAH 22 and CSAH 9 (Lake George Blvd). Large areas of wetlands, rivers, lakes and park and recreation areas, together with the community's desire for a rural character, have resulted in limited concentrated areas of urban development.

NORTHERN ANOKA COUNTY RIVER CROSSING STUDY



Legend

Project Area

Existing Land Use 2005

- Agricultural
- Single Family Residential
- Multifamily Residential
- Commercial
- Mixed Use
- Industrial
- Institutional
- Park and Recreation
- Railway
- Airport
- Undeveloped
- Water
- City Boundary
- County Boundary

Source:
Anoka County, Met Council, MNDNR, MNDOT

0 5,000 Feet

Existing 2005 Land Use

Figure 2

January, 2011

Map Document: (\\arcserver1\gis\AKCO\T42102757\ESRI\Maps\102757 2005 Land Use 11x17.mxd)
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Nowthen – The City of Nowthen was incorporated as a city in July 2008. The majority of existing land uses in Nowthen are rural residential and agricultural; however, the community is evolving with demand shifting from agricultural uses to more rural residential land uses. Similar to Oak Grove, natural features such as wetlands, lakes and parks, etc. and the community's past as a primarily agricultural area have resulted in limited concentrated areas of urban development.

Surrounding Communities

Bethel – The City of Bethel, located to the east of St. Francis, consists mainly of rural residential development with scattered single family residential and limited industrial development along CSAH 13(University Avenue Extended NW)/CR 73 (University Avenue Extended NE). Bethel is located one mile west of TH 65. There are limited retail and employment centers within the city.

East Bethel – East Bethel, located to the east of St. Francis and Oak Grove, consists mainly of low-density rural residential development. Commercial/business land uses are primarily concentrated along the TH 65 corridor.

Elk River – Elk River is located to the west of the study area, in Sherburne County. Existing land use within Elk River includes a mix of residential uses along the western, northern and eastern portions of the city, with commercial and industrial development along the US 10 and US 169 corridors. In addition, limited areas of rural residential land uses also exist along the outskirts of the urban residential areas.

Stanford and Athens Townships – Agriculture and rural residential land uses create the existing land use landscape in Stanford and Athens Townships to the north of the study area in Isanti County.

Concentrations of Existing Development

Within the study area and surrounding communities there are noticeable existing concentrations of both residential and commercial/industrial development. St. Francis is the most concentrated area for residential development among the three study area communities. Both Oak Grove and Nowthen have limited concentrations and instead consist of spread out rural residential development. Residential land uses in St. Francis are located on both sides of the Rum River within the community.

Commercial/industrial development in the study area is focused on major highway corridors such as TH 47 and CSAH 24 in St. Francis, the intersection of CSAH 22/CSAH 5(Nowthen Blvd) in Nowthen, and along the CSAH 22 corridor in Oak Grove. Outside of the study area, commercial/industrial areas are focused on the TH 5 corridor in East Bethel and the US 10 and US 169 corridors in Elk River.

The comprehensive plans for study area communities all noted that a significant portion of the population in this area commutes to the Twin Cities metro area for employment. Therefore, north/south roadways such as TH 65, TH 47/US 10, CSAH 7(Rum River Blvd) and CSAH 9, as well as east-west connections to these roadways such as CSAH 22 and CSAH 24/28, provide important

connections between where people live and commute to work. Although many people in this northern area of Anoka County commute to the metro area to work, other employers also draw employees into the study area. One of the major employers in this area is the St. Francis School District which serves over 6,000 students from St. Francis, East Bethel, Bethel, Oak Grove, Nowthen, Andover, and Athens and Stanford Townships. St. Francis also serves as a commercial center for northern Anoka County and southern Isanti County. Employees and customers are drawn to businesses and some industry along the TH 47 corridor and the CSAH 24 corridor in St. Francis. In addition, the TH 65 corridor in East Bethel provides employment opportunities through commercial, industrial and retail development located there. The US 10/US 169 corridors in Elk River are also home to several commercial and industrial/manufacturing businesses providing employment and shopping opportunities.

2. Forecasted 2030 Conditions

Table 1 identifies historic and projected population, households and employment for communities within and surrounding the study area. Based on the data in this table, it is apparent that communities in this region have experienced steady growth in the past decade and are projected to continue to grow, some at a relatively fast pace. According to study area community comprehensive plans, characteristics which have contributed to population growth in this area include:

- Close proximity to the Twin Cities metropolitan core. The outer-ring suburbs of the Twin Cities metro area and beyond experienced rapid growth during the 2000s as the metro area continued to expand outward.
- Access to regional employment opportunities. Close proximity to the Twin Cities metro area provides residents with a multitude of employment opportunities within a reasonable commuting distance from their homes.
- Affordable housing opportunities. Due to this region's location in the far northern portion of the Twin Cities, housing costs remain less than larger, highly populated suburbs to the south, closer to the metro core.

These factors have contributed to many young families moving to this area. Several of the communities in this area reported in their comprehensive plans average ages of 34 or less for their residents. Many communities also reported that residents commute 30 to 60 miles or more to work on a daily basis.

TABLE 1 – Historic and Projected Population, Households and Employment Growth

	Population			Households			Employment		
Community	**2000**	**2010**	**2030**	**2000**	**2010**	**2030**	**2000**	**2010**	**2030**
St. Francis	4,910	7,700	12,800	1,638	2,800	5,000	1,247	1,630	2,200
Oak Grove	6,903	9,200	11,300	2,200	3,000	4,100	359	520	820
Nowthen	3,557	4,480	5,800	1,123	1,530	2,120	337	350	450
East Bethel	10,941	12,600	23,500	3,607	4,500	9,000	1,374	2,000	4,500
Bethel	443	550	650	149	200	260	229	330	440
Elk River*	16,447	16,447	34,754	5,658	5,658	13,461	6,317	8,384	17,774
Athens Twp**	2,322	2,322	2,657	--	--	--	210	210	403
Stanford Twp**	2,075	2,075	2,579	--	--	--	209	209	390

Sources: US Census, 2000 and Metropolitan Council Regional Development Forecasts

**Represents 2000 data (for both 2000 and 2010) and 2025 Forecasts from City Comprehensive Plan*

***Represents 2000 data (for both 2000 and 2010) and 2030 Forecasts*

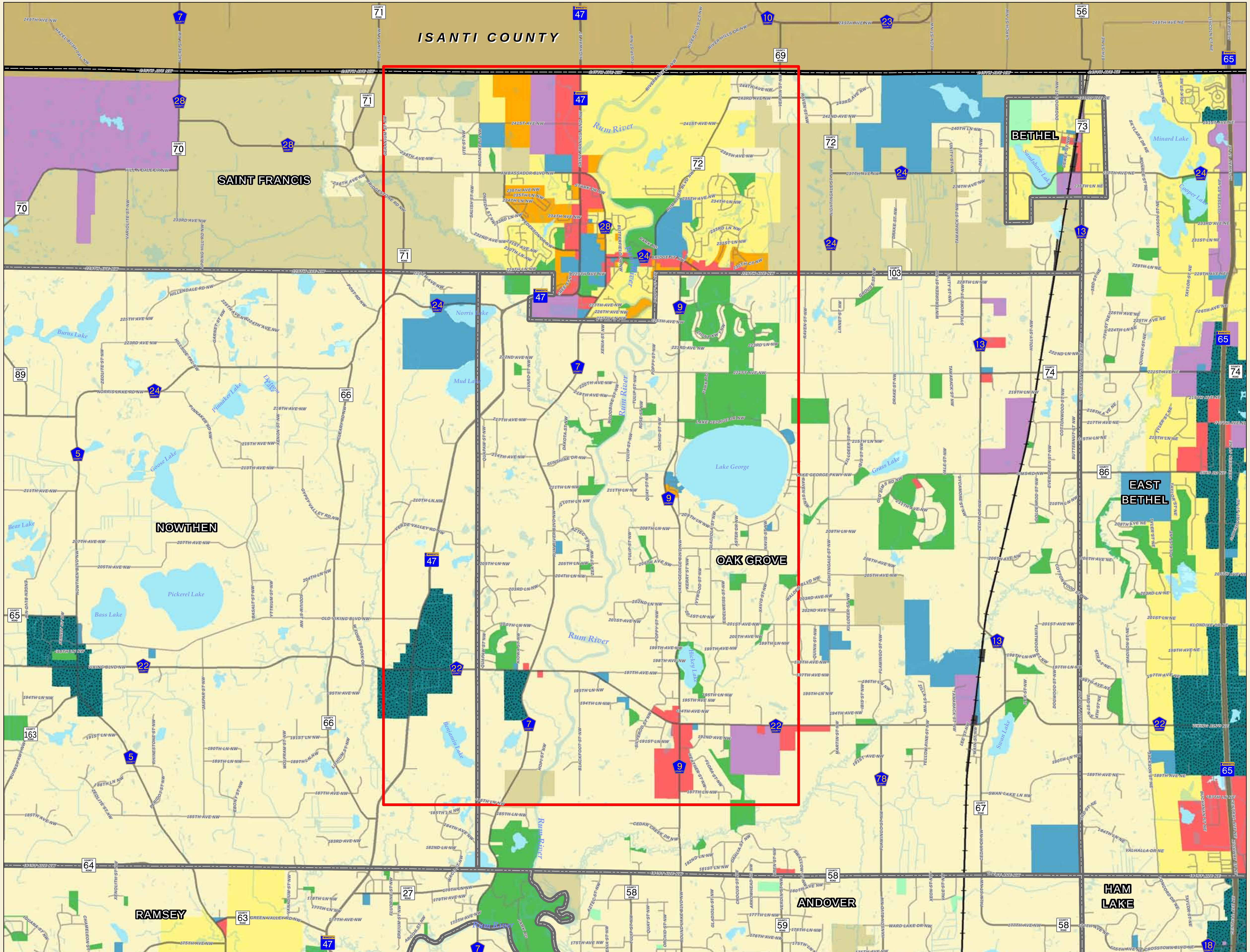
As shown in Table 1, the Cities of St. Francis, East Bethel and Elk River are expected to see continued steady growth through 2030 with a near doubling of population expected for each community. The communities of Oak Grove and Nowthen will experience growth, although on a smaller scale than St. Francis, East Bethel and Elk River. However, both Oak Grove and Nowthen have made accommodations in their comprehensive plans for future Municipal Urban Service Area (MUSA) expansion post-2030 to plan for the extension of a future regional sewer interceptor into their area. Both communities have designated areas in post-2030 for more concentrated development at urban densities to support regional facilities in this area. Although this is a noteworthy factor in the future development of this area, the future land use assumptions for the Northern Anoka County River Crossing Study will focus on land use development in the study area through 2030 only.

Another factor that may affect future land use in the study area and surrounding communities is the potential future expansion of commuter rail via the Northern Lights Express corridor. Several communities including Oak Grove and Bethel addressed potential future commuter rail stations in their comprehensive plans, noting that future land use patterns would need to be modified to reflect the concentration of land uses needed to support a rail station if it were to come to fruition.

The following provides a brief description of future land uses anticipated in the study area and surrounding area communities. This information is also illustrated in Figure 3.

Study Area Communities

St. Francis – St. Francis is identified as both a diversified rural area (one unit per 10 acres) and a rural growth center (three to five units per acre) in the Metropolitan Council's 2030 Regional Development Forecast (RDF). These forecasts anticipate a near doubling of existing population in the City of St. Francis by 2030.



NORTHERN ANOKA COUNTY RIVER CROSSING STUDY

Legend

Project Area

Planned Land Use - Generalized

- Agricultural
- Rural or Large-Lot Residential
- Single Family Residential
- Multifamily Residential
- Commercial
- Industrial
- Institutional
- Mixed Use
- Multi-Optional Development
- Park and Recreation
- Open Space or Restrictive Use
- Railway (inc. LRT)
- Airport
- Vacant or Unknown
- Open Water
- City Boundary
- County Boundary

Source:
Anoka County, Met Council, MNDNR, MNDOT

0 5,000 Feet

Planned Land Use

Figure 3

January, 2011

www.bolton-menk.com

Map Document: (\\arcserver1\gis\AKCO\T42102757\ESRI\Maps\102757 Planned Land Use 11x17.mxd)
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The city's future land use plan shows a staged plan for MUSA expansion. The residential areas are designated as medium- and high-density residential development within the city's future land use plan and are located within the current MUSA and MUSA expansion areas on both sides of the Rum River.

The city's future land use plan shows commercial, industrial and public uses along the TH 47 corridor. In addition, the plan shows a large area of future industrial uses in the northern portion of the city next to planned medium- and high-density residential. The city's downtown district surrounding TH 47 and CSAH 28/CSAH 24 continues to be planned for a mix of public, commercial and mixed-density residential uses.

Oak Grove – Oak Grove is identified as a rural residential area per the Metropolitan Council's 2030 RDF. The city's land use plan anticipates two stages of community development. The first stage (2008-2030) promotes very low density rural growth patterns characterized by large lots, conservation subdivision design, individual wells and septic systems, and a rural level of community services. This rural land use pattern is reflective of the city's growth history and goal of retaining its rural character. The second phase (post 2030) land use plan, involves the future introduction of regional utilities within the defined MUSA.

The city's 2030 land use plan shows a MUSA expansion area that is intended to be a holding zone until the city is ready for the introduction of regional utilities into the area. This area is intended to be preserved in a manner that allows for the logical and financially practical extension of utilities, post-2030.

Nowthen – The City of Nowthen is identified as a diversified rural area within the Metropolitan Council's 2030 RDF. Therefore, the intent is to remain largely rural residential but to preserve areas where future concentrated urban development, served by regional utility extensions can be accommodated after 2030. In the meantime, the preservation of the city's rural character is important to the community. Commercial and industrial tracts of land have been identified in the city's future land use plan along CSAH 22 at its intersections with CSAH 5 and TH 47.

Surrounding Communities

Bethel – The City of Bethel has a finite growth boundary, as it is landlocked by the Cities of East Bethel and St. Francis. The city anticipates future residential development around Sandshore Lake and future commercial and industrial development along CSAH 13 and CR 73. Should the Bethel Corridor commuter rail project come to fruition, the city could anticipate additional higher density housing opportunities within close proximity to a future station within the city. At this time, Bethel has no plans to turn over its wastewater treatment plant to the Metropolitan Council for management.

East Bethel – The City of East Bethel is identified as both a diversified rural area and a rural growth center in the Metropolitan Council's 2030 RDF. The City of East Bethel requested to become a Rural Growth Center in 2006 while beginning the development of their comprehensive plan update. The city's intent in requesting this designation was to gain Met Council approval for wastewater support to their community since they are interested in concentrating future growth as an alternative to more scattered development. Widespread wetland

areas in the city complicate land division that could be cost-effectively served by central wastewater services, if such services were available. Therefore, the City of East Bethel intends to maintain a large portion of the community as rural residential. However, the city intends to focus its growth on areas surrounding the TH 65 corridor, where the extension of municipal services is anticipated. The majority of this area is identified as low- to medium-density residential adjacent to commercial and industrial land uses directly located along TH 65. A city center plan was also developed for the area surrounding the CSAH 22/TH 65 intersection. This area is envisioned as a mixed use area with commercial, civic and residential land uses. Overall, the city is projected to nearly double its population by 2030.

Elk River – The City of Elk River is projected to continue to grow and nearly double its population over the next 20 years. This growth will likely be focused in the northern and eastern portions of the city. A potential redevelopment opportunity exists in the current mining area located north of the city along US 169. It is anticipated that the majority of mining resources will be extracted over the next 20 years. The city's comprehensive plan guides this area for future commercial, industrial and residential development. The majority of commercial and industrial land uses will continue to be focused along US 169 and US 10 and CR 1(Elk Lake Road).

Stanford and Athens Township – Future land use in both Athens and Stanford Townships is guided by Isanti County. Isanti County's Comprehensive Plan states their objectives are to continue to protect the rural, agricultural character of the county and to direct growth to municipalities if possible.

Concentrations of Future Development

As discussed above, both residential and commercial/industrial growth is planned for the study area and surrounding communities. Figure 4 illustrates where, based on future land use plans, concentrations of future development is anticipated. As shown on this figure, future residential development in St. Francis is planned on both the west and east sides of the Rum River. Although residential development on the east side of the river encompasses a large area, it is lower density than the residential development planned on the west side of the river. Therefore, total population growth on the west side of the river (additional 3,260 people) is almost double what is projected on the east side (additional 1,840 people). The same is true for future commercial/industrial developments in this area. The majority of future commercial/industrial growth in St. Francis is planned on the west side of the Rum River along TH 47 (additional 1,500 employees), although growth in existing commercial areas along CSAH 24 on the east side of the river is also projected (additional 670 employees).

Future residential growth in Oak Grove is planned to be spread out across the community; however, areas to the north of CSAH 22 and east of the Rum River are planned for a larger share of this rural residential growth. Concentrations of commercial/industrial growth is planned to be focused along the CSAH 22 corridor, near its intersections with CSAH 7 (additional 60 employees) and CSAH 9 (additional 170 employees), and a few isolated pockets along CSAH 13 (additional 70 employees).

Similar to Oak Grove, future residential growth in Nowthen is also planned to be spread out across the community, with no noticeable concentrations of future

NORTHERN ANOKA COUNTY RIVER CROSSING STUDY

ANOKA COUNTY

ISANTI COUNTY

SAINT FRANCIS

BETHEL

NOWTHEN

OAK GROVE

EAST BETHEL

RAMSEY

ANDOVER

HAM LAKE

+3,262 Population
+1,537 Employees

+1,838 Population
+667 Employees

To Elk River
+11,457 Employees

+40 Employees

+60 Employees

+60 Employees

+170 Employees

+70 Employees

+10,640 Population
+3,779 Employees

Legend

- Project Area

Planned Land Use - Generalized

- Agricultural
- Rural or Large-Lot Residential
- Single Family Residential
- Multifamily Residential
- Commercial
- Industrial
- Institutional
- Mixed Use
- Multi-Optional Development
- Park and Recreation
- Open Space or Restrictive Use
- Railway (inc. LRT)
- Airport
- Vacant or Unknown
- Open Water
- City Boundary
- County Boundary

Source:
Anoka County, Met Council, MNDNR, MNDOT

Notes:
1. Population and employment growth based on comparison of 2010 & 2030 Land Use, except for East Bethel (2000 & 2030) and Elk River (2000 & 2025).

0 1 Mile

Concentrations of Future Development

Figure 4

February, 2011

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Map Document: (H:\AKCO\T42102757\ESRI\T42102757\ESRI\Maps\102757 Concentrations of Future Development 11x17.mxd)
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development. Concentrations of commercial/industrial growth are planned along the CSAH 22 corridor near its intersections with CSAH 5 (additional 40 employees) and TH 47 (additional 60 employees).

For communities surrounding the study area, Elk River and East Bethel have the largest concentrations of future commercial/industrial developments that have the potential to draw people through and/or out of the study area. Elk River plans to continue and expand its commercial/industrial areas along US 10 and US 169 within the community offering employment, shopping and service opportunities in the manufacturing, retail, education and healthcare sectors. Elk River forecasts employment growth in the city to increase by approximately 11,500 employees by 2025. East Bethel also has plans to expand its commercial/industrial corridor along TH 65 thereby drawing people from and through the immediate study area to the east to access similar employment, shops and services in this area. The TH 65 corridor in East Bethel is forecasted to accommodate an additional 10,600 people and 3,800 employees by 2030.

B. Environmental Constraints

1. Basis for Review

The Rum River's Wild and Scenic River designation is a significant factor when considering environmental impacts of the potential addition of river crossing capacity. In addition, there is often a high likelihood of other environmental resources, such as cultural resources, contaminated sites, wetlands/water resources, parks, schools and recreation sites, etc., that may influence locations to provide additional crossing capacity. A social, environmental and economic (SEE) scan of the study area was conducted to identify existing built and natural resources. Since the Northern Anoka County River Crossing Study is focused on identifying the need for and potential location of river crossing improvements, the study area for the SEE scan focused on existing river crossings at CSAH 22 and CSAH 24 and areas adjacent to the Rum River between CSAH 22 and the northern Anoka County border.

The National Environmental Policy Act (NEPA) and Minnesota Environmental Policy Act (MEPA) require governmental agencies to examine the environmental impacts of their proposed projects. The SEE scan documented in this memorandum is meant to identify issues at a screening level and to document big picture or fatal-flaw constraints that would prevent additional capacity at existing crossings and/or potential new river crossing locations in the future. If the study progresses, SEE topics will need further investigation as part of a future formal environmental documentation process.

2. Potential Fatal Flaw Challenges

The SEE scan revealed existing built and natural resources and other planning considerations within the Northern Anoka County River Crossing Study. SEE topics and their present conditions are outlined within Table 2 and include social, economic, and natural resources and considerations. Because the SEE information is provided at the screening level, it does not represent all or the potential full extent of the possible considerations that may be present within the study area. Further analysis will be necessary to fully understand any possible

Table 2
Environmental Screening
Northern Anoka County River Crossing Study

SEE Topics	Considerations	Existing Conditions
Air Quality	• Impacts to air quality • Mobile source air toxins	The study area is within an attainment area. To be considered in future environmental review.*
Noise	• Comply with federal noise criteria and Minnesota Noise Standards • Identify of sensitive noise receptors	To be considered in future environmental review.*
Wetlands	Wetlands that may be impacted by partial or complete filling, excavation or drainage, or severance of water supply	• The Rum River is classified as a slow meandering perennial • Lakes and wetlands within the study area are protected bodies of water (See Figure 1)
Water Resources	Effects to water resources	Through Anoka County, the Rum River is a state-listed Wild and Scenic River District. (See Figure 1)
Floodplains	Development encroachments on the 100-year floodplain	100-year floodplains are associated with the Rum River, Seelye Brook, Cedar Creek, Ford Brook, County Ditch 18 & 19, Lake George, and Hickey Lake. (See Figure 1)
Drainage	Effects of drainage modifications	To be considered in future environmental review.*
Water Quality	Run-off effects to protected lakes and watercourses	Drainage infrastructure alterations and impervious surface additions may affect the bodies of water.
Wildlife, Threatened and Endangered Species	• Unique habitats • Widened section • Federal and state listed threatened and endangered species	Blanding's Turtle is a threatened species. The Black Sandshell, the Creek Heelsplitter, and the Red-shouldered Hawk are a special concern. The Sandhill Crane is tracked but not listed. (See Figure 3)
Fisheries	• Trout streams • Fish migrations • Spawning runs • Unique habitats	To be considered in future environmental review.*
Vegetation	• Native plant communities • Landscape vegetation • Functional vegetation • High value vegetation • Hazard trees	Portions of the study area are developed rural residential lots with altered vegetation. (See Figure 2 and 3). Impacts to vegetation will be considered in future environmental review.*
Utilities	Impacts to utilities may incur additional project costs.	• Telephone lines, minor power lines and other utilities parallel Highways 7, 9, 22, 24, and 28 • 69kV transmission line parallels Highway 47 from the northern county line to a transmission substation in between Ambassador Blvd NW and Stark Dr NW
Farmland and Soils	• Minimization of effects to agricultural land • Properties of soils • Suitability for roadway construction	• Farmland occurs in the far northern and south-western portions of the study area • The study area is within the Anoka Sand Plains • The soils range from excessively well drained to poorly drained • Soil suitability of farmland impacts will be addressed in future environmental review*
Excess Materials	Disposal and reuse of materials	To be considered in future environmental review.*
Erosion and Steep Slopes	• Erosional effects • Water pollution	• Steep slopes are found along the drainage ways and large lowland areas

Table 2
Environmental Screening
Northern Anoka County River Crossing Study

SEE Topics	Considerations	Existing Conditions
Contaminated Properties	Disturbance of contaminated properties may increase project cost	• 6 known leaking underground storage tanks • 30 known hazardous waste sites • 1 inactive Superfund site • Known history of contamination in the study area • 3 hazardous waste sites are located near the Rum River crossing on County Highway 24 (See Figure 4)
Land Use	Compatibility with existing plans	To be considered in future environmental review.*
Economic Issues	Minimization of negative economic effects	To be considered in future environmental review.*
Parks and Recreation	Minimization of negative effects to parks and recreational properties	• Rum River North County Park, Lake George Regional Park, and 38 local parks and recreational areas. (See Figure 5) • North County Park is located near the County Highway 24 bridge and on both sides of the corridor; Woodbury Park located along the County Highway on on the south side of the corridor
Sections 4(f)	• Parks and recreation areas • Wildlife & waterfowl refuges • Historic sites • Landscapes • Highways • Bridges • Buildings & districts • Wildlife management areas • School playgrounds • Fairgrounds • Public multiple-use land holdings • Public golf courses • Archaeological sites • Wild & scenic rivers • Recreational bikeways and trails	• Rum River North County Park • Lake George Regional Park • Rum River Wild and Scenic River • H.E. Seelye Farm • Louis J. Greenwald Farm • Log Stage Relay Station • Riverside Hotel • H.G. Leathers House • Leather's Ford Garage • Shaddick House • Swan Gustav Anderson Farmstead • Albert Buckholz Farmstead • Archaeological sites and features • Riverside Hotel, H.G. Leathers House, Leathers' Ford Garage, and Shaddick House are located near the Rum River crossing on County Highway 24 (See Figure 6)
Sections 6(f)	Land and Water Conservation (LAWCON) funds	• Community Park • Deer Creek Park Two • Highland Woods Park • Lake George Regional Park • Rum River North Park, located near the Rum River crossing on County Highway 24 • Rum Wild and Scenic River • (See Figure 5)
Social and Environmental Justice	Disproportionate effects to low-income or minority populations	Mobile home community located in the northwestern portion of St. Francis, within the study area. To be considered in future environmental review.*
Accessibility	Accessibility of facilities	To be considered in future environmental review.*
Right of Way and Relocation	Effects of right of way acquisition	To be considered in future environmental review.*

Table 2
Environmental Screening
Northern Anoka County River Crossing Study

SEE Topics	Considerations	Existing Conditions
Visual Quality	• Scenic intrusion • Grading, Trails • Vegetation modifications • Bridges • Walls • Lighting • Fencing • Railings	To be considered in future environmental review.*
Community Facilities	• Hospitals • Schools • Libraries • Churches • Government buildings • Post offices	• The St. Francis Medical Clinic is located at 23671 St. Francis Blvd • County Highway 24 crossing Rum River is used to access schools located on both sides of the river within St. Francis • St. Francis library is located at 3519 Bridge St NW • Four places of worship within St. Francis (22940 St. Francis Blvd, 23038 Rum River Blvd NW, 3914 229 Ave NW, and 3812 229 Ave NW) • St. Francis Government Center is located at 23340 Cree St NW • Oak Grove City Hall is located at 19900 Nightinggale St NW, just outside the study area • The St. Francis Post Office is located at 3726 Bridge St NW • (See Figure 2)
Cultural Resources	Buildings that exceed 50 years in age, archaeological sites, and Traditional Cultural Properties.	• Buildings over 50 years in age are known to exist within the study area • Buildings in the study area may require further evaluation for National Register of Historic Places eligibility • Other properties within the study area may require documentation • 2 National Register and 2 historic properties are located near the Rum River crossing on County Highway 24 • (See Figure 6)
Pedestrian & Bicycle Facilities	Bicycle and pedestrian safety	To be considered in future environmental review.* (See Figure 5)
Traffic	Adequacy of proposed design	To be considered in future environmental review.*
Transit & Intermodal Issues	All modes of transportation and existing facilities for alternatives.	To be considered in future environmental review.*
Local Access & Community Impacts	• Community cohesiveness • Access to transportation	Rum River is a barrier to east-west travel across Anoka County. There are two crossings within the study area. To be considered in future environmental review.* (See Figure 2)
Construction Impacts	Human and natural environment	Future project effects could include noise, air quality, vibrations, traffic, and economic. To be considered in future environmental review.*
Cumulative Impacts	Human and natural environment	To be considered in future environmental review.*

*Additional study considerations will be pursued when improvements are identified.

impacts by proposed construction activities. Below is a discussion of selected SEE resources that have been identified as potential fatal-flaws.

Water Resources

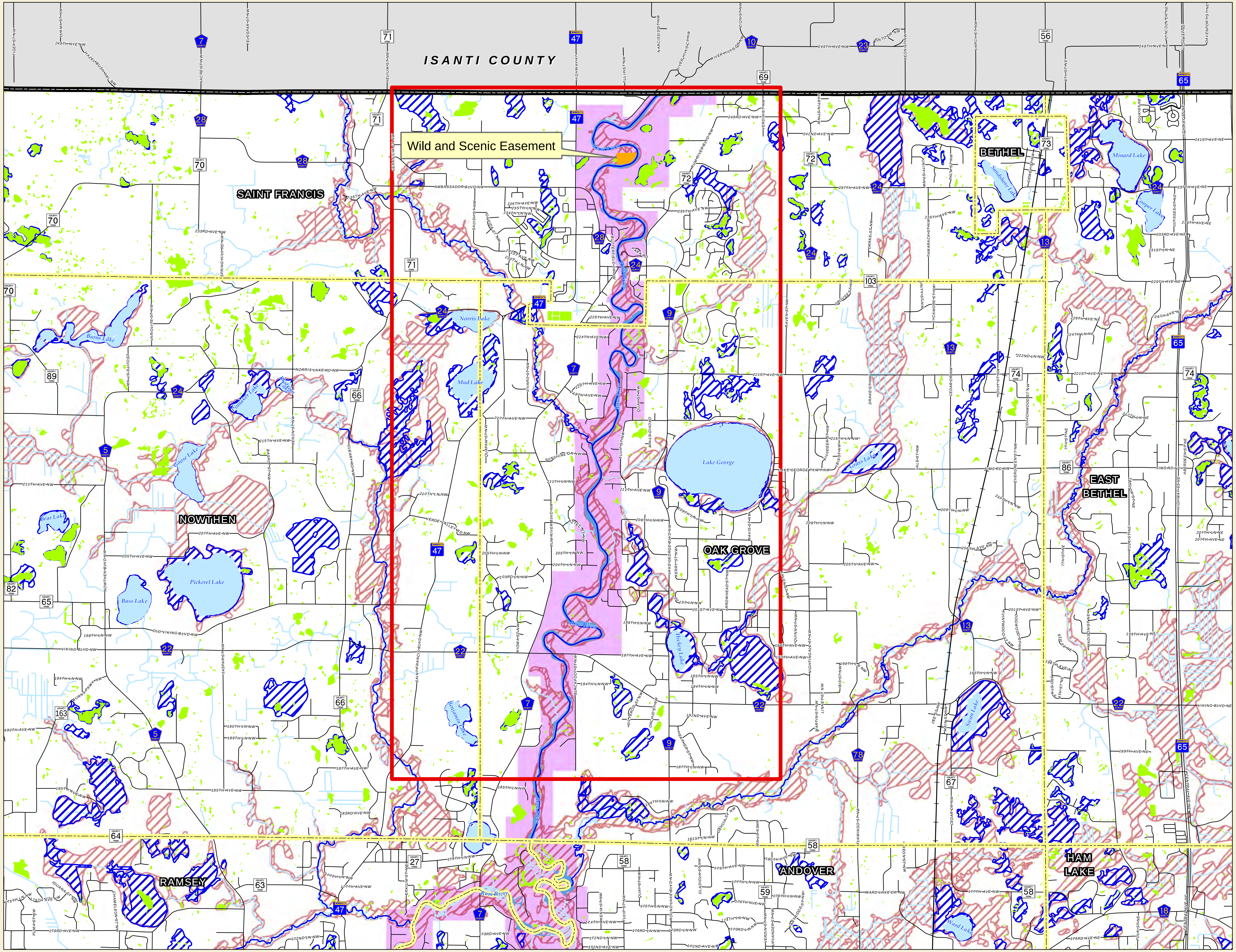
The Rum River itself is within an area declared as a Wild and Scenic River District, illustrated on Figure 5. Different sections of the river have been classified within the wild, scenic, and recreational designations. The river is designated 'scenic' within the study area. The 'scenic' designation is for rivers that have not undergone physical changes to their natural course. As noted by the presence of artificial surfaces on Figure 6, much of the existing surrounding landscape is developed with rural residential lots. The Rum River is a protected waterway by local shoreland regulations, as are its tributaries (Cedar Creek, Ford Brook, and Seelye Brook). Minnesota State Statute (MS) 6105.0200 and 6105.0230 provide protection of wild, scenic, and recreational rivers. In general, wild and scenic rivers are to be avoided by new construction or reconstruction of roads or river crossings. If there are no feasible alternatives, the design must take certain precautions to minimize adverse effects. These precautions include avoiding steep slopes, ridge lines, scenic intrusions, wetlands, and soils susceptible to erosion or high water tables. A conditional use permit from the local land use authority is required for construction or reconstruction of an existing road (MS 6105.0190). Additionally, Public Waters Rules (MS 6115.0230) regulate crossings of public waters and require permits for bridge construction or reconstruction. Generally, a crossing cannot make more than a minimal change to the environment. It needs to adhere to floodplain, shoreland, and wild and scenic rivers management standards and ordinances.

In 1979, the Minnesota Department of Natural Resources (DNR) acquired an easement (i.e. recorded document #534306) for the purposes of protecting the scenic, recreational or natural characteristics of an approximate 15 acre area of land located west of Rum River and north of CSAH 28 (Ambassador Blvd NW). The easement regulates physical changes to the topography and environment, such as no alteration of the natural landscape and no construction of buildings or structures without authorization from the Commissioner of Natural Resources. The easement's location is illustrated on Figure 5.

Wildlife and Ecological Resources

In general, within the study area there have been sightings of rare plants, animals, and natural features. The sightings include State endangered, threatened, or special concern species, native plant or animal communities, or geologic features. The vertebrate animal is the most common category identified within the study area. Both invertebrate animals, the Black Sandshell and the Creek Heelsplitter, have been identified in the vicinity of the Rum River crossings at County Highways 22 and 24. Species not listed as endangered, threatened, or of special concern may require depredation permits to help avoid impacting active nesting activities, such as swallows that nest on bridges. Coordination with the Department of Natural Resources (DNR) may be needed to ensure there are no adverse impacts on wildlife.

NORTHERN ANOKA COUNTY
RIVER CROSSING STUDY



Legend

- National Wetlands Inventory
- 100-Year Floodplain
- Protected Water Body
- Protected Water Course
- Lake/Pond/River
- Stream
- Wild and Scenic River District
- Wild and Scenic Easement
- Roads
- Railroads
- City Boundary
- County Boundary
- Study Area

Source:
Anoka County, Met Council, MNDNR, MNDOT, FEMA

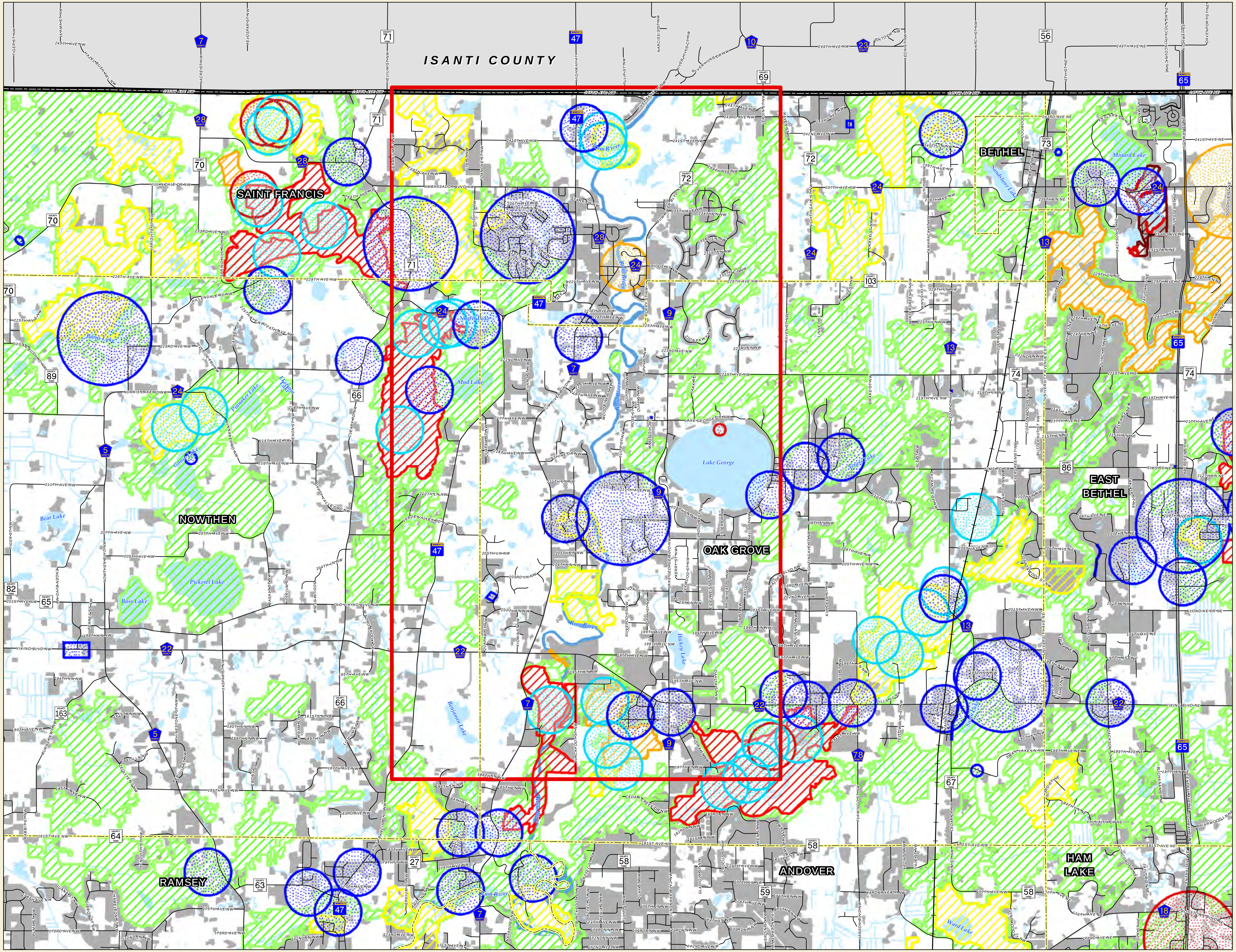
0 1 Mile

Water Resources

Figure 5

February, 2011

NORTHERN ANOKA COUNTY RIVER CROSSING STUDY



Legend

Rare & Natural Features

- Vertebrate Animal
- Community
- Invertebrate Animal
- Vascular Plant

Area of Biodiversity Significance

- Outstanding
- High
- Moderate
- Below
- Regionally Significant Ecological Area
- Rum River
- Lake/Pond/River
- Stream
- Artificial Surface and Associated Area
- Roads
- Railroads
- City Boundary
- County Boundary

Source:
Anoka County, Met Council, MNDNR, MNDOT,
MNDNR Division of Ecological Resources - Jan. 2011

0 1 Mile

Natural Areas & Wildlife Habitat

Figure 6

February, 2011

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Following is a listing of Rare & Natural Features identified within the study area:

Vertebrate Animals:	Invertebrate Animals:
Blanding's Turtle	Black Sandshell
Sandhill Crane (tracked, not listed)	Creek Heelsplitter
Red-shouldered Hawk	

Vascular Plants:
Halberd-leaved Tearthumb
Leafless Water Milfoil

Plant/Tree Communities:
Native plant community-undetermined (terrestrial)
Tamarack Swamp (Southern)
Prairie Rich Fen
Dry Sand-Gravel Oak Savanna (Southern)
Silver Maple (Virginia Creeper) Floodplain Forest

Most sightings are in, or near, areas designated as regionally significant ecological areas. As identified by the DNR, regionally significant ecological areas are terrestrial or wetland environments that retain intact native plant and/or animal communities. These intact communities provide habitat, biological diversity, and contribute to the natural landscape. Regionally significant ecological areas have been divided into areas that are outstanding, high, moderate, and low importance. Within the study area, there are no outstanding areas. Areas of high significance are located primarily in the south-east, south-central and along the center of the western boundary of the study area. Moderate areas of significance are located in the south-central portion of the study area. Larger tracts of regionally significant ecological areas are found to the north of Lake George, in the southeast portion of the study area concentrating along Cedar Creek, and between Seelye Brook and Ford Brook extending to the northwest portion of the study area (west of Rum River). Tracts are also identified in the southwest and south-central portions of the study area and along the Rum River. Isolated smaller tracts are located throughout the study area, mainly associated with bodies of water and waterways. Figure 6 illustrates rare and natural features and regionally significant ecological areas within the study area.

Contaminated Properties

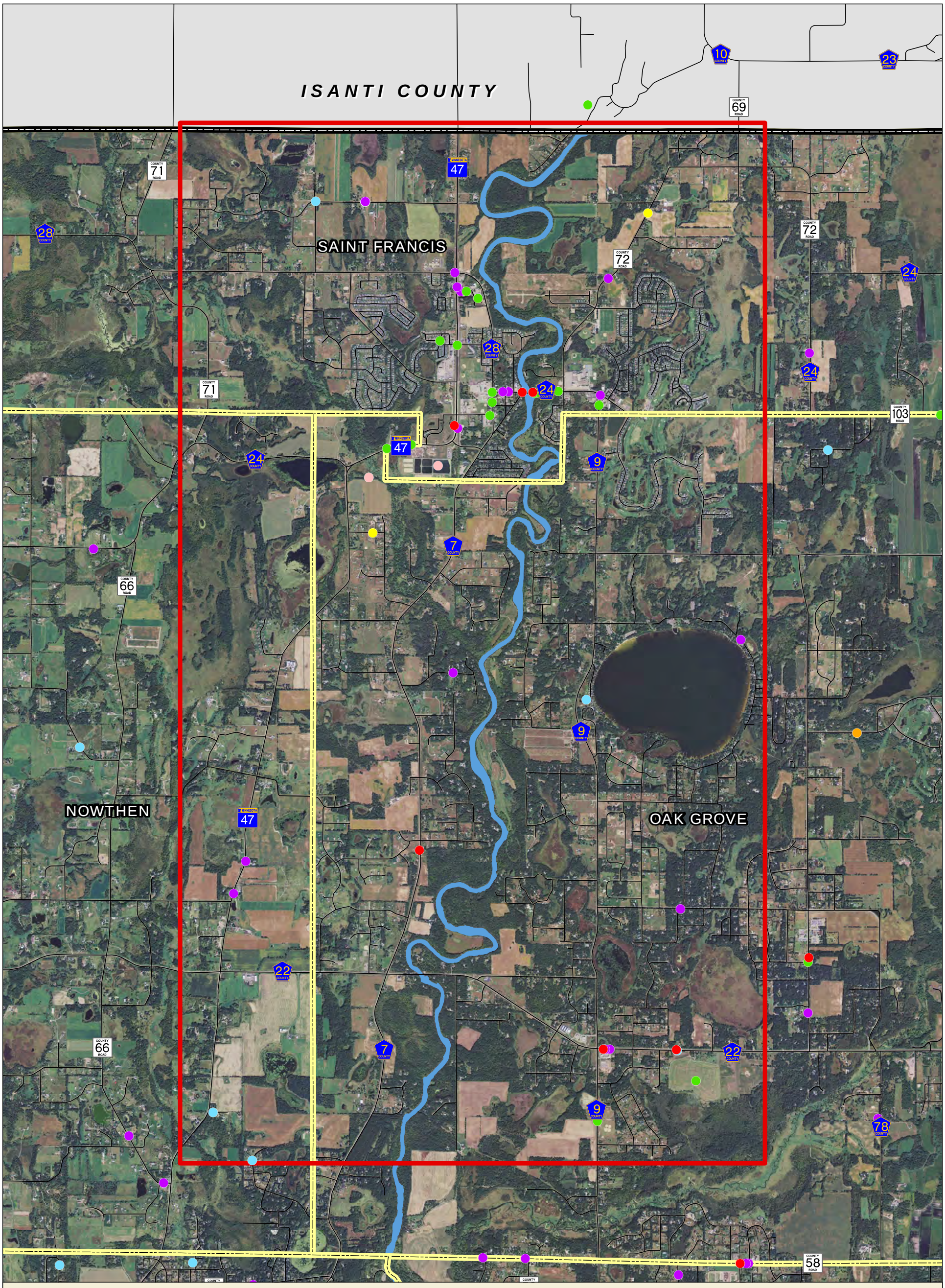
There is a known history of contaminated sites within the study area. Thirty hazardous waste sites and six underground leaking storage tanks have been identified. Hazardous waste sites, small to minimal in quantity, are located along CSAH 24 near the current Rum River crossing. The Oak Grove Sanitary Landfill is an inactive Superfund site. It is located in the southeastern portion of the study area, south of CSAH 22 and east of CSAH 9. The site has been removed from the National Priorities List (NPL). Sites removed from the NPL require no further monitoring for the health and safety of people or the environment. A

second Superfund site, Kunshier Well, is identified east of CSAH 13, and out of the study area. It is considered inactive and not listed on the NPL. Figure 7 illustrates the sites within the study area identified by the Minnesota Pollution Control Agency.

Sections 4f and 6f

Two county parks are located within the study area, Rum River North County Park (north end of the study area) and Lake George Regional Park (north side of Lake George). Figure 8 illustrates the 38 local city parks and recreational areas throughout the study area. They are located primarily along bodies of water and waterways. Community Park, Deer Creek Park Two, Highland Woods Park, Lake George Regional Park, Rum River North Park, and portions of the Rum Wild and Scenic River have been funded or partially funded by the Land and Water Conservation Fund (LAWCON) and Minnesota Local Grants Programs. Should an expanded or new crossing be pursued, these areas should be avoided. If they cannot be avoided, prior approval is needed by the State Commissioner of Natural Resources and potentially the National Park Service if the property is proposed for non-recreational purposes per the DNR, Office of Management and Budget Services.

Eleven archaeological sites and nine historic sites have been identified within the study area, including two properties listed on the National Register of Historic Places. The two National Register properties and two historic properties are located on or near the Rum River crossing within St. Francis on CSAH 24. NEPA, MEPA, and the National Historic Preservation Act (NHPA) require consideration of archaeological and historical resources prior to construction activities. The known cultural resources are illustrated on Figure 9.



0 3,500 Feet

Legend

Minnesota Pollution Control Agency Sites

- Feedlot
- Hazardous Waste, Small to Minimal Quantity
- Landfill, Permitted By Rule
- Leak Site
- Multiple Activities
- Tank Site
- Unpermitted Dump Site

- Rum River
- Roads
- Railroads
- City Boundary
- County Boundary
- Study Area

Source: Anoka County, Met Council, MNDNR, MNDOT, MPCA, NRCS

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ANOKA COUNTY

Norther Anoka County River Crossing Study

MPCA Sites

Figure 7

February, 2011

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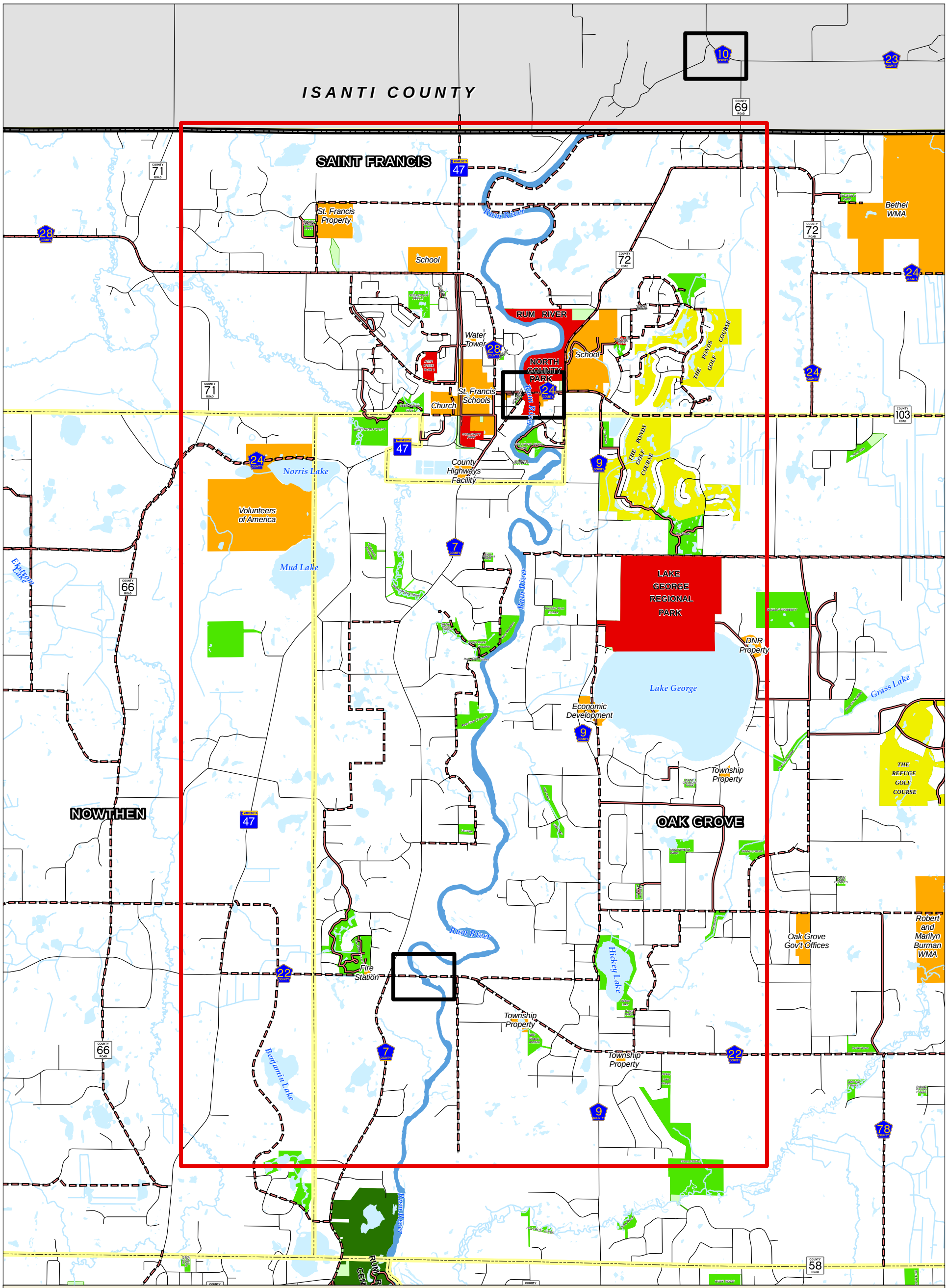

0 3,500 Feet

Legend

- LAWCON Park
- County Park
- City Park
- Golf Course *Fairway & Greens*
- Planned Open Space
- Natural or Institutional Area*
- Existing Trail
- Proposed Trail
- Rum River
- Roads
- Existing Rum River Crossing
- Railroads
- City Boundary
- County Boundary
- Study Area

* Land uses within this category are labeled on the map.

