PRINCIPAL ARTERIAL INTERSECTION CONVERSION STUDY

METROPOLITAN COUNCIL

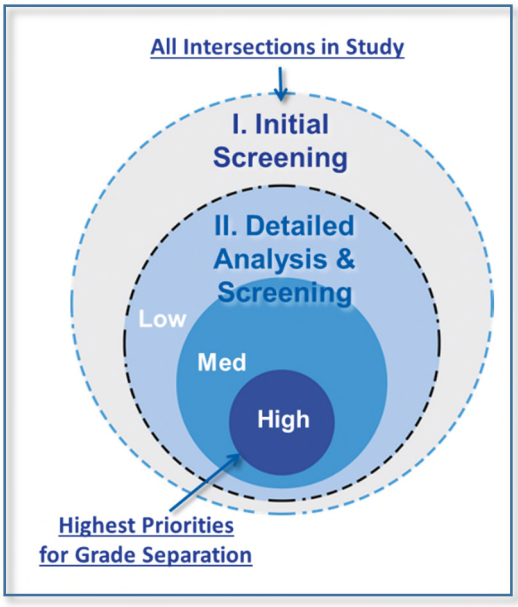
DEPARTMENT OF TRANSPORTATION

Overview of Study and Results

The Principal Arterial Intersection Conversion Study considered priorities for the potential upgrading of intersections on non-freeway principal arterials throughout the Twin Cities Metro, especially priorities for grade separations. The current Metro highway system includes about 300 miles of non-freeway principal arterials with at-grade intersections. In many cases, these intersections limit the ability of the roadways to best provide for long-term safety and mobility.

Intersection Screening Process

More than 370 intersections were initially considered in the ***Intial Screening*** (Phase I of the Study). Of those, 91 intersections were selected for ***Detailed Analysis and Screening*** (Phase II) and were prioritized as Low-, Medium-, or High-Priority locations for grade-separation projects (new interchanges or similar designs). The Study also recognized the importance of considering lower-cost/high-benefit at-grade treatments that could improve intersection safety and performance without grade separations.



Regional Map of Study Results

From the Study's Executive Summary, ***Figure ES-1*** (next/opposite page) is an overview of the results based on grade-separation priorities for the 91 Phase II intersections (it also highlights the full extent of the corridors evaluated in the Study). For the 91 prioritized intersections, the results provide high-level guidance for the "right-sizing" of potential projects as follows:

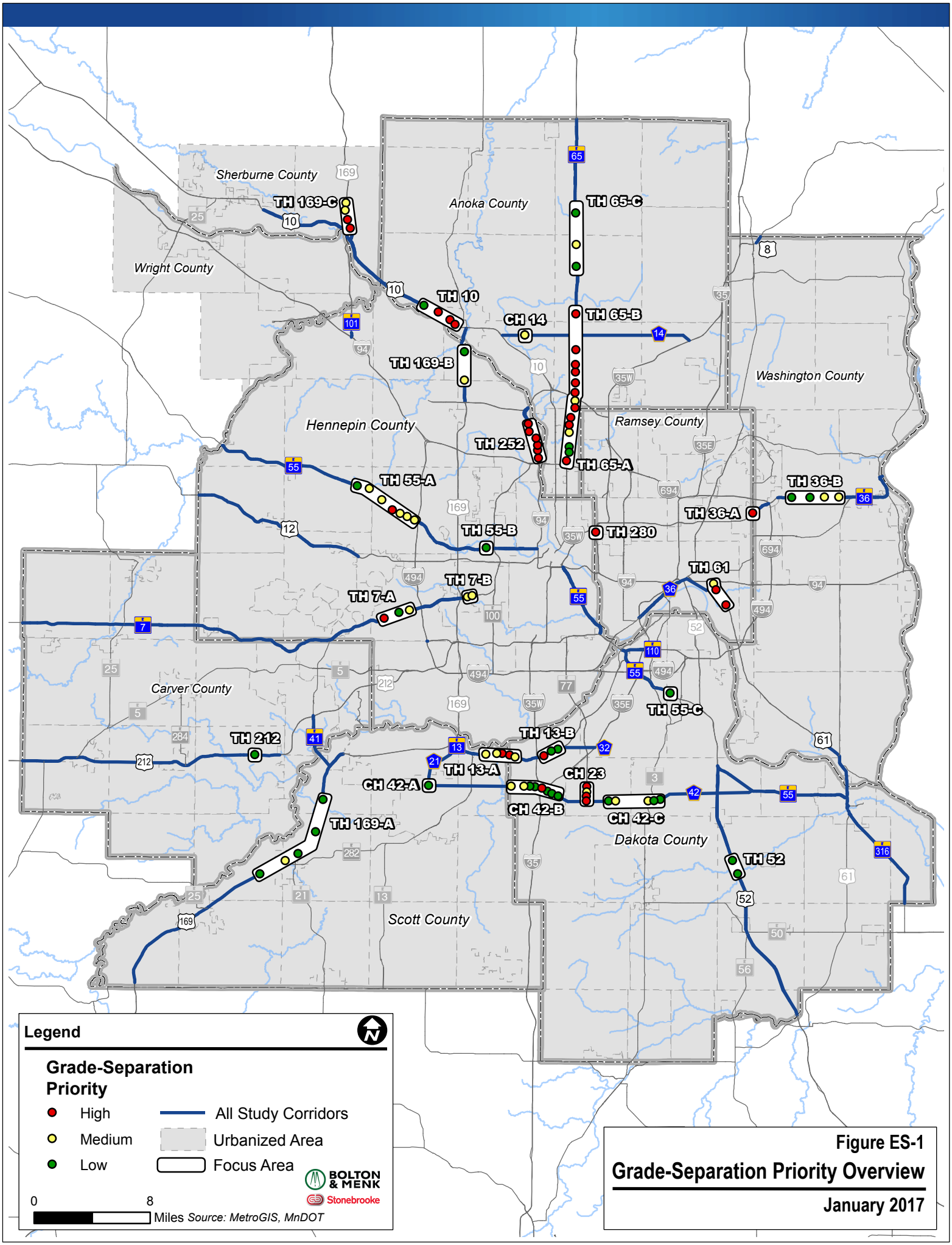
- **34 High-Priority Intersections** – The High-Priority intersections often exhibit needs that can justify high-capacity at-grade improvements or grade separations. These intersection locations (and the corridors they are within) should be addressed in more detail to determine the right-sized investments.

- **27 Medium-Priority Intersections** – The Medium-Priority intersections typically do not need grade-separation projects based on current demand. However, additional studies at these locations could show needs for high-capacity at-grade improvements or limited/emerging needs for grade-separation elements (for example, a bridge which may serve only one movement).

- **30 Low-Priority Intersections** – These locations generally do not need major changes or projects based on current demand and any problems can most likely be addressed with at-grade projects. However, some Low-Priority intersections are located on corridors near Medium- and High-Priority intersections or may be in growth areas.

Next Steps

The Study's key inputs for future planning will be to support local planning, the Transportation Policy Plan (TPP), the State Highway Investment Plan (MnSHIP), and related Council and MnDOT funding programs. The work will also help guide the right-sizing of proposed projects and provide background for other plans and for transportation policy initiatives.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BOLTON & MENK
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Figure ES-1
Grade-Separation Priority Overview
January 2017

PRINCIPAL ARTERIAL

INTERSECTION CONVERSION STUDY

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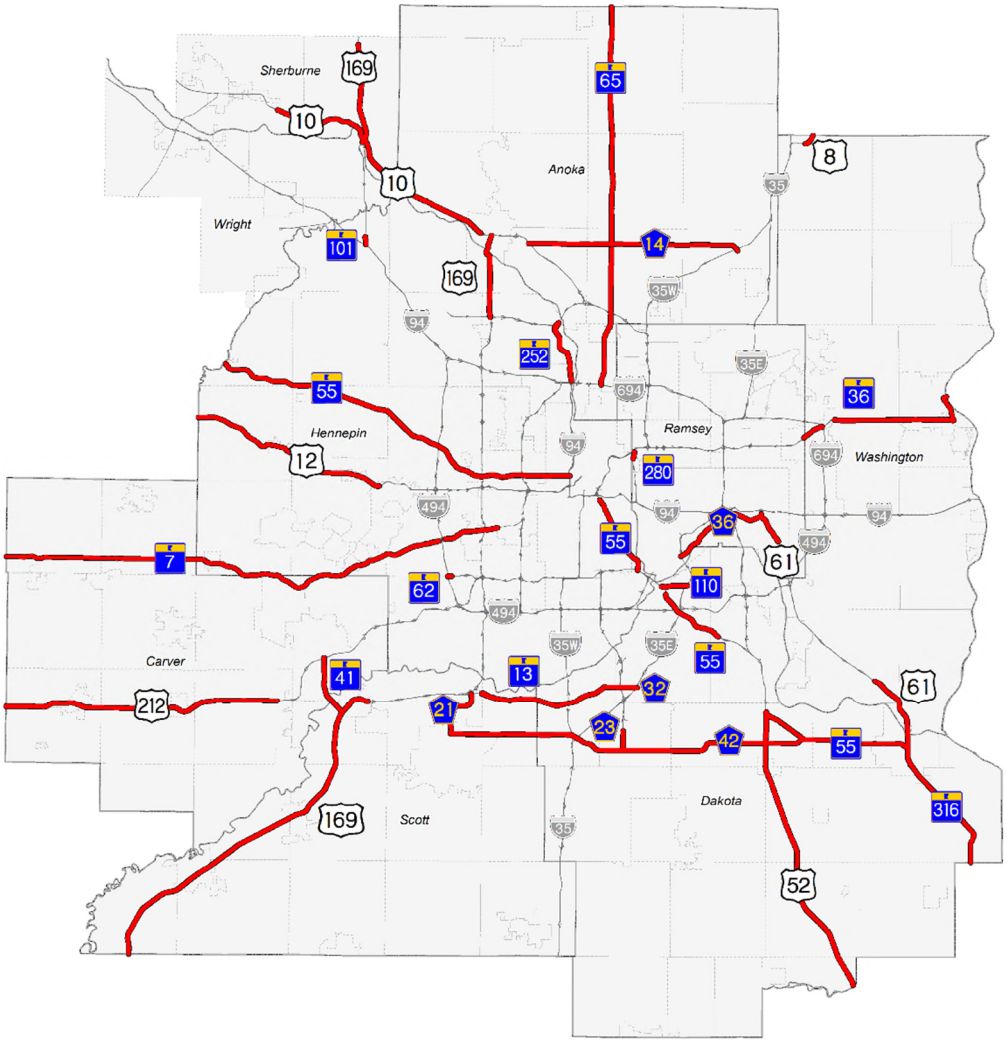

Description

This *DRAFT* Final Report provides an Executive Summary, background information, and the results of the Study. The main outcome of the work was to identify priorities for upgrades to non-freeway principal arterial intersections. The Study identified 91 intersections for detailed evaluation; it prioritized each as High-, Medium-, or Low-Priority for grade separation projects (new interchanges or similar). This report also provides guidance and tools for future transportation planning, with reference to the results.

Principal Arterial Intersection Conversion Study

Draft Final Report

January 2017

Metropolitan Council Contract No. 15P102

Prepared for:
Metropolitan Council
Minnesota Department of Transportation, Metro District

Prepared by:
Bolton & Menk, Inc.
Stonebrooke Engineering

ACKNOWLEDGEMENTS

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- Joe Lux, Ramsey County
- Lisa Freese, Scott County
- John Menter, Sherburne County (Phase I of study)
- Andrew Witter, Sherburne County (Phase II of study)
- Jan Lucke, Washington County
- Jean Keely, City of Blaine (City Rep. on TSC)

Other agency representatives:

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- Tom O'Keefe, MnDOT Metro District
- Tony Fischer, MnDOT Metro District
- Steve Voss, MnDOT District 3
- Amy Vennewitz, Metropolitan Council
- Mark Filipi, Metropolitan Council
- Carl Ohrn, Metropolitan Council
- Jim McCarthy, Federal Highway Administration

Consultant Support

Technical support and staffing to complete the study, under contract with the Metropolitan Council and MnDOT, was led by Bolton & Menk, Inc. with assistance from Stonebrooke Engineering, Inc. (Doug Abere, Bolton & Menk, Consultant Team Project Manager).

Draft Final Report

Prepared by Bolton & Menk, Inc. with Stonebrooke Engineering

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4. Phase I Technical Memorandum

List of Acronyms

AADT	Annual Average Daily Traffic
CH	County Highway
CMSP	Congestion Management Safety Plan
CSAH	County State Aid Highway
EIS	Environmental Impact Statement
FHWA	Federal Highway Administration
HCM	Highway Capacity Manual
ICE	Intersection Control Evaluation
MnSHIP	Minnesota State Highway Investment Plan
PA	Principal Arterial
PMT	Project Management Team
STIP	State Transportation Improvement Program
TED	Transportation Economic Development

TH	Trunk Highway
TSC	Technical Screening Committee
VMT	Vehicle Miles Traveled
VPD	Vehicles per Day

Executive Summary

The Principal Arterial Intersection Conversion Study considered needs at intersections on non-freeway principal arterials throughout the Minneapolis-St. Paul metropolitan area, specifically to set priorities for grade separations. Principal arterials are the region's highest type of roadway and are intended to provide reliably safe and high-speed travel over significant distances. While most principal arterials are limited-access freeways, the system also includes about 300 miles of non-freeway segments with at-grade intersections. In many cases, these intersections limit the highway's ability to best provide for long-term safety and mobility. This first-of-its-kind study helped set project priorities for these important at-grade intersections. The Study did not address interchange needs on existing freeways; it focused only on priorities for the possible conversion of non-freeway segments.

This first-of-its-kind study helped set project priorities for important at-grade intersections in the Minneapolis-St. Paul metropolitan area. It did not address interchange needs on existing freeways.

In total, more than 370 intersections were initially considered. Of those, 91 intersections were selected for more detailed study and were prioritized as low, medium, or high priority for grade-separation projects (new interchanges or similar designs). The Study also recognized the importance of considering lower-cost/high-benefit at-grade treatments that could improve intersection safety and performance without grade separations.

The Metropolitan Council and the Minnesota Department of Transportation (MnDOT) Metro District led the Study. This Executive Summary briefly reviews of the Study's process, results, and its proposed role in future transportation planning and decision-making.

Study Scope and Process

The Study was organized to address needs in eight metro-area counties. These included the seven counties typically addressed by the Metropolitan Council (Anoka, Carver, Dakota, Hennepin, Ramsey, Scott, and Washington Counties) plus the southeast portion of Sherburne County in MnDOT District 3.[1]

The Study process included two phases:

- **Initial Screening** (**Phase I)** – The Phase I screening identified more than 270 intersections that were not prioritized by the Study for grade separation or similar investments. The Phase I screening advanced intersections to Phase II that had justifications based on the data (volume and safety), had supportive local plans and context, or exhibited both characteristics. Some Phase I intersections, even with high volumes, did not advance because of local preference and context.

[1] The southeast portion of Sherburne County (the City of Elk River) is closest to the rest of the metropolitan area. This area is included in the study because it is part of the U.S. Census defined Metropolitan Statistical Area (MSA) and has strong connectivity with the region. The urbanized portion of Wright County was also considered, but it did not have any non-freeway Principal Arterials

- **Detailed Analysis and Screening** (**Phase II)** – Phase II was a more detailed analytical process which established the priorities for 91 at-grade intersections identified in Phase I. For each Phase II intersection, this work ultimately identified grade-separation investment priorities as High, Medium, and Low and placed intersections and corridors into context for possible additional studies and solutions. The Phase II analysis scored the 91 intersections based on technical and contextual criteria using the following steps:

    - **Capacity Analysis** – The team completed a high-level technical capacity analysis for each intersection based on site-specific traffic and conditions (specific peak-hour turning movements and intersection capacity)

    - **Other Weighted Criteria** – With input from the Study's Technical Steering Committee, the team established and weighted other general criteria for scoring intersections, based on:
        - **Mobility and reliability**, considering volume and general performance (40% weight)
        - **Safety**, including crash frequency and severity (30% weight)
        - **Corridor context**, including functional class of intersecting roads, land use compatibility, proximity to existing grade separations, prior planning for interchanges, and service to freight, transit, and bicycle needs (30% weight)

The final Phase II scoring analysis combined representative capacity analysis scores with the weighted criteria scores to derive composite scores for each intersection. The composite scores and data were carefully reviewed to develop the Study's final results, identifying intersections with High-, Medium-, and Low-Priority for possible grade separations.

Study Results and Grade-Separation Priorities

Overview

Figure ES-1 is an overview of the Study results based on grade-separation priorities for the 91 Phase II intersections (it also highlights the full extent of the corridors evaluated in the Study). For the 91 prioritized intersections, the results provide high-level guidance for the "right-sizing" of potential projects as follows:

- **34 High-Priority Intersections** – The High-Priority intersections often exhibit needs that can justify high-capacity at-grade improvements or grade separations. These intersection locations (and the corridors they are within) should be addressed in more detail to determine the right-sized investments.

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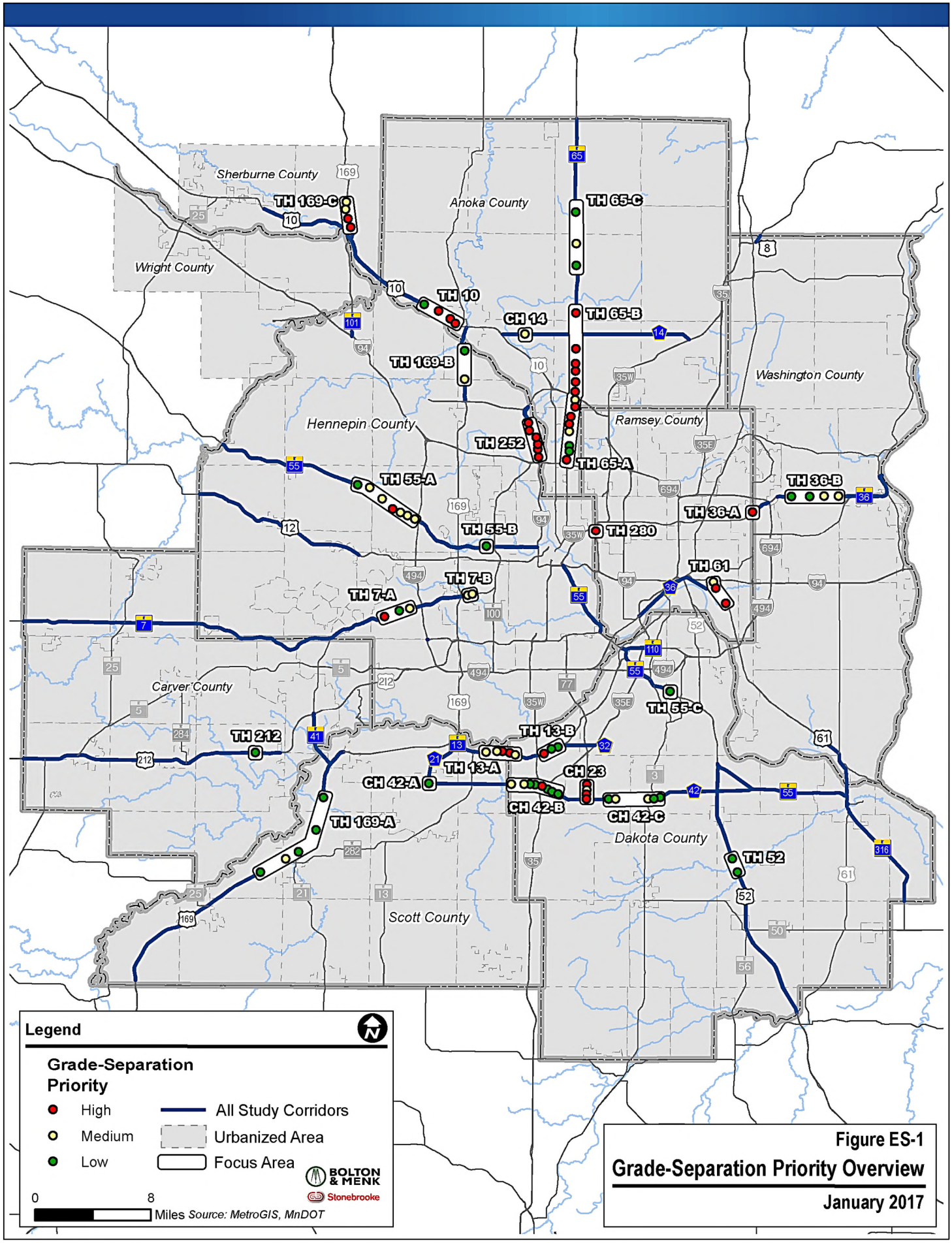
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Urbanized Area
Focus Area
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Miles Source: MetroGIS, MnDOT
Figure ES-1
Grade-Separation Priority Overview
January 2017

Figure ES-1 shows that the 91 prioritized intersections were also organized into 26 Focus Areas, which are locations and corridors with one or more intersection. As the Study concluded, the Focus Areas established the basis for future corridor studies to support development of projects and funding.

Focus Area Summary

The body of the Final Report provides many details on Study results with reference to the 26 Focus Areas shown in Figure ES-1. The Focus Areas provide the best means to review and understand the Study's results based on the 91 intersection locations and their priorities. Observations on the Focus Areas include:

- **The Focus Areas and Intersection Priorities Provide Guidance for Additional Studies** – For all Phase II Focus Areas, the results of this Study can provide the basis for additional studies. Intersections and corridors with High- and Medium-Priority outcomes are more likely to merit in-depth studies for potential intersection or interchange projects than Low-Priority locations. In some cases, the Focus Areas served to reinforce needs identified in prior studies. For example, two north-metro Focus Areas that have been long-planned for intersection or interchange projects include only High-Priority intersections (see Figure ES-1):
  - Anoka County TH 65-B (93rd Lane to Bunker Lake Blvd.) – Six high-priority intersections; 5.5 miles
  - Hennepin County TH 252 (66th Ave. to 85th Ave.) – Six high-priority intersections; 2.5 miles
- **There are Opportunities to Coordinate Corridor-Wide Intersection Improvements** – Several Focus Areas suggest opportunities to coordinate intersection improvements along corridors, including the possible consolidation or closure of intersections at some locations. While the Study recognized these opportunities, it did not develop site-specific design concepts nor develop scores for the consolidation or closure of intersections. Note as well the discussion of "right-sizing" below, which was addressed in this Study through guidance on the appropriate scaling of intersection or interchange designs.

The 26 Focus Areas are presented in detail within the Final Report. Several of them suggest opportunities to coordinate intersection improvements along corridors, including the consolidation or closure of intersections at some locations.

Role of the Study in Future Planning

The "pace" of major intersection conversion projects has been about 16 projects in 10 years (less than half of the 34 High-Priority intersections identified in this Study). This confirms the expected need for selectivity and value in future projects. The key inputs from this Study for future planning will be to:

- **Incorporate Study Findings into Transportation Policy and Investment Plans** – The Study serves as a key input for updates to the Transportation Policy Plan (TPP), the State Highway Investment Plan (MnSHIP), and related Council and MnDOT funding programs. The results will be used to establish regional priorities for the conversion of at-grade intersections into interchanges or other grade-separated designs.

- **Support Project Funding Decisions** – The Council's semi-annual Regional Solicitation and MnDOT programs, such as the Transportation Economic Development (TED) program and the Safety and Mobility (SaM) Interchange Program, regularly fund numerous highway mobility projects. The Council and MnDOT intend to use the intersection priorities in the Study and related information as inputs on selection of projects for funding.

- **Provide a Reference for Local Planning** – The Study may be used as a basis for local transportation and corridor planning. It may also be referenced to support general transportation planning and strategies used by counties and cities in local transportation or comprehensive plans.

- **Guide the Right-Sizing of Proposed Projects** – The right-sizing of proposed projects is expected to be an important factor as projects on non-freeway principal arterials are reviewed for funding. ***Figure ES-2*** illustrates how the Study's intersection priorities are proposed for review in project funding evaluations and decisions. The intersection priorities are proposed for review in funding decisions when principal arterial intersections evaluated in Phase II are seeking competitive funds such as federal funds through the semi-annual Regional Solicitation. For those cases, the Study's intersection priorities will bring a measurable weight into project funding decisions. Still, most project funding criteria will be unchanged, with reviews based on program intent, other technical justifications, and sound project planning.

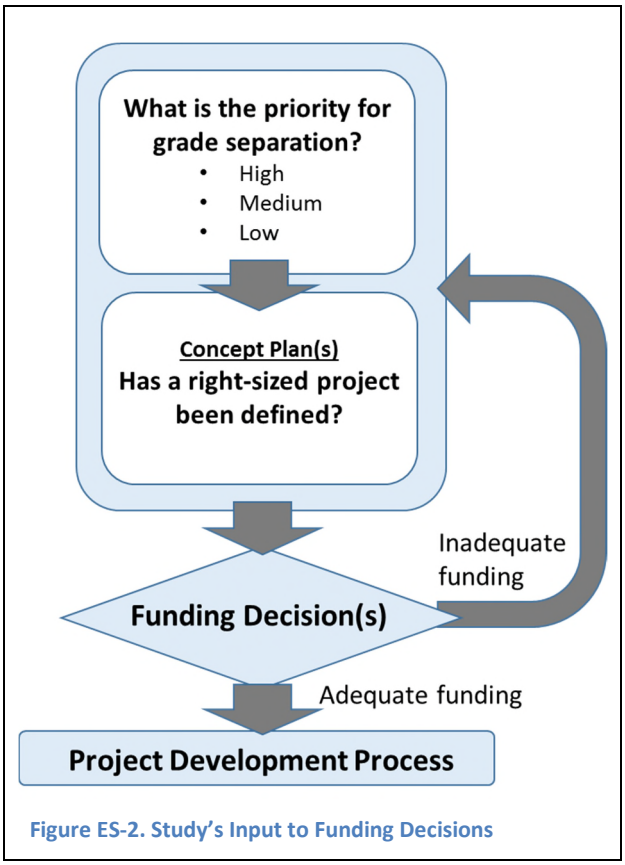


Figure ES-2. Study's Input to Funding Decisions

The investment philosophy shown in ***Figure ES-3*** (next page) is consistent with the 2040 TPP and is supported by both the Council and MnDOT Metro District. This diagram recommends that development of intersection improvement design alternatives consider a progression of investment decisions along with the technical data and context at the intersection and throughout the corridor. This recommended progression in project decision-making is intended to guide right-sizing so that more projects and benefits can become reality sooner. The regional investment philosophy now supported by the Council and MnDOT Metro generally states, "Expansion needs far exceed fiscal realities. Since the region cannot build its way out of congestion, it needs to be strategic when making investments to ensure the right-sizing of projects." This Study is part of the region's emphasis on improved targeting for transportation investments.

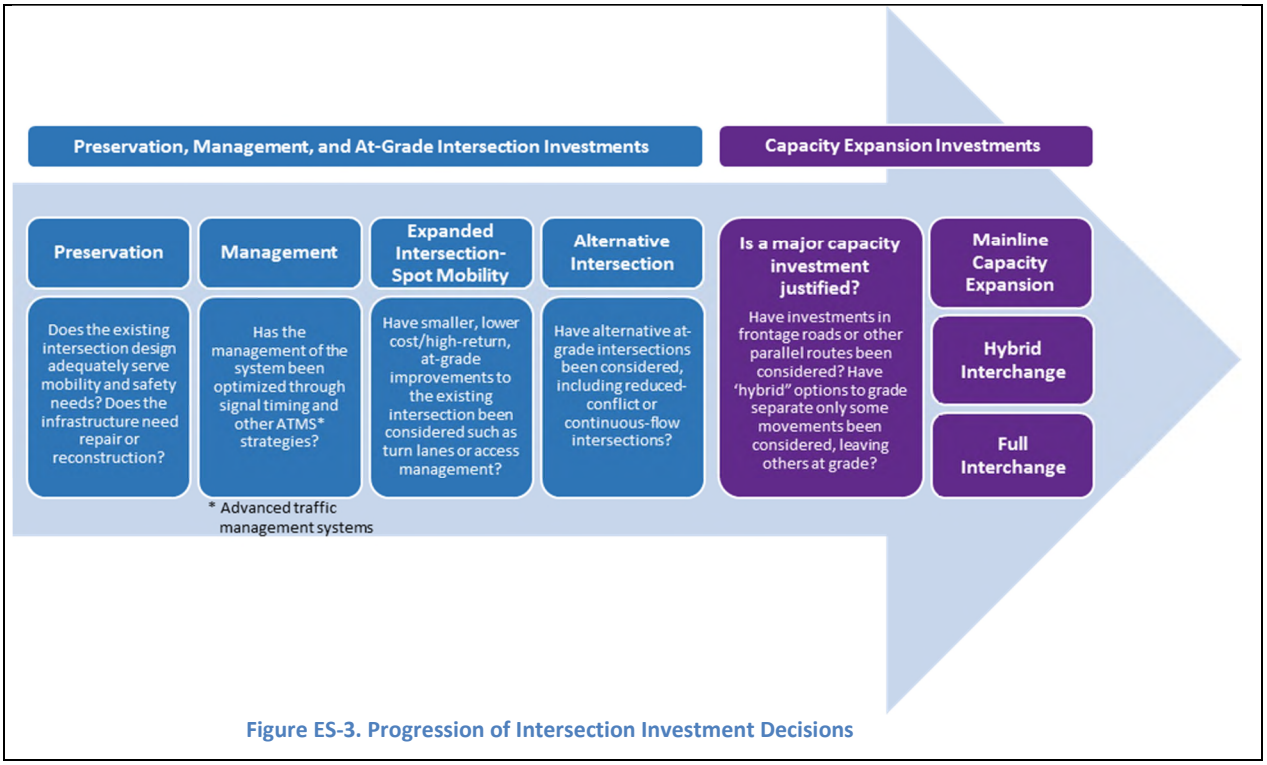


Figure ES-3. Progression of Intersection Investment Decisions

- **Provide a Transportation Policy Reference** – The transportation planning framework in this Study provides high-level guidance for possible legislative priorities, whether from a highway system perspective (broad state and regional needs) or from an individual project funding perspective as outlined above (the Study's Focus Areas). Staff representing the Metropolitan Council, MnDOT, and other agencies should find opportunities to present the Study's background and results to support legislative topics, whether programmatic or project-specific.

Updating the Study's Analysis and Intersection Priorities

The Study emphasized current needs, but also recognized the potential for growth and change. The technical team for the Study implemented a repeatable process that can be periodically updated in whole or in part. After discussing the frequency of such updates with the Study's Steering Committee, the Metropolitan Council and MnDOT project management team recommended that intersection priorities be updated every 4 to 8 years (with reference to the 4-year TPP update cycle).

1 Introduction

1.1 Need for the Intersection Conversion Study

Principal arterials are the highest functional classification highways in the Minneapolis-St. Paul (Twin Cities) metropolitan area. Their purpose within the roadway hierarchy is to optimize mobility – to provide reliably safe and high-speed travel over significant distances. While principal arterials make up less than five percent of the region's roadways (by mileage), they carry approximately 50 percent of its vehicle miles traveled (VMT). The majority of metro-area principal arterials are limited-access freeways, which provide the greatest mobility and safety characteristics of all roadway types. However, there are approximately 300 miles of non-freeway principal arterial highways with at-grade intersections (traffic signals or stop-controlled) which must balance mobility, safety, and access to destinations – typically within footprints that are smaller than freeways.

Non-freeway principal arterials typically operate with a mobility advantage for through traffic; but this mobility objective becomes more challenging with at-grade intersections as total volumes and crossing volumes increase. Such intersections may limit the ability to best provide for long-term mobility and safety. This sometimes leads to proposals for new interchanges or "grade-separation" projects. These types of projects have regularly been completed and have resulted in mobility and safety improvements and the conversion of non-freeway arterials into either:

- Extensions of metro-area freeways, or
- Limited segments along principal arterials that operate like freeways but still include at-grade intersections off each end of the converted segment.

Non-freeway principal arterial highways in the Twin Cities metro were the focus of the study. These roadways serve critical mobility functions and their at-grade intersections need region-wide prioritization to guide investments and help set visions.

The demand to develop additional projects is high, as are the potential benefits. However, there is also a need to prioritize intersection conversions on a region-wide basis, to more strategically guide investments and help set long-term corridor visions.[2] Specifically, this first-of-its-kind study led by the Metropolitan Council and MnDOT's Metro District recognized that many needed intersection conversion projects cannot be delivered in the foreseeable future due to expected funding constraints. Illustrating this point, MnDOT's *Minnesota State Highway Investment Plan* (MnSHIP) identifies 20-year highway investment needs at $30 billion,[3] and corresponding anticipated revenues at $18 billion, leaving a 20-year $12-billion gap (40 percent).

[2] While regional prioritizations have been applied to managed lane (MnPASS) investments and to transit, a similar approach has not been used to prioritize new grade-separation projects.

[3] http://www.dot.state.mn.us/planning/mnship/ (December 2013). The $30-billion figure covers a full range of statewide transportation infrastructure needs including maintenance, vehicle mobility improvements, non-motorized accommodations, regional and community priorities, and others. The MnSHIP supports 10-Year MnDOT Work Plans by district and will be periodically updated to reflect new funding cycles.

The main objective of the Intersection Study was to set priorities for potential grade-separation projects (high, medium, or low) based on system problems, needs, and context. The types of intersection improvements to be undertaken is another dimension of this study. This aspect of the work reflects current transportation planning and engineering practice, which may find cost-effective intersection mobility investments that do not require complete grade separations (full-movement interchanges). Recent and emerging project development and design approaches show that lower-cost, high-benefit intersection projects are often possible without grade separations or by combining at-grade and grade-separated design elements. Therefore, the Study guides intersections that warrant strategic investments toward the "right solutions", whether interchanges, innovative high-capacity arterials ("superstreets"), or hybrid combinations, typically along corridors with some at-grade intersections and some grade separations. In addition, the Study recognized the context of specific corridors and intersections and helped align locally and regionally driven investments on non-freeway principal arterials.

Recent and emerging project development approaches show that lower-cost high-benefit intersection projects are often possible. The study recognized the context of specific corridors and intersections and helped align locally and regionally driven investments.

Given the current and anticipated funding climate, there is broad recognition of the need to ensure transportation investments reflect sound analysis, effective local/regional collaboration, and strategic prioritization to target system needs and maximize the value of investments. The *Principal Arterial Intersection Conversion Study* was identified as a work program item in the Metropolitan Council's *2040 Transportation Policy Plan*.

1.2 Study Organization, Approach, and Outcomes

To optimize the allocation of resources, the Study was organized into two analytical phases (see ***Figure 1***):

- **Initial Screening** (**Phase I)** – To identify intersections that will not be prioritized for grade-separation or similar investments at this time
- **Detailed Analysis and Screening** (**Phase II)** – To identify grade-separation investment priorities as High, Medium, and Low, and to place locations into context in terms of solutions

Overall, the Study helped organize investment priorities for intersection mobility projects on non-freeway principal arterials. Discussions during the December 2015 outreach meetings (summarized below) helped the Project Management Team (PMT) members and local representatives refine the Study's approach and understanding. Based in-part on these inputs, the results of the Study:

- **Focused on opportunities and priorities for new grade separations.** Meaningful results are best attained by keeping the focus on strategic high-priority investments for grade separations (interchanges or other projects using bridges to reduce conflicts). Subject to available resources, and in coordination with other planning, the Study has also identified other opportunities for high-capacity intersections, including potential for lower-cost/high-benefit innovative-intersection projects, with or without grade separation.

MnDOT has been engaged in related studies, to identify cost-effective highway projects for many years – most notably the Congestion Management Safety Plan (CMSP), now in Phase 4.[4]

- **Addressed relevant timeframes for funding and implementation.** The Study's outcome clarifies investment priorities within a foreseeable timeframe, approximately 10 years—similar to MnDOT 10-Year Work Plans for each district. While 20 years (or more) is consistent with the *Transportation Policy Plan's* long-term planning framework, the Intersection Conversion Study's focus is on more near-term priorities. The needs identified for intersection upgrade projects stretch beyond expected funding levels, in case additional funding becomes available and to support long-term plans. However, corridor visions must not be so far-reaching and comprehensive that the most achievable and strategic projects are unclear. Relevant short-term planning cycles include:

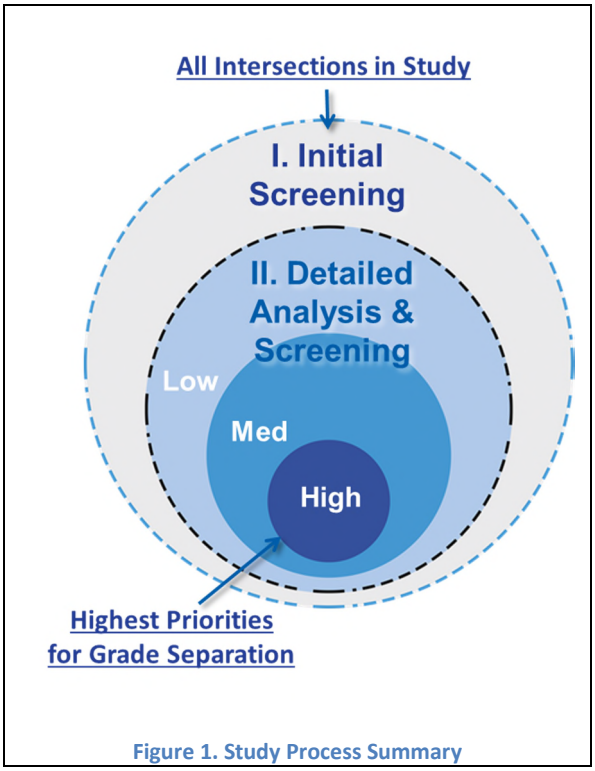


Figure 1. Study Process Summary

  - The Regional Solicitation for federal funding (every two years)
  - The Metropolitan Council *Transportation Policy Plan* update cycle and the MnDOT State Highway Investment Plan (MnSHIP), which are 20-year plans, generally updated every four years
  - Other funding and programming cycles which range from one to five years, including the Transportation Economic Development (TED) program, the Congestion Mitigation Safety Plan (CMSP) framework, and similar funding programs
  - The annual State Transportation Improvement Program (STIP), and local capital improvement budget cycles[5]
  - The anticipated practical timeframe for relevance of the intersection priorities in this Study, which is no more than 10 years

- **Emphasized planning that is driven both locally and regionally.** Local support and participation in this regional Study and in project development was critical to the development of intersection priorities and will remain critical to develop high-capacity intersection projects, including efforts to leverage funding sources.

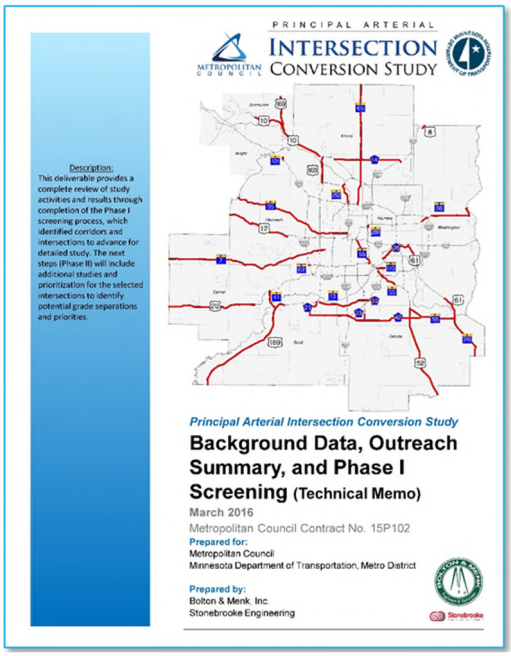
[4] The CMSP planning framework (led by MnDOT's Metro District and the Metropolitan Council) recognizes that system-wide capacity expansion will not be feasible and focuses a portion of Metro District resources on opportunities for lower-cost/high-benefit mobility and safety improvements.

[5] This study does not represent any change in funding cycles or funding availability. However, it will be used to help organize studies and priorities for project funding on non-freeway principal arterials in the Regional Solicitation process and in other funding programs like the TED program.

2 Phase I Screening Summary

2.1 Basic Screening Question and Overall Results

Phase I was documented in a Technical Memorandum to conclude the Study's Phase I screening (see ***Attachment 4***). This part of the Study was conducted to answer the basic question:



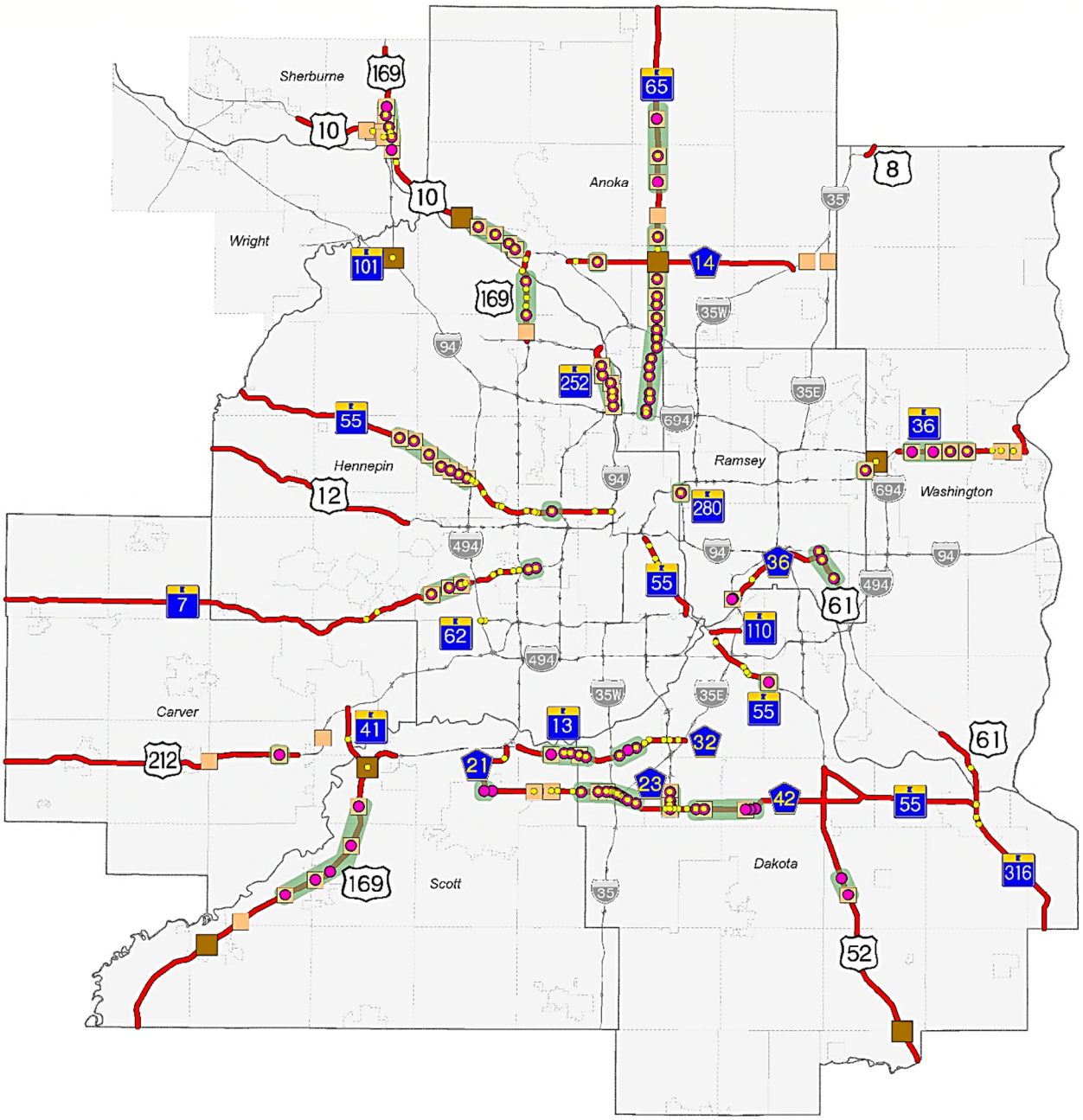
Which non-freeway principal arterial locations are not candidates for grade separation at this time?

The primary work elements in Phase I included:

- Document reviews to determine locations previously identified as priorities for grade separation, or locations where grade separation was not preferred due to site constraints or other factors.
- Outreach to county and local stakeholders to discuss needs and priorities.
- Technical screening using data-driven methods refined through the outreach process; this process recommended locations for Phase II analysis.

The initial Phase I screening result was that 104 of 374 intersections (28 percent) were identified for more detailed study in Phase II.

Through the Phase I work, 374 at-grade intersections were initially identified for the Study. These are at-grade intersections on principal arterials, including cross streets and intersections with ramps. Of these, 104 intersections (28 percent) were ultimately advanced to Phase II analysis. That number was later adjusted to 101 intersections based on local input and additional information. Ultimately, Phase II addressed 91 conventional at-grade intersections and 10 intersections of principal arterials with freeway ramps. The recommended Phase II locations are highlighted on ***Figure 2*** and more information about the screening process and outcomes is provided in Section 2.2 and in the referenced Phase I Technical Memorandum.



Legend

- Intersections Meeting Volume Criteria
- Phase II Intersections
- Locally Identified Future Grade Separation
- Recent or Funded Grade Separation
- Principal Arterial
- Non-Freeway Study Segments
- Phase II Study Area
- City/Township Boundaries
- County Boundaries

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Source: MetroGIS, MnDOT

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Figure 2
Phase II Study Areas
January 2017

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2.2 Phase I Screening Objectives and Criteria

2.2.1 Phase I Objectives and Screening Documentation

Many discussions with participants during Phase I concerned the approach and focus of the Study and the Phase I screening objectives. The Phase I screening process used technical criteria (including intersection volumes) and contextual criteria to consider intersections both individually and in corridors. This work was based generally on the following objectives:

- **Address in Phase II** those intersections and segments for which grade-separated design solutions (or innovative high-capacity intersections) warrant planning-level consideration in the foreseeable future.
- **Dismiss from Phase II** intersections and segments that do not exhibit local support for grade-separated design solutions or innovative high-capacity intersections.

Intersections and segments that did not advance to Phase II represented locations where investments are expected to address conventional at-grade intersections. This does not preclude future safety projects or other adjustments, nor a later shift toward a grade-separated vision based on future intersection conversion priorities. Technical Phase I Technical Memorandum provides the following information for intersections and segments not advanced to Phase II:

- The basis for the screening recommendation
- Reference to local input
- Information about needs and context – locations screened out may be considered in MnDOT's Congestion Management Safety Plan (CMSP)

2.2.2 Phase I Traffic Volume-Based Screening Criteria

Based on input received at the county outreach meetings, the Study's technical team worked to refine the Phase I screening approach and criteria. The first consideration was to adjust the traffic volume criteria based on technical observations about intersection capacity and conflicts.

At the Phase I county outreach meetings, the Study leadership team initially proposed and discussed thresholds based on MnDOT Intersection Control Evaluation (ICE) guidance. However, these values were typically seen as representing the low end of guidance to justify grade-separated intersection designs and projects. Many participants said such thresholds did not adequately reflect industry experience in decision-making for an intersection project, including conversion to a grade separation. The refinements to the traffic volume criteria considered the discussions at the outreach meetings and other industry guidance – primarily Highway Capacity Manual (HCM) methodologies to analyze the capacity of a signalized intersection. The resulting guidance on intersection volumes (see ***Figure 3*** below) takes into account a range of conditions for mainline (principal arterial) volumes and crossing volumes and was used as the Study's threshold guidance to identify potential grade separations.

The Phase I guidance on intersection volumes was based on the capacity of a signalized intersection and takes into account a range of conditions for mainline and crossing volumes.

The volume threshold plot depicts a range of volume scenarios at the level of service D/E threshold of a signalized intersection, with various volumes for both the mainline principal arterial and the intersecting roadways. The development of the curve considered the capacity of an intersection based on the HCM methodology for a four-lane roadway. Because this methodology is peak-hour orientated, different directional splits and peak-hour ranges were used to determine the volume ranges.

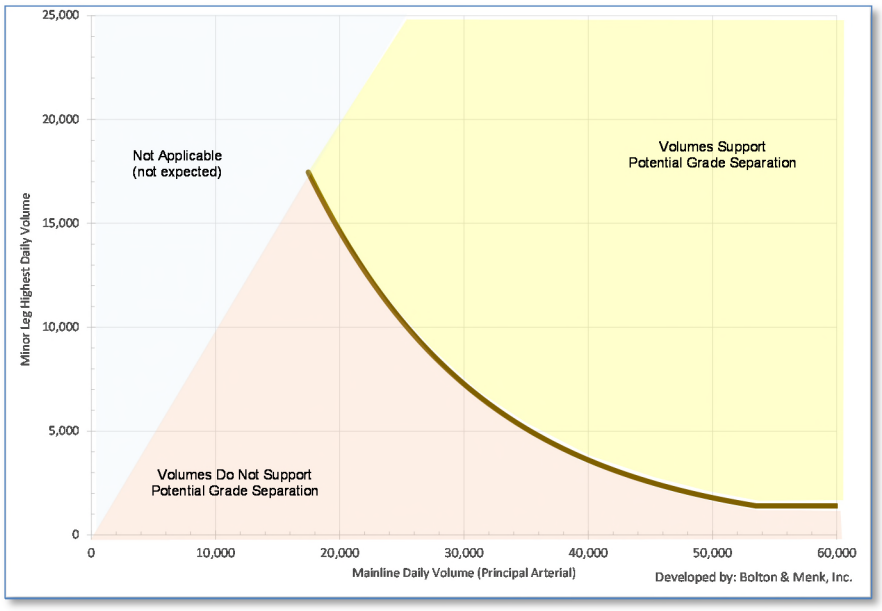


Figure 3. Intersection Volumes and Threshold Guidance for Potential Grade Separation

2.2.3 Other Phase I Screening Criteria and Overall Screening Approach

Figure 4 below outlines the series of criteria considered during the Phase I screening, both data-driven factors (e.g. volume and safety) and context-driven factors (based on the arterial's role in the system, previous planning, and local context). The flowchart structure and methodology was refined from the initial criteria in response to the outreach meetings, including screening discussions for specific intersections and related practical observations.

In practice, the safety, context, and local input factors provided examples in the outreach meetings which transcended the volume and mobility factors in the Phase I screening process. As noted on the Phase I Screening Flowchart, these examples were based especially on safety, local support, right-of-way or context issues, or the state of new infrastructure (questions 1, 3, 4, and 6). Such outcomes resulted in recommendations to not advance several high-volume locations.

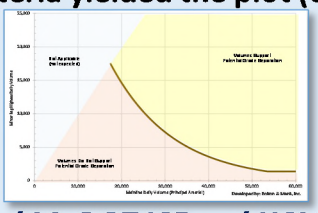
This was expected in the Study because some principal arterial stretches (for example, the TH 55 Hiawatha corridor) present current context and constraints that are incompatible with planning for grade-separated intersections. In a few cases, the PMT recommended that some relatively low-volume locations advance to Phase II based on local/regional context and support in local planning.

The safety, context, and local input factors provided examples in the outreach meetings which transcended the volume and mobility factors in the Phase I screening process.

Volume and Capacity Factors

Guidance Based on ADT Thresholds

Study of volume criteria yielded the plot (explanation above).



Thresholds considered MnDOT ICE and HCM guidance, based on capacity of a signalized intersection (plot)

Safety, Context & Local Input Factors

Criteria Based on PA Role, Previous Planning, and Local Context

1. **Safety.** Is the critical crash rate index > 1.0? Are there observed safety deficiencies or concerns?
2. **Functional Class & System Context.** Intersection with another PA or A-Minor arterial? In context with multiple intersections and cumulative demands? Nearby interchange(s) on the PA?
3. **Local Planning Support.** Recent/current studies recommend grade separation? Support at local meetings? (No strong opposition?)
4. **Right-of-Way and Physical Feasibility.** Expressway to freeway character or potential within right-of-way? (Not an urban arterial/street with dense development and little/no setback?)
5. **Regional Mobility or Growth Corridor.** Priority corridor for mobility in region? Serving growth area(s)?
6. **Infrastructure and Funding Cycle.** Need for new infrastructure? (No large recent/committed projects in 10-year funding cycle?)

- ***Answering "yes" to questions 1-6 increases support to advance high-volume intersections/corridors to Phase II analysis.***
- ***Some locations, even with high volumes, may not advance to Phase II based on lack of support, right-of-way or context issues, or the presence of new infrastructure (questions 3, 4, and 6).***

Figure 4. Phase I Screening Flowchart

3 Phase II Prioritization Criteria and Process

3.1 Overview

With input from the Technical Steering Committee, 91 at-grade intersections were identified for the Phase II portion of the project and were assigned priorities for grade separation, High, Medium and Low. The Study also identified 10 principal arterial intersections with freeway ramps, which were relevant to the Study's context; however, the ramp intersections were not prioritized.[6] This part of the Study's Final Report summarizes the Phase II screening criteria and the results, organized by county and location. Additional Phase II data and details are provided in attachments, including:

- **Attachment 1. Detailed Phase II Data Tables** – Detailed listing of data for the 91 Phase II intersections, sorted both by score and by location
- **Attachment 2. Analysis of Principal Arterial Intersections with Freeway Ramps** – Presentation and high-level analysis of the 10 ramp intersections

The 91 Phase II intersections analyzed in detail were ultimately organized into 26 Focus Areas, which are locations and corridors with one or more intersection. The Focus Areas will help to establish a basis for locally based strategic transportation studies (see Section 4, which provides the detailed Focus Area results).

In Phase II, the Study evaluated 91 at-grade intersections based on the criteria and process explained here. The 91 intersections were also organized into 26 Focus Areas, which are presented in detail in Section 4.

3.2 Capacity Analysis

For the 91 Phase II intersections, the team collected turning-movement data and geometric information to analyze the capacity of the existing intersections. The Capacity Analysis for Planning of Junctions (CAP-X) tool, developed by the FHWA, was used to evaluate existing intersections using worst-case peak-hour volumes (AM or PM).[7] Each intersection was evaluated to provide planning-level capacity assessments, for both existing conditions and expected conditions with various improvement levels assumed. The Study's intersection capacity analyses were not detailed operational assessments and, importantly, were always based on existing traffic volumes. The objective was to create a consistent comparative approach for the 91 intersections. The main questions asked for each intersection were:

- What is the volume/capacity (V/C) ratio of the existing intersection and is it acceptable?
- How would that V/C ratio change under a range of intersection scenarios, from at-grade improvements to interchanges?

[6] The 10 ramp intersections were identified for planning consideration based on proximity with the at-grade intersections evaluated in the Study and possible needs and issues identified through stakeholder input. The ramp intersections operate differently than conventional at-grade intersections and are already associated with a grade-separated condition. Therefore, they were addressed separately as documented in Attachment 2 and were not prioritized.

[7] For more on the FHWA CAP-X tool, see: http://www.fhwa.dot.gov/software/research/operations/cap-x.

Consistent with industry guidance, the calculated existing V/C ratios were considered either poor (V/C ≥ 1); borderline (V/C > 0.85); or acceptable (V/C ≤ 0.85). This result was calculated for all intersections based on the existing at-grade configuration and based on a range of improvement scenarios (see more on the scenarios considered and the results in Section 4).

The capacity analysis results were the most important single input to the intersection scores to determine grade-separation priority, accounting for about 50 percent of the result. The other 50 percent of the scoring was based on the weighted Phase II screening criteria as described in detail below.

3.3 Phase II Screening Criteria and Weighting

3.3.1 Identification of Screening Criteria

The following criteria were proposed and weighted with input from the Technical Steering Committee (TSC) at a series of meetings. These screening criteria served to describe each intersection based on how each category would relate to the need for intersection conversion:

- **Mobility – Provide grade separations at locations that serve higher volumes of traffic, need more capacity, and where there is more variability in travel times.**[8]
  - Traffic Volume – Measure the total entering annual average daily traffic (AADT), with emphasis on the relationship of mainline AADT to cross street AADT.
  - General Intersection Capacity – Based on the volume and overall intersection layout, the general intersection configuration was considered to determine a representative V/C ratio (this evaluation was general, not as detailed as the capacity analysis work described above).
- **Safety – Provide grade separations at locations that have a higher number of crashes and a higher number of severe crashes.**
  - Crash Frequency – The frequency of crashes at the intersection.
  - Crash Index – A relative score based on the number of crashes and intersection volume as compared to similar intersections throughout Minnesota.
  - Crash Severity – Crash severity or costs are considered to give higher weight to more severe crashes.
- **Corridor Context - Provide grade-separations at locations that are better able to accommodate grade separation and serve important regional crossing routes.**
  - Functional Class – The functional classification of the cross street. Higher functional class crossroads serve more regional traffic and were rated higher.
  - Intersection Density – The intersection density of the arterial segment in which the intersection is located (lower densities are more favorable).
  - Proximity to Existing Grade-Separation – Intersection is located within two miles of an existing freeway or interchange.
  - Existing Land Use and Potential Impact – The land uses immediately adjacent (within 500' buffer) to the intersection will be summarized to determine the ease of constructing improvements.
  - Prior Planning for an Interchange – Was an interchange proposed at the intersection location in previous planning documents?

[8] Development of the mobility criteria included discussion of other specific factors. For example, "events and special traffic generators" was identified as a possible issues and was included in the initial weighting discussions (at about 5 percent). However, that weight was ultimately distributed evenly to the other general mobility criteria because differentiating intersections based on special peak-traffic generators was not feasible in the study's scope.

- Freight – The number of heavy commercial vehicles (relative rating).
- Transit – Does the principal arterial (and intersection) support an express transit route? If yes, this will increase the priority score.
- Regional Bicycle Transportation Network (RBTN) – Is the intersection within ½-mile of a RBTN crossing of the principal arterial? If yes, this will increase the priority score.

3.3.2 Weighting of Criteria

The following weights were based on the values given to the above-described criteria based on TSC input and as finalized based on rounding and appropriate adjustments as determined by the Project Management Team.

Table 1. Phase II Screening Weighted Score

General Criteria	Detailed Criteria	Final Weights
Mobility	Traffic Volume	16%
	Capacity (V/C ratio)	24%
	Subtotal	**40%**
Safety	Crash Frequency	10%
	Crash Index	11%
	Crash Severity	9%
	Subtotal	**30%**
Corridor Context	Functional Classification	2%
	Intersection Density	3%
	Proximity to Existing Grade Separation	5%
	Land Use Impact (500-ft. buffer)	6%
	Prior Planning for Interchange	7%
	Freight (no. of heavy commercial vehicles)	4%
	Transit (presence of express route on PA)	2%
	Bicycle (potential enhancement to RBTN trail)	1%
	Subtotal	**30%**
	Total	**100%**

3.4 Composite Scores and Grade-Separation Priorities

The final Phase II scoring analysis combined representative capacity analysis scores with the weighted criteria scores to derive composite scores for each intersection. The composite scores and data were carefully reviewed to develop the Study's final results, identifying intersections with High-, Medium-, and Low-Priority for possible grade separations.

This subsection provides an overview of the Study results based on grade-separation priorities for the 91 Phase II intersections. The overall results of the Study provide high-level guidance for the "right-sizing" of potential projects as follows:

- **34 High-Priority Intersections** – The High-Priority intersections often exhibit needs that can justify high-capacity at-grade improvements or grade separations. These intersection locations (and the corridors they are within) should be addressed in more detail to determine the right-sized investments.

- **27 Medium-Priority Intersections** – The Medium-Priority intersections typically do not need grade-separation projects based on current demand. However, additional studies at these locations could show needs for high-capacity at-grade improvements and limited or emerging needs for grade-separation elements (for example, a bridge which may serve only one movement).

- **30 Low-Priority Intersections** – These locations generally do not need major changes or projects based on current demand and any problems can be addressed with at-grade projects. However, some Low-Priority intersections are located on corridors near Medium- and High-Priority intersections or may be in growth areas.

3.4.1 Definition of Focus Areas (Corridors)

Table 2 and ***Figure 5*** (on the following pages) show that the 91 prioritized intersections were organized into 26 Focus Areas, which are locations and corridors with one or more intersection. As the Study concluded, the Focus Areas established the basis for future corridor studies to support development of projects and funding. The Focus Areas were defined based on the presence of:

- Phase II intersections, either one or more in a series

- Clear "breaks" along a corridor (for example on TH 65 in the north metro) based on major junctions with other principal arterials or long gaps between Phase II intersections

In many cases the Focus Areas may define logical corridors for additional planning; however, the definition of logical termini for future project development was not formally considered.

3.4.2 Focus Area Summary

The 26 Focus Areas provide the best means to review and understand the Study's results in detail based on the 91 intersection locations and their priorities. Observations on the Focus Areas include:

- **Two North-Metro Corridors Both Include a Series of Six High-Priority Intersections** – These two corridors are:

  - Anoka County TH 65-B (93rd Lane to Bunker Lake Blvd.) – Six high-priority intersections; 5.5 miles
  - Hennepin County TH 252 (66th Ave. to 85th Ave.) – Six high-priority intersections; 2.5 miles

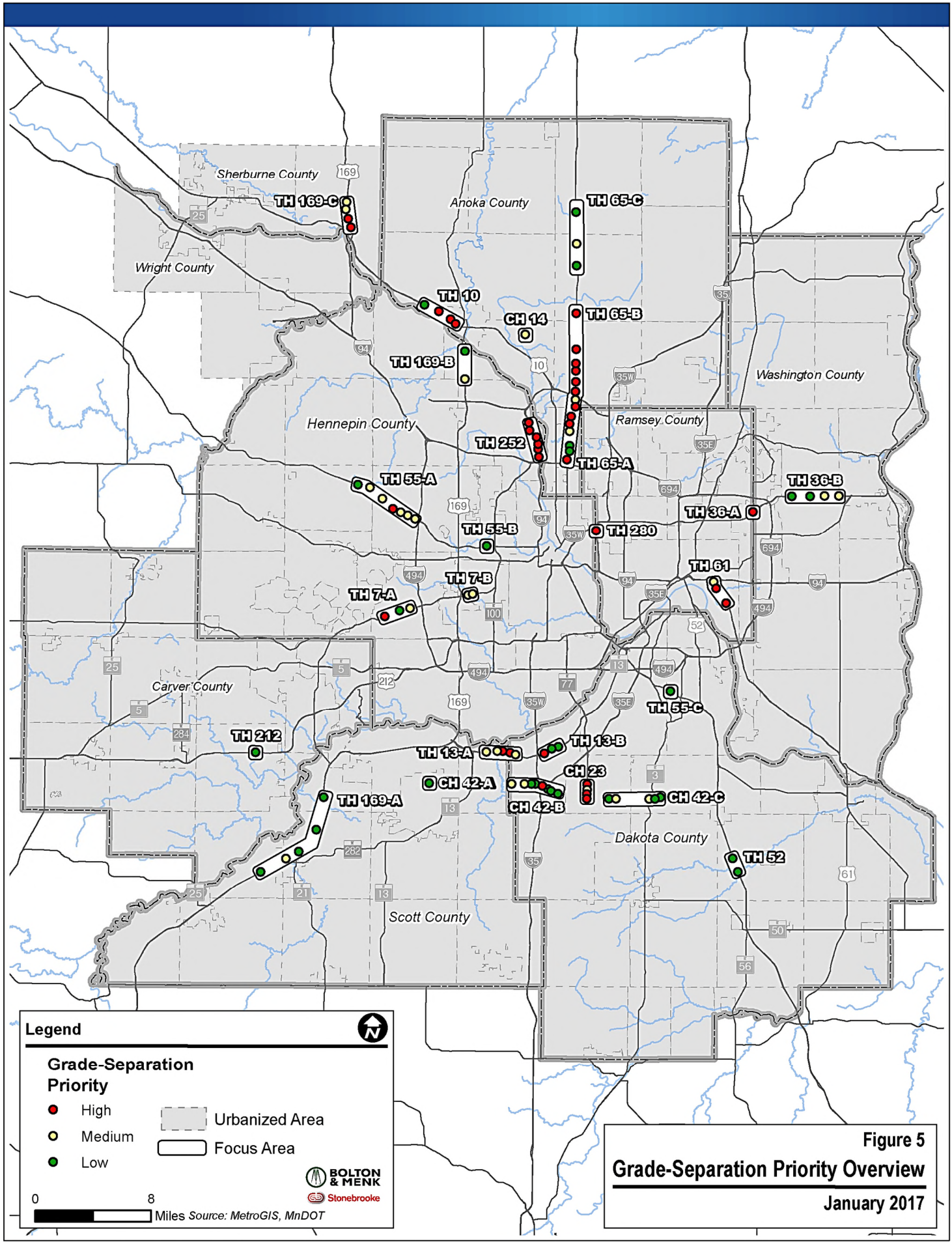
- **More than Half of the Focus Areas Include at Least One High-Priority Intersection** – Of the 26 Focus Areas, 14 of them have at least one high-priority intersection.

- **Many Corridors Include Intersections with a Range of Priorities** – While there are five Focus Areas comprised exclusively of Low-Priority intersections, many others define corridors with a range of priorities. While the exclusively Low-Priority locations suggest little need for major improvements, the presence of medium-priority intersections may be trend indicators. The 27 Medium-Priority

intersections are distributed to 15 of the Focus Areas. These Focus Areas could provide a basis to investigate lower-cost/high-benefit design solutions, using either high-capacity at-grade concepts or hybrid-type grade separations. Additionally, traffic growth forecasts should be carefully considered for mixed-priority corridors, especially where development is ongoing or is anticipated.[9]

Table 2. Summary of Focus Area Results for Intersection Grade-Separation Priority			No. of Intersections by Priority			Total
County	**Focus Area**	**Location**	**Low**	**Med**	**High**	
Anoka	TH 10	Ramsey Blvd to Fairoak Ave.	1		3	**4**
	CH 14	CH 14 & Hanson Blvd.		1		**1**
	TH 65-A	Medtronic Pkwy to 89th Ave. (I-694 to TH 10)	2	2	4	**8**
	TH 65-B	93rd Lane to Bunker Lake Blvd.			6	**6**
	TH 65-C	Constance Blvd. to Viking Blvd.	2	1		**3**
Carver	TH 212	TH 212 & CH 43	1			**1**
Dakota	CH 23 (Cedar Ave.)	CH 42 (150th St.) to 140th St.		1	3	**4**
	CH 42-B	Burnsville Pkwy to CH 11 (in the I-35W & I-35E area)	5	2	1	**8**
	CH 42-C	Johnny Cake Ridge Rd. to 145th St.	3	2		**5**
	TH 13-B	Nicollet Ave. to 12th Ave. (Burnsville)	2		1	**3**
	TH 52	200th St. to 190th St.	2			**2**
	TH 55-C	TH 55 & Argenta Trail	1			**1**
Hennepin	TH 7-A	CH 101 to Williston Rd.	1	1	1	**3**
	TH 7-B	Blake Rd. to Texas Ave.		2		**2**
	TH 55-A	CH 116 to Fernbrook Ln.	1	5	1	**7**
	TH 55-B	TH 55 & Douglas Drive	1			**1**
	TH 169-B	109th Ave. & Haden Lake Rd.	1	1		**2**
	TH 252	66th Ave. to 85th Ave.			6	**6**
Ramsey	TH 36-A	TH 36 & Century Ave. (with Washington Co.)			1	**1**
	TH 61	Lower Afton Rd. to Burns Ave.		1	2	**3**
	TH 280	TH 280 & Broadway St.			1	**1**
Scott	CH 42-A	CH 42 & CH 21	1			**1**
	TH 13-A	Dakota Ave. (Scott Co.) to Washburn Ave. (Dakota Co.)		2	3	**5**
	TH 169-A	Delaware Ave. to 150th St.	4	1		**5**
Sherburne	TH 169-C	Main St. to 197th Ave.		2	2	**4**
Washington	TH 36-B	Demontreville Trail to Manning Ave.	2	2		**4**
		Total	**30**	**27**	**34**	**91**

[9] High rates of traffic growth could affect the appropriate timing and extent of improvements and could lead to higher intersection priorities when the study's results are updated.


Sherburne County
Wright County
Anoka County
Hennepin County
Ramsey County
Washington County
Carver County
Dakota County
Scott County
TH 169-C
TH 10
TH 169-B
TH 55-A
TH 7-A
TH 7-B
TH 55-B
TH 252
TH 65-C
CH 14
TH 65-B
TH 65-A
TH 280
TH 36-B
TH 36-A
TH 61
TH 55-C
TH 212
TH 13-A
TH 13-B
CH 23
CH 42-A
CH 42-B
CH 42-C
TH 169-A
TH 52
Legend
Grade-Separation Priority
High
Medium
Low
Urbanized Area
Focus Area
0
8
Miles Source: MetroGIS, MnDOT
BOLTON & MENK
Stonebrooke
Figure 5
Grade-Separation Priority Overview
January 2017

- **There are Opportunities to Coordinate Corridor-Wide Intersection Improvements** – Several Focus Areas suggest opportunities to coordinate intersection improvements along corridors, including the possible consolidation or closure of intersections at some locations. Opportunities for access management can also be noted for some corridors; and clearly, removal of at-grade access points is a prerequisite for complete conversions from at-grade to grade-separated corridors. While the Study recognized these opportunities, it did not develop site-specific design concepts nor develop scores for the consolidation or closure of intersections. Note as well the discussion of "right-sizing" in Section 5, which was addressed in this Study through guidance on the appropriate scaling of intersection or interchange designs based on assigned grade-separation priorities.

The 26 Focus Areas are presented in detail below in Section 4. They often suggest opportunities to coordinate intersection improvements along corridors, including the consolidation or closure of intersections at some locations.

The Focus Areas identified in this Study will help counties and local governments, working with the Metropolitan Council and MnDOT, to structure future highway planning, funding, and design efforts. In addition, the reasons that other locations were eliminated from Phase II will remain part of the record (more than 270 intersections were initially screened out).

For more detailed information on the Focus Areas and the role of this Study in future planning, see Sections 4 and 5 below and the Phase I Technical Memorandum.

- Section 4 presents the 26 Focus Areas in detail, including a data page and a map for each one. These pages, and other information in this Final Report, can be used as a basis for additional planning.
- Section 5 outlines the role for this Study in future planning and references background information and tools to support additional studies.

Section 4 presents the Focus Areas (corridors) in detail.

Section 5 outlines the role for this Study in future planning.

4 Phase II Focus Area Review

4.1 Focus Areas and Observed Corridor Types

The 26 Focus Areas are locations or corridors comprised of the 91 Phase II intersections. Each Focus Area was established based on the locations of Phase II intersections and geographical factors such as proximity to other principal arterials or distance from another Phase II intersection.

To establish general context, ***Figure 6*** illustrates the observed principal arterial corridor types in the 26 Focus Areas. The first corridor type is the suburban arterial. These corridors (with four or six general lanes) are constrained by surrounding development and exhibit closely spaced intersections or access points. Posted speed limits along suburban arterial corridors are generally lower, typically 40 to 50 mph. The second observed type, a constrained limited-access expressway, is a corridor that exhibits more space for the highway; this type will often have more right-of-way, but with development constraints and moderate spacing of access points. Speed limits are higher than seen on a suburban arterial, typically 55 mph. The third type, an unconstrained limited-access expressway generally exhibits the maximum right-of-way (footprint) and longest access spacing of the four observed corridor types. Speed limits are also the highest, at 55 to 65 mph.

- Constrained developed setting; closely spaced access points
- Exhibits lower posted speeds (40-50 mph)

- More right-of-way; moderate access
- Higher posted speeds (55 mph)

- Maximum right-of-way; longest access spacing
- Highest posted speeds (55-65 mph)

Figure 6. Observed Corridor Types

These three corridor types describe observed *existing* conditions. The long-term *future* vision for a principal arterial corridor is another topic that generated attention and discussion during the Study process. While visioning is appropriate for long-term corridor planning, the consensus was that shorter-term timeframes are more relevant to set general regional priorities. Specifically, the Study's Technical Steering Committee supported the shorter-term perspective emphasized in the work, reaching consensus that Study results should not set out long-term visions for the 26 Focus Areas (this is better left to corridor planning studies). Similarly, the Study recognizes that if long-term corridor visions were identified, and if they are too far-reaching and comprehensive, the most strategic intersections and Focus Areas might then be less clear.

4.2 Overview Map

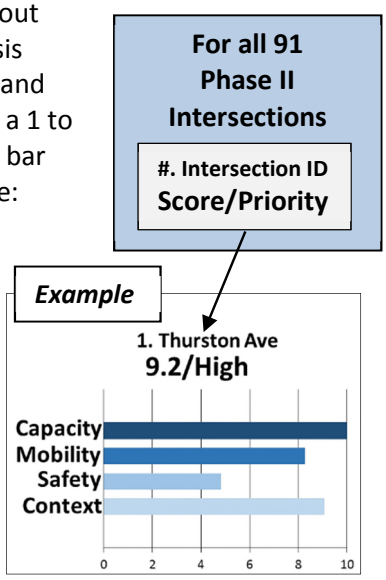
As noted above, the 91 conventional at-grade intersections prioritized in the Study are organized into 26 Focus Areas. ***Figure 7*** shows the Focus Areas by county with a colors assigned for each county. This serves as a map key for ***Figures 8 through 33***, which show each Focus Area in detail.

4.3 Focus Area Narrative Pages and Maps

The 52 pages that follow Figure 7 present the Study's results in detail, for all 91 Phase II intersections. The pages are sequenced with one narrative page for each Focus Area and one referenced map/figure. This section is organized alphabetically and by color for each county as follows:

- Anoka Co. (Figures 8-12)
- Carver Co. (Figure 13)
- Dakota Co. (Figures 14-19)
- Hennepin Co. (Figures 20-25)
- Ramsey Co. (Figures 26-28)
- Scott Co. (Figures 29-31)
- Sherburne Co. (Figure 32)
- Washington Co. (Figure 33)

Presentation of Scores/Priorities. The narrative pages include information about the intersection priorities and underlying scores, as well as the capacity analysis results. Each intersection has a bar chart that depicts the intersections scores and grade-separation priority by ranking capacity, mobility, safety, and context on a 1 to 10 scale. The image here is an example of an intersection score graphic with a bar chart showing components of the composite score of 9.2. The components are:

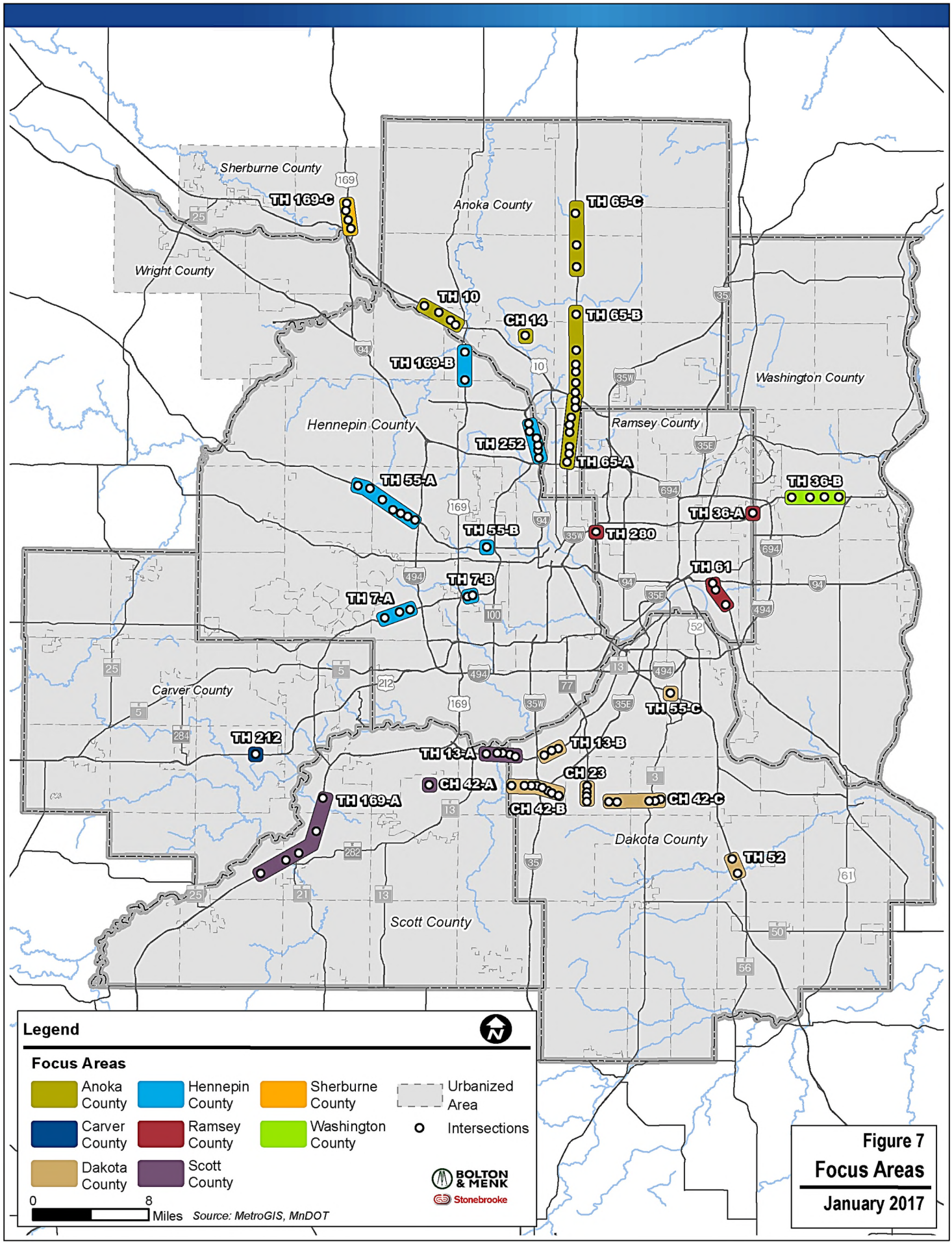


- **Capacity** – Measures if current peak-hour traffic volumes and operations exceed the practical capacity of the given intersection
- **Mobility** – Asks if the average daily traffic volumes and congestion are at high levels
- **Safety** – Considers if the intersection has a known history of frequent or severe crashes
- **Context** – Accounts for plans or studies that support a grade separation at the intersection and other context favorable to a major project

Safety Top 10. The intersections with the top-10 highest safety scores are indicated on the appropriate narrative pages and Focus Area maps using the orange flag symbol shown here. These intersections scored well above the mid-range based on crash data and deserve special attention to identify specific crash types or other safety issues.

Presentation of Capacity Analysis Results. The capacity analysis summary table is derived from the Intersection Capacity Analysis (CAP-X Tool) and relates closely to the Capacity scoring component above (it represents about half of the composite score). The CAP-X result is based on volume/capacity at the intersection based on six scenarios and is summarized by color-code and symbol (□, ▨, or ▩) – see the legend on each table for more detail. The six scenarios considered are:

- **Existing Intersection** – The existing traffic demands and conditions at the intersection
- **Expanded Intersection** – Assumes the addition of turn lanes to the intersection
- **Alternative At-Grade Intersection** – Assumes a reduced-conflict or unconventional intersection
- **Add PA Capacity** – Assumes the addition of continuous capacity to principle arterial mainline
- **Hybrid Interchange** – Assumes use of limited grade separation elements with other at-grade features
- **Full Interchange** – Assumes a fully grade-separated intersection (various interchange configurations)


Sherburne County
Anoka County
Wright County
Hennepin County
Ramsey County
Washington County
Carver County
Dakota County
Scott County
TH 169-C
TH 65-C
TH 10
CH 14
TH 65-B
TH 169-B
TH 252
TH 65-A
TH 55-A
TH 36-B
TH 36-A
TH 55-B
TH 280
TH 61
TH 7-B
TH 7-A
TH 55-C
TH 212
TH 13-A
TH 13-B
CH 23
CH 42-A
CH 42-B
CH 42-C
TH 169-A
TH 52
Legend
Focus Areas
Anoka County
Hennepin County
Sherburne County
Urbanized Area
Carver County
Ramsey County
Washington County
Intersections
Dakota County
Scott County
BOLTON & MENK
Stonebrooke
0
8
Miles
Source: MetroGIS, MnDOT
Figure 7
Focus Areas
January 2017

4.3.1 Anoka County

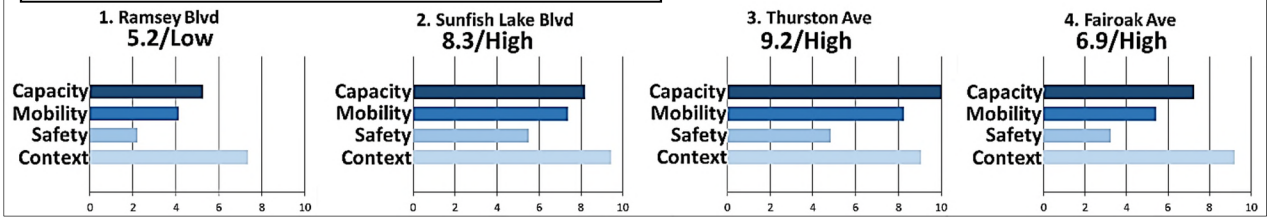
TH 10: Ramsey Boulevard to Fairoak Avenue (Anoka County 1 of 5)

Corridor Context. Constrained Limited-Access Expressway with four at-grade intersections evaluated in the study (see Figure 8). This corridor generally has four through lanes of mainline capacity and a median, which narrows towards the southeastern end of the corridor. The posted speed limit is 60 mph. The corridor is constrained by development and a railroad, but also has areas with wide setbacks and frontage roads. Other characteristics include:

- Intersection Spacing – The four intersections are spaced approximately 0.5 to 1.1 miles apart and are located 0.8 miles west of the TH 169 interchange.
- Access – Roadway access is limited to intersections with right-in/right-out access and private businesses.
- Previous Planning for Interchanges? Yes. Grade separations have been proposed for Ramsey Boulevard, Sunfish Lake Boulevard and Thurston Avenue.

Intersection measures:
Capacity: Do peak-hour volumes exceed design?
Mobility: Are daily volumes and congestion high?
Safety: Are there many or severe crashes?
Context: Are plans and multi-modal factors supportive?

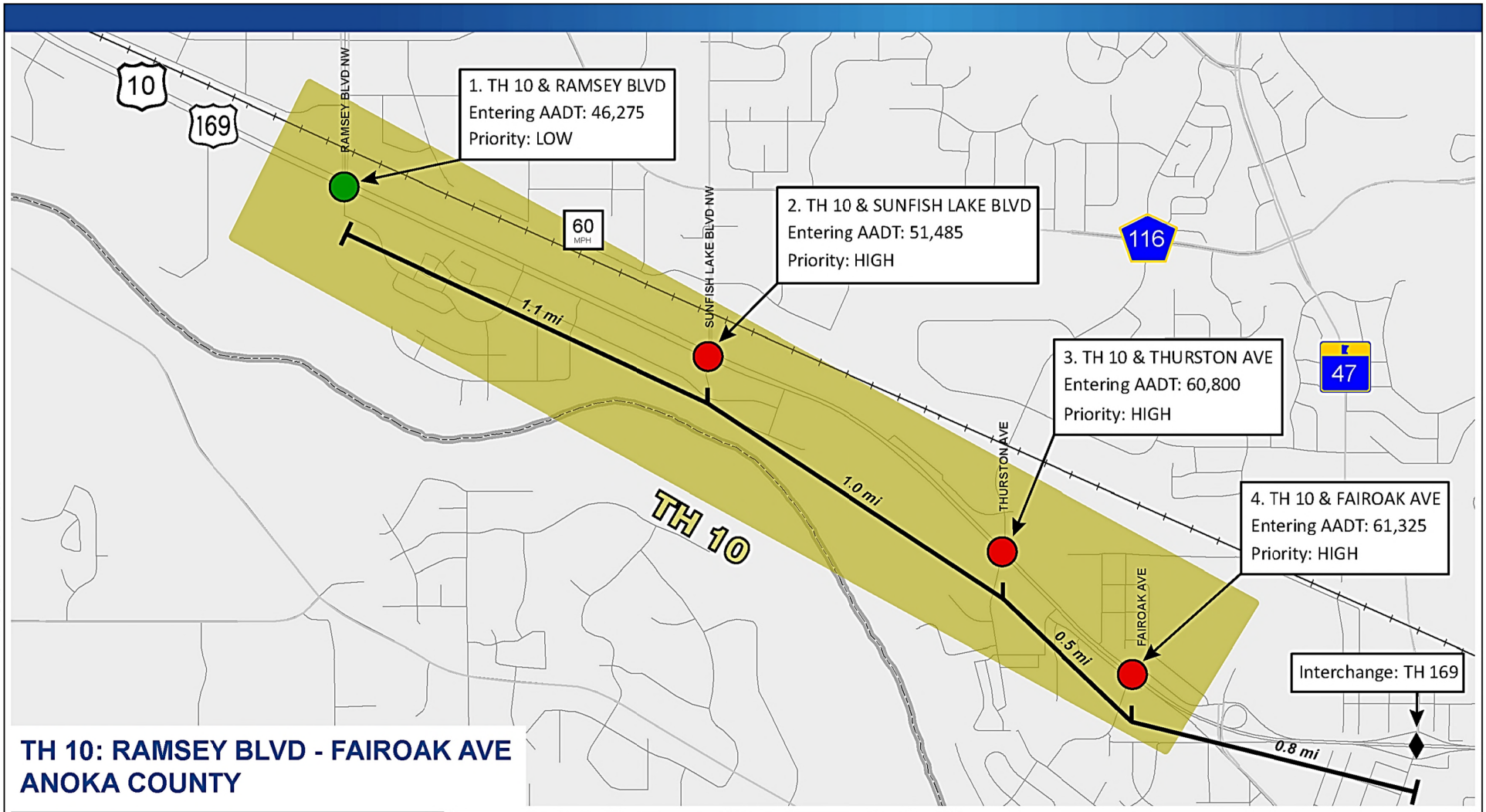
Intersection Scores and Grade-Separation Priorities



Capacity Analysis, Needs, and Opportunities. This corridor includes the full range of intersection priorities. The capacity analysis indicates need for high-capacity at-grade improvements or grade separations.

Capacity Analysis Summary

		Existing Intersection	Expanded Intersection	Alternative At-Grade Intersection	Add PA Capacity	Hybrid Interchange	Full Interchange
TH 10							
1	Ramsey Blvd.	☐	☐	☐	☐	☐	☐
2	Sunfish Lake Blvd.	☒	☒	☒	☐	☒	☐
3	Thurston Ave.	☒	☒	☒	☒	☒	☐
4	Fairoak Ave.	☒	☒	☒	☐	☐	☐
Key		☒ V/C ≥ 1.0		▨ V/C > 0.85 & < 1.0		☐ V/C ≤ 0.85	



TH 10: RAMSEY BLVD - FAIROAK AVE
ANOKA COUNTY

Legend

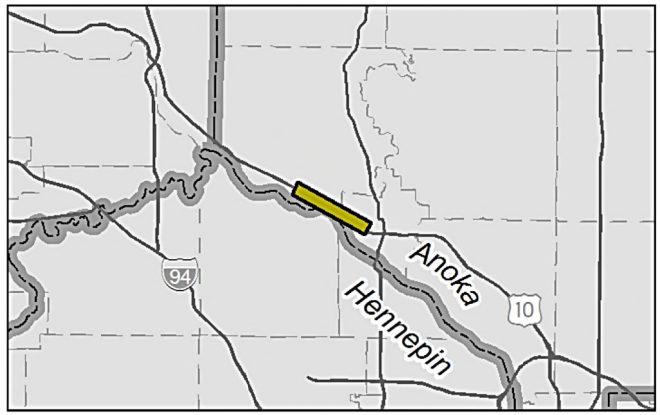
Grade-Separation Priority

- HIGH
- MEDIUM
- LOW
- Interchange
- Intersection Spacing
- Focus Area

0 0.5 Miles

Source: MetroGIS, MnDOT

BOLTON & MENK
Stonebrooke



This corridor includes the full range of intersection priorities. The capacity analysis indicates need for high-capacity at-grade improvements or grade separations.

Figure 8
Anoka County - TH 10 Focus Area
January 2017

METROPOLITAN COUNCIL
INTERSECTION CONVERSION STUDY
PRINCIPAL ARTERIAL
DEPARTMENT OF TRANSPORTATION

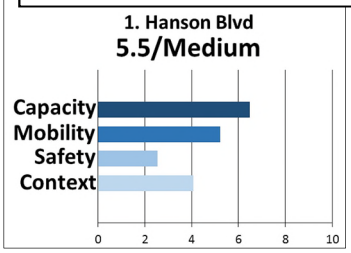
CH 14: Intersection at Hanson Boulevard/CH 78 (Anoka County 2 of 5)

Corridor Context. Suburban Arterial with one intersection evaluated in the study (see Figure 9). The corridor at this medium-priority intersection has four through lanes of mainline capacity with turn lanes present and a median. The posted speed limit is 55 mph. The corridor is constrained by development, but also includes some areas of open land. Other characteristics include:

- Intersection Spacing – This intersection is located approximately 1.6 miles east of TH 10 and about 3.5 miles west of TH 65.
- Access – Roadway access is limited to major street intersections along this section of CH 14, and right-in/right-out access.
- Previous Planning for Interchanges? Yes. A grade separation has been proposed for this intersection in previous planning documents.

Intersection measures:
Capacity: Do peak-hour volumes exceed design?
Mobility: Are daily volumes and congestion high?
Safety: Are there many or severe crashes?
Context: Are plans and multi-modal factors supportive?

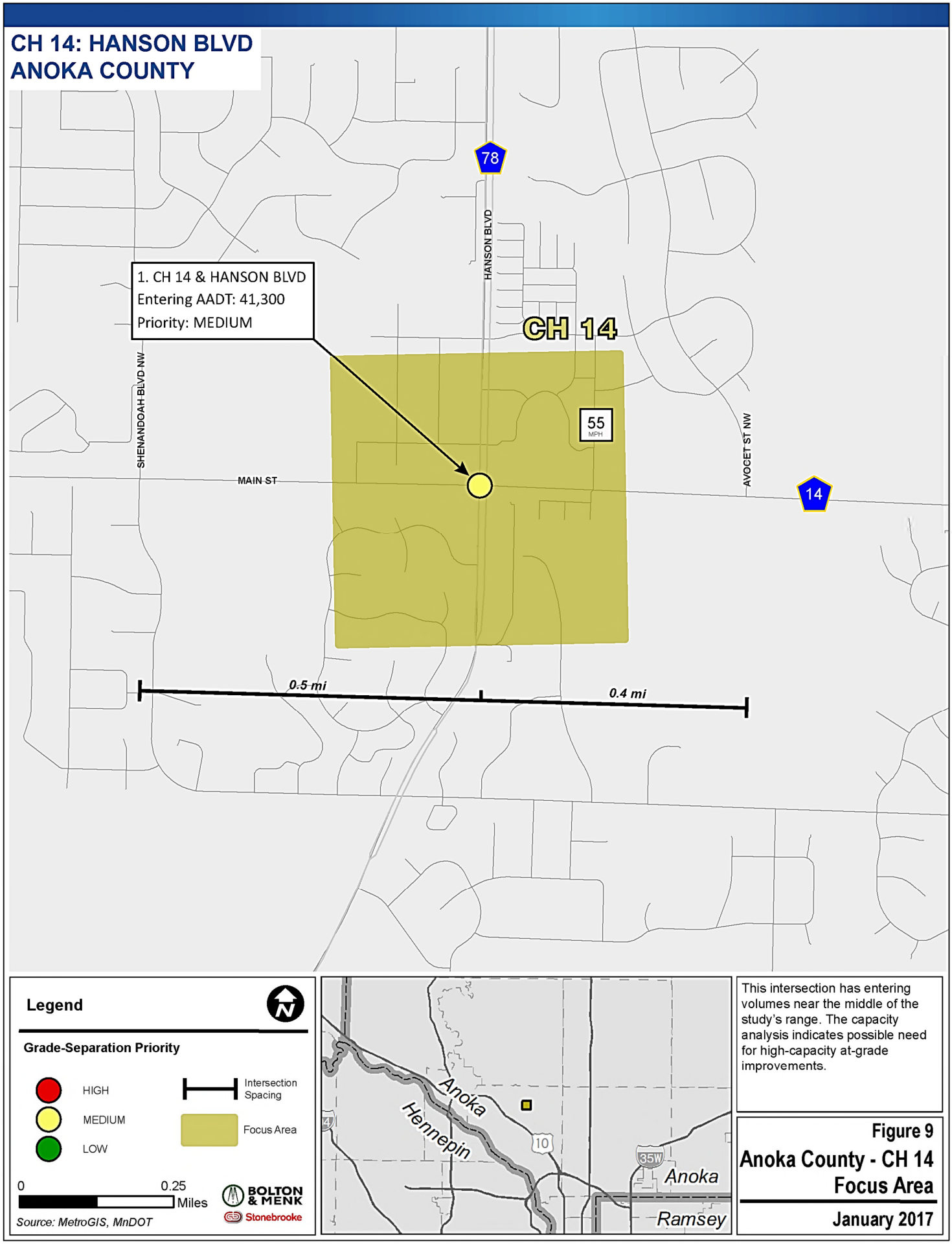
Intersection Score and Grade-Separation Priority



Capacity Analysis, Needs, and Opportunities. This intersection has entering volumes near the middle of the study's range. The capacity analysis indicates possible need for high-capacity at-grade improvements.

Capacity Analysis Summary

		Existing Intersection	Expanded Intersection	Alternative At-Grade Intersection	Add PA Capacity	Hybrid Interchange	Full Interchange
CH 14							
1	Hanson Blvd.	▨	☐	▨	☐	☐	☐
	Key	▨ V/C ≥ 1.0		▨ V/C > 0.85 & < 1.0		☐ V/C ≤ 0.85	



This intersection has entering volumes near the middle of the study's range. The capacity analysis indicates possible need for high-capacity at-grade improvements.

Figure 9
Anoka County - CH 14 Focus Area
January 2017

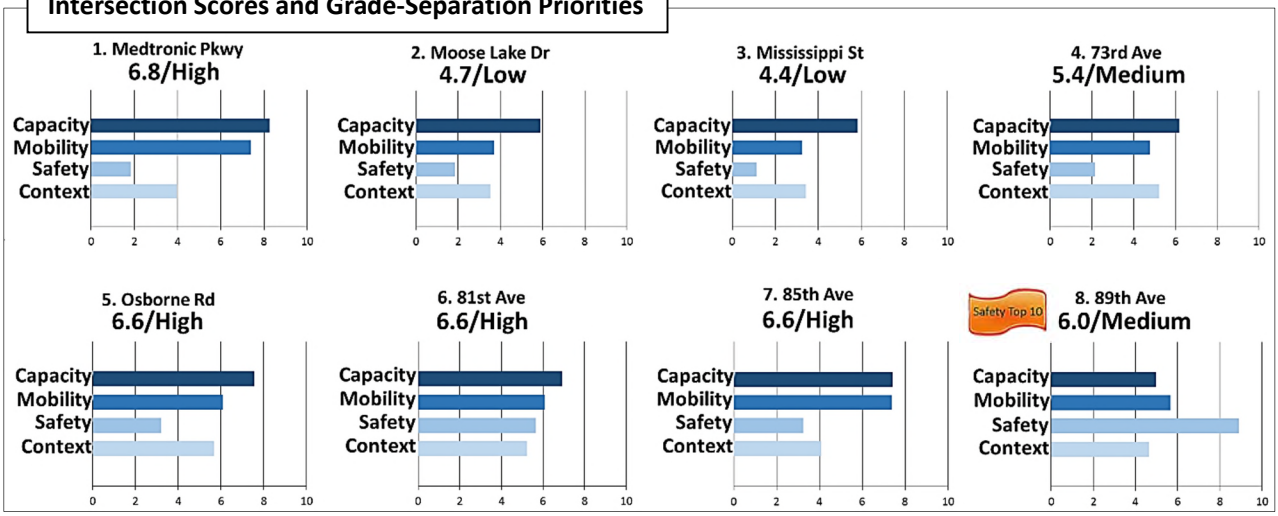
TH 65-A: I-694 to TH 10 (Anoka County 3 of 5)

Corridor Context. Constrained Limited-Access Expressway with eight at-grade intersections evaluated in the study, as well as three ramp intersections (see Figure 10). This corridor generally has four through lanes of mainline capacity, a median, and is a proposed future BRT corridor. The posted speed limit is 50-55 mph. The corridor is constrained by development, includes the railroad crossing as shown, and often includes wide setbacks and frontage roads. Other characteristics include:

- Intersection Spacing – The eight intersections are spaced approximately 0.4 to 1.0 mile(s) apart, and are about 0.2 miles from the I-694 interchange and less than 0.1 miles from the TH 10 interchange.
- Access – Roadway access between the major intersections is limited to right-in/right-out access and private access roadways.
- Previous Planning for Interchanges? No. Grade separations have not been proposed for this area in previous planning documents.

Intersection measures:
Capacity: Do peak-hour volumes exceed design?
Mobility: Are daily volumes and congestion high?
Safety: Are there many or severe crashes?
Context: Are plans and multi-modal factors supportive?

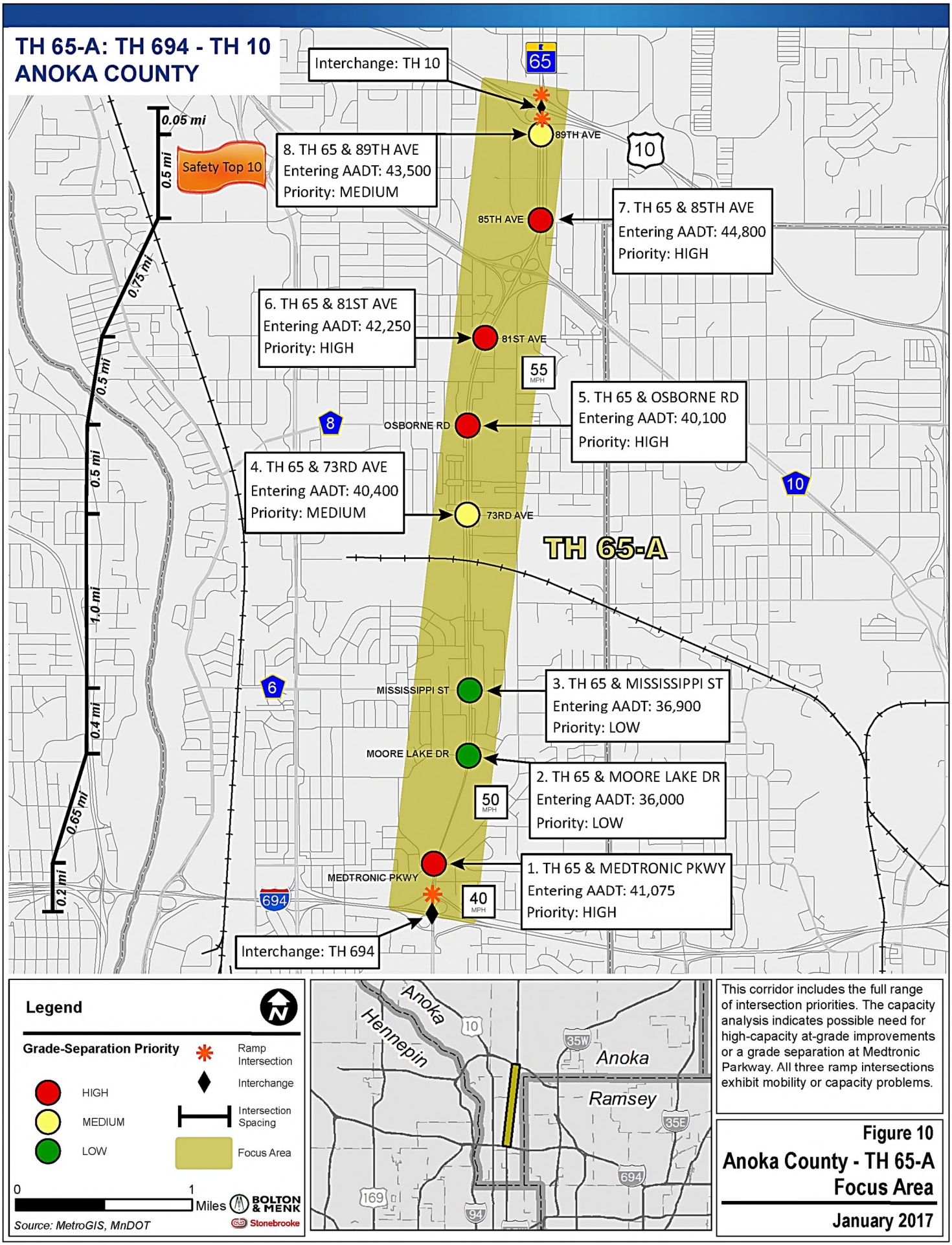
Intersection Scores and Grade-Separation Priorities



Capacity Analysis, Needs, and Opportunities. This corridor includes the full range of intersection priorities. The capacity analysis indicates possible need for high-capacity at-grade improvements or a grade separation at the Medtronic Parkway intersection, located 0.2 miles north of the I-694 interchange. The segment from Osborne Avenue to the north also warrants attention for possible capacity improvements. All three ramp intersections exhibit mobility or capacity problems.

Capacity Analysis Summary

		Existing Intersection	Expanded Intersection	Alternative At-Grade Intersection	Add PA Capacity	Hybrid Interchange	Full Interchange
TH 65-A							
1	Medtronic Pkwy.	▩	▩	▩	▨	☐	☐
2	Moore Lake Dr.	☐	☐	☐	☐	☐	☐
3	Mississippi St.	☐	☐	☐	☐	☐	☐
4	73rd Ave.	☐	☐	▨	☐	☐	☐
5	Osborne Rd.	▩	▩	▩	☐	▨	☐
6	81st Ave.	▨	▨	▨	☐	▨	☐
7	85th Ave.	▨	▨	▩	☐	☐	☐
8	89th Ave.	☐	☐	☐	☐	☐	☐
Key		▩ V/C ≥ 1.0		▨ V/C > 0.85 & < 1.0		☐ V/C ≤ 0.85	



This corridor includes the full range of intersection priorities. The capacity analysis indicates possible need for high-capacity at-grade improvements or a grade separation at Medtronic Parkway. All three ramp intersections exhibit mobility or capacity problems.

Figure 10
Anoka County - TH 65-A Focus Area
January 2017

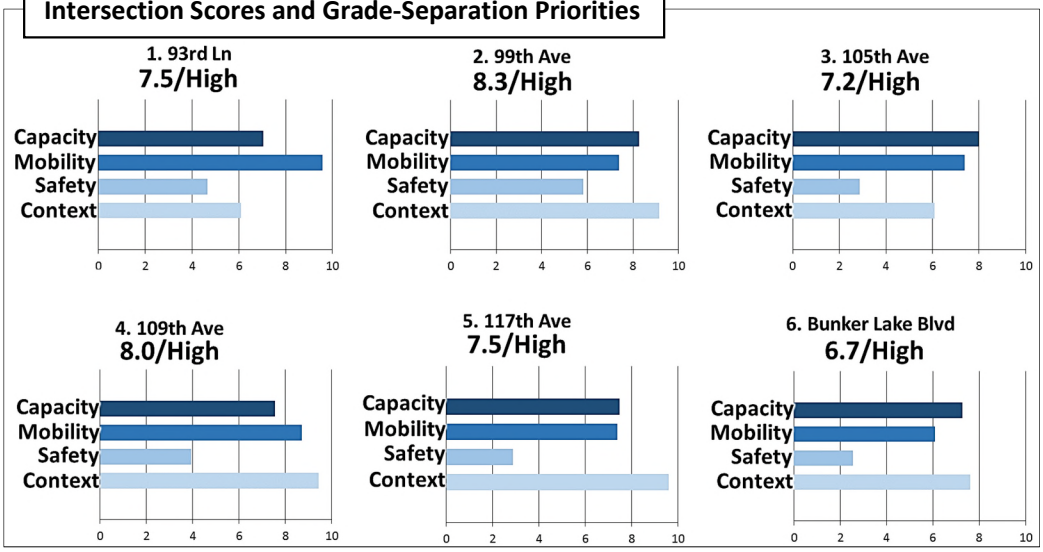
TH 65-B: 93rd Lane to CH 116 (Anoka County 4 of 5)

Corridor Context. Constrained Limited-Access Expressway with six at-grade intersections evaluated in the study (see Figure 11). The two ramp intersections at TH 10 are addressed within the TH 65-A Focus Area narrative. This corridor generally has four through lanes of mainline capacity and a median. The posted speed limit is 55-65 mph. The corridor is constrained by development but often includes wide setbacks and frontage roads. Other characteristics include:

- Intersection Spacing – The six intersections are spaced approximately 0.5 to 2.5 miles apart and are located approximately 0.4 miles from the TH 10 interchange.
- Access – Roadway access is limited to right-in/right-out access and private access roadways.
- Previous Planning for Interchanges? Yes. Grade separations have been proposed for this area in previous planning documents. Current design studies are also addressing potential at-grade capacity and safety improvements.

Intersection measures:
Capacity: Do peak-hour volumes exceed design?
Mobility: Are daily volumes and congestion high?
Safety: Are there many or severe crashes?
Context: Are plans and multi-modal factors supportive?

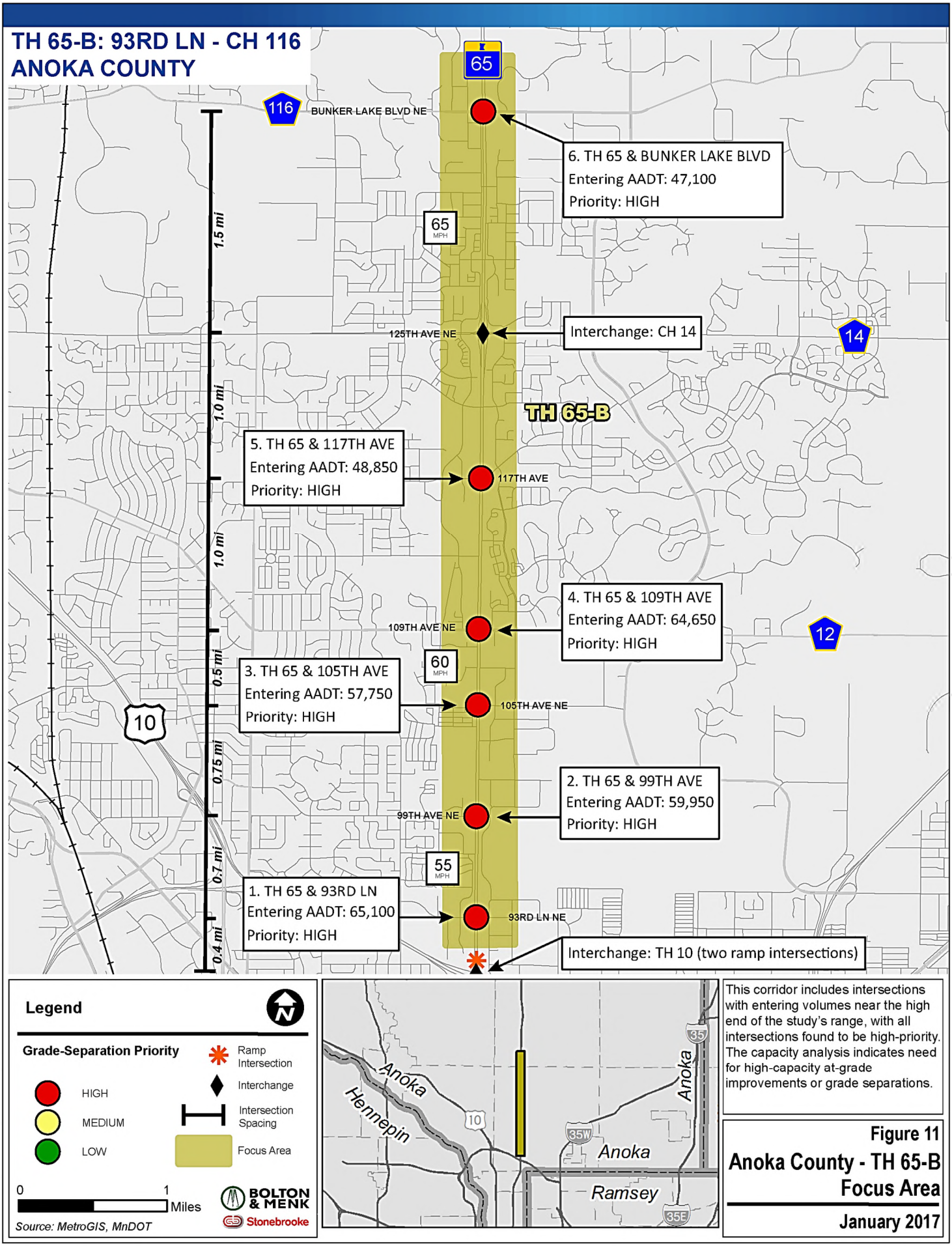
Intersection Scores and Grade-Separation Priorities



Capacity Analysis, Needs, and Opportunities. This corridor includes intersections with entering volumes near the high end of the study's range, with all intersections found to be high priority. The capacity analysis indicates need for high-capacity at-grade improvements or grade separations.