Source: Anoka County, Met Council, MNDNR, MNDOT

BOLTON & MENK Engineers & Surveyors www.bolton-menk.com

ANOKA COUNTY

Norther Anoka County River Crossing Study

Parks, Trails and Institutional Properties

Figure 8

February, 2011

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ISANTI COUNTY

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SAINT FRANCIS
BETHEL
EAST BETHEL
OAK GROVE
NOWTHEN
RAMSEY
ANDOVER
HAM LAKE
EAST BETHEL

NORTHERN ANOKA COUNTY RIVER CROSSING STUDY

Legend

Project Area

Known Cultural Resources

- National Register Historic Structure
- Other Historic Structure
- Archaeological Sites

Source:
USGS

Note:
Known cultural resources were not field-reviewed for this project.
Locations of archaeological sites are approximate and have been intentionally adjusted in order to protect each resource.

0 1 Mile

Known Cultural Resources

Figure 9

February, 2011

Map Document: (H:\AKCO\T4210275\7\ESRI\Maps\102757 Known Cultural Resources 11x17.mxd)
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C. Roadway Network and Connectivity

Roadway connectivity, particularly east-west connectivity, in the study area is an issue that has been identified in early data collection/analyses. The purpose of this section of the report is to identify existing network connectivity deficiencies based on a comparison of the functional classification of roadways in the study area and the Metropolitan Council's arterial route spacing guidelines. This discussion will also consider future land use plans and known environmental constraints within areas noted as having arterial route spacing deficiencies.

1. Functional Classification

It is recognized that individual roads and streets do not operate independently. Most travel involves movement through a network of roadways. It becomes necessary to determine how this travel can be channelized within the network in a logical and efficient manner. Functional classification defines the nature of this channelization process by defining the part that any particular road or street should play in serving the flow of trips through a roadway network. Functional classification is the process by which streets and highways are grouped into classes according to the character of service they are intended to provide. Functional classification involves determining what functions each roadway should perform prior to determining its design features, such as street widths, speed, and intersection control. Table 3 illustrates the Metropolitan Council's detailed criteria established for the functional classification of roadways within the Twin Cities metropolitan area.

The functional classification system consists of four classes of roadways within the seven-county metropolitan area: principal arterials, minor arterials, collector streets and local streets.

The following discussion describes each of the roadway functional classification categories. Figure 10 shows the functional classification of the roadways in and near the study area.

Principal Arterials

Roadways of this classification typically connect large urban areas to other large urban areas or they connect metro centers to regional business concentrations via a continuous roadway without stub connections. They are designed to accommodate the longest trips. Their emphasis is focused on mobility rather than access. They connect only with other Principal Arterials, interstate freeways, and select Minor Arterials and Collector Streets. In rural areas, spacing of six to twelve miles is considered appropriate for principal arterials.

The principal arterials surrounding the study area include TH 65 to the east, US 169 to the west, and US 10 to the south.

Minor Arterials

The minor arterial system connects the urban service area to cities and towns inside and outside the region. They interconnect the rural growth centers in the region to one another as well as to similar places just outside the region. They provide supplementary connections between the two metro centers and the regional business concentrations. They connect major generators within the central business districts and the regional business concentrations.

TABLE 3 – Roadway Functional Classification Criteria

Criteria	Principal Arterial	Minor Arterial	Collector	Local Street
Place Connections	Interconnects metro centers and regional business concentrations	Interconnects major trip generators and rural growth centers	Interconnects neighborhoods, minor business concentrations and rural growth centers	Interconnects blocks within neighborhoods and land parcels within commercial areas
Spacing	Developed areas: 2-3 miles Developing areas: 3-6 miles Rural Areas: 6-12 miles	Developed areas: ½ - 1 mile Developing areas: 1-2 miles Rural areas*: 2-3 miles	Developed areas: ¼ - ¾ mile Developing areas: ½ - 1 mile Rural areas: As needed	As needed to access land uses
System Connections	To interstates, principal arterials and selected minor arterials and collectors	To interstates, principal arterials, other minor arterials, collectors and some local streets	To minor arterials, other collectors and local streets	To collectors, other local streets and a few minor arterials
Mobility	Highest	High	Moderate	Low
Access	No direct property access	Limited access to property	Access to properties is common	Unrestricted property access
Percent of Mileage	5-10% (urban) 2-4% (rural)	15-25% (urban) 6-12% (rural)	5-10% (urban) 20-25% (rural)	65-80% (urban) 63-75% (rural)
Percent Vehicle Miles Traveled	40-65% (urban) 30-55% (rural)	65-80% (urban) 45-75% (rural)	5-10% (urban) 20-35% (rural)	10-30% (urban) 5-20% (rural)
Intersections	Grade separated or high-capacity intersection controls	Traffic signals and cross-street stops	All-way stops and some traffic signals	As required for safe operation
Parking	None	Restricted as necessary	Restricted as necessary	Usually unrestricted
Large Trucks	No restrictions	Restricted as necessary	Restricted as necessary	Restricted as necessary
Typical Average Daily Traffic	15,000-100,000 (urban) 2,500-25,000 (rural)	5,000-30,000 (urban) 1,000-10,000 (rural)	1,000-15,000 (urban) 250-2,500 (rural)	Less than 1,000 (urban and rural)
Right-of-Way Width	100-300 feet	60-150 feet	60-100 feet	50-80 feet

Source: Adapted from Metropolitan Council 2030 Transportation Policy Plan, Appendix D

**Standard is consistent with Federal Highway Administration's arterial spacing guidelines for lowest density development areas.*

NORTHERN ANOKA COUNTY RIVER CROSSING STUDY

ANOKA COUNTY

ISANTI COUNTY
SHERBURNE COUNTY
WRIGHT COUNTY
HENNEPIN COUNTY
SAINT FRANCIS
NOWTHEN
RAMSEY
ANDOVER
OAK GROVE
BETHEL
EAST BETHEL
HAM LAKE
ANOKA

Rum River
Mississippi River

Legend

- Principal Arterial
- A Minor Expander
- A Minor Connector*
- B Minor
- Major Collector
- Minor Collector
- Local Road
- Existing Crossing
- Railroad
- City Boundary
- Rum River
- Lake/Pond/River
- Stream

* Also includes minor arterials identified in Sherburne County & Isanti County transportation plans

Source:
Anoka County, Met Council, MNDNR, MNDOT

0 1.5 Miles

Functional Classification

Figure 10

Febuary, 2011

Bolton & Menk, Inc. Engineers & Surveyors www.bolton-menk.com

Map Document: (H:\AKCO\T42102757\ESRI\T42102757\ESRI\Maps\102757 Functional Classification 11x17.mxd)
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The emphasis on minor arterials is on mobility over land access. The minor arterial should connect to principal arterials, other minor arterials and collectors. Connection to some local streets is acceptable. Minor arterials should service medium-to-short trips. In rural areas, spacing of two to three miles is considered appropriate.

The region has subdivided minor arterials into two classes for administrative purposes, "A" minor arterials which are eligible to compete for federal funding and "B" minor arterials which are not. “A” minor arterials are categorized into four types, consistent with Metropolitan Council guidelines:

- Relievers – Provide direct relief for metropolitan highway traffic
- Expanders – Provide a way to make connections between urban areas outside the I-494/694 beltway
- Connectors – Provide connections to and among communities at the edge of the urbanized area and in rural areas
- Augmentors – Augment principal arterials within the I-494/694 beltway

Existing “A” minor arterials within the study area are shown in Figure 10 and include such routes as TH 47, CSAH 9, CSAH 24 (in downtown area of St. Francis) and CSAH 22.

“B” minor arterials serve medium-to-long distance trips. Examples of “B” minor arterials within the study area are shown in Figure 10 and include CSAH 7 and CSAH 28 (west of TH 47).

Collectors

The collector system provides connections between neighborhoods and from neighborhoods to minor business concentrations. It also provides supplementary interconnections of major traffic generators within the metro centers and regional business concentrations. Mobility and land access are equally important. Direct land access should predominately be to development concentrations. Collector connections are predominately to minor arterials. Typically, collectors serve short trips of one to four miles. Spacing varies from ½ to 1 mile in developing areas to spacing as needed in rural areas.

Collectors are typically categorized as major and minor. Major collectors can link both local streets and minor collectors to minor arterials; minor collectors connect local streets to other collectors or minor arterials. Figure 10 illustrates collectors within the study area. Examples of roadway segments identified as major collectors include CSAH 24 (north of CR 103) and CR 72. Examples of minor collectors include CR 70 and CR 74.

Local Streets

Roadways of this classification typically include city streets and rural township roadways, which facilitate the collection of local traffic and convey it to collectors and minor arterials. Their emphasis is to provide direct property access, and mobility is not promoted.

2. Route Spacing

The spacing of roadways within a community is largely dependent on the capacity and connection needs of traffic. The Metropolitan Council has defined arterial route spacing guidelines, which are documented in Table 3. These guidelines aid in determining where and how many arterials are needed within an area based on the type of existing and planned future development patterns. The 2030 Metropolitan Council Regional Development Forecasts (RDF) and the 2030 Comprehensive Plans for the study area communities defined the City of St. Francis as both a diversified rural area and a rural growth center, the City of Oak Grove as a rural residential area, and the City of Nowthen as a diversified rural area. Per the Metropolitan Council's 2030 Transportation Policy Plan and for purposes of the Northern Anoka County River Crossing Study, the rural residential area, diversified rural area and rural growth center classifications all fall within the rural area type identified in Table 3 in terms of establishing appropriate arterial route spacing guidelines. Rural area spacing guidelines in Table 3 indicate principal arterial spacing of six to twelve miles and minor arterial spacing of two to three miles is appropriate.

3. Network Deficiencies

Figure 11 illustrates functional classification within the study area and the spacing in miles between principal and minor arterial roadways. The purpose of this section of the memorandum is to identify, based on functional classification and route spacing guidelines, where existing deficiencies exist within the current roadway network.

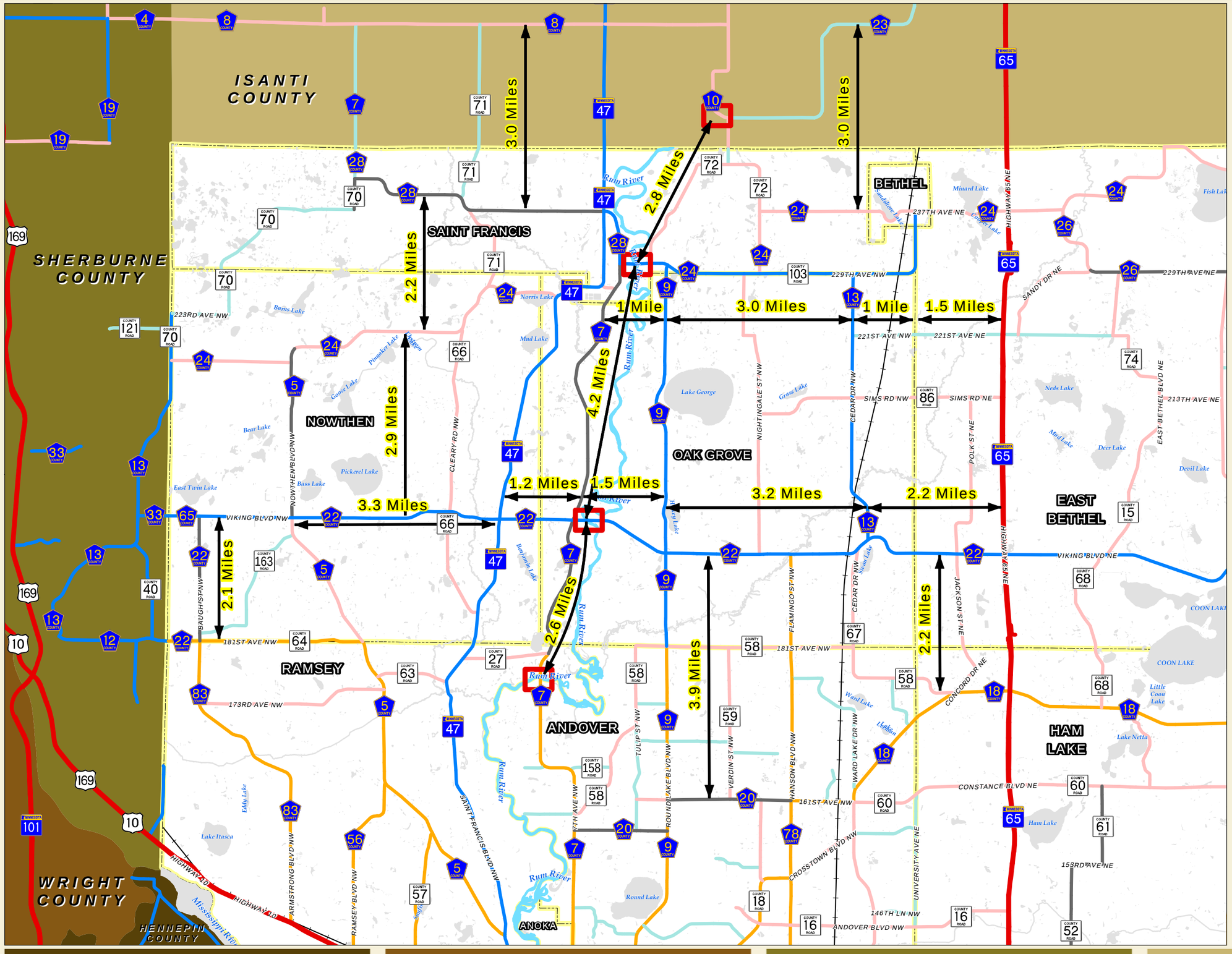
East-West Connectivity

Currently, there are two river crossings within the study area (CSAH 24 and CSAH 22) and one approximately three miles to the north of CSAH 24 (Isanti CSAH 10) and one approximately two and one-half miles to the south of CSAH 22 (CSAH 7). Metropolitan Council and FHWA spacing guidelines recommend two to three mile spacing of minor arterials in rural areas such as this study area. Based purely on these guidelines, it appears the spacing between CSAH 24 and Isanti CSAH 10 (Zion St NW) and between CSAH 22 and CSAH 7 is adequate. However, it is important to note that CSAH 7 is a north-south roadway that crosses the Rum River south of CSAH 22. Although it provides a river crossing approximately two and a half miles south of CSAH 22, it does not provide an east-west connection across the river in this area. The next true east-west river crossing is approximately six and a half miles to the south of CSAH 22 at CSAH 116 in the Ramsey/Anoka/Andover area. This is greater than the recommended spacing of two to three miles for a minor arterial corridor.

The spacing between CSAH 22 and CSAH 24 is approximately four miles. This is greater than the recommended spacing for minor arterials in this area. However, spacing guidelines need to be considered in conjunction with the surrounding land use, as well as known environmental constraints in order to determine if existing connections are adequate or lacking. Existing and planned future land use concentrations between CSAH 22 and CSAH 24 are generally rural residential in nature, resulting in less travel demand for the size of the geographic area. Additionally, environmental features such as lakes, wetlands

NORTHERN ANOKA COUNTY RIVER CROSSING STUDY

ANOKA COUNTY



Legend

- Principal Arterial
- A Minor Expander
- A Minor Connector*
- B Minor
- Major Collector
- Minor Collector
- Existing Rum River Crossings
- Railroad
- City Boundary
- Rum River
- Lake/Pond/River
- Stream

* Also includes minor arterials identified in Sherburne County & Isanti County transportation plans

Source:
Anoka County, Met Council, MNDNR, MNDOT

0 1.5 Miles

Route Spacing Deficiencies

Figure 11

February, 2011

BOLTON & MENK Engineers & Surveyors www.bolton-menk.com

Map Document: (H:\AKCO\T42102757\ESRI\T42102757\ESRI\Maps\102757 Route Spacing Deficiencies 11x17.mxd)
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and parks/recreation areas are prevalent making direct east/west river crossing connections difficult in this area.

The City of St. Francis has plans for future residential and commercial/industrial growth on both sides of the Rum River, mainly to the north of the existing CSAH 24 river crossing. Although the spacing guidelines alone do not suggest the need for an additional river crossing in this area, the concentration of land use in this area and the fact that the community of St. Francis is split by the Rum River, with CSAH 24 providing the only connection across the river in this area, may suggest otherwise.

In addition to east-west connectivity across the Rum River, CSAH 22 and CSAH 24 also lack direct connections to the principal arterial system in this area (e.g., TH 65 and US 169), except for the CSAH 22/TH 65 connection. CSAH 24 lacks a direct connection to TH 65 to the east and to US 169 to the west of the Rum River. A connection between CSAH 24 (at CSAH 28) and TH 47 is lacking, thereby making it unattractive for traffic to stay on CSAH 24 to travel west to Elk River, since they must first go north on CSAH 28 and then south on TH 47 to get back on CSAH 24 to travel to the west. The CSAH 24/CSAH 28 connection in St. Francis encourages traffic to use CSAH 28 to travel west towards Elk River; however, CSAH 28 does not connect directly to US 169 either. Therefore, traveling between St. Francis and Elk River is difficult and somewhat circuitous since people are forced to use a combination of north-south and east-west minor arterial and collector roadways to make this connection. A large existing industrial area/future county park area is a significant barrier to any future connection of CSAH 28 to the west in this area as well.

CSAH 22 does connect directly to TH 65 on the east but lacks a direct connection to US 169 on the west. Currently, there is no direct connection to Elk River from CSAH 22. Traffic on CSAH 22 must go south on CSAH 22/CSAH 83 (Armstrong Blvd) to access US 10/US 169 in Ramsey.

North-South Connectivity

Within the study area, north-south minor arterial and collector roadway spacing appears adequate based on spacing guidelines, with one exception. There are no north-south arterials west of TH 47, north of CSAH 24, within the study area. However, the land use in this area is projected to remain rural and therefore, the need for an additional connection in this area should be studied prior to land use changes in the future. Outside of this exception, north-south minor arterial spacing in the study area appears adequate and consistent with the two to three mile spacing recommendation being met by the spacing of CSAH 5, TH 47, CSAH 7, CSAH 9 and CSAH 13.

Although the spacing of north-south minor arterial and collector roadways within the study area appear adequate, many of these roadways serve a dual purpose of serving both east-west and north-south traffic movements. The result of these dual purpose routes is that they often carry higher traffic volumes than the routes coming into them and also require drivers to go through two intersections instead of one. In addition, the mobility of regional routes can also be decreased if they are serving both east-west and north-south movements. CSAH 28, CSAH 7 and CSAH 24 serve dual purposes within the City of St. Francis. CSAH 22 also serves a dual purpose by gathering traffic from the entire study area and funneling it to north-south roadways for travel into and out of the metro area. As

land use concentrations continue to develop over time and land use changes occur, consideration of separate north-south and east-west routes may need to be evaluated.

D. Existing Conditions

An existing conditions analysis was conducted to document and summarize pedestrian movements, safety issues, and traffic operations under existing conditions within the study area. This section of the report outlines the results of these analyses.

1. Pedestrian Movements

Within the Northern Anoka County River Crossing Study are three public education facilities that generate a high volume of pedestrian traffic during the school year. Two of these facilities (elementary and middle schools) are located at the intersections of TH 47 at Pederson Drive and CSAH 24 at CSAH 28. The third facility, St. Francis High School, is located northeast of the intersection of CSAH 24 at CR 72/Poppy Street and has a second access located approximately 950 feet to the east. In addition to the three public schools, Bridge Street Learning Community School is also located in St. Francis near Butterfield Drive, just west of the CSAH 24 river crossing.

An analysis was conducted to evaluate pedestrian movements along and across CSAH 24, between CSAH 9 and CSAH 28, and takes into account pedestrian volumes, specific crossing locations, and available gaps for crossing. Pedestrian counts were also performed at intersections located on CSAH 22 and at multiple other intersections within the study area. All counts at these other intersections indicate very little pedestrian traffic, with the sole observation of pedestrian traffic coming at the intersection of CSAH 22 and CSAH 9.

Data Collection

Pedestrian volumes were collected during the AM (6:30- 9:00 AM), Afternoon (1:30- 3:30 PM), and PM (4:30-6:30 PM) peak hours. The highest pedestrian volumes were observed during the Afternoon peak hour, when school was dismissed. The designated school hours for the four schools in St. Francis are:

St. Francis Elementary:	8:55 am – 3:25 pm
St. Francis Middle School:	7:25 am – 2:12 pm
St. Francis High School:	7:25 am – 2:25 pm
Bridge Street Learning Community School:	7:45 am – 2:15 pm

Data collection occurred primarily during late October and early November 2010 with a limited number of turning movement counts extending into mid-November. Gap studies were performed at a later date, bringing the data collection period into early December.

Gap studies were performed at select crossing locations to evaluate available gaps in traffic for pedestrian and vehicle movements across CSAH 24 and TH 47. This data provides insight into the amount of time available for a pedestrian to safely cross the roadway without being affected by vehicular traffic. Gap analyses are performed where interest lies in the ability of vehicle and pedestrian

traffic to cross or access a concentrated movement of vehicle traffic on a roadway. The gap study is performed by gathering data on the amount of time, in seconds, between the back of a lead vehicle and the front end of the following vehicle. The value can then be compared against pedestrian crossing times and commonly accepted gaps to determine the adequacy and safety of existing crossing locations.

Adequate gaps in traffic for pedestrian movements across roadways should be provided at crossing locations with a high volume of pedestrians, but are not always necessary. Minnesota state law requires all vehicles to stop for pedestrians at intersections with marked or unmarked crosswalks.

Analysis

Figure 12 illustrates the number of pedestrians at each of the study intersections as well as at commonly used non-intersection crossing locations along CSAH 24. As shown in this figure, pedestrian movements along CSAH 24 between CSAH 9 and CSAH 28 are distributed throughout the study area, with the heaviest concentrations traveling on the north side of CSAH 24. The overwhelming majority of pedestrians are school-age children either walking to school, between schools, or home from school. The CSAH 24 bridge over the Rum River serves as a link between the high school and the middle and elementary schools to the west by providing a connection for approximately 100-125 pedestrians daily. Sidewalks are provided along CSAH 24 on both sides of the road west of the river crossing and on the north side of the roadway across the bridge and east of the river crossing.

While the majority of pedestrians cross at designated striped crosswalks, a number of pedestrians choose to cross CSAH 24 at other locations. Three students were observed crossing CSAH 24 to the east of CR 72, while 10 students were observed crossing near Woodbury Park and the Bridge Street Learning Community Center east of Butterfield Drive. The most prevalent non-intersection crossing location utilized by school age children is located north of CSAH 24 on CR 72. As noted on Figure 12, the parking lot located near location “F” provides additional parking to high school students. Approximately 160 pedestrian crossings occurred in this location during the peak hours, the majority during the half-hour periods immediately before and after school.

Pedestrian traffic at the intersection of TH 47 at Pederson Drive/St. Francis Middle School entrance is mainly concentrated to the north leg of the intersection. The TH 47 crossing is a marked crosswalk with flashing lights and regulatory signs. Eleven pedestrians were observed crossing the intersection during the Afternoon peak hour and one pedestrian during the AM peak. The Afternoon peak may have been favored on this particular day because of colder morning temperatures paired with a dusting of snow from the previous night’s snowfall, which may have resulted in more rides from parents in the morning.

A gap study completed at the crosswalk on the west leg of the east high school access yielded an average gap of four to five seconds for the AM peak and a six to seven second gap for the Afternoon peak. At the location the approximate roadway width is 35 feet. With an assumed 3.5 feet per second (ft/s) walking speed and 3 seconds of reaction time, the average pedestrian takes 13 seconds to determine if there is a gap and cross the roadway. This time is currently provided approximately 55 times during the AM peak and 41 times during the Afternoon

SITE IDENTIFIER	PEAK HOUR PERIODS											
	AM (6:30-9:00 AM)				AFTERNOON (1:30-3:30 PM)				PM (4:30-6:30 PM)			
	NORTH	EAST	SOUTH	WEST	NORTH	EAST	SOUTH	WEST	NORTH	EAST	SOUTH	WEST
A	14	13	0	0	4	5	0	2	2	2	2	0
B	2	0	2	0	9	5	48	2	1	0	1	0
C	14	3	4	7	40*	3	14	5	27	0	2	1
D	2				5				3			
E	19	1	1	1	76	10	13	4	11	1	2	0
F	75				80				5			
G	1				2				0			
H	0	1	0	55	1	3	0	41	-	-	-	-
I	1	0	0	0	11	0	1	0	0	0	0	0

ABOVE DIRECTIONS (N,E,S,W) INDICATE LEG OF INTERSECTION CROSSED BY PEDESTRIAN
* AN ADDITIONAL 60 PEDESTRIANS WALKED BETWEEN THE SCHOOLS DURING THE SCHOOL HOURS FOR A SPECIAL EVENT

XXX DAILY PEDESTRIAN VOLUME IN INTERSECTION CROSSING LOCATIONS

XXX DAILY PEDESTRIAN VOLUME IN NON-INTERSECTION CROSSING LOCATIONS

FIGURE 12 DAILY PEDESTRIAN VOLUMES

NORTHERN ANOKA COUNTY RIVER CROSSING STUDY

OAK GROVE
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ANOKA COUNTY
City of St. Francis

peak. These acceptable gaps are developed with the assistance of the pedestrian flasher system at the crossing. The flashing yellow lights and regulatory sign provide an extra warning to motorists that they must yield to pedestrians crossing the roadway as required by state law.

A gap study was also performed on CSAH 24 at the intersection of CSAH 24 and Butterfield Drive. The average gap time during the AM peak hour was six to seven seconds and four to five seconds in the PM when the amount of traffic occupying the roadway increased. CSAH 24 has a roadway width of approximately 26 feet. With an assumed 3.5 ft/s walking speed and 3 seconds for reaction time, the average pedestrian takes 10.5 seconds to determine if there is an adequate gap to cross the roadway. This gap is currently provided approximately 10 times during the AM peak, eight times during the Afternoon peak, and one time during the PM peak. As state law requires all vehicles to stop for pedestrians at intersections with marked or unmarked crosswalks, the existing gaps at both locations discussed above are adequate.

Analysis Summary

The Northern Anoka County River Crossing Study is able to identify a large population of pedestrians along CSAH 24 between CSAH 9 and CSAH 28. The majority of pedestrians cross CSAH 24 at the marked crosswalk on the east end of the project area or at the four-way stop located on the west end of the project area. Pedestrians crossing CSAH 24 at locations not designated by a crosswalk or at an intersection are a small percentage.

While the majority of pedestrians avoid crossing CSAH 24, the most common areas to do so are on the south leg of CSAH 24 at CSAH 24/28 and the marked crosswalk located at the east entrance to the high school. These two crossing locations account for nearly 70 percent of pedestrians crossing CSAH 24 at any point on the roadway. Many of the pedestrians utilizing the crosswalk at the east high school entrance do so to get to/from their vehicles and those picking them up, as well as to shop at the St. Francis Mall.

With schools releasing students between 2:12 and 3:25, the majority of pedestrian traffic is removed from the network during the evening vehicle traffic peak hour. This provides pedestrians with more gaps to cross CSAH 24 at various points along the roadway.

The locations studied along CSAH 24 within the study area appear to be accommodating to pedestrians due to the adequate gaps present, the pedestrian phasing at the signalized intersection (CSAH 24 at CR 72), the pedestrian flasher systems in conjunction with marked crosswalks (CSAH 24 at High School East Access and TH 47 at Pederson Drive), and the crosswalks at the four-way stop (CSAH 24 at CSAH28).

2. Safety Analysis

The safety of pedestrians and motorists traveling throughout the transportation network is a primary concern for Anoka County as it is with other public agencies. A safety analysis was conducted to review existing safety conditions within the study area.

This safety analysis was developed by completing an evaluation of Minnesota Department of Transportation (Mn/DOT) and Anoka County crash data for the

years 2005 through 2009. This data is used to document crash locations, patterns, and trends by evaluating the number, type, and severity of crashes that occurred at key intersections and roadway segments within the study area.

There are a number of crash analysis techniques used to identify potentially hazardous locations including crash rate, critical crash rate and crash severity. The crash rate is the number of crashes per exposure level such as crashes per million vehicle miles (for roadway segments) or million entering vehicles (for intersections). Since crash rates account for differences in traffic volumes, they are usually considered to be a better indicator of hazardous (or higher hazard) locations than just the number of crashes. Crash rates can be compared to similar facility average crash rates to determine segments or intersections with higher than average crash rates. Since the statewide average crash rate is an average rate it is expected that half of the intersections within the study will be higher than the average and half will be lower.

The critical crash rate is a measure that gives an indication of the statistical significance of a comparison between the crash rates and the statewide average crash rates. Locations with a critical crash rate above the crash rate are considered to be in need of safety improvements because there is a high probability (95 percent or more) that conditions at this location are contributing to the higher crash rate.

The crash severity rate is a method that adjusts crash rates to give greater weight to injury and fatal crashes than property damage only crashes. A review of crash severity helps to identify locations where the total number of severe or life-changing crashes is high, but the actual crash frequency or crash rate may be low.

The crash rate, critical crash rate and severity rate calculations were computed for key segments and intersections within the study area in order to provide a comprehensive approach in the development of the safety analysis.

In addition, traffic gap data was also reviewed to ascertain the available gaps for motorists at the intersections. Gaps were compared against the accepted gap by motorists entering from minor approach streets to determine whether any safety issues were present. Gap analyses are performed where interest lies in the ability of vehicle and pedestrian traffic to cross or access a concentrated movement of vehicle traffic on a roadway. The gap study is performed by gathering the amount of time, in seconds, between the back of a lead vehicle and the front end of the following vehicle. The value can then be compared against the actual gaps used by vehicles to determine the adequacy and safety of existing operational devices.

The results of the safety analysis for key segments and intersections within the study area are described in the following section. The safety analysis is divided into a discussion of key intersection and roadway segments within the study area.

Intersections

Overall, the roadway network within the Northern Anoka County River Crossing Study area is a safe network, with few crash issues. Table 4 shows crash rates, critical crash rates, severity rates, and statewide average crash and severity rates for intersections. Computations from the 2005-2009 crash analysis reveal that crash rates exceed statewide average crash rates at eight intersections and exceed critical crash rates at three intersections within the study area. Additionally, nine

Northern Anoka County River Crossing Study
Table 4: Intersection Crash Analysis

1/13/2011

Table 4: 2005-2009 Intersection Crash Analysis

Intersection #	Intersection	Traffic Control	ADT				Crashes from 2005-2009	Crashes per Year	Crash Rate (per MEV)	Metro District Average Crash Rate* (per MEV)	Statewide Average Crash Rate* (per MEV)	Critical Crash Rate (per MEV)	Crash Severity Rate (per MEV)	Metro District Average Severity Rate** (per MEV)	Statewide Average Severity Rate** (per MEV)
			North Leg	South Leg	East Leg	West Leg									
1	TH 47 at CSAH 24	TWSC	10400	6300	4350	0	15	3	**0.78**	**0.2**	**0.3**	**0.53**	**1.82**	**0.3**	**0.5**
2	TH 47 at Pederson Dr./ Middle School Access Driveway	TWSC	10400	10400	0	6900	18	3.6	**0.71**	**0.2**	**0.3**	**0.50**	**1.42**	**0.3**	**0.5**
3	TH 47 at CSAH 28	TWSC	7600	10400	2550	2650	10	2	**0.47**	**0.2**	**0.3**	0.52	**0.90**	**0.3**	**0.5**
4	CSAH 28 at 233rd Ave	TWSC	2550	4850	0	2150	4	0.8	**0.46**	**0.2**	**0.3**	0.66	**0.92**	**0.3**	**0.5**
5	CSAH 24 at CSAH 24/CSAH 28	AWSC	4850	5150	9150	230	0	0	0.00	0.5	0.5	0.93	0.00	0.7	0.8
6	CSAH 24 at 229th Ave	TWSC	5150	1550	0	4300	2	0.4	0.20	0.2	0.3	0.63	0.20	0.3	0.5
7	CSAH 24 at CSAH 7	TWSC	2550	6900	0	4350	2	0.4	0.16	0.2	0.3	0.59	0.24	0.3	0.5
8	CSAH 24 at Butterfield Dr.	TWSC	420	290	9450	9150	4	0.8	**0.23**	**0.2**	**0.2**	0.54	**0.45**	**0.2**	**0.4**
9	CSAH 24 at Rum River Blvd.	TWSC	0	1350	9450	9450	2	0.4	0.11	0.2	0.2	0.54	0.11	0.2	0.4
10	CSAH 24 at CR 72	Signal	2200	460	8500	9600	6	1.2	0.32	0.6	0.6	0.92	0.42	0.8	0.8
11	CSAH 24 at East High School Access Driveway	TWSC	400	0	8600	8600	3	0.6	0.19	0.2	0.3	0.56	0.31	0.3	0.5
12	CSAH 24 at CSAH 9	TWSC	0	5800	7000	8600	11	2.2	**0.56**	**0.2**	**0.3**	**0.53**	**0.72**	**0.3**	**0.5**
13	CSAH 24 at Kerry St.	TWSC	1700	1150	7000	7000	6	1.2	**0.39**	**0.2**	**0.3**	0.56	**0.72**	**0.3**	**0.5**
14	CSAH 24 at Arrowhead St.	TWSC	2250	0	7000	7000	1	0.2	0.07	0.2	0.3	0.57	0.13	0.3	0.5
15	TH 47 at CSAH 22	AWSC	5000	5300	6400	5600	10	2	0.49	0.5	0.5	0.91	0.79	0.7	0.8
16	CSAH 22 at CSAH 7	AWSC	6900	6000	6700	5100	10	2	0.44	0.5	0.5	0.89	**0.93**	**0.7**	**0.8**
17	CSAH 22 at CSAH 9	AWSC	7500	10400	8200	7800	21	4.2	**0.68**	**0.5**	**0.5**	0.85	**1.00**	**0.7**	**0.8**

TWSC - Two-Way Stop Control

AWSC - All-Way Stop Control

MEV = Million Entering Vehicles

* Metro District and Statewide average crash and severity rates are based on Mn/DOT 2007 to 2009 Intersection Green Sheets.

of the intersections have severity rates higher than statewide average severity rates. Conditions at each of these intersection locations are described in detail below:

- *TH 47 at CSAH 24* has a crash rate of 0.78 crashes per million entering vehicles (MEV) which is higher than the statewide average crash rate of 0.3 crashes per MEV for a thru-stop intersection and the critical crash rate of 0.53 crashes per MEV. The crash severity rate of 1.82 also exceeds the statewide average severity rate of 0.50 for a thru-stop intersection. This intersection has the highest crash rate in the studied network and it also has the highest number of incapacitating (severe injury) crashes (three crashes). From the years of 2005-2009, a total of 15 crashes occurred at the intersection. TH 47 through the intersection has a posted speed limit of 55 mph, is on a tight curve, and has a lane drop in the southbound direction. This may play a role in the five crashes involving vehicles running off the roadway and four head-on collisions that occurred at this intersection.
- *TH 47 at Pederson Drive* has a crash rate of 0.71 crashes per MEV which is higher than the statewide average crash rate of 0.3 crashes per MEV for a thru-stop intersection and the critical crash rate of 0.50 crashes per MEV. The crash severity rate of 1.42 exceeds the statewide average rate of 0.5 for a thru-stop intersection. Right-angle (nine crashes) and left-turn crashes (six crashes) represent 15 of the 18 total crashes at the intersection. High volumes, high speeds, and multiple lanes on TH 47 create a difficult environment for vehicles attempting to enter onto the roadway from either Pederson Drive or the Middle School access driveway. The six left-turn crashes occurring on TH 47 may be attributed to the requirement of vehicles to cross two lanes of 55 mph traffic to access side streets.
- *TH 47 at CSAH 28* has a crash rate of 0.47 crashes per MEV which is higher than the statewide average crash rate of 0.3 crashes per MEV, but is not higher than the critical crash rate. The crash severity rate of 0.90 exceeds the statewide average rate of 0.5 for a thru-stop intersection. Right-angle crashes represent eight of the 10 crashes at the intersection. The intersection is the transition point from a rural highway with few intersections, to a rural highway with multiple intersections through the City of St. Francis. This combined with the high volumes and high speeds on TH 47, create a difficult environment for vehicles attempting to enter onto or cross the roadway from CSAH 28.
- *CSAH 28 at 233rd Avenue* has a crash rate of 0.46 crashes per MEV which is higher than the statewide average crash rate of 0.3 crashes per MEV, but is not higher than the critical crash rate. The crash severity rate of 0.92 exceeds the statewide average rate of 0.5 for a thru-stop intersection. Of the four crashes that occurred at the intersection, three of them were injury crashes. The absence of turn lanes, along with the crashes being either head-on (two crashes) or rear-end crashes (two crashes), indicates that vehicles may be following too closely on CSAH 28 resulting in a crash if a vehicle makes a turn movement in front of the close following vehicle. Overall the sight lines are acceptable and the speed limit is low.

- *CSAH 24 at Butterfield Drive* has a crash rate of 0.23 crashes per MEV which is higher than the statewide average crash rate of 0.2 crashes per MEV, but is not higher than the critical crash rate. The crash severity rate of 0.45 exceeds the statewide average rate of 0.4 for an urban thru-stop intersection. Four crashes have occurred at the intersection of which two were right-angle crashes. This may be due to slightly obstructed sight lines from buildings and parking located on the corner properties.
- *CSAH 24 at CSAH 9* has a crash rate 0.56 crashes per MEV which is higher than the statewide average crash rate of 0.3 crashes per MEV for a thru-stop intersection and the critical crash rate of 0.53 crashes per MEV. This indicates that the intersection has narrowly exceeded the calculated threshold. The crash severity rate of 0.72 exceeds the acceptable rate of 0.5 for a thru-stop intersection. The majority of the 11 crashes occurring from 2005-2009 involved property damage only (nine crashes) which is likely attributable to a lower posted speed (40 mph). Crash types occurring at this intersection, right-angle (six crashes) and rear-end (five crashes), may occur because of the reduced sight distance available to vehicles entering from CSAH 9 and the multiple accesses from driveways and Kerry Street near the intersection. These multiple accesses in the area can cause make it difficult for drivers to anticipate the movements of other drivers. Gap study analysis results indicated that the average gap available at the intersection is between six and seven seconds. With drivers entering from CSAH 9 routinely accepting gaps of six seconds, the available gaps appears to be adequate for entering vehicles, indicating that the movements can occur safely.
- *CSAH 24 at Kerry Street* has a crash rate of 0.39 crashes per MEV which is higher than the statewide average crash rate of 0.3 crashes per MEV, but is not higher than the critical crash rate. The crash severity rate of 0.72 exceeds the statewide average rate of 0.5 for a thru-stop intersection. Six crashes have occurred at the intersection of which three were injury crashes. The rear-end (two crashes) crashes may be caused by sudden turn movements from CSAH 24 whereas the right-angle crashes (three crashes) may be caused by a misjudgment of vehicle speeds, the reduced sight distance available to vehicles entering from Kerry Street and the multiple accesses from driveways and CSAH 9 near the intersection. These multiple accesses in the area can cause make it difficult for drivers to anticipate the movements of other drivers.
- *CSAH 22 at CSAH 7* has a crash rate of 0.44 crashes per MEV which is lower than the statewide average crash rate and the critical crash rate. The crash severity rate of 0.93 exceeds the statewide average rate of 0.8 for an all-way stop intersection. Ten crashes have occurred at the intersection of which four were injury crashes. The high severity rate may be due to the high speeds on the roadways and the higher volumes. With the high number of right-angle crashes (five crashes) it appears that vehicles are running the stop signs. This may be due to the traffic control being unexpected. As the all-way stop control is appropriate given the traffic volumes, other traffic control options would be expected to increase the crash rates.
- *CSAH 22 at CSAH 9* has a crash rate of 0.68 crashes per MEV which is

higher than the statewide average crash rate of 0.5 crashes per MEV, but is not higher than the critical crash rate. The crash severity rate of 1.00 exceeds the statewide average rate of 0.8 for an all-way stop intersection. Twenty-one crashes have occurred at the intersection of which six were injury crashes. The high severity rate may be due to the high speeds on the roadways and the high volumes. With the high number of right-angle (11 crashes), rear-end (three crashes), side-swipe (two crashes), and head-on crashes (two crashes), it appears that vehicles are running the stop signs. This may be due to the traffic control being unexpected. As the all-way stop control is appropriate given the traffic volumes, other traffic control options would be expected to increase the crash rates.

The remaining intersections, while containing crashes, have crash rates that are below the statewide average crash rates and calculated critical crash rates. To see the types and severity of crashes that occurred in the project area, please refer to Figures 13 and 14.

Segments

A segment crash analysis was conducted along the CSAH 22 and CSAH 24 roadway segments within the study area. The segment analysis takes into account the crashes between the intersections and not at the intersections. Table 5 shows crash rates, critical crash rates, severity rates and statewide average rates for these segments.

All of the roadway segments evaluated along CSAH 22 and CSAH 24 have crash rates and crash severity rates that exceed the statewide rates. Typically, the severity of crashes is higher on roadway segments operating at higher posted speeds or with alignment changes (i.e., curves, skews, etc.). There are no segments along CSAH 22 or CSAH 24 that have crash rates above the critical crash rate indicating that further analysis is likely warranted.

- *CSAH 24* has an average daily traffic (ADT) volume in the range of 4,350 to 9,600 through the City of St. Francis. Segments on CSAH 24 in downtown St. Francis have crash rates that are two to four times the average rate and severity rates two to five times the average rate. While these are high, the actual number of crashes is low (two crashes or less) on each segment. The only segment with a high number of crashes is CSAH 24 from CR 72 to CSAH 24/28. This segment of roadway is an urban design with no curves and adequate visibility. There are multiple driveway accesses which likely contributed to the three rear-end crashes. The four run-off-road crashes are unexpected with the straight roadway alignment but may be due to unsafe vehicle speeds as there are lower posted speeds compared to other segments of CSAH 24.
- *CSAH 22* from CSAH 7 to CSAH 9 has an ADT volume in the range of 6,700 to 7,800. The crash rate and severity rate is approximately three times the average rates. This segment of CSAH 22 has two curves separated by approximately a mile of straight highway. These curves may be unexpected to drivers, resulting in the 11 run-off-road crashes and eight injury crashes. The crashes along CSAH 22 between TH 47 and CSAH 7 are unexpected with the straight roadway section and the all-way stops on either end of the segment. While the segments have

2005-2009 CRASH SEVERITY AND CRASH TYPE INFORMATION

INTERSECTION #	INTERSECTION AND TRAFFIC CONTROL	TOTAL CRASHES	CRASH SEVERITY				CRASH TYPE							
			INCAPACITATING	NON-INCAPACITATING	POSSIBLE INJURY	PROPERTY DAMAGE	LEFT TURN	RAN OFF ROAD	RIGHT ANGLE	HEAD ON	SIDESWIPE	REAR END	OTHER	PED./ BICYCLE
1	TH 47 AT CSAH 24 *TWO-WAY STOP CONTROL*	15	3	3	5	4	2	5	3	4	1			
2	TH 47 AT PEDERSON DR NW/ MIDDLE SCHOOL ACCESS DRIVEWAY *TWO-WAY STOP CONTROL*	18		7	4	7	6	1	9				1	1
3	TH 47 AT CSAH 28/ AMBASSADOR BLVD NW *TWO-WAY STOP CONTROL*	10		4	1	5			8	1	1			
4	CSAH 28 AT 233RD AVE NW *TWO-WAY STOP CONTROL*	4		1	2	1				2		2		
5	CSAH 24/ MIDDLE SCHOOL ACCESS AT CSAH 28 *ALL-WAY STOP CONTROL*	0												
6	CSAH 24 AT 229TH AVE NW *TWO-WAY STOP CONTROL*	2				2		1	1					
7	CSAH 24 AT CSAH 7 *TWO-WAY STOP CONTROL*	2			1	1			1			1		
8	CSAH 24 AT BUTTERFIELD ST *TWO-WAY STOP CONTROL*	4		2		2	1		2			1		
9	CSAH 24 AT RUM RIVER BLVD NW *TWO-WAY STOP CONTROL*	2				2		1				1		
10	CSAH 24 AT CR-72 *SIGNALIZED*	6			2	4			3	1		2		
11	CSAH 24 AT ST FRANCIS HIGH SCHOOL EAST ACCESS DRIVEWAY *TWO-WAY STOP CONTROL*	3		1		2			1			2		
12	CSAH 24 AT CSAH 9/ LAKE GEORGE BLVD NW *TWO-WAY STOP CONTROL*	11		1	1	9	0		6			5		
13	CSAH 24 AT KERRY ST NW *TWO-WAY STOP CONTROL*	6		2	1	3			3		1	2		
14	CSAH 24 AT ARROWHEAD ST *TWO-WAY STOP CONTROL*	1			1				1					
ADDITIONAL ROADWAYS	CSAH 24 FROM KERRY ST TO ARROWHEAD ST	2			1	1		1			1			
	CSAH 24 FROM CSAH 9 TO CSAH 72	2	1		1				1			1		
	CSAH 24 FROM CSAH 72 TO CSAH 24/CSAH 28	7		1	2	4		3				3	1	
	CSAH 24 FROM CSAH 24/28 TO CSAH 7	1				1			1					
	CSAH 24 FROM CSAH 24/CSAH 7 TO TH 47	1				1								1

NOTES: A PEDESTRIAN WAS STRUCK IN THE CROSSWALK BETWEEN CSAH 9 AND CSAH 72 AT 11:05 AM ON 5/22/2003.
SIX REAR END CRASHES, FOUR OF WHICH INVOLVED A DRIVER UNDER THE AGE OF 18, OCCURRED IN THE YEARS OF 2001-2006 ON CSAH 24 FROM CSAH 9 TO CSAH 72.