Capacity Analysis Summary

		Existing Intersection	Expanded Intersection	Alternative At-Grade Intersection	Add PA Capacity	Hybrid Interchange	Full Interchange
TH 65-B							
1	93rd Ln.	▨	☐	▨	☐	☐	☐
2	99th Ave.	▩	▩	▩	▨	▩	☐
3	105th Ave.	▩	▩	▩	☐	▨	☐
4	109th Ave.	▩	▩	▩	☐	▩	☐
5	117th Ave.	▩	▩	▩	☐	☐	☐
6	Bunker Lake Blvd.	▩	▩	▨	☐	☐	☐
	Key	▩ V/C ≥ 1.0		▨ V/C > 0.85 & < 1.0		☐ V/C ≤ 0.85	



This corridor includes intersections with entering volumes near the high end of the study's range, with all intersections found to be high-priority. The capacity analysis indicates need for high-capacity at-grade improvements or grade separations.

Figure 11
Anoka County - TH 65-B Focus Area
January 2017

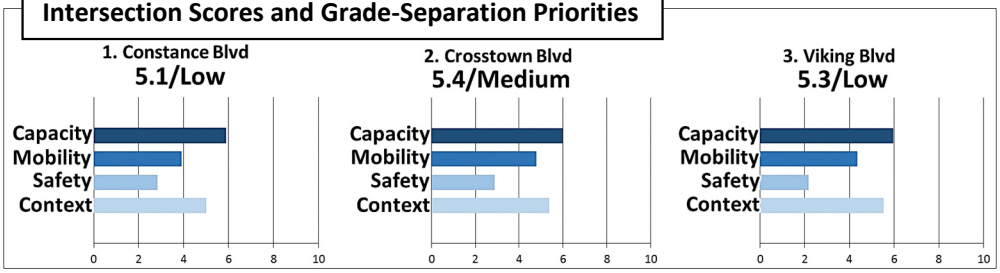
TH 65-C: Constance Blvd. to Viking Blvd. (Anoka County 5 of 5)

Corridor Context. Constrained and Unconstrained Limited-Access Expressway with three at-grade intersections evaluated in the study (see Figure 12). This corridor generally has four through lanes of mainline capacity and a median. The posted speed limit is 65 mph. The corridor is unconstrained with development at Viking Boulevard, but otherwise is constrained with some wide setbacks. Other characteristics include:

- Intersection Spacing – The three intersections are spaced approximately 1.5 and 2.2 miles apart and there are no major expressways near the focus area.
- Access – Roadway access is limited to right-in/right-out access, and private roadway access. Left-hand turns are allowed onto 169th Avenue NE., 181th Avenue NE, and 187th Lane NE.
- Previous Planning for Interchanges? Yes. Grade separations have been proposed for these intersections in previous planning documents.

Intersection measures:
Capacity: Do peak-hour volumes exceed design?
Mobility: Are daily volumes and congestion high?
Safety: Are there many or severe crashes?
Context: Are plans and multi-modal factors supportive?

Intersection Scores and Grade-Separation Priorities

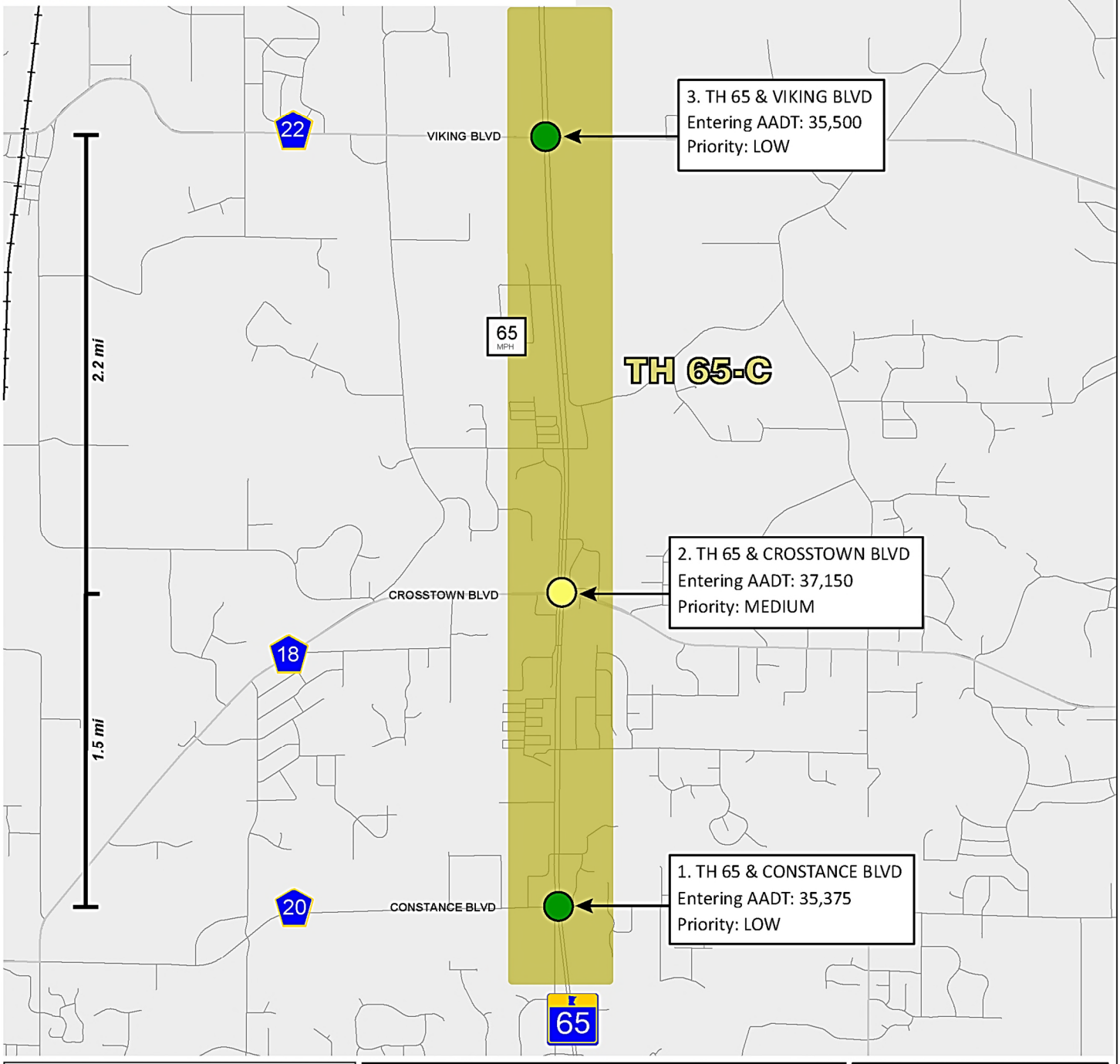


Capacity Analysis, Needs, and Opportunities. This corridor includes intersections with entering volumes near the middle of the study's range, with Crosstown Boulevard ranked as medium-priority. The capacity analysis indicates that major changes are not needed to accommodate current demand.

Capacity Analysis Summary

		Existing Intersection	Expanded Intersection	Alternative At-Grade Intersection	Add PA Capacity	Hybrid Interchange	Full Interchange
TH 65-C							
1	Constance Blvd.	☐	☐	☐	☐	☐	☐
2	Crosstown Blvd.	☐	☐	▨	☐	☐	☐
3	Viking Blvd.	☐	☐	☐	☐	☐	☐
Key		▩ V/C ≥ 1.0		▨ V/C > 0.85 & < 1.0		☐ V/C ≤ 0.85	

TH 65-C: CONSTANCE BLVD - VIKING BLVD
ANOKA COUNTY



Legend

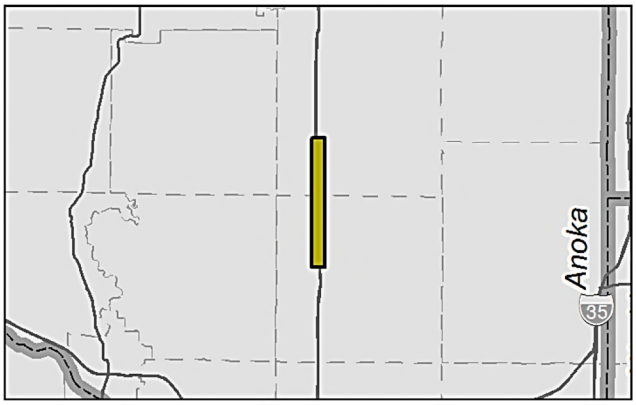
Grade-Separation Priority

- HIGH
- MEDIUM
- LOW
- Intersection Spacing
- Focus Area

0 1 Miles

Source: MetroGIS, MnDOT

BOLTON & MENK
Stonebrooke



This corridor includes intersections with entering volumes in the middle of the study's range, with Crosstown Boulevard ranked as medium-priority. The capacity analysis indicates that major changes are not needed to accommodate current demand.

Figure 12
Anoka County - TH 65-C Focus Area
January 2017

4.3.2 Carver County

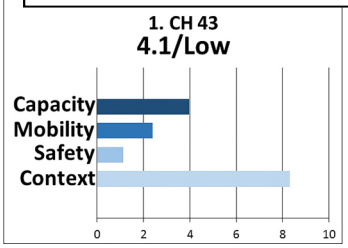
TH 212: Intersection at CH 43 (Carver County 1 of 1)

Corridor Context. Unconstrained Limited-Access Expressway with one intersection evaluated in the study (see Figure 13). The corridor at this low-priority intersection has two through lanes of mainline capacity with turn lanes present, but no median. The posted speed limit is 55 mph and the corridor is unconstrained by development. Other characteristics include:

- Intersection Spacing – This intersection is located two miles west of the TH 212/CH 11 interchange.
- Access – Roadway access near this intersection includes several private access points and some minor public streets.
- Previous Planning for Interchanges? No. A grade separation has not been proposed for this intersection in previous planning documents.

Intersection measures:
Capacity: Do peak-hour volumes exceed design?
Mobility: Are daily volumes and congestion high?
Safety: Are there many or severe crashes?
Context: Are plans and multi-modal factors supportive?

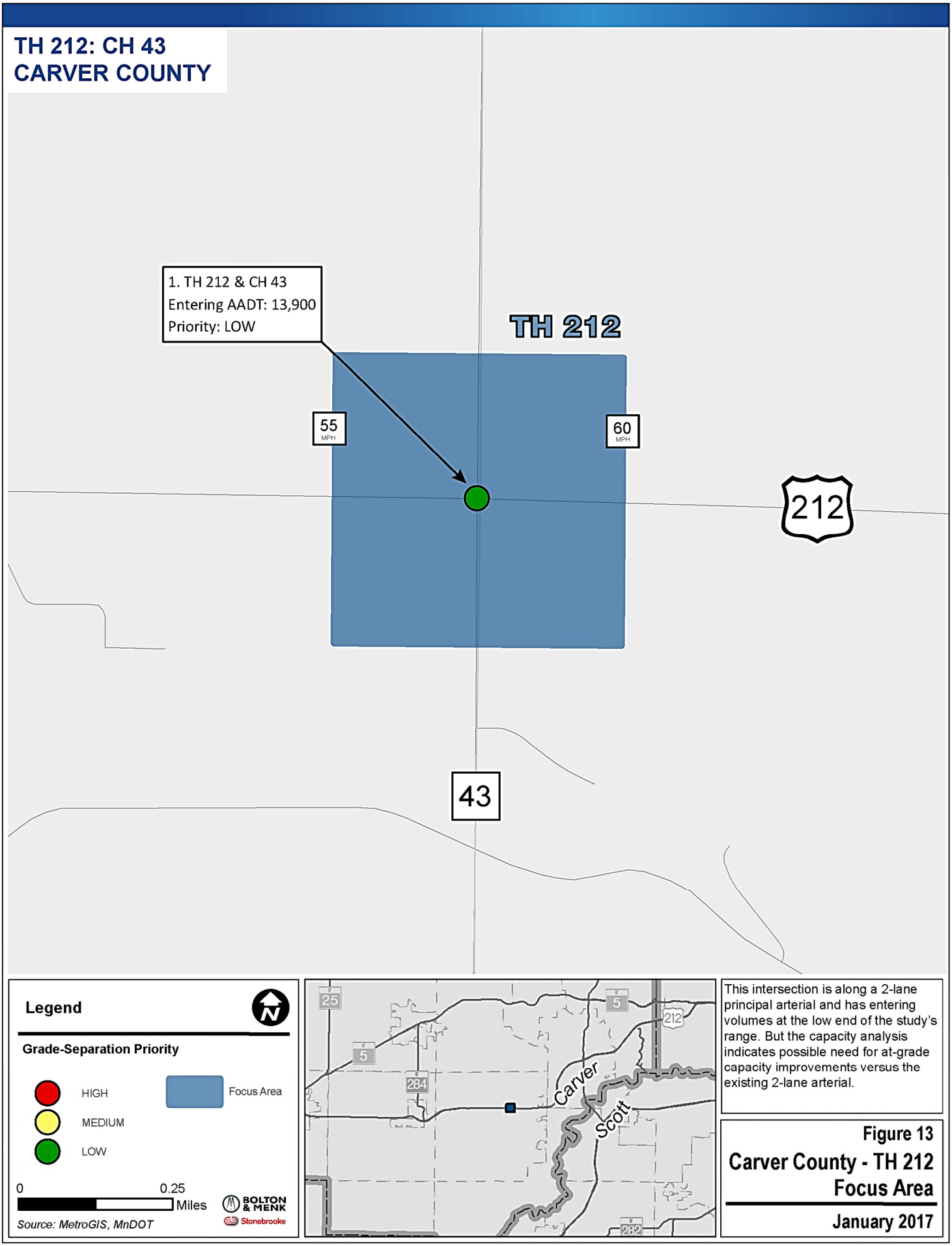
Intersection Score and Grade-Separation Priority



Capacity Analysis, Needs, and Opportunities. This intersection has entering volumes near the low of the study's range. But the location is within two miles of an existing interchange and the capacity analysis indicates possible need for at-grade capacity improvements versus the existing 2-lane arterial. Access management should also be considered.

Capacity Analysis Summary

		Existing Intersection	Expanded Intersection	Alternative At-Grade Intersection	Add PA Capacity	Hybrid Interchange	Full Interchange
TH 212							
1	CH 43	☒	☐	☐	☐	☐	☐
Key		☒ V/C ≥ 1.0		▨ V/C > 0.85 & < 1.0		☐ V/C ≤ 0.85	



This intersection is along a 2-lane principal arterial and has entering volumes at the low end of the study's range. But the capacity analysis indicates possible need for at-grade capacity improvements versus the existing 2-lane arterial.

Figure 13
Carver County - TH 212 Focus Area
January 2017

4.3.3 Dakota County

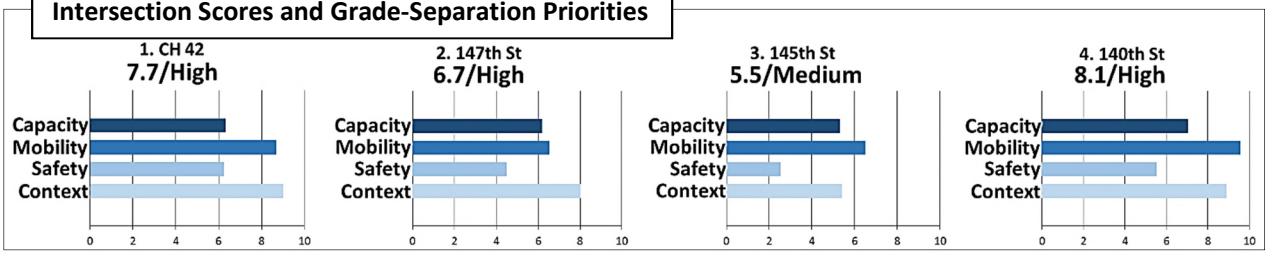
CH 23 (Cedar Ave.): CH 42 to 140th St. (Dakota County 1 of 6)

Corridor Context. Suburban Arterial with four at-grade intersections evaluated in the study (see Figure 14). This corridor generally has six through lanes of mainline capacity, a median, and is an existing BRT corridor. The posted speed limit is 40-50 mph and the corridor is constrained by development. Other characteristics include:

- Intersection Spacing – The four intersections are spaced approximately 0.2 to 0.5 miles apart, and are located about a quarter mile south of the transition to TH 77 (a freeway).
- Access – Roadway access includes public street intersections that allow for right-in/right-out turns as well as multiple private access roadways.
- Previous Planning for Interchanges? Yes. Grade separations have been proposed for CH 42, 147th Street and 140th Street.

Intersection measures:
Capacity: Do peak-hour volumes exceed design?
Mobility: Are daily volumes and congestion high?
Safety: Are there many or severe crashes?
Context: Are plans and multi-modal factors supportive?

Intersection Scores and Grade-Separation Priorities

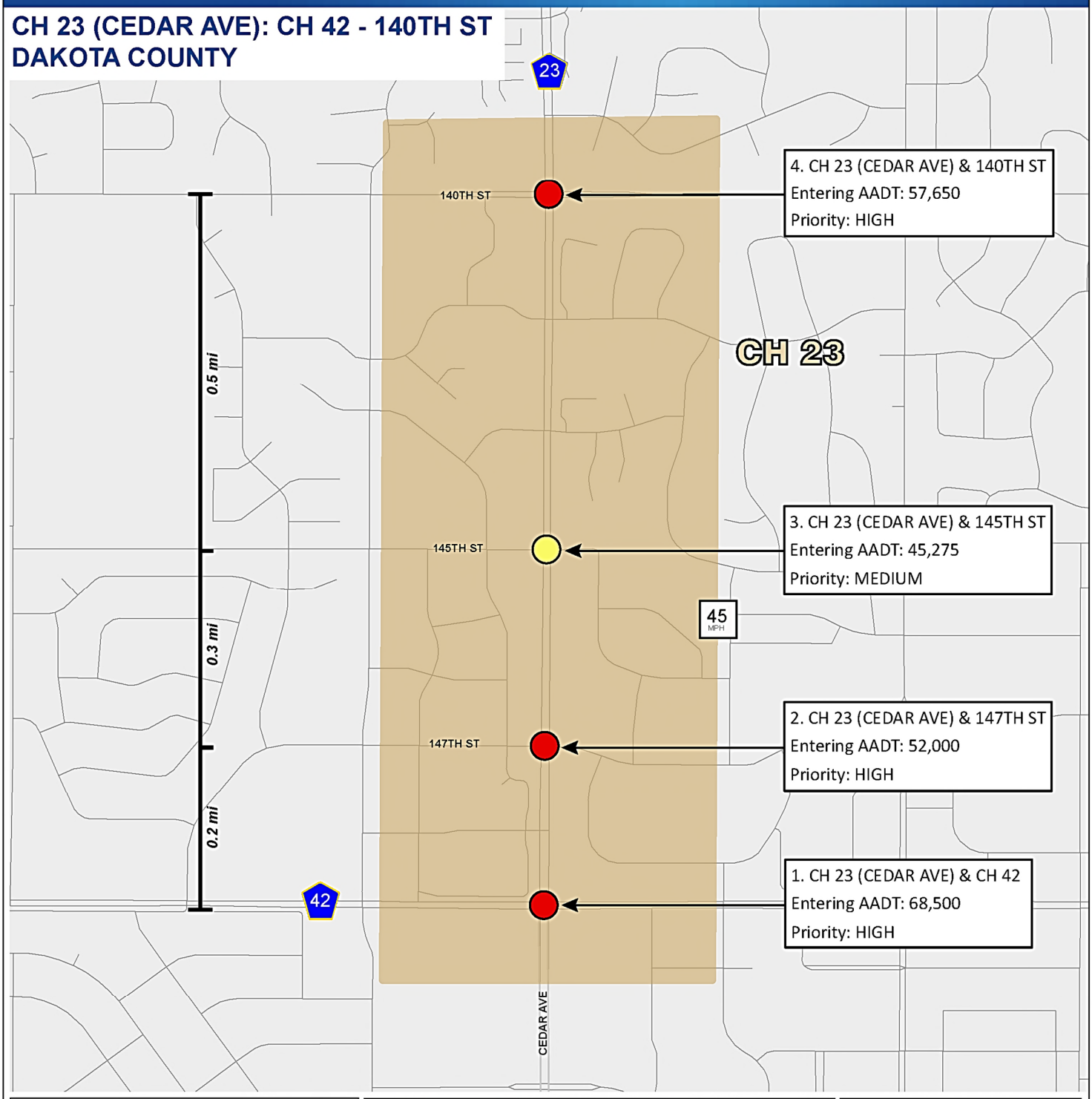


Capacity Analysis, Needs, and Opportunities. This corridor includes intersections with entering volumes near the high end of the study's range. The capacity analysis indicates possible need for high-capacity at-grade improvements or grade separations. Contextually, CH 23 has received major at-grade investments and improvements in the last few years and access management, grades, and adjacent development will continue to constrain design concepts that include grade separations.

Capacity Analysis Summary

		Existing Intersection	Expanded Intersection	Alternative At-Grade Intersection	Add PA Capacity	Hybrid Interchange	Full Interchange
CH 23							
1	CH 42	▨	▨	▩	▨	☐	☐
2	147th St.	▨	▨	▨	▨	☐	☐
3	145th St.	☐	☐	☐	☐	☐	☐
4	140th St.	▨	☐	▩	☐	▨	☐
Key		▩ V/C ≥ 1.0		▨ V/C > 0.85 & < 1.0		☐ V/C ≤ 0.85	

CH 23 (CEDAR AVE): CH 42 - 140TH ST
DAKOTA COUNTY



Legend

Grade-Separation Priority

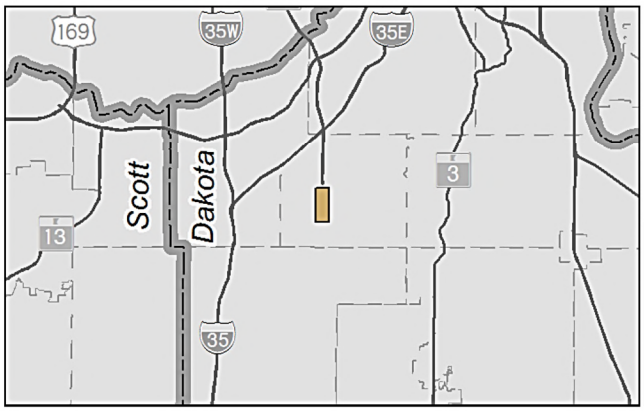
- HIGH
- MEDIUM
- LOW
- Intersection Spacing
- Focus Area

0 0.25 Miles

Source: MetroGIS, MnDOT

BOLTON & MENK

Stonebrooke



This corridor includes intersections with entering volumes near the high end of the study's range. The capacity analysis indicates possible need for high-capacity at-grade improvements or grade separations.

Figure 14
Dakota County - CH 23 Focus Area
January 2017

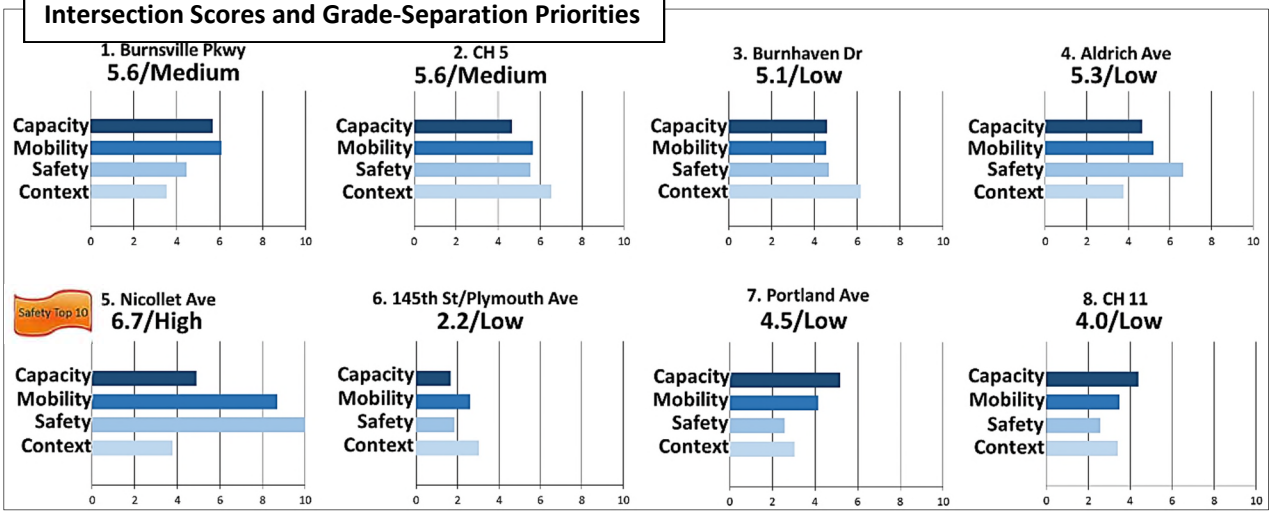
CH 42-B: Burnsville Parkway to CH 11 (Dakota County 2 of 6)

Corridor Context. Suburban Arterial with eight at-grade intersections evaluated in the study, and four ramp intersections (see Figure 15). This corridor generally has four through lanes of mainline capacity and a median. The posted speed limit is 40-55 mph. The corridor is constrained by development, but often includes wide setbacks and frontage roads. Other characteristics include:

- Intersection Spacing – The eight intersections are spaced approximately 0.1 to 1.0 mile(s) apart, and are located about two miles west of CH 23. I-35W and I-35E both cross through the corridor and are only 0.1 miles from the Nicollet Avenue intersection.
- Access – Roadway access is limited to right-in/right-out access, public street intersections and private businesses.
- Previous Planning for Interchanges? Yes. A grade separation has been proposed for all study intersections from CH 5 to Nicollet Avenue in previous planning documents.

Intersection measures:
Capacity: Do peak-hour volumes exceed design?
Mobility: Are daily volumes and congestion high?
Safety: Are there many or severe crashes?
Context: Are plans and multi-modal factors supportive?

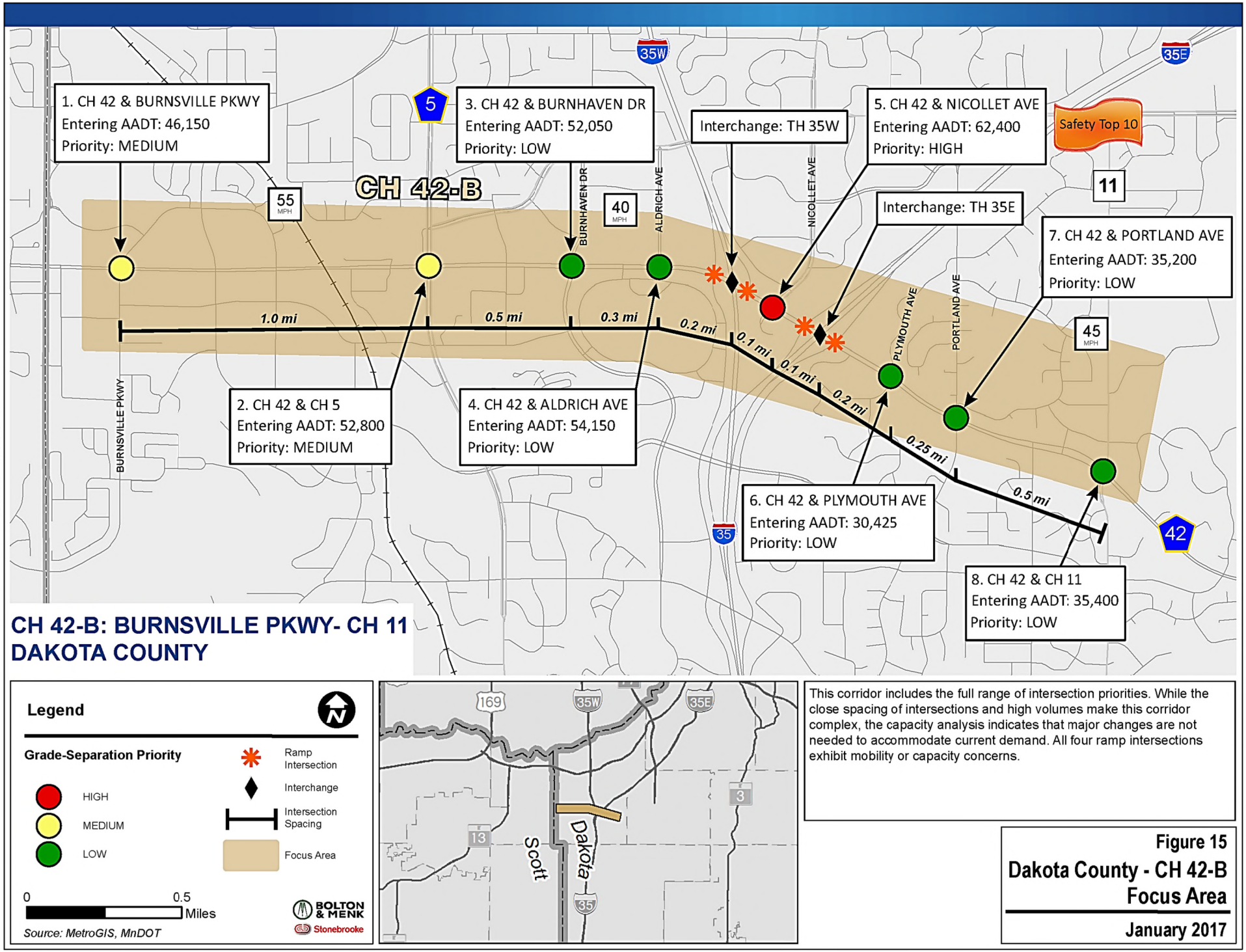
Intersection Scores and Grade-Separation Priorities



Capacity Analysis, Needs, and Opportunities. This corridor includes the full range of intersection priorities. While the close spacing of intersections and high volumes make the corridor complex, the capacity analysis indicates that major changes are not needed to accommodate current demand. All four ramp intersections exhibit mobility or capacity concerns.

Capacity Analysis Summary

		Existing Intersection	Expanded Intersection	Alternative At-Grade Intersection	Add PA Capacity	Hybrid Interchange	Full Interchange
CH 42-B							
1	Burnsville Pkwy.	☐	☐	☐	☐	☐	☐
2	CH 5	☐	☐	☐	☐	☐	☐
3	Burnhaven Dr.	☐	☐	▨	☐	☐	☐
4	Aldrich Ave.	☐	☐	▨	☐	☐	☐
5	Nicollet Ave.	☐	☐	☐	☐	☐	☐
6	Plymouth Ave.	☐	☐	☐	☐	☐	☐
7	Portland Ave.	☐	☐	☐	☐	☐	☐
8	CH 11	☐	☐	☐	☐	☐	☐
Key		▩ V/C ≥ 1.0		▨ V/C > 0.85 & < 1.0		☐ V/C ≤ 0.85	



This corridor includes the full range of intersection priorities. While the close spacing of intersections and high volumes make this corridor complex, the capacity analysis indicates that major changes are not needed to accommodate current demand. All four ramp intersections exhibit mobility or capacity concerns.

Figure 15
Dakota County - CH 42-B Focus Area
January 2017

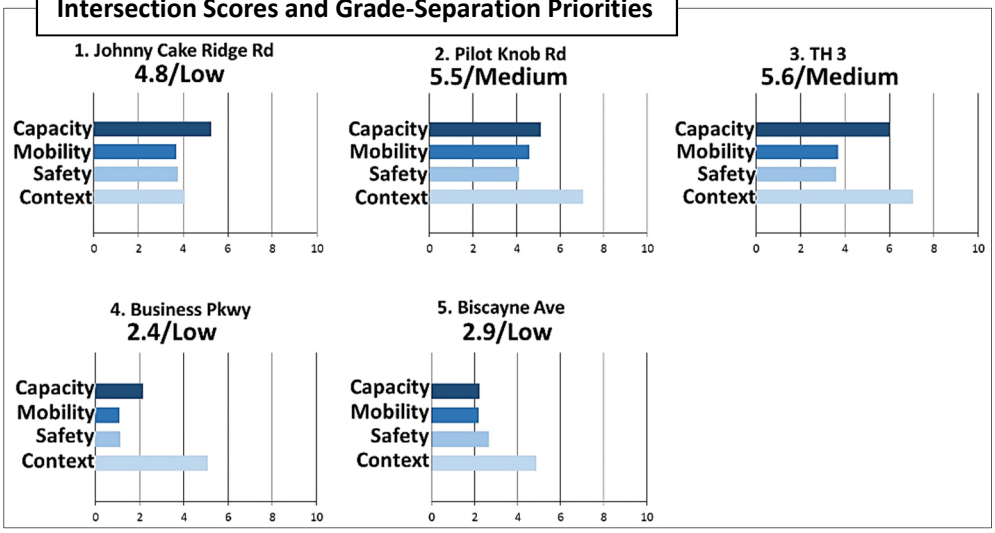
CH 42-C: Johnny Cake Ridge Road to Biscayne Avenue (Dakota County 3 of 6)

Corridor Context. Constrained Limited-Access Expressway and suburban arterial with five intersections evaluated in the study (see Figure 16). This corridor generally has four through lanes of mainline capacity and a median. The posted speed limit is 50-55 mph. The corridor is constrained by development, includes the railroad crossing as shown, but also includes some areas of open land. Other characteristics include:

- Intersection Spacing – The five intersections are spaced approximately 0.3 to 2.4 miles apart.
- Access – Roadway access is limited to intersections with right-in/right-out turns, left-hand turn-restricted intersections, and private access roadways.
- Previous Planning for Interchanges? Yes. Grade separations have been identified for the Pilot Knob Road and TH 3 intersections (Source: Dakota County).

Intersection measures:
Capacity: Do peak-hour volumes exceed design?
Mobility: Are daily volumes and congestion high?
Safety: Are there many or severe crashes?
Context: Are plans and multi-modal factors supportive?

Intersection Scores and Grade-Separation Priorities

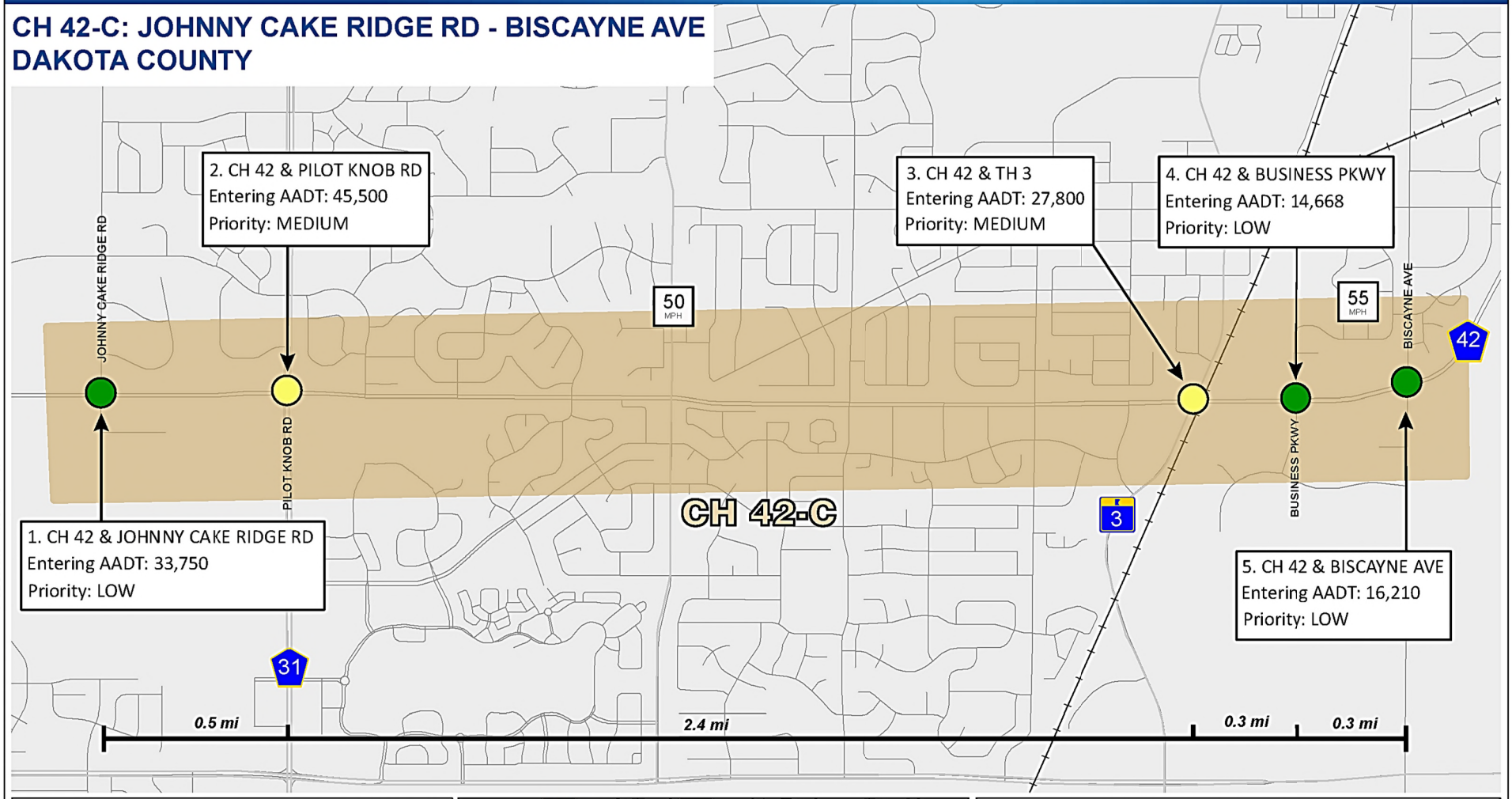


Capacity Analysis, Needs, and Opportunities. This corridor includes intersections with entering volumes ranging from the middle to the low end of the study's range. The capacity analysis indicates that major changes are not needed to accommodate current demand.

Capacity Analysis Summary

		Existing Intersection	Expanded Intersection	Alternative At-Grade Intersection	Add PA Capacity	Hybrid Interchange	Full Interchange
CH 42-C							
1	Johnny Cake Rdg. Rd.	☐	☐	☐	☐	☐	☐
2	Pilot Knob Rd.	☐	☐	▨	☐	☐	☐
3	TH 3	☐	☐	☐	☐	☐	☐
4	Business Pkwy.	☐	☐	☐	☐	☐	☐
5	Biscayne Ave.	☐	☐	☐	☐	☐	☐
Key		▩ V/C ≥ 1.0		▨ V/C > 0.85 & < 1.0		☐ V/C ≤ 0.85	

CH 42-C: JOHNNY CAKE RIDGE RD - BISCAYNE AVE
DAKOTA COUNTY



Legend

Grade-Separation Priority

- HIGH
- MEDIUM
- LOW
- Intersection Spacing
- Focus Area

0 0.5 Miles

Source: MetroGIS, MnDOT

BOLTON & MENK
Stonebrooke

This corridor includes intersections with entering volumes ranging from the middle to the low end of the study's range. The capacity analysis indicates that major changes are not needed to accommodate current demand.

Figure 16
Dakota County - CH 42-C Focus Area
January 2017

Metropolitan Council
Intersection Conversion Study
Principal Arterial
Department of Transportation

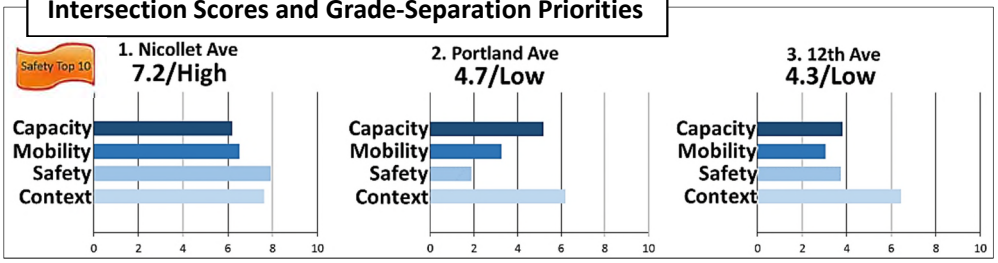
TH 13-B: Nicollet Avenue to 12th Avenue (Dakota County 4 of 6)

Corridor Context. Suburban Arterial with three at-grade intersections evaluated in the study (see Figure 17). This corridor generally has four through lanes of mainline capacity and median. The posted speed limit is 50-55 mph. The corridor is constrained by development, but includes wide setbacks and frontage roads. Other characteristics include:

- Intersection Spacing – The three intersections are spaced approximately 0.5 and 0.6 miles apart, and are located about a half-mile east of the I-35W interchange.
- Access – Roadway access is very limited between the three intersections with only local access to businesses.
- Previous Planning for Interchanges? No. Grade separations have not been proposed for this area in previous planning documents.

Intersection measures:
Capacity: Do peak-hour volumes exceed design?
Mobility: Are daily volumes and congestion high?
Safety: Are there many or severe crashes?
Context: Are plans and multi-modal factors supportive?

Intersection Scores and Grade-Separation Priorities

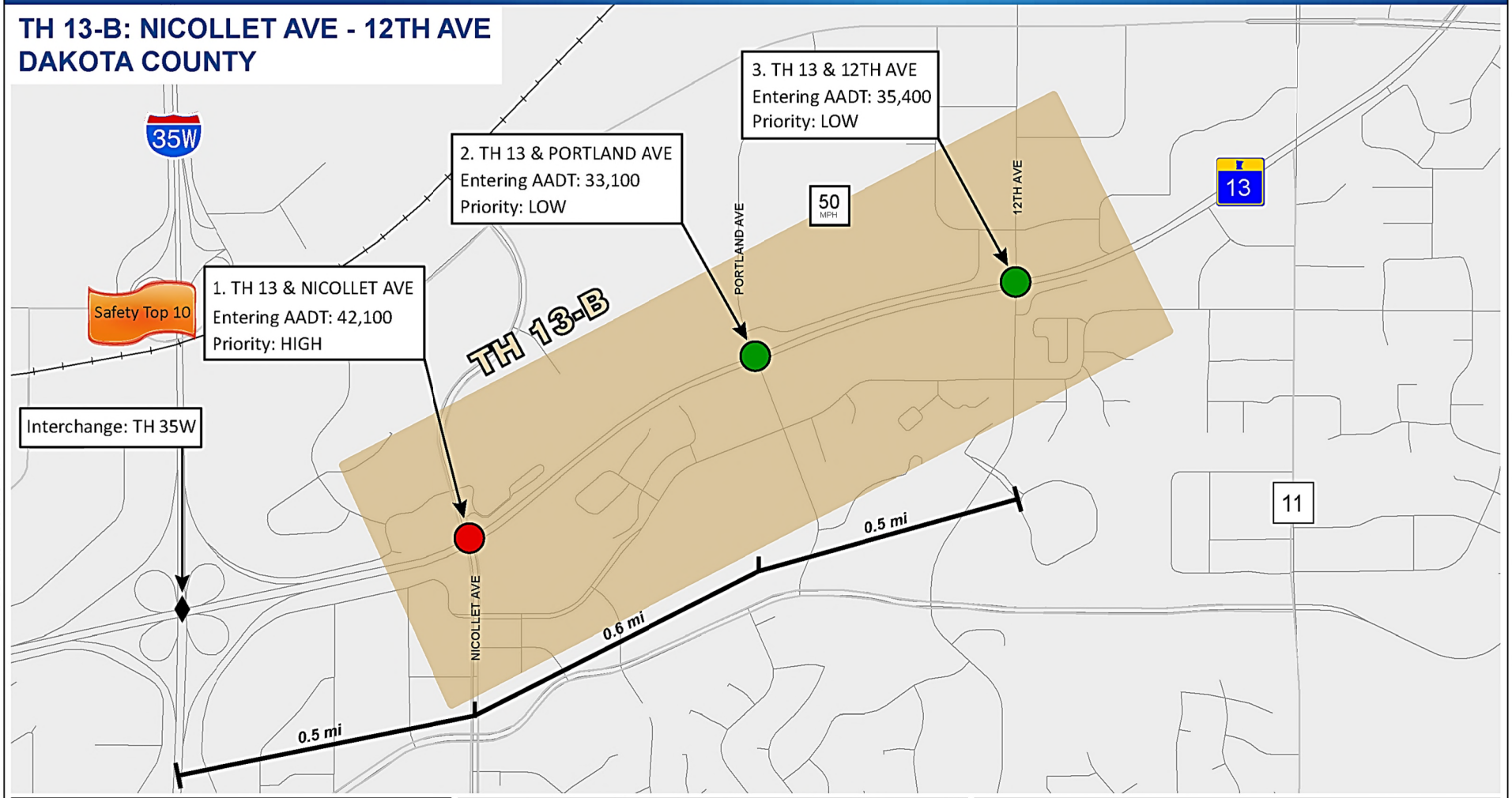


Capacity Analysis, Needs, and Opportunities. This corridor includes two intersections with relatively low entering volumes and one intersection ranked as high-priority. While Nicollet Avenue is high-priority, the capacity analysis indicates that major changes are not needed to accommodate current demand.

Capacity Analysis Summary

		Existing Intersection	Expanded Intersection	Alternative At-Grade Intersection	Add PA Capacity	Hybrid Interchange	Full Interchange
TH 13-B							
1	Nicollet Ave.	☐	☐	▨	☐	☐	☐
2	Portland Ave.	☐	☐	☐	☐	☐	☐
3	12th Ave.	☐	☐	☐	☐	☐	☐
Key		▩ V/C ≥ 1.0		▨ V/C > 0.85 & < 1.0		☐ V/C ≤ 0.85	

TH 13-B: NICOLLET AVE - 12TH AVE
DAKOTA COUNTY



Legend

Grade-Separation Priority

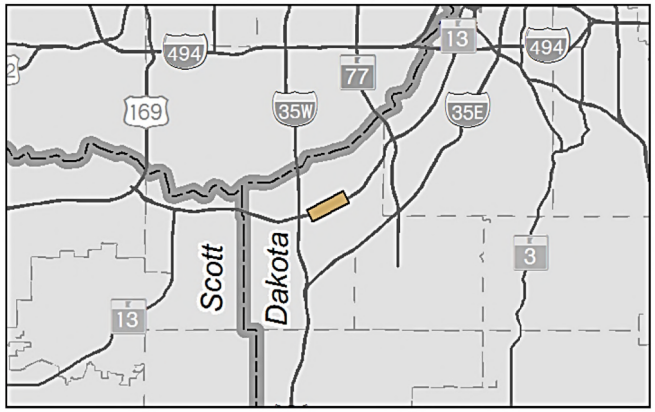
- HIGH
- MEDIUM
- LOW
- Interchange
- Intersection Spacing
- Focus Area

0 0.5 Miles

Source: MetroGIS, MnDOT

BOLTON & MENK

Stonebrooke



This corridor includes two intersections with relatively low entering volumes and one intersection ranked as high-priority. While Nicollet Avenue is high-priority, the capacity analysis indicates that major changes are not needed to accommodate current demand.

Figure 17
Dakota County - TH 13-B Focus Area
January 2017

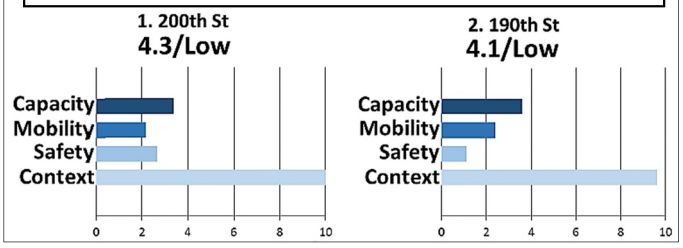
TH 52: 200th Street to 190th Street (Dakota County 5 of 6)

Corridor Context. Unconstrained Limited-Access Expressway with two at-grade intersections evaluated in the study (see Figure 18). This corridor generally has four through lanes of mainline capacity and a median. The posted speed limit is 65 mph and the corridor is unconstrained by development. Other characteristics include:

- Intersection Spacing – The two intersections are spaced approximately one mile apart and there are no nearby expressways.
- Access – Roadway access is limited between the two intersections to two residential access points.
- Previous Planning for Interchanges? No. Grade separations have not been proposed for this area in previous planning documents.

Intersection measures:
Capacity: Do peak-hour volumes exceed design?
Mobility: Are daily volumes and congestion high?
Safety: Are there many or severe crashes?
Context: Are plans and multi-modal factors supportive?

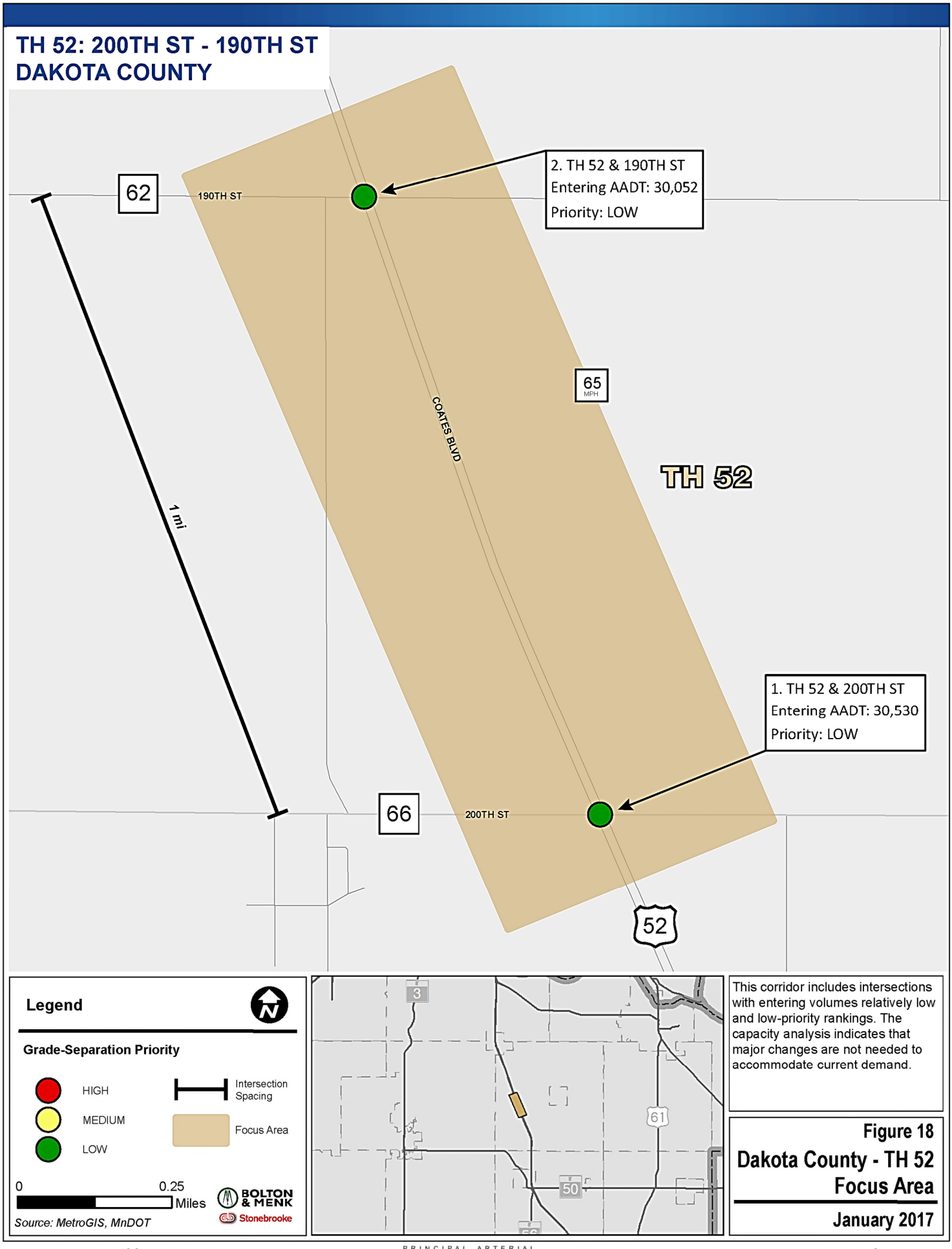
Intersection Scores and Grade-Separation Priorities



Capacity Analysis, Needs, and Opportunities. This corridor includes intersections with relatively low entering volumes and low-priority rankings. The capacity analysis indicates that major changes are not needed to accommodate current demand. However, this is a high-speed rural expressway location with potential for growing demand and need for access management.