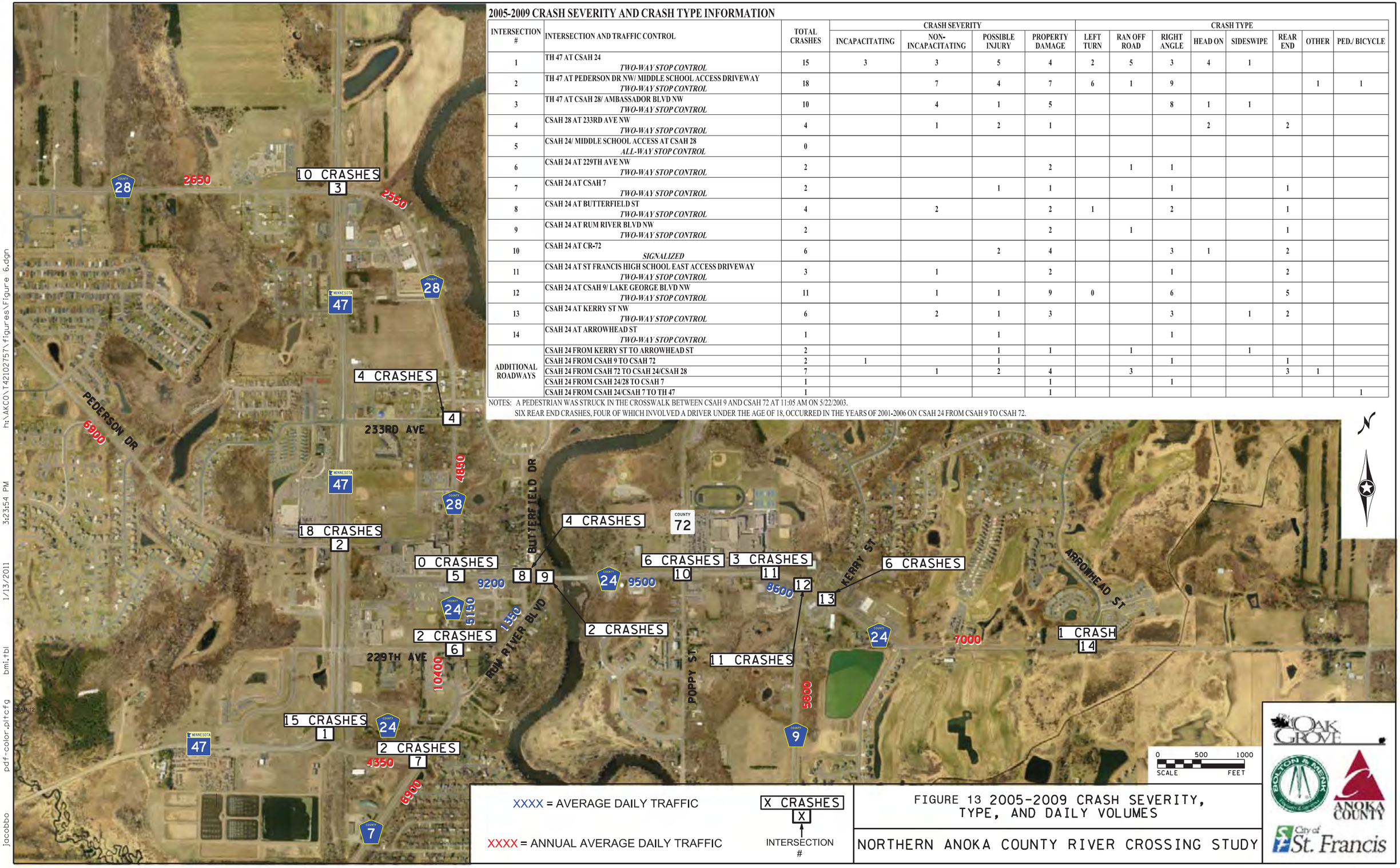


FIGURE 13 2005-2009 CRASH SEVERITY, TYPE, AND DAILY VOLUMES

NORTHERN ANOKA COUNTY RIVER CROSSING STUDY

OAK GROVE
BOLTON & MENK
ANOKA COUNTY
City of St. Francis

2005-2009 CRASH SEVERITY AND CRASH TYPE INFORMATION

INTERSECTION #	INTERSECTION AND TRAFFIC CONTROL	TOTAL CRASHES	CRASH SEVERITY				CRASH TYPE						
			INCAPACITATING	NON-INCAPACITATING	POSSIBLE INJURY	PROPERTY DAMAGE	LEFT TURN	RAN OFF ROAD	RIGHT ANGLE	HEAD ON	SIDESWIPE	REAR END	OTHER
15	CSAH 22 AT TH 47 *ALL-WAY STOP CONTROL*	10	1		3	6			8			2	
16	CSAH 22 AT CSAH 7 *ALL-WAY STOP CONTROL*	10	3	1		6			5	1	1	1	2
17	CSAH 22 AT CSAH 9/LAKE GEORGE BLVD *ALL-WAY STOP CONTROL*	21		4	2	15	1	1	11	2	2	3	1
ADDITIONAL ROADWAYS	CSAH 22 FROM CSAH 7 TO CSAH 9	22		5	3	14		11	2			3	6
	CSAH 22 FROM TH 47 TO CSAH7	4		1		3		2				1	1

0 500 1000
SCALE FEET

XXXX = AVERAGE DAILY TRAFFIC

XXXX = ANNUAL AVERAGE DAILY TRAFFIC

X CRASHES
X
INTERSECTION #

FIGURE 14 2005-2009 CRASH SEVERITY, TYPE, AND DAILY VOLUMES

NORTHERN ANOKA COUNTY RIVER CROSSING STUDY

OAK GROVE
BOLTON & MENK
ANOKA COUNTY
City of St. Francis

Table 5: Segment Crash Analysis

Table 5: 2005-2009 Corridor Crash Rates

Segment	Segment Length (Miles)	ADT	Crashes from 2005-2009	Crashes per Year per Mile	Crash Rate (per MVM)	Metro District Average Crash Rate* (per MVM)	Statewide Average Crash Rate* (per MVM)	Critical Crash Rate (per MVM)	Crash Severity Rate (per MVM)	Metro District Average Severity Rate* (per MVM)	Statewide Average Severity Rate* (per MVM)
CSAH 22 from TH 47 to CSAH 7	1.20	5100	4	0.67	**0.36**	**0.4**	**0.3**	1.29	**0.54**	**0.7**	**0.5**
CSAH 22 from CSAH 7 to CSAH 9	1.60	7800	22	2.75	**0.97**	**0.4**	**0.3**	1.13	**1.54**	**0.7**	**0.5**
CSAH 24 from TH 47 to CSAH 7	0.20	4350	1	1.00	**0.63**	**0.4**	**0.3**	4.59	**0.63**	**0.5**	**0.5**
CSAH 24 from CSAH 7 to CSAH 28	0.45	3850	3	1.33	**0.95**	**0.4**	**0.3**	3.86	**0.95**	**0.5**	**0.5**
CSAH 24 from CSAH 28 to Rum River Blvd.	0.20	9150	6	6.00	**1.80**	**0.8**	**0.6**	3.81	**2.99**	**1.0**	**0.9**
CSAH 24 from Rum River Blvd to CR 72	0.30	9600	7	4.67	**1.33**	**0.8**	**0.6**	3.48	**2.09**	**1.0**	**0.9**
CSAH 24 from CR 72 to CSAH 9	0.30	8600	6	4.00	**1.27**	**0.4**	**0.3**	3.56	**2.76**	**0.6**	**0.5**
CSAH 24 from CSAH 9 to Arrowhead St.	0.65	7000	9	2.77	**1.08**	**0.4**	**0.3**	1.37	**1.93**	**0.7**	**0.5**

MVM = Million Vehicle Miles

* Metro District and Statewide average crash and severity rates are based on Mn/DOT 2007 to 2009 Segment Green Sheets.

elevated crash rates compared to the average, most of the crashes along CSAH 22 occur at the intersections.

3. Existing Traffic Operations

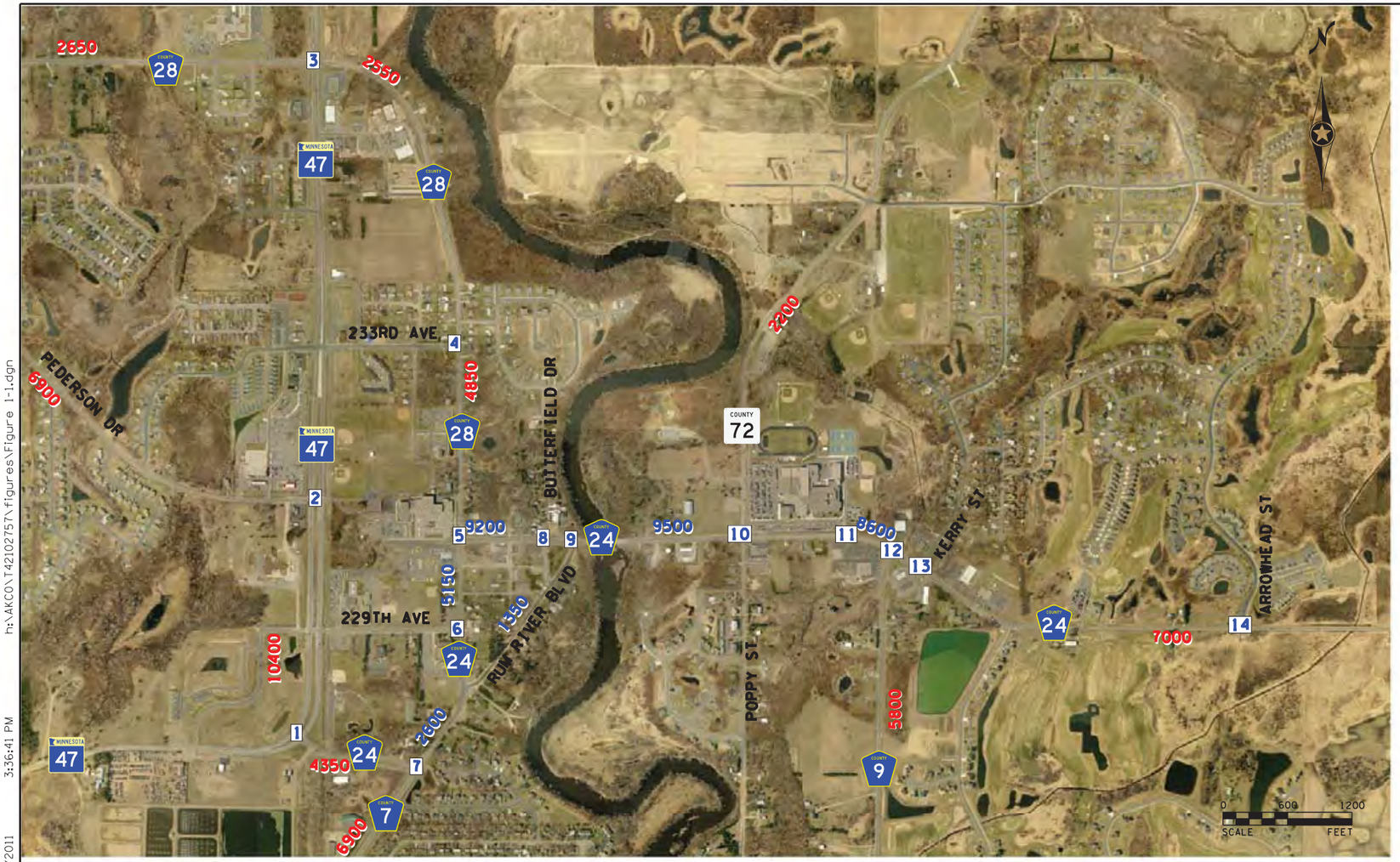
Data Collection

In order to determine how traffic is currently operating in the study area, a traffic operations analysis was completed for existing conditions at several key intersections and roadway segments within the study area. Turning movement volumes, Annual Daily Traffic volumes (ADT), and Annual Average Daily Traffic volumes (AADT) were collected from both field studies and information from the Minnesota Department of Transportation (Mn/DOT) and Anoka County for these key intersections/segments.

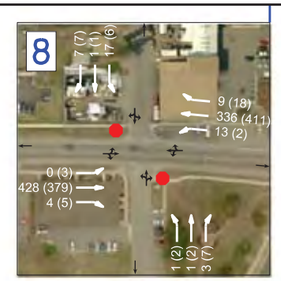
Traffic data collection efforts occurred between the dates of October 26, 2010 and November 16, 2010 for AM (6:30- 8:30 a.m.), Afternoon (1:30- 3:30 p.m.) and PM (4:30 – 6:30 p.m.) peak periods at the following key intersections:

- CSAH 24 at TH 47
- TH 47 at Pederson Drive NW/Middle School Access Driveway
- TH 47 at CSAH 28/Ambassador Blvd NW
- CSAH 28 at 233rd Avenue NW
- CSAH 24/Middle Schools Access at CSAH 28
- CSAH 24 at 229th Avenue NW
- CSAH 24 at CSAH 7
- CSAH 24 at Butterfield Street
- CSAH 24 at Rum River Blvd NW
- CSAH 24 at CR 72
- CSAH 24 at St. Francis High School East Access Driveway
- CSAH 24 at CSAH 9/Lake George Blvd NW
- CSAH 24 at Kerry Street NW
- CSAH 24 at Arrowhead Street
- CSAH 22 at CSAH 7
- CSAH 22 at CSAH 9/Lake George Blvd NW

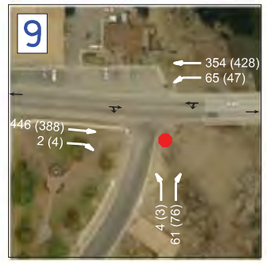
Figures 15, 16, 17 illustrate the locations of these key intersections. Additional traffic gap data was collected the week of December 13, 2010 in order to complete a gap study analysis. A gap study is a traffic data collection method used to identify the adequacy of the frequency and length of gaps in vehicular traffic for pedestrians/vehicles to complete a desired movement. Gap analyses are performed where interest lies in the ability of vehicle and pedestrian traffic to cross or access a concentrated movement of vehicle traffic on a roadway.



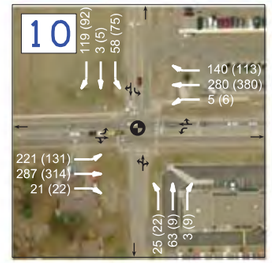
CSAH 7 AT CSAH 24



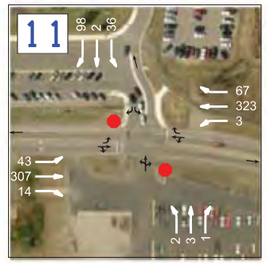
CSAH 24 AT BUTTERFIELD DR



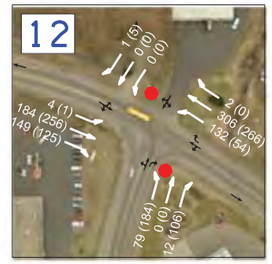
CSAH 24 AT RUM RIVER BLVD



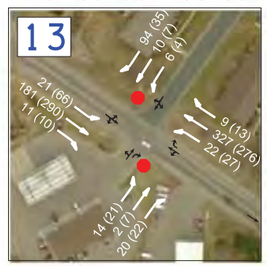
CSAH 24 AT CR 72



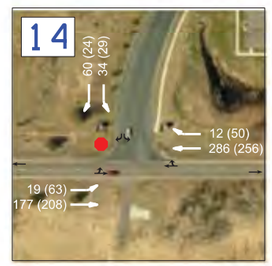
CSAH 24 AT EAST HIGH SCHOOL ACCESS



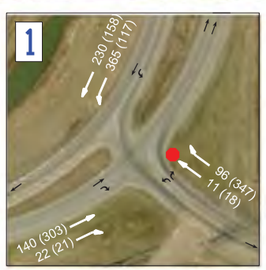
CSAH 24 AT CSAH 9



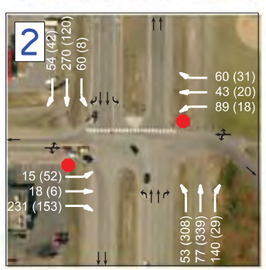
CSAH 24 AT KERRY ST



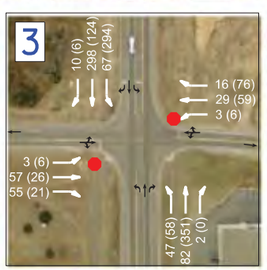
CSAH 24 AT ARROWHEAD ST



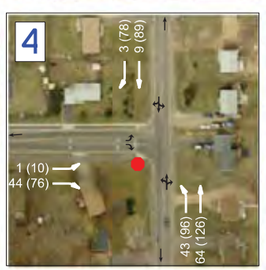
TH 47 AT CSAH 24



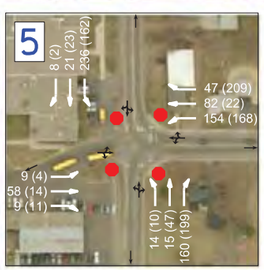
TH 47 AT PEDERSON DR.



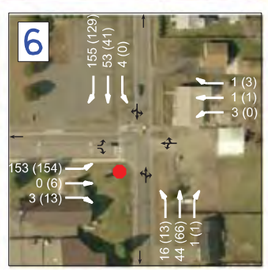
TH 47 AT CSAH 28



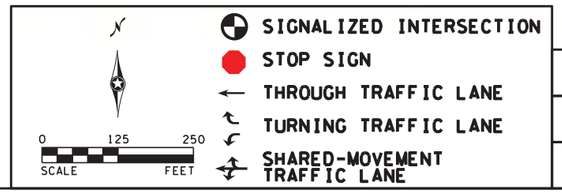
CSAH 28 AT 233RD AVE



CSAH 24 AT CSAH 24/28



CSAH 24 AT 229TH AVE



XXXX = AVERAGE DAILY TRAFFIC

XXXX = 2009 ANNUAL AVERAGE DAILY TRAFFIC

PEAK HOUR VOLUME = AM (PM)

FIGURE 15 1 EXISTING GEOMETRY AND PEAK HOUR TRAFFIC VOLUMES

NORTHERN ANOKA COUNTY RIVER CROSSING STUDY

OAK GROVE

BOLTON & MENK

ANOKA COUNTY

City of St. Francis

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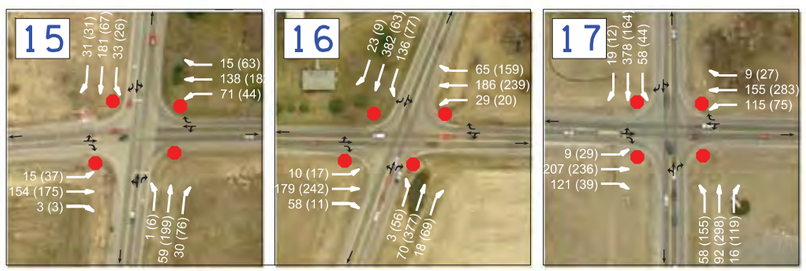
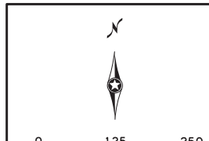


TH 47 AT CSAH 22

CSAH 22 AT CSAH 7

CSAH 22 AT CSAH 9



SIGNALIZED INTERSECTION
STOP SIGN
THROUGH TRAFFIC LANE
TURNING TRAFFIC LANE
SHARED-MOVEMENT TRAFFIC LANE

XXXX = AVERAGE DAILY TRAFFIC

PEAK HOUR VOLUME = AM (PM)

XXXX = ANNUAL AVERAGE DAILY TRAFFIC

FIGURE 16 EXISTING GEOMETRY AND PEAK HOUR TRAFFIC VOLUMES

NORTHERN ANOKA COUNTY RIVER CROSSING STUDY

OAK GROVE
BOLTON & MENK
ANOKA COUNTY
City of St. Francis

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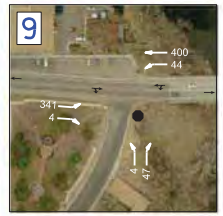
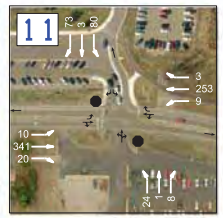
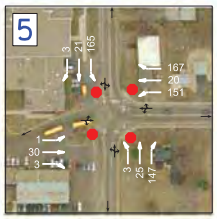


CSAH 24 AT RUM RIVER BLVD

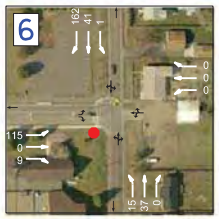
CSAH 24 AT CR 72



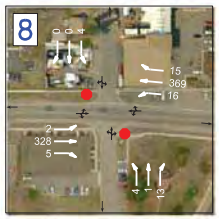
CSAH 24 AT EAST HIGH SCHOOL ACCESS



CSAH 24 AT CSAH 24/28



CSAH 24 AT 229TH AVE



CSAH 24 AT BUTTERFIELD DR

- SIGNALIZED INTERSECTION
- STOP SIGN
- THROUGH TRAFFIC LANE
- TURNING TRAFFIC LANE
- SHARED-MOVEMENT TRAFFIC LANE

PEAK HOUR VOLUME = AFTERNOON

FIGURE 17 EXISTING GEOMETRY AND SCHOOL HOUR TRAFFIC VOLUMES

NORTHERN ANOKA COUNTY RIVER CROSSING STUDY

OAK GROVE

ANOKA COUNTY

City of St. Francis

The gap study is performed by gathering the amount of time gaps, in seconds, between the back of a lead vehicle and the front end of the following vehicle. The value can then be compared against pedestrian crossing times and commonly accepted gaps to determine the adequacy and safety of existing operational devices.

Existing Traffic Operations Analysis Results

The traffic operations analysis for intersections and segments within the study considered the following measures to determine the adequacy of existing intersection operations: intersection delay/Level of Service (LOS), volume-to-capacity ratios, and vehicle hours of delay. An explanation of each of these measures is provided below:

a) Intersection Delay/Level of Service (LOS):

A level of service (LOS) analysis was completed on every intersection that peak hour turning movement data was collected to determine how well these intersections are operating. The LOS results are based on average delay per vehicle as calculated by the 2000 Highway Capacity Manual (HCM), which defines the level of service, based on control delay. Control delay is the delay experienced by vehicles slowing down as they are approaching the intersection, the wait time at the intersection, and the time for the vehicle to speed up through the intersection and enter into the traffic stream. The average intersection control delay is a volume weighted average of delay experienced by all motorists entering the intersection on all intersection approaches. Intersections and each intersection approach are given a ranking from LOS A through LOS F. LOS A indicates the best traffic operation, with vehicles experiencing minimal delays. LOS A through D is generally perceived to be acceptable to drivers. LOS E indicates that an intersection is operating at, or very near, its capacity and that drivers experience considerable delays. LOS F indicates an intersection where demand exceeds capacity and drivers experience substantial delays.

The LOS and its associated intersection delay for signalized and unsignalized intersections is presented Table 6. The delay threshold for unsignalized intersections is lower for each LOS compared to signalized intersections, which accounts for the fact that people expect a higher level of service when at a stop-controlled intersection.

TABLE 6 – Level of Service Criteria

	Signalized Intersection	**Unsignalized Intersection**
LOS	Control Delay per Vehicle (sec.)	Control Delay per Vehicle (sec.)
A	≤ 10	≤ 10
B	>10 and ≤ 20	>10 and ≤ 15
C	>20 and ≤ 35	>15 and ≤ 25
D	>35 and ≤ 55	>25 and ≤ 35
E	>55 and ≤ 80	>35 and ≤ 50
F	>80	>50

b) Volume-to-Capacity Ratios:

Table 7 provides a method to evaluate roadway capacity. For each facility type, a planning-level daily capacity range and a maximum ADT volume range is listed, along with the level of traffic volume indicating a segment is approaching capacity (defined as 85 percent of the daily volume). These are based upon guidance from the 2000 Highway Capacity Manual and professional engineering judgment. A range is used since the actual capacity of a roadway will vary based on its access control, speed, functional classification, peaking and other characteristics.

TABLE 7 – Planning Level Roadway Capacities by Facility Type

Facility Type	Planning Level Daily Capacity Ranges (ADT)	Anoka County Daily Capacity (ADT)*	Anoka County Approaching Capacity (85% of ADT)
Two-lane undivided urban	8,000-10,000	10,000	8,500
Two-lane undivided rural	14,000-15,000	15,000	12,750
Four-lane undivided urban	18,000-22,000	22,000	18,700
Four-lane divided with turn lanes	28,000-32,000	32,000	27,200
Four-lane divided rural with turn lanes	35,000-38,000	38,000	32,300

**If access is limited/controlled, roadway facilities listed may be able to adequately carry traffic above the daily capacity threshold identified in this table.*

In addition to the daily capacity thresholds for roadway facilities listed above, a review of peak hour traffic volumes compared to peak hour thresholds can also be used to identify potential capacity issues. The Highway Capacity Manual identifies peak hour traffic volume thresholds per facility type. Typically, peak hour traffic volumes represent approximately 10 percent of the daily volume on a roadway.

A measurement of a roadway segment or intersection's ability to handle traffic includes determining how close the facility is to meeting its capacity threshold. As noted above, this can be measured in terms of daily capacity or peak hour capacity. A facility can be either a roadway segment or an intersection with stop sign, traffic signal, or roundabout control. A volume-to-capacity ratio (v/c) is the proportion of the actual traffic utilizing the facility compared to the facility's physical ability to carry a specific maximum volume. This is calculated by dividing the total traffic using the facility by the capacity of the facility. This can then determine if a facility is sufficient to handle the traffic that is expected to use it. A ratio greater than 1.0 predicts that the facility will be unable to discharge all of the demand arriving on it. Such a situation would result in long queues and extensive delays or diversion to alternate routes. While a v/c ratio below 1.0 is acceptable, it is preferable to have v/c ratios below 0.85 to account for traffic fluctuations.

c) Vehicle Hours of Delay:

Vehicle hours of delay is a measure used in traffic signal warrants. The measure takes into account both the traffic volume using the intersection and the delay experienced by the traffic volume. Unacceptable levels of delay occur when the delay hours begin to exceed four hours for both the AM and PM peak periods. This indicates that the volume of traffic and delay of the traffic is nearing a level where a change in traffic control or an increase in capacity may be needed to maintain safety and mobility.

The remainder of this section of the memorandum will discuss the existing traffic operational analysis results for both key intersections and segments within the study area.

Intersections

Table 8 and Figures 15, 16 and 17 provide details on each of the intersection operation measures identified above and discussed in detail within this section. As shown in Table 8, three intersections in the study area are currently operating at a LOS E or F during the peak hours. An additional two intersections contain specific movements that are operating at a LOS E or F during the AM and PM peak hours. These intersections also have high volume-to-capacity (v/c) ratios on several movements. Maximum v/c ratios above 0.85 occur on approaches at five of the study intersections, four of which also have LOS E or F movements. The six existing intersections listed below are not currently operating efficiently with the number of vehicles utilizing the network. Issues with the noted intersections occur exclusively during the AM, Afternoon, or PM peak hours. The following provides additional information on each of the six intersections noted to have poor levels of service and/or high v/c ratios:

- *TH 47 at Pederson Dr/Middle School Access Driveway* experiences unacceptable levels of service along with traffic volumes that exceed the capacity of the intersection. The high traffic volumes and speeds on TH 47 paired with vehicles entering and exiting the St. Francis Middle School parking lot results in long queues and high levels of delay during the AM peak hour. The PM peak hour displays an elevated LOS, but low vehicle hours of delay show that mitigation is not currently required. The delay for vehicles exiting the school's driveway in the AM peak hour is the highest for any movement in the study area at 215 seconds per vehicle. This delay is a result of vehicles exiting the school property after dropping off students and occurs during the half hour before the commencement of school in morning hours. While this delay is high, it occurs within a short period of time and is not a concern at any other time of day.
- *CSAH 24 at the East High School Access Driveway* boasts a high volume of eastbound and westbound traffic on CSAH 24 in both the AM and PM peak hours. While operating essentially as a T-intersection, fairly large queues develop in the Afternoon peak hour due to elevated traffic volumes attributed to parents picking up students and school bus traffic. During the Afternoon peak, a police officer stops traffic on CSAH 24 at

Table 8: Northern Anoka County River Crossing Study
Existing Operations Analysis

Table 1: 2010 Existing Peak Hour

Intersection #	Intersection and Traffic Control	Peak Hour	Intersection Delay*- LOS		Maximum Delay-LOS-v/c**			Limiting Movement	Max Queue	Vehicle Hours of Delay
1	CSAH 24 at TH 47	AM	5	A	25	C	0.30	WB	-	-
	Two-Way Stop Control	PM	14	B	31	D	0.83	WB	-	-
2	TH 47 at Pederson Dr. NW/ Middle School Access Driveway	AM	55	F	215	F	1.35	WB	500'	11.5
	Two-Way Stop Control	PM	16	C	50	E	0.80	WB	80'	1.0
3	TH 47 at CSAH 28/ Ambassador Blvd NW	AM	7	A	22	C	0.41	WB	-	-
	Two-Way Stop Control	PM	7	A	18	C	0.47	WB	-	-
4	CSAH 28 at 233rd Ave. NW	AM	4	A	10	B	0.06	EB	-	-
	Two-Way Stop Control	PM	4	A	13	B	0.10	EB	-	-
5	CSAH 24/ Middle School Access at CSAH 28	AM	24	C	30	D	0.78	WB	-	-
	All-Way Stop Control	AFTERNOON	16	C	19	C	0.69	WB	-	-
		PM	19	C	24	C	0.76	WB	-	-
6	CSAH 24 at 229th Ave. NW	AM	6	A	1	A	0.39	WB	-	-
	Two-Way Stop Control	AFTERNOON	4	A	12	B	0.22	EB	-	-
		PM	6	A	13	B	0.32	WB	-	-
7	CSAH 24 at CSAH 7	AM	7	A	13	B	0.45	EB	-	-
	Two-Way Stop Control	PM	7	A	30	D	0.29	EB	-	-
8	CSAH 24 at Butterfield St.	AM	2	A	26	D	0.22	SB	-	-
	Two-Way Stop Control	AFTERNOON	2	A	29	D	0.10	NB	-	-
		PM	1	A	17	C	0.07	SB	-	-
9	CSAH 24 at Rum River Blvd. NW	AM	2	A	13	B	0.29	NB	-	-
	Two-Way Stop Control	AFTERNOON	1	A	12	B	0.22	NB	-	-
		PM	2	A	12	B	0.25	NB	-	-
10	CSAH 24 at CR-72	AM	30	C	43	D	0.91	WB	-	-
	Signalized	AFTERNOON	18	B	26	C	0.72	SB	-	-
		PM	14	B	19	B	0.62	WB	-	-
11	CSAH 24 at St. Francis High School East Access Driveway	AM	5	A	38	E	0.40	SB	20'	0.4
	Two-Way Stop Control	AFTERNOON	15	C	74	F	0.88	SB	185'	1.7
12	CSAH 24 at CSAH 9/ Lake George Blvd. NW	AM	10	A	87	F	0.78	NB	120'	1.9
	Two-Way Stop Control	PM	12	B	58	F	0.80	NB	155'	3.0
13	CSAH 24 at Kerry St. NW	AM	4	A	20	C	0.32	NB	-	-
	Two-Way Stop Control	PM	4	A	23	C	0.25	NB	-	-
14	CSAH 24 at Arrowhead St.	AM	3	A	17	C	0.29	SB	-	-
	Two-Way Stop Control	PM	2	A	16	C	0.18	SB	-	-
15	CSAH 22 at TH 47	AM	11	B	13	B	0.44	WB	-	-
	All-Way Stop Control	PM	12	B	14	B	0.49	EB	-	-
16	CSAH 22 at CSAH 7	AM	44	E	88	F	1.08	SB	180'	14.3
	All-Way Stop Control	PM	45	E	97	F	1.10	NB	260'	16.7
17	CSAH 22 at CSAH 9/Lake George Blvd.	AM	39	E	76	F	1.03	SB	190'	13.4
	All-Way Stop Control	PM	50	E	96	F	1.09	NB	375'	20.5

*Delay in seconds per vehicle **Maximum delay, LOS, and v/c ratio on any approach and/or movement

***Limiting Movement is the highest delay movement. Queues given for LOS E and F movements only.

the driveway to allow the busses to exit the site. This reduces the overall delay of the intersection because it allows busses to complete the southbound movements without waiting for gaps in CSAH 24 traffic. The east high school access is used less frequently in the AM Peak hour.

- *CSAH 24 at CSAH 9* has a high volume of traffic in both the AM and PM peak hours. While operating essentially as a T-intersection, turning movements from CSAH 9 onto CSAH 24 are difficult to complete because of the free movement given to a high volume of vehicles on CSAH 24 (only traffic on CSAH 9 is required to stop). While delay occurs for traffic entering from CSAH 9 onto CSAH 24, acceptable queue lengths and low vehicle hours of delay confirm that mitigation is not required in the near future. A gap study performed at this location also indicated that the average gap available for those on CSAH 9 at the intersection is between six and seven seconds. With drivers entering from CSAH 9 routinely accepting gaps in the range of six seconds, the existing gaps appear to be adequate for entering vehicles.
- *CSAH 22 at CSAH 7* is hampered by high traffic volumes and an inability to add additional capacity (i.e. more lanes) to the all-way stop control. All-way stop signs are present to accommodate large traffic volumes approaching from each leg of the intersection. Intersections utilizing all-way stop controls should be limited to a maximum of two lanes of approach from each direction to maintain driver safety and decrease traffic delay. An analysis was completed for vehicle hours of delay and it was determined that the threshold of four vehicle-hours was met for both the AM and PM peak hours. While the intersection meets the threshold for considering intersection improvements, queue lengths are acceptable. Anoka County has been monitoring the intersection and determined that it has not yet met traffic signal warrants.
- *CSAH 22 at CSAH 9* operates similar to CSAH 22 at CSAH 7 which is hampered by high traffic volumes and an inability to add additional capacity (i.e. more lanes) to the all-way stop control. All-way stop signs are present to accommodate large traffic volumes approaching from each leg of the intersection. Intersections utilizing all-way stop controls should be limited to a maximum of two lanes of approach from each direction to ensure driver safety and decrease traffic delay. The vehicle hours of delay at the intersection exceeds four vehicle-hours in the AM and PM peak hours. While the intersection meets the threshold for considering intersection improvements, Anoka County has been monitoring the intersection and determined that it has not yet met traffic signal warrants.
- *CSAH 24 at CR 72* does have some movements with v/c ratios exceeding 0.85. While this does indicate that the intersection is limited in its ability to handle traffic fluctuations, the intersection

usually does not see problems. The intersection is controlled by a traffic signal which is programmed to handle some traffic fluctuation and is generally able to keep the v/c ratios to less than 1.00, taking green time from other movements as needed.

The remaining intersections within the corridor are able to accommodate current traffic volumes under existing conditions.

Segments

In addition to the operational analysis of key intersections within the study area, an existing condition analysis was conducted for the CSAH 22 (Viking Blvd) and CSAH 24 (Bridge Street) Rum River crossings. The following summarizes the analysis results for these segments:

- CSAH 22

  CSAH 22 has a speed limit of 55 mph with an ADT of 6,700 crossing the river. As shown in Table 7, the maximum daily capacity for this facility (a two-lane undivided rural) is 15,000 vehicles per day. Therefore, the existing daily segment v/c ratio for CSAH 22 is 0.44. The maximum peak hour volume crossing the river is 450 vehicles on one lane. Per the 2000 Highway Capacity Manual, the capacity of the river crossing (a two-lane highway) is approximately 1,700 vehicles per lane per hour away from intersections and 900 vehicles per lane per hour in areas with intersections. The resulting peak hour v/c ratio calculations are shown in Table 9.

TABLE 9 – CSAH 22 Roadway Segment Volume-to-Capacity (V/C) Ratios

Route	ADT	Peak-Hour Maximum			V/C Ratio	
		Volume	Time	Direction	at Crossing	East and West of Crossing
CSAH 22	6,700	450	PM	WB	0.26	0.50

While the above provides a measurement of the capacity of the existing bridge crossing and roadway, it does not account for the traffic control on the roadway. Traffic control can significantly impact the physical capacity of a roadway as compared to the general corridor's capacity. The intersection v/c ratios east and west of the crossings are shown in Table 8 and reiterated in Table 10.

TABLE 10 – CSAH 22 Intersection Volume-to-Capacity (V/C) Ratios

Route	Peak-Hour Maximum				Peak Hour Maximum			
	c/v ration	Volume	Intersection	Direction	v/c ratio	Time	Intersection	Direction
CSAH 22	0.71	PM	CSAH 7	EB	0.77	AM	CSAH 9	WB

The v/c ratios in Tables 8 and 9 indicate that while the bridge could handle a 74 percent increase in traffic, the roadway could only handle a 50 percent increase in traffic (using segment v/c ratios). The intersections as currently designed further reduce the capacity of the corridor such that the roadway can only handle a 23 percent increase in traffic (using

intersection v/c ratios). This is an example of how, as noted above, intersections and traffic control can impact the physical capacity of a roadway compared to the overall corridor's general capacity.

Heavy commercial vehicle ADT (HCADT) information was collected for CSAH 22 and is illustrated in Figure 18. Truck traffic on CSAH 22 exceeds 20 percent west of CSAH 7, which is high for a rural highway. Average HCADT for a rural trunk highway is approximately 10 percent. The higher percentage of truck traffic on CSAH 22 may be related to the connection it serves between multiple trunk highways including TH 169, TH 47, and TH 65. It may also be attributed to the more direct connection it serves east-west traffic across the county and higher speed limits than on CSAH 24.

- CSAH 24

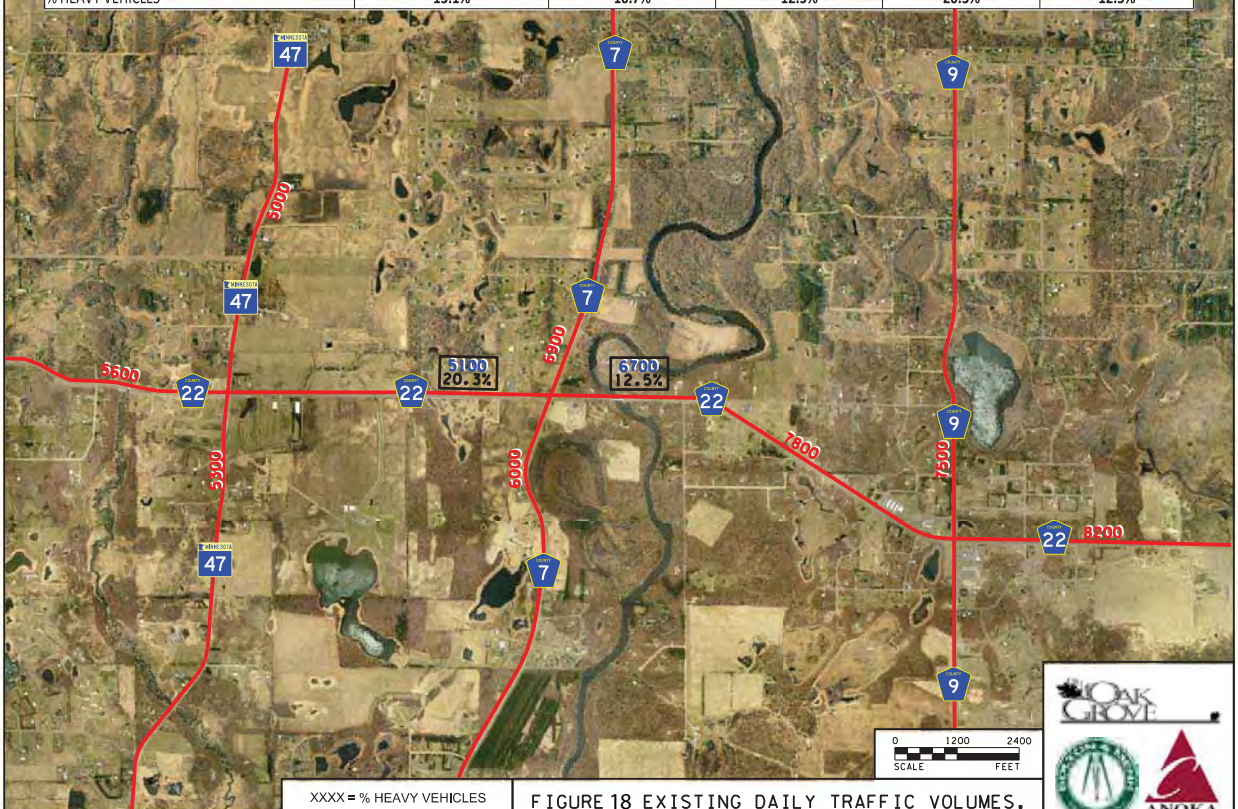
  CSAH 24 splits the City of St. Francis and crosses the Rum River in the downtown area. The ADT on CSAH 24 is approximately 9,500. As shown in Table 7, the maximum daily capacity for this facility (a two-lane undivided urban) is 10,000 vehicles per day. Therefore, the existing daily segment v/c ratio for CSAH 24 is 0.95. This indicates the roadway segment is approaching capacity (>85 percent) but has not yet met the over capacity v/c ratio of 1.00. The maximum peak hour volume crossing the river is 529 vehicles on one lane. According to the 2000 Highway Capacity Manual, the capacity of the river crossing (a two-lane highway) is approximately 1,700 vehicles per lane per hour away from intersections and 900 vehicles per lane per hour in areas with intersections. The resulting v/c ratios are shown in Table 11.

TABLE 11 – CSAH 24 Roadway Segment Volume-to-Capacity (V/C) Ratios

Route	ADT	Peak-Hour Maximum			V/C Ratio	
		Volume	Time	Direction	at Crossing	East and West of Crossing
CSAH 24	9,500	529	AM	EB	0.32	0.59

While the above provides a measurement of the capacity of the existing bridge crossing and roadway, it does not account for the traffic control on the roadway. Traffic control can significantly impact the physical capacity of a roadway as compared to the general corridor's capacity. The intersection v/c ratios east and west of the crossings are shown in Table 8 and reiterated in Table 12.

VEHICLE CLASSIFICATION SCHEME	CSAH 24 EAST OF RIVER BRIDGE	CSAH 24 NORTH OF CSAH 7	CSAH 24 WEST OF CSAH 9	CSAH 22 WEST OF CSAH 7	CSAH 22 EAST OF CSAH 7
PASSENGER VEHICLES	86.9%	89.3%	87.5%	79.7%	87.5%
2 AXLE SINGLE UNIT TRUCK	5.0%	6.8%	5.0%	13.6%	6.8%
3 OR MORE AXLE SINGLE UNIT TRUCK	0.4%	0.9%	0.5%	0.8%	0.8%
4 AXLE SEMI TRUCK	3.7%	0.9%	3.7%	3.1%	2.5%
5 OR MORE AXLE SEMI TRUCK	0.4%	0.2%	0.5%	1.0%	0.9%
BUSES	3.3%	1.8%	2.6%	1.7%	1.2%
TRUCKS WITH TRAILER/ TWIN TRAILER SEMI TRUCK	0.3%	0.1%	0.2%	0.1%	0.3%
% HEAVY VEHICLES	**13.1%**	**10.7%**	**12.5%**	**20.3%**	**12.5%**



SCHOOL SPEED ZONE
= 25 MPH
= 30 MPH

= 30 MPH
= 35 MPH
= 40 MPH
= 45 MPH
= 50 MPH
= 55 MPH

XXXX = % HEAVY VEHICLES

XXXX = AVERAGE DAILY TRAFFIC

XXXX = 2009 ANNUAL AVERAGE DAILY TRAFFIC

FIGURE 18 EXISTING DAILY TRAFFIC VOLUMES, SPEED LIMITS, AND VEHICLE CLASSIFICATIONS

NORTHERN ANOKA COUNTY RIVER CROSSING STUDY

OAK GROVE

ANOKA COUNTY

City of St. Francis

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TABLE 12 – CSAH 24 Intersection Volume-to-Capacity (V/C) Ratios

Route	Peak-Hour Maximum				Peak Hour Maximum			
	c/v ration	Volume	Intersection	Direction	v/c ratio	Time	Intersection	Direction
CSAH 24	0.78	AM	CSAH 28	WB	0.91	AM	CR 72	WB

The v/c ratios in Tables 11 and 12 indicate that while the bridge could handle a 68 percent increase in traffic, the roadway could only handle a 41 percent increase in traffic (using the segment v/c ratios). The intersections as currently designed further reduce the capacity of the corridor such that the roadway can only handle a 9 percent increase in traffic (using the intersection v/c ratios). This again represents the impact on a general corridor's capacity, based on traffic control.

Heavy commercial vehicle percentages for the CSAH 24 corridor near 10 percent, which is consistent for a rural highway that connects regional centers and farming communities. Further information regarding heavy vehicle percentages and ADT values can be found in Figure 18.

E. Future Traffic Operations

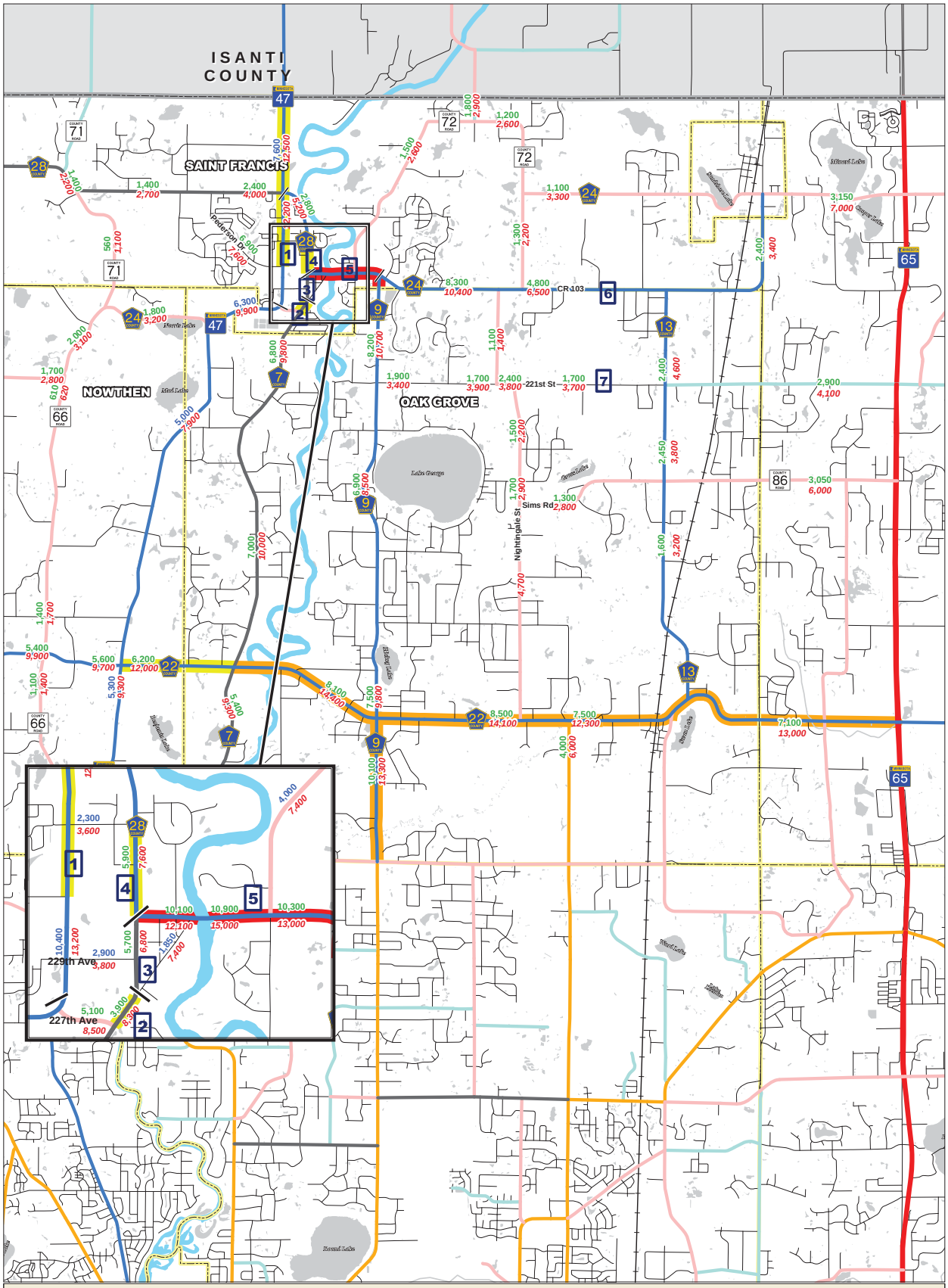
An analysis of future traffic operations was conducted to document traffic operations for 2030 under the no-build (no major improvements) and the build scenarios (new roadways, capacity expansion and/or improvements).

1. Future 2030 No Build Conditions

Traffic Forecasts

The Anoka County Traffic Model was used to develop 2030 traffic forecasts for the study. As part of this study, minor changes to the model were completed. These changes included updates to socioeconomic information for the Traffic Analysis Zones (TAZs), the creation of additional TAZs, the addition of roadway links, modification of roadway link attributes, and the modification of centroid link connectors to the roadway network system. The full explanation of the model changes and modifications completed and the travel demand modeling methodology to develop the traffic forecasts are included in the Travel Forecasting Technical Memorandum in Appendix A.

The 2030 no-build traffic forecast results are shown in Figure 19. Table 13 includes historical changes in Annual Average Daily Traffic (AADT) volumes, annual growth rates based off historical traffic volumes, 2030 AADT forecasted volumes and their associated annual growth rates.