Capacity Analysis Summary

		Existing Intersection	Expanded Intersection	Alternative At-Grade Intersection	Add PA Capacity	Hybrid Interchange	Full Interchange
TH 52							
1	200th St.	☐	☐	☐	☐	☐	☐
2	190th St.	☐	☐	☐	☐	☐	☐
Key		☒ V/C ≥ 1.0		▨ V/C > 0.85 & < 1.0		☐ V/C ≤ 0.85	


TH 52: 200TH ST - 190TH ST
DAKOTA COUNTY
62
190TH ST
2. TH 52 & 190TH ST
Entering AADT: 30,052
Priority: LOW
65
MPH
COATES BLVD
TH 52
1 mi
1. TH 52 & 200TH ST
Entering AADT: 30,530
Priority: LOW
66
200TH ST
52
Legend
Grade-Separation Priority
HIGH
MEDIUM
LOW
Intersection Spacing
Focus Area
0
0.25
Miles
BOLTON & MENK
Stonebrooke
Source: MetroGIS, MnDOT
3
61
50
This corridor includes intersections with entering volumes relatively low and low-priority rankings. The capacity analysis indicates that major changes are not needed to accommodate current demand.
Figure 18
Dakota County - TH 52 Focus Area
January 2017

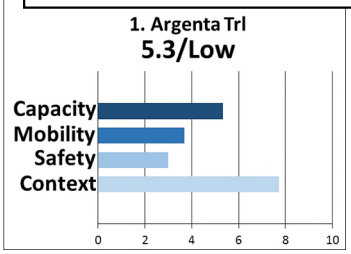
TH 55-C: Intersection at Argenta Trail (Dakota County 6 of 6)

Corridor Context. Constrained Limited-Access Expressway with one intersection evaluated in the study (see Figure 19). The corridor at this low-priority intersection has four through lanes of mainline capacity and a median. The posted speed limit is 65 mph and the corridor is constrained by development. Other characteristics include:

- Intersection Spacing – This intersection is located approximately 2.5 miles southeast of the I-35E and I-494 interchange and about 0.8 miles west of the South Robert Trail interchange.
- Access – Roadway access is limited to major intersections along this part of TH 55, which allow right-in/right-out access.
- Previous Planning for Interchanges? Yes. A grade separation has been proposed for this intersection in previous planning documents.

Intersection measures:
Capacity: Do peak-hour volumes exceed design?
Mobility: Are daily volumes and congestion high?
Safety: Are there many or severe crashes?
Context: Are plans and multi-modal factors supportive?

Intersection Score and Grade-Separation Priority

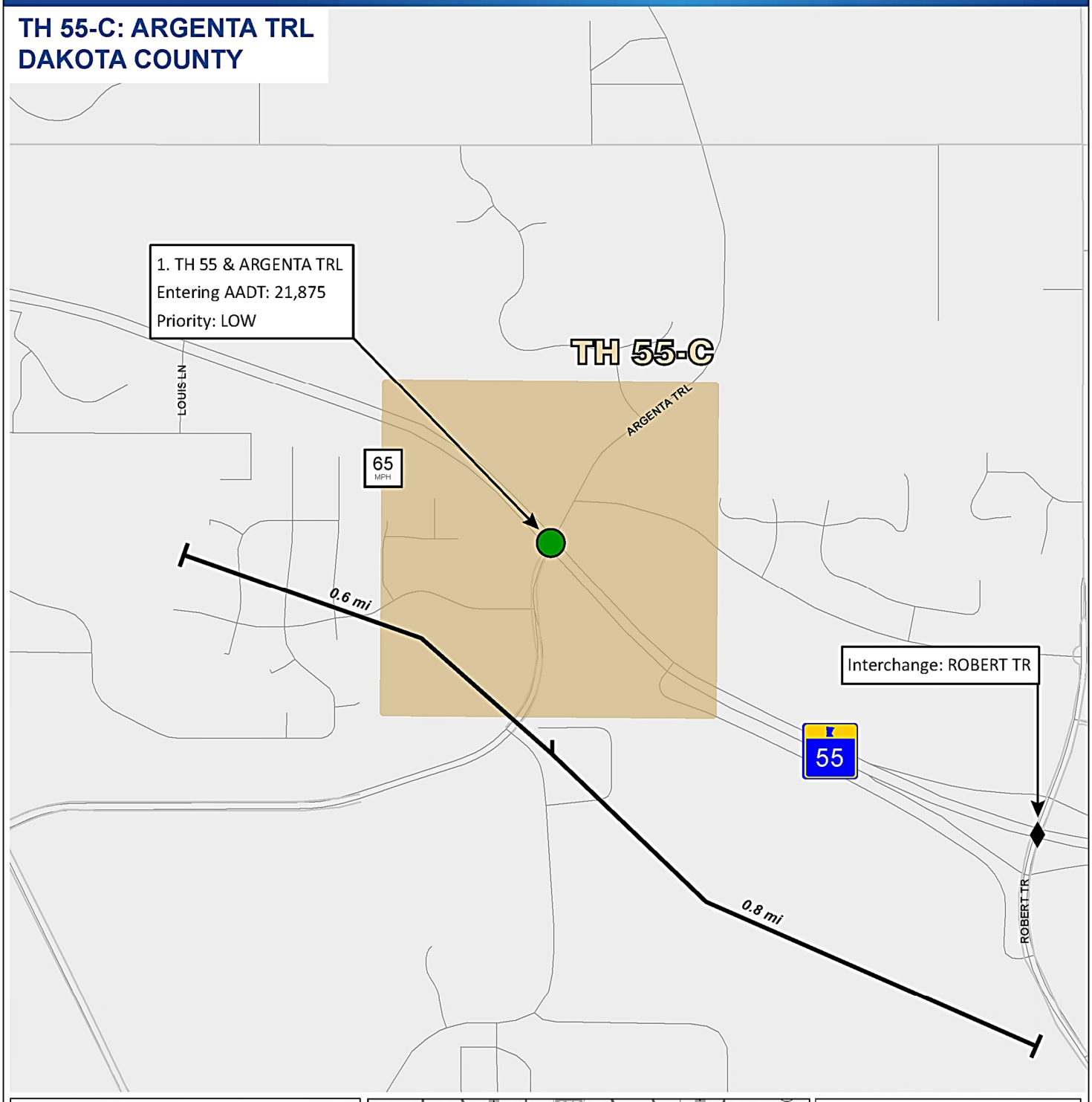


Capacity Analysis, Needs, and Opportunities. This intersection has entering volumes near the low end of the study's range, and scored on the low end of the intersection priority ranking. The capacity analysis indicates that major changes are not needed to accommodate current demand.

Capacity Analysis Summary

		Existing Intersection	Expanded Intersection	Alternative At-Grade Intersection	Add PA Capacity	Hybrid Interchange	Full Interchange
TH 55-C							
1	Argenta Trl.	☐	☐	☐	☐	☐	☐
	Key	▩ V/C ≥ 1.0		▨ V/C > 0.85 & < 1.0		☐ V/C ≤ 0.85	

TH 55-C: ARGENTA TRL
DAKOTA COUNTY



Legend

Grade-Separation Priority

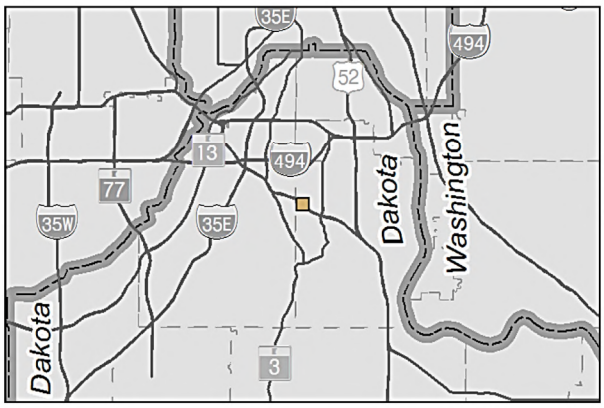
- HIGH
- MEDIUM
- LOW
- Interchange
- Intersection Spacing
- Focus Area

0 0.25 Miles

Source: MetroGIS, MnDOT

BOLTON & MENK

Stonebrooke



This intersection has entering volumes near the low end of the study's range and scored a low-priority ranking. The capacity analysis indicates that major changes are not needed to accommodate current demand.

Figure 19
Dakota County - TH 55-C Focus Area
January 2017

4.3.4 Hennepin County

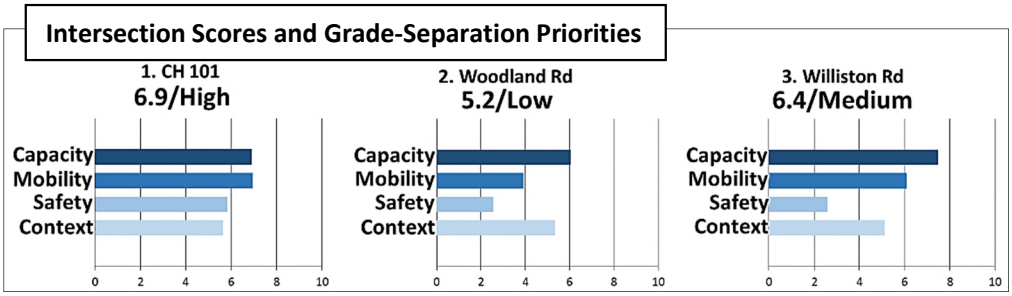
TH 7-A: CH 101 to Williston Road (Hennepin County 1 of 6)

Corridor Context. Suburban Arterial with three at-grade intersections evaluated in the study (see Figure 20). This corridor generally has four through lanes of mainline capacity and a median. The posted speed limit is 50 mph and the corridor is constrained by development. Other characteristics include:

- Intersection Spacing – The two intersections are spaced approximately 0.75 and 1.1 miles apart and located about 0.75 miles west of the I-494 interchange.
- Access – Roadway access is limited to right-in/right-out access and private businesses.
- Previous Planning for Interchanges? Yes. Grade separation has been proposed for CH 101 and Williston Road in previous planning documents.

Intersection measures:
Capacity: Do peak-hour volumes exceed design?
Mobility: Are daily volumes and congestion high?
Safety: Are there many or severe crashes?
Context: Are plans and multi-modal factors supportive?

Intersection Scores and Grade-Separation Priorities

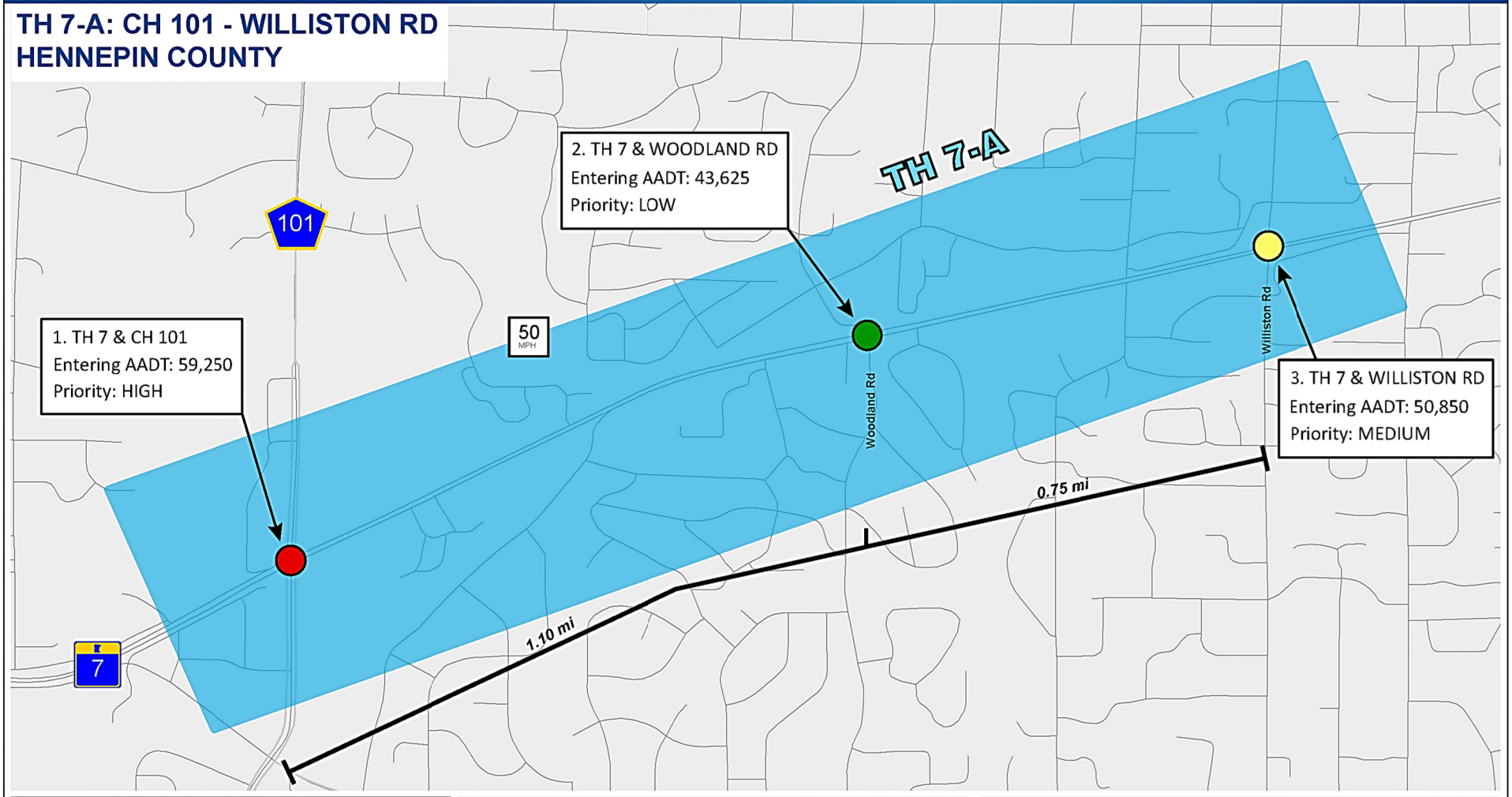


Capacity Analysis, Needs, and Opportunities. This corridor includes the full range of intersection priorities. The capacity analysis indicates possible need for high-capacity at-grade improvements or grade separations at the CH 101 and Williston Road intersections.

Capacity Analysis Summary

		Existing Intersection	Expanded Intersection	Alternative At-Grade Intersection	Add PA Capacity	Hybrid Interchange	Full Interchange
TH 7-A							
1	CH 101	▨	▨	▨	☐	▨	☐
2	Woodland Rd.	☐	☐	☐	☐	☐	☐
3	Williston Rd.	▩	▩	▩	☐	▨	☐
Key		▩ V/C ≥ 1.0		▨ V/C > 0.85 & < 1.0		☐ V/C ≤ 0.85	

TH 7-A: CH 101 - WILLISTON RD
HENNEPIN COUNTY



Legend

Grade-Separation Priority

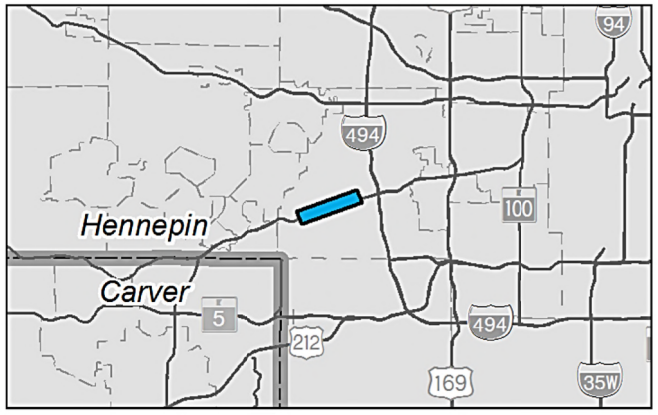
- HIGH
- MEDIUM
- LOW
- Intersection Spacing
- Focus Area

0 0.5 Miles

Source: MetroGIS, MnDOT

BOLTON & MENK

Stonebrooke



This corridor includes the full range of intersection priorities. The capacity analysis indicates possible need for high-capacity at-grade improvements or grade separations at the CH 101 and Williston Road intersections.

Figure 20
Hennepin County - TH 7-A Focus Area
January 2017

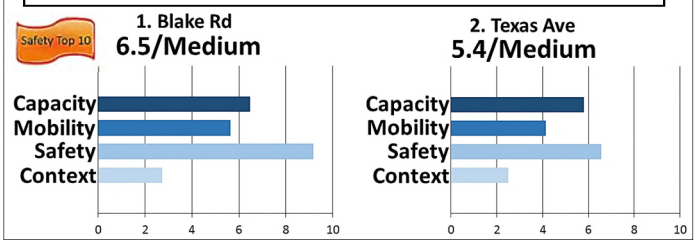
TH 7-B: Blake Road to Texas Avenue (Hennepin County 2 of 6)

Corridor Context. Suburban Arterial with two at-grade intersections evaluated in the study (see Figure 21). This corridor generally has four through lanes of mainline capacity and a median. The posted speed limit is 55 mph and the corridor is constrained by development. Other characteristics include:

- Intersection Spacing – The two intersections are spaced approximately 0.25 miles apart and located about 0.5 miles east of the TH 169 interchange.
- Access – There are no major access points to TH 7 between the two intersections with the exception of a right-in access off the westbound lane to a shopping center.
- Previous Planning for Interchanges? No. Grade separations have not been proposed for this area in previous planning documents.

Intersection measures:
Capacity: Do peak-hour volumes exceed design?
Mobility: Are daily volumes and congestion high?
Safety: Are there many or severe crashes?
Context: Are plans and multi-modal factors supportive?

Intersection Scores and Grade-Separation Priorities

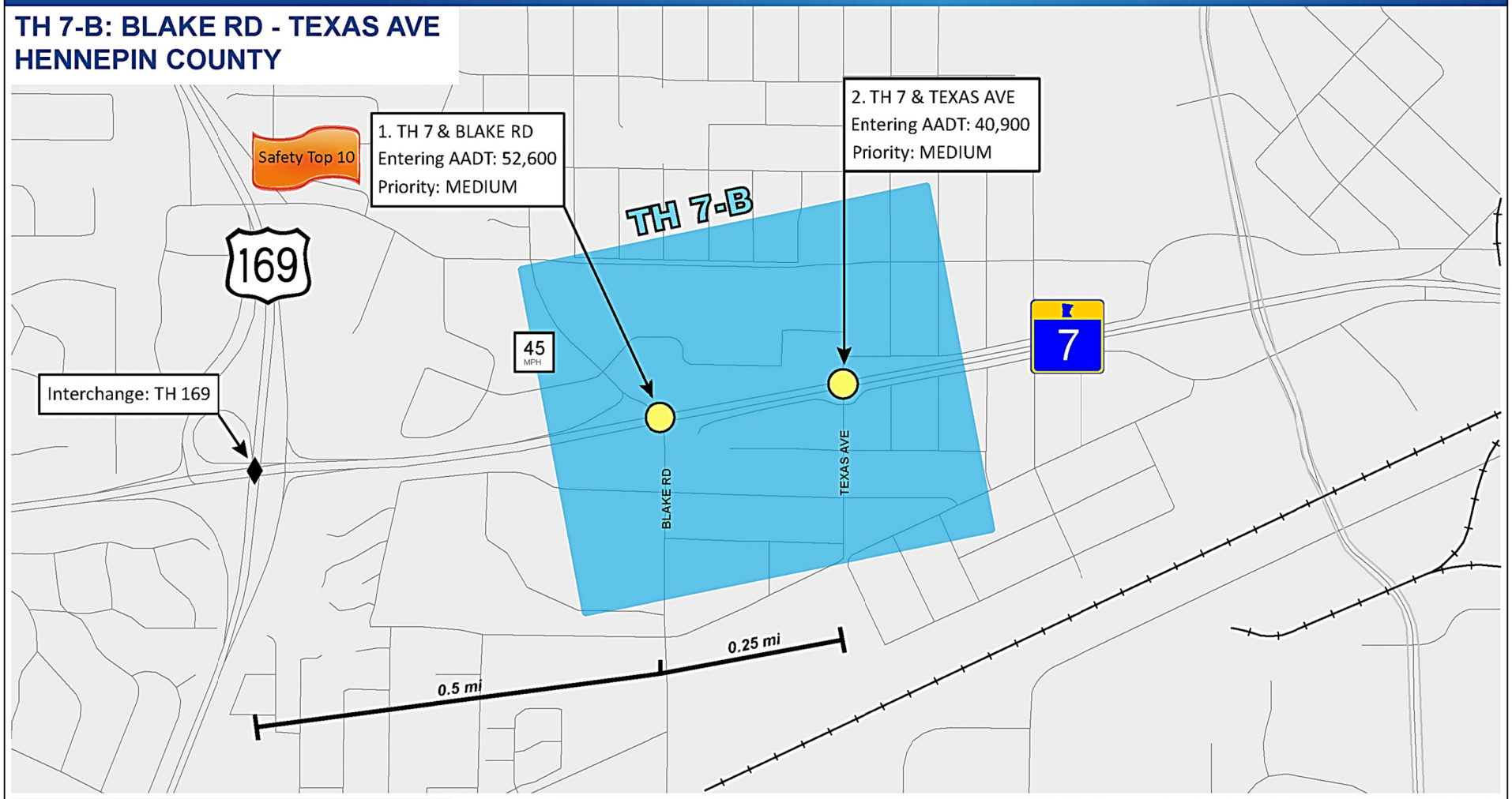


Capacity Analysis, Needs, and Opportunities. This corridor includes intersections with entering volumes near the middle of the study's range. With Blake Road scoring a medium priority ranking, the capacity analysis indicates possible need for high-capacity at-grade improvements for the intersection.

Capacity Analysis Summary

		Existing Intersection	Expanded Intersection	Alternative At-Grade Intersection	Add PA Capacity	Hybrid Interchange	Full Interchange
TH 7-B							
1	Blake Rd.	▨	▨	☐	☐	☐	☐
2	Texas Ave.	☐	☐	▨	☐	☐	☐
Key		▩ V/C ≥ 1.0		▨ V/C > 0.85 & < 1.0		☐ V/C ≤ 0.85	

TH 7-B: BLAKE RD - TEXAS AVE
HENNEPIN COUNTY



Legend

Grade-Separation Priority

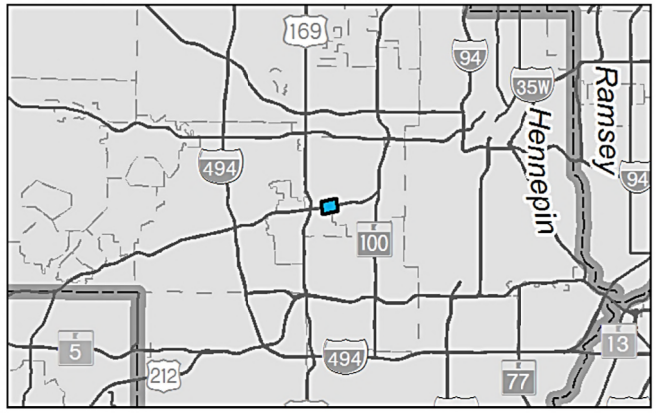
- HIGH
- MEDIUM
- LOW

- Interchange
- Intersection Spacing
- Focus Area

BOLTON & MENK
Stonebrooke

0 0.5 Miles

Source: MetroGIS, MnDOT



This corridor includes intersections with entering volumes near the middle of the study's range. Blake Road scored a medium priority ranking. The capacity analysis indicates possible need for high-capacity at-grade improvements for the Blake Road intersection.

Figure 21
Hennepin County - TH 7-B Focus Area
January 2017

METROPOLITAN COUNCIL
PRINCIPAL ARTERIAL INTERSECTION CONVERSION STUDY
DEPARTMENT OF TRANSPORTATION

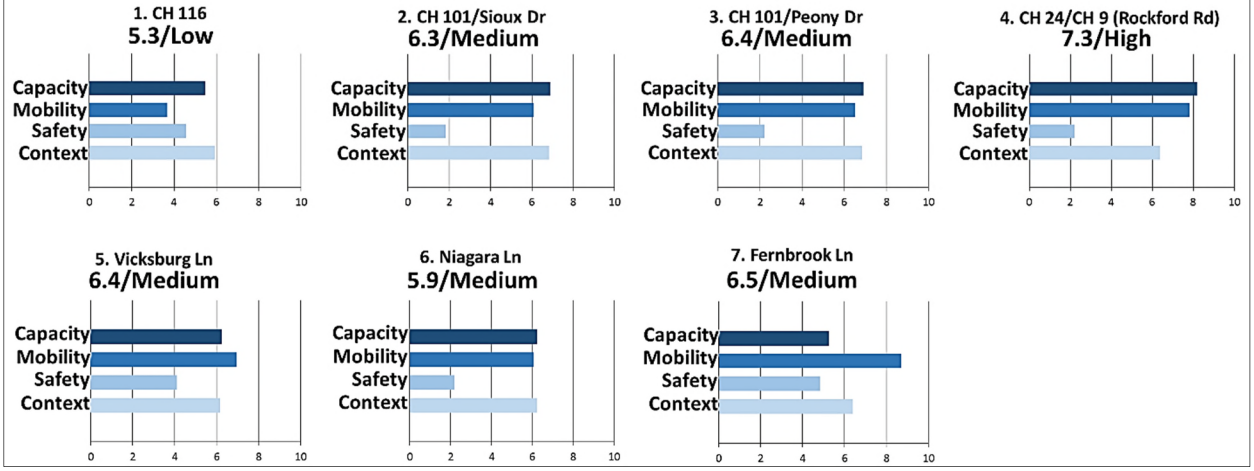
TH 55-A: CH 116 to Fernbrook Lane (Hennepin County 3 of 6)

Corridor Context. Constrained Limited-Access Expressway with seven at-grade intersections evaluated in the study (see Figure 22). This corridor generally has four through lanes of mainline capacity and a median. The posted speed limit is 55 mph. The corridor is constrained by development and a railroad that runs along a short segment of the corridor's western end. Other characteristics include:

- Intersection Spacing – The seven intersections are spaced approximately 0.6 to 1.2 miles apart and are located approximately 0.2 miles west of the TH 494 interchange.
- Access – Roadway access is limited to right-in/right-out access for public street intersections and private businesses.
- Previous Planning for Interchanges? Yes. Grade separation has been proposed for all intersections along this corridor in previous planning documents.

Intersection measures:
Capacity: Do peak-hour volumes exceed design?
Mobility: Are daily volumes and congestion high?
Safety: Are there many or severe crashes?
Context: Are plans and multi-modal factors supportive?

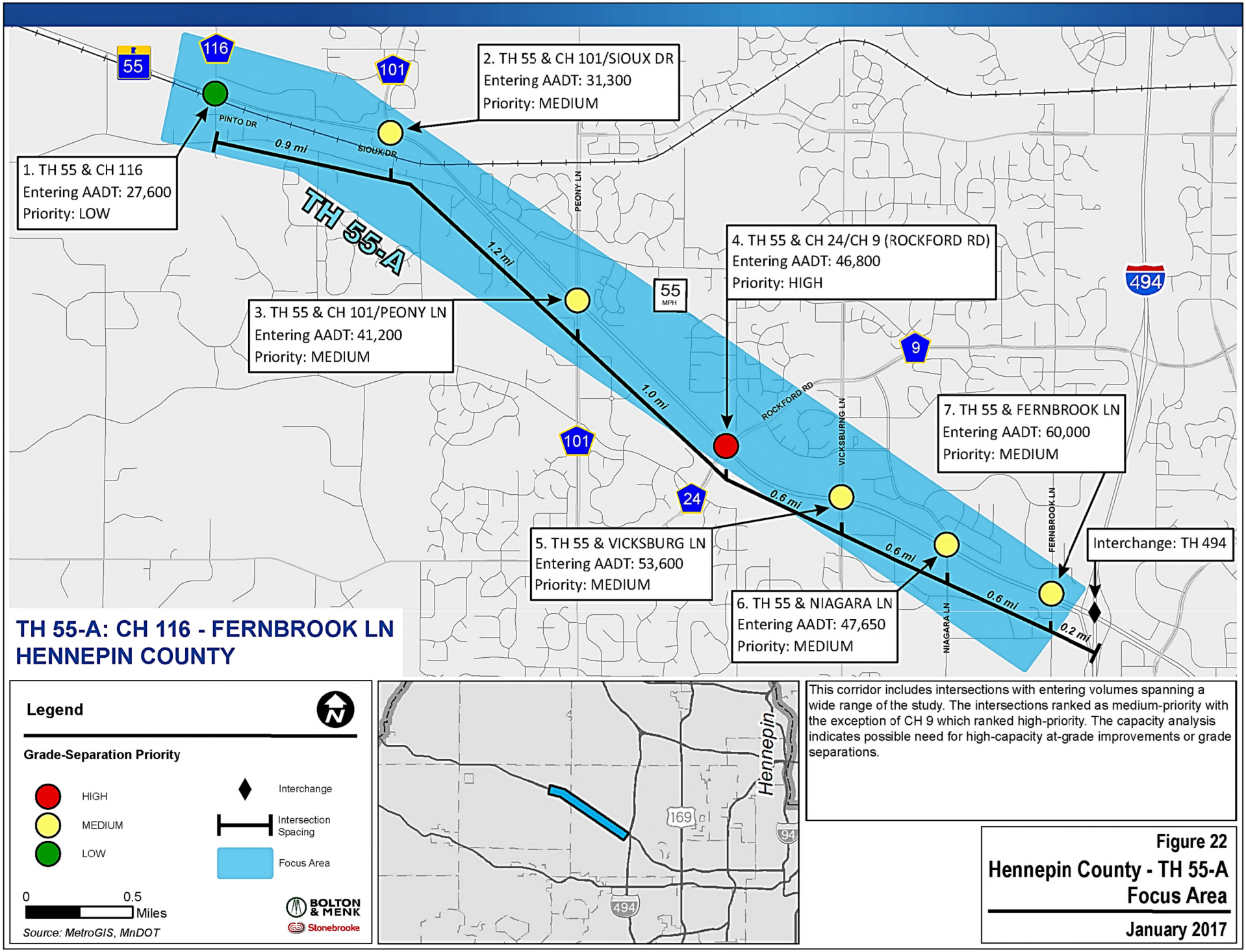
Intersection Scores and Grade-Separation Priorities



Capacity Analysis, Needs, and Opportunities. This corridor includes intersections with entering volumes spanning a wide range of the study. The intersections ranked as medium-priority with the exception of CH 9 which ranked high-priority. The capacity analysis indicates possible need for high-capacity at-grade improvements or grade separations.

Capacity Analysis Summary

		Existing Intersection	Expanded Intersection	Alternative At-Grade Intersection	Add PA Capacity	Hybrid Interchange	Full Interchange
TH 55-A							
1	CH 116	▨	☐	▨	☐	☐	☐
2	CH 101/Sioux Dr.	▨	▨	▩	☐	☐	☐
3	CH 101/Peony Ln.	▨	▨	▨	☐	☐	☐
4	CH 24/CH 9 (Rockford Rd)	▩	▩	▩	☐	▨	☐
5	Vicksburg Ln.	▨	▨	▩	☐	☐	☐
6	Niagara Ln.	▨	▨	▨	☐	☐	☐
7	Fernbrook Ln.	☐	☐	☐	☐	☐	☐
	Key	▩ V/C ≥ 1.0		▨ V/C > 0.85 & < 1.0		☐ V/C ≤ 0.85	



This corridor includes intersections with entering volumes spanning a wide range of the study. The intersections ranked as medium-priority with the exception of CH 9 which ranked high-priority. The capacity analysis indicates possible need for high-capacity at-grade improvements or grade separations.

Figure 22
Hennepin County - TH 55-A Focus Area
January 2017

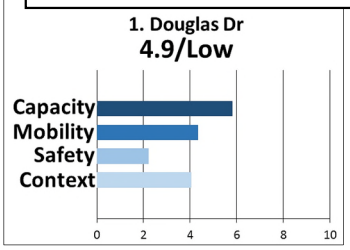
TH 55-B: Intersection at Douglas Drive (Hennepin County 4 of 6)

Corridor Context. Suburban Arterial with one intersection evaluated in the study (Figure 23). The corridor at this low-priority intersection has four through lanes of mainline capacity and a median. The posted speed limit is 55 mph. The corridor is constrained by development and a railroad. Other characteristics include:

- Intersection Spacing – This intersection is located approximately a half mile west of the TH 100 interchange.
- Access – Roadway access is limited to right-in/right-out access. Frontage roads run along this stretch of the corridor for access to residential neighborhoods.
- Previous Planning for Interchanges? No. A grade separation has not been proposed for this intersection in previous planning documents.

Intersection measures:
Capacity: Do peak-hour volumes exceed design?
Mobility: Are daily volumes and congestion high?
Safety: Are there many or severe crashes?
Context: Are plans and multi-modal factors supportive?

Intersection Score and Grade-Separation Priority

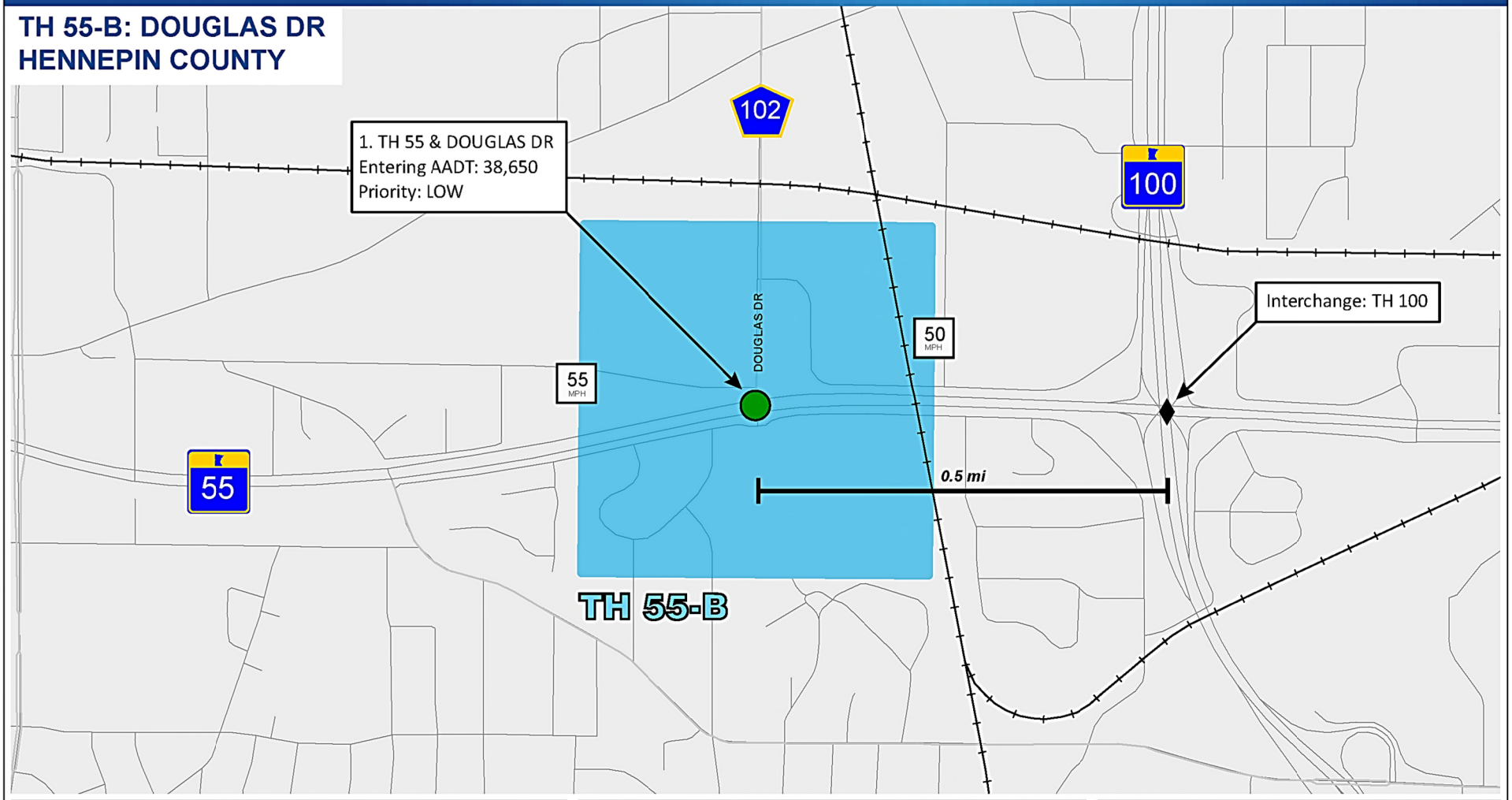


Capacity Analysis, Needs, and Opportunities. This corridor includes an intersection with entering volumes below the middle of the study's range. The capacity analysis indicates that major changes are not needed to accommodate current demand.

Capacity Analysis Summary

		Existing Intersection	Expanded Intersection	Alternative At-Grade Intersection	Add PA Capacity	Hybrid Interchange	Full Interchange
TH 55-B							
1	Douglas Dr.	☐	☐	▨	☐	☐	☐
Key		▩ V/C ≥ 1.0		▨ V/C > 0.85 & < 1.0		☐ V/C ≤ 0.85	

TH 55-B: DOUGLAS DR
HENNEPIN COUNTY



Legend

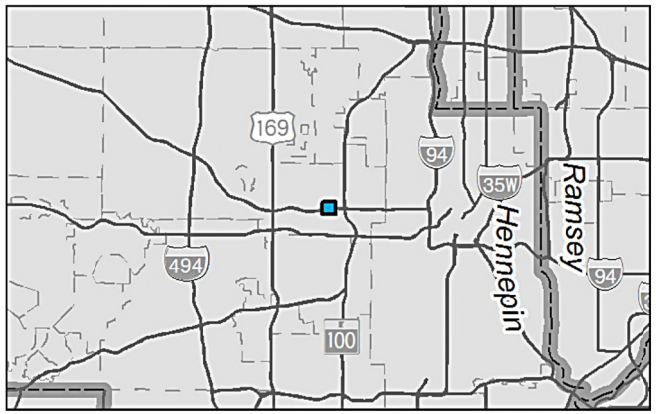
Grade-Separation Priority

- HIGH
- MEDIUM
- LOW
- Interchange
- Intersection Spacing
- Focus Area

0 0.5 Miles

BOLTON & MENK
Stonebrooke

Source: MetroGIS, MnDOT



This intersection has an entering volume below the middle of the study's range. The capacity analysis indicates that major changes are not needed to accommodate current demand.

Figure 23
Hennepin County - TH 55-B Focus Area
January 2017

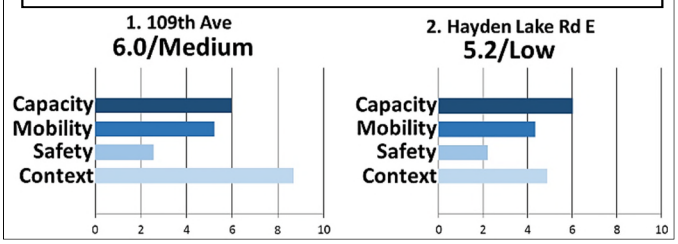
TH 169-B: 109th Avenue North to Hayden Lake Road East (Hennepin County 5 of 6)

Corridor Context. Suburban Arterial with two at-grade intersections evaluated in the study (see Figure 24). This corridor generally has four through lanes of mainline capacity and a median. The posted speed limit is 55 mph. The corridor is constrained by development, but includes wide setbacks and frontage roads. Other characteristics include:

- Intersection Spacing – The two intersections are spaced approximately 2.0 miles apart and are located about 1.5 miles north of TH 610.
- Access – Roadway access is limited to three signalized public street intersections.
- Previous Planning for Interchanges? No. Grade separations have not been proposed for this area in previous planning documents.

Intersection measures:
Capacity: Do peak-hour volumes exceed design?
Mobility: Are daily volumes and congestion high?
Safety: Are there many or severe crashes?
Context: Are plans and multi-modal factors supportive?

Intersection Scores and Grade-Separation Priorities

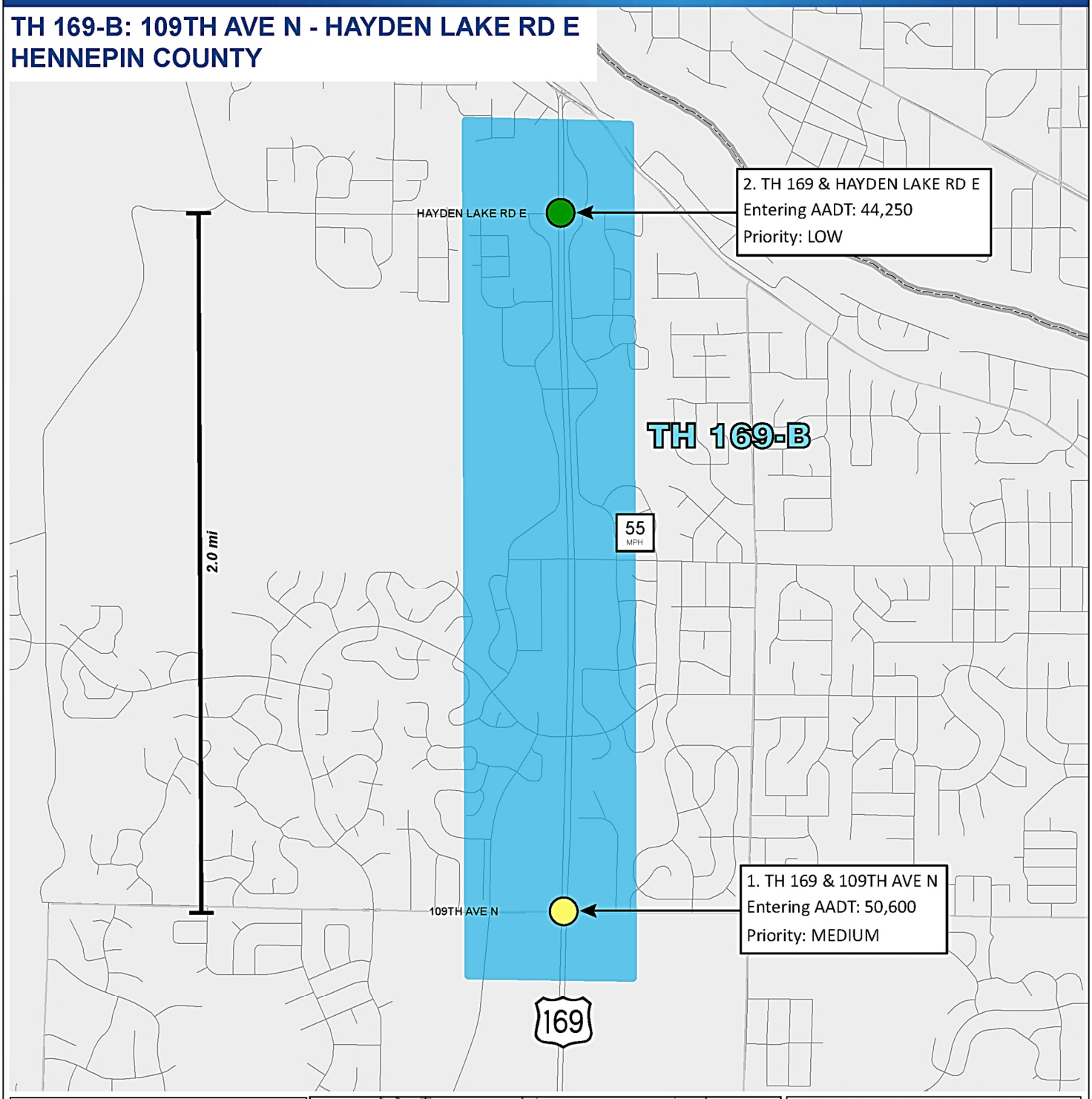


Capacity Analysis, Needs, and Opportunities. This corridor includes two intersections with entering volumes near the middle of the study's range. The capacity analysis indicates that major changes are not needed to accommodate current demand.

Capacity Analysis Summary

		Existing Intersection	Expanded Intersection	Alternative At-Grade Intersection	Add PA Capacity	Hybrid Interchange	Full Interchange
TH 169-B							
1	109th Ave N	☐	☐	▨	☐	☐	☐
2	Hayden Lake Rd E	☐	☐	☐	☐	☐	☐
Key		▩ V/C ≥ 1.0		▨ V/C > 0.85 & < 1.0		☐ V/C ≤ 0.85	

TH 169-B: 109TH AVE N - HAYDEN LAKE RD E
HENNEPIN COUNTY



Legend

Grade-Separation Priority

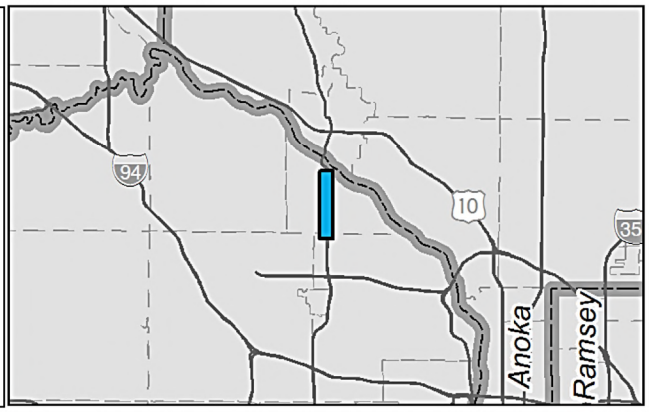
HIGH
MEDIUM
LOW

Intersection Spacing

Focus Area

0 0.25 Miles

Source: MetroGIS, MnDOT



This corridor includes two intersections with entering volumes near the middle of the study's range. The capacity analysis indicates that major changes are not needed to accommodate current demand.

Figure 24
Hennepin County - TH 169-B Focus Area
January 2017

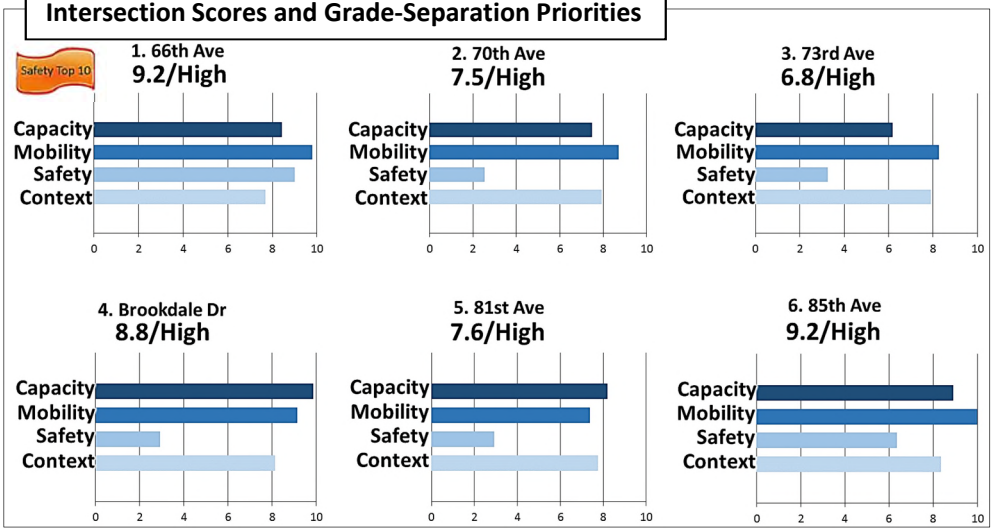
TH 252: 66th Avenue to 85th Avenue (Hennepin County 6 of 6)

Corridor Context. Constrained Limited-Access Expressway with six at-grade intersections evaluated in the study (see Figure 25). This corridor generally has four through lanes of mainline capacity and a median. The posted speed limit is 55 mph. The corridor is constrained by development, but includes wide setbacks and frontage roads. Other characteristics include:

- Intersection Spacing – The six intersections are spaced approximately 0.3 to 0.7 miles apart and are located about 0.3 miles north of the TH 694 interchange.
- Access – Roadway access is limited to right-in/right-out access and private businesses.
- Previous Planning for Interchanges? Yes. Grade separations have been proposed for this entire corridor in previous planning documents.

Intersection measures:
Capacity: Do peak-hour volumes exceed design?
Mobility: Are daily volumes and congestion high?
Safety: Are there many or severe crashes?
Context: Are plans and multi-modal factors supportive?

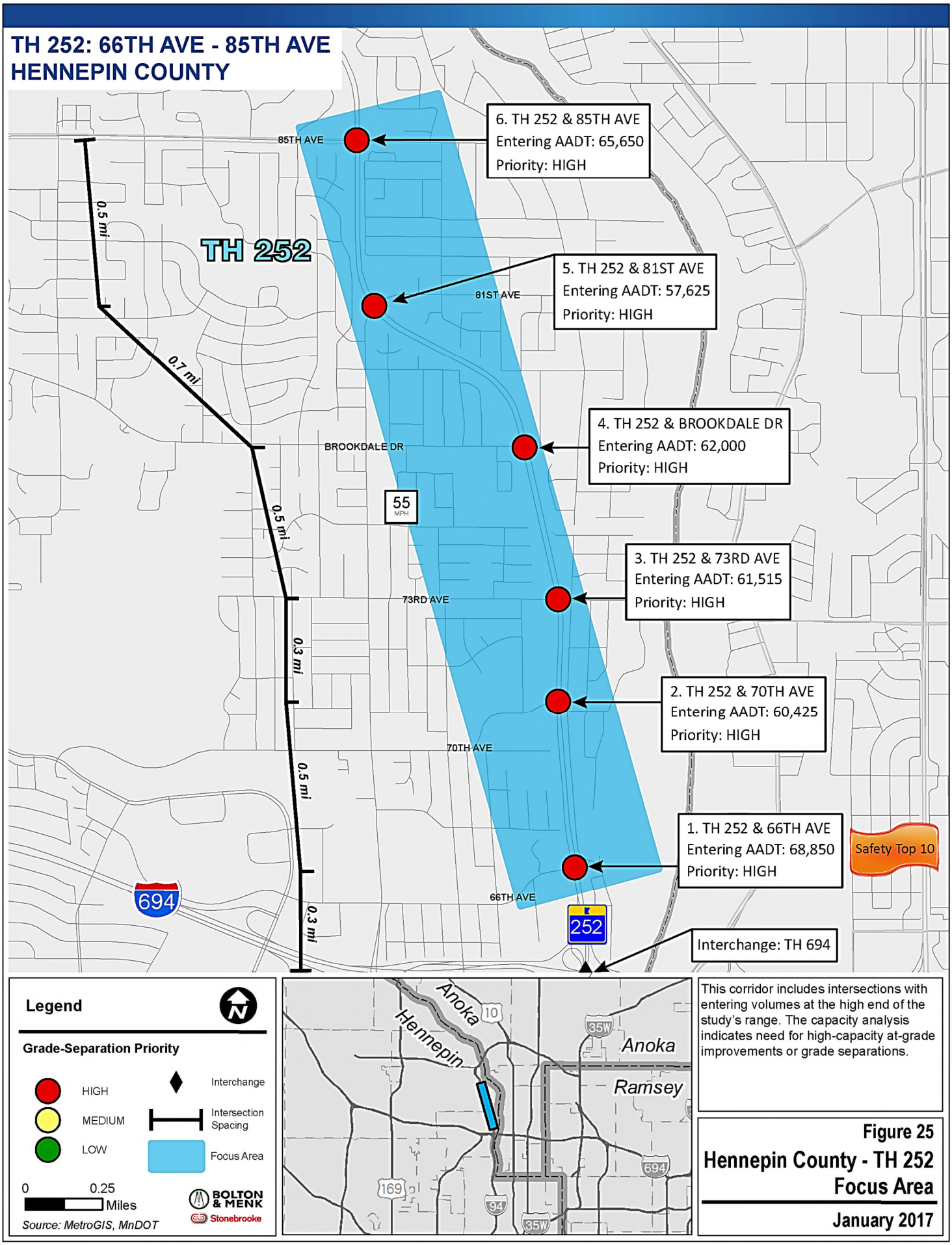
Intersection Scores and Grade-Separation Priorities



Capacity Analysis, Needs, and Opportunities. This corridor includes intersections with entering volumes at the high end of the study's range. The capacity analysis indicates need for high-capacity at-grade improvements or grade separations.

Capacity Analysis Summary

		Existing Intersection	Expanded Intersection	Alternative At-Grade Intersection	Add PA Capacity	Hybrid Interchange	Full Interchange
TH 252							
1	66th Ave.	▩	▩	▩	▩	☐	☐
2	70th Ave.	▩	▩	▩	▩	☐	☐
3	73rd Ave.	▧	▧	▧	☐	☐	☐
4	Brookdale Dr.	▩	▩	▩	▧	☐	☐
5	81st Ave.	▩	▩	▩	☐	☐	☐
6	85th Ave.	▩	▩	▩	☐	☐	☐
Key		▩ V/C ≥ 1.0		▧ V/C > 0.85 & < 1.0		☐ V/C ≤ 0.85	


TH 252: 66TH AVE - 85TH AVE
HENNEPIN COUNTY
6. TH 252 & 85TH AVE
Entering AADT: 65,650
Priority: HIGH
85TH AVE
TH 252
0.5 mi
5. TH 252 & 81ST AVE
Entering AADT: 57,625
Priority: HIGH
81ST AVE
0.7 mi
4. TH 252 & BROOKDALE DR
Entering AADT: 62,000
Priority: HIGH
BROOKDALE DR
55
MPH
0.5 mi
3. TH 252 & 73RD AVE
Entering AADT: 61,515
Priority: HIGH
73RD AVE
0.3 mi
2. TH 252 & 70TH AVE
Entering AADT: 60,425
Priority: HIGH
70TH AVE
0.5 mi
1. TH 252 & 66TH AVE
Entering AADT: 68,850
Priority: HIGH
Safety Top 10
694
66TH AVE
0.3 mi
252
Interchange: TH 694
Legend
Grade-Separation Priority
HIGH
MEDIUM
LOW
Interchange
Intersection Spacing
Focus Area
0
0.25
Miles
Source: MetroGIS, MnDOT
BOLTON & MENK
Stonebrooke
Anoka
Hennepin
Ramsey
10
35W
169
94
694
This corridor includes intersections with entering volumes at the high end of the study's range. The capacity analysis indicates need for high-capacity at-grade improvements or grade separations.
Figure 25
Hennepin County - TH 252 Focus Area
January 2017

4.3.5 Ramsey County

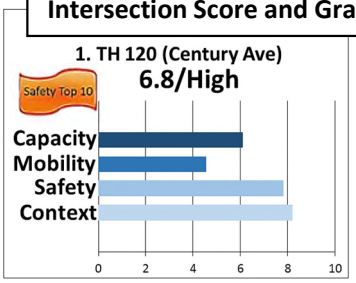
TH 36-A: Intersection at TH 120 (Century Avenue) (Ramsey & Washington Counties 1 of 3)

Corridor Context. Constrained Limited-Access Expressway with one intersection evaluated in the study (see Figure 26). The corridor at this high-priority intersection has four through lanes of mainline capacity, a median, and is a proposed BRT corridor. The posted speed limit is 55 mph. The corridor is constrained by development, but it has been upgraded to a freeway along nearby segments. Other characteristics include:

- Intersection Spacing – This intersection is located approximately 0.8 miles southwest of Hadley Avenue which is a committed and funded location for a new interchange (2019 construction).
- Access – Roadway access is limited to right-in/right-out access.
- Previous Planning for Interchanges? Yes. A grade separation has been proposed for this intersection in previous planning documents.

Intersection measures:
Capacity: Do peak-hour volumes exceed design?
Mobility: Are daily volumes and congestion high?
Safety: Are there many or severe crashes?
Context: Are plans and multi-modal factors supportive?

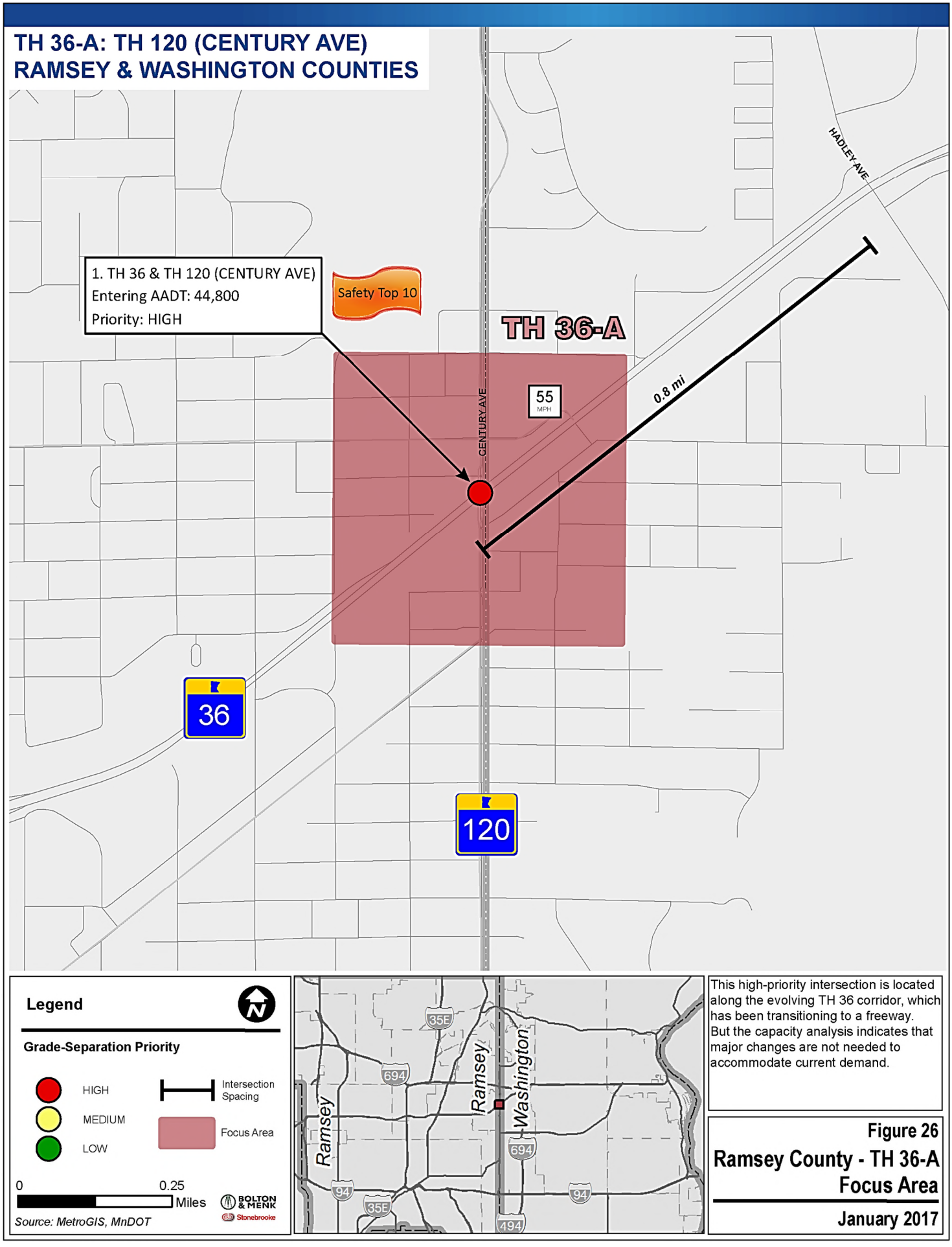
Intersection Score and Grade-Separation Priority



Capacity Analysis, Needs, and Opportunities. The capacity analysis indicates that major changes are not needed to accommodate current demand. However, this is a high-priority intersection and the TH 36 corridor has been transitioning to a freeway with potential for growing demand. Ramsey and Washington counties have a cooperative agreement in place and will continue to plan for possible improvements.

Capacity Analysis Summary

		Existing Intersection	Expanded Intersection	Alternative At-Grade Intersection	Add PA Capacity	Hybrid Interchange	Full Interchange
TH 36-A							
1	TH 120	☐	☐	☐	☐	☐	☐
Key		☒ V/C ≥ 1.0		▨ V/C > 0.85 & < 1.0		☐ V/C ≤ 0.85	



This high-priority intersection is located along the evolving TH 36 corridor, which has been transitioning to a freeway. But the capacity analysis indicates that major changes are not needed to accommodate current demand.

Figure 26
Ramsey County - TH 36-A Focus Area
January 2017

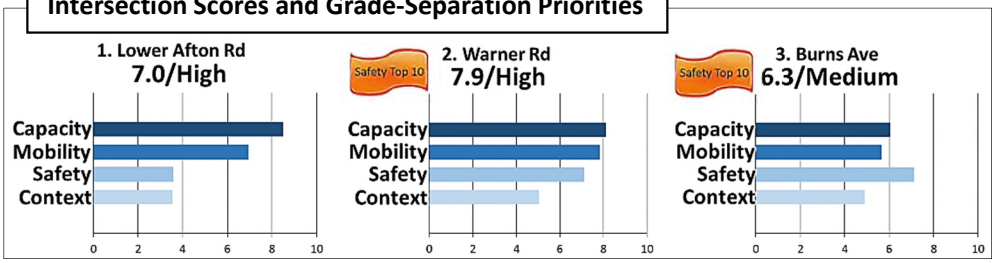
TH 61: Lower Afton Road to Burns Avenue (Ramsey County 2 of 3)

Corridor Context. Suburban Arterial with three at-grade intersections evaluated in the study (see Figure 27). This corridor generally has four through lanes of mainline capacity and a median. The posted speed limit is 45-60 mph. The corridor is constrained by development, railroads, and parklands. Other characteristics include:

- Intersection Spacing – The three intersections are spaced approximately 0.1 to 1.6 miles apart and are located about 0.25 miles south of the I-94 interchange.
- Access – There are no additional access points between the three intersections.
- Previous Planning for Interchanges? No. Grade separations have not been proposed for this area in previous planning documents.

Intersection measures:
Capacity: Do peak-hour volumes exceed design?
Mobility: Are daily volumes and congestion high?
Safety: Are there many or severe crashes?
Context: Are plans and multi-modal factors supportive?

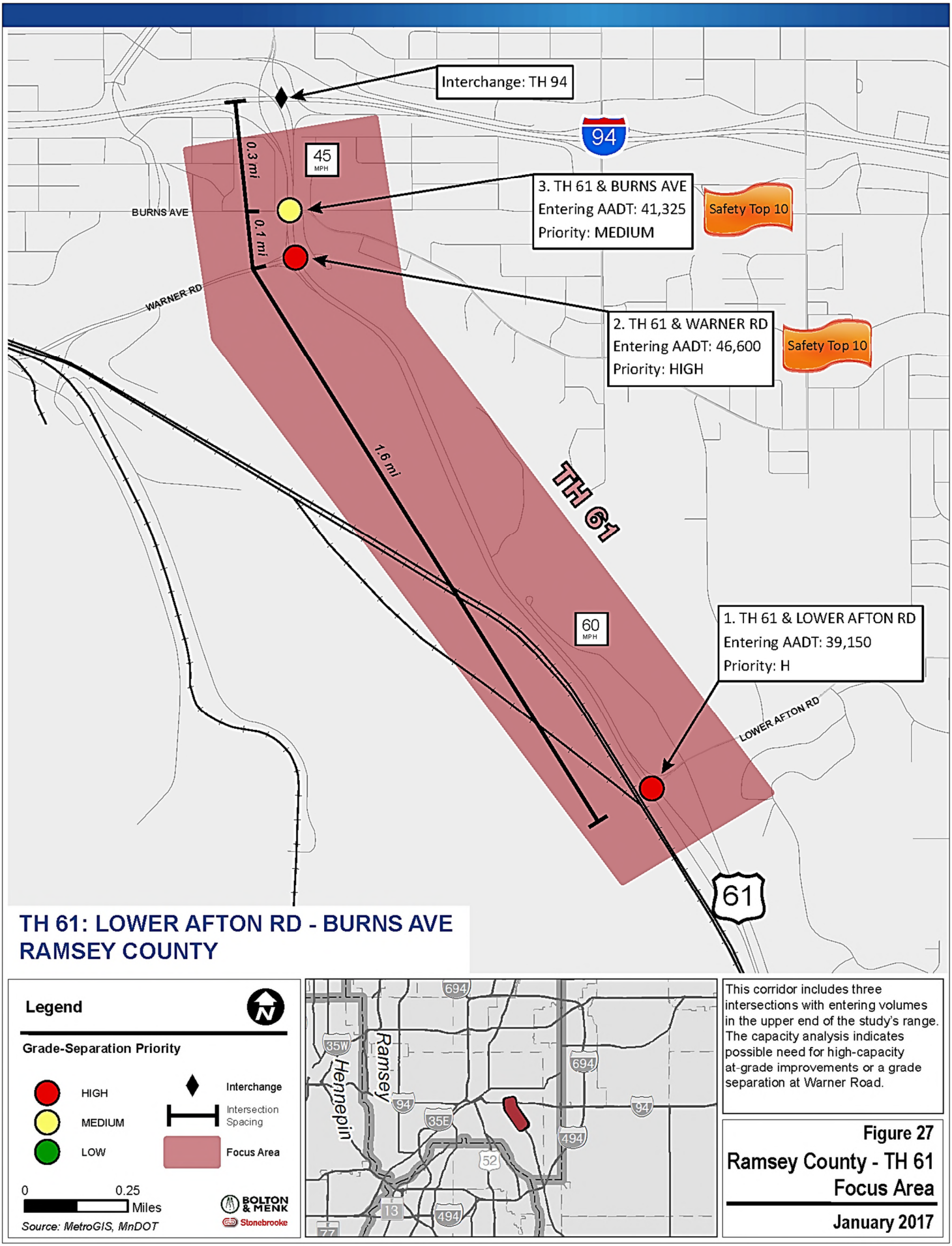
Intersection Scores and Grade-Separation Priorities



Capacity Analysis, Needs, and Opportunities. The corridor includes three intersections with entering volumes in the upper end of the study's range. The capacity analysis indicates possible need for high-capacity at-grade improvements or a grade-separation at Warner Road. Contextually, the Warner Road intersection, while not constrained by development, is a jurisdictionally and operationally complex location, surrounded by parkland.

Capacity Analysis Summary

		Existing Intersection	Expanded Intersection	Alternative At-Grade Intersection	Add PA Capacity	Hybrid Interchange	Full Interchange
TH 61							
1	Lower Afton Rd.	☒	☒	☒	▨	☐	☐
2	Warner Rd.	☒	▨	☒	☐	☐	☐
3	Burns Ave.	☐	☐	☐	☐	☐	☐
Key		☒ V/C ≥ 1.0		▨ V/C > 0.85 & < 1.0		☐ V/C ≤ 0.85	


Interchange: TH 94
94
45
MPH
0.3 mi
0.1 mi
BURNS AVE
3. TH 61 & BURNS AVE
Entering AADT: 41,325
Priority: MEDIUM
Safety Top 10
WARNER RD
2. TH 61 & WARNER RD
Entering AADT: 46,600
Priority: HIGH
Safety Top 10
1.6 mi
TH 61
60
MPH
1. TH 61 & LOWER AFTON RD
Entering AADT: 39,150
Priority: H
LOWER AFTON RD
61
TH 61: LOWER AFTON RD - BURNS AVE
RAMSEY COUNTY
Legend
Grade-Separation Priority
HIGH
MEDIUM
LOW
Interchange
Intersection Spacing
Focus Area
0
0.25
Miles
Source: MetroGIS, MnDOT
BOLTON & MENK
Stonebrooke
694
35W
Ramsey
Hennepin
94
35E
694
94
494
52
13
494
This corridor includes three intersections with entering volumes in the upper end of the study's range. The capacity analysis indicates possible need for high-capacity at-grade improvements or a grade separation at Warner Road.
Figure 27
Ramsey County - TH 61 Focus Area
January 2017

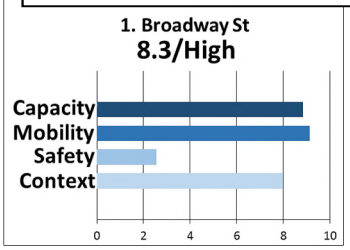
TH 280: Intersection at Broadway Street (Ramsey County 3 of 3)

Corridor Context. Constrained Limited-Access Expressway with one intersection evaluated in the study (see Figure 28). The corridor at this high-priority intersection has four through lanes of mainline capacity and a median. The posted speed limit is 50 mph and the corridor is constrained by development. Other characteristics include:

- Intersection Spacing – This intersection is located approximately 0.5 miles south of the I-35W interchange and about 0.6 miles north of the Hennepin Avenue interchange.
- Access – Roadway access is limited to major intersections along this part of TH 280. There are multiple industrial entrances north of the Broadway Street intersection that allow right-in/right-out turns.
- Previous Planning for Interchanges? Yes. A grade separation has been proposed for this intersection in previous planning documents.

Intersection measures:
Capacity: Do peak-hour volumes exceed design?
Mobility: Are daily volumes and congestion high?
Safety: Are there many or severe crashes?
Context: Are plans and multi-modal factors supportive?

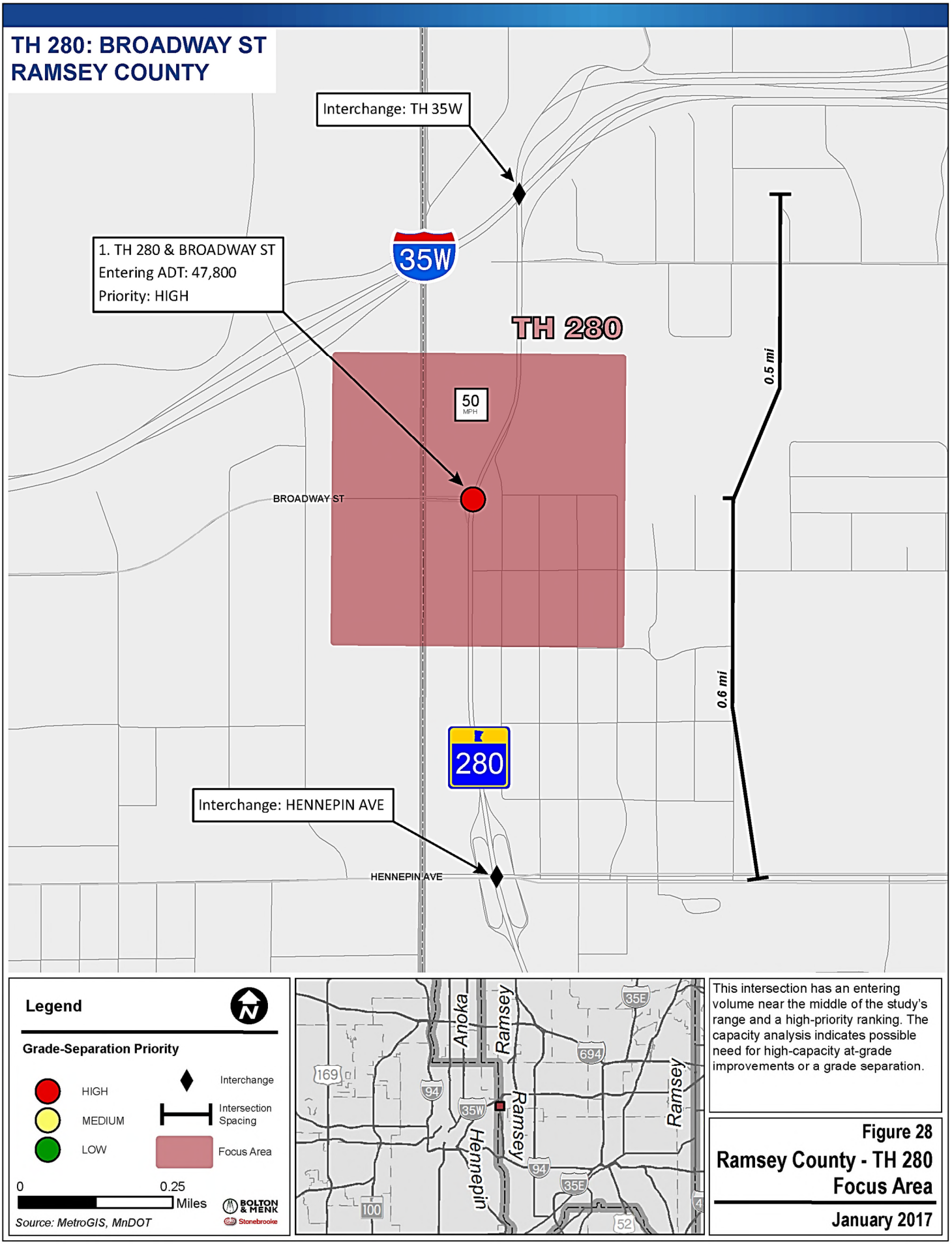
Intersection Score and Grade-Separation Priority



Capacity Analysis, Needs, and Opportunities. This intersection has entering volumes near the middle of the study's range and a high-priority ranking. The capacity analysis indicates possible need for high-capacity at-grade improvements or a grade separation. There may also be a need for MnDOT/local partnerships to examine the highly constrained right-of-way.

Capacity Analysis Summary

		Existing Intersection	Expanded Intersection	Alternative At-Grade Intersection	Add PA Capacity	Hybrid Interchange	Full Interchange
TH 280							
1	Broadway St.	☒	▨	▨	☐	▨	☐
Key		☒ V/C ≥ 1.0		▨ V/C > 0.85 & < 1.0		☐ V/C ≤ 0.85	



This intersection has an entering volume near the middle of the study's range and a high-priority ranking. The capacity analysis indicates possible need for high-capacity at-grade improvements or a grade separation.

Figure 28
Ramsey County - TH 280 Focus Area
January 2017

4.3.6 Scott County

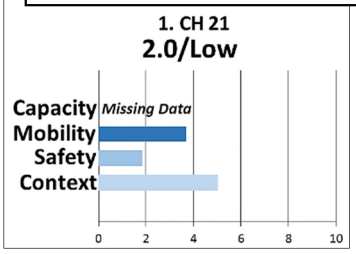
CH 42: Intersection at CH 21 (Scott County 1 of 3)

Corridor Context. Suburban Arterial with one intersection evaluated in the study (see Figure 29). The corridor at this low-priority intersection has four through lanes of mainline capacity and a median. The posted speed limit is 55 mph and the corridor is unconstrained by development. Other characteristics include:

- Intersection Spacing – This intersection is located approximately 2.0 miles west of TH 13.
- Access – Roadway access is limited to right-in/right-out access, and private access.
- Previous Planning for Interchanges? No. A grade separation has not been proposed for this intersection in previous planning documents.

Intersection measures:
Capacity: Do peak-hour volumes exceed design?
Mobility: Are daily volumes and congestion high?
Safety: Are there many or severe crashes?
Context: Are plans and multi-modal factors supportive?

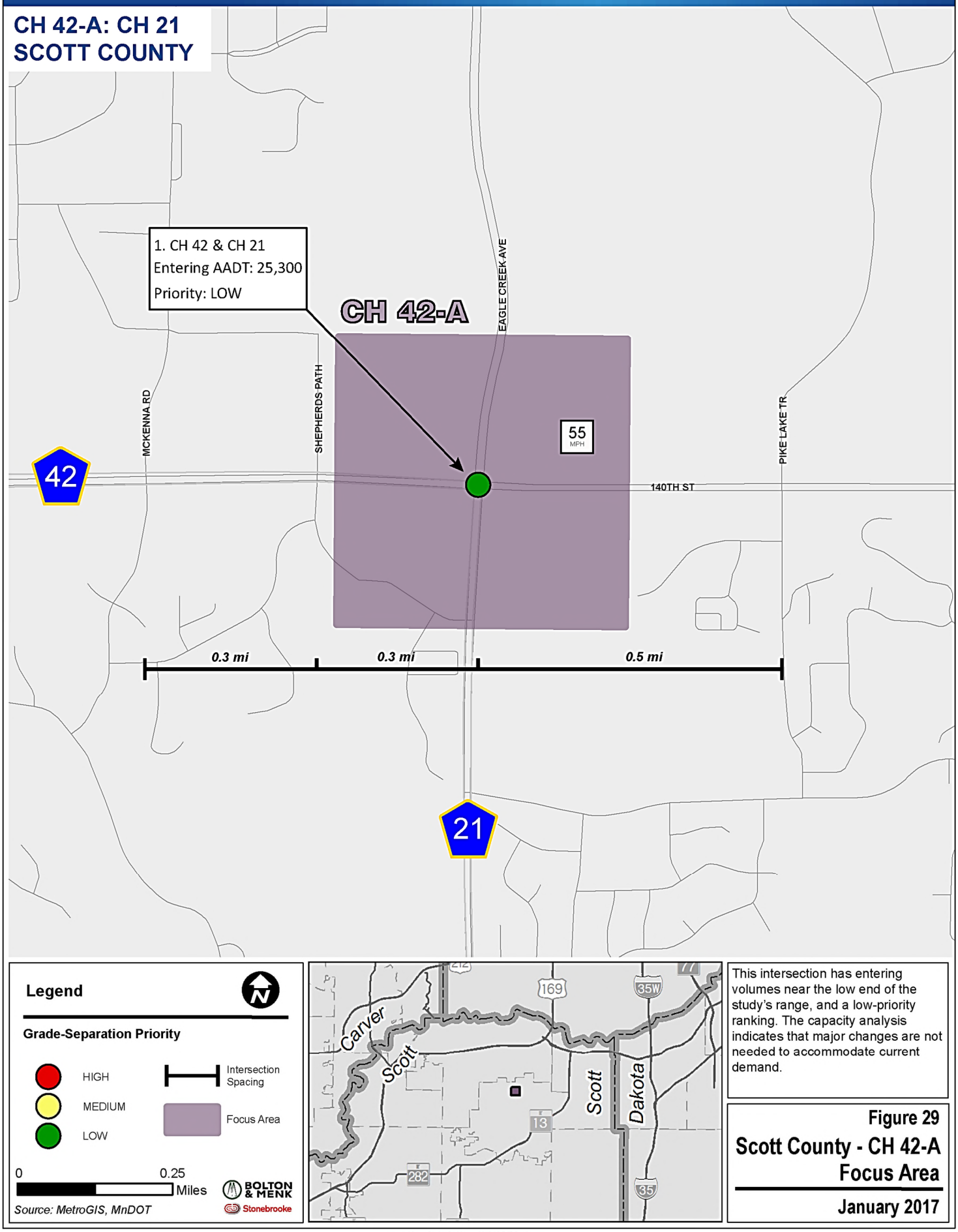
Intersection Score and Grade-Separation Priority



Capacity Analysis, Needs, and Opportunities. This intersection has entering volumes near the low end of the study's range and a low-priority ranking. The capacity analysis indicates that major changes are not needed to accommodate current demand.

Capacity Analysis Summary

		Existing Intersection	Expanded Intersection	Alternative At-Grade Intersection	Add PA Capacity	Hybrid Interchange	Full Interchange
CH 42-A							
1	CH 21	*Missing Data*					
Key		V/C ≥ 1.0		V/C > 0.85 & < 1.0		V/C ≤ 0.85	



This intersection has entering volumes near the low end of the study's range, and a low-priority ranking. The capacity analysis indicates that major changes are not needed to accommodate current demand.

Figure 29
Scott County - CH 42-A Focus Area
January 2017

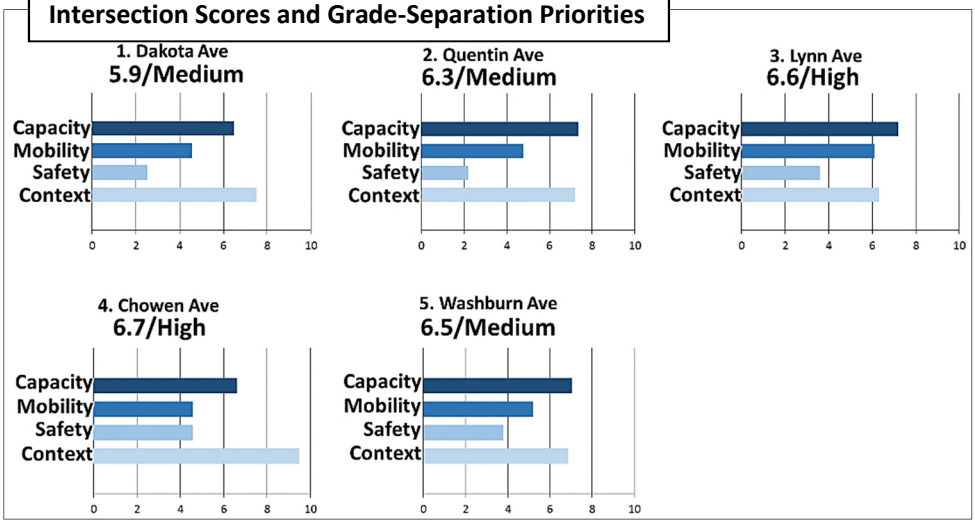
TH 13-A: Dakota Avenue to Washburn Avenue (Scott & Dakota Counties 2 of 3)

Corridor Context. Constrained Limited-Access Expressway with five at-grade intersections evaluated in the study (see Figure 30). This corridor generally has four through lanes of mainline capacity and a median. The posted speed limit is 45-mph. The corridor is constrained by development, and a railroad, but also includes wide setbacks and frontage roads. Other characteristics include:

- Intersection Spacing – The five intersections are spaced approximately 0.4 to 0.75 mile apart, and located about 1.5 miles west of the I-35W interchange.
- Access – Roadway access is limited to intersections with right-in/right-out turns, public street intersections and private access roadways which also have right-in/right-out turns.
- Previous Planning for Interchanges? Yes. Grade separations have been proposed for the Chowen Avenue intersection and the Dakota Avenue intersection.

Intersection measures:
Capacity: Do peak-hour volumes exceed design?
Mobility: Are daily volumes and congestion high?
Safety: Are there many or severe crashes?
Context: Are plans and multi-modal factors supportive?

Intersection Scores and Grade-Separation Priorities

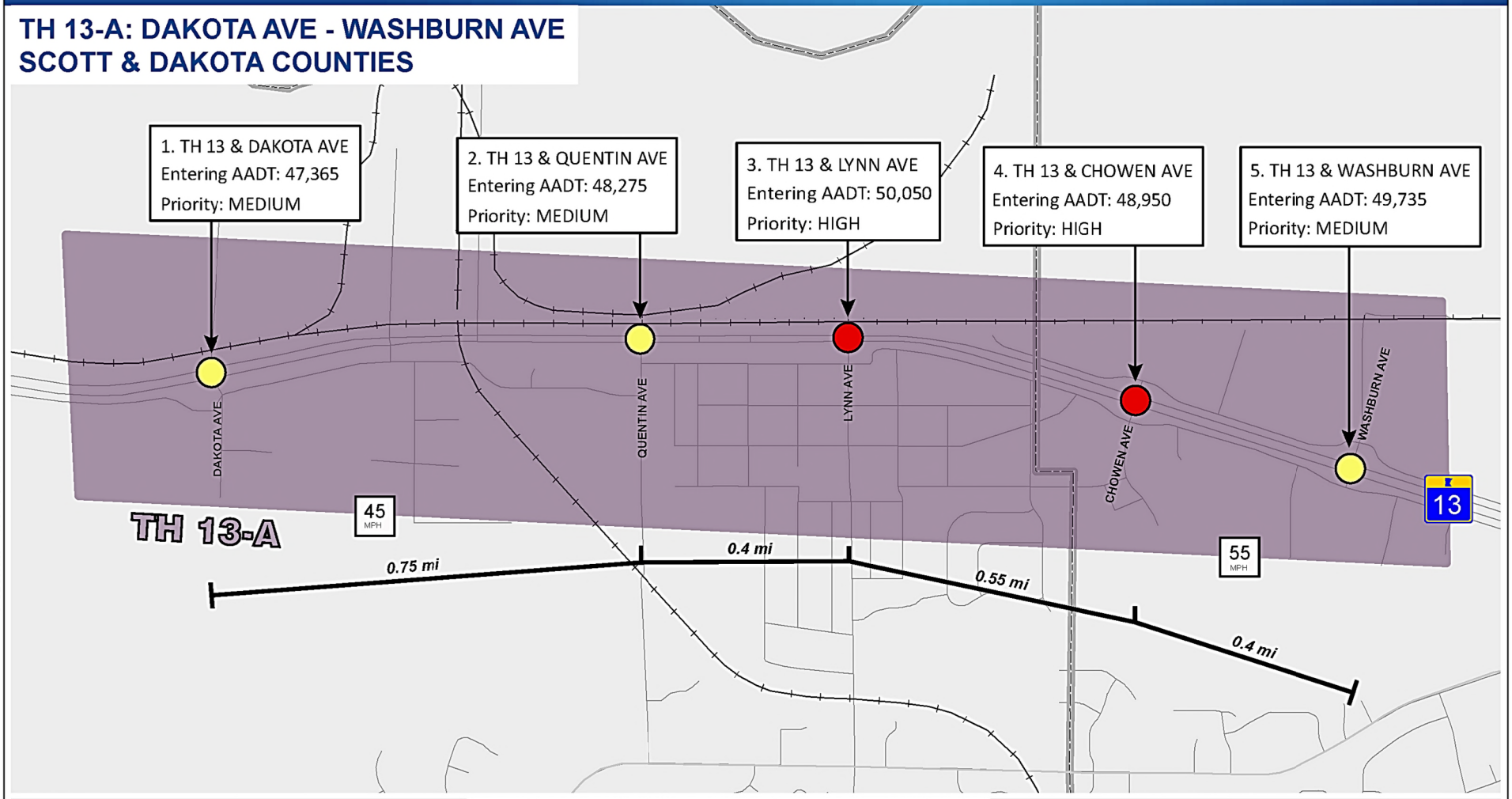


Capacity Analysis, Needs, and Opportunities. This corridor includes intersections with entering volumes approaching the upper end of the study's range, with Lynn Avenue and Chowen Avenue ranked as high-priority. The capacity analysis indicates possible need for high-capacity at-grade improvements or grade separations. This corridor crosses the Scott/Dakota County line and may warrant additional analysis as part of a joint effort based on the closely spaced intersections. Other corridor needs and planning issues include freight movement, port access, and truck traffic.

Capacity Analysis Summary

		Existing Intersection	Expanded Intersection	Alternative At-Grade Intersection	Add PA Capacity	Hybrid Interchange	Full Interchange
TH 13-A							
Scott County							
1	Dakota Ave.	▨	▨	▨	☐	☐	☐
2	Quentin Ave.	▩	▩	▨	☐	☐	☐
3	Lynn Ave.	▩	▨	▨	☐	▨	☐
Dakota County							
4	Chowen Ave.	▨	▨	▨	☐	▨	☐
5	Washburn Ave.	▨	▨	▨	☐	▨	☐
Key		▩ V/C ≥ 1.0		▨ V/C > 0.85 & < 1.0		☐ V/C ≤ 0.85	

TH 13-A: DAKOTA AVE - WASHBURN AVE
SCOTT & DAKOTA COUNTIES



Legend

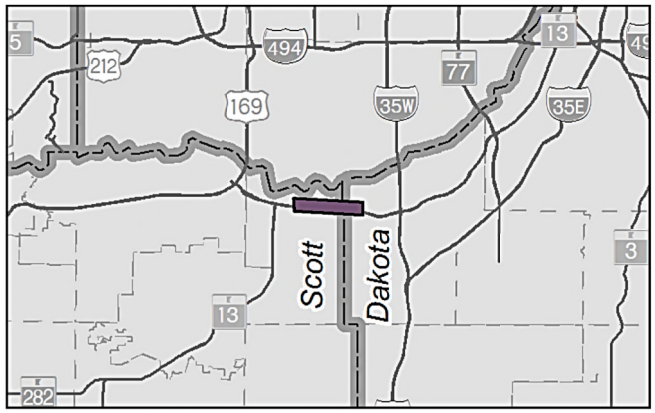
Grade-Separation Priority

- HIGH
- MEDIUM
- LOW
- Intersection Spacing
- Focus Area

0 0.5 Miles

Source: MetroGIS, MnDOT

BOLTON & MENK
Stonebrooke



This corridor includes intersections with entering volumes approaching the upper end of the study's range and Lynn Avenue and Chowen Avenue ranked as high-priority. The capacity analysis indicates possible need for high-capacity at-grade improvements or grade separations.

Figure 30
Scott County - TH 13-A Focus Area
January 2017

Metropolitan Council
Intersection Conversion Study
Principal Arterial
Department of Transportation

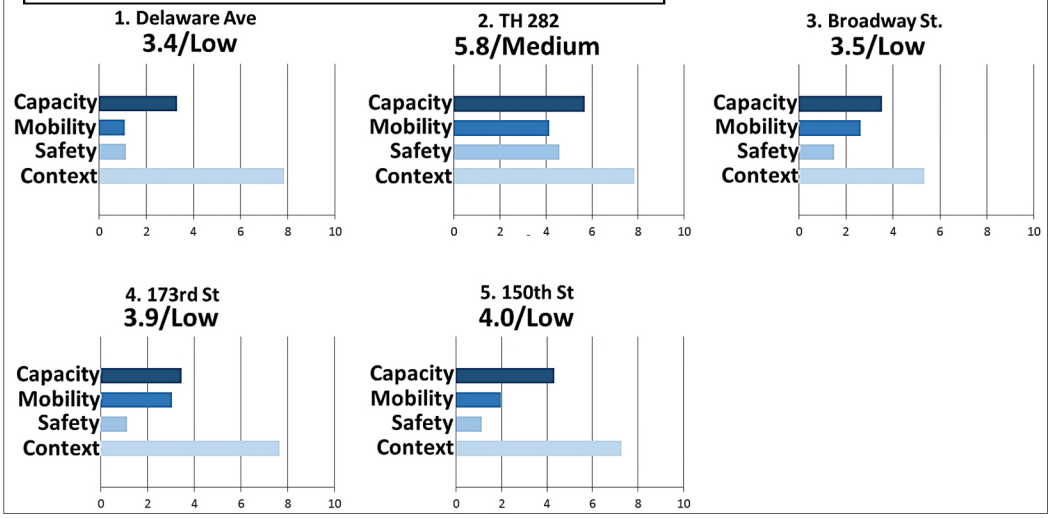
TH 169-A: Delaware Avenue to 150th Street (Scott County 3 of 3)

Corridor Context. Constrained and Unconstrained Limited-Access Expressway with five at-grade intersections evaluated in the study (see Figure 31). This corridor generally has four through lanes of mainline capacity and a median. The posted speed limit is 55-65 mph. The corridor is mostly unconstrained by development, except in Jordan where there is a concentration of surrounding development. There is also a railroad on the west side of the corridor. Other characteristics include:

- Intersection Spacing – The five intersections are spaced approximately 1.0 to 2.3 miles apart.
- Access – The corridor has multiple intersections with minor public and private access roads which include median breaks.
- Previous Planning for Interchanges? Yes. Grade separations have been proposed for this area, including the TH 282 intersection in Jordan and the 150th Street intersection.

Intersection measures:
Capacity: Do peak-hour volumes exceed design?
Mobility: Are daily volumes and congestion high?
Safety: Are there many or severe crashes?
Context: Are plans and multi-modal factors supportive?

Intersection Scores and Grade-Separation Priorities

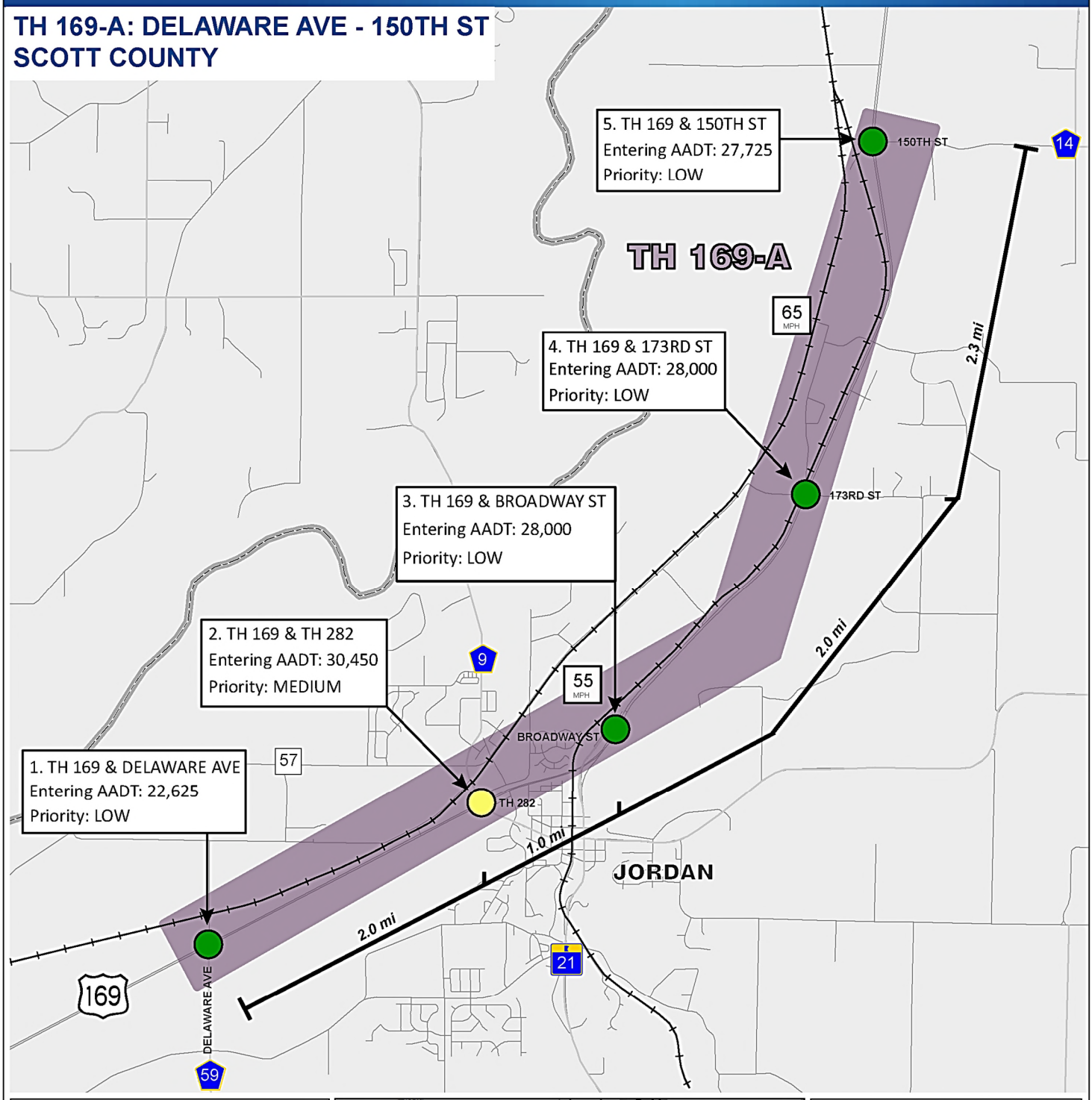


Capacity Analysis, Needs, and Opportunities. The capacity analysis indicates that major changes are not needed to accommodate current demand. However, this is a high-speed rural expressway location with potential for growing demand and need for access management. Note, the TH 282 intersection connects to CSAH 9 and a river crossing.

Capacity Analysis Summary

		Existing Intersection	Expanded Intersection	Alternative At-Grade Intersection	Add PA Capacity	Hybrid Interchange	Full Interchange
TH 169-A							
1	Delaware Ave.	☐	☐	☐	☐	☐	☐
2	TH 282	☐	☐	☐	☐	☐	☐
3	Broadway St.	☐	☐	☐	☐	☐	☐
4	173rd St.	☐	☐	☐	☐	☐	☐
5	150th St.	☐	☐	☐	☐	☐	☐
Key		▩ V/C ≥ 1.0		▨ V/C > 0.85 & < 1.0		☐ V/C ≤ 0.85	

TH 169-A: DELAWARE AVE - 150TH ST
SCOTT COUNTY



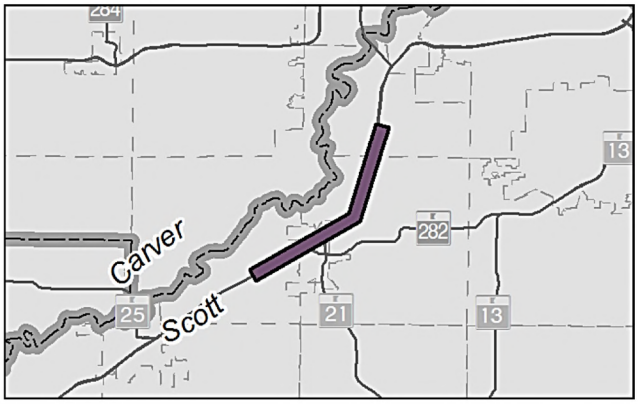
Legend

Grade-Separation Priority

- HIGH
- MEDIUM
- LOW
- Intersection Spacing
- Focus Area

0 1 Miles

Source: MetroGIS, MnDOT



All intersections in this corridor have entering volumes near the low end of the study's range and ranked as low-priority with the exception of TH 282. The capacity analysis indicates that major changes are not needed to accommodate current demand.

Figure 31
Scott County - TH 169-A Focus Area
January 2017

4.3.7 Sherburne County

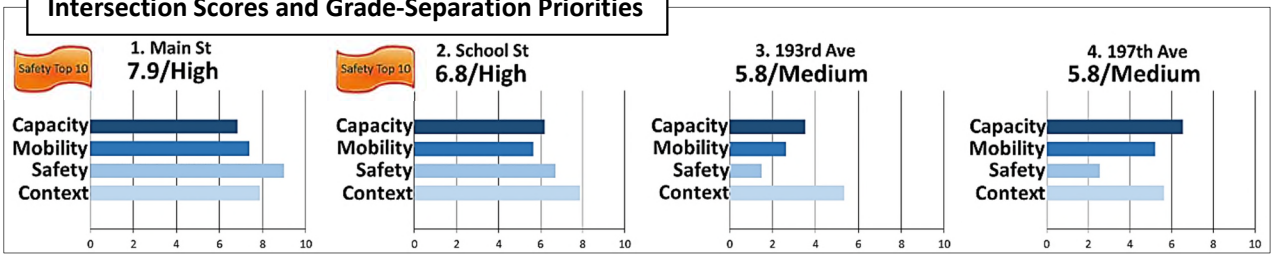
TH 169-C: Main Street to 197th Avenue (Sherburne County 1 of 1)

Corridor Context. Constrained Limited-Access Expressway with four at-grade intersections evaluated in the study and one ramp intersection (see Figure 32). This corridor generally has four through lanes of mainline capacity and a median. The posted speed limit is 55-65 mph. The corridor is constrained by development, but often includes wide setbacks and frontage roads. Other characteristics include:

- Intersection Spacing – The four intersections are spaced approximately 0.5 to 0.7 miles apart and are located about 0.8 miles north of the TH 10 Phase II ramp intersection.
- Access – Roadway access is limited to intersections allowing right-in/right-out turns.
- Previous Planning for Interchanges? Yes. Grade separations have been proposed for these intersections in previous planning documents.

Intersection measures:
Capacity: Do peak-hour volumes exceed design?
Mobility: Are daily volumes and congestion high?
Safety: Are there many or severe crashes?
Context: Are plans and multi-modal factors supportive?

Intersection Scores and Grade-Separation Priorities

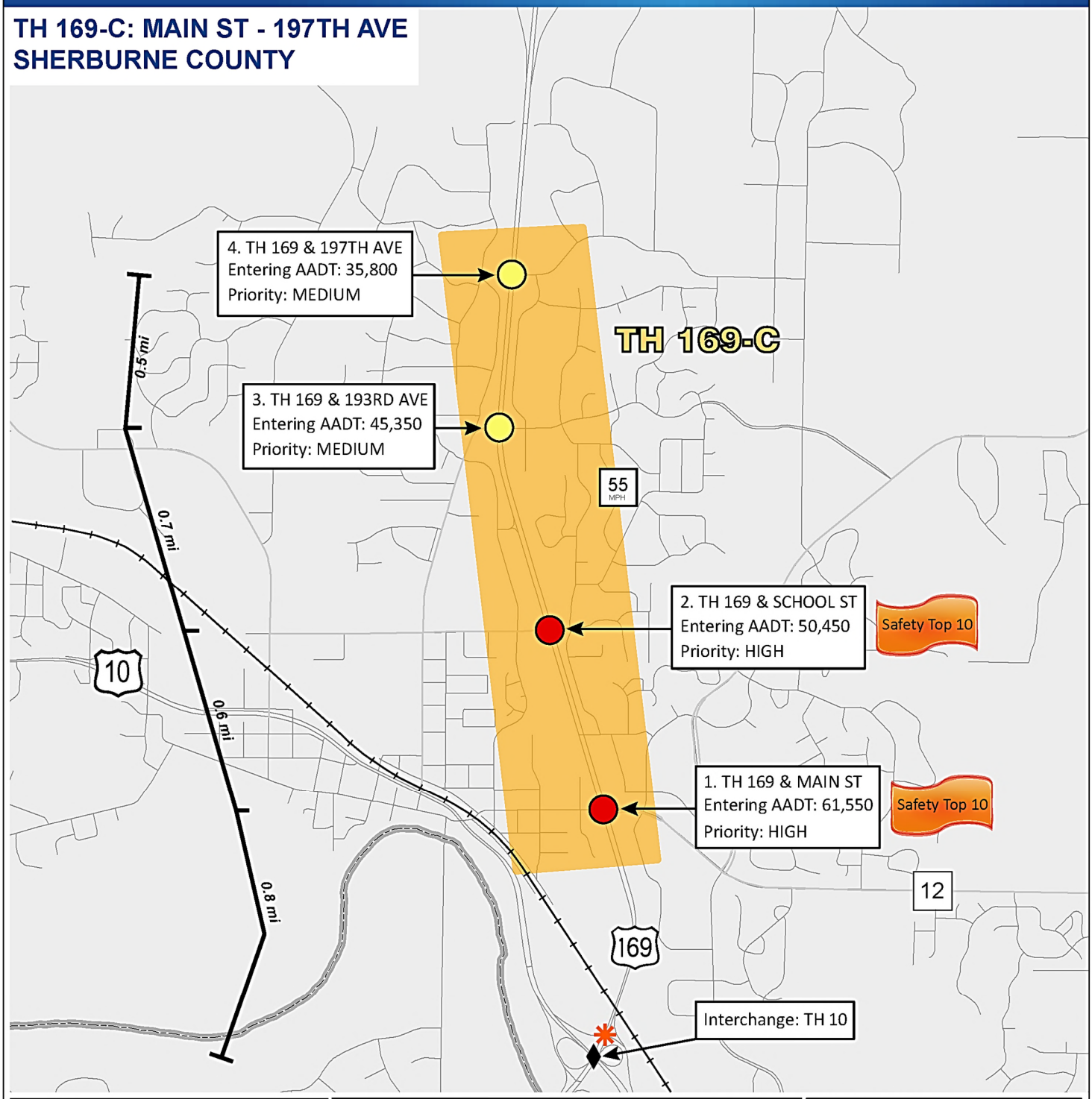


Capacity Analysis, Needs, and Opportunities. This corridor includes intersections spanning a range of volumes, with Main Street and School Street having high-priority rankings. The capacity analysis indicates need for high-capacity at-grade improvements or possibly grade separations. The corridor is 0.8 mile north of a signalized WB ramp intersection, which exhibits mobility concerns. This corridor connects to established regional freeway segments (on TH 10 and TH 101) and a river crossing nearby to the south and is subject to summer weekend traffic peaks.

Capacity Analysis Summary

		Existing Intersection	Expanded Intersection	Alternative At-Grade Intersection	Add PA Capacity	Hybrid Interchange	Full Interchange
TH 169-C							
1	Main St.	▨	▨	▩	☐	☐	☐
2	School St.	▨	▨	☐	☐	☐	☐
3	193rd Ave.	☐	☐	▨	☐	☐	☐
4	197th Ave.	▨	▨	▨	☐	☐	☐
Key		▩ V/C ≥ 1.0		▨ V/C > 0.85 & < 1.0		☐ V/C ≤ 0.85	

TH 169-C: MAIN ST - 197TH AVE
SHERBURNE COUNTY



Legend

Grade-Separation Priority

- HIGH
- MEDIUM
- LOW

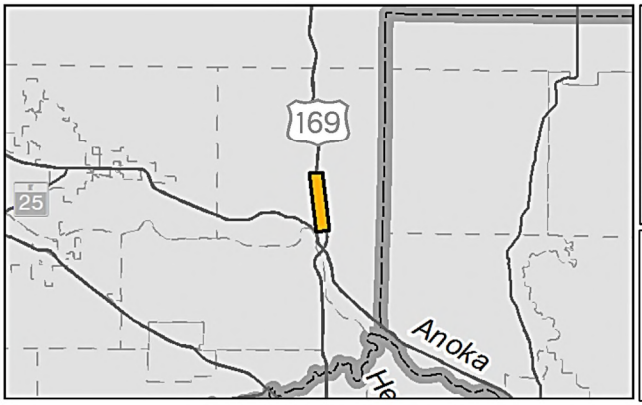
- Ramp Intersection
- Interchange
- Intersection Spacing
- Focus Area

BOLTON & MENK
Stonebrooke

0 1

Source: MetroGIS, MnDOT

Miles



This corridor includes intersections spanning a range of volumes, with Main Street and School Street having high-priority rankings. The capacity analysis indicates need for high-capacity at-grade improvements or possibly grade separations. The corridor is 0.8 mi. north of a signalized WB ramp intersection, which exhibits mobility concerns.

Figure 32
Sherburne County - TH 169-C Focus Area
January 2017

4.3.8 Washington County

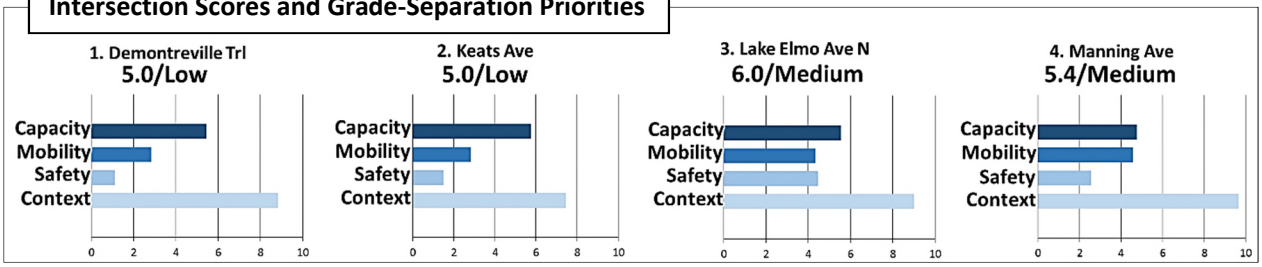
TH 36-B: Demontreville Trail to Manning Avenue (Washington County 1 of 1)

Corridor Context. Constrained Limited-Access Expressway with four at-grade intersections evaluated in the study (see Figure 33). This corridor generally has four through lanes of mainline capacity and a median. The posted speed limit is 60-65 mph. The corridor is constrained by development, but includes wide setbacks and frontage roads. Other characteristics include:

- Intersection Spacing – The four intersections are spaced approximately 1.0 to 1.25 miles apart and Demontreville Trail is located about 1.75 miles east of I-694.
- Access – Roadway access is limited to right-in/right-out access, and private access roadways.
- Previous Planning for Interchanges? Yes. Grade separations have been proposed for these intersections in previous planning documents.