Source: Anoka County, MET Council, MnDOT, MnDNR

Note:
Traffic volumes rounded to nearest 10 if less than 1,000 and to nearest 100 if greater than 1,000.

AADT - Annual Average Daily Traffic.

* Forecast numbers have a confidence range of +/- 15%

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ANOKA COUNTY

NORTHERN ANOKA COUNTY RIVER CROSSING STUDY

Existing and Forecasted No-Build Traffic Volume

Figure 19

March, 2011

Map Document: H:\AKCO\T42102757\ESRI\T42102757\ESRI\Maps\1_102757 Traffic Volume v4 11x17.mxd
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Table 13: 2030 No-Build Traffic Volumes

Northern Anoka County Rum River Crossing Study
Study Area Roadways >1,000 Forecasted AADT

Roadway			Historical Traffic Volumes													Forecasted Traffic	
Route	Route Description	Roadway Type	1990 AADT	1991-92 AADT	1993-94 AADT	1995-96 AADT	1997-98 AADT	1999-2000 AADT	2001-02 AADT	2003-04 AADT	2005-06 AADT	2007-08 AADT	2009 AADT	2010 AADT	Annual Growth	2030 AADT*	Annual Growth
TH 47	S. of CSAH 22	R2	3,400	4,000	4,000	4,400	4,600	4,800	5,000	5,600	5,500	5,300			2.50%	9,300	2.59%
	CSAH 22 to CSAH 24	R2	2,500	2,900	3,300	3,800	4,200	4,100	4,700	4,600	5,000	5,000			3.93%	7,900	2.10%
	CSAH 24 to CSAH 24	R2	2,850	3,700	4,000	4,600	5,200	4,800	5,200	5,300	5,700	6,300			4.51%	9,900	2.08%
	CSAH 24 to Pederson Drive	R4	3,100	3,450	3,800	4,400	5,700	6,500	8,000	7,600	9,000	10,400			6.96%	13,200	1.09%
	Pederson Drive to CSAH 28	R2	2,800	3,450	3,800	4,400	5,700	6,500	8,000	7,600	9,000	10,400			7.56%	12,200	0.73%
	N. of CSAH 28	R2	3,300	3,300	3,700	4,800	6,100	6,700	7,100	6,600	6,900	7,600			4.74%	12,500	2.29%
CSAH 7	S. of CSAH 22	R2	2,300	2,600	2,800	3,100	4,000	5,500		6,000	5,900	5,800	6,000	5,419	4.38%	9,300	2.74%
	CSAH 22 to 217th Avenue	R2	2,375	2,600	2,900	3,100	4,600	6,600		7,700	6,800	7,000	6,900	6,970	5.53%	10,000	1.82%
	217th Avenue to CSAH 24	R2	2,225	2,000	2,550	3,100	3,600	5,100		6,500	6,000	6,400	6,900	6,829	5.77%	9,800	1.82%
CSAH 9	S. of CSAH 22	R2	6,000	5,700	6,500	7,900	6,800	7,500		8,700	8,300	9,000	10,400	10,144	2.66%	13,300	1.36%
	CSAH 22 to 201st Avenue	R2	4,500	4,500	4,800	5,400	5,300	5,900		7,000	7,900	7,700	7,500	7,536	2.61%	9,800	1.32%
	201st Avenue to 221st Avenue	R2	4,000	3,900	4,100	4,750	4,300	5,400		5,800	6,700	6,500	6,800	6,922	2.78%	8,500	1.03%
	221st Avenue to CSAH 24	U2	3,500	3,500	3,300	4,400	3,750	4,500		5,500	6,000	6,100	5,800	8,247	4.38%	10,700	1.31%
CSAH 22	W. of CR 66	R2	1,600	2,200	2,300	2,550	3,600	4,650		5,100	4,450	5,600	5,300	5,401	6.27%	9,900	3.08%
	CR 66 to TH 47	R2	1,750	2,400	2,500	2,650	3,800	4,800		5,200	5,700	6,200	5,600	5,617	6.00%	9,700	2.77%
	TH 47 to CSAH 7	R2	2,000	2,400	2,500	3,400	4,450	5,700		6,100	6,800	6,600	6,400	6,244	5.86%	12,000	3.32%
	CSAH 7 to CSAH 9	R2	2,700	2,800	3,650	4,600	5,600	6,500		7,900	8,500	8,100	7,800	8,099	5.65%	14,400	2.92%
	CSAH 9 to CR 78	R2	3,100	3,200	4,350	5,400	7,600	7,900		7,500	8,400	8,900	8,200	8,537	5.20%	14,100	2.54%
	E. of CR 78	R2	3,250	3,400	5,200	6,200	7,200	6,800		7,500	7,800	8,100	7,300	7,449	4.23%	12,300	2.54%
CSAH 24	W. of CR 66	R2	800	400	680	900	1,000	1,200		1,400	1,700	1,700	1,600	1,711	3.87%	2,800	2.49%
	CR 66 to CR 71	R2	950	690	820	1,100	1,200	1,200		1,500	1,800	1,800	1,750	1,982	3.75%	3,100	2.26%
	CR 71 to TH 47	R2	1,100	900	900	1,100	1,000	1,100		1,600	2,000	1,850	1,650	1,759	2.37%	3,200	3.04%
	TH 47 to CSAH 7	R2	1,600	1,200	1,700	2,000	2,650	2,650		3,800	3,600	4,750	4,350	5,071	5.94%	8,500	2.62%
	CSAH 7 to Rum River Blvd	U2	3,900	3,400	3,000	3,400	4,000	5,000		6,000	5,800	2,750	2,550	3,850	-0.06%	8,300	3.92%
	Rum River Blvd to CSAH 24/28	U2	1,300	1,200	1,300	1,550	1,400	2,500		6,200	6,000	3,450	3,800	5,711	7.68%	6,800	0.88%
	CSAH 24/28 to Rum River Blvd	U2	4,600	4,200	4,700	6,200	5,000	5,500		8,000	7,500	8,100	8,000	10,115	4.02%	12,100	0.90%
	Rum River Blvd to CR 72	U2	5,400	5,200	6,100	8,100	7,000	7,700		9,400	9,000	11,000	9,600	10,897	3.57%	15,000	1.61%
	CR 72 to CSAH 9	U2	5,000	5,200	6,100	8,100	6,700	7,400		8,300	8,000	8,700	8,500	10,253	3.66%	13,000	1.19%
	CSAH 9 to CR 103	R2	2,800	3,200	3,000	4,000	3,850	4,050		4,200	4,100	7,200	7,000	8,289	5.58%	10,400	1.14%
	CR 103 to CR 72	R2	560	740	500	870	980	1,100		1,150	1,100	1,350	1,250	1,323	4.39%	2,200	2.58%
	E. of CR 72	R2	500	610	430	600	720	780		1,000	1,000	1,050	980	1,051	3.78%	3,300	5.89%
CSAH 28	CSAH 24 to 223rd Avenue	U2	3,300	3,600	3,800	4,600	4,350	4,500		5,400	5,200	5,300	4,850	5,866	2.92%	7,600	1.30%
	223rd Avenue to TH 47	U2	1,650	1,900	1,900	2,700	2,750	3,200		2,900	2,800	2,850	2,550	2,823	2.72%	5,200	3.10%
	TH 47 to Pederson Drive	R2	850	960	1,150	1,600	1,800	2,050		2,450	2,500	2,650	2,650	2,391	5.31%	4,500	3.21%
	Pederson Drive to CR 71	R2	590	600	550	860	960	960		1,300	1,700	1,550	1,250	1,367	4.29%	2,700	3.46%
	CR 71 to CR 71	R2	580	660	610	900	850	950		1,400	1,700	1,450	1,300	1,392	4.47%	2,200	2.31%
CR 66	S. of CSAH 22	R2	460	720	640	640	840	840		800	850	900	870	1,056	4.24%	1,400	1.42%
	CSAH 22 to Gypsy Valley Road	R2	550	680	620	860	740	830		1,200	1,250	1,300	1,250	1,363	4.64%	1,700	1.11%
	Gypsy Valley Road to CSAH 24	R2	400	590	400	480	350	450		500	580	580	590	611	2.14%	620	0.07%
CR 71	CSAH 24 to CSAH 28	R2	320	440	370	450	470	470		500	670	580	560	558	2.82%	1,100	3.45%
CR 72	CSAH 24 to 235th Avenue	U2	780	900	1,100	1,450	1,350	1,950		1,950	1,900	2,200	2,200	4,009	8.53%	7,400	3.11%
	235th Avenue to CR 72	R2	580	590	640	790	830	1,200		1,250	1,200	1,350	1,300	1,545	5.02%	2,600	2.64%
	CR 72 to CSAH 24	R2	450	590	500	670	600	850		1,050	1,000	1,150	1,050	1,209	5.07%	2,600	3.90%
	N. of CR 72	R2						770		1,650		1,800		1,803	8.88%	2,900	2.40%
CR 78	S. of CSAH 22	R2		2,450	3,050	3,900	3,800	3,200		4,000	5,100	4,050	3,950	4,023	2.79%	6,000	2.02%
CR 103	E. of CSAH 24	R2	2,200	2,400	2,400	3,100	3,000	3,800		4,500	5,300	4,750	3,950	4,804	3.98%	6,500	1.52%

Roadway			Historical Traffic Volumes												Forecasted Traffic	
Route	Route Description	Roadway Type	1990 AADT	1991-92 AADT	1993-94 AADT	1995-96 AADT	1997-98 AADT	1999-2000 AADT	2001-02 AADT	2003-04 AADT	2005-06 AADT	2007-08 AADT	2009 AADT	2010 AADT	Annual Growth	2030 AADT*	Annual Growth
Pederson Drive	TH 47 to CSAH 28	R2	190	210	250	250	250	2,100		4,000	4,000	6,300	6,900		19.68%	7,600	0.46%
Rum River Blvd	CSAH 24 to CSAH 24	R2								1,850	3,200	1,850			0.00%	7,400	7.18%
Raven Street	221st Avenue to CSAH 24	R2					1,000	1,000	720		1,100		1,050		0.41%	1,400	1.38%
Nightingale Street	CSAH 22 to Sims Road	R2	1,500	1,650	1,900	3,250									13.75%	4,700	1.09%
	Sims Road to Lake George Pkwy	R2				1,500	1,500	1,500	1,600		1,600		1,650		0.68%	2,900	2.72%
	Lake George Pkwy to 221st Avenue	R2				640	1,050	1,050	1,100		1,550		1,450		6.02%	2,200	2.01%
221st Avenue	CSAH 9 to Zion Pkwy	R2				250	440	440	800		2,000		1,900		15.59%	3,400	2.81%
	Zion Pkwy to Raven Street	R2				150	280	280	700		1,800		1,650		18.68%	3,900	4.18%
	Raven Street to Nightingale Street	R2				740	1,250	1,250	1,300		2,500		2,350		8.60%	3,800	2.31%
	E. of Nightingale Street	R2							450		1,800		1,650		17.63%	3,700	3.92%
Sims Road	E. of Nightingale Street	R2				295	400	400	1,500		1,250		1,250		10.86%	2,800	3.92%
229th Avenue	TH 47 to CSAH 24	U2								2,600	2,450	2,900			2.77%	3,900	1.36%
233rd Avenue	TH 47 to CSAH 28	U2								2,000	2,350	2,300			3.56%	3,600	2.06%

*The Forecast Numbers Have a Likely Confidence Range of Plus or Minus 15%.

AADT = Annual Average Daily Traffic

Roadway Type			
U2	Urban 2-Lane Undivided	R2	Rural 2-Lane Undivided
U4	Urban 4-Lane Undivided	R4	Rural 4-Lane Divided (w/ Turn Lanes)
D4	Urban 4-Lane Divided (with Turn Lanes)		

Traffic volumes are expected to increase on all of the study area roadways due to the anticipated growth in the communities. While this growth is substantial, a majority of the roadways within the study area are anticipated to increase at a lower annual growth rate than over the past 20 years.

One notable roadway segment traffic volume forecast is along Rum River Boulevard in St. Francis at 7,400. While this growth is unexpected on a local road, it is not unexpected based on historical traffic volumes and the roadway network. The high volume forecasted along the route is due to the anticipated congestion along CSAH 24. Rum River Boulevard provides an alternative route around the congestion. Improvements to capacity along CSAH 24 would be anticipated to reduce the traffic volumes on Rum River Boulevard. Additionally, local roadway changes to make it difficult for traffic to use Rum River Boulevard as a through route would be expected to decrease the traffic projection along the route.

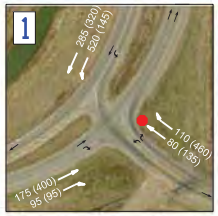
The daily traffic volumes were developed into peak hour traffic volumes based on the existing peak distribution (K Factor) and directional distribution (D Factor) along each of the roadways. The K Factor is the proportion of the peak hour volume to the total daily volume whereas the D Factor is the directional split of the peak hour volume. These two factors combined are used to determine total traffic entering and exiting each intersection. These peak hour traffic projections are then compared against existing intersection turning volumes. The forecast turning volumes are projected based on existing turning movement volumes and forecasted future approach and departure volumes, using the techniques described in NCHRP 255, “Highway Traffic Data for Urbanized Area Project Planning and Design”, Chapter 8. The 2030 no-build peak hour turning movement volumes are shown in Figures 20, 21 and 22.

Future Traffic Operations Analysis Results

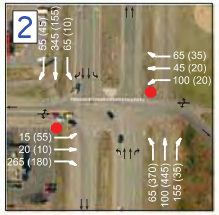
The section of the report discusses the 2030 no build traffic operational analysis results for both key segments and intersections within the study area.

Segments

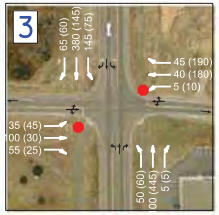
In addition to the future no-build operational analysis of the key intersections within the study area, a forecasted conditions analysis was conducted for the roadway segments as shown in Figure 23 and Table 14. Based on the planning level daily capacities and the forecasted traffic volumes, multiple roadway segments are anticipated to be close to or above capacity by 2030. CSAH 22 has an anticipated traffic volume of over 14,000 vehicles per day from CSAH 7 to CSAH 78. With a capacity of 15,000 vehicles per day on these roadway segments, the v/c ratio is expected to be just below 1.00, which is acceptable but unable to effectively handle traffic fluctuations. As the area along CSAH 22 develops, access management will be important to maintaining acceptable traffic flow as these traffic volumes approach the daily capacity thresholds. Other areas along CSAH 22 may be of concern as the area develops and will also require access management considerations to maintain acceptable service levels. These include CSAH 22 from TH 47 to CSAH 7 and CSAH 22 from CSAH 78 to TH 65.



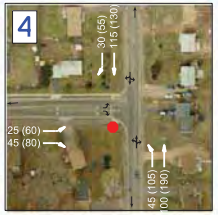
TH 47 AT CSAH 24



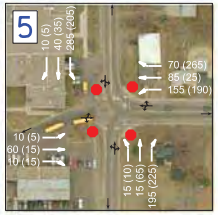
TH 47 AT PEDERSON DR.



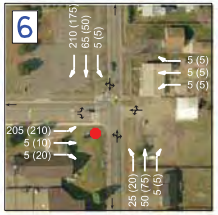
TH 47 AT CSAH 28



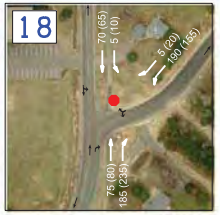
CSAH 28 AT 233RD AVE



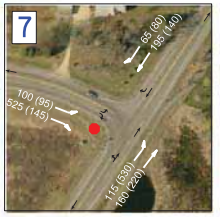
CSAH 24 AT CSAH 24/28



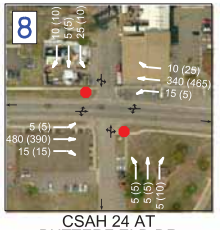
CSAH 24 AT 229TH AVE



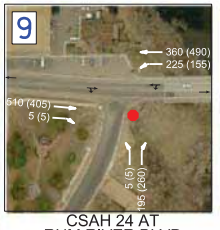
CSAH 24 AT
RUM RIVER BLVD



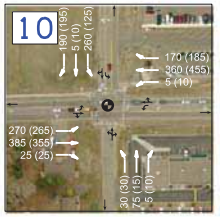
CSAH 7 AT CSAH 24



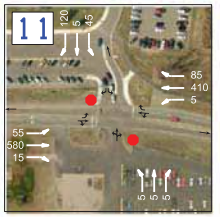
CSAH 24 AT
BUTTERFIELD DR



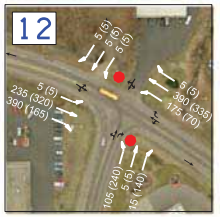
CSAH 24 AT
RUM RIVER BLVD



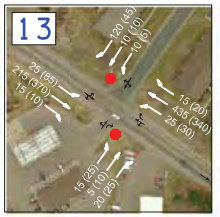
CSAH 24 AT CR 72



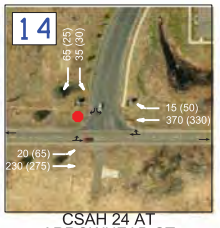
CSAH 24 AT EAST
HIGH SCHOOL ACCESS



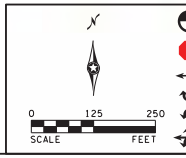
CSAH 24 AT CSAH 9



CSAH 24 AT KERRY ST



CSAH 24 AT
ARROWHEAD ST



SIGNALIZED INTERSECTION
STOP SIGN
THROUGH TRAFFIC LANE
TURNING TRAFFIC LANE
SHARED-MOVEMENT TRAFFIC LANE

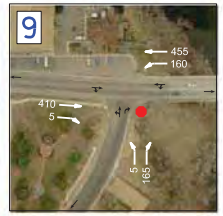
XXXX = 2030 ANNUAL AVERAGE DAILY TRAFFIC

PEAK HOUR VOLUME = AM (PM)
*2030 NO BUILD TRAFFIC VOLUMES ROUNDED TO NEAREST 5

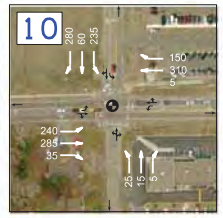
FIGURE 20 2030 NO BUILD GEOMETRY AND PEAK HOUR TRAFFIC VOLUMES

NORTHERN ANOKA COUNTY RIVER CROSSING STUDY

OAK GROVE
ANOKA COUNTY
City of St. Francis



CSAH 24 AT RUM RIVER BLVD



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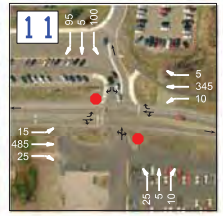
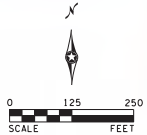
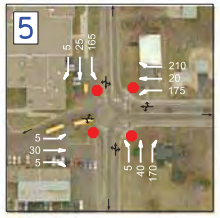


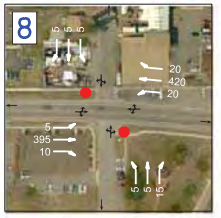
CSAH 24 AT EAST HIGH SCHOOL ACCESS





CSAH 24 AT CSAH 24/28

CSAH 24 AT 229TH AVE



CSAH 24 AT BUTTERFIELD DR

PEAK HOUR VOLUME = AFTERNOON

THROUGH TRAFFIC LANE
TURNING TRAFFIC LANE
SHARED-MOVEMENT TRAFFIC LANE
SIGNALIZED INTERSECTION
STOP SIGN

FIGURE 21 2030 NO BUILD GEOMETRY AND SCHOOL HOUR TRAFFIC VOLUMES

NORTHERN ANOKA COUNTY RIVER CROSSING STUDY

OAK GROVE
ANOKA COUNTY
City of St. Francis

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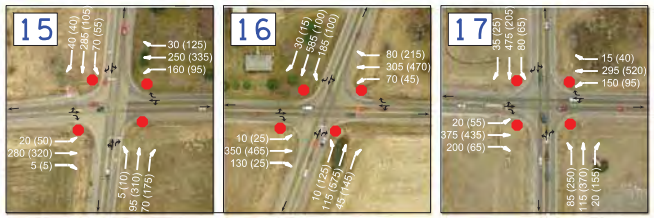


TH 47 AT CSAH 22 | CSAH 22 AT CSAH 7 | CSAH 22 AT CSAH 9

0 125 250
SCALE FEET

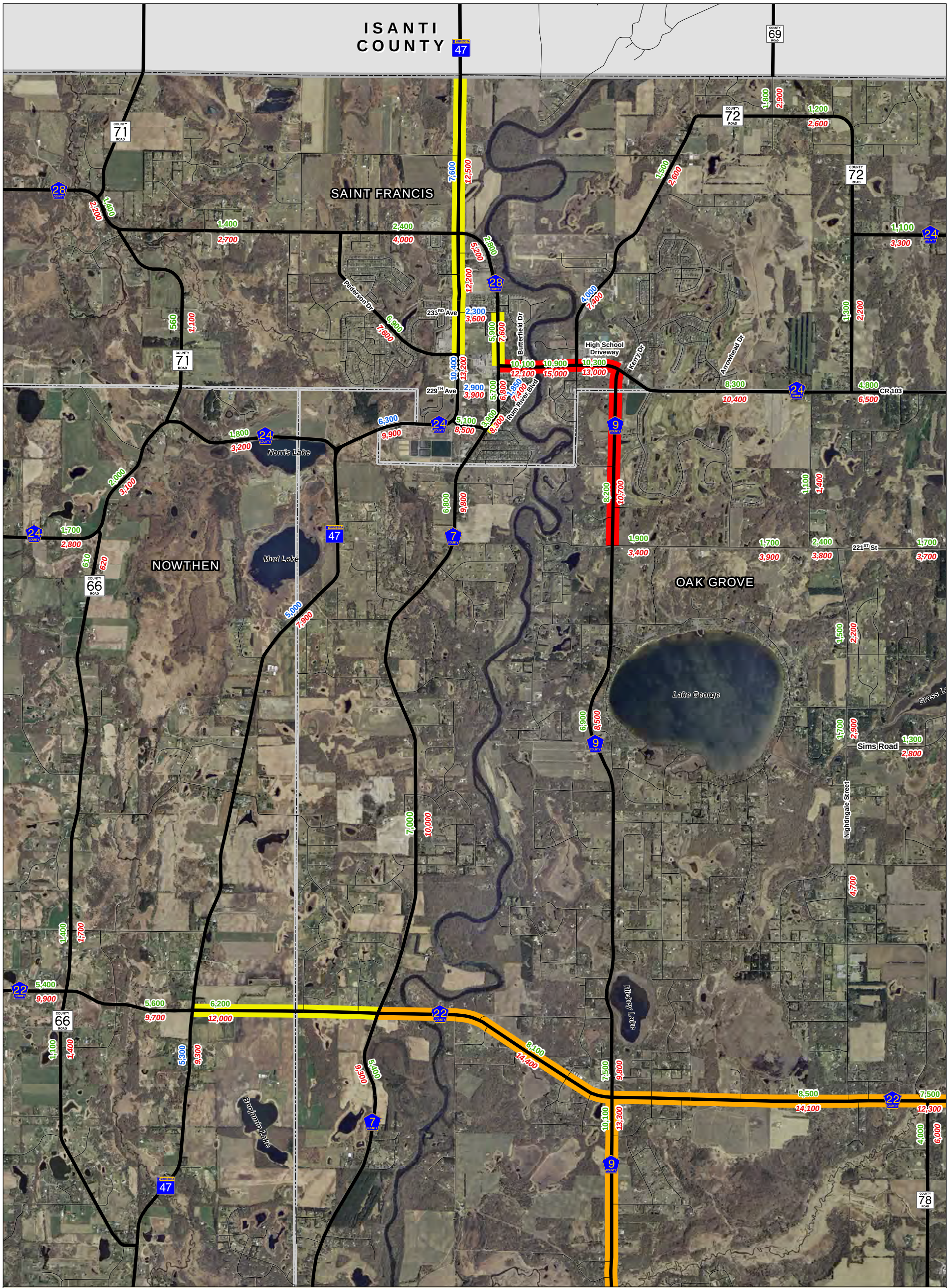
- SIGNALIZED INTERSECTION
- STOP SIGN
- THROUGH TRAFFIC LANE
- TURNING TRAFFIC LANE
- SHARED-MOVEMENT TRAFFIC LANE

2030 PEAK HOUR VOLUME = AM (PM) | XXXX = 2030 ANNUAL AVERAGE DAILY TRAFFIC

FIGURE 22 2030 NO BUILD GEOMETRY AND PEAK HOUR TRAFFIC VOLUMES

NORTHERN ANOKA COUNTY RIVER CROSSING STUDY

OAK GROVE | ANOKA COUNTY | City of St. Francis



Legend

- Periodically Congested
- Near Congested
- Congested
- xxxx 2008 AADT (MnDOT)
- xxxx 2009/2010 AADT (Anoka County)
- xxxx 2030 Forecasted AADT*
- Major Road
- Local Road
- City Boundary

Source: Anoka County, MET Council, MnDOT, MnDNR

Note:
Traffic volumes rounded to nearest 10 if less than 1,000 and to nearest 100 if greater than 1,000.

AADT - Annual Average Daily Traffic.

* Forecast numbers have a confidence range of +/- 15%

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ANOKA COUNTY

NORTHERN ANOKA COUNTY RIVER CROSSING STUDY

2030 Forecasted No-Build Capacity Issues

Figure 23

March, 2011

Map Document: H:\AKCO\T42102757\ESRI\T42102757\ESRI\Maps\102757 2030 No-Build Capacity Issues 11x17.mxd
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Table 14: 2030 No-Build Traffic Volumes and Capacity Analysis

Northern Anoka County Rum River Crossing Study
Study Area Roadways >1,000 Forecasted AADT

Roadway		Roadway Type	Forecasted Traffic			Daily Roadway Capacity
Route	Route Description		2030 AADT*	Annual Growth	2030 V/C Ratio	
TH 47	S. of CSAH 22	R2	9,300	2.59%	0.62	15000
	CSAH 22 to CSAH 24	R2	7,900	2.10%	0.53	15000
	CSAH 24 to CSAH 24	R2	9,900	2.08%	0.66	15000
	CSAH 24 to Pederson Drive	R4	13,200	1.09%	0.35	38000
	Pederson Drive to CSAH 28	R2	12,200	0.73%	0.81	15000
	N. of CSAH 28	R2	12,500	2.29%	0.83	15000
CSAH 7	S. of CSAH 22	R2	9,300	2.74%	0.62	15000
	CSAH 22 to 217th Avenue	R2	10,000	1.82%	0.67	15000
	217th Avenue to CSAH 24	R2	9,800	1.82%	0.65	15000
CSAH 9	S. of CSAH 22	R2	13,300	1.36%	0.89	15000
	CSAH 22 to 201st Avenue	R2	9,800	1.32%	0.65	15000
	201st Avenue to 221st Avenue	R2	8,500	1.03%	0.57	15000
	221st Avenue to 300' S. of CSAH 24	R2	10,700	1.31%	0.71	15000
	300' S. of CSAH 24 to CSAH 24	U2	10,700	1.31%	1.07	10000
CSAH 22	W. of CR 66	R2	9,900	3.08%	0.66	15000
	CR 66 to TH 47	R2	9,700	2.77%	0.65	15000
	TH 47 to CSAH 7	R2	12,000	3.32%	0.80	15000
	CSAH 7 to CSAH 9	R2	14,400	2.92%	0.96	15000
	CSAH 9 to CR 78	R2	14,100	2.54%	0.94	15000
	E. of CR 78	R2	12,300	2.54%	0.82	15000
CSAH 24	W. of CR 66	R2	2,800	2.49%	0.19	15000
	CR 66 to CR 71	R2	3,100	2.26%	0.21	15000
	CR 71 to TH 47	R2	3,200	3.04%	0.21	15000
	TH 47 to CSAH 7	R2	8,500	2.62%	0.57	15000
	CSAH 7 to Rum River Blvd	U2	8,300	3.92%	0.83	10000
	Rum River Blvd to CSAH 24/28	U2	6,800	0.88%	0.68	10000
	CSAH 24/28 to Rum River Blvd	U2	12,100	0.90%	1.21	10000
	Rum River Blvd to CR 72	U2	15,000	1.61%	1.50	10000
	CR 72 to CSAH 9	U2	13,000	1.19%	1.30	10000
	CSAH 9 to CR 103	R2	10,400	1.14%	0.69	15000
	CR 103 to CR 72	R2	2,200	2.58%	0.15	15000
	E. of CR 72	R2	3,300	5.89%	0.22	15000
CSAH 28	CSAH 24 to 223rd Avenue	U2	7,600	1.30%	0.76	10000
	223rd Avenue to TH 47	U2	5,200	3.10%	0.52	10000
	TH 47 to Pederson Drive	R2	4,500	3.21%	0.30	15000
	Pederson Drive to CR 71	R2	2,700	3.46%	0.18	15000
	CR 71 to CR 71	R2	2,200	2.31%	0.15	15000
CR 66	S. of CSAH 22	R2	1,400	1.42%	0.09	15000
	CSAH 22 to Gypsy Valley Road	R2	1,700	1.11%	0.11	15000
	Gypsy Valley Road to CSAH 24	R2	620	0.07%	0.04	15000
CR 71	CSAH 24 to CSAH 28	R2	1,100	3.45%	0.07	15000
CR 72	CSAH 24 to 235th Avenue	U2	7,400	3.11%	0.74	10000
	235th Avenue to CR 72	R2	2,600	2.64%	0.17	15000
	CR 72 to CSAH 24	R2	2,600	3.90%	0.17	15000
	N. of CR 72	R2	2,900	2.40%	0.19	15000
CR 78	S. of CSAH 22	R2	6,000	2.02%	0.40	15000
CR 103	E. of CSAH 24	R2	6,500	1.52%	0.43	15000
Pederson Drive	TH 47 to CSAH 28	R2	7,600	0.46%	0.51	15000
Rum River Blvd	CSAH 24 to CSAH 24	R2	7,400	7.18%	0.74	10000
Raven Street	221st Avenue to CSAH 24	R2	1,400	1.38%	0.09	15000
Nightingale Street	CSAH 22 to Sims Road	R2	4,700	1.09%	0.31	15000
	Sims Road to Lake George Pkwy	R2	2,900	2.72%	0.19	15000
	Lake George Pkwy to 221st Avenue	R2	2,200	2.01%	0.15	15000
221st Avenue	CSAH 9 to Zion Pkwy	R2	3,400	2.81%	0.23	15000
	Zion Pkwy to Raven Street	R2	3,900	4.18%	0.26	15000
	Raven Street to Nightingale Street	R2	3,800	2.31%	0.25	15000
	E. of Nightingale Street	R2	3,700	3.92%	0.25	15000
Sims Road	E. of Nightingale Street	R2	2,800	3.92%	0.19	15000
229th Avenue	TH 47 to CSAH 24	U2	3,900	1.36%	0.39	10000
233rd Avenue	TH 47 to CSAH 28	U2	3,600	2.06%	0.36	10000

*The Forecast Numbers Have a Likely Confidence Range of Plus or Minus 15%.

AADT = Annual Average Daily Traffic

Roadway Type			
U2	Urban 2-Lane Undivided	R2	Rural 2-Lane Undivided
U4	Urban 4-Lane Undivided	R4	Rural 4-Lane Divided (w/ Turn Lanes)
D4	Urban 4-Lane Divided (with Turn Lanes)		

V/C = Volume to Capacity Ratio

Periodically Congested, V/C > 0.75
Near Congested, V/C > 0.85
Congested, V/C>1.00 (with existing roadway)

- CSAH 24 through the river crossing area in downtown St. Francis is anticipated to operate above capacity, resulting in congestion and queues during the peak hours. The 2030 forecast for the CSAH 24 river crossing is 15,000 vehicles per day. Unlike CSAH 22, the area along CSAH 24 is urban in nature, which results in a lower roadway capacity at 10,000 vehicles per day. Based on the anticipated traffic volumes, CSAH 24 is expected to operate above capacity from CSAH 28 to CSAH 9 with v/c ratios in the range of 1.2 to 1.5 through the area.
- CSAH 9, just south of CSAH 24 has an anticipated daily traffic volume of 10,700 vehicles per day which results in a v/c ratio of 1.07. As CSAH 9 becomes more rural, the capacity of the roadway is increased and the v/c ratio drops to acceptable limits. South of 221st Street the traffic is lighter. 221st Street provides a direct connection to TH 65 to the east and traffic splits between 221st Street/TH 65 and CSAH 9 to handle the northwest/southeast trip movement. CSAH 9 is also nearing capacity south of CSAH 22 due to the confluence of multiple routes to get traffic to/from the south.
- TH 47 also has some high v/c ratios north of Pederson Drive. This roadway may be able to accommodate these traffic volumes if access management principles are maintained.

While the above provides a measurement of the capacity of the existing bridge crossings and roadways, it does not account for the traffic control on the roadway. Traffic control can significantly impact the physical capacity of a roadway as compared to the general corridor's capacity.

Intersections

Table 15 provides details on the key intersections. As shown in Table 15 and on Figures 24 and 25, 11 intersections in the study area are anticipated to operate at a LOS E or F during the peak hours by 2030. Two intersections also have specific movements that are operating at a LOS E or F during the AM or PM peak hours. Twelve of these intersections also have high volume-to-capacity (v/c) ratios on several movements. Anticipated issues with the noted intersections occur exclusively during the AM, Afternoon, or PM peak hours.

The following provides additional information on each of the intersections noted to have poor levels of service and/or high v/c ratios:

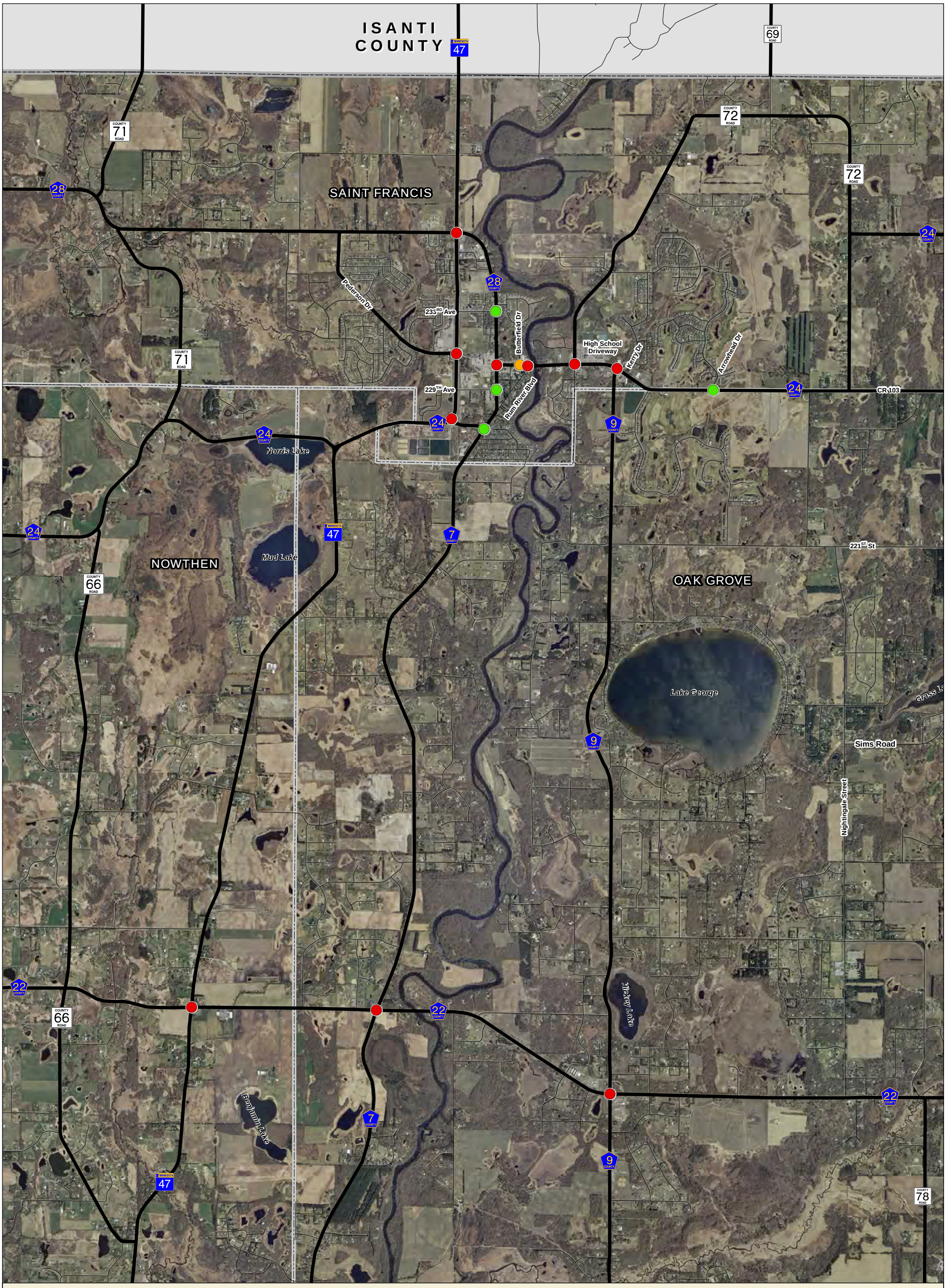
- CSAH 24 at TH 47 (Intersection #1) is anticipated to experience unacceptable levels of service in both the AM and PM peak hours. The existing two-way stop control (CSAH 24 stops for TH 47) is not anticipated to be able to adequately handle the forecasted traffic volumes. The overall intersection LOS is LOS F for both the AM and PM peak hours. The worst movement is the westbound movement with LOS F and v/c ratios of 1.51 and 1.36 in the AM and PM peak hours respectively.

Table 5: 2030 No Build Peak Hour

Intersection #	Intersection and Traffic Control	Peak Hour	Intersection Delay*- LOS		Maximum Delay-LOS-v/c**			Limiting Movement	Max Queue	Vehicle Hours of Delay
1	CSAH 24 at TH 47	AM	62	F	295	F	1.51	WB	480	-
	Two-Way Stop Control	PM	73	F	196	F	1.36	WB	790	-
2	TH 47 at Pederson Dr. NW/ Middle School Access Driveway	AM	143	F	617	F	2.24	WB	835	35.6
	Two-Way Stop Control	PM	96	F	644	F	2.06	WB	450	17.2
3	TH 47 at CSAH 28/ Ambassador Blvd NW	AM	105	F	480	F	1.90	EB	535	24.4
	Two-Way Stop Control	PM	151	F	973	F	2.86	EB	475	24.9
4	CSAH 28 at 233rd Ave. NW	AM	4	A	11	B	0.17	EB	-	-
	Two-Way Stop Control	PM	4	A	17	C	0.19	EB	-	-
5	CSAH 24/ Middle School Access at CSAH 28	AM	57	F	85	F	1.06	SB	-	14.9
	All-Way Stop Control	AFTERNOON	25	C	37	E	0.88	WB	-	5.8
		PM	42	E	69	F	1.02	WB	-	12.2
6	CSAH 24 at 229th Ave. NW	AM	9	A	20	C	0.58	EB	-	-
	Two-Way Stop Control	AFTERNOON	5	A	13	B	0.32	EB	-	-
		PM	7	A	15	C	0.46	EB	-	-
7	CSAH 24 at CSAH 7	AM	12	B	21	C	0.73	EB	-	-
	Two-Way Stop Control	PM	69	F	714	F	2.22	EB	320	-
8	CSAH 24 at Butterfield St.	AM	2	A	32	D	0.30	SB	30	-
	Two-Way Stop Control	AFTERNOON	2	A	39	E	0.13	SB	15	-
		PM	1	A	19	C	0.09	SB	-	-
9	CSAH 24 at Rum River Blvd. NW (North)	AM	5	A	18	C	0.44	NB	55	-
	Two-Way Stop Control	AFTERNOON	4	A	15	B	0.33	NB	35	-
		PM	5	A	17	C	0.49	NB	70	-
10	CSAH 24 at CR-72	AM	77	E	120	F	1.12	NB	505	-
	Signalized	AFTERNOON	67	E	140	F	1.11	NB	495	-
		PM	23	C	34	C	0.88	WB	535	-
11	CSAH 24 at St. Francis High School East Access Driveway	AM	28	D	502	F	1.67	SB	205	-
	Two-Way Stop Control	AFTERNOON	89	F	542	F	2.02	SB	530	-
12	CSAH 24 at CSAH 9/ Lake George Blvd. NW	AM	63	F	762	F	2.36	NB	360	22.0
	Two-Way Stop Control	PM	55	F	303	F	1.51	NB	430	20.2
13	CSAH 24 at Kerry St. NW	AM	5	A	30	D	0.49	NB	65	-
	Two-Way Stop Control	PM	5	A	34	D	0.35	NB	40	-
14	CSAH 24 at Arrowhead St.	AM	3	A	23	C	0.38	SB	-	-
	Two-Way Stop Control	PM	2	A	20	C	0.22	SB	-	-
15	CSAH 22 at TH 47	AM	52	F	98	F	1.10	WB	-	18.7
	All-Way Stop Control	PM	62	F	91	F	1.13	WB	-	27.7
16	CSAH 22 at CSAH 7	AM	202	F	460	F	1.94	SB	-	106.6
	All-Way Stop Control	PM	269	F	253	F	2.09	NB	-	170.6
17	CSAH 22 at CSAH 9/Lake George Blvd.	AM	157	F	269	F	1.52	WB	-	80.7
	All-Way Stop Control	PM	232	F	361	F	1.73	WB	-	145.2
18	CSAH 24 at Rum River Blvd. NW (South)	AM	4	A	11	B	0.25	EB	-	-
	Two-Way Stop Control	PM	3	A	10	B	0.22	EB	-	-

*Delay in seconds per vehicle **Maximum delay, LOS, and v/c ratio on any approach and/or movement

***Limiting Movement is the highest delay movement. Queues given for LOS E and F movements only.



0 0.6 Mile

Legend

- Level of Service A-C (Acceptable)
- Level of Service E (Unacceptable)
- Level of Service F
- Major Road
- Local Road
- City Boundary

Source: Anoka County, MET Council, MnDOT, MnDNR

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ANOKA COUNTY

NORTHERN ANOKA COUNTY RIVER CROSSING STUDY

2030 No-Build Conditions AM Peak Hour Traffic

Figure 24

March, 2011

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ISANTI COUNTY

SAINT FRANCIS

NOWTHEN

OAK GROVE

Mud Lake

Norris Lake

Lake George

Hickey Lake

Benjamin Lake

Pederson Dr

233RD Ave

229TH Ave

Butterfield Dr

Rum River Blvd

High School Driveway

Arrowhead Dr

CR 103

221ST St

Sims Road

Nightingale Street

COUNTY 71 ROAD

COUNTY 72 ROAD

COUNTY 69 ROAD

COUNTY 66 ROAD

COUNTY 78 ROAD

MINNESOTA 47

28 COUNTY

24 COUNTY

9 COUNTY

7 COUNTY

22 COUNTY

0 0.6 Mile

Legend

- Level of Service A-C (Acceptable)
- Level of Service D (Unacceptable)
- Level of Service F
- Major Road
- Local Road
- City Boundary

Source: Anoka County, MET Council, MnDOT, MnDNR

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ANOKA COUNTY

NORTHERN ANOKA COUNTY RIVER CROSSING STUDY

2030 No-Build Conditions PM Peak Hour Traffic

Figure 25

March, 2011

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TH 47 at Pederson Dr/Middle School Access Driveway (Intersection #2) is anticipated to experience unacceptable levels of service in both the AM and PM peak hours. The existing two-way stop control (Pederson and the driveway stop) is not anticipated to be able to adequately handle the forecasted traffic volumes. The overall intersection LOS is LOS F for both the AM and PM peak hours. The worst movement is the westbound movement with LOS F and v/c ratios of 2.24 and 2.06 in the AM and PM peak hours respectively.

- TH 47 at CSAH 28/Ambassador Boulevard (Intersection #3) is anticipated to experience unacceptable levels of service in both the AM and PM peak hours. The existing two-way stop control (CSAH 28 stops for TH 47) is not anticipated to be able to adequately handle the forecasted traffic volumes. The overall intersection LOS is LOS F for both the AM and PM peak hours. The worst movement is the eastbound movement with LOS F and v/c ratios of 1.90 and 2.86 in the AM and PM peak hours respectively.
- CSAH 24/Middle School Access at CSAH 28 (Intersection #5) is anticipated to experience unacceptable levels of service. The existing all-way stop is not anticipated to be able to adequately handle the forecasted traffic volumes. The overall intersection LOS is LOS F in the AM and LOS E in the PM. The overall intersection is anticipated to operate acceptably in the Afternoon peak hour. The worst movement LOS is the southbound movement in the AM peak with LOS F and a v/c ratio of 1.06, the westbound movement in the Afternoon with a LOS E and v/c ratio of 0.88, and the westbound movement in the PM peak with a LOS F and a v/c ratio of 1.02.
- CSAH 24 at CSAH 7 (Intersection #7) is anticipated to experience unacceptable levels of service in the PM peak hour.. The existing two-way stop control (CSAH 24 stops for CSAH 7) is not anticipated to be able to adequately handle the forecasted traffic volumes. The overall intersection LOS in the PM peak is LOS F. The worst movement LOS is the eastbound movement with a LOS F and v/c ratio of 2.22.
- CSAH 24 at Butterfield Street (Intersection #8) is anticipated to experience unacceptable levels of service. The existing two-way stop control (Butterfield Street stops for CSAH 24) is not anticipated to be able to adequately handle the forecasted traffic volumes. The decrease in service levels is primarily due to the increased traffic along CSAH 24. While the service levels are unacceptable, they are just over the threshold for LOS E from LOS D and the volumes are low. The overall intersection LOS in the AM, Afternoon and PM peak hours are anticipated to be acceptable. The worst movement LOS is the southbound movement in the AM peak with a LOS E and v/c ratio of 0.37 and the northbound movement in the Afternoon peak with a LOS E and a v/c ratio of 0.14.
- CSAH 24 at Rum River Boulevard North (Intersection #9) is anticipated to experience unacceptable levels of service. The existing two-way stop control (Rum River Boulevard stops for CSAH 24) is not anticipated to be able to adequately handle the forecasted traffic volumes. Traffic on

Rum River Boulevard is anticipated to increase substantially due to the congestion anticipated along CSAH 24 to the west of the intersection. The overall intersection LOS is anticipated to be acceptable in the AM, Afternoon and PM peak hours. The worst movement LOS is anticipated to be the northbound movement in the AM peak with LOS F and a v/c ratio of 1.07.

- CSAH 24 at CR 72 (Intersection #10) is anticipated to experience unacceptable levels of service. The existing signal control and lanes are not anticipated to be able to adequately handle the forecasted traffic volumes. The overall intersection LOS is LOS F in the AM peak and LOS E in the Afternoon peak hour. The worst movement LOS is the northbound movement in the AM and Afternoon peak hours with LOS F and v/c ratios of 1.12 and 1.11 respectively.
- CSAH 24 at the East High School Access Driveway (Intersection #11) is anticipated to experience unacceptable levels of service. The unacceptable service levels are due to the high volume of eastbound and westbound traffic on CSAH 24 during the peak hours. The overall intersection LOS is LOS F in the Afternoon peak hour. The worst movement LOS is the southbound movement with LOS F and a v/c ratio of 1.67 in the AM peak and LOS F and a v/c ratio of 2.02 in the Afternoon peak.
- CSAH 24 at CSAH 9 (Intersection #12) is anticipated to have a high volume of traffic in both the AM and PM peak hours that exceed the capacity of the intersection. The overall intersection LOS is LOS E in the AM and LOS F in the PM. The worst movement LOS is the northbound movement with LOS F and a v/c ratio of 2.36 in the AM peak and LOS F and a v/c ratio of 1.51 in the PM peak.
- CSAH 22 at TH 47(Intersection #15) is anticipated to experience unacceptable levels of service in both the AM and PM peak hours. The existing all-way stop control is not anticipated to be able to adequately handle the forecasted traffic volumes. The overall intersection LOS is LOS F for both the AM and PM peak hours. The worst movement LOS is the westbound movement with LOS F and v/c ratios of 1.10 and 1.13 for the AM and PM peak hours respectively.
- CSAH 22 at CSAH 7(Intersection #16) is anticipated to experience unacceptable levels of service for both the AM and PM peak hours. The existing all-way stop control is not anticipated to be able to adequately handle the forecasted traffic volumes. The overall intersection LOS is LOS F for both the AM and PM peak hours. The worst movement LOS is the southbound movement in the AM peak with a LOS F and a v/c ratio of 1.94 and the northbound movement in the PM peak with a LOS F and a v/c ratio of 2.09.
- CSAH 22 at CSAH 9 (Intersection #17) is anticipated to experience unacceptable levels of service for both the AM and PM peak hours. The existing all-way stop control is not anticipated to be able to adequately handle the forecasted traffic volumes. The overall intersection LOS is LOS F for both the AM and PM peak hours. The worst movement LOS is the westbound movement with a LOS F and a v/c ratio of 1.52 in the

AM peak and a LOS F and a v/c ratio of 1.73 in the PM peak.