Intersection measures:
Capacity: Do peak-hour volumes exceed design?
Mobility: Are daily volumes and congestion high?
Safety: Are there many or severe crashes?
Context: Are plans and multi-modal factors supportive?

Intersection Scores and Grade-Separation Priorities

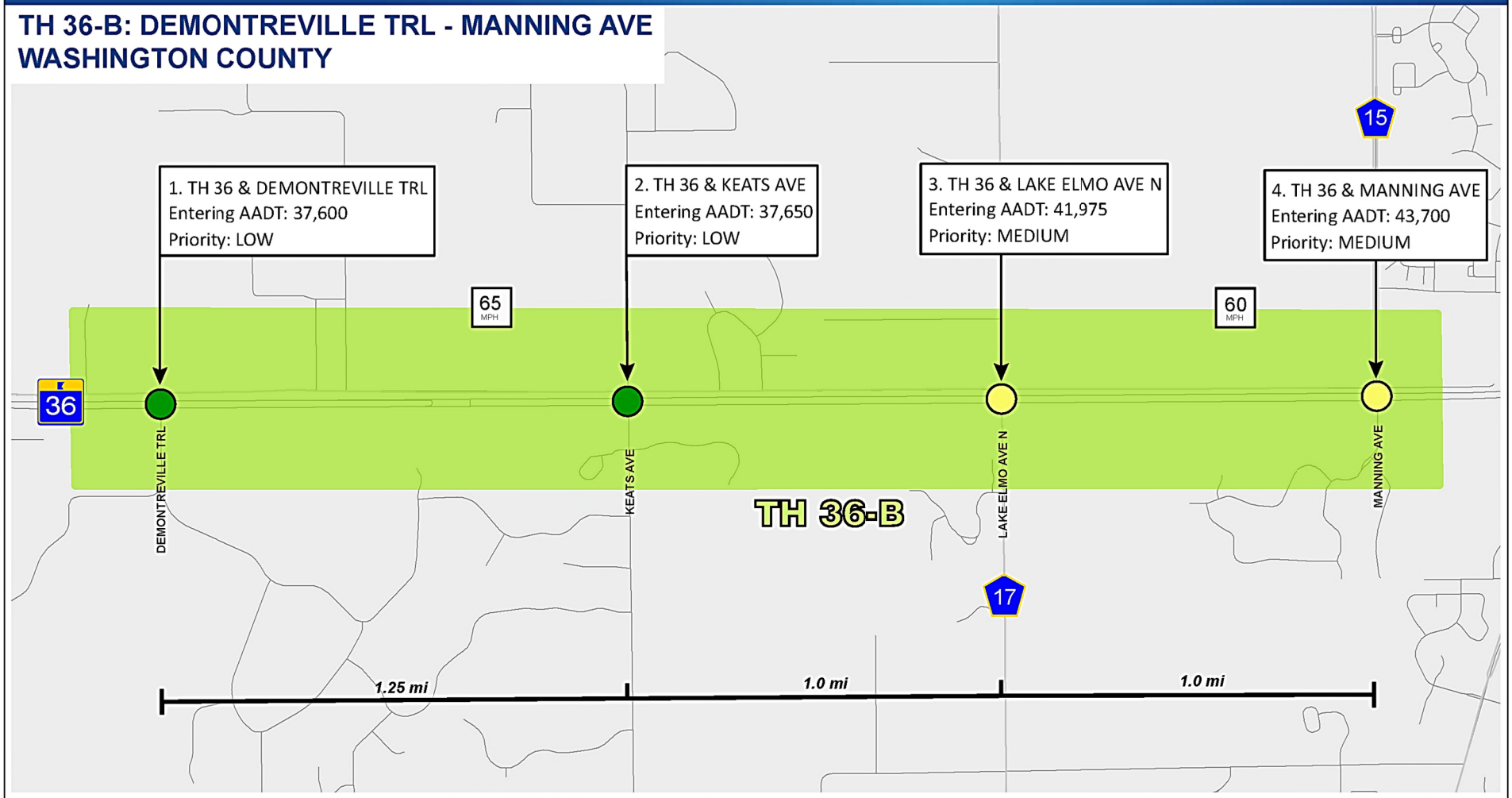


Capacity Analysis, Needs, and Opportunities. All intersections in this corridor have entering volumes near the middle of the study's range, with Lake Elmo Avenue North and Manning Avenue having medium-priority rankings. The capacity analysis indicates that major changes are not needed to accommodate current demand. However, the context for this area includes prior planning for new interchanges, the potential for growing demand as the St. Croix Bridge opens, and the history of TH 36 transitioning to a freeway.

Capacity Analysis Summary

		Existing Intersection	Expanded Intersection	Alternative At-Grade Intersection	Add PA Capacity	Hybrid Interchange	Full Interchange
TH 36-B							
1	Demontreville Trl.	☐	☐	☐	☐	☐	☐
2	Keats Ave.	☐	☐	☐	☐	☐	☐
3	Lake Elmo Ave. N	☐	☐	☐	☐	☐	☐
4	Manning Ave.	☐	☐	☐	☐	☐	☐
Key		▩ V/C ≥ 1.0		▨ V/C > 0.85 & < 1.0		☐ V/C ≤ 0.85	

TH 36-B: DEMONTREVILLE TRL - MANNING AVE
WASHINGTON COUNTY



Legend

Grade-Separation Priority

- HIGH
- MEDIUM
- LOW

Intersection Spacing

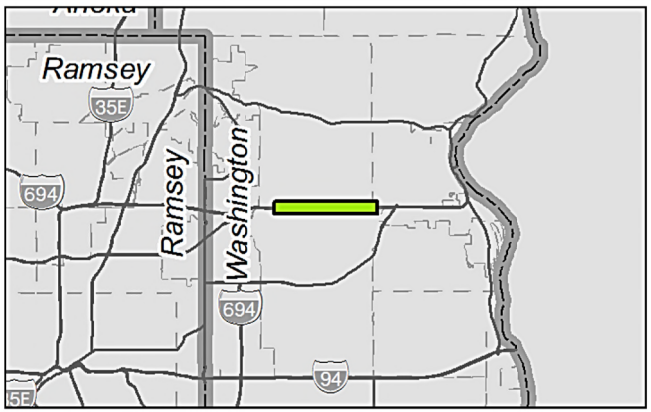
Focus Area

0 0.5 Miles

Source: MetroGIS, MnDOT

BOLTON & MENK

Stonebrooke



All intersections in this corridor have entering volumes near the middle of the study's range, with Lake Elmo Avenue North and Manning Avenue having medium-priority rankings. The capacity analysis indicates that major changes are not needed to accommodate current demand.

Figure 33
Washington County - TH 36-B Focus Area
January 2017

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4.4 Study Limitations and Corridor Planning

As described in Section 3, the 91 Phase II intersections were analyzed and categorized into High, Medium, and Low priority for grade separation. The results were based on intersection capacity analyses (using the FHWA CAP-X Tool) and other criteria fitting into the three general categories of mobility, safety, and corridor context. This approach provided a regionally consistent means to compare intersections and determine the priorities for grade separation, as well as an opportunity to describe intersections by locations and corridors (the 26 Focus Areas). However, the methodology looked at characteristics of individual intersections and did not address the interactions of multiple intersections or other design complexities along corridors. The Study's results should not be considered similar to a detailed corridor traffic analysis, nor were the results intended to identify specific design solutions. Further safety, operational, and environmental studies will be required to develop improvement projects, along with a full and transparent public process. The subsections below provide general observations and cite examples to recognize how closely spaced intersections may interact and how corridor continuity and context can bring more complexity to future planning than implied by the priorities assigned to individual intersections. Unlike the basic results of this Study, these corridor planning factors should recognize how an intersection priority at one location may drive upstream and downstream issues and inform the full scope of corridor improvements.

Future corridor planning should recognize how an intersection priority and project at one location may drive upstream and downstream issues and inform the full scope of corridor improvements.

4.4.1 Closely Spaced Intersections

A detailed capacity analysis using microsimulation software would be required to better understand how closely spaced intersections interact, and thus what coordinated improvements may be justified. Advantages of the CAP-X Tool include its simplicity and cost effectiveness in assessing macroscopic and isolated capacity of existing conditions and numerous alterative intersection types. CAP-X is based in Microsoft Excel, with only volumes and number of lanes required for analysis. While this is efficient, the tool does not consider how closely spaced intersections may influence each other.

For example, Focus Area CH 42-B includes eight conventional intersections along CH 42 reflecting a mix of all three priorities, High, Medium, and Low. The Focus Area also includes four ramp intersections with both I-35W and I-35E. The results of the CAP-X analysis indicate that the only High Priority intersection for grade separation is at Nicollet Avenue. Five of the eight intersections, including Burnhaven Drive and Aldrich Avenue (west of Nicollet Avenue) were found to be Low Priority intersections. However, the limitations of this Study include no consideration of how overlapping intersection influence areas may impact operational performance. ***Figure 34*** (next page) shows an example of overlapping influence areas based on distances of 1,000 feet from CH 42 intersections. In its 2030 Comprehensive Plan, Dakota County notes that closely spaced intersections, with less than 1,000 feet of separation, can have difficulty fully accommodating tapers, turn lane storage, and weaving. Other agencies may have different definitions of "closely spaced" intersections, but the same principles will often apply.

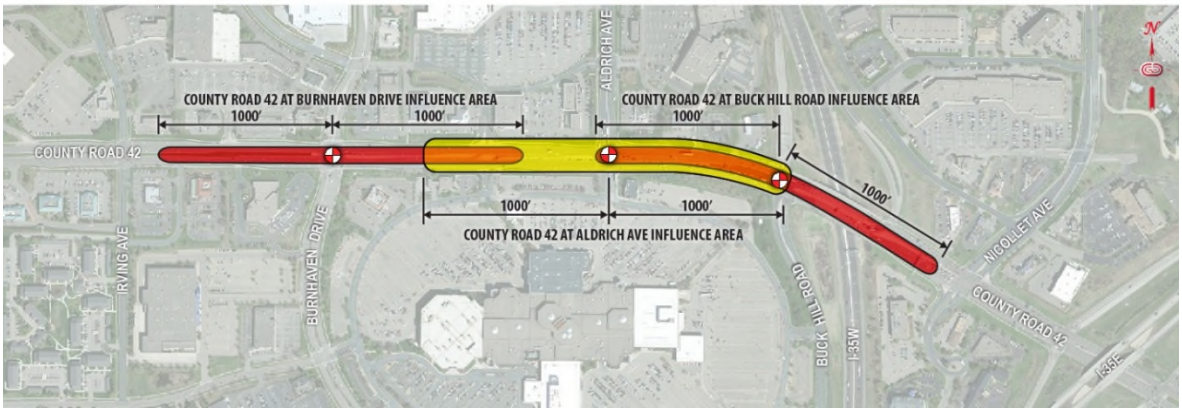

Figure 34. Example of Closely Spaced Intersections and Overlapping Intersection Influence Areas

4.4.2 Corridor Continuity and Spacing of Future Interchanges

A detailed operational and safety study will be required to fully define potential solutions and develop a preliminary design. As described above, this analysis should consider closely spaced intersections and what impact they have on each other. It should also consider what improvements are being contemplated at nearby and adjacent intersections. For example, the six intersections along Focus Area TH 252 are all identified as High Priority for potential grade separation. These intersections are spaced as closely as 0.3 miles, but not more than 0.7 miles apart. In the TPP, the Metropolitan Council established desired interchange spacing of not less than one mile in urban and suburban areas. If such a corridor were to become a freeway, it is reasonable to consider design concepts proposing consolidation of access and fewer than six interchanges. Access can also be served with frontage roads or other network improvements to serve all connections, maintain continuity, and yet increase the effective access spacing. Addressing such competing goals involves many complex geometric and operational issues that are far beyond this Study's focus on grade-separation priorities.

4.4.3 Corridor Context and Jurisdictional Issues

Issues related to corridor context must be more fully vetted as part of a detailed intersection or corridor study, or as part of formal project proposals and funding applications. The intersection priorities determined in this Study scored corridor context issues such as land use, prior planning activities, and freight, transit, and bicycle usage, among others. These weighted factors were developed and refined through work with the TSC and were considered at a high level. While a goal was to identify a representative list of corridor context issues that were applicable to all Phase II intersections and corridors, this Study does not address the unique contextual issues found in each and every Focus Area. Similar to the topics discussed above, the context in each intersection and corridor will be a major input to the process of developing the right types of design solutions.

At some locations, jurisdictional issues may also present challenges in project context. For example, some Focus Areas straddle boundaries between counties or cities, and some will present a variety of needs and funding opportunities or constraints, considering both local and regional perspectives. The next section of this report provides additional background and guidance on how this Study can be used by agencies in future transportation planning.

5 Role of the Study in Future Planning

The key inputs from this Study for future planning will be to support local planning, the Transportation Policy Plan (TPP), the State Highway Investment Plan (MnSHIP), and related Council and MnDOT funding programs. The work will also help guide the right-sizing of proposed projects and provide background for updates transportation policy initiatives. This section provides a baseline grounded in recent project development trends and expands on each of the above noted topics.

5.1 Intersection Conversion Background (Project Trends)

This Study concluded with 91 intersections considered possible candidates for grade-separation projects. Of those, 34 are High-Priority intersections. In order to ground the Study in relevant background, ***Table 3*** provides a review of past projects, to foresee the potential number of intersection conversions (new interchanges) in years ahead. This review was based on data compiled for such projects over approximately the last 10 years, plus committed projects through 2016 (year 11).[10]

Based on the Table 3 data and other inputs, the Study team shared the general observation that leadership and funding of new interchange projects has shifted from mostly MnDOT-led projects to mostly locally led projects over time (over the last 20 years or more). Observations based on Table 3 and input from the Study's TSC members include:

- The "pace" of major intersection conversion projects has been about one to two per year or 16 projects in 10 years (less than half of the 34 High-Priority intersections identified in this Study).
- The average project construction cost for one new interchange has been about $18 million.[11]
- Right-of-way costs can substantially increase overall project costs over construction estimates. This is evident in Table 3 when comparing the construction costs to the sum of funding sources needed for implementation (the needed funding often far exceeds the costs cited solely for construction).

5.2 Using the Study in Future Planning

The Focus Area details presented in Section 4 provide a basis for future planning, either for individual intersections or for corridors. However, as described in Section 4.4, many of the Focus Areas identified in this Study present possible complexities based on mixed intersection priorities, closely spaced intersections, and corridor context. The sections below conclude this Final Report by outlining how the Study may be used to support additional planning.

5.2.1 Incorporate Study Findings into Transportation Policy and Investment Plans

The Intersection Conversion Study identifies priorities for one category of TPP Regional Mobility Improvements: Highway Strategic Capacity Enhancements. The possible strategic capacity projects implied by intersection priorities may be included in both the Current and Increased Revenue Scenarios.

[10] In reviewing relevant data, the study team found that details for past projects were most clear over the last 10 years. Trends and data prior to that 10-year timeframe were less clear and less consistent.

[11] Note, this figure (based on Table 3 data) is likely skewed low based on inflation and considering some costs and funding sources not captured in MnDOT data, especially local government costs.

Table 3 - Past and Programmed Intersection Conversions

2006 to 2016

Primary Roadway	Minor Roadway	Project # (SP#)	County	Lead Agency	Year Construction Began	Construction Costs (PPMS)	Funding Sources (STIP)
TH 169	TH 25-CSAH 64	7008-45	Scott	MnDOT	2006	$16,500,000	- $16.0 M - FHWA NHS - $4.9 M - Local
TH 52	CSAH 47	1906-48 19-647-16 1906-55	Dakota	MnDOT	2006 (grade separation) 2012 (ramps)	$10,900,000	- $4.8 M TH - $3.0 FHWA - $3.0 Other
TH 36	McKnight Rd	6211-81 151-090-01 151-101-02 151-248-13 151-010-02	Ramsey	City of North St. Paul	2006	$27,800,000	- $0.9 M Enhancement - $0.8 M Miscellaneous Fed. Funds - $6.6 M STP - $6.0 M NHS - $1.5 M TH - $3.3 M Local
TH 65	CSAH 14	0208-123	Anoka	Anoka County	2007	$16,500,000	- $9.6 M FHWA NHS - $2.4 M TH - $12.0 M Local
TH 169	CSAH 109 (85th Ave)/CSAH 81 (Bottineau Blvd)	2750-57	Hennepin	MnDOT	2008	$50,000,000	- $35.9 M FHWA NHS - $6.5 M STP - $6.5M Bond Funds - $9.0 M TH - $7.5 M Local
TH 7	Wooddale	2706-222 163-280-020	Hennepin	City of St Louis Park	2009	$11,600,000	- $5.7 M Federal Funds (unspecified) - $3.5 M ARRA
CSAH 42	CSAH 17	070-617-023	Scott	Scott County	2011	$4,900,000	Partial Interchange - $1.8 M HSIP - $1.6 M SMSC Contribution
TH 13	CSAH 101	070-596-003 7001-103	Scott	Scott County	2011	$18,400,000	Partial Interchange - $7.8 M STP - $2 M Local - $1.1 M TH - $5.0 M ARRA
TH 10	CSAH 96	062-596-003S 062-596-003UG	Ramsey	Ramsey County	2012	$12,200,000	- $2.0 M HSIP - $5.6 M STP - $4.6 M Local
TH 7	Louisiana Ave	2706-226 163-010-038	Hennepin	City of St Louis Park	2012	$22,300,000	- $7.6 M STP - $6.3 M Local - $4.5 M TED
TH 13	CSAH 5	1901-148 019-605-028	Dakota	Dakota County	2013	$27,500,000	- $7.1 M - STP - $12.9 M Local - $4 M Chapter 152 Interchange Bonds - $12 M Chapter 36 Bonds - $1 M Safety/Capacity - $0.6 M Municipal Agreement - $0.8 M TH - $0.25 M Federal Appropriations
TH 169	CSAH 39 (93rd Ave)	2750-75	Hennepin	MnDOT	2013	$8,100,000	- $6.0 M TH / Interchange Bonds - $6.0 M Local
TH 36	English St	6211-90 138-101-018	Washington	City of Maplewood	2013	$17,800,000	- $7.3 M STP - $1.8 M TED - $1.0 M Private Investors
TH 36	CSAH 29 (Hilton Trl)	8204-55	Washington	MnDOT	2013	$14,000,000	- $8.9 M STP - $2.2 M TH - $0.5 M Local
TH 101	CSAH 144 (141st Ave)	238-010-003 2738-28 2738-29	Hennepin	City of Rogers	2014	$14,600,000	- $7.7 M STP - $0.9 M Local - $9.2 M 2011 SAM - $0.2 M TH - $0.9 M NHPP
TH 169	CSAH 69	7005-97	Scott	Scott County	2014	$10,900,000	- $10.9 M SAM
TH 10	CSAH 83 (Armstrong Blvd)	0202-95	Anoka	Anoka County	2016	$29,800,000	- $10.2 M CTIB - $10.0 M TIGER grant - $10.0 M CIMS - $8.0 M LRIP - $1.1 M BNSF RR - $1.56 M HPP - $5.6 M Local
TH 52	CSAH 86	1905-39	Dakota	Dakota County	2016	$8,300,000	- $0.4 M Municipal Agreement - $1.0 M Safety / Capacity - $0.4 M WRE - $3.4 M TH
CSAH 42	TH 52	019-642-059	Dakota	Dakota County	2017	$10,400,000	- $7.3 M STP - $3.1 M Local
TH 169	TH 41	070-596-013	Scott	Scott County	2019	$22,700,000	- $7.6 M STP - $10.0 M TED - $5.1 M Local
TH 36	Hadley Ave	082-596-005	Washington	Washington County	2019	$12,000,000	- $7.6 M STP - $3.4 M TED

Findings: 18 conversions from 2006 - 2016

Project Leads

- 44% of the projects are led by County
- 28% of the projects are led by City
- 28% of the projects are led by MnDOT

Investment

- Region builds 1.6 conversions per year (on non-freeway PA's)
- Investing $30 million / year, averaging $18 million per project

Funding

- 61% of the projects have funds from the Regional Solicitation
- 72% of the projects have funds obtained from a competitive solicitation

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The MnDOT MnSHIP will also reference this Study in setting priorities for Metro-area projects and funding. In the past, the Met Council's TPP and MnSHIP priorities have been similar and this is expected to continue.

The TPP's Appendix F, Highway Interchange Request Criteria and Review Procedure, has also been reviewed and edited as a part of this Study.

The TPP's Appendix F, *Highway Interchange Request Criteria and Review Procedure*, has also been reviewed and edited as a part of this Study. The initial revisions will be reviewed by Study TSC members and later finalized during the TPP update in 2017-2018. The revised guidance will recognize the inputs to be provided by this Study's intersection conversion priorities and are proposed to add an initial high-level review to efficiently confirm if an interchange (grade separation) is the right type of solution. The second level of review would then be similar to the existing guidance, which requires additional detailed traffic engineering and design studies.

5.2.2 Support Project Funding Decisions

The Council's semi-annual Regional Solicitation and MnDOT programs, such as the Transportation Economic Development (TED) program and the Safety and Mobility (SaM) Interchange Program, regularly fund numerous highway mobility projects. The Council and MnDOT intend to use the intersection priorities in this Study and related information as inputs on selection of projects for funding.

5.2.3 Provide a Reference for Local Planning

The Study may provide guidance for local transportation and corridor planning. For example, it could be referenced to support transportation planning and project strategies used by counties and cities in local transportation or comprehensive plans. There are many examples of related locally driven planning initiatives – for example access management and right-of-way preservation. Specifically, actions taken based on the Right-of-Way Acquisition Loan Fund (RALF) could reference priorities in this Study.[12] Conversely, the Study itself could be leveraged by MnDOT and the Metropolitan Council to establish priorities and guide the proactive use of the RALF program for potential interchange projects or other proposed capacity expansions.

5.2.4 Guide the Right-Sizing of Proposed Projects

The "right-sizing" of projects proposed for funding and implementation is a fundamental objective for future planning in reference to this Study. ***Figure 35*** illustrates generally how the Study's intersection

[12] See: https://metrocouncil.org/transportation/planning-2/transit-plans,-studies-reports/highways-roads/right-of-way-acquisition-loan-fund.aspx

priorities are proposed for review in project funding evaluations and decisions. The priorities will be considered when principal arterial intersections evaluated in Phase II are seeking competitive funds such as federal funds through the semi-annual Regional Solicitation. For those cases, the Study's intersection priorities will bring a measurable weight into project funding decisions—especially when new interchanges or other grade-separated designs are proposed. Still, most project funding criteria will be unchanged, with reviews based on program intent, other technical justifications, and sound project planning.

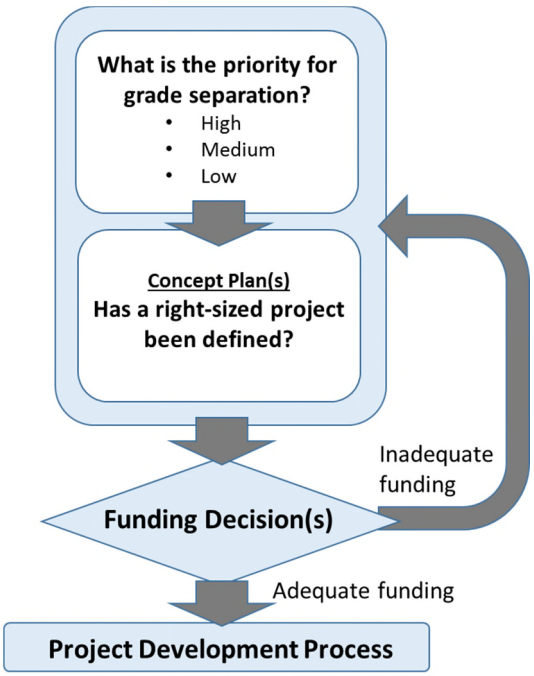

Figure 35. Study's Input to Funding Decisions

The investment philosophy shown in ***Figure 36*** is consistent with the 2040 TPP and is supported by both the Council and MnDOT Metro District. This diagram recommends that development of intersection improvement design alternatives consider a progression of investment decisions along with the technical data and context at the intersection and throughout the corridor. This progression should shift from at-grade lower-cost designs to, where supported, designs that propose to substantially increase principal arterial capacity. The sequence shown recognizes project decision-making could result in smaller investments that prove to be interim solutions over time; however, this can allow user benefits to accumulate sooner than benefits of much larger projects that take longer to implement.

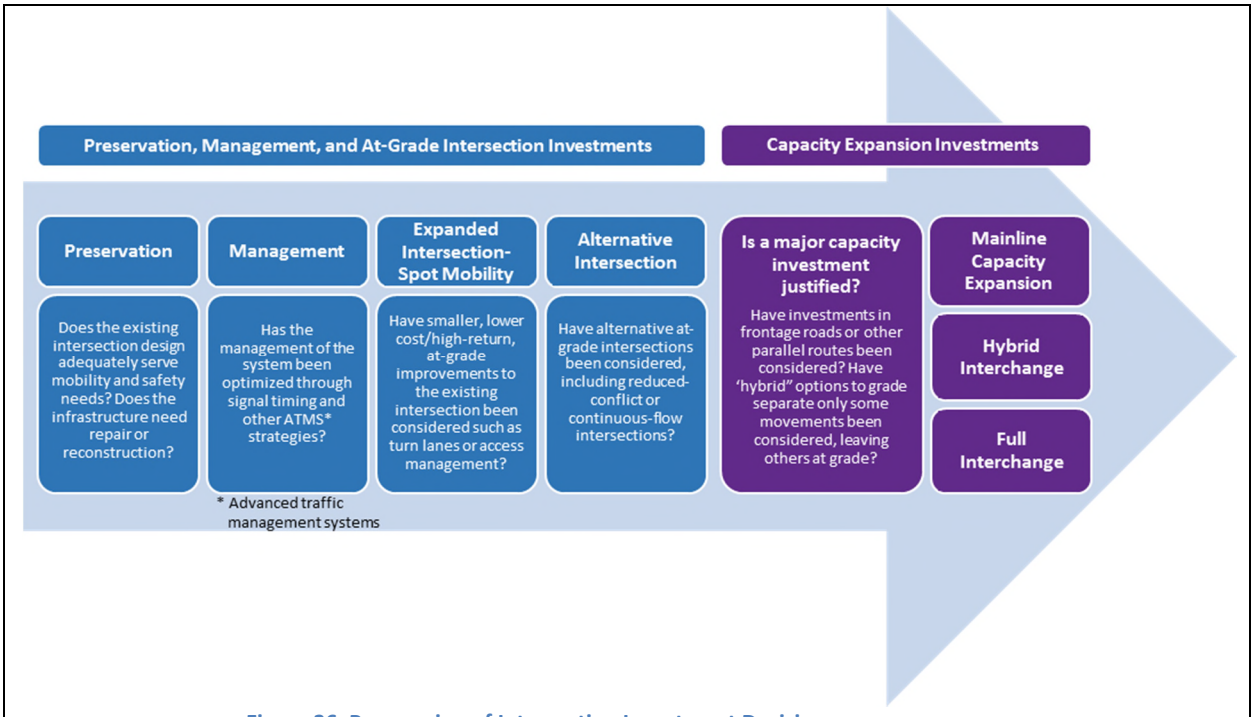

Figure 36. Progression of Intersection Investment Decisions

The history of Twin Cities non-freeway system conversion to interchanges and freeways suggests major projects need considerable funds and time and to materialize (one to two interchanges per year as noted in Section 5.1). The recommended progression in project decision-making is intended to guide right-sizing so that more projects and benefits can become reality sooner.

The recommended progression in project decision-making is intended to guide right-sizing so that more projects and benefits can become reality sooner.

The development of right-sized projects is consistent with the 2040 TPP regional investment philosophy (Figure 36 above). The philosophy generally states, "Expansion needs far exceed fiscal realities. Since the region cannot build its way out of congestion, it needs to be strategic when making investments to ensure the right-sizing of projects." This statement is consistent with the Study's intersection priorities, which place the highest priority on intersections with greater congestion. Other highway issues, including safety, speed, and system connectivity, are also considered; but lower-cost high-benefit projects may prove effective to address such issues. High levels of congestion, with the related user costs, often require more costly investments in new capacity to mitigate–including conversions of intersections into interchanges. This Study is part of the region's emphasis on improved targeting for transportation investments.

The Study did not develop site-specific design concepts; however, the guidance here illustrates the appropriate decision-making framework with reference to the assigned grade-separation priorities. Additional guidance is provided in ***Attachment 3***, *Intersection Solution Sets and Cost Ranges*. The attachment provides more detail on potential intersection solutions, including computed and observed cost ranges for both unconstrained and constrained settings. The intent of this guidance is to help project teams align locally and regionally driven investments on non-freeway principal arterials.

In evaluating right-sizing, the target timeframe for projects, and estimated benefits over time, should be considered. This is highlighted by ***Figure 37***, which illustrates the concept of a lower-cost/high-benefit project. The element of time adds additional complexity for project development, when the benefits and costs of projects over time are estimated. Therefore, the criteria and analyses that will confirm a right-sized project may be complex and will be determined through project-specific efforts.

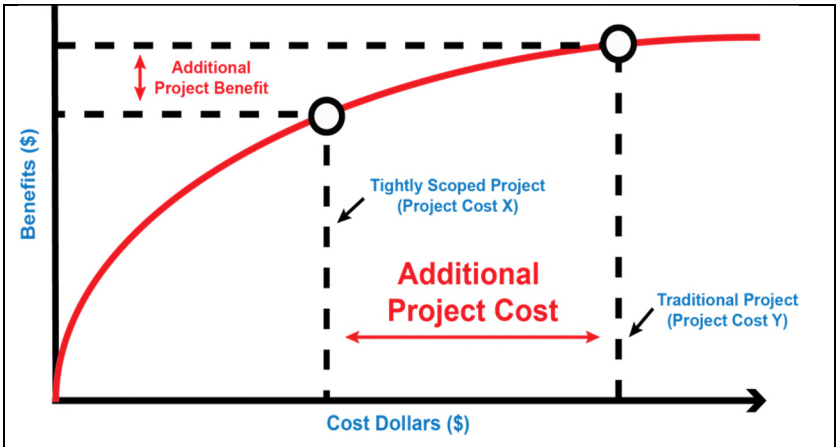

Figure 37. Concept of a Lower-Cost/High-Benefit Project

5.2.5 Provide a Transportation Policy Reference

The transportation planning framework in this Study provides high-level guidance for possible legislative priorities, whether from a highway system perspective (broad state and regional needs) or from an individual project funding perspective as outlined above (the Study's Focus Areas). Staff representing the Metropolitan Council, MnDOT, and other agencies should find opportunities to present the Study's background and results to support legislative topics, whether programmatic or project-specific. For example, county and local staff/representatives should find the information in this report can be "sampled" to answer questions and support communications about project planning and funding priorities.

5.3 Updating the Study's Analysis and Intersection Priorities

The Study emphasized current needs, but also recognized the potential for growth and change. The technical team for the Study implemented a repeatable process that can be periodically updated in whole or in part. After discussing the frequency of such updates with the Study's Steering Committee, the Metropolitan Council and MnDOT project management team recommended that intersection priorities be updated every 4 to 8 years (with reference to the 4-year TPP update cycle).

PRINCIPAL ARTERIAL INTERSECTION CONVERSION STUDY

METROPOLITAN COUNCIL

DEPARTMENT OF TRANSPORTATION

FINAL REPORT

ATTACHMENT 1

Detailed Phase II Data Tables

This attachment contains the entire set of data tables that were developed for the Phase II portion of the project. The Capacity Analysis for Planning of Junctions (CAP-X) tool was used to analyze all 91 conventional at-grade intersections in the study. The Federal Highway Administration (FHWA) developed this tool to provide high-level technical capacity analysis for intersections needing future consideration for funding and projects.

There are two tables that were used to analyze all 91 intersections. Each are **formatted for 11x17 printing** and organized by:

- Table 1-1 Composite Score/Priority Sort
- Table 1-2 County and Focus Area Sort

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Table 1-1. Principal Arterial Intersection Conversion Study - Grade-Separation Priorities by Composite Score (DRAFT Final Report)

Intersections	County Name	Corridor ID	Locally Identified Future Grade Separation	Entering Daily Traffic Volume (AADT)	Speed Limit (mph) (Maximum)	Intersection Thru Lanes	Corridor Thru Lanes	Mobility Weighted Score Subtotal	Safety Weighted Score Subtotal	Corridor Context Weighted Score Subtotal	Existing Intersection	Expanded Conventional Intersection	Alternative Intersection	Arterial Capacity Improvements	Hybrid Intersection (Partial Grade Separation)	Full Grade Separation (Interchange)	Total Weighted Score	Normalized Weighted Score	CAP-X Existing V/C	Normalized Capacity Analysis Score (CAP-X)	Composite Score	Grade-Sep Priority
TH 252 & 66TH AVE	Hennepin	TH252	Yes	68,850	55	6	6	3.6	2.4	2.1	R	R	R	R	G6	G	8.1	10.0	1.2	8.4	9.2	H
TH 10 & THURSTON AVE	Anoka	TH10	Yes	60,800	60	4	4	3.0	1.3	2.4	R	R	R	R	R	G	6.8	8.4	1.4	10.0	9.2	H
TH 252 & 85TH AVE	Hennepin	TH252	Yes	65,650	55	5	5	3.7	1.7	2.2	R	R	R	G6	G	G	7.6	9.5	1.2	8.9	9.2	H
TH 252 & BROOKDALE DR	Hennepin	TH252	Yes	62,000	55	5	4	3.4	0.8	2.2	R	R	R	Y	G6	G	6.3	7.8	1.4	9.9	8.8	H
TH 65 & 99TH AVE	Anoka	TH65	Yes	59,950	55	4	4	2.7	1.6	2.5	R	R	R	Y	R	G	6.7	8.3	1.2	8.3	8.3	H
TH 10 & SUNFISH LAKE BLVD	Anoka	TH10	Yes	51,485	60	4	4	2.7	1.5	2.5	R	R	R	G	R	G	6.7	8.3	1.1	8.2	8.3	H
TH 280 & BROADWAY ST	Ramsey	TH280	Yes	47,800	50	4	4	3.4	0.7	2.1	R	Y	DLY	G	Y	G	6.2	7.7	1.2	8.8	8.3	H
CH 23 (CEDAR AVE) & 140TH ST	Dakota	CH23	Yes	57,650	40	6	6	3.5	1.5	2.4	Y	G6	R	G6	Y	G	7.4	9.2	1.0	7.1	8.1	H
TH 65 & 109TH AVE	Anoka	TH65	Yes	64,650	60	4	4	3.2	1.1	2.5	R	R	R	G	R	G	6.8	8.4	1.1	7.6	8.0	H
TH 169 & MAIN ST	Sherburne	TH169	Yes	61,550	55	4	4	2.7	2.4	2.1	Y	Y	R	G	G	G	7.2	9.0	1.0	6.8	7.9	H
TH 61 & WARNER RD	Ramsey	TH61		46,600	60	4	4	2.9	1.9	1.4	R	Y	R	G	G	G	6.1	7.6	1.1	8.1	7.9	H
CH 23 (CEDAR AVE) & CH 42	Dakota	CH23	Yes	68,500	50	6	6	3.2	1.7	2.4	Y	Y	R	Y	G6	G	7.3	9.0	0.9	6.3	7.7	H
TH 252 & 81ST AVE	Hennepin	TH252	Yes	57,625	55	4	4	2.7	0.8	2.1	R	R	R	G6	G6	G	5.6	6.9	1.1	8.2	7.6	H
TH 65 & 117TH AVE	Anoka	TH65	Yes	48,850	60	4	4	2.7	0.8	2.6	R	R	R	G	G	G	6.1	7.5	1.0	7.5	7.5	H
TH 65 & 93RD LN	Anoka	TH65		65,100	55	7	4	3.5	1.2	1.6	Y	G6	DLY	G6	G6	G	6.4	7.9	1.0	7.1	7.5	H
TH 252 & 70TH AVE	Hennepin	TH252	Yes	60,425	55	6	6	3.2	0.7	2.1	R	R	R	R	G6	G	6.0	7.4	1.0	7.5	7.5	H
TH 55 & CH 24/CH 9 (ROCKFORD RD)	Hennepin	TH55	Yes	46,800	55	4	4	2.9	0.6	1.7	R	R	R	G	Y	G	5.2	6.4	1.1	8.2	7.3	H
TH 65 & 105TH AVE	Anoka	TH65		57,750	55	4	4	2.7	0.8	1.6	R	R	R	G	Y	G	5.1	6.4	1.1	8.0	7.2	H
TH 13 & NICOLLET AVE	Dakota	TH13		42,100	55	4	4	2.4	2.1	2.0	G	G	DLY	G	G	G	6.6	8.1	0.9	6.2	7.2	H
TH 61 & LOWER AFTON RD	Ramsey	TH61		39,150	60	4	4	2.6	0.9	1.0	R	R	R	Y	G	G	4.4	5.5	1.2	8.5	7.0	H
TH 7 & CSAH 101	Hennepin	TH7	Yes	59,250	50	4	4	2.6	1.6	1.5	Y	Y	DLY	G	Y	G	5.6	7.0	1.0	6.9	6.9	H
TH 10 & FAIROAK AVE	Anoka	TH10	Yes	61,325	60	4	4	2.0	0.9	2.5	R	R	R	G	G	G	5.3	6.6	1.0	7.3	6.9	H
TH 252 & 73RD AVE	Hennepin	TH252	Yes	61,515	55	6	6	3.0	0.9	2.1	Y	Y	Y	G6	G6	G	6.0	7.5	0.9	6.2	6.8	H
TH 169 & SCHOOL ST	Sherburne	TH169	Yes	50,450	55	4	4	2.1	1.8	2.1	Y	Y	DLG	G	G	G	6.0	7.4	0.9	6.2	6.8	H
TH 65 & MEDTRONIC PKWY	Anoka	TH65		41,075	50	5	4	2.7	0.5	1.1	R	R	R	Y	G	G	4.3	5.3	1.2	8.3	6.8	H
TH 36 & TH 120 (CENTURY AVE)	Ramsey	TH36	Yes	44,800	55	4	4	1.7	2.1	2.2	G	G	G	G	G	G	6.0	7.4	0.9	6.1	6.8	H
CH 42 & NICOLLET AVE	Dakota	CH42		62,400	40	6	6	3.2	2.7	1.0	G6	G6	G6	G6	G6	G	6.9	8.5	0.7	4.9	6.7	H
TH 65 & BUNKER LAKE BLVD	Anoka	TH65	Yes	47,100	65	4	4	2.2	0.7	2.0	R	R	DLY	G	G	G	5.0	6.2	1.0	7.3	6.7	H
TH 13 & CHOWEN AVE	Dakota	TH13	Yes	48,950	55	4	4	1.7	1.2	2.5	Y	Y	Y	G	Y	G	5.4	6.7	0.9	6.6	6.7	H
CH 23 (CEDAR AVE) & 147TH ST	Dakota	CH23	Yes	52,000	40	6	6	2.4	1.2	2.2	Y	Y	DLY	Y	G6	G	5.8	7.1	0.9	6.2	6.7	H
TH 65 & 81ST AVE	Anoka	TH65		42,250	55	4	4	2.2	1.5	1.4	Y	Y	DLY	G	Y	G	5.2	6.4	1.0	6.9	6.6	H
TH 65 & OSBORNE RD	Anoka	TH65		40,100	55	4	4	2.2	0.9	1.5	R	R	R	G	Y	G	4.6	5.7	1.1	7.6	6.6	H
TH 13 & LYNN AVE	Scott	TH13		50,050	55	4	4	2.2	1.0	1.7	R	Y	Y	G	Y	G	4.9	6.1	1.0	7.2	6.6	H
TH 65 & 85TH AVE	Anoka	TH65		44,800	55	5	4	2.7	0.9	1.1	Y	Y	R	G6	G6	G	4.7	5.8	1.0	7.4	6.6	H
TH 7 & BLAKE RD	Hennepin	TH7		52,600	45	4	4	2.1	2.5	0.7	Y	Y	DLG	G	G	G	5.3	6.5	0.9	6.5	6.5	M
TH 13 & WASHBURN AVE	Dakota	TH13		49,735	55	4	4	1.9	1.0	1.8	Y	Y	DLY	G	Y	G	4.8	5.9	1.0	7.1	6.5	M
TH 55 & FERNBROOK LN	Hennepin	TH55	Yes	60,000	55	6	4	3.2	1.3	1.7	G6	G6	DLG6	G6	G6	G	6.2	7.7	0.7	5.3	6.5	M
TH 55 & CH 101/PEONY LN	Hennepin	TH55	Yes	41,200	55	4	4	2.4	0.6	1.8	Y	Y	DLY	G	G	G	4.8	6.0	1.0	6.9	6.4	M
TH 55 & VICKSBURG LN	Hennepin	TH55	Yes	53,600	55	4	4	2.6	1.1	1.7	Y	Y	R	G	G	G	5.3	6.6	0.9	6.3	6.4	M
TH 7 & WILLISTON RD	Hennepin	TH7	Yes	50,850	50	4	4	2.2	0.7	1.4	R	R	R	G	Y	G	4.3	5.3	1.0	7.5	6.4	M
TH 13 & QUENTIN AVE	Scott	TH13		48,275	45	4	4	1.8	0.6	1.9	R	R	Y	G	G	G	4.3	5.3	1.0	7.3	6.3	M
TH 61 & BURNS AVE	Ramsey	TH61		41,325	45	6	4	2.1	1.9	1.3	G6	G6	G6	G6	G6	G	5.3	6.6	0.8	6.0	6.3	M
TH 55 & CH 101/SIOUX DR	Hennepin	TH55	Yes	31,300	55	4	4	2.2	0.5	1.8	Y	Y	R	G	G	G	4.6	5.7	1.0	6.9	6.3	M
TH 169 & 109TH AVE N	Hennepin	TH169		50,600	55	4	4	1.9	0.7	2.3	G	G	Y	G	G	G	4.9	6.1	0.8	6.0	6.0	M
TH 65 & 89TH AVE	Anoka	TH65		43,500	55	6	4	2.1	2.4	1.2	G6	G6	G6	G6	G6	G	5.7	7.1	0.7	5.0	6.0	M
TH 36 & LAKE ELMO AVE N	Washington	TH36	Yes	41,975	65	4	4	1.6	1.2	2.4	G	G	G	G	G	G	5.2	6.5	0.8	5.5	6.0	M
TH 13 & DAKOTA AVE	Scott	TH13	Yes	47,365	55	4	4	1.7	0.7	2.0	Y	Y	Y	G	G	G	4.4	5.4	0.9	6.5	5.9	M
TH 55 & NIAGARA LN	Hennepin	TH55	Yes	47,650	55	4	4	2.2	0.6	1.7	Y	Y	DLY	G	G	G	4.5	5.6	0.9	6.3	5.9	M
TH 169 & TH 282	Scott	TH169	Yes	30,450	55	4	4	1.5	1.2	2.1	G	G	G	G	G	G	4.8	6.0	0.8	5.7	5.8	M
TH 169 & 197TH AVE	Sherburne	TH169	Yes	35,800	65	4	4	1.9	0.7	1.5	Y	Y	Y	G	G	G	4.1	5.1	0.9	6.5	5.8	M
TH 169 & 193RD AVE	Sherburne	TH169	Yes	45,350	55	4	4	1.8	1.0	1.6	G	G	Y	G	G	G	4.4	5.4	0.9	6.1	5.8	M
CH 42 & CH 5	Dakota	CH42	Yes	52,800	55	6	6	2.1	1.5	1.8	G6	G6	G6	G6	G6	G	5.3	6.6	0.7	4.7	5.6	M
CH 42 & TH 3	Dakota	CH42	Yes	27,800	55	4	4	1.4	0.9	1.9	G	G	G	G	G	G	4.2	5.2	0.8	6.0	5.6	M
CH 42 & BURNSVILLE PKWY	Dakota	CH42		46,150	55	6	6	2.2	1.2	1.0	G6	G6	G6	G6	G6	G	4.4	5.4	0.8	5.7	5.6	M
CH 14 & HANSON BLVD	Anoka	CH14	Yes	41,300	55	4	4	1.9	0.7	1.1	Y	G	Y	G	G	G	3.7	4.6	0.9	6.5	5.5	M
CH 23 (CEDAR AVE) & 145TH ST	Dakota	CH23		45,275	40	6	6	2.4	0.7	1.5	G6	G6	G6	G6	G6	G	4.5	5.6	0.7	5.3	5.5	M
CH 42 & PILOT KNOB RD	Dakota	CH42	Yes	45,500	50	4	4	1.7	1.1	1.9	G	G	Y	G	G	G	4.7	5.8	0.7	5.1	5.5	M
TH 65 & CROSSTOWN BLVD	Anoka	TH65	Yes	37,150	65	4	4	1.8	0.8	1.4	G	G	Y	G	G	G	4.0	4.9	0.8	6.0	5.4	M
TH 36 & MANNING AVE	Washington	TH36	Yes	43,700	60	4	4	1.7	0.7	2.6	G	G	G	G	G	G	5.0	6.1	0.7	4.7	5.4	M
TH 65 & 73RD AVE	Anoka	TH65		40,400	55	4	4	1.8	0.6	1.4	G	G	Y	G	G	G	3.7	4.6	0.9	6.2	5.4	M
TH 7 & TEXAS AVE	Hennepin	TH7		40,900	45	4	4	1.5	1.8	0.7	G	G	Y	G	G	G	3.9	4.9	0.8	5.8	5.4	M
TH 55 & CH 116	Hennepin	TH55	Yes	27,600	55	4	4	1.4	1.2	1.6	Y	G	DLY	G	G	G	4.2	5.2	0.8	5.5	5.3	L
TH 55 & ARGENTA TRL	Dakota	TH55	Yes	21,875	65	4	4	1.4	0.8	2.1	G	G	G	G	G	G	4.2	5.2	0.7	5.3	5.3	L
TH 65 & VIKING BLVD	Anoka	TH65	Yes	35,500	65	4	4	1.6	0.6	1.5	G	G	G	G	G	G	3.7	4.5	0.8	6.0	5.3	L
CH 42 & ALDRICH AVE	Dakota	CH42		54,150	40	6	6	1.9	1.8	1.0	G6	G6	Y	G6	G6	G	4.7	5.8	0.7	4.7	5.3	L
TH 7 & WOODLAND RD	Hennepin	TH7	Yes	43,625	50	4	4	1.4	0.7	1.4	G	G	G	G	G	G	3.6	4.4	0.8	6.0	5.2	L
TH 169 & HAYDEN LAKE RD E	Hennepin	TH169		44,250	55	4	4	1.6	0.6	1.3	G	G	G	G	G	G	3.5	4.3	0.8	6.0	5.2	L
TH 10 & RAMSEY BLVD	Anoka	TH10	Yes	46,275	60	4	4	1.5	0.6	2.0	G	G	G	G	G	G	4.1	5.1	0.7	5.3	5.2	L
TH 65 & CONSTANCE BLVD	Anoka	TH65	Yes	35,375	65	4	4	1.4	0.8	1.3	G	G	G	G	G	G	3.5	4.4	0.8	5.9	5.1	L
CH 42 & BURNHAVEN DR	Dakota	CH42	Yes	52,050	40	6	6	1.7	1.3	1.7	G6	G6	Y	G6	G6	G	4.6	5.7	0.6	4.6	5.1	L
TH 36 & DEMONTREVILLE TRL	Washington	TH36	Yes	37,600	65	4	4	1.0	0.3	2.4	G	G	G	G	G	G	3.7	4.6	0.8	5.5	5.0	L
TH 36 & KEATS AVE	Washington	TH36	Yes	37,650	65	4	4	1.0	0.4	2.0	G	G	G	G	G	G	3.4	4.3	0.8	5.8	5.0	L
TH 55 & DOUGLAS DR	Hennepin	TH55		38,650	55	4	4	1.6	0.6	1.1	G	G	DLY	G	G	G	3.3	4.1	0.8	5.8	4.9	L
CH 42 & JOHNNY CAKE RIDGE RD	Dakota	CH42		33,750	50	4	4	1.4	1.0	1.1	G	G	G	G	G	G	3.5	4.3	0.7	5.3	4.8	L

Table 1-1. Principal Arterial Intersection Conversion Study - Grade-Separation Priorities by Composite Score (DRAFT Final Report)

Intersections	County Name	Corridor ID	Locally Identified Future Grade Separation	Entering Daily Traffic Volume (AADT)	Speed Limit (mph) (Maximum)	Intersection Thru Lanes	Corridor Thru Lanes	Mobility Weighted Score Subtotal	Safety Weighted Score Subtotal	Corridor Context Weighted Score Subtotal	Existing Intersection	Expanded Conventional Intersection	Alternative Intersection	Arterial Capacity Improvements	Hybrid Intersection (Partial Grade Separation)	Full Grade Separation (Interchange)	Total Weighted Score	Normalized Weighted Score	CAP-X Existing V/C	Normalized Capacity Analysis Score (CAP-X)	Composite Score	Grade-Sep Priority
TH 65 & MOORE LAKE DR	Anoka	TH65		36,000	50	4	4	1.4	0.5	0.9	G	G	G	G	G	G	2.8	3.5	0.8	5.9	4.7	L
TH 13 & PORTLAND AVE	Dakota	TH13		33,100	50	4	4	1.2	0.5	1.7	G	G	G	G	G	G	3.4	4.2	0.7	5.2	4.7	L
CH 42 & PORTLAND AVE	Dakota	CH42		35,200	45	4	4	1.5	0.7	0.8	G	G	G	G	G	G	3.0	3.7	0.7	5.2	4.5	L
TH 65 & MISSISSIPPI ST	Anoka	TH65		36,900	50	4	4	1.2	0.3	0.9	G	G	G	G	G	G	2.4	3.0	0.8	5.8	4.4	L
TH 52 & 200TH ST	Dakota	TH52	Yes	30,530	65	4	4	0.8	0.7	2.7	G	G	G	G	G	G	4.2	5.2	0.5	3.4	4.3	L
TH 13 & 12TH AVE	Dakota	TH13		35,400	50	4	4	1.1	1.0	1.7	G	G	G	G	G	G	3.8	4.8	0.5	3.8	4.3	L
TH 52 & 190TH ST	Dakota	TH52	Yes	30,052	65	4	4	0.9	0.3	2.6	G	G	G	G	G	G	3.8	4.7	0.5	3.6	4.1	L
TH 212 & CH 43	Carver	TH212	Yes	13,900	55	2	2	0.9	0.3	2.2	R	G	G	G	G	G	3.4	4.2	0.6	4.0	4.1	L
TH 169 & 150TH ST	Scott	TH169	Yes	27,725	65	4	4	0.7	0.3	2.0	G	G	G	G	G	G	3.0	3.7	0.6	4.3	4.0	L
CH 42 & CH 11	Dakota	CH42		35,400	45	4	4	1.3	0.7	0.9	G	G	G	G	G	G	2.9	3.6	0.6	4.4	4.0	L
TH 169 & 173RD ST W	Scott	TH169	Yes	28,000	65	4	4	1.1	0.3	2.1	G	G	G	G	G	G	3.5	4.3	0.5	3.5	3.9	L
TH 169 & TH 21/BROADWAY ST	Scott	TH169		28,000	65	4	4	1.0	0.4	1.4	G	G	G	G	G	G	2.8	3.5	0.5	3.5	3.5	L
TH 169 & DELAWARE AVE	Scott	TH169	Yes	22,625	65	4	4	0.4	0.3	2.1	G	G	G	G	G	G	2.8	3.5	0.5	3.3	3.4	L
CH 42 & BISCAYNE AVE	Dakota	CH42		16,210	55	4	4	0.8	0.7	1.3	G	G	G	G	G	G	2.8	3.5	0.3	2.2	2.9	L
CH 42 & BUSINESS PKWY	Dakota	CH42		14,668	55	4	4	0.4	0.3	1.4	G	G	G	G	G	G	2.1	2.6	0.3	2.2	2.4	L
CH 42 & 145TH ST/PLYMOUTH AVE	Dakota	CH42		30,425	45	4	4	1.0	0.5	0.8	G	G	G	G	G	G	2.3	2.8	0.2	1.7	2.2	L
CH 42 & CH 21	Scott	CH21		25,300	40	4	4	1.4	0.5	1.4	Missing Data						3.2	4.0		0.0	2.0	L

Distribution of intersection grade-separation priorities:

High	34
Medium	27
Low	30
	91

Other Initially Considered Phase 2 Intersections (Removed)

CH 42 & PIKE LAKE TRL	Scott	CH42	Removed at Request of Scott County
CH 42 & CHICAGO AVE	Dakota	CH42	Removed at Request of Dakota County (Future RIRO)
TH 36 & HADLEY AVE	Washington	TH36	Funded Interchange
TH 169 & 101ST AVE	Hennepin	TH169	Current RIRO

Legend for Cap-X Results Summary:

R	V/C >= 1 Volume to Capacity Ratio Unacceptable
Y	V/C > 0.85, <1 May be acceptable, may be possible to optimize to less than 0.85 with signal timing
DLY	V/C > 0.85, <1 May be acceptable, Only Displaced Left Alternative At-Grade
DLG	V/C <= 0.85 Only Displaced Left Alternative At-Grade
G6	V/C <= 0.85 Volume to Capacity Ratio Acceptable, With 6-Lane, if corridor already 6-Lane
G	V/C <= 0.85 Volume to Capacity Ratio Acceptable
N/A	Not Applicable (ramp intersections)

Table 1-2. Principal Arterial Intersection Conversion Study - Grade-Separation Priorities by County and Focus Area (DRAFT Final Report)

Intersections	County Name	Corridor ID	Corridor Segment	Corridor Sub-Segment	Locally Identified Future Grade Separation	Entering Daily Traffic Volume (AADT)	Corridor Type	Speed Limit (mph) (Maximum)	Intersection Thru Lanes	Corridor Thru Lanes	Mobility Weighted Score Subtotal	Safety Weighted Score Subtotal	Corridor Context Weighted Score Subtotal	At-Grade Intersections: Existing Intersection	At-Grade Intersections: Expanded Conventional Intersection	At-Grade Intersections: Alternative Intersection	At-Grade Intersections: Arterial Capacity Improvements	Partial to Full Grade Separation: Hybrid Intersection (Partial Grade Separation)	Partial to Full Grade Separation: Full Grade Separation (Interchange)	Total Weighted Score	Normalized Weighted Score	CAP-X Existing V/C	Normalized Capacity Analysis Score (CAP-X)	Composite Score	Grade-Sep Priority
TH 10 & RAMSEY BLVD	Anoka	TH10	A	1	Yes	46,275	CLAE	60	4	4	1.5	0.6	2.0	G	G	G	G	G	G	4.1	5.1	0.7	5.3	5.2	L
TH 10 & SUNFISH LAKE BLVD	Anoka	TH10	A	2	Yes	51,485	CLAE	60	4	4	2.7	1.5	2.5	R	R	R	G	R	G	6.7	8.3	1.1	8.2	8.3	H
TH 10 & THURSTON AVE	Anoka	TH10	A	3	Yes	60,800	CLAE	60	4	4	3.0	1.3	2.4	R	R	R	R	R	G	6.8	8.4	1.4	10.0	9.2	H
TH 10 & FAIROAK AVE	Anoka	TH10	A	4	Yes	61,325	CLAE	60	4	4	2.0	0.9	2.5	R	R	R	G	G	G	5.3	6.6	1.0	7.3	6.9	H
CH 14 & HANSON BLVD	Anoka	CH14	A	1	Yes	41,300	4-LSA	55	4	4	1.9	0.7	1.1	Y	G	Y	G	G	G	3.7	4.6	0.9	6.5	5.5	M
TH 65 & MEDTRONIC PKWY	Anoka	TH65	A	1		41,075	CLAE	50	5	4	2.7	0.5	1.1	R	R	R	Y	G	G	4.3	5.3	1.2	8.3	6.8	H
TH 65 & MOORE LAKE DR	Anoka	TH65	A	2		36,000	CLAE	50	4	4	1.4	0.5	0.9	G	G	G	G	G	G	2.8	3.5	0.8	5.9	4.7	L
TH 65 & MISSISSIPPI ST	Anoka	TH65	A	3		36,900	CLAE	50	4	4	1.2	0.3	0.9	G	G	G	G	G	G	2.4	3.0	0.8	5.8	4.4	L
TH 65 & 73RD AVE	Anoka	TH65	A	4		40,400	CLAE	55	4	4	1.8	0.6	1.4	G	G	Y	G	G	G	3.7	4.6	0.9	6.2	5.4	M
TH 65 & OSBORNE RD	Anoka	TH65	A	5		40,100	CLAE	55	4	4	2.2	0.9	1.5	R	R	R	G	Y	G	4.6	5.7	1.1	7.6	6.6	H
TH 65 & 81ST AVE	Anoka	TH65	A	6		42,250	CLAE	55	4	4	2.2	1.5	1.4	Y	Y	DLY	G	Y	G	5.2	6.4	1.0	6.9	6.6	H
TH 65 & 85TH AVE	Anoka	TH65	A	7		44,800	CLAE	55	5	4	2.7	0.9	1.1	Y	Y	R	G6	G6	G	4.7	5.8	1.0	7.4	6.6	H
TH 65 & 89TH AVE	Anoka	TH65	A	8		43,500	CLAE	55	6	4	2.1	2.4	1.2	G6	G6	G6	G6	G6	G	5.7	7.1	0.7	5.0	6.0	M
TH 65 & 93RD LN	Anoka	TH65	B	1		65,100	CLAE	55	7	4	3.5	1.2	1.6	Y	G6	DLY	G6	G6	G	6.4	7.9	1.0	7.1	7.5	H
TH 65 & 99TH AVE	Anoka	TH65	B	2	Yes	59,950	CLAE	55	4	4	2.7	1.6	2.5	R	R	R	Y	R	G	6.7	8.3	1.2	8.3	8.3	H
TH 65 & 105TH AVE	Anoka	TH65	B	3		57,750	CLAE	55	4	4	2.7	0.8	1.6	R	R	R	G	Y	G	5.1	6.4	1.1	8.0	7.2	H
TH 65 & 109TH AVE	Anoka	TH65	B	4	Yes	64,650	CLAE	60	4	4	3.2	1.1	2.5	R	R	R	G	R	G	6.8	8.4	1.1	7.6	8.0	H
TH 65 & 117TH AVE	Anoka	TH65	B	5	Yes	48,850	CLAE	60	4	4	2.7	0.8	2.6	R	R	R	G	G	G	6.1	7.5	1.0	7.5	7.5	H
TH 65 & BUNKER LAKE BLVD	Anoka	TH65	B	6	Yes	47,100	CLAE	65	4	4	2.2	0.7	2.0	R	R	DLY	G	G	G	5.0	6.2	1.0	7.3	6.7	H
TH 65 & CONSTANCE BLVD	Anoka	TH65	C	1	Yes	35,375	CLAE	65	4	4	1.4	0.8	1.3	G	G	G	G	G	G	3.5	4.4	0.8	5.9	5.1	L
TH 65 & CROSSTOWN BLVD	Anoka	TH65	C	2	Yes	37,150	CLAE	65	4	4	1.8	0.8	1.4	G	G	Y	G	G	G	4.0	4.9	0.8	6.0	5.4	M
TH 65 & VIKING BLVD	Anoka	TH65	C	3	Yes	35,500	ULAE	65	4	4	1.6	0.6	1.5	G	G	G	G	G	G	3.7	4.5	0.8	6.0	5.3	L
TH 212 & CH 43	Carver	TH212	A	1	Yes	13,900	ULAE	55	2	2	0.9	0.3	2.2	R	G	G	G	G	G	3.4	4.2	0.6	4.0	4.1	L
CH 23 (CEDAR AVE) & CH 42	Dakota	CH23	A	1	Yes	68,500	6-LSA	50	6	6	3.2	1.7	2.4	Y	Y	R	Y	G6	G	7.3	9.0	0.9	6.3	7.7	H
CH 23 (CEDAR AVE) & 147TH ST	Dakota	CH23	A	2	Yes	52,000	6-LSA	40	6	6	2.4	1.2	2.2	Y	Y	DLY	Y	G6	G	5.8	7.1	0.9	6.2	6.7	H
CH 23 (CEDAR AVE) & 145TH ST	Dakota	CH23	A	3		45,275	6-LSA	40	6	6	2.4	0.7	1.5	G6	G6	G6	G6	G6	G	4.5	5.6	0.7	5.3	5.5	M
CH 23 (CEDAR AVE) & 140TH ST	Dakota	CH23	A	4	Yes	57,650	6-LSA	40	6	6	3.5	1.5	2.4	Y	G6	R	G6	Y	G	7.4	9.2	1.0	7.1	8.1	H
CH 42 & BURNSVILLE PKWY	Dakota	CH42	B	1		46,150	6-LSA	50	6	6	2.2	1.2	1.0	G6	G6	G6	G6	G6	G	4.4	5.4	0.8	5.7	5.6	M
CH 42 & CH 5	Dakota	CH42	B	2	Yes	52,800	6-LSA	50	6	6	2.1	1.5	1.8	G6	G6	G6	G6	G6	G	5.3	6.6	0.7	4.7	5.6	M
CH 42 & BURNHAVEN DR	Dakota	CH42	B	3	Yes	52,050	6-LSA	40	6	6	1.7	1.3	1.7	G6	G6	Y	G6	G6	G	4.6	5.7	0.6	4.6	5.1	L
CH 42 & ALDRICH AVE	Dakota	CH42	B	4		54,150	6-LSA	40	6	6	1.9	1.8	1.0	G6	G6	Y	G6	G6	G	4.7	5.8	0.7	4.7	5.3	L
CH 42 & NICOLLET AVE	Dakota	CH42	B	5		62,400	6-LSA	40	6	6	3.2	2.7	1.0	G6	G6	G6	G6	G6	G	6.9	8.5	0.7	4.9	6.7	H
CH 42 & 145TH ST/PLYMOUTH AVE	Dakota	CH42	B	6		30,425	ULAE	45	4	4	1.0	0.5	0.8	G	G	G	G	G	G	2.3	2.8	0.2	1.7	2.2	L
CH 42 & PORTLAND AVE	Dakota	CH42	B	7		35,200	4-LSA	45	4	4	1.5	0.7	0.8	G	G	G	G	G	G	3.0	3.7	0.7	5.2	4.5	L
CH 42 & CH 11	Dakota	CH42	B	8		35,400	4-LSA	45	4	4	1.3	0.7	0.9	G	G	G	G	G	G	2.9	3.6	0.6	4.4	4.0	L
CH 42 & JOHNNY CAKE RIDGE RD	Dakota	CH42	C	1		33,750	4-LSA	50	4	4	1.4	1.0	1.1	G	G	G	G	G	G	3.5	4.3	0.7	5.3	4.8	L
CH 42 & PILOT KNOB RD	Dakota	CH42	C	2	Yes	45,500	4-LSA	50	4	4	1.7	1.1	1.9	G	G	Y	G	G	G	4.7	5.8	0.7	5.1	5.5	M
CH 42 & TH 3	Dakota	CH42	C	3	Yes	27,800	4-LSA	55	4	4	1.4	0.9	1.9	G	G	G	G	G	G	4.2	5.2	0.8	6.0	5.6	M
CH 42 & BUSINESS PKWY	Dakota	CH42	C	4		14,668	CLAE	55	4	4	0.4	0.3	1.4	G	G	G	G	G	G	2.1	2.6	0.3	2.2	2.4	L
CH 42 & BISCAYNE AVE	Dakota	CH42	C	5		16,210	CLAE	55	4	4	0.8	0.7	1.3	G	G	G	G	G	G	2.8	3.5	0.3	2.2	2.9	L
TH 13 & NICOLLET AVE	Dakota	TH13	B	1		42,100	4-LSA	55	4	4	2.4	2.1	2.0	G	G	DLY	G	G	G	6.6	8.1	0.9	6.2	7.2	H
TH 13 & PORTLAND AVE	Dakota	TH13	B	2		33,100	4-LSA	50	4	4	1.2	0.5	1.7	G	G	G	G	G	G	3.4	4.2	0.7	5.2	4.7	L
TH 13 & 12TH AVE	Dakota	TH13	B	3		35,400	4-LSA	50	4	4	1.1	1.0	1.7	G	G	G	G	G	G	3.8	4.8	0.5	3.8	4.3	L
TH 52 & 200TH ST	Dakota	TH52	A	1	Yes	30,530	ULAE	65	4	4	0.8	0.7	2.7	G	G	G	G	G	G	4.2	5.2	0.5	3.4	4.3	L
TH 52 & 190TH ST	Dakota	TH52	A	2	Yes	30,052	ULAE	65	4	4	0.9	0.3	2.6	G	G	G	G	G	G	3.8	4.7	0.5	3.6	4.1	L
TH 55 & ARGENTA TRL	Dakota	TH55	C	1	Yes	21,875	CLAE	65	4	4	1.4	0.8	2.1	G	G	G	G	G	G	4.2	5.2	0.7	5.3	5.3	L
TH 7 & CSAH 101	Hennepin	TH7	A	1	Yes	59,250	4-LSA	50	4	4	2.6	1.6	1.5	Y	Y	DLY	G	Y	G	5.6	7.0	1.0	6.9	6.9	H
TH 7 & WOODLAND RD	Hennepin	TH7	A	2	Yes	43,625	4-LSA	50	4	4	1.4	0.7	1.4	G	G	G	G	G	G	3.6	4.4	0.8	6.0	5.2	L
TH 7 & WILLISTON RD	Hennepin	TH7	A	3	Yes	50,850	4-LSA	50	4	4	2.2	0.7	1.4	R	R	R	G	Y	G	4.3	5.3	1.0	7.5	6.4	M
TH 7 & BLAKE RD	Hennepin	TH7	B	1		52,600	4-LSA	45	4	4	2.1	2.5	0.7	Y	Y	DLG	G	G	G	5.3	6.5	0.9	6.5	6.5	M
TH 7 & TEXAS AVE	Hennepin	TH7	B	2		40,900	4-LSA	45	4	4	1.5	1.8	0.7	G	G	Y	G	G	G	3.9	4.9	0.8	5.8	5.4	M
TH 55 & CH 116	Hennepin	TH55	A	1	Yes	27,600	CLAE	55	4	4	1.4	1.2	1.6	Y	G	DLY	G	G	G	4.2	5.2	0.8	5.5	5.3	L
TH 55 & CH 101/SIOUX DR	Hennepin	TH55	A	2	Yes	31,300	CLAE	55	4	4	2.2	0.5	1.8	Y	Y	R	G	G	G	4.6	5.7	1.0	6.9	6.3	M
TH 55 & CH 101/PEONY LN	Hennepin	TH55	A	3	Yes	41,200	CLAE	55	4	4	2.4	0.6	1.8	Y	Y	DLY	G	G	G	4.8	6.0	1.0	6.9	6.4	M
TH 55 & CH 24/CH 9 (ROCKFORD RD)	Hennepin	TH55	A	4	Yes	46,800	CLAE	55	4	4	2.9	0.6	1.7	R	R	R	G	Y	G	5.2	6.4	1.1	8.2	7.3	H
TH 55 & VICKSBURG LN	Hennepin	TH55	A	5	Yes	53,600	CLAE	55	4	4	2.6	1.1	1.7	Y	Y	R	G	G	G	5.3	6.6	0.9	6.3	6.4	M
TH 55 & NIAGARA LN	Hennepin	TH55	A	6	Yes	47,650	CLAE	55	4	4	2.2	0.6	1.7	Y	Y	DLY	G	G	G	4.5	5.6	0.9	6.3	5.9	M
TH 55 & FERNBROOK LN	Hennepin	TH55	A	7	Yes	60,000	CLAE	55	6	4	3.2	1.3	1.7	G6	G6	DLG6	G6	G6	G	6.2	7.7	0.7	5.3	6.5	M
TH 55 & DOUGLAS DR	Hennepin	TH55	B	1		38,650	4-LSA	55	4	4	1.6	0.6	1.1	G	G	DLY	G	G	G	3.3	4.1	0.8	5.8	4.9	L
TH 169 & 109TH AVE N	Hennepin	TH169	B	1		50,600	4-LSA	55	4	4	1.9	0.7	2.3	G	G	Y	G	G	G	4.9	6.1	0.8	6.0	6.0	M
TH 169 & HAYDEN LAKE RD E	Hennepin	TH169	B	2		44,250	4-LSA	55	4	4	1.6	0.6	1.3	G	G	G	G	G	G	3.5	4.3	0.8	6.0	5.2	L
TH 252 & 66TH AVE	Hennepin	TH252	A	1	Yes	68,850	CLAE	55	6	6	3.6	2.4	2.1	R	R	R	R	G6	G	8.1	10.0	1.2	8.4	9.2	H
TH 252 & 70TH AVE	Hennepin	TH252	A	2	Yes	60,425	CLAE	55	6	6	3.2	0.7	2.1	R	R	R	R	G6	G	6.0	7.4	1.0	7.5	7.5	H
TH 252 & 73RD AVE	Hennepin	TH252	A	3	Yes	61,515	CLAE	55	6	6	3.0	0.9	2.1	Y	Y	Y	G6	G6	G	6.0	7.5	0.9	6.2	6.8	H
TH 252 & BROOKDALE DR	Hennepin	TH252	A	4	Yes	62,000	CLAE	55	5	4	3.4	0.8	2.2	R	R	R	Y	G6	G	6.3	7.8	1.4	9.9	8.8	H
TH 252 & 81ST AVE	Hennepin	TH252	A	5	Yes	57,625	CLAE	55	4	4	2.7	0.8	2.1	R	R	R	G6	G6	G	5.6	6.9	1.1	8.2	7.6	H
TH 252 & 85TH AVE	Hennepin	TH252	A	6	Yes	65,650	CLAE	55	5	5	3.7	1.7	2.2	R	R	R	G6	G	G	7.6	9.5	1.2	8.9	9.2	H
TH 36 & TH 120 (CENTURY AVE)	Ramsey	TH36	A	1	Yes	44,800	4-LSA	55	4	4	1.7	2.1	2.2	G	G	G	G	G	G	6.0	7.4	0.9	6.1	6.8	H
TH 61 & LOWER AFTON RD	Ramsey	TH61	A	1		39,150	4-LSA	60	4	4	2.6	0.9	1.0	R	R	R	Y	G	G	4.4	5.5	1.2	8.5	7.0	H
TH 61 & WARNER RD	Ramsey	TH61	A	2		46,600	4-LSA	60	4	4	2.9	1.9	1.4	R	Y	R	G	G	G	6.1	7.6	1.1	8.1	7.9	H
TH 61 & BURNS AVE	Ramsey	TH61	A	3		41,325	4-LSA	45	6	4	2.1	1.9	1.3	G6	G6	G6	G6	G6	G	5.3	6.6	0.8	6.0	6.3	M
TH 280 & BROADWAY ST	Ramsey	TH280	A	1	Yes	47,800	CLAE	50	4	4	3.4	0.7	2.1	R	Y	DLY	G	Y	G	6.2	7.7	1.2	8.8	8.3	H
CH 42 & CH 21	Scott	CH21	A	1		25,300	4-LSA	40	4	4	1.4	0.5	1.4	Missing Data						3.2	4.0		0.0	2.0	L

Table 1-2. Principal Arterial Intersection Conversion Study - Grade-Separation Priorities by County and Focus Area (DRAFT Final Report)

Intersections	County Name	Corridor ID	Corridor Segment	Corridor Sub-Segment	Locally Identified Future Grade Separation	Entering Daily Traffic Volume (AADT)	Corridor Type	Speed Limit (mph) (Maximum)	Intersection Thru Lanes	Corridor Thru Lanes	Mobility Weighted Score Subtotal	Safety Weighted Score Subtotal	Corridor Context Weighted Score Subtotal	Existing Intersection	Expanded Conventional Intersection	Alternative Intersection	Arterial Capacity Improvements	Hybrid Intersection (Partial Grade Separation)	Full Grade Separation (Interchange)	Total Weighted Score	Normalized Weighted Score	CAP-X Existing V/C	Normalized Capacity Analysis Score (CAP-X)	Composite Score	Grade-Sep Priority
TH 13 & DAKOTA AVE	Scott	TH13	A	1	Yes	47,365	CLAE	55	4	4	1.7	0.7	2.0	Y	Y	Y	G	G	G	4.4	5.4	0.9	6.5	5.9	M
TH 13 & QUENTIN AVE	Scott	TH13	A	2		48,275	CLAE	45	4	4	1.8	0.6	1.9	R	R	Y	G	G	G	4.3	5.3	1.0	7.3	6.3	M
TH 13 & LYNN AVE	Scott	TH13	A	3		50,050	CLAE	55	4	4	2.2	1.0	1.7	R	Y	Y	G	Y	G	4.9	6.1	1.0	7.2	6.6	H
TH 13 & CHOWEN AVE	Dakota	TH13	A	4	Yes	48,950	CLAE	55	4	4	1.7	1.2	2.5	Y	Y	Y	G	Y	G	5.4	6.7	0.9	6.6	6.7	H
TH 13 & WASHBURN AVE	Dakota	TH13	A	5		49,735	CLAE	55	4	4	1.9	1.0	1.8	Y	Y	DLY	G	Y	G	4.8	5.9	1.0	7.1	6.5	M
TH 169 & DELAWARE AVE	Scott	TH169	A	1	Yes	22,625	ULAE	65	4	4	0.4	0.3	2.1	G	G	G	G	G	G	2.8	3.5	0.5	3.3	3.4	L
TH 169 & TH 282	Scott	TH169	A	2	Yes	30,450	CLAE	55	4	4	1.5	1.2	2.1	G	G	G	G	G	G	4.8	6.0	0.8	5.7	5.8	M
TH 169 & TH 21/BROADWAY ST	Scott	TH169	A	3		28,000	CLAE	65	4	4	1.0	0.4	1.4	G	G	G	G	G	G	2.8	3.5	0.5	3.5	3.5	L
TH 169 & 173RD ST W	Scott	TH169	A	4	Yes	28,000	ULAE	65	4	4	1.1	0.3	2.1	G	G	G	G	G	G	3.5	4.3	0.5	3.5	3.9	L
TH 169 & 150TH ST	Scott	TH169	A	5	Yes	27,725	ULAE	65	4	4	0.7	0.3	2.0	G	G	G	G	G	G	3.0	3.7	0.6	4.3	4.0	L
TH 169 & MAIN ST	Sherburne	TH169	C	1	Yes	61,550	CLAE	55	4	4	2.7	2.4	2.1	Y	Y	R	G	G	G	7.2	9.0	1.0	6.8	7.9	H
TH 169 & SCHOOL ST	Sherburne	TH169	C	2	Yes	50,450	CLAE	55	4	4	2.1	1.8	2.1	Y	Y	DLG	G	G	G	6.0	7.4	0.9	6.2	6.8	H
TH 169 & 193RD AVE	Sherburne	TH169	C	3	Yes	45,350	CLAE	55	4	4	1.8	1.0	1.6	G	G	Y	G	G	G	4.4	5.4	0.9	6.1	5.8	M
TH 169 & 197TH AVE	Sherburne	TH169	C	4	Yes	35,800	CLAE	65	4	4	1.9	0.7	1.5	Y	Y	Y	G	G	G	4.1	5.1	0.9	6.5	5.8	M
TH 36 & DEMONTREVILLE TRL	Washington	TH36	B	1	Yes	37,600	CLAE	65	4	4	1.0	0.3	2.4	G	G	G	G	G	G	3.7	4.6	0.8	5.5	5.0	L
TH 36 & KEATS AVE	Washington	TH36	B	2	Yes	37,650	CLAE	65	4	4	1.0	0.4	2.0	G	G	G	G	G	G	3.4	4.3	0.8	5.8	5.0	L
TH 36 & LAKE ELMO AVE N	Washington	TH36	B	3	Yes	41,975	CLAE	65	4	4	1.6	1.2	2.4	G	G	G	G	G	G	5.2	6.5	0.8	5.5	6.0	M
TH 36 & MANNING AVE	Washington	TH36	B	4	Yes	43,700	CLAE	60	4	4	1.7	0.7	2.6	G	G	G	G	G	G	5.0	6.1	0.7	4.7	5.4	M

Other Initially Considered Phase 2 Intersections (Removed)

CH 42 & PIKE LAKE TRL	Scott	CH42	Removed at Request of Scott County
CH 42 & CHICAGO AVE	Dakota	CH42	Removed at Request of Dakota County (Future RIRO)
TH 36 & HADLEY AVE	Washington	TH36	Funded Interchange
TH 169 & 101ST AVE	Hennepin	TH169	Current RIRO

Corridor Types:

CLAE: Constrained limited-access expressway
ULAE: Unconstrained limited-access expressway
4-LSA: 4-Lane suburban arterial
6-LSA: 6-Lane suburban arterial

Legend for Cap-X Results Summary:	
R	V/C >= 1 Volume to Capacity Ratio Unacceptable
Y	V/C > 0.85, <1 May be acceptable, may be possible to optimize to less than 0.85 v
DLY	V/C > 0.85, <1 May be acceptable, Only Displaced Left Alternative At-Grade
DLG	V/C <= 0.85 Only Displaced Left Alternative At-Grade
G7	V/C <= 0.85 Volume to Capacity Ratio Acceptable, With 6-Lane, if corridor already
G	V/C <= 0.85 Volume to Capacity Ratio Acceptable
N/A	Not Applicable (ramp intersections)

FINAL REPORT
ATTACHMENT 2
Ramp Intersections

This attachment contains detailed analysis of principal arterial intersections with freeway ramps. During the Phase II project, ten (10) ramp intersections were identified for detailed analysis. A summary of each ramp intersection and its relation to the focus area corridors is in the table below.

Intersection	Intersection Entering AADT	Nearby Intersections Priority
Anoka County		
TH 65 & TH 10 Eastbound	55,974	H
TH 65 & TH 10 Westbound	59,982	H
TH 65 & I-694 Westbound	42,438	L
Dakota County		
CH 42 & I-35W Southbound/Buck Hill Rd.	74,390	M
CH 42 & I-35W Northbound	51,000	H
CH 42 & I-35E Southbound	56,330	H
CH 42 & I-35E Northbound	41,517	L
Ramsey County		
I-35E Southbound & Shepard Rd.	16,200	N/A
I-35E Northbound & Shepard Rd.	27,029	N/A
Sherburne County		
TH 169 & TH 10 Westbound	50,603	H

These intersections are already grade-separated but are at-grade intersections placed on a non-freeway principal arterial, which are the centerpiece for the study. Each of the ramp intersections have different operational components than the conventional at-grade intersections analyzed in the body of the study. Also, ramp intersection improvements differ from at-grade intersections. Therefore, the ten ramp intersections are analyzed separately from the 91 intersections.

Analysis of Principal Arterial Intersections with Freeway Ramps

Overview

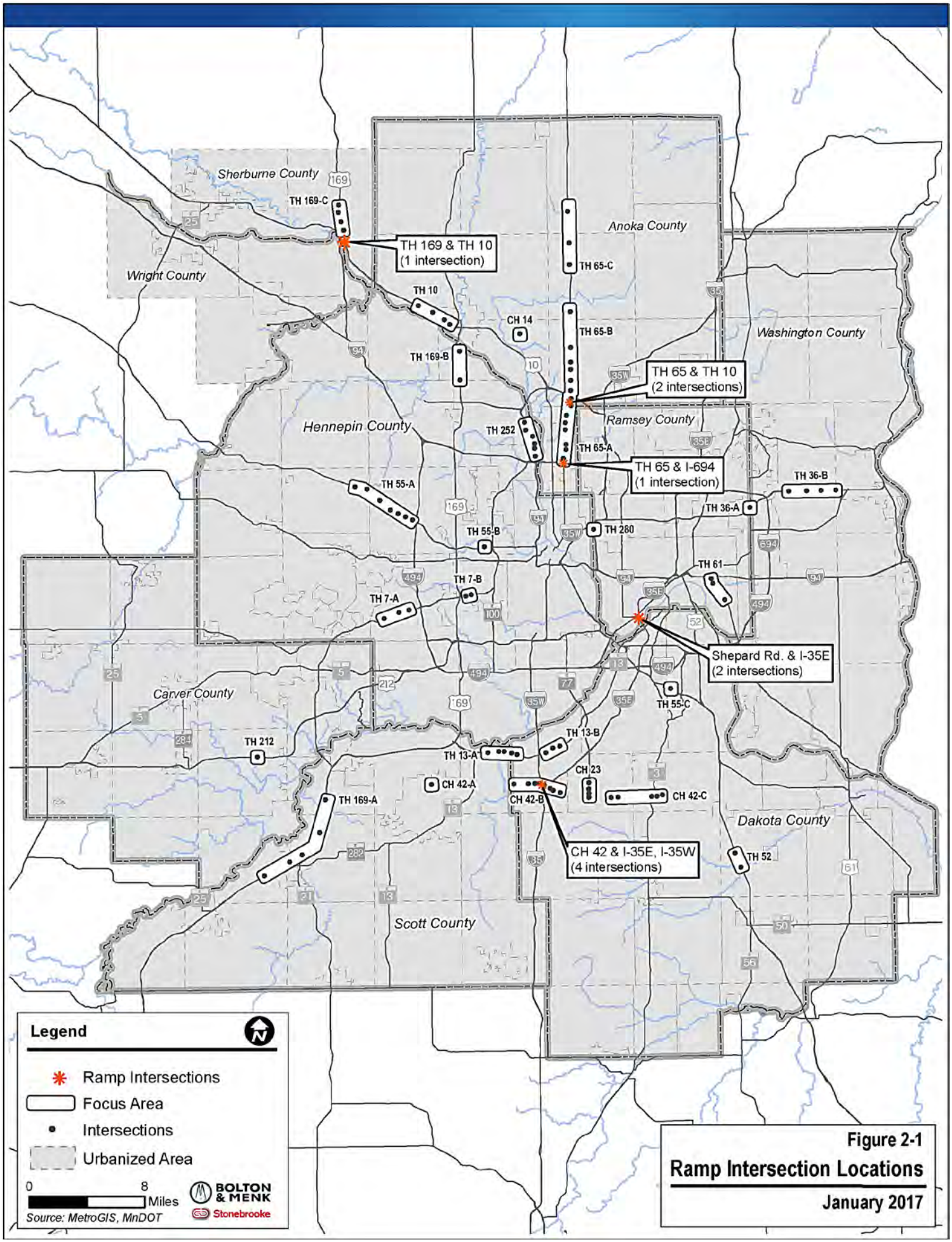
Principal arterials are the highest functional classification highways in the Twin Cities area with their purpose to optimize mobility. This mobility advantage for principal arterials puts an emphasis on conveying traffic through a corridor quickly and with as little delay as possible. Intersections and crossing volumes are the primary impediment to corridor mobility and need to be considered due to their influence and impacts. Intersections that do not effectively convey traffic and are in need of capacity improvements have been identified through this study. These intersection locations could be considered for solutions including grade separation or at-grade intersection improvements. This overview focuses on the intersection locations that are already grade separated but have an at-grade intersection on the non-freeway principal arterial. This includes at-grade intersections between freeway ramps and a non-freeway principal arterial.

The ramp intersections (see ***Figure 2-1***) addressed in Phase II of the study were included because of their association with specific non-freeway principal arterials, which are the main subject of the study. Therefore, the study does not provide a complete metro-wide evaluation of ramp intersections that connect from a freeway principal arterial to a non-freeway principal arterial. Additionally, the study recognizes that the ten (10) ramp intersections which are addressed in Phase II of the study operate differently than the 91 conventional intersections prioritized for grade separation. There are operational differences as compared to conventional at-grade intersections and the types of improvements available for ramp intersections are also different.

The ramp intersections brought forth in Phase II of the study are limited to locations in Anoka, Dakota, Ramsey, and Sherburne counties as shown in Table 1.

Table 2-1: Phase II Ramp Intersections

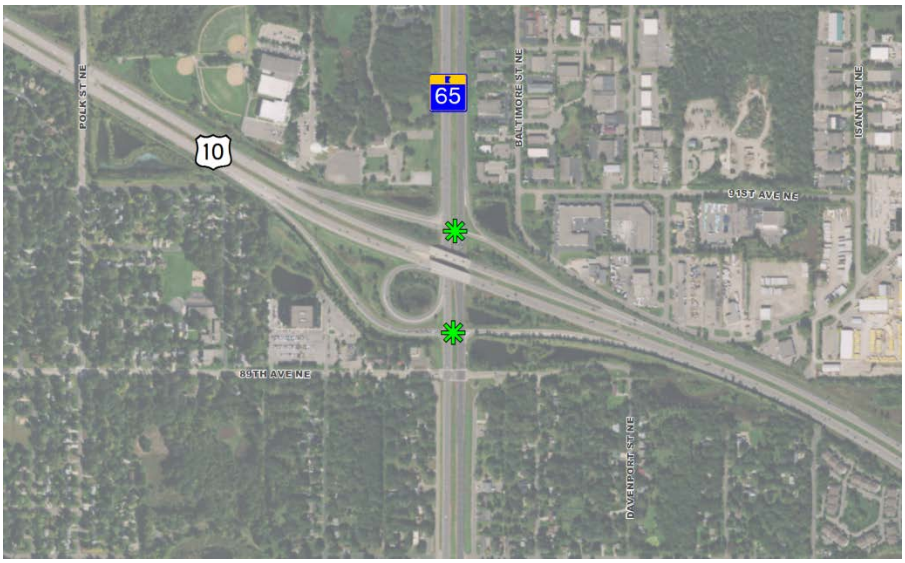
Intersection	Through Lanes	Speed Limit	Intersection Entering AADT	Nearby Intersections Priority	Existing v/c Ratio
Anoka County					
TH 65 & TH 10 Eastbound	6	55	55,974	H	0.82
TH 65 & TH 10 Westbound	7	55	59,982	H	1.15
TH 65 & I-694 Westbound	6	40	42,438	L	1.11
Dakota County					
CH 42 & I-35W Southbound/Buck Hill Rd.	6	40	74,390	M	0.71
CH 42 & I-35W Northbound	6	40	51,000	H	0.62
CH 42 & I-35E Southbound	7	40	56,330	H	0.75
CH 42 & I-35E Northbound	6	40	41,517	L	0.62
Ramsey County					
I-35E Southbound & Shepard Rd.	4	50	16,200	N/A	0.99
I-35E Northbound & Shepard Rd.	4	50	27,029	N/A	0.61
Sherburne County					
TH 169 & TH 10 Westbound	5	55	50,603	H	1.15


Sherburne County
Wright County
Anoka County
Washington County
Ramsey County
Hennepin County
Carver County
Dakota County
Scott County
TH 169-C
TH 169 & TH 10
(1 intersection)
TH 10
TH 65-C
CH 14
TH 65-B
TH 169-B
TH 65 & TH 10
(2 intersections)
TH 252
TH 65-A
TH 65 & I-694
(1 intersection)
TH 55-A
TH 36-B
TH 36-A
TH 280
TH 55-B
TH 61
TH 7-B
TH 7-A
Shepard Rd. & I-35E
(2 intersections)
TH 55-C
TH 13-B
TH 13-A
TH 212
CH 23
CH 42-A
CH 42-B
CH 42-C
TH 169-A
CH 42 & I-35E, I-35W
(4 intersections)
TH 52
Legend
Ramp Intersections
Focus Area
Intersections
Urbanized Area
0
8
Miles
Source: MetroGIS, MnDOT
BOLTON & MENK
Stonebrooke
Figure 2-1
Ramp Intersection Locations
January 2017

The ramp intersections considered in the study generally serve high traffic volumes and the associated non-freeway principal arterials often have more than two lanes in each direction and multiple turn lanes. The opportunities for capacity improvements are generally limited to additional lanes to increase capacity or the full or partial conversion from a service interchange to a system-to-system interchange. The intersections are all within areas that are surrounded by development or environmental constraints which may make capacity improvements difficult to implement. Some of the intersection locations may be candidates for further detailed evaluation under the Congestion Management Safety Program (CMSP).

Anoka County

TH 65 & TH 10 Ramps (two ramp intersections)



The TH 65 ramp intersections at TH 10 (eastbound and westbound) are located along TH 65 between focus areas (Focus Areas TH 65-A and TH 65-B). The north ramp (TH 10 westbound) currently exhibits operational and capacity issues. The surrounding TH 65 corridor includes a range of priorities for grade-separation, including six high-priority intersections immediately north of TH 10 in Focus Area TH 65-B.

The current interchange is a partial cloverleaf interchange with two movements that are not impacted by conflicting traffic and have full merge/diverge areas. This includes a system to system free movement for southbound TH 65 to eastbound TH 10 and westbound TH 10 to northbound TH 65. The westbound ramp intersection has an average entering daily traffic volume of 59,982 vehicles while the eastbound ramp intersection experiences slightly less entering volume at 55,974 vehicles. While the volume is higher on the westbound ramp, the eastbound ramp has ramp volumes that are closer to mainline volumes. The speed limit is 55 miles per hour on TH 65 indicating that this is a high speed corridor. While there are seven through lanes on TH 65 (three northbound and four southbound through the intersection) additional capacity expansion is constrained by residential and commercial uses nearby.

A capacity analysis was completed to examine current interchange conditions and assess the potential need for improvements. The existing partial cloverleaf interchange fails to meet daily capacity needs. The volume to capacity (v/c) ratio of the westbound TH 10 ramp intersection is 1.15, indicating that

demand exceeds capacity. The eastbound TH 10 ramps may also exhibit operational or capacity problems. The v/c ratio for the TH 65/TH 10 eastbound ramps was 0.82, indicating that demand is nearing capacity.

Neighboring intersections to the south in Focus Area TH 65-A experience medium priority for grade separation while intersections north of this interchange in Focus Area TH 65-B experience a high priority for grade separation. The high-priority need extends about five miles north from the TH 65/TH 10 interchange to Bunker Lake Road.

Implementing an expanded conventional intersection improvement at the westbound TH 10 ramps, the v/c ratio could potentially be decreased to an acceptable level. Possible solutions include constructing additional left turn lanes or reconstructing the intersection to make more free movements (loop ramps).

TH 65 & I-694 Westbound Ramps (one ramp intersection)

The Interstate 694 (I-694) westbound ramp intersection with TH 65 exhibits operational and capacity issues and is located at the south end of Focus Area TH 65-A. This corridor includes a range of study priorities, including one high-priority intersection (Medtronic Parkway) located immediately north of the ramp intersection.

The current interchange is a partial cloverleaf interchange with four movements that are not impacted by conflicting traffic and have full merge/diverge areas. This includes a system to system free movement for southbound TH 65 to westbound TH 10, southbound TH 65 to eastbound TH 10, northbound TH 65 to westbound TH 10 and northbound TH 65 to eastbound TH 65. The westbound ramp intersection experiences an average daily traffic of 42,438 vehicles. TH 65 has a speed limit of 40 miles per hour through the interchange making this a low speed corridor. This urban interchange is constrained by residential and commercial uses but has possible space for expansion within the interchange area.

A capacity analysis was completed to examine current interchange conditions and assess the potential need for improvements. The existing partial cloverleaf interchange fails to meet current capacity needs. The v/c ratio of this intersection is 1.11, indicating that demand exceeds capacity. The next intersection to the north, Medtronic Parkway, along Focus Area 65-A experiences a high priority for grade separation or some other high capacity improvement. The need for improvement at both intersections will be

interrelated due to the close proximity of the intersections. Implementing a full grade separated interchange would be expected to lower the v/c ratio to an acceptable level.

Dakota County

CH 42 Interchange With I-35W AND I-35E (four ramp intersections)

The series of four County Highway (CH) 42 ramp intersections with I-35W and I-35E present a challenging study area for possible improvements. One improvement is planned for the I-35W interchange in spring 2017 which will extend the eastbound left at the I-35W north ramp through the southbound ramp. All four of the ramp intersections are located along Focus Area CH 42-B, which exhibits the full range of intersection priorities in a closely spaced and complex corridor. The four intersections west of the I-35W interchange exhibit medium-priority for improvement (Burnhaven Drive ranked low). Both intersections east of the I-35E interchange ranked low. The Nicollet Avenue intersection, located between the I-35W and I-35E ramp intersections is the only high-priority intersection within the CH 42-B corridor.

The current interchange at I-35W is a partial diamond, with no direct access to and from I-35W to the south. The daily entering traffic is 51,000 (northbound ramp) and 74,390 (southbound ramp) and a speed limit of 40 mph on CH 42. This interchange is constrained by commercial uses including Burnsville Center on the southwest corner. Though volumes are high and congestion is common, the capacity analysis suggests the existing interchange is able to meet demand. The v/c ratio for the northbound ramp intersection is 0.62, and the southbound v/c ratio is 0.71. While the v/c ratio is acceptable, congestion is common through the area during the peak hours. The number of lanes accounts for the

low volume to capacity ratio, but the capacity analysis does not take into account the backups that occur from the turn lanes onto the mainline through lanes and the close spacing of intersections that results in queue backups from one intersection to the next.

The I-35E and CH 42 interchange is a full diamond with a daily entering traffic of 41,517 (northbound ramps) and 56,330 (southbound ramps) and a speed limit of 40 miles per hour on CH 42. This interchange is constrained by commercial uses around the interchange and residential uses starting approximately one quarter mile to the east. Though volumes are high and congestion is common, the capacity analysis suggests that this interchange meets current demand. The v/c ratio for the northbound ramps was 0.62 while the southbound v/c ratio was 0.75. Similar to the I-35W ramps, the number of lanes accounts for the low volume to capacity ratio, but the capacity analysis does not take into account the backups that occur from the turn lanes onto the mainline through lanes and the close spacing of the intersections which limits queue storage. This results in some congestion in the area.

The need for improvements at both interchanges will be interrelated to each other and with Nicollet Avenue and Aldrich Avenue due to the close proximity of the intersections. With CH 42 already a six-lane facility through the area and dual left and right turn lanes for most movements, the possible improvements will likely have significant impacts. Improvements that would impact the service levels would include making many of the left turn movements into right turn free type movements.

Ramsey County

Shepard Road Interchange with I-35E (two ramp intersections)

Shepard Road is identified as a principal arterial for this study and the two ramp intersections with the I-35E were carried forward for Phase II analysis to see if there are operational or capacity problems based

on current traffic. The current interchange is a partial diamond, with no direct access to and from I-35E to the north. The daily entering traffic is 27,029 (northbound ramp) and 16,200 (southbound ramp) and a speed limit of 50 mph on Shepard Road. This interchange is constrained by vertical environmental features on the north side and river area environmental features on the south side. A traffic signal was most recently added to the west ramp. These ramp intersections are not located along a Focus Area corridor and the nearest significant intersections are 0.10 miles to the west and 0.85 miles to the east.

A capacity analysis was completed to examine current interchange conditions and assess the potential need for improvements. The v/c ratio for the northbound ramp intersection is 0.61 and the southbound v/c ratio is 0.99. The capacity analysis indicates that the interchange is functioning acceptably today but the southbound ramp intersection is very close to meeting and exceeding the capacity of the intersection due to the westbound left versus the eastbound right turn movement in the PM peak hour. Potential capacity improvements to the interchange possibly include dual left turn lanes but the environmental and bridge impacts would be anticipated to be significant. There is potential for other adjustments to this interchange, which is not fully directional with no access to and from the north. The interchange could be modified to provide the missing movements and accommodate traffic diverted from the TH 5 (West 7th Street) which parallels Shepard Road. This would necessitate the bridge reconstruction which could then be designed to accommodate a dual left turn. The analysis indicates that there are currently few safety problems at these two ramp intersections.

Sherburne County

TH 169 & Highway 10 Westbound Ramps (one ramp intersection)

The westbound TH 10 ramp intersection with TH 169 is signalized and is subject to peak-period congestion due to the westbound off-ramp delay associated with the at-grade westbound to southbound left turn. This congestion is most prevalent during the PM peak hour and during summertime weekend traffic. The intersection is located along Focus Area TH 169-C. There are two high-priority intersections to the north of the intersections of TH 169 with Main Street and School Street in Elk River.

The current interchange is a partial cloverleaf interchange. The westbound ramp experiences an average entering daily traffic of 50,603 vehicles with a speed limit of 55 miles per hour on TH 169. This urban interchange is unconstrained, though a nearby railroad runs northwest and southeast, with a grade-separated crossing over TH 169 approximately 500 feet north of the westbound TH 10 ramp intersection.

A capacity analysis was completed to examine current interchange conditions. The existing partial clover interchange experiences traffic volumes that exceed the intersection capacity. The v/c ratio of this intersection is 1.15, indicating that demand exceeds capacity. Implementing a full grade separated interchange by adding a westbound to southbound loop would be expected to reduce the v/c ratio to an acceptable level. The loop would eliminate at-grade westbound to southbound left turns. However, it appears that the railroad to the north could be an issue.

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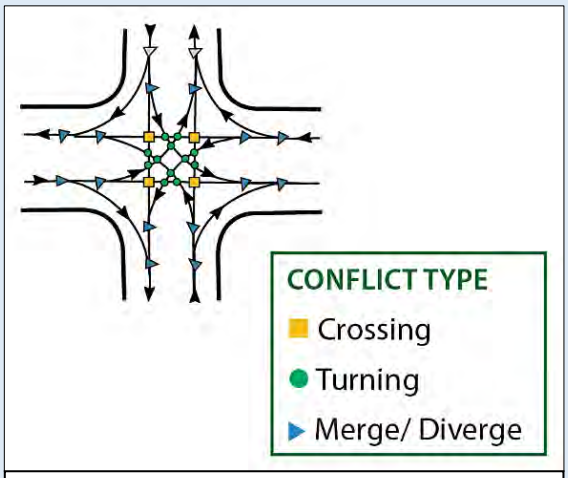
FINAL REPORT
ATTACHMENT 3
Solution Sets

This attachment provides an informational resource on the types of improvements, or design solutions that may be considered for major intersection projects. As illustrated here, conventional at-grade intersections present many conflict points which increase delays and the potential for crashes. These include crossings movements on the minor legs and the many left turn movements required at a fully directional intersection. The progression of potential improvements at major intersections trend toward designs that reduce the number of conflicts and promote lower-risk turns and improved merging and diverging over traditional crossing maneuvers.



Conflicts at Typical At-Grade Intersections

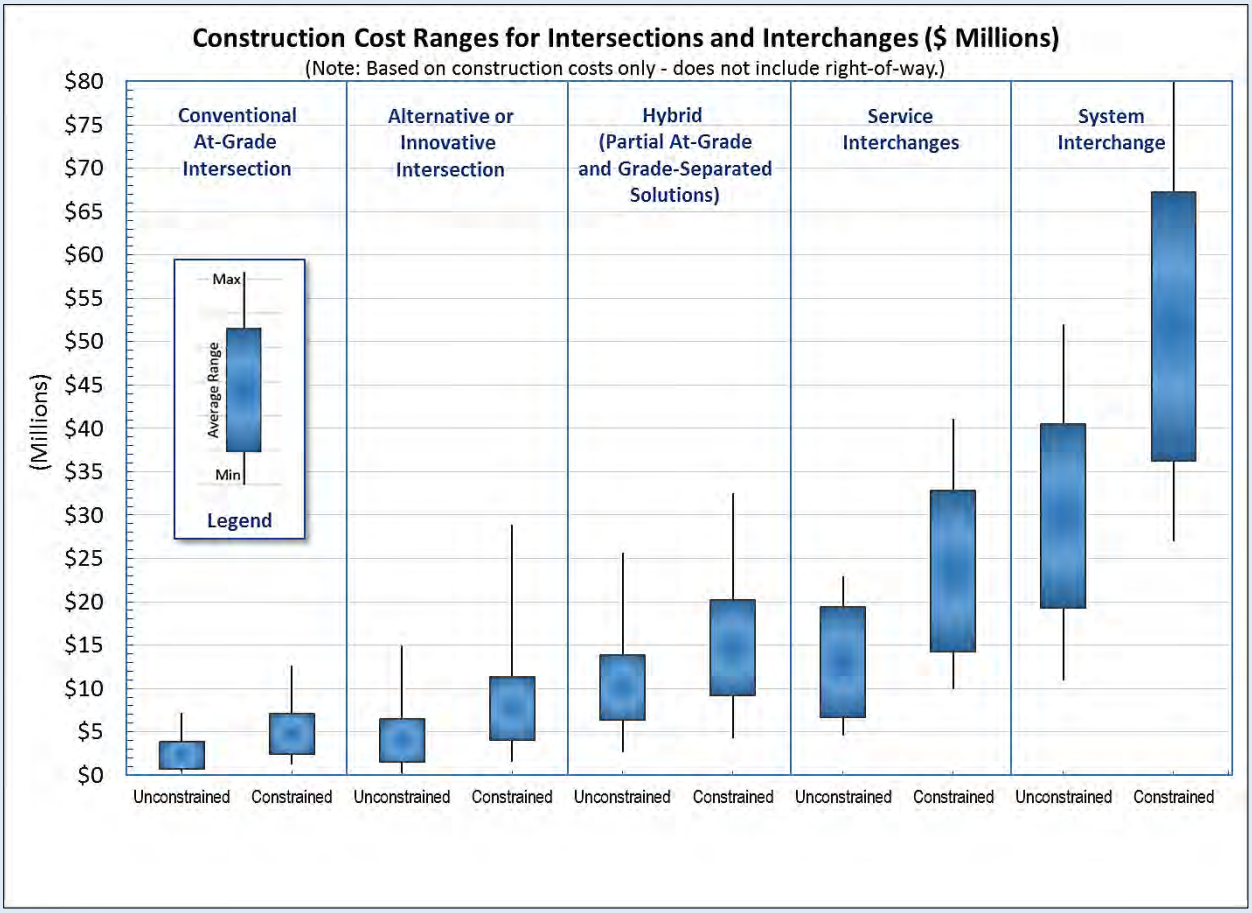
The solutions sets and cost ranges presented in this attachment are based on general definitions, assumptions, research, and professional judgement. In terms of cost, the solutions can vary widely based on scale, quantities, construction materials used, complexity of design solutions, and the presence or need of three-dimensional structures such as bridges or walls. Solutions for unconstrained (rural) settings require less structures and pavements and thus are less expensive than solutions for constrained (urban) settings.

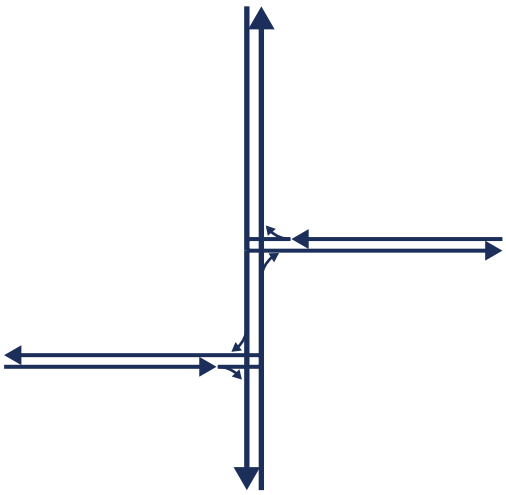
The general construction cost ranges computed for potential design solutions are presented on the next page, with line diagrams of various solution sets attached for cross referencing. NOTE: These cost ranges are based on construction costs only. These costs do not include engineering or right-of-way.

The types of intersection/interchange solution sets which follow the two cover pages include:

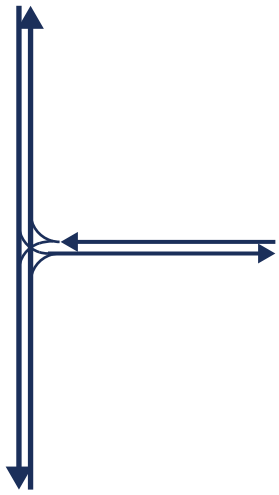
- Alternative or Innovative At-Grade Intersection
- Hybrid (Partial At-Grade and Grade-Separated Solutions)
- Service Interchanges
- System Interchanges

The construction cost ranges for constructing of intersections and interchanges is shown below. The graphic shows a steady upward progression in cost as solutions sets favor interchanges over other solutions.