The remaining intersections within the corridor are able to accommodate forecasted 2030 no-build traffic volumes under existing lane and traffic control conditions.

2. Future 2030 Build Conditions

The Anoka County Traffic Model was used to develop 2030 traffic forecasts for the study. As part of this study, minor changes to the model were completed to the no-build model and are included in the Future No Build Conditions Technical Memorandum. The full explanation of the model changes, modifications completed and the travel demand modeling methodology to develop the traffic forecasts are included in the Travel Forecasting Technical Memorandum in Appendix A.

The traffic forecasts developed have a confidence range of plus or minus 15 percent. This confidence range is primarily based on the reliability of the historical traffic data, where a count one day out of the year is used to estimate what is happening every other day of the same year. Traffic naturally changes from day to day. As traffic is forecasted further into the future, the reliability of forecasting the exact traffic volume is less. This accounts for the confidence range. If a traffic volume forecast on a roadway segment changes by less than 15 percent, there is considered to be no substantial change in traffic volume. This is especially important to note when comparing the build forecasts to the no build forecasts. As a result, a less than 15 percent change in traffic volume is essentially considered to result in no change in traffic volume.

For each Build Forecast, the roadway capacities of the CSAH 22 and CSAH 24 expansion alternatives were altered to include 4-lane roadways, instead of the current 2-lane roadways. Each Roadway Expansion alternative was completed independent of the other. The analysis determined where the 4-lane segment was most needed based on congestion levels. The CSAH 22 Expansion was determined to be most needed from TH 7 to TH 65. The CSAH 24 Expansion was determined to be most needed from CSAH 24/28 to CSAH 9. An extension of a two-lane CR 103 from CSAH 13 to TH 65 was assumed with the CSAH 24 Expansion.

Traffic Forecast Results

The traffic analysis for segments within the study considered the following measures for evaluation of the alternatives: volume-to-capacity ratios, VMT (Vehicle-Miles Traveled), VHT (Vehicle-Hours Traveled), and Efficiency Index

It is best to have low VMT, low VHT, and a high efficiency index. No one measure is better than the other, and all should be considered.

Table 16 is the No-Build Forecasts presented in the No-Build Traffic Forecasts Results in the section above. Table 16 has been amended to include the VMT (Vehicle-Miles Traveled), VHT (Vehicle-Hours Traveled), and Efficiency Index, along with some additional roadway segment forecasts.

As mentioned above, a less than 15 percent change in volume from the No Build Forecasts to the Build Forecasts is not considered a change in volume due to the confidence range of the traffic forecasts. As a result, specific increases or decreases described below are discussed only when there is more than a 15

percent change between the No Build Forecasts to the Build Forecasts.

Figures 26-28 and Tables 16-18 correspond with the Build Forecasts. The Build Forecasts were developed for three alternative scenarios. Scenario 1 is the expansion of CSAH 22 to four lanes, Scenario 2 is the expansion of CSAH 24 to four lanes, and Scenario 3 is the expansion of CSAH 24 to four lanes with a Pederson Drive Extension from TH 47 to CSAH 24/28 south of the schools. An overview of the Build Forecasts and their comparison with the No Build condition and each other is included with each set of figures and tables.

Expansion Scenario 1: CSAH 22 Expansion (Figure 26 and Table 16)

The CSAH 22 Expansion in the traffic model considers expansion of CSAH 22 to a four lane facility from TH 47 to TH 65.

- CSAH 22 Expansion shows a need for the increased capacity from CSAH 7 to CSAH 78 due to the increase in traffic volume, but expansion from TH 47 to TH 65 is recommended due to the functional classification of the roadway as a principal arterial and the volume to capacity ratios over or near 1.0. Based on the traffic volumes and speeds, the capacity improvement would be a 4-lane divided facility.
- This expansion pulls more trips to CSAH 22 than the No Build condition.
- This expansion does reduce the traffic volume on CSAH 24, but not to a noticeable degree and not enough to eliminate a need for improvements on CSAH 24.
- Due to the directional changes in traffic, many of the roadways do not show a substantial decrease or increase in traffic volume.
- The only segments with a change of more than 15 percent as compared to the No Build scenario are Rum River Boulevard in St. Francis, Nightingale Street between CSAH 22 and Sims Road, CSAH 22 between CSAH 7 and CSAH 9, and CSAH 22 between CSAH 78 and CSAH 13.
- The traffic on Rum River Boulevard is reduced by 23 percent. The traffic traditionally using Rum River Boulevard is instead carried on CSAH 7 and CSAH 22.
- There is a 23 percent traffic increase on Nightingale Street north of CSAH 22 due to traffic shifts that take advantage of the CSAH 22 capacity increase and shorter travel times. The shift in traffic is from local routes.
- The traffic increases by 15 percent on CSAH 22 between CSAH 7 and CSAH 9. Traffic uses CSAH 7 and CSAH 22, instead of CSAH 24 and CSAH 9 to head east toward TH 65 or south toward TH 10. There is also a slight increase in traffic on CSAH 22 from sources outside the project area (i.e. Elk River).
- The traffic increases by 19 percent on CSAH 22 between CSAH 78 and CSAH 13. This is a result of the traffic increase on CSAH 22 from the above along with a slight traffic increase along CSAH 78.
- VMT increases from the No Build condition by approximately 12,900

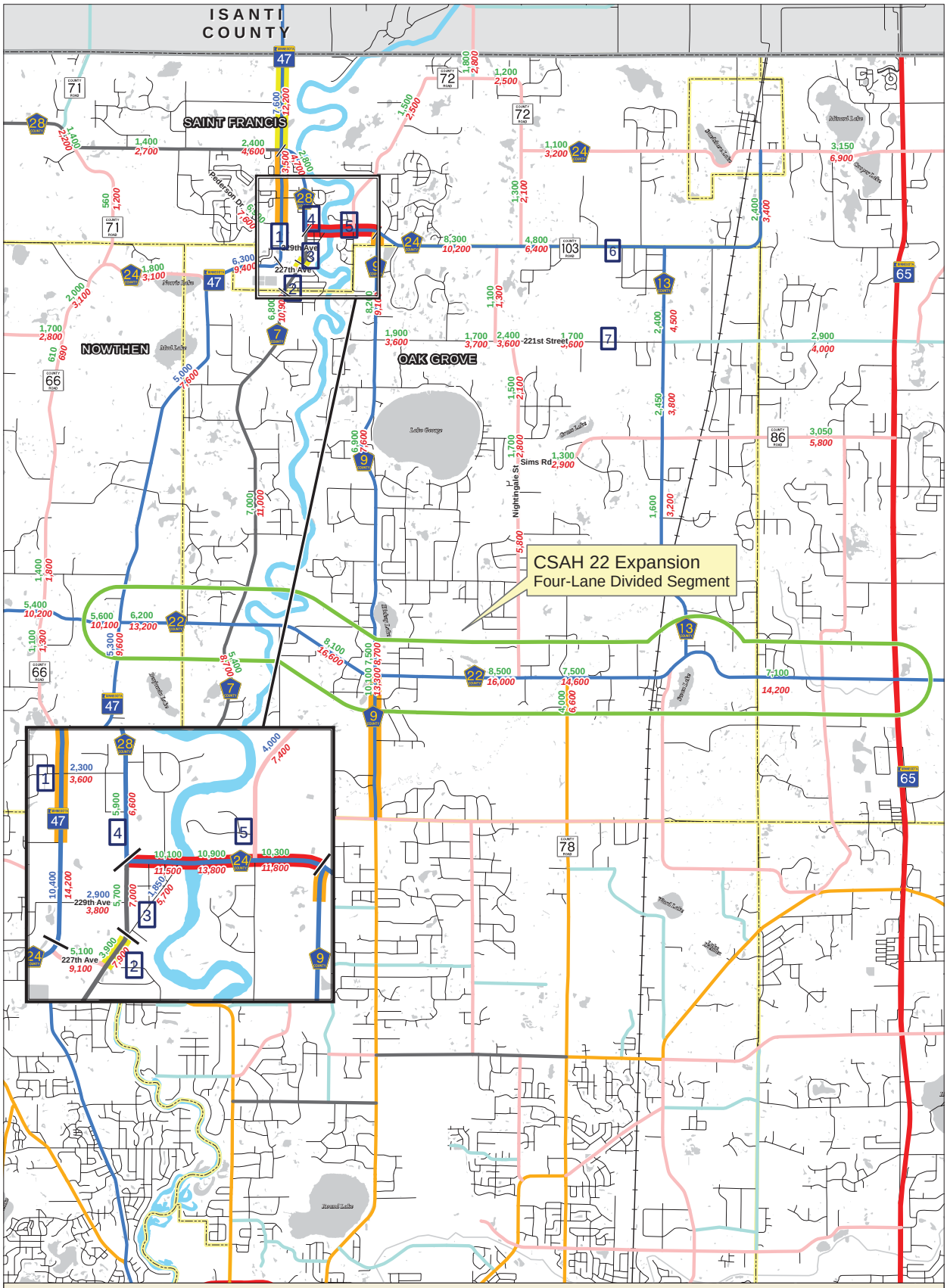

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Table 16: 2030 Build Traffic Volumes and Capacity Analysis

Northern Anoka County Rum River Crossing Study

Study Area Roadways >1,000 Forecasted AADT

CSAH 22 EXPANSION

4-Lane Divided Roadway from TH 47 to CR 78

Roadway					Forecasted Traffic						
Route	Route Description	Length (miles)	Posted Speed	Roadway Type	2030 AADT*	Annual Growth	2030 V/C Ratio	Daily Roadway Capacity	VMT	Efficiency Index	VHT
TH 47	S. of CSAH 22	1.58	55	R2	9,600	2.74%	0.64	15000	15,170	0.98	282
	CSAH 22 to CSAH 24	3.78	55	R2	7,600	1.92%	0.51	15000	28,730	1.00	525
	CSAH 24 to CSAH 24	0.78	55	R2	9,400	1.84%	0.63	15000	7,330	0.96	139
	CSAH 24 to Pederson Drive	0.43	55	R4	14,700	1.59%	0.39	38000	6,320	0.99	116
	Pederson Drive to CSAH 28	0.77	55	R2	13,500	1.19%	0.90	15000	10,400	0.87	216
	N. of CSAH 28	2.99	55	R2	12,600	2.32%	0.84	15000	37,670	0.97	704
CSAH 7	S. of CSAH 22	2.28	55	R2	8,700	2.40%	0.58	15000	19,840	0.99	365
	CSAH 22 to 217th Avenue	2.57	55	R2	11,000	2.31%	0.73	15000	28,270	0.98	524
	217th Avenue to CSAH 24	1.40	45	R2	10,900	2.37%	0.73	15000	15,260	0.97	349
CSAH 9	S. of CSAH 22	1.49	55	R2	13,300	1.36%	0.89	15000	19,820	0.94	385
	CSAH 22 to 201st Avenue	1.00	55	R2	8,700	0.72%	0.58	15000	8,700	0.97	162
	201st Avenue to 221st Avenue	2.55	55	R2	7,600	0.47%	0.51	15000	19,380	0.99	355
	221st Avenue to 300' S. of CSAH 24	1.06	55	R2	9,100	0.49%	0.61	15000	9,650	0.97	180
	300' S. of CSAH 24 to CSAH 24	0.06	55	U2	9,100	0.49%	0.91	10000	550	0.26	39
CSAH 13	CSAH 22 to CR 86	2.36	55	R2	3,200	2.52%	0.21	15000	7,550	1.00	138
	CR 86 to CR 74	1.00	55	R2	3,800	2.21%	0.25	15000	3,800	0.99	70
	CR 74 to CR 103	1.00	55	R2	4,500	2.80%	0.30	15000	4,500	0.99	82
	CR 103 to CSAH 24	1.93	55	R2	3,400	2.33%	0.23	15000	6,560	1.00	120
CSAH 22	W. of CR 66	1.29	55	R2	10,200	3.23%	0.68	15000	13,160	0.97	247
	CR 66 to TH 47	0.82	55	R2	10,100	2.98%	0.67	15000	8,280	0.95	158
	TH 47 to CSAH 7	1.18	55	R2	13,200	3.81%	0.35	38000	15,580	1.00	284
	CSAH 7 to CSAH 9	1.62	55	R4	16,600	3.65%	0.44	38000	26,890	1.00	491
	CSAH 9 to CR 78	2.00	55	R4	16,000	3.19%	0.42	38000	32,000	1.00	583
	CR 78 to CSAH 13	1.32	55	R2	14,600	3.42%	0.38	38000	19,270	1.00	352
	CSAH 13 to TH 65	2.31	55	R2	14,200	2.70%	0.37	38000	32,800	1.00	598
CSAH 24	W. of CR 66	1.56	55	R2	2,800	2.49%	0.19	15000	4,370	1.00	80
	CR 66 to CR 71	0.84	55	R2	3,100	2.26%	0.21	15000	2,600	0.99	48
	CR 71 to TH 47	1.13	55	R2	3,100	2.87%	0.21	15000	3,500	0.99	64
	TH 47 to CSAH 7	0.22	55	R2	9,100	2.97%	0.61	15000	2,000	0.88	41
	CSAH 7 to Rum River Blvd	0.14	45	U2	7,900	3.66%	0.79	10000	1,110	0.64	39
	Rum River Blvd to CSAH 24/28	0.29	35	U2	7,000	1.02%	0.70	10000	2,030	0.87	67
	CSAH 24/28 to Rum River Blvd	0.20	30	U2	11,300	0.56%	1.13	10000	2,260	0.29	263
	Rum River Blvd to CR 72	0.30	40	U2	13,800	1.19%	1.38	10000	4,140	0.14	763
	CR 72 to CSAH 9	0.27	40	U2	11,800	0.71%	1.18	10000	3,190	0.23	349
	CSAH 9 to CR 103	1.52	55	R2	10,200	1.04%	0.68	15000	15,500	0.97	290
	CR 103 to CR 72	0.99	55	R2	2,100	2.34%	0.14	15000	2,080	1.00	38
	CR 72 to CSAH 13	2.63	55	R2	3,200	5.72%	0.21	15000	8,420	1.00	153
	CSAH 13 to TH 65	1.50	55	R2	6,900	3.34%	0.46	15000	10,350	0.99	190
CSAH 28	CSAH 24 to 223rd Avenue	0.33	40	U2	6,600	0.59%	0.66	10000	2,180	0.89	61
	223rd Avenue to TH 47	0.62	45	U2	4,700	2.58%	0.47	10000	2,910	0.97	67
	TH 47 to Pederson Drive	0.74	55	R2	4,600	3.33%	0.31	15000	3,400	0.99	63
	Pederson Drive to CR 71	1.40	55	R2	2,700	3.46%	0.18	15000	3,780	1.00	69
	CR 71 to CR 71	0.25	55	R2	2,200	2.31%	0.15	15000	550	0.99	10
CR 66	S. of CSAH 22	1.81	55	R2	1,300	1.04%	0.09	15000	2,350	1.00	43
	CSAH 22 to Gypsy Valley Road	1.00	55	R2	1,800	1.40%	0.12	15000	1,800	1.00	33
	Gypsy Valley Road to CSAH 24	1.57	55	R2	690	0.61%	0.05	15000	1,080	1.00	20
CR 71	CSAH 24 to CSAH 28	1.45	55	R2	1,200	3.90%	0.08	15000	1,740	1.00	32
CR 72	CSAH 24 to 235th Avenue	0.67	55	U2	7,400	3.11%	0.74	10000	4,960	0.89	101
	235th Avenue to CR 72	1.62	55	R2	2,500	2.44%	0.17	15000	4,050	1.00	74
	CR 72 to CSAH 24	1.20	55	R2	2,500	3.70%	0.17	15000	3,000	1.00	55
	N. of CR 72	0.74	55	R2	2,800	2.23%	0.19	15000	2,070	0.99	38
CR 74	CSAH 13 to TH 65	2.41	55	R2	4,000	1.47%	0.27	15000	9,640	1.00	176
CR 78	S. of CSAH 22	1.49	55	R2	6,600	2.51%	0.44	15000	9,830	0.99	181
CR 86	CSAH 13 to TH 65	2.41	55	R2	5,800	2.60%	0.39	15000	13,980	1.00	255
CR 103	CSAH 24 to CSAH 13	1.49	55	R2	6,400	1.44%	0.43	15000	9,540	0.99	175
Pederson Drive	TH 47 to CSAH 28	1.22	55	R2	7,600	0.46%	0.51	15000	9,270	0.99	171
Rum River Blvd	CSAH 24 to CSAH 24	0.35	30	R2	5,700	5.79%	0.57	10000	2,000	0.95	70
Raven Street	221st Avenue to CSAH 24	1.00	55	R2	1,300	1.02%	0.09	15000	1,300	1.00	24
Nightingale Street	CSAH 22 to Sims Road	2.25	55	R2	5,800	1.72%	0.39	15000	13,050	0.99	239
	Sims Road to Lake George Pkwy	0.25	55	R2	2,800	2.55%	0.19	15000	700	0.98	13
	Lake George Pkwy to 221st Avenue	1.00	55	R2	2,100	1.78%	0.14	15000	2,100	1.00	38
221st Avenue	CSAH 9 to Zion Pkwy	0.75	55	R2	3,600	3.09%	0.24	15000	2,700	0.99	49
	Zion Pkwy to Raven Street	0.50	55	R2	3,700	3.92%	0.25	15000	1,850	0.99	34
	Raven Street to Nightingale Street	0.18	55	R2	3,600	2.05%	0.24	15000	650	0.97	12
	Nightingale Street to CSAH 13	1.57	55	R2	3,600	3.78%	0.24	15000	5,650	1.00	103
Sims Road	Nightingale Street to CSAH 13	1.61	55	R2	2,900	4.09%	0.19	15000	4,670	1.00	85
229th Avenue	TH 47 to CSAH 24	0.25	30	U2	3,800	1.24%	0.38	10000	950	0.96	33
233rd Avenue	TH 47 to CSAH 28	0.25	30	U2	3,600	2.06%	0.36	10000	900	0.97	31
Total									**581,680**	**0.89**	**12,200**

*The Forecast Numbers Have a Likely Confidence Range of Plus or Minus 15%.

AADT = Annual Average Daily Traffic

Roadway Type			
U2	Urban 2-Lane Undivided	R2	Rural 2-Lane Undivided
U4	Urban 4-Lane Undivided	R4	Rural 4-Lane Divided (w/ Turn Lanes)
D4	Urban 4-Lane Divided (with Turn Lanes)		

V/C = Volume to Capacity Ratio

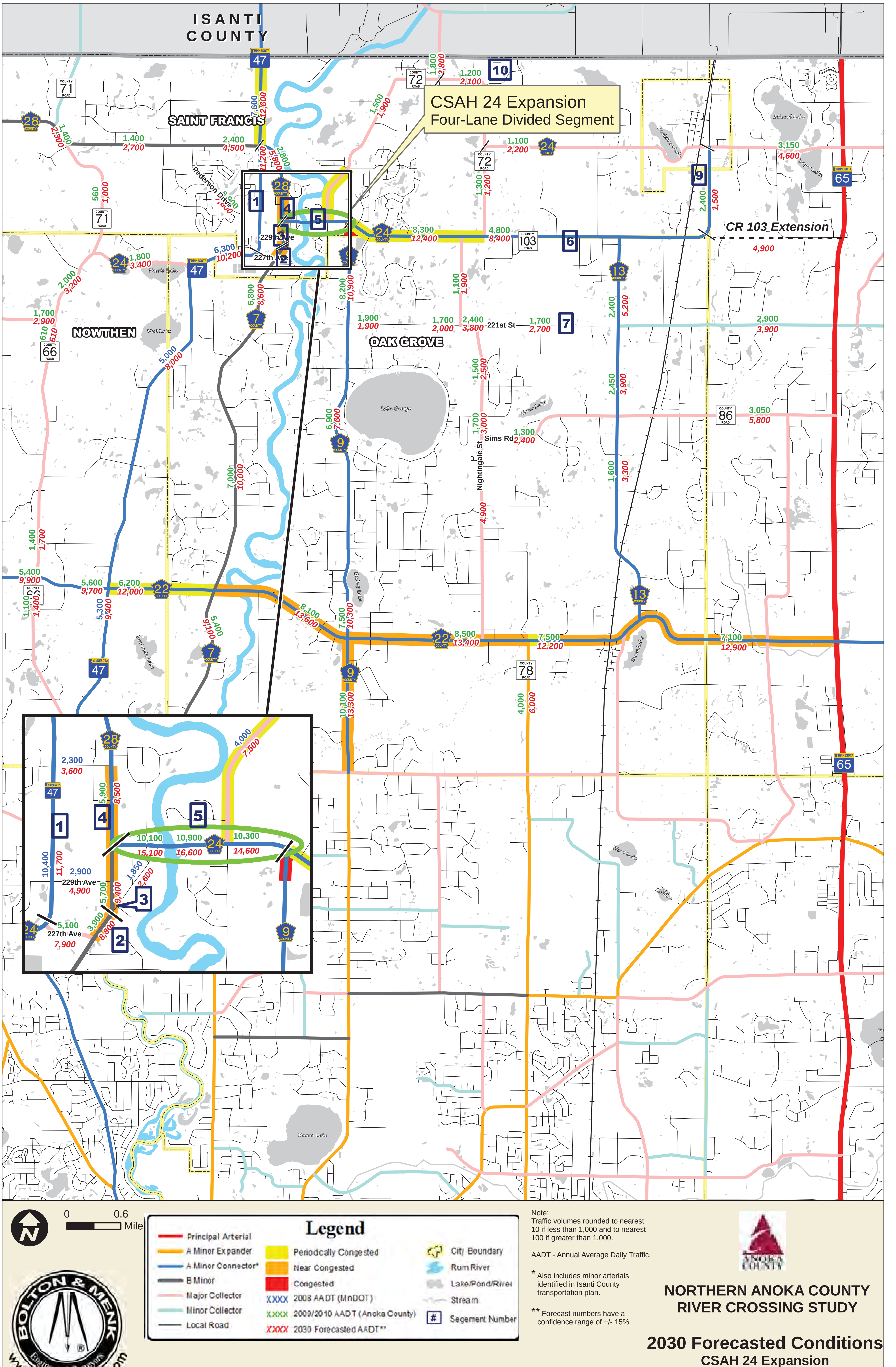
- Periodically Congested, V/C > 0.75
- Near Congested, V/C > 0.85
- Congested, V/C>1.00 (with existing roadway)

miles, but VHT decreases by 500 hours. As a result, traffic travels further to use CSAH 22, but travel time is reduced. The result is a slightly more efficient system (from 0.86 to 0.88).

Expansion Scenario 2: CSAH 24 Expansion (Figure 27 and Table 17)

The CSAH 24 Expansion considers an extension of CR 103/CSAH 13 east from CSAH 13 to TH 65 and expansion of the CSAH 24 roadway to a four lane facility from CSAH 24/28 to TH 65. The CSAH 24 roadway in this analysis is considered to be CSAH 24 from CSAH 24/28 to CR 103, CR 103 from CSAH 24 to CSAH 13, and CSAH 13 east of CR 103. The CR 103 extension is directly east of that roadway alignment.

- CSAH 24 Expansion shows a need for the increased capacity from CSAH 24/28 to CSAH 9 due to the increase in traffic volume. Capacity improvements would not be needed all the way to TH 65. Based on the traffic volumes and speeds, the capacity improvements would be a 3-lane facility or 4-lane divided facility.
- This expansion pulls more trips to CSAH 24 than the No Build condition. This expansion reduces the traffic volume on CSAH 22 from the No Build condition.
- Due to the directional changes in traffic, many of the roadways do not show a substantial decrease or increase in traffic volume.
- The only segments with a change of more than 15 percent as compared to the No Build scenario are Rum River Boulevard in St. Francis, CSAH 24 (segments 3 and 5 on Figure 27), CSAH 24 between CSAH 9 and TH 65, CR 103 between CSAH 24 and CSAH 13, CSAH 13 between CR 103 and CSAH 24 (segment 9), CR 72 between 235th Avenue and CSAH 24 (segment 10), Raven Street between CSAH 24 and 221st Avenue, 221st Avenue between CSAH 9 and Raven Street, and 221st Avenue between Nightingale Street and CSAH 13.
- The traffic on Rum River Boulevard is reduced by 65 percent for this alternative. The traffic is instead carried on CSAH 24. This coincides with a 25 to 38 percent increase in traffic on CSAH 24 (segments 3 and 5).
- The traffic using the alignment that includes CSAH 24, CR 103, and CSAH 13 is increased due to the higher capacity and less congestion in the bridge area and the direct connection to TH 65.
- Traffic using parallel routes is decreased since traffic uses the CR 103 Extension alignment. This includes the traffic using the CSAH 24 through Bethel, the traffic using CR 72 north and east of the high school (this traffic now goes south on CR 72 past the high school), Raven Street, and 221st Avenue. Additionally the traffic using CSAH 13 between Bethel and the CR 103 Extension is reduced by 56 percent.
- The CR 103 Extension from CSAH 13 to TH 65 does shorten the trip lengths, but elimination of this extension does not change the need for capacity improvements on CSAH 24. A quick evaluation of the CR 103 extension shows that without the extension, traffic is expected to be



Note:
Traffic volumes rounded to nearest 10 if less than 1,000 and to nearest 100 if greater than 1,000.

AADT - Annual Average Daily Traffic.

* Also includes minor arterials identified in Isanti County transportation plan.

** Forecast numbers have a confidence range of +/- 15%

Source: Anoka County, MET Council, MnDOT, MnDNR

NORTHERN ANOKA COUNTY RIVER CROSSING STUDY

2030 Forecasted Conditions

CSAH 24 Expansion

Figure 27

May, 2011

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Table 17: 2030 Build Traffic Volumes and Capacity Analysis

Northern Anoka County Rum River Crossing Study

Study Area Roadways >1,000 Forecasted AADT

CSAH 24 EXPANSION

4-Lane Divided Roadway from CSAH 24/28 to CSAH 9

New 2-Lane Undivided CR 103 Extension from CSAH 13 to TH 65

Roadway					Forecasted Traffic						
Route	Route Description	Length (miles)	Posted Speed	Roadway Type	2030 AADT*	Annual Growth	2030 V/C Ratio	Daily Roadway Capacity	VMT	Efficiency Index	VHT
TH 47	S. of CSAH 22	1.58	55	R2	9,400	2.64%	0.63	15000	14,850	0.98	276
	CSAH 22 to CSAH 24	3.78	55	R2	8,000	2.16%	0.53	15000	30,240	0.99	553
	CSAH 24 to CSAH 24	0.78	55	R2	10,200	2.21%	0.68	15000	7,960	0.95	152
	CSAH 24 to Pederson Drive	0.43	55	R4	11,700	0.54%	0.31	38000	5,030	0.99	92
	Pederson Drive to CSAH 28	0.77	55	R2	11,200	0.34%	0.75	15000	8,620	0.93	168
	N. of CSAH 28	2.99	55	R2	12,600	2.32%	0.84	15000	37,670	0.97	704
CSAH 7	S. of CSAH 22	2.28	55	R2	9,100	2.63%	0.61	15000	20,750	0.99	382
	CSAH 22 to 217th Avenue	2.57	55	R2	8,900	1.23%	0.59	15000	22,870	0.99	420
	217th Avenue to CSAH 24	1.40	45	R2	8,600	1.16%	0.57	15000	12,040	0.99	271
CSAH 9	S. of CSAH 22	1.49	55	R2	13,300	1.36%	0.89	15000	19,820	0.94	385
	CSAH 22 to 201st Avenue	1.00	55	R2	10,300	1.57%	0.69	15000	10,300	0.96	195
	201st Avenue to 221st Avenue	2.55	55	R2	7,600	0.47%	0.51	15000	19,380	0.99	355
	221st Avenue to 300' S. of CSAH 24	1.06	55	R2	10,900	1.40%	0.73	15000	11,550	0.95	220
	300' S. of CSAH 24 to CSAH 24	0.06	55	U2	10,900	1.40%	1.09	10000	650	0.09	138
CSAH 13	CSAH 22 to CR 86	2.36	55	R2	3,300	2.67%	0.22	15000	7,790	1.00	142
	CR 86 to CR 74	1.00	55	R2	3,900	2.33%	0.26	15000	3,900	0.99	71
	CR 74 to CR 103	1.00	55	R2	5,200	3.48%	0.35	15000	5,200	0.99	95
	CR 103 to CSAH 24	1.93	55	R2	1,500	-1.41%	0.10	15000	2,900	1.00	53
CSAH 22	W. of CR 66	1.29	55	R2	9,900	3.08%	0.66	15000	12,770	0.97	239
	CR 66 to TH 47	0.82	55	R2	9,700	2.77%	0.65	15000	7,950	0.96	151
	TH 47 to CSAH 7	1.18	55	R2	12,000	3.32%	0.80	15000	14,160	0.95	272
	CSAH 7 to CSAH 9	1.62	55	R2	13,600	2.63%	0.91	15000	22,030	0.93	429
	CSAH 9 to CR 78	2.00	55	R2	13,400	2.28%	0.89	15000	26,800	0.95	513
	CR 78 to CSAH 13	1.32	55	R2	12,200	2.50%	0.81	15000	16,100	0.95	309
	CSAH 13 to TH 65	2.31	55	R2	12,900	2.25%	0.86	15000	29,800	0.96	563
CSAH 24	W. of CR 66	1.56	55	R2	2,900	2.67%	0.19	15000	4,520	1.00	82
	CR 66 to CR 71	0.84	55	R2	3,200	2.42%	0.21	15000	2,690	0.99	49
	CR 71 to TH 47	1.13	55	R2	3,400	3.35%	0.23	15000	3,840	0.99	70
	TH 47 to CSAH 7	0.22	55	R2	7,900	2.24%	0.53	15000	1,740	0.92	34
	CSAH 7 to Rum River Blvd	0.14	45	U2	8,800	4.22%	0.88	10000	1,230	0.53	51
	Rum River Blvd to CSAH 24/28	0.29	35	U2	9,400	2.52%	0.94	10000	2,730	0.68	115
	CSAH 24/28 to Rum River Blvd	0.20	30	D4	15,100	2.02%	0.47	32000	3,020	0.98	103
	Rum River Blvd to CR 72	0.30	40	D4	16,600	2.13%	0.52	32000	4,980	0.98	127
	CR 72 to CSAH 9	0.27	40	D4	14,600	1.78%	0.46	32000	3,940	0.98	100
	CSAH 9 to CR 103	1.52	55	R2	12,400	2.03%	0.83	15000	18,850	0.95	360
	CR 103 to CR 72	0.99	55	R2	1,200	-0.49%	0.08	15000	1,190	1.00	22
	CR 72 to CSAH 13	2.63	55	R2	2,200	3.76%	0.15	15000	5,790	1.00	105
	CSAH 13 to TH 65	1.50	55	R2	4,600	1.45%	0.31	15000	6,900	0.99	126
CSAH 28	CSAH 24 to 223rd Avenue	0.33	40	U2	8,500	1.87%	0.85	10000	2,810	0.78	90
	223rd Avenue to TH 47	0.62	45	U2	5,800	3.67%	0.58	10000	3,600	0.95	84
	TH 47 to Pederson Drive	0.74	55	R2	4,500	3.21%	0.30	15000	3,330	0.99	61
	Pederson Drive to CR 71	1.40	55	R2	2,700	3.46%	0.18	15000	3,780	1.00	69
	CR 71 to CR 71	0.25	55	R2	2,300	2.54%	0.15	15000	580	1.00	11
CR 66	S. of CSAH 22	1.81	55	R2	1,400	1.42%	0.09	15000	2,530	1.00	46
	CSAH 22 to Gypsy Valley Road	1.00	55	R2	1,700	1.11%	0.11	15000	1,700	1.00	31
	Gypsy Valley Road to CSAH 24	1.57	55	R2	610	-0.01%	0.04	15000	960	1.00	17
CR 71	CSAH 24 to CSAH 28	1.45	55	R2	1,000	2.96%	0.07	15000	1,450	1.00	26
CR 72	CSAH 24 to 235th Avenue	0.67	55	U2	7,500	3.18%	0.75	10000	5,030	0.89	103
	235th Avenue to CR 72	1.62	55	R2	1,900	1.04%	0.13	15000	3,080	1.00	56
	CR 72 to CSAH 24	1.20	55	R2	2,100	2.80%	0.14	15000	2,520	1.00	46
	N. of CR 72	0.74	55	R2	2,800	2.23%	0.19	15000	2,070	0.99	38
CR 74	CSAH 13 to TH 65	2.41	55	R2	3,900	1.36%	0.26	15000	9,400	1.00	171
CR 78	S. of CSAH 22	1.49	55	R2	6,000	2.02%	0.40	15000	8,940	0.99	164
CR 86	CSAH 13 to TH 65	2.41	55	R2	5,800	2.60%	0.39	15000	13,980	1.00	255
CR 103	CSAH 24 to CSAH 13	1.49	55	R2	8,400	2.83%	0.56	15000	12,520	0.98	231
CR 103 Extension	CSAH 13 to TH 65	1.48	55	R2	4,900		0.33	15000	7,250	0.99	133
Pederson Drive	TH 47 to CSAH 28	1.22	55	R2	7,600	0.46%	0.51	15000	9,270	0.99	171
Rum River Blvd	CSAH 24 to CSAH 24	0.35	30	R2	2,600	1.72%	0.26	10000	910	0.98	31
Raven Street	221st Avenue to CSAH 24	1.00	55	R2	1,900	2.86%	0.13	15000	1,900	1.00	35
Nightingale Street	CSAH 22 to Sims Road	2.25	55	R2	4,900	1.21%	0.33	15000	11,030	1.00	201
	Sims Road to Lake George Pkwy	0.25	55	R2	3,000	2.89%	0.20	15000	750	0.98	14
	Lake George Pkwy to 221st Avenue	1.00	55	R2	2,500	2.63%	0.17	15000	2,500	1.00	46
221st Avenue	CSAH 9 to Zion Pkwy	0.75	55	R2	1,900	0.00%	0.13	15000	1,430	1.00	26
	Zion Pkwy to Raven Street	0.50	55	R2	2,000	0.92%	0.13	15000	1,000	0.99	18
	Raven Street to Nightingale Street	0.18	55	R2	3,800	2.31%	0.25	15000	680	0.96	13
	Nightingale Street to CSAH 13	1.57	55	R2	2,700	2.37%	0.18	15000	4,240	1.00	77
Sims Road	Nightingale Street to CSAH 13	1.61	55	R2	2,400	3.16%	0.16	15000	3,860	1.00	70
229th Avenue	TH 47 to CSAH 24	0.25	30	U2	4,900	2.41%	0.49	10000	1,230	0.95	43
233rd Avenue	TH 47 to CSAH 28	0.25	30	U2	3,600	2.06%	0.36	10000	900	0.97	31
Total									**557,780**	**0.93**	**10,904**

*The Forecast Numbers Have a Likely Confidence Range of Plus or Minus 15%.

AADT = Annual Average Daily Traffic

Roadway Type			
U2	Urban 2-Lane Undivided	R2	Rural 2-Lane Undivided
U4	Urban 4-Lane Undivided	R4	Rural 4-Lane Divided (w/ Turn Lanes)
D4	Urban 4-Lane Divided (with Turn Lanes)		

V/C = Volume to Capacity Ratio

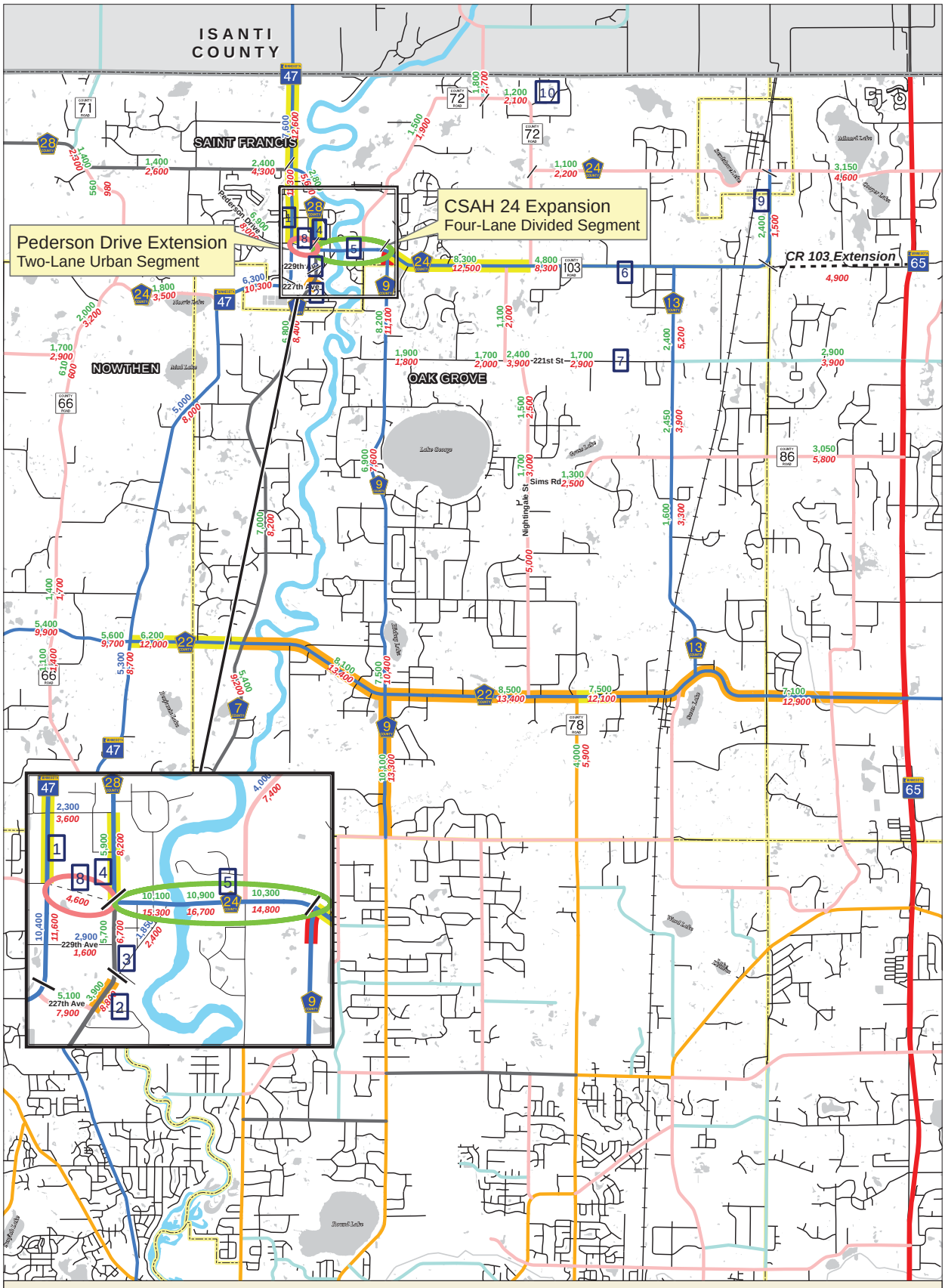
- Periodically Congested, V/C > 0.75
- Near Congested, V/C > 0.85
- Congested, V/C>1.00 (with existing roadway)

- higher on the alternate routes mentioned above.
- VMT decreases from the No Build condition by approximately 11,000 miles and VHT decreases by 1,900 hours. As a result, travel distance and time are reduced and the outcome is a more efficient system (from 0.86 to 0.93).

Expansion Scenario 3: CSAH 24 Expansion with Extension (Figure 28 and Table 18)

The CSAH 24 Expansion with Extension considers an extension of Pederson Drive from TH 47 to Bridge Street (CSAH 24/28), extension of CR 103/CSAH 13 east from CSAH 13 to TH 65, and expansion of the CSAH 24 roadway to a four lane facility from CSAH 24/28 to TH 65. The CSAH 24 roadway in this analysis is considered to be CSAH 24 from CSAH 24/28 to CR 103, CR 103 from CSAH 24 to CSAH 13, and CSAH 13 east of CR 103. The CR 103 extension is directly east of that roadway alignment.

- This scenario is similar to the CSAH 24 Expansion, except it includes a 2-lane urban roadway extension of Pederson Drive from TH 47 to Bridge St (CSAH 24/28), adjacent to the schools (segment 8 on Figure 28). The new roadway extension between CSAH 24/28 and TH 47 would be a city roadway. Additional discussion is warranted between the city and school district to evaluate whether or not this new roadway is a direction they want to pursue.
- This expansion pulls more trips to CSAH 24 than the No Build condition, but is otherwise the same as Expansion Scenario 2.
- All of the results from Expansion Scenario 2 are repeated under this scenario except the following:
    - The traffic on Rum River Boulevard is reduced by 68 percent from the No Build condition. This results in a 26 percent traffic increase along CSAH 24/Bridge St (segment 5). The increase along segment 3 of CSAH 24 is much smaller due to the use of the local extension.
    - The traffic is reduced by 59 percent on 229th Avenue when compared to the No Build condition. This traffic now uses the new extension.
    - There are 4,600 vehicles per day forecasted to use the Pederson Drive extension. This is a low volume connection that is a significant volume decrease from what is on CSAH 24. This is likely the result of where the City is growing. Forecasts suggest growth will occur between TH 47 and CSAH 28, as well as north along TH 47. The traffic to and from these areas use CSAH 28 and TH 47 to access the larger roadway network. This is not going to change with the extension. Traffic using the extension is primarily to and from Pederson Drive. There may be a potential that some traffic could shift from CSAH 28 to Pederson Drive and the extension if other factors are considered including pavement condition or service and retail business access, but this is not taken into account in the model.



Legend

- Principal Arterial
- A Minor Expander
- A Minor Connector*
- B Minor
- Major Collector
- Minor Collector
- Local Road
- Railroad
- Periodically Congested
- Near Congested
- Congested
- XXXX 2008 AADT (MnDOT)
- XXXX 2009/2010 AADT (Anoka County)
- XXXX 2030 Forecasted AADT**
- County Boundary
- City Boundary
- Rum River
- Lake/Pond/River
- Stream
- # Segment Number

Note:
Traffic volumes rounded to nearest 10 if less than 1,000 and to nearest 100 if greater than 1,000.

AADT - Annual Average Daily Traffic.

* Also includes minor arterials identified in Isanti County transportation plan.

** Forecast numbers have a confidence range of +/- 15%

Source: Anoka County, MET Council, MnDOT, MnDNR

NORTHERN ANOKA COUNTY RIVER CROSSING STUDY

2030 Forecasted Conditions

CSAH 24 Expansion and Extension

Figure 28

June, 2011

Map Document: H:\AKCO\T42102757\ESRI\T42102757\ESRI\Maps\4_102757 2030 No-Build Conditions CSAH 24 Expansion with Extension 11x17.mxd
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Table 18: 2030 Build Traffic Volumes and Capacity Analysis
Northern Anoka County Rum River Crossing Study

Study Area Roadways >1,000 Forecasted AADT

CSAH 24 EXPANSION With EXTENSION

4-Lane Divided Roadway from CSAH 24/28 to CSAH 9
New 2-Lane Undivided Pederson Drive Extension from TH 47 to CSAH 24/28
New 2-Lane Undivided CR 103 Extension from CSAH 13 to TH 65

Roadway					Forecasted Traffic						
Route	Route Description	Length (miles)	Posted Speed	Roadway Type	2030 AADT*	Annual Growth	2030 V/C Ratio	Daily Roadway Capacity	VMT	Efficiency Index	VHT
TH 47	S. of CSAH 22	1.58	55	R2	8,700	2.28%	0.58	15000	13,750	0.98	254
	CSAH 22 to CSAH 24	3.78	55	R2	8,000	2.16%	0.53	15000	30,240	0.99	553
	CSAH 24 to CSAH 24	0.78	55	R2	10,300	2.26%	0.69	15000	8,030	0.95	154
	CSAH 24 to Pederson Drive	0.43	55	R4	11,600	0.50%	0.31	38000	4,990	0.99	91
	Pederson Drive to CSAH 28	0.77	55	R2	11,300	0.38%	0.75	15000	8,700	0.93	170
	N. of CSAH 28	2.99	55	R2	12,600	2.32%	0.84	15000	37,670	0.97	704
CSAH 7	S. of CSAH 22	2.28	55	R2	9,200	2.68%	0.61	15000	20,980	0.99	386
	CSAH 22 to 217th Avenue	2.57	55	R2	8,700	1.11%	0.58	15000	22,360	0.99	411
	217th Avenue to CSAH 24	1.40	45	R2	8,400	1.04%	0.56	15000	11,760	0.99	265
CSAH 9	S. of CSAH 22	1.49	55	R2	13,300	1.36%	0.89	15000	19,820	0.94	385
	CSAH 22 to 201st Avenue	1.00	55	R2	10,400	1.62%	0.69	15000	10,400	0.96	197
	201st Avenue to 221st Avenue	2.55	55	R2	7,600	0.47%	0.51	15000	19,380	0.99	355
	221st Avenue to 300' S. of CSAH 24	1.06	55	R2	11,100	1.50%	0.74	15000	11,770	0.95	225
	300' S. of CSAH 24 to CSAH 24	0.06	55	U2	11,100	1.50%	1.11	10000	670	0.07	168
CSAH 13	CSAH 22 to CR 86	2.36	55	R2	3,300	2.67%	0.22	15000	7,790	1.00	142
	CR 86 to CR 74	1.00	55	R2	3,900	2.33%	0.26	15000	3,900	0.99	71
	CR 74 to CR 103	1.00	55	R2	5,200	3.48%	0.35	15000	5,200	0.99	95
	CR 103 to CSAH 24	1.93	55	R2	1,500	-1.41%	0.10	15000	2,900	1.00	53
CSAH 22	W. of CR 66	1.29	55	R2	9,900	3.08%	0.66	15000	12,770	0.97	239
	CR 66 to TH 47	0.82	55	R2	9,700	2.77%	0.65	15000	7,950	0.96	151
	TH 47 to CSAH 7	1.18	55	R2	12,000	3.32%	0.80	15000	14,160	0.95	272
	CSAH 7 to CSAH 9	1.62	55	R2	13,400	2.55%	0.89	15000	21,710	0.94	421
	CSAH 9 to CR 78	2.00	55	R2	13,400	2.28%	0.89	15000	26,800	0.95	513
	CR 78 to CSAH 13	1.32	55	R2	12,100	2.46%	0.81	15000	15,970	0.95	306
	CSAH 13 to TH 65	2.31	55	R2	12,900	2.25%	0.86	15000	29,800	0.96	563
CSAH 24	W. of CR 66	1.56	55	R2	2,900	2.67%	0.19	15000	4,520	1.00	82
	CR 66 to CR 71	0.84	55	R2	3,200	2.42%	0.21	15000	2,690	0.99	49
	CR 71 to TH 47	1.13	55	R2	3,500	3.50%	0.23	15000	3,960	1.00	72
	TH 47 to CSAH 7	0.22	55	R2	7,900	2.24%	0.53	15000	1,740	0.92	34
	CSAH 7 to Rum River Blvd	0.14	45	U2	8,800	4.22%	0.88	10000	1,230	0.53	51
	Rum River Blvd to CSAH 24/28	0.29	35	U2	6,700	0.80%	0.67	10000	1,940	0.88	63
	CSAH 24/28 to Rum River Blvd	0.20	30	D4	15,300	2.09%	0.48	32000	3,060	0.98	104
	Rum River Blvd to CR 72	0.30	40	D4	16,700	2.16%	0.52	32000	5,010	0.98	128
	CR 72 to CSAH 9	0.27	40	D4	14,800	1.85%	0.46	32000	4,000	0.98	102
	CSAH 9 to CR 103	1.52	55	R2	12,500	2.08%	0.83	15000	19,000	0.95	363
	CR 103 to CR 72	0.99	55	R2	1,200	-0.49%	0.08	15000	1,190	1.00	22
	CR 72 to CSAH 13	2.63	55	R2	2,200	3.76%	0.15	15000	5,790	1.00	105
	CSAH 13 to TH 65	1.50	55	R2	4,600	1.45%	0.31	15000	6,900	0.99	126
CSAH 28	CSAH 24 to 223rd Avenue	0.33	40	U2	8,200	1.69%	0.82	10000	2,710	0.80	84
	223rd Avenue to TH 47	0.62	45	U2	5,600	3.48%	0.56	10000	3,470	0.96	81
	TH 47 to Pederson Drive	0.74	55	R2	4,300	2.98%	0.29	15000	3,180	0.99	58
	Pederson Drive to CR 71	1.40	55	R2	2,600	3.27%	0.17	15000	3,640	1.00	66
	CR 71 to CR 71	0.25	55	R2	2,300	2.54%	0.15	15000	580	1.00	11
CR 66	S. of CSAH 22	1.81	55	R2	1,400	1.42%	0.09	15000	2,530	1.00	46
	CSAH 22 to Gypsy Valley Road	1.00	55	R2	1,700	1.11%	0.11	15000	1,700	1.00	31
	Gypsy Valley Road to CSAH 24	1.57	55	R2	600	-0.09%	0.04	15000	940	1.00	17
CR 71	CSAH 24 to CSAH 28	1.45	55	R2	980	2.86%	0.07	15000	1,420	1.00	26
CR 72	CSAH 24 to 235th Avenue	0.67	55	U2	7,400	3.11%	0.74	10000	4,960	0.89	101
	235th Avenue to CR 72	1.62	55	R2	1,900	1.04%	0.13	15000	3,080	1.00	56
	CR 72 to CSAH 24	1.20	55	R2	2,100	2.80%	0.14	15000	2,520	1.00	46
	N. of CR 72	0.74	55	R2	2,700	2.04%	0.18	15000	2,000	1.00	37
CR 74	CSAH 13 to TH 65	2.41	55	R2	3,900	1.36%	0.26	15000	9,400	1.00	171
CR 78	S. of CSAH 22	1.49	55	R2	5,900	1.93%	0.39	15000	8,790	0.99	161
CR 86	CSAH 13 to TH 65	2.41	55	R2	5,800	2.60%	0.39	15000	13,980	1.00	255
CR 103	CSAH 24 to CSAH 13	1.49	55	R2	8,300	2.77%	0.55	15000	12,370	0.99	228
CR 103 Extension	CSAH 13 to TH 65	1.48	55	R2	4,900		0.33	15000	7,250	0.99	133
Pederson Drive	TH 47 to CSAH 28	1.22	55	R2	8,000	0.71%	0.53	15000	9,760	0.98	180
Rum River Blvd	CSAH 24 to CSAH 24	0.35	30	R2	2,400	1.31%	0.24	10000	840	0.99	28
Raven Street	221st Avenue to CSAH 24	1.00	55	R2	2,000	3.12%	0.13	15000	2,000	1.00	36
Nightingale Street	CSAH 22 to Sims Road	2.25	55	R2	5,000	1.28%	0.33	15000	11,250	1.00	205
	Sims Road to Lake George Pkwy	0.25	55	R2	3,000	2.89%	0.20	15000	750	0.98	14
	Lake George Pkwy to 221st Avenue	1.00	55	R2	2,500	2.63%	0.17	15000	2,500	1.00	46
221st Avenue	CSAH 9 to Zion Pkwy	0.75	55	R2	1,800	-0.26%	0.12	15000	1,350	1.00	25
	Zion Pkwy to Raven Street	0.50	55	R2	2,000	0.92%	0.13	15000	1,000	0.99	18
	Raven Street to Nightingale Street	0.18	55	R2	3,900	2.44%	0.26	15000	700	0.96	13
	Nightingale Street to CSAH 13	1.57	55	R2	2,900	2.72%	0.19	15000	4,550	1.00	83
Sims Road	Nightingale Street to CSAH 13	1.61	55	R2	2,500	3.36%	0.17	15000	4,030	1.00	73
229th Avenue	TH 47 to CSAH 24	0.25	30	U2	1,600	-2.67%	0.16	10000	400	0.99	13
233rd Avenue	TH 47 to CSAH 28	0.25	30	U2	3,600	2.06%	0.36	10000	900	0.97	31
Pederson Drive Extension	CSAH24/28 to TH 47	1.25	30	U2	4,600		0.46	10000	5,750	0.99	194
Total									**560,800**	**0.94**	**11,017**

*The Forecast Numbers Have a Likely Confidence Range of Plus or Minus 15%.

AADT = Annual Average Daily Traffic

Roadway Type			
U2	Urban 2-Lane Undivided	R2	Rural 2-Lane Undivided
U4	Urban 4-Lane Undivided	R4	Rural 4-Lane Divided (w/ Turn Lanes)
D4	Urban 4-Lane Divided (with Turn Lanes)		

V/C = Volume to Capacity Ratio
- Periodically Congested, V/C > 0.75
- Near Congested, V/C > 0.85
- Congested, V/C>1.00 (with existing roadway)

VMT decreases from the No Build condition by approximately 9,700 miles and VHT decreases by 1,850 hours. Travel distance and time is reduced, but not as effectively as just having CSAH 24 without the extension. The result is an efficient system that is about the same as the CSAH 24 expansion without the extension (from 0.93 to 0.94).

Potential traffic shifts from CSAH 28 may occur to increase the traffic forecasted on the extension. An analysis of the potential shift in traffic volumes based on the trips that currently or potentially could use CSAH 28 and could shift to the extension are expected to be less than 3,000 additional trips over the forecasted volume, but the traffic shift is truly unknown due to the impacts the school would have on the traffic shifts. It should be noted that the anticipated volumes on the extension could double and the information presented here would still hold true. A two-lane city roadway would still be able to accommodate the future volumes, even if doubled.

III. STUDY FINDINGS AND RECOMMENDATIONS

A. 2030 River Crossing Demand Findings

The evaluation and analysis of existing and future land uses, existing arterial route spacing, environmental issues/constraints, and existing and forecasted traffic operations and safety issues resulted in the following study findings related to 2030 river crossing demand:

1. The study area and surrounding communities are projected to continue to grow with a large portion of this growth planned to occur in St. Francis, East Bethel and Elk River. These three communities are projected to nearly double their populations by 2030. Modest growth is anticipated in Nowthen and Oak Grove as these communities are planned to remain largely rural residential through 2030.
2. Wetlands, lakes, rivers, parks and recreation areas divide the landscape in this region making land use concentration difficult in some areas, such as in Oak Grove and Nowthen. The Rum River is a natural barrier to east-west travel within the study area and designated is a State Wild and Scenic River.
3. State designated Wild and Scenic Rivers are managed by the Minnesota Department of Natural Resources (DNR). In general, Wild and Scenic Rivers are to be avoided by new construction or construction of roads or river crossings. To justify a new river crossing, it must first be proved that: 1) existing roads/river crossings cannot handle existing or projected traffic volumes, 2) expansion of the existing river crossings will not be able to handle future traffic volumes. If both of these tests show there is still a need, a river crossing in a new location may be considered, with restrictions.
4. Many residents in this portion of the county commute to the Twin Cities metro area. As a result, connections to important north/south highway corridors such as TH 47, TH 65 and US 10/US 169 are important. In addition, concentrations of employment, shopping and service opportunities are also located along these same corridors.
5. The CSAH 28 (Armstrong Blvd)/CSAH 24 corridor in St. Francis is one of two Rum River crossings in the study area and the corridor serves the downtown commercial

area, the St. Francis School District campuses and is the main connection between the west and east sections of the city. The city is anticipated to continue to grow, with the majority of future commercial/industrial development planned on the west side of the Rum River and future residential development planned on both the west and east sides of the river.

6. CSAH 22 is a main artery supporting through traffic to important north/south roadways such as TH 47, TH 65, CSAH 7 (Rum River Blvd), CSAH 9 (Lake George Blvd), CSAH78 (Flamingo St) and to the Elk River area, as well as providing direct access for commercial/industrial developments within each community along the corridor. CSAH 22 is planned to be transitioned to a future principal arterial under the jurisdiction of Mn/DOT. The primary function of a principal arterial is to connect metro centers and regional business concentrations. The timing of this jurisdictional transfer is unknown at this time, but a Memorandum of Understanding for the transfer has been established between Anoka County and Mn/DOT.
7. The communities of St. Francis, Oak Grove and Nowthen are all considered rural areas in terms of the Metropolitan Council's arterial route spacing guidelines. These guidelines recommended principal arterial route spacing of six to 12 miles and minor arterial spacing of two to three miles for rural areas.
8. The application of functional classification and route spacing guidelines are used as the basis for identifying and evaluating a roadway network; however, land use and environmental resources must also be considered to ensure the network adequately serves population concentrations and avoids or minimizes impacts to the built and natural environment.
9. North-south connectivity within the study area appears adequate, although many of these routes currently serve a dual purpose of providing both east-west and north-south connectivity. As traffic demand increases in this area, the dual purpose nature of these routes may decrease mobility, thereby creating a need for separate east-west and north-south routes.
10. East-west arterial spacing conforms to rural minor arterial spacing guidelines of two to three miles between CSAH 24 and Isanti CSAH 10. However, planned future land use in northern St. Francis may suggest otherwise.
11. East-west arterial spacing between CSAH 24 and CSAH 22 is greater than the recommended two to three mile spacing. The rural residential nature of land use in Oak Grove, along with environmental constraints and natural features create challenges for an additional connection in this area.
12. East-west connectivity to principal arterials is lacking in this area (e.g. connections to US 169 to the west and TH 65 to the east).
13. The forecasted 2030 no-build condition projects CSAH 22 from CSAH 7 to CR78 will be nearing its capacity with an anticipated traffic volume of over 14,000 vehicles per day. With a capacity of 15,000 vehicles per day, the volume-to-capacity ratio for CSAH 22 will be acceptable; however, because the anticipated volumes are nearing capacity the roadway will be unable to effectively handle traffic fluctuations.
14. As the area along CSAH 22 develops, access management will be important to maintaining acceptable traffic flow as these volumes approach daily capacity thresholds.

15. The forecasted 2030 no-build condition projects CSAH 24 through downtown St. Francis (CSAH 28 to CSAH 9) will be over capacity, resulting in congestion and significant vehicle queues at all intersections during the peak hours.

In summary, the study findings showed CSAH 22 is projected to be near capacity and CSAH 24 is projected to be over capacity by 2030 without any improvements. In order to determine if there was a need for additional river crossing capacity, a 2030 build analysis was completed. The build analysis tested several improvement scenarios, the first of which was to see if improvements to the existing river crossings could be made to handle future traffic volumes. This approach was consistent with the State Wild and Scenic River regulations to first consider addressing traffic needs at existing crossings before considering a new crossing of the Rum River. If improvements to existing crossings could not handle future traffic volumes, a new river crossing corridor would need to be tested.

Three build scenarios were tested independently of one another and included:

- CSAH 22 Expansion – expand CSAH 22 to four-lanes from TH 47 to TH 65
- CSAH 24 Expansion – extension of CR 103/CSAH 13 east from CSAH 13 to TH 65 and expansion of CSAH 24 between CSAH 24/28 and TH 65 to a four-lane facility
- CSAH 24 Expansion with Extension to TH 47 – extension of CR 103/CSAH 13 east from CSAH 13 to TH 65, expansion of CSAH 24 between CSAH 24/28 and TH 65 to a four-lane facility, and an extension of Pederson Drive from TH 47 to CSAH 24

Below is a summary of key findings and conclusions from the build analyses:

1. Improvements to one corridor do not have much of an impact on the other. The majority of users are already using their preferred route and this does not change based on the congestion levels.
2. Capacity improvements do increase the volume of traffic using the expanded route (either CSAH 22 or CSAH 24).
3. The majority of roadways in the study area do not have a noticeable change (greater than 15 percent change) in traffic volume between the no-build and build scenarios when considering the confidence range of the forecasts.
4. The expansion scenarios most significantly change traffic patterns by shifting how traffic travels through the area.
    a. With the CSAH 22 Expansion, more traffic uses CSAH 22 and the routes to and from CSAH 22 such as CSAH 7, Nightingale Street and CSAH 78.
    b. With the CSAH 24 Expansion, more traffic uses CSAH 24 and the routes to and from CSAH 24 including CSAH 28, CSAH 24 and CR 72.
    c. The CR 103 Extension (part of the CSAH 24 Expansion) shifts traffic from the parallel routes of CSAH 24 through Bethel and 221st Avenue to the CSAH 24/CR 103/CSAH 13 alignment.
5. The local extension between TH 47 and CSAH 28, adjacent to the schools, is not projected to carry a significant traffic volume (4,600), but would shift trips from the other east-west routes between TH 47 and Ambassador Boulevard, including

229th Avenue to the new local extension. Further study of this extension should take into account Mn/DOT access plans for TH 47. In addition, this extension would be a city roadway and further discussions between the city and school district are needed to determine if this is a direction they want to pursue.

6. All of the expansion scenarios decrease the traffic volume on Rum River Boulevard. This is due to route shifts that take advantage of the additional highway capacity. Any highway expansion in the area makes Rum River Boulevard a less attractive route for cut-through trips.

7. The CSAH 22 Expansion scenario tested the roadway network's ability to handle future traffic volumes if CSAH 22 were expanded to four-lanes between TH 47 and TH 65. The analysis found that if more capacity was provided on CSAH 22, there is a minimal increase in traffic volumes on CSAH 22 (13,200 to 16,600 vehicles per day). People are using the corridors they want to use and these choices do not change with the expansion of CSAH 22. Since CSAH 22 is projected to be nearing capacity by 2030 (not over capacity), the analysis showed that the corridor may not need to be widened to handle the currently projected 20-year future traffic volumes; however, specific intersection improvements may be required earlier. This is particularly true if access along the corridor is managed to accommodate future growth properly.

8. Expansion of CSAH 24 combined with access management efforts will be necessary within a 20-year timeframe to accommodate future traffic volumes. Additional analysis is required to determine specific expansion needs for this corridor.

B. 2030 River Crossing Study Conclusions

Consideration of the above study findings suggests the following key River Crossing Study conclusions:

- Improvements to one river crossing corridor do not have much impact on the other corridor. Drivers will use the routes that meet their needs regardless of congestion.
- Improvements could be made at the existing river crossings to handle future traffic volumes:
    - CSAH 22 – Corridor is nearing capacity from CSAH 7 to CSAH 78 by 2030, but expansion to four-lanes is not anticipated within the next 20 years. Some improvements anticipated at intersections or to address safety issues.
    - CSAH 24 – Corridor already near capacity and some improvements will be necessary.
    - Both Corridors – Access management will be important to maintain acceptable traffic flow.

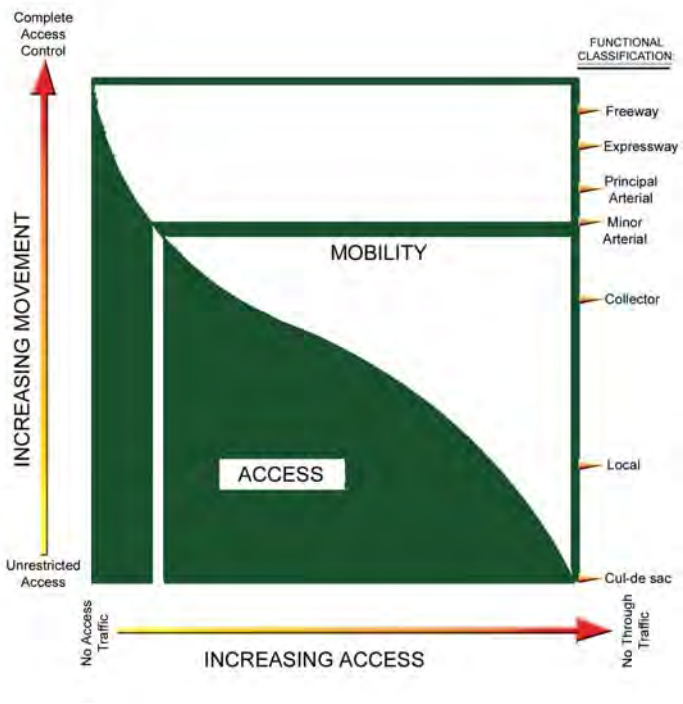
Because the analysis showed improvements to the existing river crossings could be made to handle future traffic volumes, new river crossing locations were not studied further, consistent with the Wild and Scenic designation of the Rum River.

IV. CSAH 22 AND CSAH 24 FUTURE IMPROVEMENT NEEDS

As outlined in the section above, the Northern Anoka County River Crossing Study concluded that a new river crossing in the study area was not needed and improvements to the CSAH 22 and CSAH 24 corridors could be made to handle future traffic volumes. The purpose of this section is to describe the additional analysis that was completed following the river crossing study to determine what types of improvements are needed and to develop a long-term access vision for both the CSAH 22 and CSAH 24 corridors.

Common to both corridors is the need to manage access to preserve mobility, reduce delay, increase safety and minimize crash problems. Before discussing the long-term vision for CSAH 22 and CSAH 24, a brief overview on access management is warranted. Access management is used to maintain traffic flow on a roadway so that it can provide its functional duties, while at the same time provide adequate access for private properties to the transportation network. The harmonization of access and mobility is the keystone to effective access management. There is an inverse relationship between the amount of access provided and the ability to move through-traffic on a roadway. As higher levels of access are provided, the ability to move traffic is reduced. Figure 29 below illustrates the relationship between access and mobility.

FIGURE 29 – ROADWAY MOBILITY/ACCESS RELATIONSHIP



Each access location (i.e., driveway and/or intersection) creates a potential point of conflict between vehicles moving through an area and vehicles entering and exiting the roadway. These conflicts can result from the slowing effects of merging and weaving that takes place as vehicles accelerate from a stop, turn onto the roadway, or decelerate to make a turn to leave the roadway. At signalized intersections, the potential for conflicts between vehicles in increased because through-vehicles are required to stop at signals. If the amount of traffic moving through an area on the roadway is high and/or the speed of traffic on a roadway is high, the number and nature of vehicle conflicts are also increased. Figures 30 and 31 depict the difference in conflicts points and connection to safety between a full access intersection (32 conflict points) and a restricted access

intersection (right-in/right-out access has 2 conflict points per direction).

FIGURE 30 – FULL ACCESS INTERSECTION

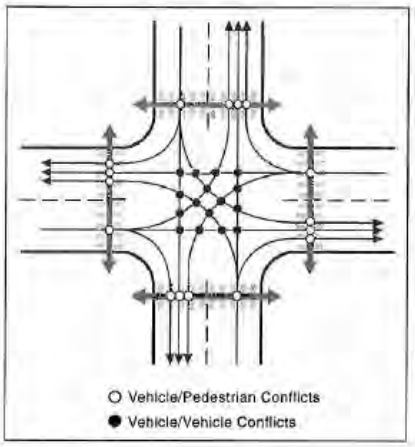
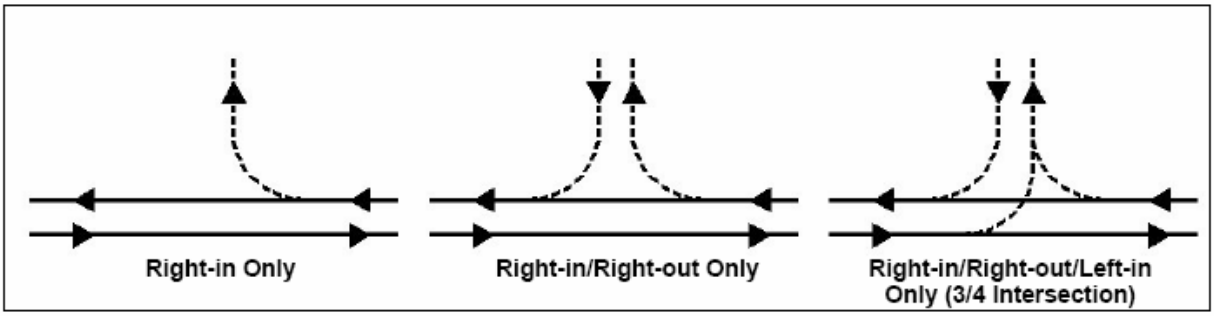


FIGURE 31 – RESTRICTED ACCESS (RIGHT-IN/RIGHT-OUT) INTERSECTION



The use of a property also has a direct bearing on how often an access on a corridor is used. For instance, an agricultural crop farmer with a field approach will likely only use this type of access a few times year, whereas an access to a single-family home can be used 10 to 15 times per day. Commercial and industrial uses will typically exceed that of a single-family home due to the need for employees, customers and deliveries to access these types of uses. However, the amount an access to a commercial or industrial property is used can vary greatly depending upon the specific business needs.

The safe speed of a road, the ability to move traffic on that road, and safe access to cross streets and properties adjacent to the roadway all diminish as the number of access points increase along a specific segment of roadway. Because of these effects, there must be a balance between the level of access provided and the desired function of the roadway.

Anoka County has developed access management guidelines to guide public and private access spacing and traffic signal spacing along roads under the county's jurisdiction. The guidelines are based on the road's functional classification and recognize the role each roadway type provides in the network. Access management guidelines are necessary to plan for intersections to connect public streets and provide adequate access for private properties. The discussion of long-term access visions for both the CSAH 22 and CSAH 24 corridor is based on the county's access management guidelines for each corridor.

The sections that follow outline future improvement plans and methods to implement these plans for both the CSAH 22 and CSAH 24 river crossing corridors.

A. CSAH 22 (Viking Blvd)

Corridor Characteristics

CSAH 22 (Viking Blvd) is an important artery through Anoka County. It is currently classified as an A-Minor Arterial Connector whose function is to connect major trip generators and rural growth centers. CSAH 22 is planned to be transitioned to a future principal arterial under the jurisdiction of Mn/DOT. The primary function of a principal arterial is to connect metro centers and regional business concentrations. The timing of this jurisdictional transfer is unknown at this time, but a Memorandum of Understanding for the transfer has been established between Anoka County and Mn/DOT. Therefore, the long-term access vision discussed in this section was developed using the principal arterial access management guidelines for CSAH 22.

CSAH 22 traverses through portions of Nowthen and Oak Grove. Currently, land uses along the corridor consist of rural residential and agricultural land uses. There are pockets of concentrated commercial and industrial land uses near major roadway intersections such as CSAH 22/CSAH 5, CSAH 22/CSAH 9 and CSAH 22 near CR 67. Future land use along CSAH 22 is planned to remain largely rural residential and agricultural with the exception of larger pockets of concentrated commercial and industrial developments near CSAH 22's intersections with CSAH 5, TH 47, CSAH 7, CSAH 9 and near CR 67.

Traffic volumes on CSAH 22 in 2009-2010 were approximately 6,000 to 8,500 vehicles per day. Based on Oak Grove, Nowthen and other area communities' projected population and employment, traffic volumes on the corridor are anticipated to grow to 12,00 to 14,500 vehicles per day by 2030. With a roadway capacity of 15,000 vehicles per day, the projected traffic volumes suggest the corridor would be approaching capacity by 2030. Since the corridor would still be under capacity, it is anticipated CSAH 22 would remain as a two-lane corridor out to 2030, however, some improvements at intersections are expected.

Managing access along the corridor as development/redevelopment occurs would reduce the need for roadway expansion within this timeframe. These access changes would be necessary over time to driveways and possibly public streets to preserve mobility, reduce delay and to minimize crash problems.

CSAH 22 Long-Term Access Vision

Anoka County and the Cities of Oak Grove and Nowthen worked together to establish a long-term access vision for the CSAH 22 corridor as shown in Figure 32. The access plan includes the application of Anoka County's access guidelines where feasible and also provides flexibility to address locations where strict application of the guidelines may not be possible due to existing land use, topography and/or natural features. The access plan considers the 2030 land use visions for the cities of Oak Grove and Nowthen.

The access plan in Figure 32 includes changes to access along the corridor via access closures, modifications to access such as right-in/right-out access, and redirection of access to new or modified local street system connections. New public and private street connections are shown in the access vision as a means to replace direct access onto CSAH 22. These potential future roadway connections provide access from CSAH 22 to the currently developed and future development areas. The roadways reduce the traffic impact on CSAH 22 by providing a network of supporting routes for local trips between residential and commercial or separate commercial areas, resulting in the need for less

NORTHERN ANOKA COUNTY RIVER CROSSING STUDY

ANOKA COUNTY

Legend

StudyLimits

Public Street Intersections
- Primary Full Movement
- Conditional Secondary (Right-In/Out)

Public Street Traffic Control
- TBD To Be Determined
- Roundabout
- Traffic Signal
- All-Way Stop Control
- 3/4 Public Street Access
- Side Street Stop Control
- Cul-de-sac (Road Closed)

Driveway Access
- Full Movement
- Right-In/Out
- Right-in-only
- Close

Potential Roadway Connections
- Public
- Private

Known Cultural Resources
- National Register Historic Structure
- Other Historic Structure

Planned Land Use - Generalized
- Multifamily Residential
- Commercial
- Industrial
- Institutional
- Mixed Use
- Multi-Optional Development
- Park and Recreation
- Open Space or Restrictive Use
- Railway (inc. LRT)
- Airport
- Vacant or Unknown
- Open Water
- Parcels Adjacent to CSAH 22
- Parcels
- Map Book Grid
- City Limits
- County Parks
- City Parks
- NWI

Intersection Spacing

Principal Arterial 50-55 mph
- Full Movement Intersection: 1 mile (5,280')
- Conditional Secondary: 1/2 mile (2,640')
- Signal Spacing: 1 mile (5,280')
- Private Access: Subject to Conditions

Source: Anoka County, MNDNR, MNDOT, ESRI

N

0 300 Feet

CSAH 22 Long-Term Access Vision

A

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NORTHERN ANOKA COUNTY RIVER CROSSING STUDY

ANOKA COUNTY

Legend

- StudyLimits

Public Street Intersections

- Primary Full Movement
- Conditional Secondary (Right-In/Out)

Public Street Traffic Control

- TBD To Be Determined
- Roundabout
- Traffic Signal
- All-Way Stop Control
- 3/4 Public Street Access
- Side Street Stop Control
- Cul-de-sac (Road Closed)

Driveway Access

- Full Movement
- Right-In/Out
- Right-in-only
- Close

Potential Roadway Connections

- Public
- Private

Known Cultural Resources

- National Register Historic Structure
- Other Historic Structure

Planned Land Use - Generalized

- Multifamily Residential
- Commercial
- Industrial
- Institutional
- Mixed Use
- Multi-Optional Development
- Park and Recreation
- Open Space or Restrictive Use
- Railway (inc. LRT)
- Airport
- Vacant or Unknown
- Open Water
- Parcels Adjacent to CSAH 22
- Parcels
- Map Book Grid
- City Limits
- County Parks
- City Parks
- NWI

Intersection Spacing

Principal Arterial 50-55 mph

- Full Movement Intersection: 1 mile (5,280')
- Conditional Secondary: 1/2 mile (2,640')
- Signal Spacing: 1 mile (5,280')
- Private Access: Subject to Conditions

Source: Anoka County, MNDNR, MNDOT, ESRI

0 300 Feet

CSAH 22 Long-Term Access Vision

B

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NORTHERN ANOKA COUNTY RIVER CROSSING STUDY

ANOKA COUNTY

Legend

- StudyLimits

Public Street Intersections

- Primary Full Movement
- Conditional Secondary (Right-In/Out)

Public Street Traffic Control

- TBD To Be Determined
- Roundabout
- Traffic Signal
- All-Way Stop Control
- 3/4 Public Street Access
- Side Street Stop Control
- Cul-de-sac (Road Closed)

Driveway Access

- Full Movement
- Right-In/Out
- Right-in-only
- Close

Potential Roadway Connections

- Public
- Private

Known Cultural Resources

- National Register Historic Structure
- Other Historic Structure

Planned Land Use - Generalized

- Multifamily Residential
- Commercial
- Industrial
- Institutional
- Mixed Use
- Multi-Optional Development
- Park and Recreation
- Open Space or Restrictive Use
- Railway (inc. LRT)
- Airport
- Vacant or Unknown
- Open Water
- Parcels Adjacent to CSAH 22
- Parcels
- Map Book Grid
- City Limits
- County Parks
- City Parks
- NWI

Intersection Spacing

Principal Arterial 50-55 mph

- Full Movement Intersection: 1 mile (5,280')
- Conditional Secondary: 1/2 mile (2,640')
- Signal Spacing: 1 mile (5,280')
- Private Access: Subject to Conditions

Source: Anoka County, MNDNR, MNDOT, ESRI

0 300 Feet

CSAH 22
Long-Term Access Vision

C

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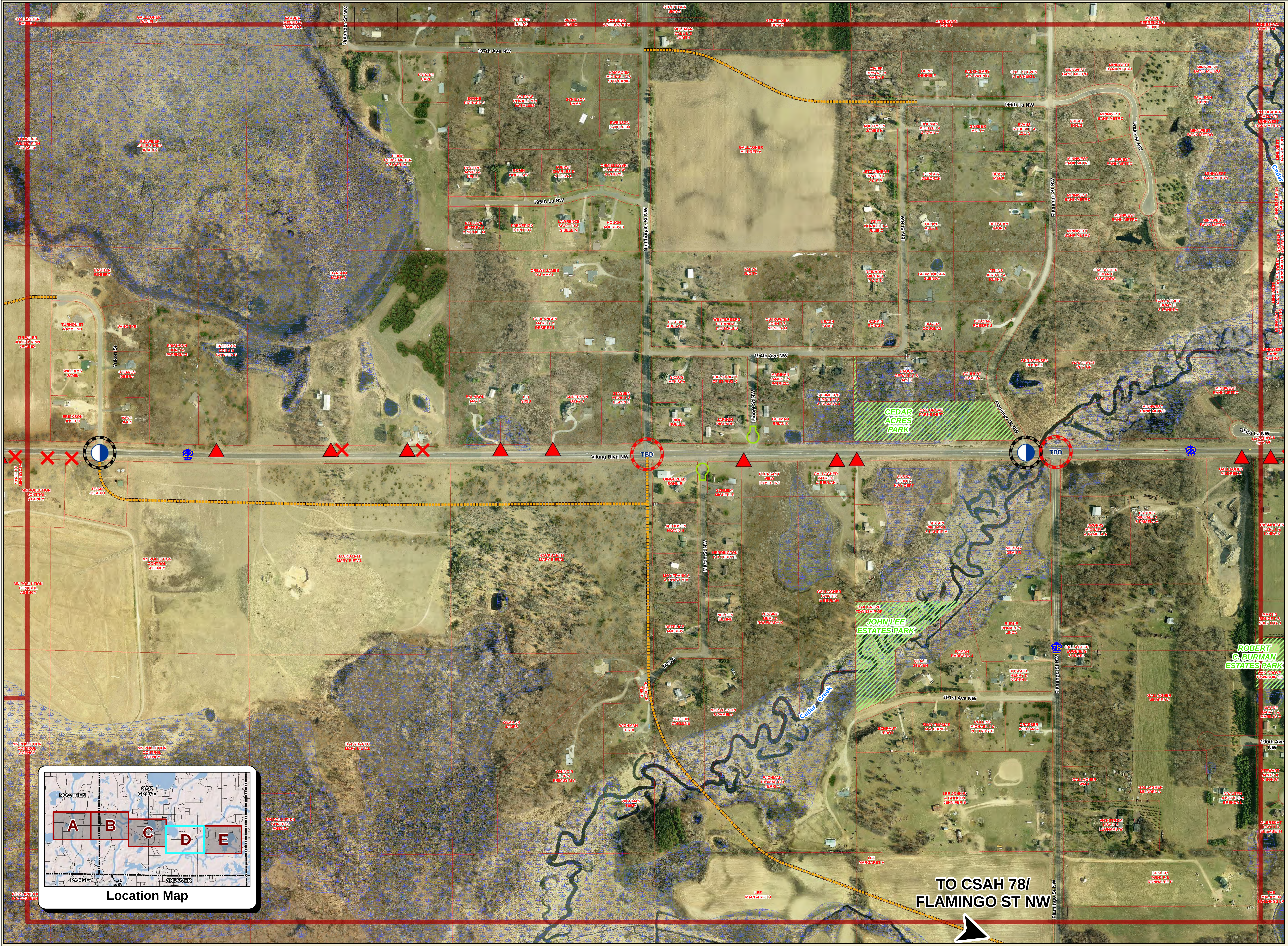
Location Map

NOWTHEN OAK GROVE RAMSEY ANDOVER A B C D E



ANOKA COUNTY

NORTHERN ANOKA COUNTY RIVER CROSSING STUDY

Legend

- Study Limits

Public Street Intersections

- Primary Full Movement
- Conditional Secondary (Right-In/Out)

Public Street Traffic Control

- TBD To Be Determined
- Roundabout
- Traffic Signal
- All-Way Stop Control
- 3/4 Public Street Access
- Side Street Stop Control
- Cul-de-sac (Road Closed)

Driveway Access

- Full Movement
- Right-In/Out
- Right-in-only
- Close

Potential Roadway Connections

- Public
- Private

Known Cultural Resources

- National Register Historic Structure
- Other Historic Structure

Planned Land Use - Generalized

- Multifamily Residential
- Commercial
- Industrial
- Institutional
- Mixed Use
- Multi-Optional Development
- Park and Recreation
- Open Space or Restrictive Use
- Railway (inc. LRT)
- Airport
- Vacant or Unknown
- Open Water
- Parcels Adjacent to CSAH 22
- Parcels
- Map Book Grid
- City Limits
- County Parks
- City Parks
- NWI

Intersection Spacing

Principal Arterial 50-55 mph

- Full Movement Intersection: 1 mile (5,280')
- Conditional Secondary: 1/2 mile (2,640')
- Signal Spacing: 1 mile (5,280')
- Private Access: Subject to Conditions

Source: Anoka County, MNDNR, MNDOT, ESRI

0 300 Feet

CSAH 22 Long-Term Access Vision

D

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NORTHERN ANOKA COUNTY RIVER CROSSING STUDY

ANOKA COUNTY

Legend

- StudyLimits

Public Street Intersections

- Primary Full Movement
- Conditional Secondary (Right-In/Out)

Public Street Traffic Control

- TBD To Be Determined
- Roundabout
- Traffic Signal
- All-Way Stop Control
- 3/4 Public Street Access
- Side Street Stop Control
- Cul-de-sac (Road Closed)

Driveway Access

- Full Movement
- Right-In/Out
- Right-in-only
- Close

Potential Roadway Connections

- Public
- Private

Known Cultural Resources

- National Register Historic Structure
- Other Historic Structure

Planned Land Use - Generalized

- Multifamily Residential
- Commercial
- Industrial
- Institutional
- Mixed Use
- Multi-Optional Development
- Park and Recreation
- Open Space or Restrictive Use
- Railway (inc. LRT)
- Airport
- Vacant or Unknown
- Open Water
- Parcels Adjacent to CSAH 22
- Parcels
- Map Book Grid
- City Limits
- County Parks
- City Parks
- NWI

Intersection Spacing

Principal Arterial 50-55 mph

- Full Movement Intersection: 1 mile (5,280')
- Conditional Secondary: 1/2 mile (2,640')
- Signal Spacing: 1 mile (5,280')
- Private Access: Subject to Conditions

Source: Anoka County, MNDNR, MNDOT, ESRI

0 300 Feet

CSAH 22 Long-Term Access Vision

E

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Location Map: NOWTHEN, OAK GROVE, RAMSEY, ANDOVER; A, B, C, D, E

expansion of CSAH 22. Alignments illustrated in Figure 32 are planning-level only at this stage and will require further study to confirm specific alignments and feasibility. The intent of showing potential future roadway connections at this point is to give the local jurisdictions a tool to guide future access changes when land use changes occur.

As Figure 32 shows, Anoka County access management guidelines call for the following intersection and signal spacing on CSAH 22 which is consistent with principal arterial spacing standards for the future transition of this roadway to a principal arterial:

- Primary intersection spacing – 1 mile
- Conditional Secondary intersection spacing – ½ mile
- Private access - subject to conditions
- Signal spacing – 1 mile

Based on these guidelines and mutually agreed upon by Anoka County and the Cities of Nowthen and Oak Grove, the CSAH 22 plan identifies primary and conditional secondary intersections along with intersections where there is a projected traffic control change in Figure 32.

Because the access plan for CSAH 22 is a long-term vision, the following map disclaimer was developed to provide additional context and explanation of the future access vision and to give an indication of how the future access vision is intended to be implemented.

1. Intersections
    a. Primary Intersections
        i. Traffic movements in all directions are planned to be maintained over time
        ii. Traffic control (i.e., all-way stop, traffic signal or roundabout) will be modified when justified
    b. Conditional Secondary Intersections
        i. Existing access will be maintained until road is reconstructed and/or there are safety issues
        ii. Some other improvements may be necessary over time to improve mobility of the roadway
        iii. Intersections could transition to limit some turning movements to maintain safety
2. Driveways
    a. As land use changes are proposed by property owners, efforts to redirect existing access to a local street will be considered
    b. At least one driveway would be preserved for each property, unless access is realigned to a local street or the property is proposed to be acquired
    c. Safety concerns could trigger modifications to driveway access

Unless crash problems arise or improvements are made at some intersections, it is anticipated that most accesses along the corridor would remain as they exist today. When a property owner proposes a land use change (e.g., build a home or business, subdivides the property, etc.), existing access to the road will be reviewed to see if the access can be redirected off CSAH 22 to an existing or planned future local street.

Timing of CSAH 22 Access Vision Implementation

The access vision for CSAH 22 is a long-term vision that will be implemented incrementally over time as opportunities present themselves and/or safety issues dictate. Access changes will occur when intersection improvements, including traffic control, are changed, when crash problems arise and/or when land use changes are proposed by a property owner (e.g., builds a home or business, subdivides the property, etc.). Factors that should be considered by the county and cities in implementing the access vision include:

- Is there an opportunity to easily relocate the access?
- Are other access opportunities available?
- How much traffic is served by the access?
- What is the design of the roadway?

Improvements to add capacity to CSAH 22 are beyond the 2030 timeframe. However, intersection improvements may be likely at locations where high levels of delay are experienced for several hours in a day and at locations where crash problems arise. The purpose of this long-term access plan is to allow the community and landowners the opportunity to work towards the established vision over time.

B. CSAH 24 (Bridge Street)

Corridor Characteristics

CSAH 24 is classified as an A-Minor Arterial Connector whose function is to connect major trip generators and rural growth centers. Consistent with this function, CSAH 24 is an important artery through downtown St. Francis that serves as a key connection between the St. Francis Elementary, Middle and High School campuses. CSAH 24 is the only river crossing serving St. Francis, portions of southern Isanti County and northern Nowthen and Oak Grove. There are currently more driveway and public street accesses along CSAH 24 than would typically be allowed under the County's access management guidelines.

Traffic volumes on CSAH 24 in 2009-2010 were approximately 10,000 vehicles per day, which is the upper limit of what the current road can handle. By 2030, traffic volumes are anticipated to grow to 12,100-15,000 vehicles per day, exceeding the capacity of the roadway leading to extensive delays, back-ups and difficulty accessing the corridor from side streets.

CSAH 24 Expansion Concept

The additional analyses conducted as part of the river crossing study for CSAH 24 included the consideration of an expansion of CSAH 24 from CSAH 28 to CSAH 9 as either a three-lane undivided or four-lane divided roadway. Based on the roadway capacity needs, either of these options would likely be able to handle the future traffic growth, but the most significant difference would be in the right-of-way needs of the

options.

Figure 33 shows the typical right-of-way needs of a three-lane and four-lane divided facility on CSAH 24 between Ambassador Blvd and CR 72/Poppy Street through St. Francis. The figure shows that a three-lane roadway section has much less impact on adjacent properties, maintains the character of downtown St. Francis, allows room for pedestrian facilities, and maintains some level of parking. A three-lane roadway also fits better into the existing right-of-way, requiring less additional right-of-way for future expansion. The existing two-lane bridge would likely be adequate for a three-lane roadway section since there will not be any turning movements that will need to be accommodated on the bridge. However, if a four-lane divided roadway were constructed along the corridor it would likely require the reconstruction of the bridge. The existing bridge is in good condition and does not have any deficiency ratings but it is a primary pedestrian/bicycle corridor that could use some improvements to better accommodate those users. Beyond this corridor, there may be an opportunity to provide a separate pedestrian bridge north of the existing bridge to accommodate bicyclists and pedestrians safely.

Due to the extensive right-of-way impacts that the four-lane divided roadway section would have to existing homes, businesses, historic properties, parkland and bridge reconstruction, the four-lane option was set aside from further consideration to focus on the analysis of a three-lane CSAH 24 corridor, utilizing the existing two-lane bridge. The three-lane concept is proposed to extend from CSAH 28 to the west end of the existing river crossing and from the east end of the existing river crossing to CR 72/Poppy Street as shown in Figure 34.

In conjunction with the three-lane concept west of CR 72/Poppy Street, Anoka County has been working on corridor improvements from CR 72/Poppy Street to CSAH 9. The concept plans for the corridor includes access modifications, roundabouts at CR 72 and CSAH 9, and a two-lane divided roadway. The three-lane section west of CR 72/Poppy Street was matched into this concept and was included together in the analysis.

The detailed traffic operations and safety analysis for the three-lane CSAH 24 roadway is included in Appendix B.

CSAH 24 Long-Term Access Vision

Although the CSAH 24 corridor is recommended to be expanded to three-lanes to accommodate future traffic volumes, access changes along CSAH 24 will also be necessary over time to driveway and public streets to preserve mobility, reduce delay and minimize crash problems. Anoka County and the City of St. Francis worked together to develop a long-range access plan for the CSAH 24 corridor as shown in Figure 35. The goal of the access plan is to provide a tool for city leaders to use to guide/permit access along the corridor as land use changes occur over time. Similar to the CSAH 22 access plan, Anoka County access management guidelines were applied where feasible and flexibility was provided at locations where strict application of the guidelines was not feasible due to existing land uses, topography and/or natural features. The goal of the long-range access plan was to provide a tool to transition the corridor overtime, including direction on how to guide access decisions and potential locations for future supporting roadway systems to allow existing accesses to transition off the corridor.

The access plan in Figure 35 includes changes to access along the corridor via access closures, modifications to access such as right-in/right-out access, and redirection of

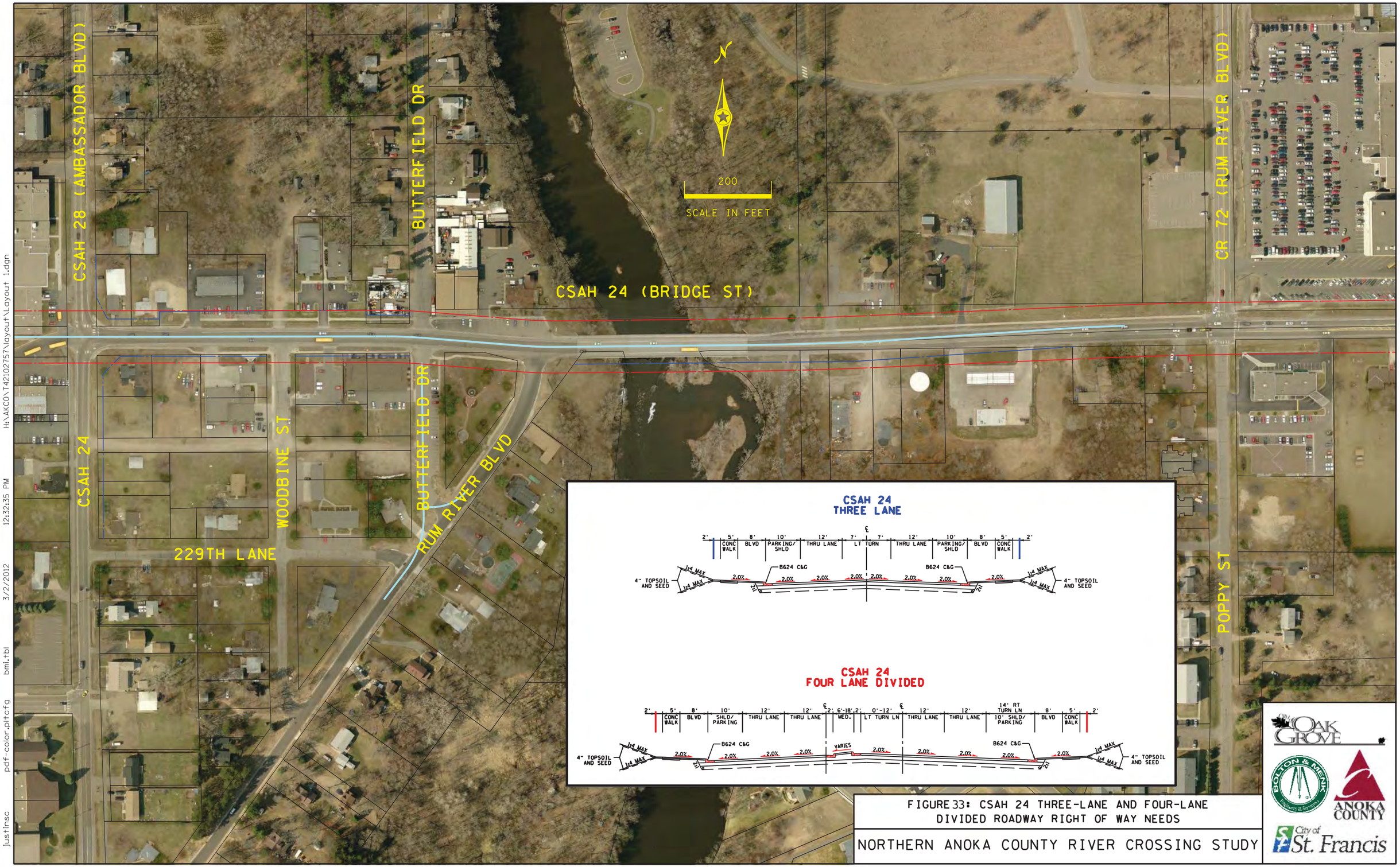

FIGURE 33: CSAH 24 THREE-LANE AND FOUR-LANE DIVIDED ROADWAY RIGHT OF WAY NEEDS

NORTHERN ANOKA COUNTY RIVER CROSSING STUDY

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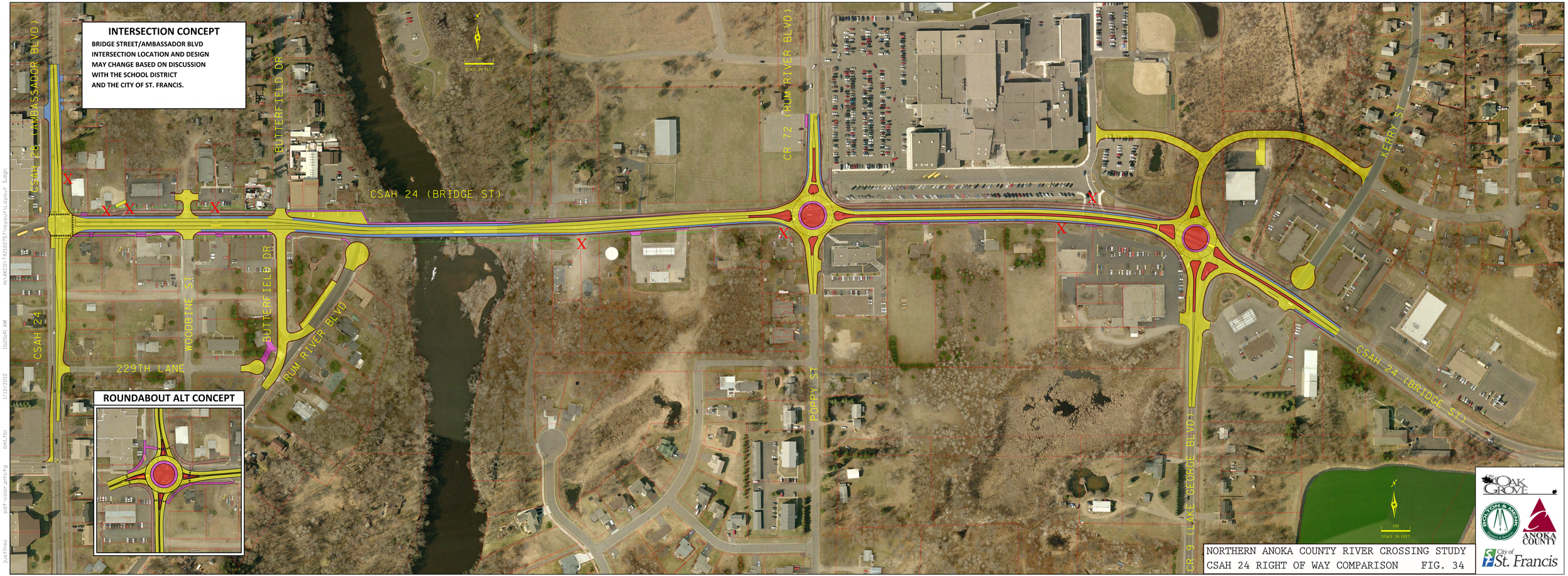

NORTHERN ANOKA COUNTY RIVER CROSSING STUDY
CSAH 24 RIGHT OF WAY COMPARISON FIG. 34

OAK GROVE
ANOKA COUNTY
City of St. Francis

NORTHERN ANOKA COUNTY RIVER CROSSING STUDY

Legend

- Study Limits

Public Street Intersections
- Primary Full Movement
- Conditional Secondary (Right-In/Out)

Public Street Traffic Control
- TBD To Be Determined
- Roundabout
- Traffic Signal
- All-Way Stop Control
- 3/4 Public Street Access
- Side Street Stop Control
- Cul-de-sac (Road Closed)

Driveway Access
- Full Movement
- Right-In/Out
- Right-in-only
- Close

Potential Roadway Connections
- Public
- Private

Known Cultural Resources
- National Register Historic Structure
- Other Historic Structure
- Archaeological Sites
- Parcels Adjacent to CSAH 24
- County Parks
- City Parks
- NWI

Intersection Spacing

CSAH 28 to Rum River Bridge
A-Minor Arterial, <40 mph
- Full Movement Intersection: 1/8 mi (660')
- Conditional Secondary: 300-660'
- Signal Spacing: 1/4 mi (1,320')
- Private Access: Subject to Conditions

Rum River Bridge to CSAH 9
A-Minor Arterial, 40-45 mph
- Full Movement Intersection: 1/4 mi (1,320')
- Conditional Secondary: 1/8 mi (660')
- Signal Spacing: 1/4 mi (1,320')
- Private Access: Subject to Condition

Source: Anoka County

Intersections
-Primary Intersections
 -Traffic movements in all directions are planned to be maintained over time
 -Traffic control (i.e. traffic signal or roundabout) will be modified when justified
-Conditional Secondary Intersections
 -Existing access will be maintained until:
  1. Road is reconstructed and/or;
  2. There are safety issues
 -Some other improvements may be necessary over time to improve mobility of the roadway
 -Intersections could transition to limit some turning movements to increase safety

Driveways
-As land use changes are proposed by property owners, efforts to redirect existing access to a local street will be considered
-At least one driveway would be preserved for each property, unless access is realigned to a local street or the property is proposed to be acquired
-Safety concerns could trigger modifications to driveway access

0 100 200 Feet

CSAH 24
Future Access Vision

Figure 35

February, 2012

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access to new or modified local street system connections. New public and private street connections are shown in the access vision as a means to replace direct access onto CSAH 24. With the three-lane concept for CSAH 24 between CSAH 28 (Armstrong Blvd) and CR 72 (Poppy St.), many of the accesses will remain as full access even though they are slated as right-in/right-out. The right-in/right-out access modifications would occur if there are safety issues or if the roadway is further expanded to a four-lane facility, which is currently beyond the 20-year projection timeframe. Alignments illustrated in Figure 35 are planning-level only at this stage and will require further study to confirm specific alignments and feasibility. The intent of showing potential future roadway connections at this point is to give the local jurisdictions a tool to guide future access changes when land use changes occur.

As Figure 35 illustrates, Anoka County access management guidelines call for the following intersection and signal spacing along CSAH 24:

- CSAH 28 to Rum River Bridge (A-Minor Arterial <40 mph)
    - Primary intersection spacing – 1/8 mile (660 ft)
    - Conditional Secondary intersection spacing – 300-660 ft
    - Signal Spacing – ¼ mile (1,320 ft)
    - Private access – subject to conditions

- Rum River Bridge to CSAH 9 (A-Minor Arterial 40-45 mph)
    - Primary intersection spacing – 1/4 mile (1,320 ft)
    - Conditional Secondary intersection spacing – 1/8 mile (660 ft)
    - Signal Spacing – ¼ mile (1,320 ft)
    - Private access – subject to conditions

Based on these guidelines and mutually agreed upon by Anoka County and the City of St. Francis, the CSAH 24 plan identifies primary and conditional secondary intersections along with projected future traffic control changes in Figure 35.

Because the access plan for CSAH 24 is a long-term vision, the following map disclaimer was developed to provide additional context and explanation of the future access vision and to give an indication of how the future access vision is intended to be implemented.

1. Intersections
    a. Primary Intersections
        i. Traffic movements in all directions are planned to be maintained over time
        ii. Traffic control (i.e., all-way stop, traffic signal or roundabout) will be modified when justified
    b. Conditional Secondary Intersections
        i. Existing access will be maintained until road is reconstructed and/or there are safety issues
        ii. Some other improvements may be necessary over time to improve mobility of the roadway

iii. Intersections could transition to limit some turning movements to maintain safety

2. Driveways

   a. As land use changes are proposed by property owners, efforts to redirect existing access to a local street will be considered

   b. At least one driveway would be preserved for each property, unless access is realigned to a local street or the property is proposed to be acquired

   c. Safety concerns could trigger modifications to driveway access

Unless crash problems arise or improvements are made at some intersections, it is anticipated that most accesses along the corridor would remain as they exist today. When a property owner proposes a land use change (e.g., build a home or business, subdivides the property, etc.), existing access to the road will be reviewed to see if the access can be redirected off CSAH 24 to an existing or planned future local street.

Timing of CSAH 24 Access Vision Implementation

The access vision for CSAH 24 is a long-term vision that will be implemented incrementally over time as opportunities present themselves and/or safety issues dictate. Access changes will occur when the road is reconstructed to a three-lane, undivided or two-lane divided facility, intersections are modified to increase capacity, intersections are changed to include a traffic signal or roundabout, when crash problems arise and/or when land use changes are proposed by a property owner (e.g., builds a home or business, subdivides the property, etc.). Factors that should be considered by the county and cities in implementing the access vision include:

- Is there an opportunity to easily relocate the access?
- Are other access opportunities available?
- How much traffic is served by the access?
- What is the design of the roadway?

There are no funds currently programmed in county or city capital improvement plans for CSAH 24 reconstruction and access improvements. The county and city are actively pursuing funding opportunities for the two-lane divided roadway from CR 72/Poppy Street to CSAH 9. Actual reconstruction of CSAH 24 is likely 5 to 10 years into the future. The purpose of this long-term access plan is to allow the community and landowners the opportunity to work towards the established vision over time.

C. Access Management Implementation

As described above, access management is an effort to maintain the effective flow of traffic and the safety of roads while accommodating the access needs of adjacent land development. Successful access management requires cooperation between land use and transportation interests in order to protect the public's investment in roads. Access management reduces congestion and crashes; preserves road capacity and postpones the need for roadway widening; reduces travel time for the delivery of goods and services; provides easy movement to destinations; and promotes sustainable community development.

The sections above defined a long-range access vision for CSAH 22 and CSAH 24 as

well as an indication as to when these access changes would be implemented. The main trigger for implementation of access changes to either corridor is a land use change. As land use changes are proposed, the following strategies should be considered by local jurisdictions in order to manage access, working ultimately towards the long-range access vision outlined in Figures 32 and 35.

- Direct access to the corridor should not be used in lieu of an acceptable local road system.
- Shared access is a management tool that provides access to multiple adjacent developments or properties. If used
    - A cross easement should be recorded at the county documenting that access is granted for the benefit of the adjacent parcel(s).
    - Consideration should also be given for the use of a recapture agreement to allow the property owner granting the easement to collect a prorated, fair-share of the cost for the facility from those property owner(s) that benefit.
- When new access is proposed, attempts should be made to align the access across from an existing access on the other side of the corridor to improve safety, if no alternate access is feasible.
- For parcels located at the intersection of the corridor and another local or county road, access should be taken from the other road.
- Access should not be allowed if it would require backing out or making turning maneuvers onto the corridor. Site improvements to be constructed to allow for vehicles to turn around within the site.
- Existing and proposed access(es) should be evaluated to determine the proposed use's traffic impact on the corridor. A traffic study may be required to be performed by a traffic engineer per the Anoka County Highway Department Development Review Process.
- Restricting turning movements may be necessary when:
    - A parcel has more than one access provided and volumes do not justify full or partial access into and/or from both access points.
    - A parcel has access provided by both a signalized access point and an unsignalized access point; left-turns should be prohibited at the unsignalized location.
    - Numerous low-volume access points exist in close proximity and the spacing between them results in the crossing of turning movement paths.
    - There are access points close to an intersection where inbound or outbound left-turns would have to be made within areas where traffic is queued during any period of the day or when there are outbound left or right turns would have to be made within the right or left turn bays.
    - Other safety conditions, such as sight distance due to roadway curves and/or visual obstructions, prevent left turns from being made safely.
    - Other capacity, delay, operational, or safety conditions that make specific left turns detrimental to the public interest (usually identified on a case by case basis).

  - A new local roadway is constructed which allows for opportunity to modify access at the highway.

- Turning movement restrictions on CSAH 22 should be enforced with barrier median channelization or driveway channelization as appropriate and allowable under Anoka County's design criteria. Signing should also be required and conform to the provision of the Minnesota Manual of Uniform Traffic Control Devices and county policies.
- If access to the corridor is unavoidable, long-term plans should be developed to redirect the driveway or street network to a local road when adjacent property develops.
- As development occurs, supporting roadways and related traffic improvements should be constructed with development. Consideration should be given for whether a financial surety (e.g. cash, irrevocable letter of credit) would be appropriate to collect by the city to fund the connection or intersection control upgrade in the future.

A site should always be oriented to function with the future access vision. If access cannot currently be provided to local roadways or the local roadways have not been fully completed, access may provisionally be allowed to the county highway, at the county's discretion. Any provisional access will be closed when the local roadway connections are complete. Placement of buildings, parking and circulation routes needs to be considered for both the immediate provisional county road access and the future local access when provisional access is closed.

APPENDIX A -
TRAVEL FORECASTING TECHNICAL MEMORANDUM

BOLTON & MENK, INC.
Consulting Engineers & Surveyors
12224 Nicollet Avenue • Burnsville, MN 55337
Phone (952) 890-0509 • Fax (952) 890-8065
www.bolton-menk.com

M E M O R A N D U M

Date: June 27, 2011

To: Technical Advisory Committee

From: Bryan Nemeth

Subject: Northern Anoka County River Crossing Study
Travel Forecasting Technical Memorandum
Project No.: T42.102757

I. Introduction

The objective of this technical memorandum is to document the Anoka County Traffic Model updates, socioeconomic forecasts, and the travel forecasting methodology to develop the traffic forecasts used for the Northern Anoka County River Crossing Study.

II. Traffic Forecast Model

The Anoka County Traffic Model is based on the Regional Travel Demand Model developed by the Metropolitan Council. Since the Anoka County Model was first developed in 2005, the structure of the Regional Model has evolved. Adjustments to the Anoka County Model were completed in 2008 to incorporate many of the changes from the Regional Model. These changes are noted in the 2008 Anoka County Model Update, August 2008. The Anoka County Traffic Model is a four-step travel demand model that includes trip generation, trip destination, mode choice, and traffic assignment in an iterative process to develop traffic forecasts.

The structure of the model was not changed for its use in the Northern Anoka County River Crossing Study but was updated as needed to obtain more accurate forecasts in northwest Anoka County.

III. Socioeconomic Forecasts

Trip generation in the Anoka County Traffic Model uses local socioeconomic data to estimate the number of person-trips for each Transportation Analysis Zone (TAZ). The Anoka County TAZs in the northwest area of Anoka County are shown in Figures 1-4. Zones 1-3 are not

original Anoka County TAZs but are new zones that were developed explicitly for this study. They were originally part of TAZ 1703 in the City of St. Francis. TAZ 1703 was split into four smaller zones (1703, 1, 2, and 3) to better allocate trips to the roadway network on CSAH 24, CSAH 28, CSAH 7, and TH 47 in St. Francis.

The socioeconomic data within each TAZ includes the number of households, population, and employment (split into retail versus non-retail employees). This data along with income and auto ownership within each TAZ is used to estimate the person-trips associated with that TAZ. The income and auto ownership data is collected through household survey data by the Metropolitan Council while the socioeconomic data is developed by the counties, cities, and townships within the seven county metropolitan area. The socioeconomic data within the 2008 Anoka County Traffic Model was updated through this study for the cities of St. Francis, Bethel, Oak Grove, Nowthen, and East Bethel using the 2030 Comprehensive Plans, some of which were completed after the Anoka County Model update in 2008.

The year 2000 was used as the base year and the year 2030 as the future modeled year. The socioeconomic data for year 2000 are included in Tables 1-4 along with the Anoka County Model and Metropolitan Council data by TAZ. Since this area is directly adjacent to the limits of the Metropolitan Council jurisdiction, there are also some external jurisdictions that have an influence on trips within the area, specifically the City of Elk River to the west of the study area in Sherburne County and the townships of Athens and Stanford to the north in Isanti County. The most recent available socioeconomic data was also included for those areas and is included by TAZ in Tables 5-7. The socioeconomic data for year 2030 are included in Tables 8-14 along with the Anoka County Model and Metropolitan Council data by TAZ.

The year 2000 and 2030 socioeconomic information was used to update the socioeconomic information in the year 2000 model and the year 2030 model. With the addition of TAZs and the socioeconomic data the following Anoka County Traffic Model files were updated.

- SE2000b.DAT (year 2000 model socioeconomic data)
- SE2030.dat (year 2030 model socioeconomic data)
- Sedata.ringonly.prn (year 2000 or 2030 model ring TAZ socioeconomic data)
- ZONECOORDS.DAT (network TAZ centroid coordinates)
- 2000.AMPK.NET (year 2000 AM Peak Highway Network)
- 2000.OPK.NET (year 2000 Off-Peak Highway Network)
- 2000.PMPK.NET (year 2000 PM Peak Highway Network)
- A2030AM.NET (year 2030 AM Peak Highway Network)
- A2030OP.NET (year 2030 Off-Peak Highway Network)
- A2030PM.NET (year 2030 PM Peak Highway Network)

- Network 2000_2196.net (year 2000 baseline highway network with baseline traffic volumes)
- Network 2000_2196_AM.net (year 2000 baseline highway network with baseline AM Peak traffic volumes)
- Network 2000_2196_OP.net (year 2000 baseline highway network with baseline Off Peak traffic volumes)
- Network 2030_2196.net (year 2030 baseline highway network with baseline traffic volumes)
- Network 2030_2196_AM.net (year 2030 baseline highway network with baseline AM Peak traffic volumes)
- Network 2030_2196_OP.net (year 2030 baseline highway network with baseline Off Peak traffic volumes)
- New2000_TRANSIT.HNT (year 2000 bus line and rail transit network)
- New2030_TRANSIT.HNT (year 2030 bus line and rail transit network)

The following script files were also updated to include the additional TAZs. This specifically included adding TAZs 1-3 in St. Francis as used zones instead of unused zones in the modeling.

- Pkopktime_post.s
- CREATE_MODE_12.s
- MSApkopktime.s
- Dcring_altered.s
- Predc.s
- Corecountyse.s
- tripgenPA.s

IV. Additional Highway Network Updates

Along with the TAZ and socioeconomic data updates as designated above, the highway network files were also updated with the link free-flow speeds and capacities as designated by the roadway functional classification and the surrounding area types. The speed and capacity updates were completed on CSAH 7, CSAH 24, and CSAH 28 in St. Francis on the roadway segments which have speed limits under 55 mph as noted in the Existing Conditions Technical Memorandum.

Each TAZ is connected to the larger highway and transit network through the use of centroid connectors. These controid connectors connect the person-trips within each TAZ to each other

TAZ through the use of the highway and transit network. Some TAZ centroid connectors to the highway network were updated based on the existing roadways within the TAZ, the future land use, and the presence of water features.

The highway network in Isanti and Sherburne Counties was also updated to include the county highways within six miles of the Anoka County border. This helps to distribute trips through the highway network outside of Anoka County and determine which trips will use CSAH 22 and CSAH 24 to get from TH 169 and Elk River to TH 65 as opposed to other routes outside of Anoka County.

V. Model Validation and Results

The year 2000 model is the baseline year for the model forecasts. The results of the model were compared against the year 2000 traffic counts on each roadway link within the study area from TH 65 to the Anoka County western border to ascertain the accuracy of the traffic forecasts to match the existing traffic volumes. It was found that since the Anoka County Traffic Model is based on the Regional Model, the accuracy of Model is not as accurate near the border of the seven-county metropolitan area. Measures were taken to alleviate this influence as much as possible through the centroid connector allocation and changes to external truck station volumes, but there is still an inherent inaccuracy that must be accounted for. Additionally, it is not possible for all highway forecasts to exactly match the real traffic volume due to the size of the TAZs. This resulted in the need for post-processing to fine-tune the 2030 traffic forecasts as designated by Mn/DOT and FHWA, using the methodologies in NCHRP 255 – Highway Traffic Data for Urbanized Area Project Planning and Design.

The traffic forecasts developed have a confidence range of plus or minus 15 percent. This confidence range is primarily based on the reliability of the historical traffic data, where a count one day out of the year is used to estimate what is happening every other day of the same year. Traffic naturally changes from day to day. As traffic is forecasted further into the future, the reliability of forecasting the exact traffic volume is less. This accounts for the confidence range. If a traffic volume forecast on a roadway segment changes by less than 15 percent, there is considered to be no substantial change in traffic volume. This is especially important to note when comparing the build forecasts to the no build forecasts. As a result, a less than 15 percent change in traffic volume is essentially considered to result in no change in traffic volume.

The historical and 2030 forecasts are included in the Future No Build Conditions Technical Memorandum and the Future Roadway Build Alternatives Technical Memorandum.

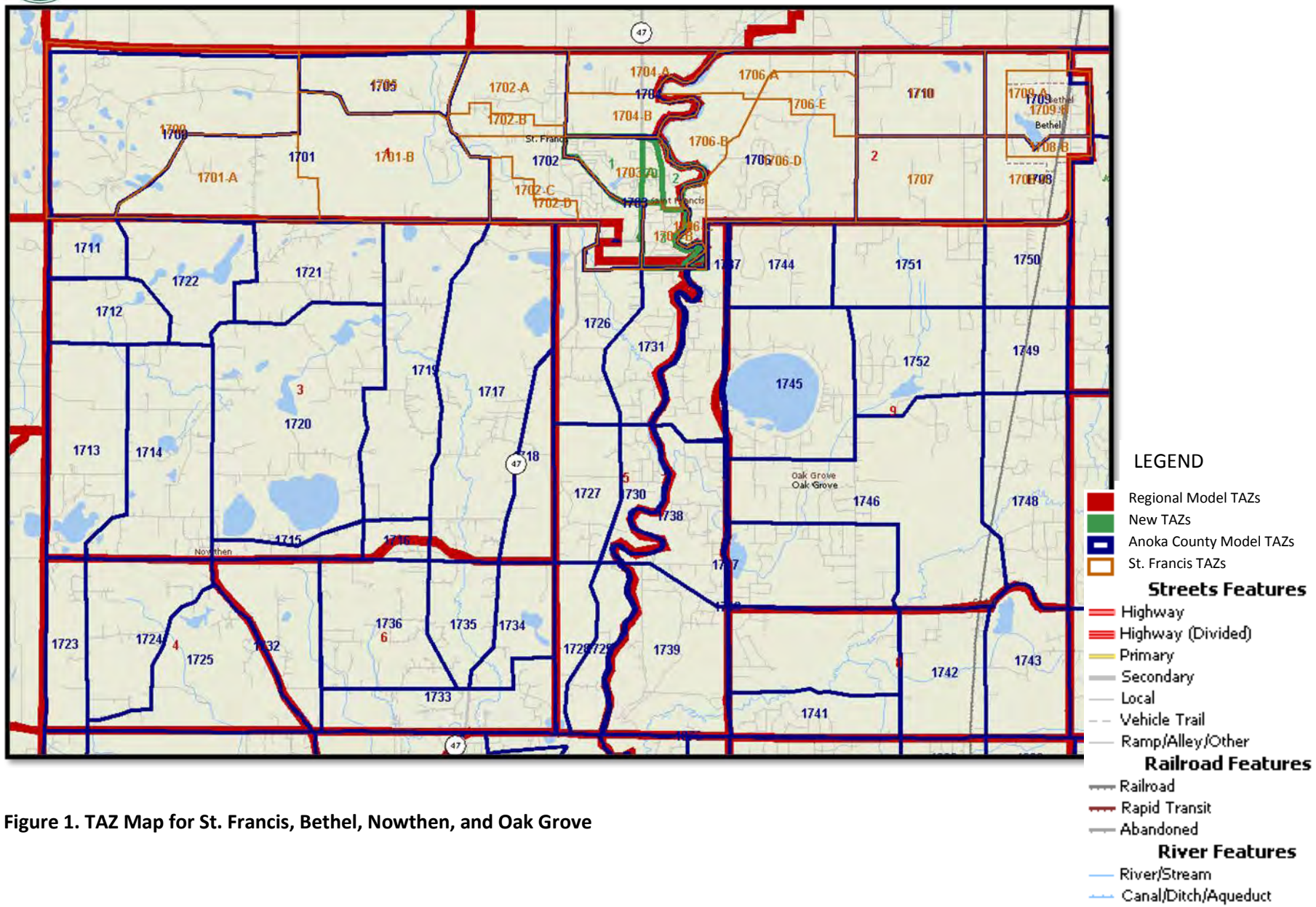

Figure 1. TAZ Map for St. Francis, Bethel, Nowthen, and Oak Grove

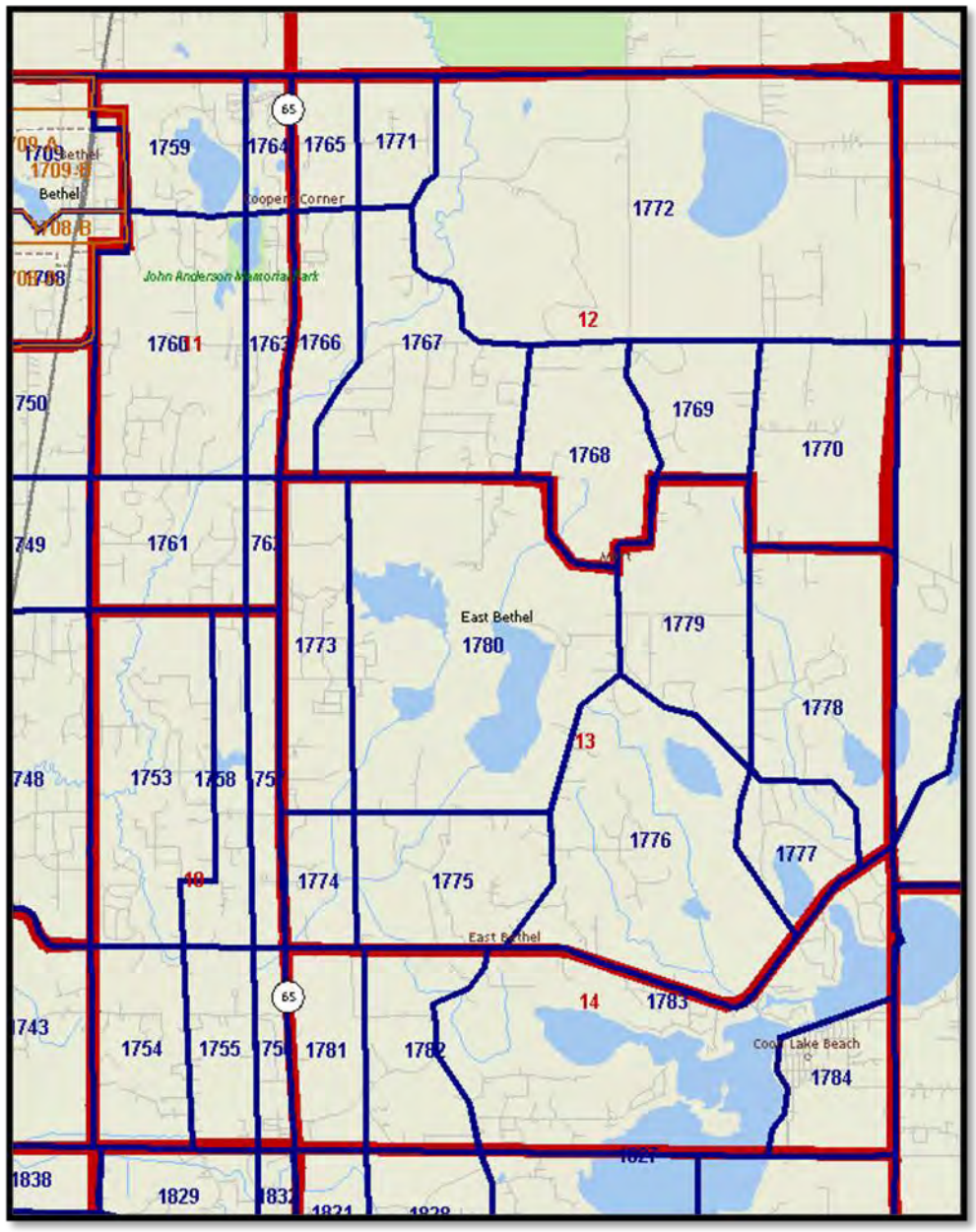

Figure 2. TAZ Map for East Bethel

LEGEND

- Regional Model TAZs
- New TAZs
- Anoka County Model TAZs
- St. Francis TAZs

Streets Features

- Highway
- Highway (Divided)
- Primary
- Secondary
- Local
- Vehicle Trail
- Ramp/Alley/Other

Railroad Features

- Railroad
- Rapid Transit
- Abandoned

River Features

- River/Stream
- Canal/Ditch/Aqueduct

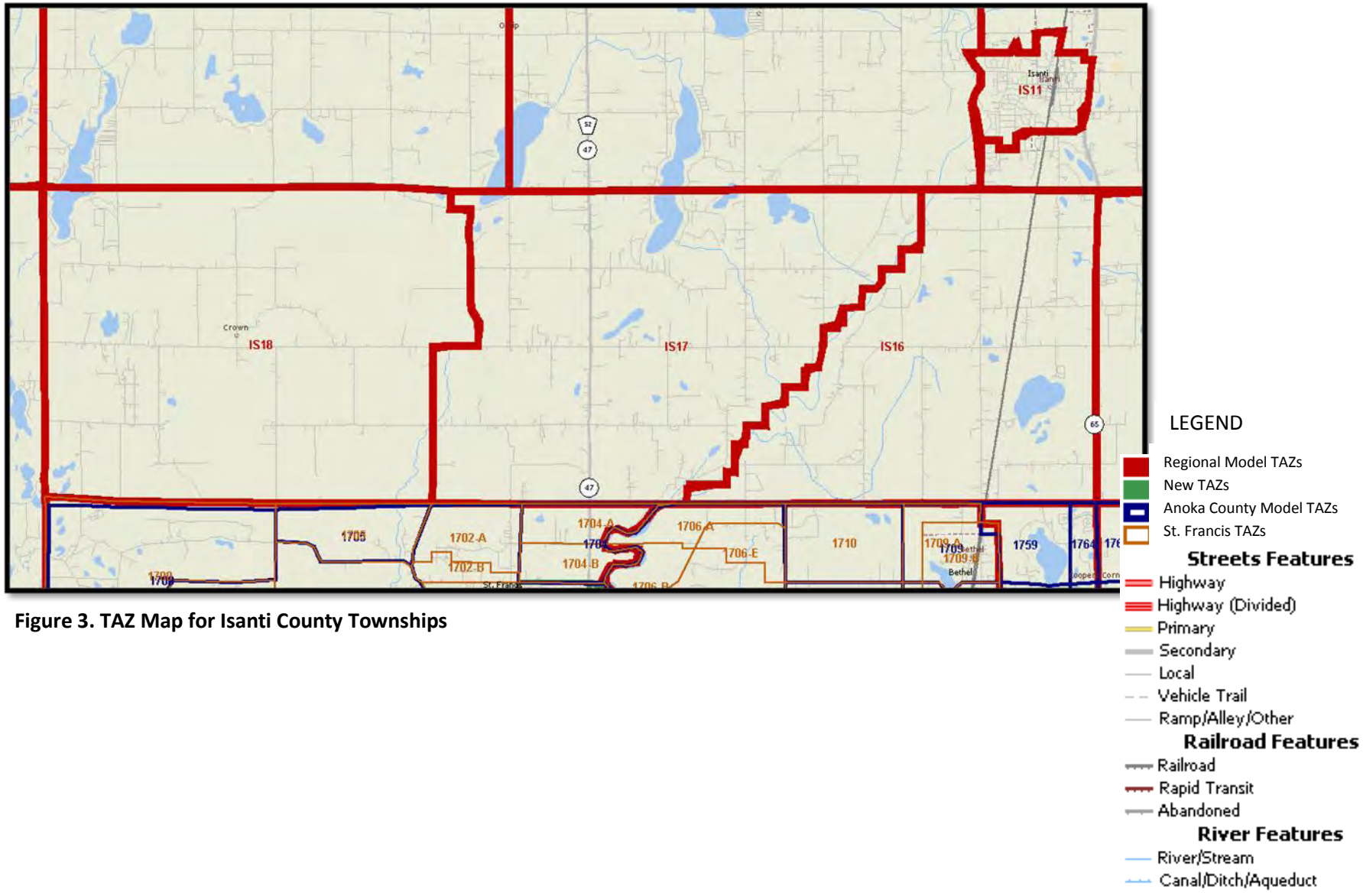

Figure 3. TAZ Map for Isanti County Townships

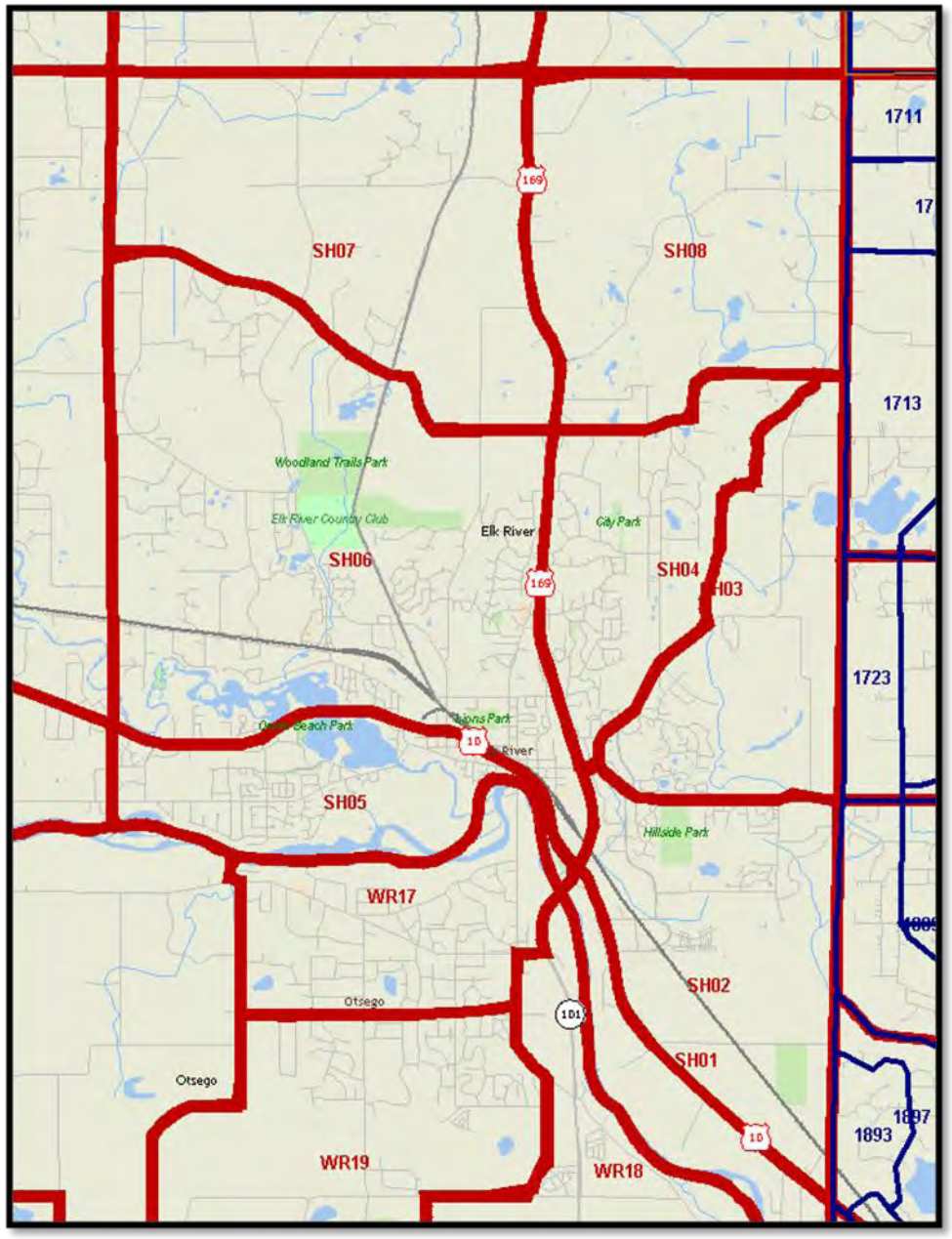

Figure 4. TAZ Map for Elk River

LEGEND

- Regional Model TAZs
- New TAZs
- Anoka County Model TAZs
- St. Francis TAZs

Streets Features

- Highway
- Highway (Divided)
- Primary
- Secondary
- Local
- Vehicle Trail
- Ramp/Alley/Other

Railroad Features

- Railroad
- Rapid Transit
- Abandoned

River Features

- River/Stream
- Canal/Ditch/Aqueduct

Table 1: Saint Francis & Bethel Year 2000 TAZ Socioeconomic Data

Anoka County Forecast						Year 2000 Model/Modified City Comprehensive Plan Forecast						Metropolitan Council Travel Demand Model					
TAZ	Population	Households	Employees	Retail Employees	Non-Retail	TAZ	Population	Households	Employees	Retail Employees	Non-Retail	TAZ	Population	Households	Employees	Retail Employees	Non-Retail
1700	956	307	75	0	75	1700	15	5	75	0	75	1	3,523	1,134	997	94	903
1701	999	321	3	0	3	1701	239	69	3	0	3						
1702	679	219	76	17	59	1702	683	206	76	17	59						
1703	290	93	715	17	698	1703	325	101	204	2	202						
						1	1,331	437	200	3	197						
						2	156	53	56	4	52						
						3	634	218	257	8	249						
1704	315	101	113	1	112	1704	77	25	112	1	111						
1705	285	92	0	0	0	1705	63	20	0	0	0						
1706	806	287	397	18	379	1706A	73	42	0	0	0	2	1,830	653	479	78	401
						1706B	22	8	0	0	0						
						1706C	101	42	36	5	31						
						1706D	671	242	213	6	207						
						1706E	92	30	0	0	0						
1707	295	105	0	0	0	1707	196	64	0	0	0						
1708	207	74	24	0	24	1708A	31	10	2	0	2						
						1708B (Bethel)	158	52	13	0	13						
1709	228	82	72	2	70	1709A	56	18	13	0	13						
						1709B (Bethel)	285	97	216	9	207						
1710	295	105	0	0	0	1710	145	48	0	0	0						
Total	**5,355**	**1,786**	**1,475**	55	1,420	**Total**	**5,353**	**1,787**	**1,476**	55	1,421	**Total**	**5,353**	**1,787**	**1,476**	172	1,304

St. Francis Metropolitan Council Forecast

1,2	**4,910**	**1,638**	**1,247**		**St. Francis Total**	**4,910**	**1,638**	**1,247**	**46**	**1,201**

Bethel Metropolitan Council Forecast

2	**443**	**149**	**229**	in 1708 & 1709	**Bethel Total**	**443**	**149**	**229**	**9**	**220**

Total Metropolitan Council Forecast

1,2	**5,353**	**1,787**	**1,476**

Table 2: Nowthen Year 2000 TAZ Socioeconomic Data

Anoka County						Year 2000 Model/Modified City Comprehensive Plan Forecast						Metropolitan Council Travel Demand Model					
TAZ	Population	Households	Employees	Retail Employees	Non-Retail	TAZ	Population	Households	Employees	Retail Employees	Non-Retail	TAZ	Population	Households	Employees	Retail Employees	Non-Retail
1711	49	16	0	0	0	1711	49	16	3	0	3	3	1,794	581	190	35	155
1712	78	25	2	0	2	1712	78	25	0	0	0						
1713	167	54	28	0	28	1713	167	54	12	0	12						
1714	205	66	21	2	19	1714	205	66	52	17	36						
1715	34	11	7	7	0	1715	34	11	0	0	0						
1716	28	9	0	0	0	1716	28	9	1	0	1						
1717	314	102	20	1	19	1717	314	103	41	7	34						
1718	76	24	2	0	2	1718	76	24	0	0	0						
1719	220	71	37	4	33	1719	220	71	29	11	17						
1720	368	119	59	0	59	1720	367	120	41	0	41						
1721	128	41	4	0	4	1721	128	41	12	0	12						
1722	128	41	0	0	0	1722	128	41	0	0	0						
1723	104	33	2	0	2	1723	104	33	1	0	1	4	513	161	10	0	10
1724	187	59	5	0	5	1724	187	59	7	0	7						
1725	222	70	3	0	3	1725	222	70	2	0	2						
1732	264	80	36	0	36	1732	264	80	61	5	56	6	1,250	381	137	5	132
1733	282	86	27	0	27	1733	282	86	11	0	11						
1734	169	51	0	0	0	1734	169	51	21	0	21						
1735	173	53	6	0	6	1735	173	53	9	0	9						
1736	362	110	36	0	36	1736	362	110	34	0	34						
Total	**3,558**	**1,121**	**295**	14	281	**Total**	**3,557**	**1,123**	**337**	40	297	**Total**	**3,557**	**1,123**	**337**	40	297

Metropolitan Council Forecast

3,4,6	**3,557**	**1,123**	**337**

Table 3: Oak Grove Year 2000 TAZ Socioeconomic Data

Anoka County						Year 2000 Model/Modified City Comprehensive Plan Forecast						Metropolitan Council Travel Demand Model					
TAZ	Population	Households	Employees	Retail Employees	Non-Retail	TAZ	Population	Households	Employees	Retail Employees	Non-Retail	TAZ	Population	Households	Employees	Retail Employees	Non-Retail
1726	381	112	82	0	82	1726,5	381	112	64	0	64	5	1,381	405	90	5	85
1727	269	79	1	0	1	1727	154	45	9	0	9						
1728	154	45	0	0	0	1728	153	45	1	0	1						
1729	170	50	1	0	1	1729	254	75	1	0	1						
1730	153	45	3	0	3	1730	170	50	0	0	0						
1731	254	75	2	0	2	1731	269	78	16	0	16						
1737	305	99	18	0	18	1737,7	305	99	25	0	25	7	1,210	393	70	0	70
1738	358	116	32	0	32	1738	358	116	27	0	27						
1739	547	178	18	0	18	1739	547	178	17	0	17						
1740	300	100	44	29	15	1740,8	300	100	32	21	11	8	920	307	89	37	52
1741	155	52	4	0	4	1741	155	52	3	0	3						
1742	230	77	7	0	7	1742	230	77	50	0	50						
1743	235	78	36	0	36	1743	235	78	6	0	6						
1744	234	76	2	0	2	1744,9	234	76	0	0	0	9	3,392	1,095	110	0	110
1745	510	164	2	0	2	1745	376	122	6	0	6						
1746	831	268	14	0	14	1746	186	60	25	0	25						
1747	376	122	9	0	9	1747	326	105	34	0	34						
1748	415	134	25	0	25	1748	329	106	8	0	8						
1749	186	60	3	0	3	1749	186	60	0	0	0						
1750	186	60	45	0	45	1750	830	268	7	0	7						
1751	329	106	1	0	1	1751	510	164	12	0	12						
1752	326	105	4	0	4	1752	415	134	14	0	14						
Total	**6,904**	**2,201**	**353**	29	324	**Total**	**6,903**	**2,200**	**359**	21	338	**Total**	**6,903**	**2,200**	**359**	42	317

Metropolitan Council Forecast

5,7-9	**6,903**	**2,200**	**359**

Table 4: East Bethel Year 2000 TAZ Socioeconomic Data

Anoka County						Year 2000 Model/Modified City Comprehensive Plan Forecast						Metropolitan Council Travel Demand Model					
TAZ	Population	Households	Employees	Retail Employees	Non-Retail	TAZ	Population	Households	Employees	Retail Employees	Non-Retail	TAZ	Population	Households	Employees	Retail Employees	Non-Retail
1753	818	271	380	36	344	1753	1,005	315	66	6	60	10	2,155	713	590	45	545
1754	399	132	3	1	2	1754	213	66	0	0	0						
1755	284	94	39	3	36	1755	452	161	82	6	76						
1756	142	47	82	12	70	1756	182	64	276	40	236						
1757	218	72	7	1	6	1757	107	37	165	24	141						
1758	294	97	7	0	7	1758	196	70	2	0	2						
1759	342	108	9	0	9	1759	180	56	32	0	32	11	1,880	591	81	35	46
1760	730	229	11	2	9	1760	706	217	6	1	5						
1761	389	122	9	0	9	1761	376	119	9	0	9						
1762	83	26	0	0	0	1762	62	18	0	0	0						
1763	217	68	39	3	36	1763	158	55	34	3	31						
1764	119	37	4	0	4	1764	398	126	0	0	0						
1765	69	22	39	31	8	1765	110	35	0	0	0	12	2,085	677	170	40	130
1766	120	39	12	0	12	1766	172	61	11	0	11						
1767	287	93	85	0	85	1767	767	238	85	0	85						
1768	189	62	6	6	0	1768	191	61	2	2	0						
1769	122	40	0	0	0	1769	139	51	0	0	0						
1770	236	77	4	0	4	1770	201	59	0	0	0						
1771	78	25	4	0	4	1771	127	39	0	0	0						
1772	983	320	0	0	0	1772	378	133	72	0	55						
1773	211	65	134	32	102	1773	343	109	345	82	263	13	2,389	737	406	70	336
1774	86	27	42	3	39	1774	44	15	60	4	56						
1775	220	68	14	0	14	1775	219	67	0	0	0						
1776	488	150	79	0	79	1776	559	178	0	0	0						
1777	118	36	29	4	25	1777	352	99	0	0	0						
1778	321	99	4	0	4	1778	161	51	0	0	0						
1779	258	80	9	0	9	1779	233	74	0	0	0						
1780	685	212	48	0	48	1780	478	144	0	0	0						
1781	302	110	79	3	76	1781	77	28	120	5	115	14	2,432	889	127	60	67
1782	375	137	2	0	2	1782	214	71	0	0	0						
1783	1,437	525	22	1	21	1783	1,634	568	5	0	5						
1784	318	116	9	1	8	1784	507	222	2	0	2						
Total	**10,938**	**3,606**	**1,211**	139	1,072	Total	10,941	3,607	1,374	174	1,183	**Total**	**10,941**	**3,607**	**1,374**	250	1,124

Metropolitan Council Forecast

10-14	**10,941**	**3,607**	**1,374**

Table 5: Athens Township Year 2000 TAZ Socioeconomic Data

Anoka County						Year 2000 Model/Modified County Comprehensive Plan Forecast						Metropolitan Council Travel Demand Model					
TAZ	Population	Households	Employees	Retail Employees	Non-Retail	TAZ	Population	Households	Employees	Retail Employees	Non-Retail	TAZ	Population	Households	Employees	Retail Employees	Non-Retail
1279	1,307		118			1279	1,361	455	41			IS15					
1280	1,015		92			1280	961	324	102			IS16					
Total	**2,322**	**0**	**210**	0	0	**Total**	**2,322**	**779**	**143**	0	0	**Total**	**0**	**0**	**0**	0	0

Table 6: Stanford Township Year 2000 TAZ Socioeconomic Data

Anoka County						Year 2000 Model/Modified County Comprehensive Plan Forecast						Metropolitan Council Travel Demand Model					
TAZ	Population	Households	Employees	Retail Employees	Non-Retail	TAZ	Population	Households	Employees	Retail Employees	Non-Retail	TAZ	Population	Households	Employees	Retail Employees	Non-Retail
1281	988		100			1281	1,291	428	60			IS17					
1282	1,087		109			1282	784	276	241			IS18					
Total	**2,075**	**0**	**209**	0	0	**Total**	**2,075**	**704**	**301**	0	0	**Total**	**0**	**0**	**0**	0	0

Table 7: Elk River Year 2000 TAZ Socioeconomic Data

Anoka County						Year 2000 Model/Modified City Comprehensive Plan Forecast						Metropolitan Council Travel Demand Model					
TAZ	Population	Households	Employees	Retail Employees	Non-Retail	TAZ	Population	Households	Employees	Retail Employees	Non-Retail	TAZ	Population	Households	Employees	Retail Employees	Non-Retail
1294	440		224			1185	145	49	199			SH01					
1295	2,520		1,284			1186-93,1259-61	416	125	373			SH02					
1296	1,058		539			1209-12,62-64	276	89	35			SH03					
1297	923		471			1213-14,27,65-67	3,501	1,140	1,268			SH04					
1298	1,593		812			1194,97-99,1200-04	3,352	1,124	1,703			SH05					
1299	6,183		3,152			1195-96,1205-08,15-26,73,74	7,719	2,821	3,636			SH06					
1300	1,963		1,001			1229-34,69-71	505	156	466			SH07					
1301	1,767		901			1228,35,68,72	533	169	44			SH08					
Total	**16,447**	**0**	**8,384**	0	0	**Total**	**16,447**	**5,673**	**7,724**	0	0	**Total**	**0**	**0**	**0**	0	0

Table 8: Saint Francis & Bethel Year 2030 TAZ Socioeconomic Data

Anoka County Forecast						Year 2030 Model/Modified City Comprehensive Plan Forecast						Metropolitan Council Travel Demand Model					
TAZ	Population	Households	Employees	Retail Employees	Non-Retail	TAZ	Population	Households	Employees	Retail Employees	Non-Retail	TAZ	Population	Households	Employees	Retail Employees	Non-Retail
1700	956	307	95	0	95	1700	26	10	75	0	75	1	7,468	2,500	1,776	576	1,200
1701	2,577	867	4	0	4	1701	407	159	0	0	0						
1702	1,863	629	355	280	75	1702	1,370	535	120	30	90						
1703	685	230	1,165	280	885	1703	381	125	290	34	256						
						1	1,831	735	230	33	197						
						2	388	156	80	33	47						
						3	635	248	300	52	248						
1704	710	238	158	16	142	1704	3,597	1,405	825	296	529						
1705	680	229	0	0	0	1705	90	35	0	0	0						
1706	1,608	696	726	157	569	1706A	315	123	0	0	0	2	5,842	2,700	884	174	710
						1706B	320	125	0	0	0						
						1706C	116	45	60	25	35						
						1706D	2,402	938	240	30	210						
						1706E	300	117	0	0	0						
1707	1,097	514	0	0	0	1707	282	110	0	0	0						
1708	1,009	483	36	0	36	1708A	45	18	0	0	0						
						1708B (Bethel)	232	91	25	0	25						
1709	1,030	491	122	17	105	1709A	85	33	0	0	0						
						1709B (Bethel)	418	169	415	17	398						
1710	1,097	514	0	0	0	1710	210	83	0	0	0						
Total	**13,312**	**5,199**	**2,661**	750	1,911	**Total**	**13,450**	**5,260**	**2,660**	550	2,110	**Total**	**13,310**	**5,200**	**2,660**	750	1,910

St. Francis Metropolitan Council Forecast

1,2	**12,800**	**5,000**	**2,220**		**St. Francis Total**	**12,800**	**5,000**	**2,220**	**533**	**1,687**

Bethel Metropolitan Council Forecast

2	**650**	**260**	**440**	in 1708 & 1709	**Bethel Total**	**650**	**260**	**440**	**17**	**423**

Total Metropolitan Council Forecast

1,2	**13,450**	**5,260**	**2,660**

Table 9: Nowthen Year 2030 TAZ Socioeconomic Data

Anoka County						Year 2030 Model/Modified City Comprehensive Plan Forecast						Metropolitan Council Travel Demand Model					
TAZ	Population	Households	Employees	Retail Employees	Non-Retail	TAZ	Population	Households	Employees	Retail Employees	Non-Retail	TAZ	Population	Households	Employees	Retail Employees	Non-Retail
1711	79	29	0	0	0	1711	73	27	0	0	0	3	2,880	1,050	270	50	220
1712	125	45	3	0	3	1712	115	43	0	0	0						
1713	268	98	37	0	37	1713	247	93	0	0	0						
1714	329	119	33	8	25	1714	303	113	233	58	176						
1715	55	20	27	27	0	1715	51	19	12	12	0						
1716	45	16	0	0	0	1716	41	15	0	0	0						
1717	504	184	29	4	25	1717	464	174	23	3	20						
1718	122	43	3	0	3	1718	112	41	2	0	2						
1719	353	128	59	15	44	1719	325	121	0	0	0						
1720	591	215	78	0	78	1720	544	204	0	0	0						
1721	205	74	5	0	5	1721	189	70	0	0	0						
1722	205	74	0	0	0	1722	189	70	0	0	0						
1723	278	102	4	0	4	1723	256	75	0	0	0	4	1,370	500	25	5	20
1724	499	183	10	0	10	1724	459	135	19	5	14						
1725	593	217	6	0	6	1725	545	160	6	0	6						
1732	433	157	48	0	48	1732	399	160	109	15	94	6	2,050	750	155	15	140
1733	462	169	36	0	36	1733	426	172	0	0	0						
1734	277	100	0	0	0	1734	255	102	44	0	44						
1735	284	104	8	0	8	1735	262	106	2	0	2						
1736	594	217	48	0	48	1736	548	221	0	0	0						
Total	**6,301**	**2,294**	**434**	54	380	**Total**	**5,800**	**2,120**	**450**	92	358	**Total**	**6,300**	**2,300**	**450**	70	380

Metropolitan Council Forecast

3,4,6	**5,800**	**2,120**	**450**

Table 10: Oak Grove Year 2030 TAZ Socioeconomic Data

Anoka County						Year 2030 Model/Modified City Comprehensive Plan Forecast						Metropolitan Council Travel Demand Model					
TAZ	Population	Households	Employees	Retail Employees	Non-Retail	TAZ	Population	Households	Employees	Retail Employees	Non-Retail	TAZ	Population	Households	Employees	Retail Employees	Non-Retail
1726	447	152	143	0	143	1726	582	199	134	0	134	5	1,620	550	160	5	155
1727	316	107	2	0	2	1727	451	174	51	0	51						
1728	181	61	0	0	0	1728	459	178	0	0	0						
1729	199	68	2	0	2	1729	320	104	1	0	1						
1730	179	61	5	0	5	1730	257	88	1	0	1						
1731	298	102	3	0	3	1731	435	150	2	0	2						
1737	358	135	33	0	33	1737	458	166	84	0	84	7	1,420	535	125	0	125
1738	420	158	59	0	59	1738	607	224	65	0	65						
1739	642	242	33	0	33	1739	1,063	402	51	0	51						
1740	352	137	82	55	27	1740	318	108	139	93	46	8	1,080	420	165	55	110
1741	182	71	7	0	7	1741	181	63	17	0	17						
1742	270	105	12	0	12	1742	274	96	22	0	22						
1743	276	107	64	0	64	1743	252	86	42	0	42						
1744	275	104	3	0	3	1744	405	150	5	0	5	9	3,980	1,495	190	10	180
1745	598	224	3	0	3	1745	608	223	14	0	14						
1746	975	366	24	0	24	1746	718	280	61	0	61						
1747	441	167	15	0	15	1747	676	257	45	0	45						
1748	487	183	42	0	42	1748	635	239	21	0	21						
1749	218	82	5	0	5	1749	212	71	5	0	5						
1750	218	82	76	0	76	1750	987	336	7	0	7						
1751	386	145	2	0	2	1751	790	286	43	0	43						
1752	383	143	7	0	7	1752	612	220	7	0	7						
Total	**8,101**	**3,002**	**622**	55	567	**Total**	**11,300**	**4,100**	**820**	93	727	**Total**	**8,100**	**3,000**	**640**	70	570

Metropolitan Council Forecast

5,7-9	**11,300**	**4,100**	**820**

Table 11: East Bethel Year 2030 TAZ Socioeconomic Data

Anoka County						Year 2030 Model/Modified City Comprehensive Plan Forecast						Metropolitan Council Travel Demand Model					
TAZ	Population	Households	Employees	Retail Employees	Non-Retail	TAZ	Population	Households	Employees	Retail Employees	Non-Retail	TAZ	Population	Households	Employees	Retail Employees	Non-Retail
1753	1,120	442	501	80	421	1753	1,085	340	66	11	55	10	2,817	1,087	690	120	570
1754	546	215	4	2	2	1754	225	91	0	0	0						
1755	389	153	51	7	44	1755	879	354	116	16	100						
1756	142	47	113	27	86	1756	344	139	62	15	47						
1757	218	72	9	2	7	1757	1,452	586	415	92	323						
1758	402	158	9	0	9	1758	796	321	110	0	110						
1759	477	181	5	0	5	1759	646	247	31	0	31	11	2,458	901	95	60	35
1760	1,019	384	35	30	5	1760	1,236	474	31	27	4						
1761	543	204	5	0	5	1761	315	120	153	0	153						
1762	83	26	0	0	0	1762	0	0	357	98	259						
1763	217	68	64	45	19	1763	168	64	354	249	105						
1764	119	37	2	0	2	1764	656	251	55	0	55						
1765	69	22	53	42	11	1765	0	0	921	730	191	12	2,725	1,032	200	50	150
1766	120	39	16	0	16	1766	574	222	140	0	140						
1767	384	147	113	0	113	1767	1,441	557	85	0	85						
1768	253	98	8	8	0	1768	203	65	0	0	0						
1769	163	63	0	0	0	1769	163	63	0	0	0						
1770	316	121	5	0	5	1770	171	66	0	0	0						
1771	104	39	5	0	5	1771	680	263	0	0	0						
1772	1,315	505	0	0	0	1772	438	169	0	0	0						
1773	211	65	204	84	120	1773	983	383	745	307	438	13	3,122	1,124	475	100	375
1774	86	27	54	8	46	1774	2,073	809	383	57	326						
1775	297	109	16	0	16	1775	696	272	0	0	0						
1776	659	240	93	0	93	1776	578	184	0	0	0						
1777	159	58	40	11	29	1777	370	142	0	0	0						
1778	433	158	5	0	5	1778	290	114	0	0	0						
1779	348	128	11	0	11	1779	236	92	0	0	0						
1780	925	339	56	0	56	1780	970	378	10	0	10						
1781	302	110	93	72	21	1781	1,570	627	459	355	104	14	3,178	1,356	150	120	30
1782	506	219	1	0	1	1782	885	353	0	0	0						
1783	1,940	840	30	24	6	1783	1,812	629	5	4	1						
1784	429	186	26	24	2	1784	1,566	625	2	2	0						
Total	**14,294**	**5,500**	**1,627**	466	1,161	**Total**	**23,500**	**9,000**	**4,500**	1,962	2,538	**Total**	**14,300**	**5,500**	**1,610**	450	1,160

Metropolitan Council Forecast

10-14	**23,500**	**9,000**	**4,500**

Table 12: Athens Township Year 2030 TAZ Socioeconomic Data

Anoka County						Year 2030 Model/Modified County Comprehensive Plan Forecast						Metropolitan Council Travel Demand Model					
TAZ	Population	Households	Employees	Retail Employees	Non-Retail	TAZ	Population	Households	Employees	Retail Employees	Non-Retail	TAZ	Population	Households	Employees	Retail Employees	Non-Retail
1279	1,307		118			1279	1,496	606	476			IS15	1,785		161		
1280	1,015		92			1280	1,161	470	370			IS16	1,386		126		
Total	**2,322**	**0**	**210**	0	0	**Total**	**2,657**	**1,076**	**845**	0	0	**Total**	**3,171**	**0**	**287**	0	0

Table 13: Stanford Township Year 2030 TAZ Socioeconomic Data

Anoka County						Year 2030 Model/Modified County Comprehensive Plan Forecast						Metropolitan Council Travel Demand Model					
TAZ	Population	Households	Employees	Retail Employees	Non-Retail	TAZ	Population	Households	Employees	Retail Employees	Non-Retail	TAZ	Population	Households	Employees	Retail Employees	Non-Retail
1281	988		100			1281	1,247	505	566			IS17	1,349		137		
1282	1,087		109			1282	1,753	710	424			IS18	1,485		149		
Total	**2,075**	**0**	**209**	0	0	**Total**	**3,000**	**1,214**	**989**	0	0	**Total**	**2,834**	**0**	**286**	0	0

Table 14: Elk River Year 2030 TAZ Socioeconomic Data

Anoka County						Year 2030 Model/Modified 2025 City Comprehensive Plan Forecast						Metropolitan Council Travel Demand Model					
TAZ	Population	Households	Employees	Retail Employees	Non-Retail	TAZ	Population	Households	Employees	Retail Employees	Non-Retail	TAZ	Population	Households	Employees	Retail Employees	Non-Retail
1294	440		224			1185	380	142	2,723	737	1,986	SH01	833		424		
1295	2,520		1,284			1186-93,1259-61	1,620	863	4,015	1,011	3,004	SH02	4,770		2,430		
1296	1,058		539			1209-12,62-64	6,552	2,758	141	0	141	SH03	2,002		1,020		
1297	923		471			1213-14,27,65-67	4,820	1,635	851	418	433	SH04	1,747		891		
1298	1,593		812			1194,97-99,1200-04	4,369	1,666	6,075	2,606	3,469	SH05	3,015		1,537		
1299	6,183		3,152			1195-96,1205-08,15-26,73,74	11,509	4,439	3,806	911	2,895	SH06	11,704		5,965		
1300	1,963		1,001			1229-34,69-71	2,162	757	144	17	127	SH07	3,715		1,895		
1301	1,767		901			1228,35,68,72	3,372	1,201	19	0	19	SH08	3,344		1,705		
Total	**16,447**	**0**	**8,384**	0	0	**Total**	**34,784**	**13,461**	**17,774**	5,700	12,074	**Total**	**31,130**	**0**	**15,867**	0	0

APPENDIX B -
CSAH 24 3-LANE ROADWAY TECHNICAL MEMORANDUM

BOLTON & MENK, INC.
Consulting Engineers & Surveyors
12224 Nicollet Avenue • Burnsville, MN 55337
Phone (952) 890-0509 • Fax (952) 890-8065
www.bolton-menk.com

M E M O R A N D U M

Date: **June 6, 2011**

To: **Technical Advisory Committee**

From: **Bryan Nemeth**

Subject: **Northern Anoka County River Crossing Study**
CSAH 24 3-Lane Roadway Technical Memorandum
Project No.: T42.102757

I. Introduction

The objective of this technical memorandum is to document traffic operations and safety for existing (2010) and 2030 under a build scenario for the improvements to CSAH 24 to three lanes from Ambassador Boulevard to the west end of the existing river crossing and from the east end of the existing river crossing to CR 72/Poppy Street. This technical memorandum also documents the operations and safety for a two-lane divided roadway from CR 72/Poppy Street to CSAH 9/Lake George Boulevard. This technical memorandum documents the AM, Afternoon and PM peak hour traffic operations with the proposed improvements to CSAH 24. Information in the memo will be used to verify that the proposed improvements can adequately handle the traffic volumes and will be used to identify problems and needs associated with the proposed improvements.

II. Background

The build alternatives analysis considered the expansion of CSAH 24 from a two-lane undivided roadway to a four-lane divided road. The roadway expansion alternative for CSAH 24 was completed independent of the expansion alternative for CSAH 22. The results of this analysis are identified in the Future Roadway Build Alternatives Technical Memorandum that showed the existing river crossing could handle 2030 traffic volumes with some improvements. The need for a new river crossing was not shown to exist.

Based on the previous technical memorandums, existing traffic volumes on CSAH 24 are 10,100 to 10,900 vehicles per day and future traffic volumes on CSAH 24 are projected to be 12,100 to 15,000 vehicles per day. The capacity threshold for CSAH 24 is 10,000 vehicles per day therefore this section of CSAH 24 is currently over capacity and congestion is projected to continue to worsen as traffic volumes increase in the future. Since there is no need for a new river crossing in the area, there is a need for improvements to the existing corridor to accommodate the existing and future traffic volumes. The two possibilities for capacity improvements on CSAH 24 presented in the Future Roadway Build Alternatives Technical

Memorandum included either a four-lane divided roadway or a three-lane undivided roadway. Based on the roadway capacity needs, either of the options would likely be able to handle the future traffic growth, but the most significant difference would be in the right-of-way needs.

Figure 1 shows the typical right-of-way needs of a three-lane and four-lane divided facility on CSAH 24 from Ambassador Boulevard to CR 72/Poppy Street through St. Francis. The figure shows that a three-lane roadway section has much less impact on adjacent properties. A three-lane roadway also fits better into the existing right-of-way, requiring less additional right-of-way. The existing two-lane bridge would likely be adequate for a three-lane roadway section since there will not be any turning movements that will need to be accommodated on the bridge. However, if a four-lane divided roadway were constructed along the corridor it would require reconstruction or expansion of the bridge. The existing bridge is in good condition and does not have any deficiency ratings but it is a primary pedestrian/bicycle corridor and could use some improvements to better accommodate those users. Beyond this corridor, there may be an opportunity to provide a separate pedestrian bridge north of the existing bridge to accommodate bicycles/pedestrians safely.

Due to the extensive right-of-way impacts that the four-lane divided roadway section would have to existing homes, businesses, historic properties and parkland and bridge reconstruction, the four-lane option was set aside and the focus of the analysis is on the three-lane alternative. It is noted that the section of CSAH 24 from Poppy Street to the bridge is a three-lane section today.

In conjunction with the three-lane alternative west of CR 72/Poppy Street, Anoka County has been working on corridor improvements from CR 72/Poppy Street to CSAH 9/Lake George Boulevard. The concept plans for the corridor includes access modifications, roundabouts at CR 72 and CSAH 9, and a two-lane divided roadway. The three-lane section west of CR 72/Poppy Street will match into this concept and will be included together in the analysis. The three-lane and two-lane divided roadway concept is shown in Figure 2.

III. Build Conditions Operations Analysis

Traffic Operations Analysis Results

The traffic operations analysis considered the following measures to determine the adequacy of future operations: intersection delay/Level of Service (LOS), vehicle hours of delay, and volume-to-capacity ratios. An explanation of each of these measures is provided below:

- Intersection Delay/Level of Service (LOS):
  A LOS analysis was completed for key intersections to determine how well these intersections are anticipated to operate in the future. The LOS results are based on average delay per vehicle as calculated by the 2000 Highway Capacity Manual (HCM). Control delay is the delay experienced by vehicles slowing down as they are approaching the intersection, the wait time at the intersection, and the time for the vehicle to speed up through the intersection and enter into the traffic stream. The average intersection control delay is a volume weighted average of delay experienced by all motorists entering the

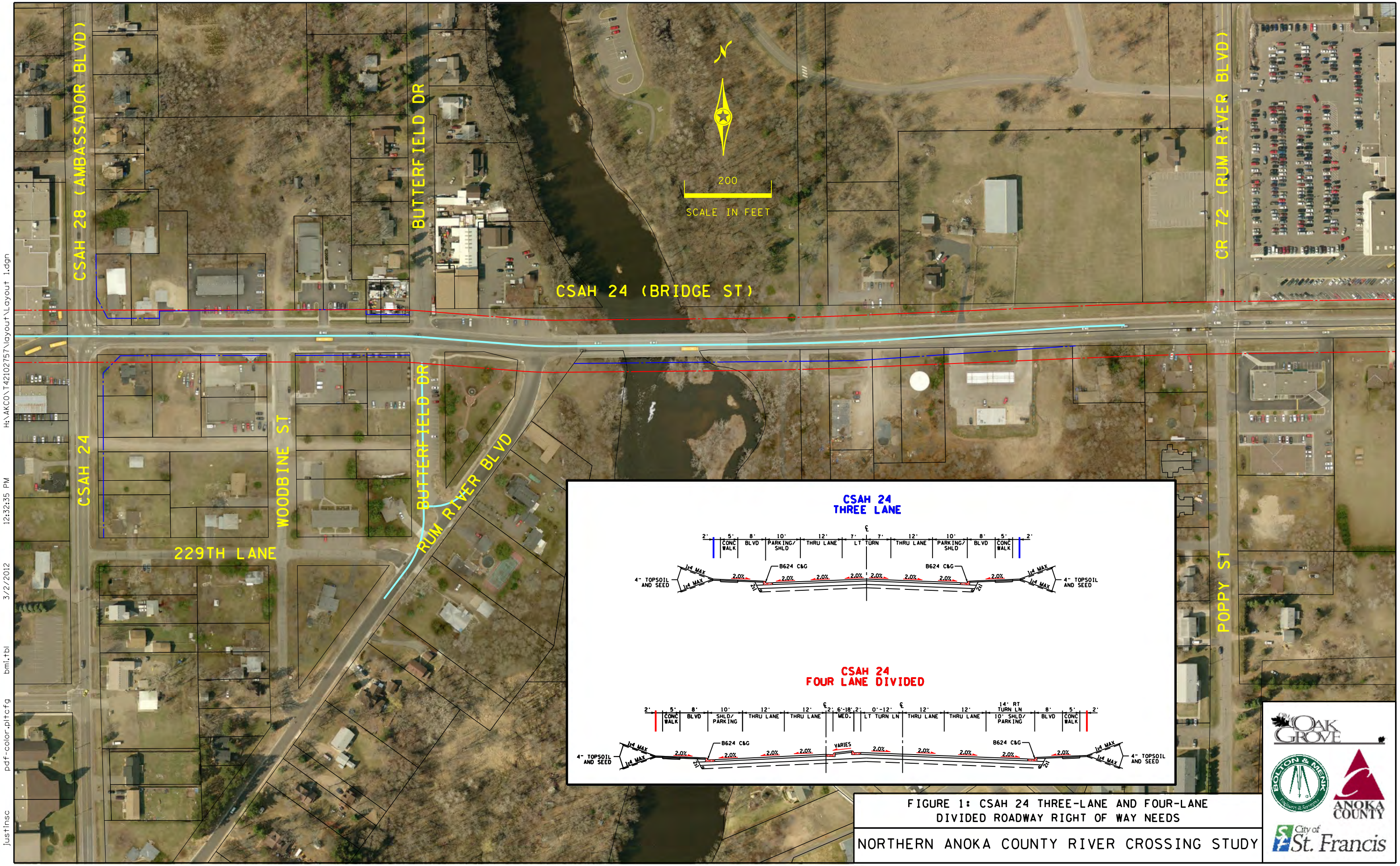

FIGURE 1: CSAH 24 THREE-LANE AND FOUR-LANE DIVIDED ROADWAY RIGHT OF WAY NEEDS

NORTHERN ANOKA COUNTY RIVER CROSSING STUDY

OAK GROVE

BOLTON & MENK

ANOKA COUNTY

City of St. Francis

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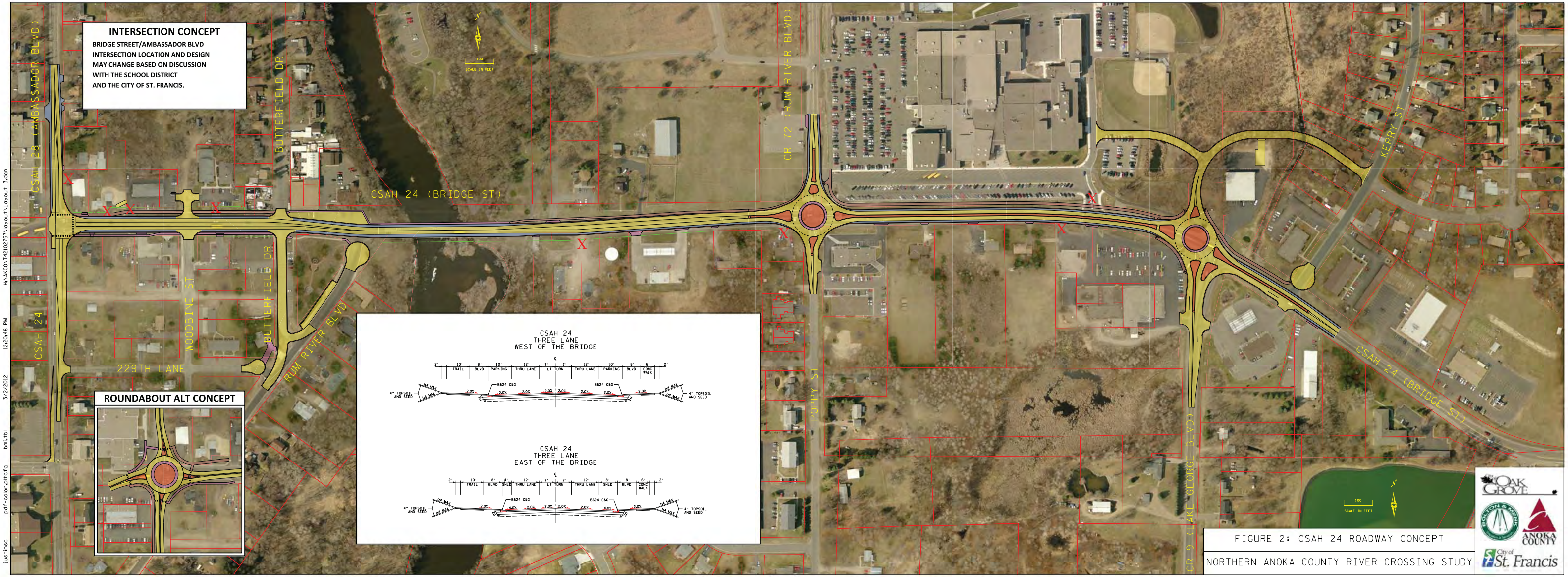

FIGURE 2: CSAH 24 ROADWAY CONCEPT

NORTHERN ANOKA COUNTY RIVER CROSSING STUDY

intersection on all intersection approaches. Intersections and each intersection approach are given a ranking from LOS A through LOS F. LOS A indicates the best traffic operation, with vehicles experiencing minimal delays. LOS A through D is generally perceived to be acceptable to drivers. LOS E indicates that an intersection is operating at, or very near, its capacity and that drivers experience considerable delays. LOS F indicates an intersection where demand exceeds capacity and drivers experience substantial delays.

The LOS and its associated intersection delay for signalized and unsignalized intersections is presented in Table 1. The delay threshold for unsignalized intersections is lower for each LOS compared to signalized intersections, which accounts for the fact that people expect a higher level of service when at a stop-controlled intersection.

Table 1
Level of Service Criteria

	Signalized Intersection	Unsignalized Intersection
LOS	**Control Delay per Vehicle (sec.)**	**Control Delay per Vehicle (sec.)**
A	≤ 10	≤ 10
B	>10 and ≤ 20	>10 and ≤ 15
C	>20 and ≤ 35	>15 and ≤ 25
D	>35 and ≤ 55	>25 and ≤ 35
E	>55 and ≤ 80	>35 and ≤ 50
F	>80	>50

- Volume-to-Capacity Ratios:
  Table 2 provides a method to evaluate roadway capacity. For each facility type, there is a planning-level daily capacity range and a maximum ADT volume range. These ranges are identified below for CSAH 24, along with the level of traffic volume indicating a segment is approaching capacity (defined as 85 percent of the daily volume). These are based upon guidance from the 2000 Highway Capacity Manual and professional engineering judgment. A range is used since the actual capacity of a roadway will vary based on its access control, speed, functional classification, peaking and other characteristics.

Table 2
Planning Level Roadway Capacities by Facility Type

Facility Type	Planning Level Daily Capacity Ranges (ADT)	Anoka County Daily Capacity (ADT)*	Anoka County Approaching Capacity (85% of ADT)
Two-lane undivided urban	8,000-10,000	10,000	8,500
Two-lane undivided rural	14,000-15,000	15,000	12,750
Two-lane divided urban	16,000-18,000	18,000	15,300
Three-lane undivided urban	14,000-18,000	18,000	15,300

*If access is limited/controlled, roadway facilities listed may be able to adequately carry traffic above the daily capacity threshold identified in this table.

In addition to the daily capacity thresholds for roadway facilities, a review of peak hour traffic volumes compared to peak hour thresholds is also used to identify potential capacity issues. The Highway Capacity Manual identifies peak hour traffic volume thresholds per facility type. Typically, peak hour traffic volumes represent approximately 10 percent of the daily volume on a roadway.

A measurement of a roadway segment or intersection's ability to handle traffic includes determining how close the facility is to meeting its capacity threshold. As noted above, this can be measured in terms of daily capacity or peak hour capacity. A facility can be either a roadway segment or an intersection with stop sign, traffic signal, or roundabout control. A volume-to-capacity ratio (v/c) is the proportion of the actual traffic utilizing the facility compared to the facility's physical ability to carry a specific maximum volume. This is calculated by dividing the total traffic using the facility by the capacity of the facility. This can then determine if a facility is sufficient to handle the traffic that is expected to use it. A ratio greater than 1.0 predicts that the facility will be unable to discharge all of the demand arriving on it. Such a situation would result in long queues and extensive delays or diversion to alternate routes. While a v/c ratio below 1.0 is acceptable, it is preferable to have v/c ratios below 0.85 to account for traffic fluctuations.

The remainder of this section of the memorandum will discuss the three-lane and two-lane divided CSAH 24 traffic operational analysis results for both key segments and intersections within the study area. The existing and future no-build operational analyses are included in the Existing Operations Technical Memorandum and the Future No Build Conditions Technical Memorandum.

Segments

The previous efforts in this study have identified the traffic volumes for the CSAH 24 roadway segments between Ambassador Boulevard and CSAH 9 as shown in Figure 3. Based on the increased expansion and the potential for closure of the east end of Rum River Boulevard at

Bridge Street, there is a high potential for traffic re-routing. This re-routing has been identified and is also shown in Table 3.

Table 3
CSAH 24 Select Link Existing and Forecasted Average Daily Traffic (ADT) Volumes

Roadway Segment	2010 ADT	2030 Build ADT	2030 Build ADT with Re-routed Rum River Boulevard Traffic
CSAH 24/28/Ambassador Boulevard to Rum River Boulevard	10,100	15,100	17,100
Rum River Boulevard to CR 72/Poppy Street	10,900	16,600	16,600
CR 72/Poppy Street to CSAH 9/Lake George Boulevard	10,300	14,600	14,600
Rum River Boulevard to CSAH 24/Bridge Street/Middle School Access	5,700	9,400	11,400

The traffic volumes presented in Table 3 indicate that CSAH 24 may be above 85 percent of capacity with a three-lane roadway section. While this may be of concern, the actual traffic directional distribution is closer to 50/50 and peak hour volumes are less than 10 percent of daily traffic volumes, resulting in a corridor that can handle the traffic volumes. Further analysis of the traffic volumes at the intersections during peak hours is especially important when traffic volumes are getting close to meeting daily capacity levels.

Intersections

Tables 4 and 5 provide details on each of the intersection operation measures identified above and discussed in detail within this section. As shown in Table 4, none of the intersections in the study area are anticipated to operate worse than LOS D during the peak hours with existing (2010) traffic volumes. This includes traffic diverted from Rum River River Boulevard and now using CSAH 24 (Ambassador Boulevard) and CSAH 24 (Bridge Street) and the proposed single-lane roundabouts at CR 72/Poppy Street and CSAH 9/Lake George Boulevard. By 2030, it is anticipated that there will be a need for additional intersection improvements as shown in Table 5. Issues with the noted intersections occur exclusively during the AM, Afternoon, or PM peak hours. The following provides additional information on each of the intersections analyzed:

1. *CSAH 24/Bridge Street/Middle School Access at CSAH 24/28/Ambassador Boulevard (Intersection #5)* experiences unacceptable levels of service along with traffic volumes that exceed the capacity of the intersection. It is anticipated that there will be intersection improvements concurrent with the CSAH 24/Bridge Street expansion. This includes all

Table 4: 2010 Existing Peak Hour, 3-Lane and 2-Lane Divided CSAH 24								
Intersection #	**Intersection and Traffic Control**	**Peak Hour**	**Intersection Delay*- LOS**		**Maximum Delay-LOS-v/c****			**Limiting Movement**
5	CSAH 24/Bridge Street at CSAH 28/Ambassador Blvd *All-Way Stop Control*	AM	24	C	31	D	0.78	SB
		AFTERNOON	14	B	16	C	0.54	WBL
		PM	16	C	18	C	0.64	NB
6	CSAH 24/Ambassador Blvd at 229th Ave. NW *Two-Way Stop Control*	AM	7	A	20	C	0.50	EBL
		AFTERNOON	4	A	13	B	0.26	EBL
		PM	6	A	15	B	0.39	EBL
8	CSAH 24 at Butterfield St. *Two-Way Stop Control*	AM	1	A	17	C	0.46	NB
		AFTERNOON	1	A	17	C	0.37	SB
		PM	1	A	14	B	0.33	NB
10	CSAH 24 at CR-72/Poppy Street *Single-Lane Roundabout*	AM	10	A	12	B	0.61	WB
		AFTERNOON	8	A	9	A	0.52	EB
		PM	10	A	11	B	0.61	WB
12	CSAH 24 at CSAH 9/ Lake George Blvd. NW *Single Lane Roundabout*	AM	8	A	8	A	0.45	EB
		PM	8	A	8	A	0.41	SB

*Delay in seconds per vehicle **Maximum delay, LOS, and v/c ratio on any approach and/or movement

***Limiting Movement is the highest delay movement.

Table 5: 2030 Peak Hour, 3-Lane and 2-Lane Divided CSAH 24

Intersection #	Intersection and Traffic Control	Peak Hour	Intersection Delay*- LOS		Maximum Delay-LOS-v/c**			Limiting Movement	Turn Lane Length Needs (Based on Maximum Queues in Feet)			
5	CSAH 24/Bridge Street at CSAH 28/Ambassador Blvd *All-Way Stop Control* *with 3-Lane Bridge Street (Added WBL)*	AM	117	F	69	F	1.40	NB	NB	SB	WBL	WBTR
		AFTERNOON	43	E	85	F	1.05	WBL	1000	250	150	125
		PM	64	F	122	F	1.18	NB				
5	CSAH 24/Bridge Street at CSAH 28/Ambassador Blvd *All-Way Stop Control* *Added SBL, NBL, and NBR Turn Lanes*	AM	21	C	41	E	0.86	SBL	NBR	SBL	WBL	WBTR
		AFTERNOON	17	C	33	D	0.84	WBL	900	425	200	150
		PM	14	B	24	C	0.73	WBL				
5	CSAH 24/Bridge Street at CSAH 28/Ambassador Blvd *Traffic Signal* *Added SBL, NBL, and NBR Turn Lanes*	AM	19	B	36	D	0.84	WBL	WBL	SBL	NBL	NBR
		AFTERNOON	18	B	38	D	0.89	WBL	300	150	125	300
		PM	13	B	24	C	0.72	WBL				
6	CSAH 24/Ambassador Blvd at 229th Ave. NW *Two-Way Stop Control*	AM	50	E	200	F	1.30	EBL	EBL			
		AFTERNOON	7	A	35	D	0.63	EBL	425			
		PM	14	B	59	F	0.86	EBL				
6	CSAH 24/Ambassador Blvd at 229th Ave. NW *All-Way Stop Control*	AM	36	E	51	F	0.96	SB	SB			
									175	-	-	-
6	CSAH 24/Ambassador Blvd at 229th Ave. NW *All-Way Stop Control* *Added SBR Turn Lane*	AM	21	C	26	D	0.73	NB	SBR			
		AFTERNOON	13	B	17	C	0.59	NB	150	-	-	-
		PM	16	C	22	C	0.68	NB				
8	CSAH 24 at Butterfield St. *Two-Way Stop Control*	AM	2	A	33	D	0.63	SB				
		AFTERNOON	1	A	24	C	0.52	SB	-	-	-	-
		PM	1	A	17	C	0.45	SB				
10	CSAH 24 at CR-72/Poppy Street *Single-Lane Roundabout*	AM	32	D	53	F	0.89	EB	EB	SB	WB	
		AFTERNOON	19	C	24	C	0.77	SB	800	275	600	-
		PM	27	D	43	E	0.86	WB				
12	CSAH 24 at CSAH 9/ Lake George Blvd. NW *Single Lane Roundabout*	AM	18	C	29	D	0.82	EB	EB			
		PM	12	B	13	B	0.60	None	375	-	-	-

*Delay in seconds per vehicle **Maximum delay, LOS, and v/c ratio on any approach and/or movement

***Limiting Movement is the highest delay movement. Maximum queues given for movements with queues over 100' in length.

necessary lane improvements to achieve acceptable levels of service. Based on the analysis, a southbound left turn lane, northbound left turn lane, and northbound right turn lane will likely be needed by 2030. While the northbound left movement traffic volume is low, the required southbound left turn lane allows the spacing for the northbound left turn lane. The all-way stop can potentially operate effectively for 15 to 20 years with this lane configuration, except for the southbound left turns in the AM peak hour. Additionally, while delay is low, queues are significant for some movements. A signal or roundabout may be more appropriate to maintain acceptable service levels for all movements as indicated in Table 5. While a roundabout may be an appropriate intersection improvement, the right-of-way needs of the roundabout will be difficult to achieve with the proximity of multiple buildings near the intersection area. If a roundabout is desired in this location, further study will be required. The analysis does show that an all-way stop may be appropriate at the intersection for some time. A signal or other intersection improvement, such as a roundabout, would be installed when justified by traffic volumes.

2. *CSAH 24/Ambassador Boulevard at 229th Avenue (Intersection #6)* experiences unacceptable levels of service along with traffic volumes that exceed the capacity of the intersection with the existing two-way stop control. It is anticipated that intersection improvements would be necessary to maintain acceptable service levels. This includes a change to all-way stop control and a southbound right turn lane by 2030. The southbound right turn lane is only needed for the 15-minute AM peak due to the proximity of the elementary school to the intersection.
3. *CSAH 24/Bridge Street at Butterfield Street (Intersection #8)* experiences acceptable levels of service along with traffic volumes that are under the capacity of the intersection with the existing two-way stop control and the three-lane roadway improvements to CSAH 24/Bridge Street.
4. *CSAH 24/Bridge Street at CR 72/Poppy Street (Intersection #10)* is at the threshold for acceptable levels of service with 2030 traffic volumes under the proposed single-lane roundabout control. Based on current roundabout capacity analysis, the roundabout may need to be a multi-lane roundabout on the east and west approaches by 2030. The intersection is anticipated to be very close to capacity as a single lane roundabout and may be able to effectively handle the traffic volumes depending on the experience of drivers with roundabouts. As has been shown in other jurisdictions throughout Minnesota and the United States, roundabouts are actually running at lower levels of service than could actually be achieved due to the inexperience of drivers with roundabouts. The theory is that as more drivers get experience with them, capacity will increase above what is currently being quoted and used in analysis. Careful consideration of lane use and traffic volume projections along with specific analysis of the lane needs of the roundabout should be re-evaluated as the concept moves into preliminary and final design. It is recommended that the roundabout be implemented as a single-lane roundabout but designed to account for possible future expansion to a multi-lane roundabout if needed. Design should take into account the placement of drainage structures and additional right-of-way considerations for a single-lane and multi-lane roundabout configuration. With the proximity of the schools in the area, the intersection

will see significant bus traffic. The roundabout should be designed to accommodate a bus without the use of the truck apron.

5. *CSAH 24/Bridge Street at CSAH 9/Lake George Boulevard (Intersection #12)* experiences acceptable levels of service along with traffic volumes that are under the capacity of the intersection with the proposed single-lane roundabout. This includes accommodating the traffic from the high school as proposed in the concept design. With the proximity of the schools in the area, the intersection will see significant bus traffic. The roundabout should be designed to accommodate a bus without the use of the truck apron.

IV. Build Conditions Safety Analysis

The safety analysis is divided into a discussion of key intersection and roadway segments within the study area.

Intersections

Overall, CSAH 24 through St. Francis from Ambassador Boulevard to CSAH 9/Lake George Boulevard is a safe corridor, with few crash issues. As stated in the Safety Analysis Technical Memorandum, there have been a total of 45 crashes within the corridor area from 2005 to 2009. A total of 19 of these crashes were between the major intersections studied and the other 28 were at the intersections. Based on information from the Federal Highway Administration, the addition of a two-way-left-turn-lane would be anticipated to reduce all crashes by 34 percent and the installation of a raised median would reduce all crashes by 25 percent and head-on crashes by 75%. The raised median would also be expected to reduce intersection crossing and left turn crashes if the median closes off access. For this analysis, the crash reduction at the major intersections are calculated separately. This results in the appearance of a higher crash reduction by going to a three-lane roadway versus a two-lane divided roadway. In actuality, when taking into account intersection crashes in conjunction with the segment crashes, the 2-lane divided roadway has a larger reduction in crashes than a change to a three-lane roadway. The existing crashes on the segments and the resulting crash reduction with the improvements is shown in Table 6.

Table 6
CSAH 24 Segment Crash Analysis

CSAH 24 Segment	2005-2009 Crashes	Segment Length (miles)	2005-2009 Crash Rate (per MVM)	2010-2030 Projected Crashes	2010-2030 Projected Crashes with Improvements
Ambassador Blvd to Rum River Blvd	6	0.20	1.80	36	24 (3-Lane)
Rum River Blvd to CR 72/Poppy St	7	0.30	1.33	40	40 (Maintain 3-Lane)
CR 72/Poppy Street to CSAH 9/Lake George Boulevard	6	0.30	1.27	32	25 (2-Lane Divided)
Total	19			108	89

*MVM=Million Vehicle Miles

Since the majority of the crashes are at intersections, the same analysis is also applied to the intersections in Table 7. In this case, the intersection improvements are taken into account including not only the roadway section improvements but also specific turn lane or traffic control improvements, including roundabouts. Of note, the intersection of CSAH 24 at CSAH 9 has a crash rate of 0.56. This is higher than the Metro District Statewide Average Crash Rate (0.2) and the Critical Crash Rate (0.53). The severity rate of the intersection (0.72) is also higher than the severity rate of the Metro District (0.3). As traffic increases, it is also anticipated that while the intersections currently have crash rates lower than the average, except as previously stated, the crash rates are likely to increase to the average over time

Table 7
CSAH 24 Intersection Crash Analysis

CSAH 24 at:	2005-2009 Crashes	2005-2009 Crash Rate (per MVM)	2010-2030 Projected Crashes	2010-2030 Projected Crashes with Improvements[#]
CSAH 28 / Ambassador Blvd	0	0	21	18 (Turn Lanes and Signal)
Butterfield Street	4	0.23	23	14 (3-Lane)
Rum River Blvd	2	0.11	16	11 (Close South Leg)
CR 72/Poppy St	6	0.32	53	27 (Roundabout)
East High School Driveway	3	0.19	19	0 (Intersection Removed)
CSAH 9/Lake George Boulevard	11	0.56	63	35 (Roundabout)
Total	26		195	105

*MEV=Million Entering Vehicles #Improvement noted below the projected crashes

The improvements do combine for an overall crash reduction of approximately 36 percent over 21 years. The roundabout improvements are also anticipated to reduce the crash severity of the crashes at that intersection by reducing fatal and injury crashes by 76 percent.

IV. Pedestrian Considerations

Recent traffic counts with this study indicated that there are approximately 100 pedestrians that travel along the corridor in the peak hours. The current bridge along CSAH 24 only has a narrow sidewalk on the north side that can be difficult for pedestrians to use. There is currently right-of-way available on the north side of the bridge that could be used for a pedestrian bridge. It is recommended that further study be done to assess the viability of a pedestrian bridge across the Rum River in this area. This pedestrian bridge would connect both sides of Bridge Street, the schools in St. Francis, and connect to the regional trail system on the east side of the Rum River.

IV. Cost Estimates

Cost estimates were completed for the CSAH 24 3-Lane concept. The cost estimate was split between the county proposed project from just west of Poppy Street to east of CSAH 9 and west of Poppy Street to Ambassador Boulevard.

1. Poppy Street to east of CSAH 9: $3.3 Million
2. West of Poppy Street to Ambassador Boulevard, Signal at Ambassador: $3.6 Million

3. West of Poppy Street to Ambassador Boulevard, Roundabout at Ambassador: $2.5 Million

These estimates do not include the cost of right-of-way. As the Ambassador roundabout takes more right-of-way, this may further change the cost analysis results and care should be taken to determine correct right-of-way needs during preliminary design of the corridor. Consideration of the needs with a possible Bridge Street extension to Pederson Drive and TH 47 would also change the costs and right-of-way needs.

V. Letter of Support

The City of St. Francis, along with the School District and Anoka County recognizes that there are immediate mobility and safety needs along the CSAH 24/Bridge Street corridor due to increasing travel demand. The City has shown support for the proposed improvements along CSAH 24/Bridge Street as evidenced by their letters of support from April 4th, 2011 for the STP application of the improvements from Poppy Street to east of CSAH 9. The letters of support are included at the end of this document.

CITY OF ST. FRANCIS
ST. FRANCIS, MINNESOTA
ANOKA COUNTY

RESOLUTION 2011-07

SUPPORTING ANOKA COUNTY FEDERAL FUNDING APPLICATION FOR CSAH 24

WHEREAS, the continued growth of the city and at its schools is leading to increasing travel demand along the CSAH 24 corridor, which, if unmanaged, can negatively affect the level of performance, safety and congestion experienced by users of the corridor; and,

WHEREAS, community leaders, public safety officials, the school district, motorists and road authorities have identified this growing travel demand and development pressure as a concern with potential negative consequences for mobility and safety in the corridor, with the potential to further degrade the performance level now provided by the corridor, and the resulting implications for the economy and quality of life of the region; and,

WHEREAS, the CSAH 24 corridor is currently operating at a substandard level of performance, continues to increase in congestion and is raising safety concerns; and,

WHEREAS, Anoka County would like to submit an application to the Transportation Advisory Board (TAB) to the Metropolitan Council for 2015 and 2016 projects to use federal transportation funds to assist with the reconstruction of the CSAH 24 corridor.

NOW THEREFORE BE IT RESOLVED BY THE CITY COUNCIL OF THE CITY OF ST. FRANCIS, MINNESOTA:

That the City of St. Francis supports the request of Anoka County for federal transportation funds for the reconstruction of the CSAH 24 corridor.

ADOPTED BY THE ST. FRANCIS CITY COUNCIL THIS 4TH DAY OF APRIL, 2011.

APPROVED:

Jerry Tveit, Mayor

ATTEST:

Barb Held, City Clerk

City of St. Francis

23340 Cree Street NW
St. Francis, Minnesota 55070
763-753-2630
FAX 763-753-9881

April 4, 2011

Douglas W. Fischer, P.E.
County Engineer
Anoka County Highway Department
1440 Bunker lake Blvd NW
Andover, MN 5304

RE: REGIONAL FUNDING SOLICITATION – CSAH 24

Dear Doug,

The City of St. Francis is writing this letter in regards to this year's federal funding solicitation. We have been informed that Anoka County would like to submit an application for the expansion and reconstruction of CSAH 24 in our community.

This letter is in support of the project and for Anoka County to pursue federal funding. The City of St. Francis and Anoka County continue to coordinate their efforts in improving the area's transportation issues. We feel this project will help address safety and mobility issues occurring in the area.

If you have any further questions in regard to the project on the city's end, please feel free to contact us.

Sincerely,

Jerry Tveit
City of St. Francis
Mayor

APPENDIX C -
CITY RESOLUTIONS OF SUPPORT

CITY OF NOWTHEN
ANOKA COUNTY, MINNESOTA

CITY COUNCIL RESOLUTION 2012-20

A RESOLUTION APPROVING THE NORTHERN RIVER CROSSING STUDY DATED JUNE, 2012 AND RECOMMENDING INCLUSION OF THE FINDINGS THEREOF IN THE CITY OF NOWTHEN 2030 COMPREHENSIVE PLAN

WHEREAS, the issue of a new or upgraded Rum River crossing has been raised in the community over the years in acknowledgement of the need to support the mobility and access needs of residents and businesses in the community; and,

WHEREAS, the issue of a new or upgraded Rum River crossing has multijurisdictional implications involving neighboring communities, as well as Anoka County; and,

WHEREAS, the City of Nowthen has participated in a sub-area study known as the "Northern River Crossing Study" with the cities of Oak Grove and St. Francis, along with Anoka County for the purpose of more clearly defining the need for a new or upgraded crossing of the Rum River; and,

WHEREAS, the "Northern River Crossing Study" is now complete;

NOW, THEREFORE, BE IT HEREBY RESOLVED BY THE CITY COUNCIL OF THE CITY OF NOWTHEN, MINNESOTA, AS FOLLOWS:

- That the findings of the "Northern River Crossing Study" dated June, 2012, are hereby accepted and adopted by the City of Nowthen; and,

- That the City of Nowthen intends to amend its 2030 Comprehensive Plan to include the findings of the "Northern River Crossing Study" dated June, 2012; and,

- That the City of Nowthen will continue to collaborate and coordinate with the cities of Oak Grove and St. Francis and Anoka County to implement the recommendations of the "Northern River Crossing Study" dated June, 2012, as funding and needs allow.

ADOPTED THIS 15th DAY OF August, 2012, BY THE CITY COUNCIL OF THE CITY OF NOWTHEN, MINNESOTA.

CITY OF NOWTHEN

By: _____
William Schulz, Mayor

Attest: _____
Corrie LaDoucer, City Clerk

RESOLUTION 12-061

APPROVING THE NORTHERN RIVER CROSSING STUDY DATED JUNE 8, 2012 AND RECOMMENDING INCLUSION OF THE FINDINGS THEREOF IN THE CITY OF OAK GROVE 2030 COMPREHENSIVE PLAN

WHEREAS, the issue of a new or upgraded Rum River crossing has been raised in the community over the years in acknowledgement of the need to support the mobility and access needs of residents and businesses in the community; and,

WHEREAS, the issue of a new or upgraded Rum River crossing has multijurisdictional implications involving neighboring communities, as well as Anoka County; and,

WHEREAS, the City of Oak Grove has participated in a sub-area study known as the "Northern River Crossing Study" with the cities of Nowthen and St. Francis along with Anoka County for the purpose of more clearly defining the need for a new or upgraded crossing of the Rum River; and,

WHEREAS, the "Northern River Crossing Study" is now complete;

NOW, THEREFORE, BE IT HEREBY RESOLVED BY THE CITY COUNCIL OF THE CITY OF OAK GROVE , MINNESOTA, AS FOLLOWS:

- That the findings of the "Northern River Crossing Study" dated June, 2012, are hereby accepted and adopted by the City of Oak Grove; and,

- That the City of Oak Grove intends to amend its 2030 Comprehensive Plan to include the findings of the "Northern River Crossing Study" dated June, 2012; and,

- That the City of Oak Grove will continue to collaborate and coordinate with the cities of Nowthen and St. Francis and Anoka County to implement the recommendations of the "Northern River Crossing Study" dated June, 2012, as funding and needs allow.

ADOPTED THIS 9th DAY OF JULY 2012, BY THE CITY COUNCIL OF THE CITY OF OAK GROVE, MINNESOTA.

Mark R. Korin, Mayor

ATTEST:

Sheryl F. Fiskewold, City Clerk

CITY OF ST. FRANCIS
ST. FRANCIS, MN
ANOKA COUNTY

RESOLUTION 2012-20

APPROVING THE NORTHERN RIVER CROSSING STUDY OF JUNE 2012 AND RECOMMENDING INCLUSION OF THE FINDINGS THEREOF IN THE CITY OF ST. FRANCIS 2030 COMPREHENSIVE PLAN

WHEREAS, the issue of a new or upgraded Rum River crossing has been raised in the community over the years in acknowledgement of the need to support the mobility and access needs of residents and businesses in the community; and

WHEREAS, the issue of a new or upgraded Rum River crossing has multijurisdictional implications involving neighboring communities, as well as Anoka County; and

WHEREAS, the City of St. Francis has participated in a sub-area study known as the "Northern River Crossing Study" with the Cities of Nowthen and Oak Grove along with Anoka County for the purpose of more clearly defining the need for a new or upgraded crossing of the Rum River; and

WHEREAS, the "Northern River Crossing Study" is now complete; and

WHEREAS, the City of St. Francis Planning Commission held a public hearing at their June 20, 2012 meeting and recommended acceptance of the study; and

NOW, THEREFORE, BE IT RESOLVED by the City Council of the City of St. Francis, Minnesota as follows:

1. That the findings of the "Northern River Crossing Study" dated June, 2012, are hereby accepted and adopted by the City of St. Francis; and

2. That the City of St. Francis intends to amend its 2030 Comprehensive Plan to include the findings of the "Northern River Crossing Study" dated June, 2012; and

3. That the City of St. Francis will continue to collaborate and coordinate with the cities of Nowthen and Oak Grove and Anoka County to implement the recommendations of the "Northern River Crossing Study" dated June, 2012, as funding and needs allow.

The motion for the adoption of the foregoing resolution was made by Councilmember Kane and was duly seconded by Councilmember McClish and upon vote being taken thereon, the following voted in favor:

Councilmember Steve Kane
Councilmember Chris McClish
Councilmember Jerry Tveit

and the following voted against the same: None.
and the following abstained: None.
and the following were absent: Tim Brown and Jeff Sandoval

ADOPTED BY THE CITY COUNCIL OF THE CITY OF ST. FRANCIS THIS 2nd DAY OF JULY, 2012.

Jerry Tveit
Mayor of St. Francis

Attest:

Barbara I. Held
City Clerk