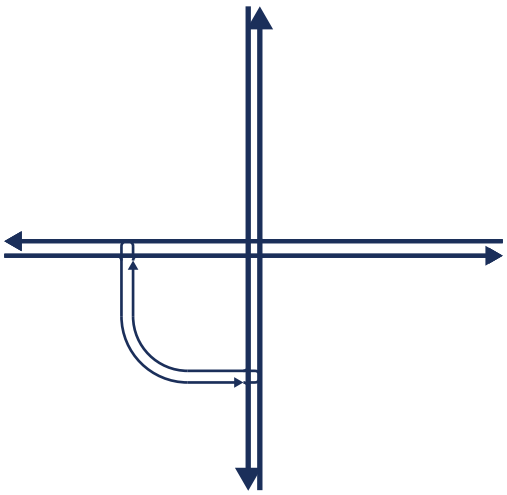




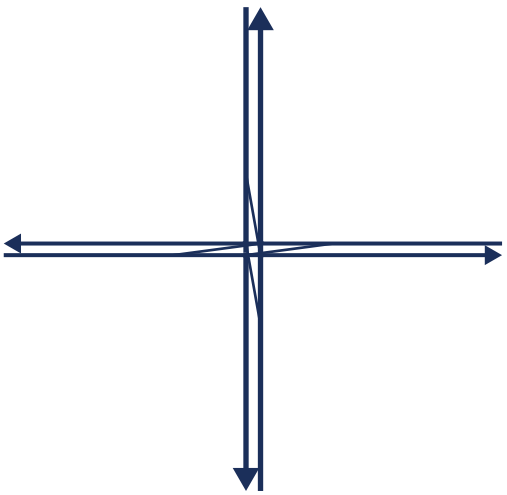
Offset T



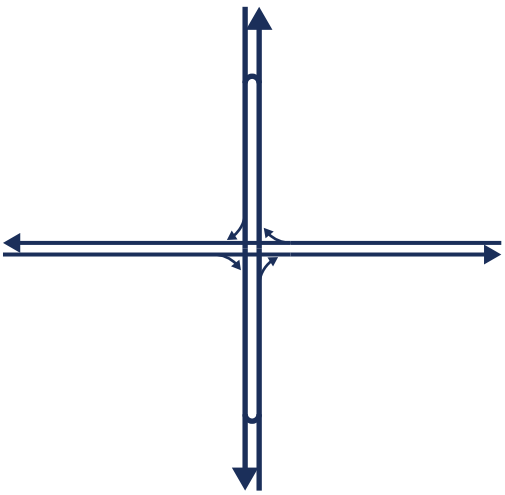
Continuous Green-T



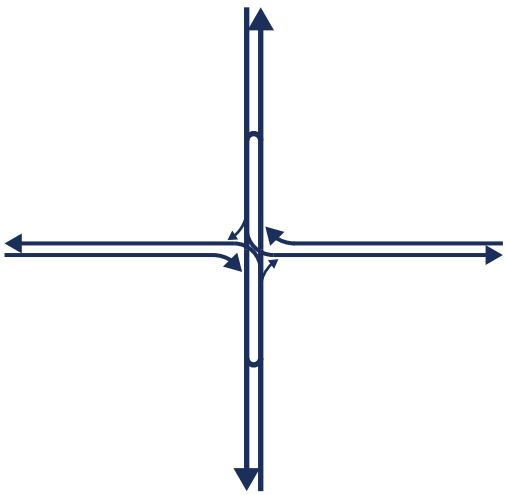
Quadrant



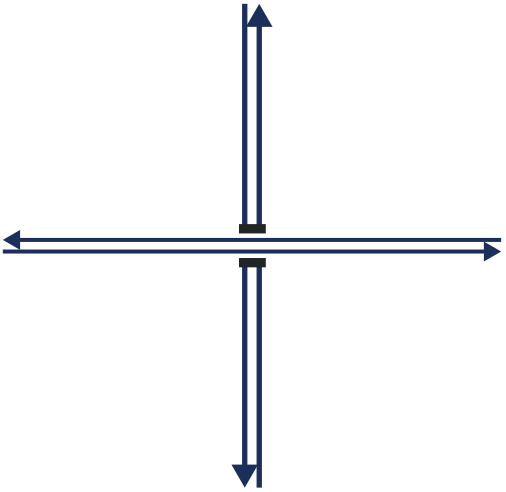
Displaced Left Turn (DLT) Intersection



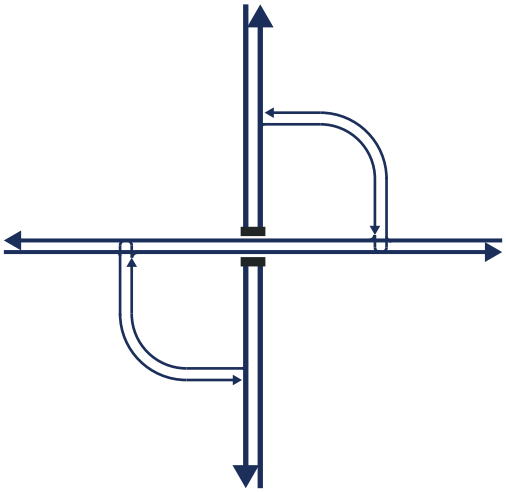
Median U-Turn



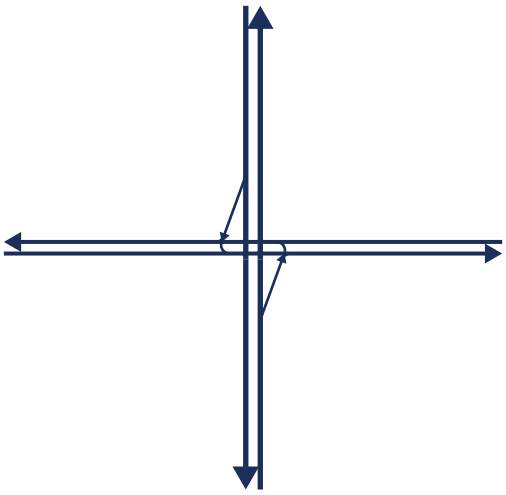
Restricted Crossing U-Turn



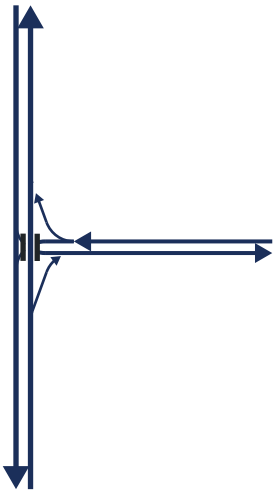
Grade Separation



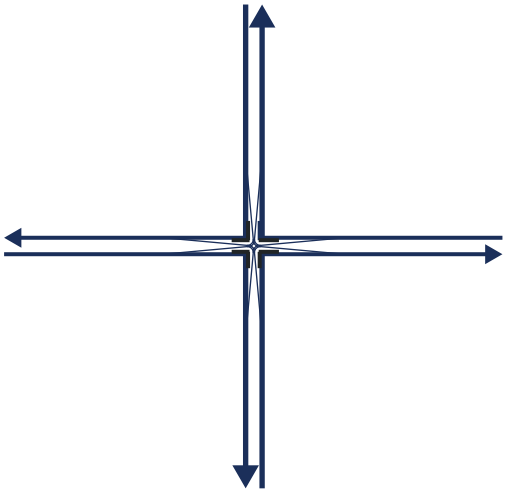
Grade Separation with At-Grade RIRO



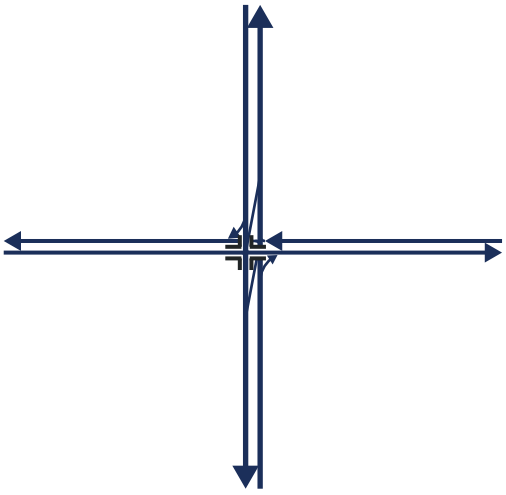
Jughandle



High-T



Center Turn Overpass



Echelon

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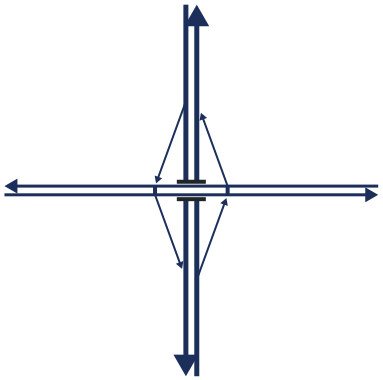
PRINCIPAL ARTERIAL INTERSECTION CONVERSION STUDY

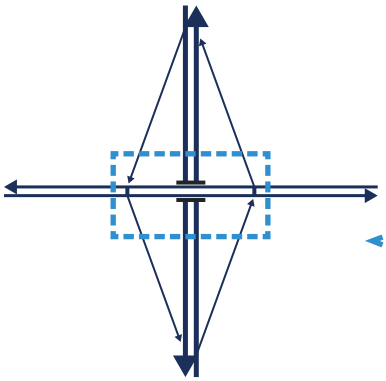
DEPARTMENT OF TRANSPORTATION

Hybrid Intersections
(Partial Grade Separations)

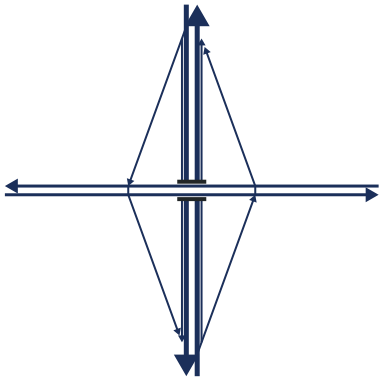
January 2017



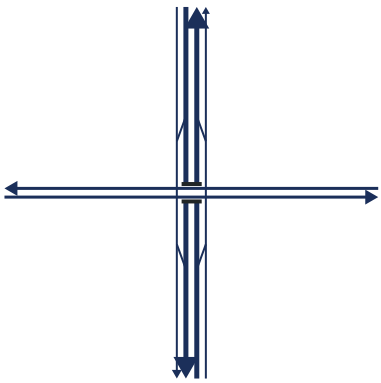
Tight Urban/Compressed Diamond



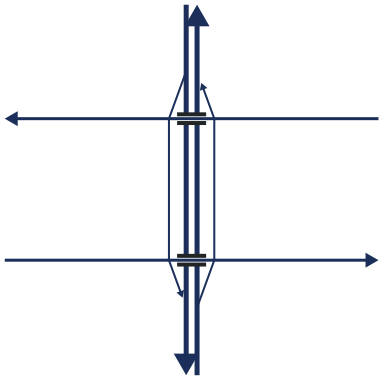
Conventional Diamond



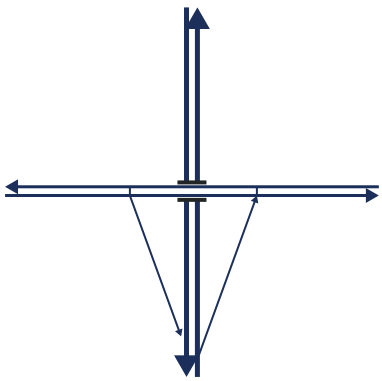
Conventional Diamond with C/D Roads



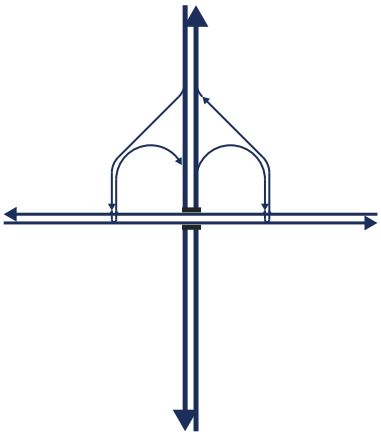
Conventional Diamond with Frontage Roads



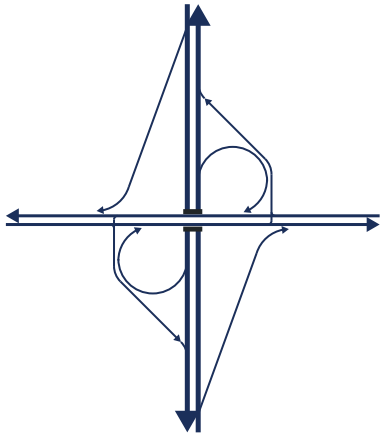
Split Diamond



Partial Diamond



Folded Diamond

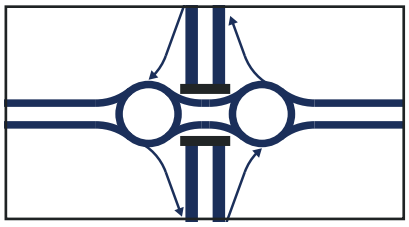


Partial Cloverleaf (PARCLO)

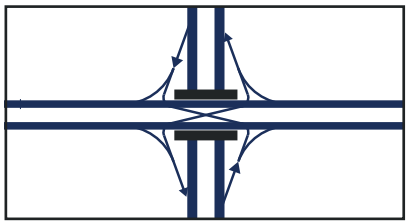
Bridge Intersection Alternatives:

Diverging Diamond (DDI)

Displaced Left Turn (DTL)



Diamond with Roundabouts



Single Point Urban (SPUI)

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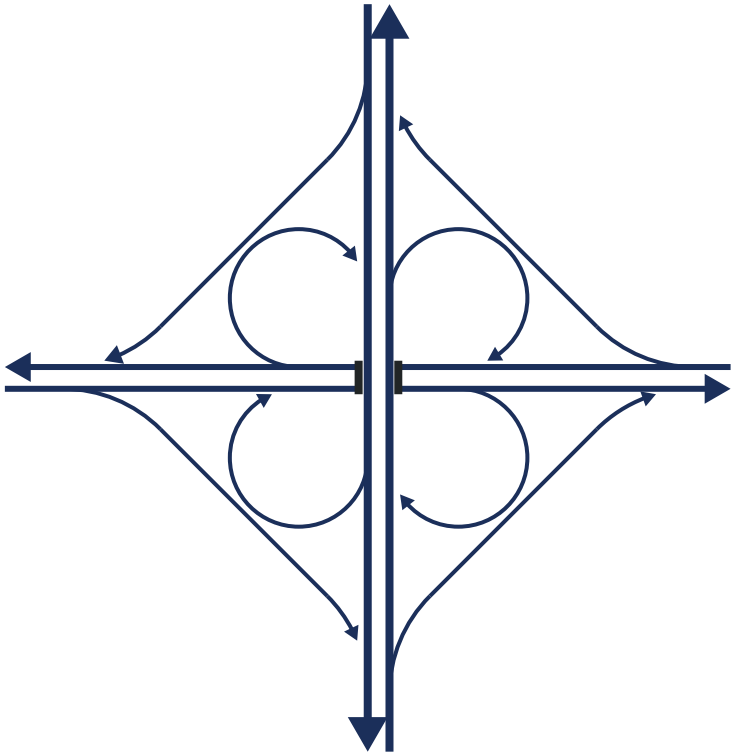
PRINCIPAL ARTERIAL INTERSECTION CONVERSION STUDY

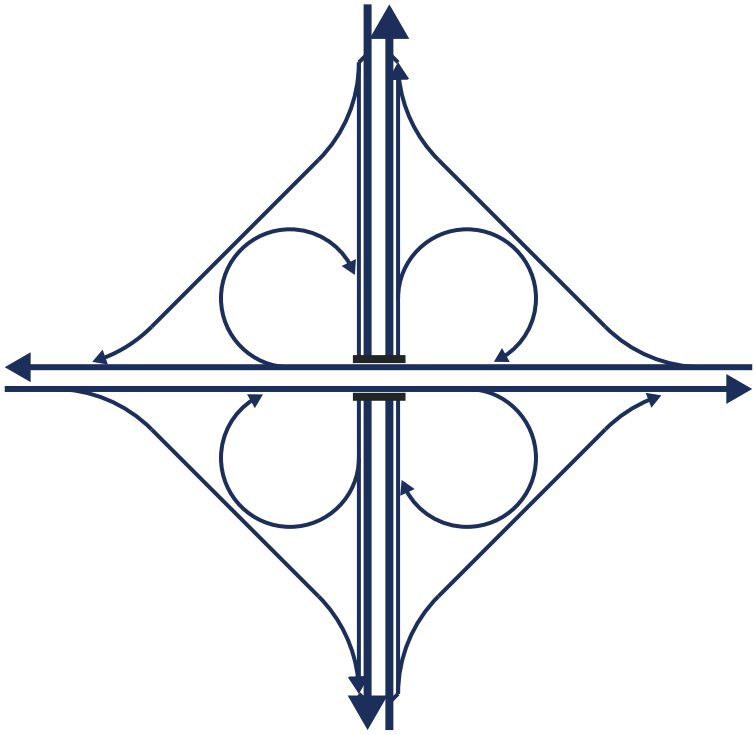
DEPARTMENT OF TRANSPORTATION

Service Interchanges

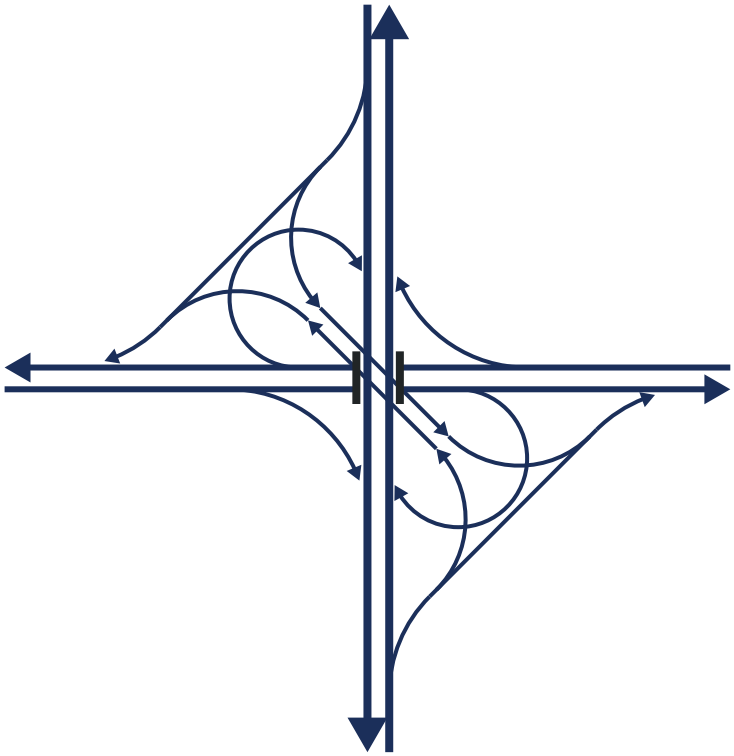
January 2017



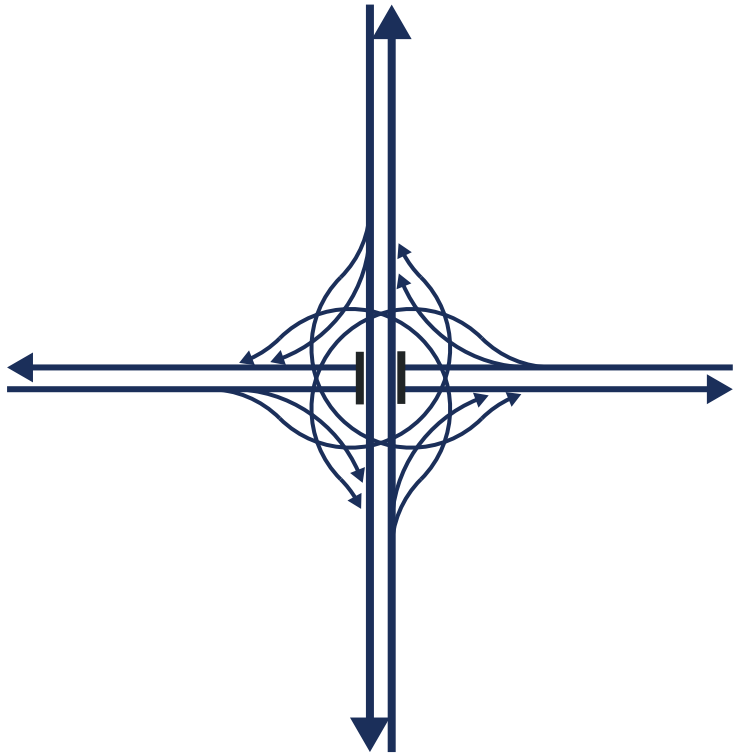
Cloverleaf



Cloverleaf with C/D Roads



Semi-Directional



Directional

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PRINCIPAL ARTERIAL INTERSECTION CONVERSION STUDY

DEPARTMENT OF TRANSPORTATION

System Interchanges

January 2017

PRINCIPAL ARTERIAL INTERSECTION CONVERSION STUDY

METROPOLITAN COUNCIL

DEPARTMENT OF TRANSPORTATION

FINAL REPORT

ATTACHMENT 4

Phase I Technical Memorandum

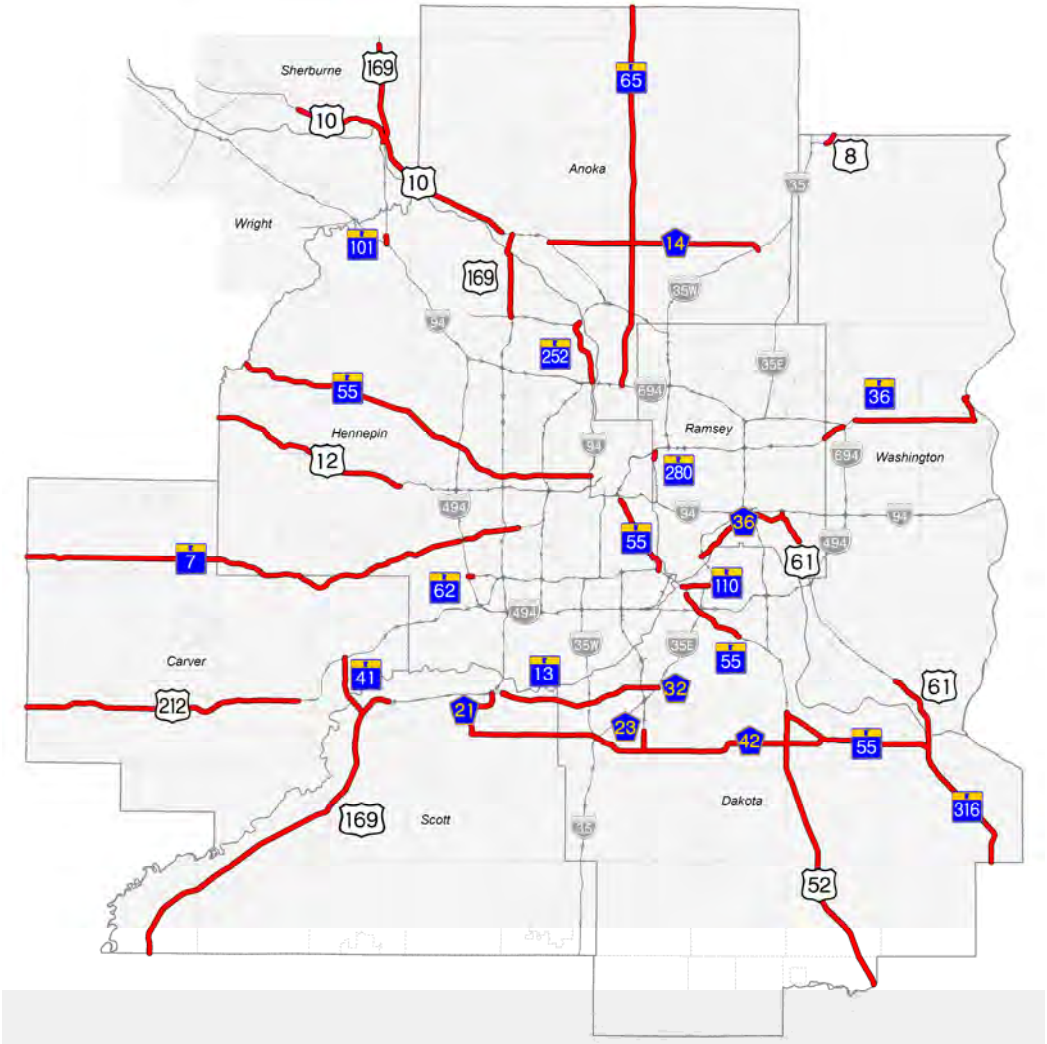
This attachment contains the Principal Arterial Intersection Conversion Study Phase I Technical Memorandum. The Tech Memo covers all of the Phase I study screening activities. The major component was the identification of corridors and intersections to advance for detailed analysis in Phase II of the study. During Phase I, there was considerable background research and outreach to all stakeholders of the study.

PRINCIPAL ARTERIAL

INTERSECTION CONVERSION STUDY

METROPOLITAN COUNCIL

MINNESOTA DEPARTMENT OF TRANSPORTATION



Description:

This deliverable provides a complete review of study activities and results through completion of the Phase I screening process, which identified corridors and intersections to advance for detailed study. The next steps (Phase II) will include additional studies and prioritization for the selected intersections to identify potential grade separations and priorities.

Principal Arterial Intersection Conversion Study

Background Data, Outreach Summary, and Phase I Screening (Technical Memo)

March 2016

Metropolitan Council Contract No. 15P102

Prepared for:

Metropolitan Council
Minnesota Department of Transportation, Metro District

Prepared by:

Bolton & Menk, Inc.
Stonebrooke Engineering

Background Data, Outreach Summary, and Phase I Screening Recommendations (Technical Memo)

Prepared by Bolton & Menk, Inc. with Stonebrooke Engineering

Contents

Tables

Figures

Attachments

List of Acronyms

ADT	Average Daily Traffic
CH	County Highway
CMSP	Congestion Management Safety Plan
CSAH	County State Aid Highway
EIS	Environmental Impact Statement
FHWA	Federal Highway Administration
HCM	Highway Capacity Manual
ICE	Intersection Control Evaluation

MnSHIP	Minnesota Highway Investment Plan
PA	Principal Arterial
PMT	Project Management Team
STIP	State Transportation Improvement Program
TED	Transportation Economic Development
TH	Trunk Highway
TSC	Technical Screening Committee
VMT	Vehicle Miles Traveled
VPD	Vehicles Per Day

1 Introduction

1.1 Need for the Intersection Conversion Study

Principal arterials are the highest functional classification highways in the Minneapolis-St. Paul (Twin Cities) metropolitan area. Their purpose within the roadway hierarchy is to optimize mobility – to provide reliably safe and high-speed travel over significant distances. While principal arterials make up less than five percent of the region's roadways (by mileage), they carry approximately 50 percent of its vehicle miles traveled (VMT). The majority of metro-area principal arterials are limited-access freeways, which provide the greatest mobility and safety characteristics of all roadway types. However, there are approximately 300 miles of non-freeway principal arterial highways which must balance mobility, safety, and access to destinations – typically within footprints that are smaller than freeways.

Non-freeway principal arterials typically operate with a mobility advantage for through traffic; but this mobility objective becomes more challenging with at-grade intersections as total volumes and crossing volumes increase. Such intersections may limit the ability to best provide for long-term mobility and safety. This sometimes leads to proposals for new interchanges or "grade-separation" projects. These types of projects have regularly been completed and have resulted in mobility and safety improvements and the conversion of non-freeway arterials into either:

- Extensions of metro-area freeways, or
- Limited segments along principal arterials that operate like freeways but still include at-grade intersections off each end of the converted segment.

Non-freeway principal arterial highways in the Twin Cities metro are the focus of the study. These roadways serve critical mobility functions and their at-grade intersections need region-wide reviews to guide investments and help set visions.

The demand to develop additional projects is high, as are the potential benefits. However, there is also a need to prioritize intersection conversions through region-wide reviews, to more strategically guide investments and help set long-term corridor visions.[1] Specifically, this first-of-its-kind study led by the Metropolitan Council and MnDOT's Metro District recognizes that many needed intersection conversion projects cannot be delivered in the foreseeable future due to expected funding constraints. Illustrating this point, MnDOT's *Minnesota State Highway Investment Plan* (MnSHIP) identifies 20-year highway investment needs at $30 billion,[2] and corresponding anticipated revenues at $18 billion, leaving a 20-year $12-billion gap (40 percent).

[1] While regional prioritizations have been applied to managed lane (MnPASS) investments and to transit, a similar approach has not been used to prioritize new grade-separation projects.

[2] http://www.dot.state.mn.us/planning/mnship/ (December 2013). The $30-billion figure covers a full range of statewide transportation infrastructure needs including maintenance, vehicle mobility improvements, non-motorized accommodations, regional and community priorities, and others. The MnSHIP supports 10-Year MnDOT Work Plans by district and will be periodically updated to reflect new funding cycles.

The types of intersection improvements to be undertaken is another dimension of this study. This aspect of the work will reflect current transportation planning and engineering practice, which may find cost-effective intersection mobility investments that do not require complete grade separations (full-movement interchanges). Recent and emerging project development and design approaches show that lower-cost, high-benefit intersection projects are often possible without grade separations or by combining at-grade and grade-separated design elements. Therefore, the study will strive to guide intersections that warrant strategic investments toward the right solutions, whether interchanges, innovative high-capacity arterials ("superstreets"), or hybrid combinations, typically along corridors with some at-grade intersections and some grade separations. Therefore, the study will recognize the context of specific corridors and intersections and will help to align locally and regionally driven investments on non-freeway principal arterials.

Recent and emerging project development approaches show that lower-cost high-benefit intersection projects are often possible. The study will recognize the context of specific corridors and intersections and will help to align locally and regionally driven investments.

Given the current and anticipated funding climate, there is broad recognition of the need to ensure transportation investments reflect sound analysis, effective local/regional collaboration, and strategic prioritization to target system needs and maximize the value of investments. The *Principal Arterial Intersection Conversion Study* was identified as a work program item in the Metropolitan Council's *2040 Transportation Policy Plan*:

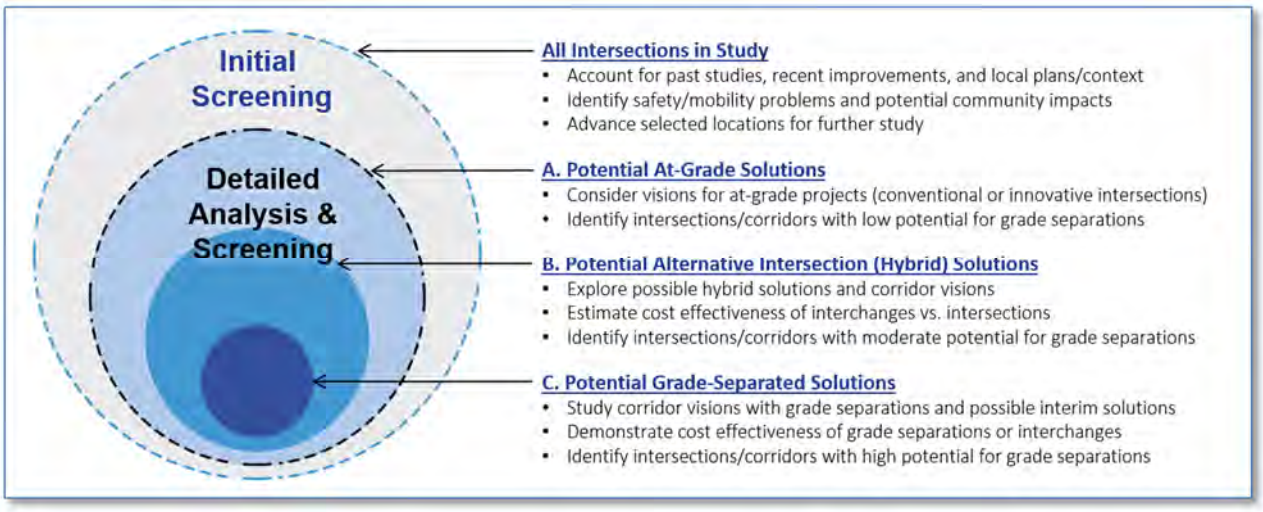
> *The Council and MnDOT will work with regional highway partners to analyze key intersections on the non-freeway principal arterial system within the urban service area to identify and prioritize specific intersection conversion projects.*

1.2 Study Organization, Approach, and Outcomes

To optimize the allocation of resources, the study was organized into two analytical phases (see the graphic on next page):

- **Initial Screening** (**Phase I)** – To identify intersections that will not be prioritized for grade-separation or similar investments at this time
- **Detailed Analysis and Screening** (**Phase II)** – To identify grade-separation investment priorities as Low, Medium, and High, and to place locations into context in terms of solutions

The objectives of this Technical Memorandum are to strengthen understanding of the study's objectives, summarize the Phase I screening activities, and present recommendations on locations to be advanced for more detailed Phase II analysis.



Overall, the study will help organize investment priorities for intersection mobility projects on non-freeway principal arterials. Discussions during the December 2015 outreach meetings (summarized below) helped the Project Management Team (PMT) members and local representatives refine the study's approach and understanding. Based in-part on these inputs, the results of the study will:

- **Focus on opportunities and priorities for new grade separations.** Meaningful results will be best attained by keeping the focus on strategic high-priority investments for grade separations (interchanges or other projects using bridges to reduce conflicts). Subject to available resources, and in coordination with other planning, the study will also identify other opportunities for high-capacity intersections, including potential for lower-cost/high-benefit innovative-intersection projects, with or without grade separation. MnDOT has been engaged in related studies, to identify cost-effective highway projects for many years – most notably the Congestion Management Safety Plan (CMSP), now in Phase IV.[3]

- **Address relevant timeframes for funding and implementation.** The study's outcomes will clarify investment priorities within a foreseeable timeframe, approximately 10 years—similar to MnDOT District's 10-Year Work Plans noted previously. While 20 years (or more) is consistent with the *Transportation Policy Plan's* long-term planning framework, the Intersection Conversion Study's focus is on more near-term priorities. The needs identified for intersection upgrade projects should stretch beyond expected funding levels, in case additional funding becomes available and to support long-term plans and. However, corridor visions must not be so far-reaching and comprehensive that the most achievable and strategic projects are unclear. Relevant short-term planning cycles include:

    - The Regional Solicitation (every two years)

    - The *Transportation Policy Plan* update cycle, which is every four years, and other funding and programming cycles which range from about two to five years, including the

[3] The CMSP planning framework (led by MnDOT's Metro District and the Metropolitan Council) recognizes that system-wide capacity expansion will not be feasible and focuses a portion of Metro District resources on opportunities for lower-cost/high-benefit mobility and safety improvements.

Transportation Economic Development (TED) and similar funding programs, the State Transportation Improvement Program (STIP), and local capital improvement budget cycles[4]

- The anticipated practical timeframe for updates to this study, which is roughly 10 years (significant changes should not be expected with every *Transportation Policy Plan* update)

- **Continue to be driven both locally and regionally.** Local support and participation in this regional study and in project development is critical to the successful and complete development of high-capacity intersection projects, including efforts to leverage funding sources.

1.3 Lead Agencies, Study Contacts, and Local Representatives

This study is the first of its kind and has been undertaken jointly by the Metropolitan Council and MnDOT's Metro District. The project managers and lead contacts are:

Steve Peterson
Metropolitan Council
Steven.Peterson@metc.state.mn.us
(651) 602-1819

Paul Czech
Minnesota Department of Transportation
Paul.Czech@state.mn.us
(651) 234-7785

Local participation in the Study was facilitated through the Technical Steering Committee (TSC), which includes representatives of each participating county:

- Doug Fischer, Anoka County
- Lyndon Robjent, Carver County
- Mark Krebsbach, Dakota County
- Carla Stueve, Hennepin County
- Joe Lux, Ramsey County
- Lisa Freese, Scott County
- John Menter, Sherburne County
- Jan Lucke, Washington County
- Jean Keely, City of Blaine (City Rep. on TSC)

The TSC also includes leadership representatives from MnDOT, Metropolitan Council, and the Federal Highway Administration (FHWA):

- Pat Bursaw, MnDOT Metro District
- Tom O'Keefe, MnDOT Metro District
- Steve Voss, MnDOT District 3
- Amy Vennewitz, Metropolitan Council
- Mark Filipi, Metropolitan Council
- Jim McCarthy, Federal Highway Administration

[4] This study does not represent any change in funding cycles or funding availably; however, it will be used to help organize studies and priorities for funding in the Regional Solicitation process and in other funding programs like the TED program.

2 Phase I Screening Overview

2.1 Basic Screening Question, Work Elements, and Result

This Technical Memorandum concludes the study's Phase I screening. This part of the study was conducted to answer the basic question:

> ***Which non-freeway principal arterial locations are not candidates for grade separation at this time?***

The primary work elements in Phase I have included:

- Document reviews to determine locations previously identified as priorities for grade separation, or locations where grade separation was not preferred due to site constraints or other factors.
- Outreach to county and local stakeholders to discuss needs and priorities.
- Technical screening using data-driven methods refined through the outreach process; this process recommended locations for Phase II analysis.

The Phase I screening identified 104 (28 percent) of the initially identified 374 intersections to advance to Phase II analysis as candidates for grade separation. PMT and TSC members reached consensus on recommended locations to advance to Phase II based on the Phase I analysis and local input, as reflected throughout this Tech Memo. Recommended Phase II locations are highlighted on **Figure 1** (next page) and more detailed information about screening results is provided in Section 5.3 and in the referenced county maps, attached. The work elements and criteria which supported the Phase I screening result are summarized below in Sections 3, 4, 5.1 and 5.2.

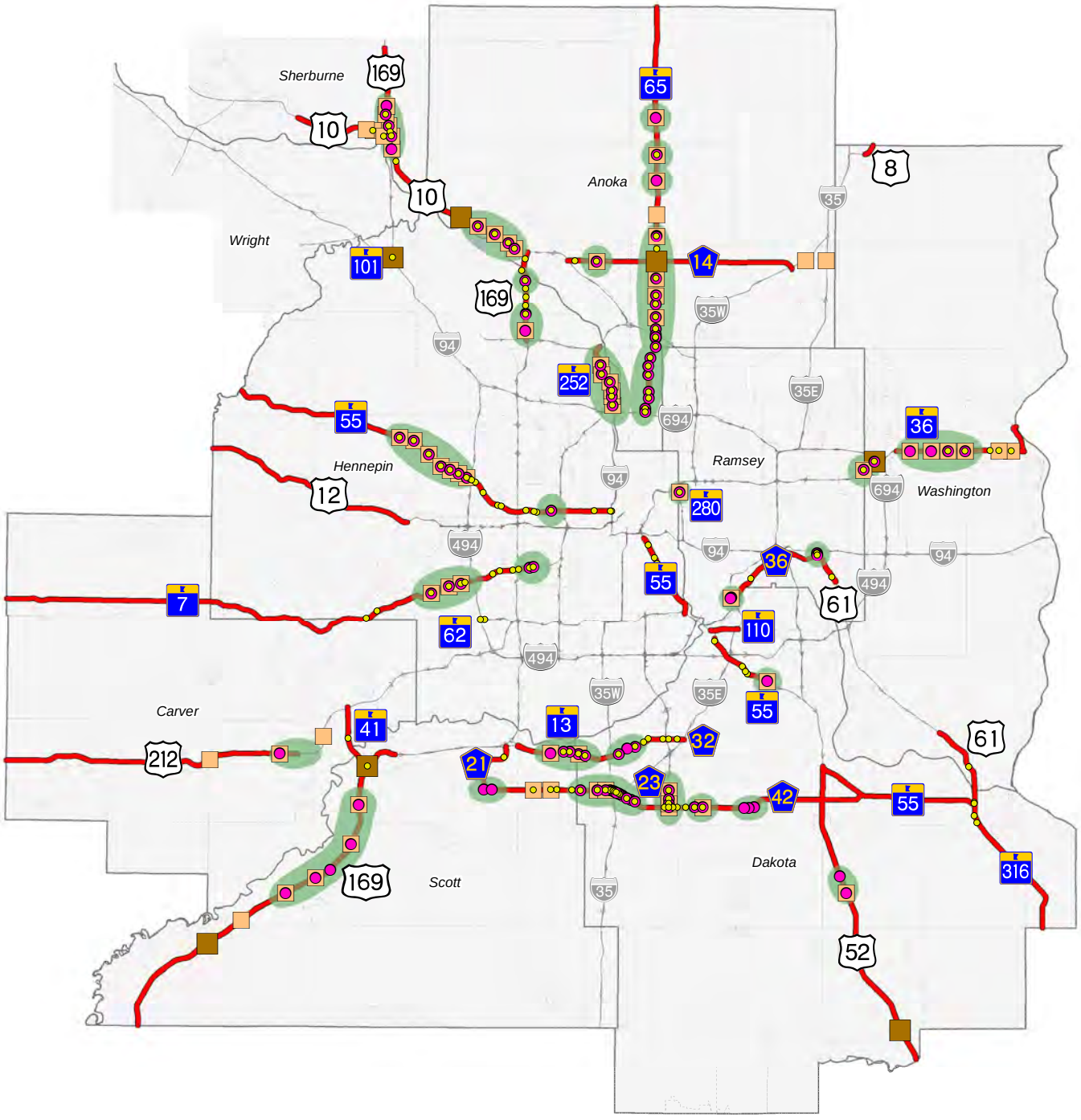
2.2 Study Focus and Phase I Screening Objectives

Many discussions with study participants during Phase I concerned the approach and focus of the study and the Phase I screening objectives. With emphasis on the Phase I screening, the planning process and study will:

- **Focus on intersections and related mobility needs,** not general highway capacity expansion needs. The focus on intersections provided in the study will identify potential mobility and safety benefits along corridors. However, setting priorities for strategic intersection mobility is a fundamental objective, and this will help to build visions and priorities for the non-freeway principal arterials throughout the Twin Cities.

- **Address in Phase II** those intersections and segments for which grade-separated design solutions (or innovative high-capacity intersections) warrant planning-level consideration in the foreseeable future.

- **Dismiss from Phase II** intersections and segments that do not exhibit local support for grade-separated design solutions or innovative high-capacity intersections. Locations were not



Legend

- Intersections Meeting Volume Criteria
- Phase II Intersections
- Locally Identified Future Grade Separation
- Recent or Funded Grade Separation
- Principal Arterial
- Non-Freeway Study Segments
- Phase II Study Area
- City/Township Boundaries
- County Boundaries

0 9 Miles

Source: MetroGIS, MnDOT

PRINCIPAL ARTERIAL INTERSECTION CONVERSION STUDY

Figure 1
Phase II Study Areas
March 2016

advanced if the balancing of data, planning background, context, and input received did not support investments in intersection mobility projects in the foreseeable future.

Intersections and segments that did not advance to Phase II represent locations where investments are expected to address "business as usual," meaning conventional at-grade intersections in the study's practical planning cycle (roughly 10 years as noted in the previous section). Screening intersections out from Phase II does not preclude future safety projects or other adjustments such as turn lanes, signal improvements, realignments, or access management. It also does not preclude a later shift toward a grade-separated vision based on future intersection conversion priorities. Section 5 of this Technical Memorandum provides the following information for intersections and segments not advanced to Phase II:

Screening intersections out from Phase II does not preclude future safety projects or other adjustments, nor a later shift toward a grade-separated vision based on future intersection conversion priorities.

- The basis for the screening recommendation
- Reference to local input
- Information about needs and context – locations screened out may be considered in MnDOT's Congestion Management Safety Plan (CMSP), noted above in Section 1.2, and in future *Intersection Conversion Study* updates

3 Document Review – Previously Identified Priorities

A comprehensive web-based review of documents was conducted as part of the Phase I work. This type of review is facilitated by the fact that many government agencies have well organized collections of on-line documents. Documents by the following levels of government were reviewed:

- Metropolitan Council
- MnDOT
- Eight metro counties[5]
- Cities as appropriate

The types of documents included:

- Regional policy/planning documents
- Technical studies (primarily MnDOT and county/city corridor studies)
- 2030 and 2040 comprehensive (transportation) plans
- Programming documentation (primarily MnDOT and county)

[5] The eight metro counties in the study include the seven counties typically addressed by the Metropolitan Council (Anoka, Carver, Dakota, Hennepin, Ramsey, Scott, and Washington Counties) plus the portion of Sherburne County closest to the metropolitan area (the City of Elk River). This area is included in the study because it is part of the U.S. Census defined Metropolitan Statistical Area (MSA) and has strong connectivity with the region.

Regarding comprehensive plans, the primary level of review was at the county level. However, select city plans were reviewed based on content in the host county plans, as well as knowledge of potential improvements/improvement corridors relative to city boundaries, to get more detailed local information.

The results of the review process were summarized by county as presented in **Attachment A, Previous Document Reviews by County**. For each county, intersections were organized by study corridor, and recommendations for grade-separated treatments (or further evaluation of such treatments) were identified. These sheets were brought to each of the county meetings (see information below, in Section 4) to facilitate discussion of local priorities.

4 Local Outreach Meetings

4.1 Background

Formal county involvement will occur throughout the *Intersection Conversion Study* by means of the TSC. The TSC includes one representative from each of the metro counties, one city representative, and representatives of the Metropolitan Council, MnDOT, and FHWA (Section 1.3). To date, the TSC has met on November 13, 2015; January 14, 2016; and March 17, 2016. This group will continue to meet regularly to review work products and provide oversight and guidance.

To get detailed local input early in the study process, a series of meetings was held with each of the metro counties in December of 2015. These meetings were held on the following dates:

- Ramsey County (Tue, 12/01/15 – morning)
- Washington County (Tue, 12/01/15 – afternoon)
- Dakota County (Wed, 12/02/15)
- Hennepin County (Tue, 12/08/15)
- Sherburne County (Thur, 12/10/15)
- Carver County (Mon, 12/14/15 – morning)
- Anoka County (Mon, 12/14/15 – afternoon)
- Scott County (Tue, 12/15/15)

The meetings were led by the PMT and were attended by the TSC representative for the given county, and other county/local representatives as advised by the county in question. The meetings were facilitated through distribution of project information sent by email in advance, and proceeded based on the following agenda items:

1. Introductions and Roles
2. Study Overview
3. Review of Meeting Purpose and Desired Outcomes
4. Initial Screening Criteria
    a. Previous Planning and Local Input
    b. Entering Volumes at Intersections

c. Crashes

5. Local Input by Corridor
6. Discussion: Local Priorities and Input on Screening Criteria

A listing of attendees is provided in **Attachment B, Local Outreach Meetings Attendees**.

4.2 Outreach Meeting Content and Input Received

Meeting participants were briefed on the purpose, goals, and objectives of the study, the study schedule, and anticipated products. A key outcome identified was the opportunity for participants to provide input on overall study approach and methods. Accordingly, participants were asked to comment on the study's guiding principles and initial screening criteria as provided and discussed at the meetings. Participants were also asked to validate or supplement early data collection efforts that identified plans, studies, and programmed projects on non-freeway principal arterials.

The Phase I screening criteria as initially proposed by the PMT included the following minimum factors, considered necessary for an intersection to advance to Phase II:

- **Traffic Volumes:**
  - Generally, intersections with greater than 20,000 entering vehicles per day should be considered for prioritization in Phase II of the study. This threshold was based partly on the daily capacity of a single-lane roundabout and partly on MnDOT Intersection Control Evaluation (ICE) guidance. The ICE guidance identifies grade separation as a potential control option (among many other choices) for a wide range of total entering volumes, from 10,000 to 80,000 (see chart below).[6]

Generalized MnDOT ICE Guidance (2007)

APPROXIMATE COMBINED ADT	FOUR-WAY STOP	SIGNAL	ROUNDABOUT	NON-TRADITIONAL INTERSECTION	ACCESS MANAGEMENT TREATMENTS	GRADE SEPARATION
7,500 – 10,000	X		X		X	
10,000 – 50,000	X	X	X	X	X	X
50,000 – 80,000		X	X	X	X	X
> 80,000						X

  - The initial criteria also noted that intersections should carry 1,000 vehicles per day or more on the minor leg, or should be treated with traditional strategies (this is also consistent with ICE guidance).

- **Crash Rates:** Intersections where the Critical Crash Index is above 1.0 and the traffic volumes are greater than 25,000 vehicles per day were identified as candidates for grade separation.

- **Previous Planning:** This factor considered the presence of studies completed over approximately the past five-10 years which recommended intersections for grade separations or

[6] http://www.dot.state.mn.us/trafficeng/safety/ice/2007_ICE_Manual.pdf.

other major capacity improvements. If such studies were present, and were confirmed through the outreach meetings, they were considered indictors that the intersection(s) should be evaluated in Phase II.

- **Functional Classification**: Intersections with A-Minor arterials were considered priorities for more detailed evaluation.

- **Local Input:** The local project partners were proposed to have input in whether intersections would proceed to Phase II or would be eliminated from further analysis.

In addition to the criteria above, the meeting participants discussed the overall scope and objectives of the study. This included data referencing more than 370 public road intersections on about 300 miles of non-freeway principal arterials. As the outreach meetings progressed, the following comments and issues came through most consistently in reference to the study's objectives and the Phase I screening criteria:

The volume thresholds presented at the local outreach meetings were typically considered too low and "permissive" – potentially allowing too many intersections to advance to Phase II.

- The above-noted traffic volume thresholds were typically considered too low and warranted more technical study and evaluation. Total entering intersection volumes of 20,000 vehicles per day (VPD) (and 1,000+ VPD on the minor leg) were noted as low thresholds in practice – often not enough to justify studies of grade-separated intersections. Many participants said these volume thresholds alone were too "permissive" and would allow too many intersections to advance to Phase II.

- The ratio of the mainline volume to cross street volume is an important factor to consider, to measure conflicts; this means there are a range of volume relationships to consider.

- The study should demonstrate that some locations are appropriate (or not appropriate) for detailed study and prioritization based on several criteria, not based solely on one criterion – for example, a volume threshold or local input.

- Locally adjacent cross-street volumes should be considered when making screening recommendations because consolidation of multiple intersections to one grade separation can often be proposed – for example, in higher-speed rural areas.

- Several local stakeholders supported functional classification of the crossing highway as a factor in the screening (i.e., intersections with other principal arterials or with minor arterials should be more important to consider).

- Some comments pointed out the value of right-of-way preservation at minor arterials for future grade separations or other projects.

- The speed and mobility functions of the principal arterial should be part of the context considered in screening. High-speed expressways are often less compatible with at-grade intersections than streets with lower posted and design speeds.

- Additional speed-related mobility factors include interregional and freight connectivity between urban centers. These contextual factors consider the roles of non-freeway principal arterials in providing reliable mobility and safety over longer distances and around the edges of the metro area.

- Unique context, including land uses, growth trends (i.e., economic development areas), and industrial/truck demands should be considered in the screening criteria. Specific major traffic generators exist in some areas and may warrant special consideration along with other criteria (for example, the Ports of Savage area near Trunk Highway (TH) 13 in Scott County).

- Other contextual factors to consider include: railroad crossings of principal arterials, railroads next to principal arterials (and near intersections), presence of pedestrian crossings or related needs, presence of transit or future plans, right-of-way, and input on such factors from local jurisdictions.

- Where significant intersection investments have recently been made or are programmed in the near future, should the location be advanced to Phase II as a priority for grade separation? Discussions of this question raised the need to understand the timeframes to be considered in the study and the opportunity to revisit locations as part of future updates. In general, participants stated there was merit in screening locations out from further study when there were recent or current committed investments (in current funding cycles) and there will be need to derive value in the lifecycle of the new at-grade intersection improvements.

- Locally known background in opposition to grade separation projects should be a factor in recommendations against advancement to Phase II screening, similar to background of support in previous plans.

- Can safety issues alone be a driver for a possible grade separation project? In general, participants agreed that the need for intersection volume and mobility should be a key factor, balanced with safety considerations.

- Study outcomes should serve as regional guidance for strategic mobility and safety projects on non-freeway principal arterials. The results should not preclude local actions to propose interchange projects.

After discussion of the screening criteria as well as general analytical considerations for the study, participants of the county/city meetings were asked to provide observations on a corridor-by-corridor basis for the intersections that should either be included in a more detailed screening evaluation, or, if appropriate, removed from further consideration. These recommendations are captured in the listing of projects to be advanced/not advanced for Phase II analysis (Section 5).

5 Refined Technical Screening and Phase I Recommendations

5.1 Traffic Volume Screening Approach

Based on input received at the county outreach meetings, the PMT worked to refine the Phase I screening approach and criteria. The first consideration was to adjust the traffic volume criteria based on more sophisticated observations about intersection capacity and conflicts.

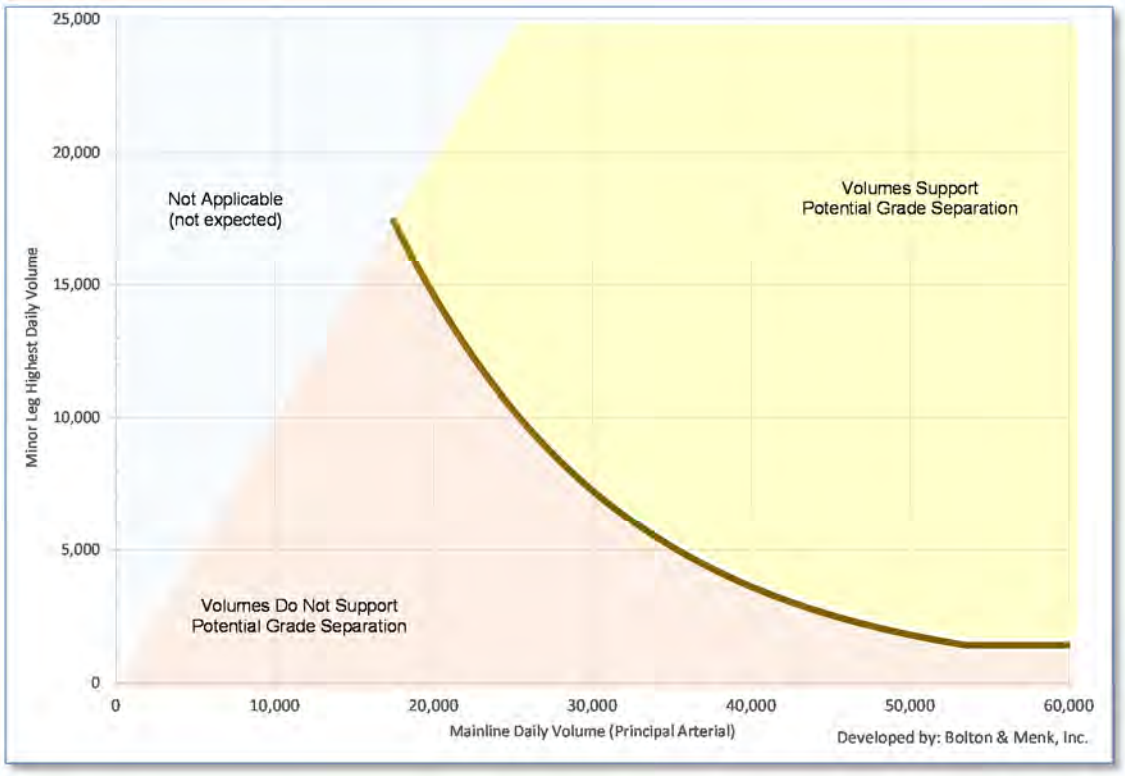
As noted in Section 4.2, above, the ICE-based thresholds proposed at the county meetings were typically seen as representing the low end of guidance to justify grade-separated intersection designs and projects. Many participants said such thresholds did not adequately reflect industry experience in decision-making for an intersection project, including conversion to a grade separation. The refinements to the traffic volume criteria considered the discussions at the outreach meetings and other industry guidance – primarily Highway Capacity Manual (HCM) methodologies to analyze the capacity of a signalized intersection. The resulting guidance on intersection volumes (see the curve on the next page) takes into account a range of conditions for mainline (principal arterial) volumes and crossing volumes and is now proposed as the study's threshold guidance to identify potential grade separations.

The refined guidance on intersection volumes is based on the capacity of a signalized intersection and takes into account a range of conditions for mainline and crossing volumes.

The volume threshold plot specifically depicts a range of volume scenarios at the level of service D/E threshold of a signalized intersection, with various volumes for both the mainline principal arterial and the intersecting roadways. The development of the curve considered the capacity of an intersection based on the HCM methodology for a four-lane roadway. Because this methodology is peak-hour orientated, different directional splits and peak-hour ranges were used to determine the volume ranges. Some of the specific inputs included:

- The lane capacity was assumed to be 1,900 vehicles per hour per lane with adjustments for lane utilization.
- The peak-hour factors ranged from 10 to 12 percent of daily traffic, while the directional distribution factors ranged from 0.55 to 0.75.
- A range of signal cycle lengths, split of the green time between phases, and other signal parameters were used to obtain a range of values.[7]

[7] Signal cycle lengths ranged from 120 to 180 seconds and splits range from 50 to 95 percent of the green time to the principal arterial with the various volumes. Clearance time was assumed to be five seconds for each phase and was assumed to be "lost time" and consequently eliminated. It was assumed that only two movements are made concurrently.



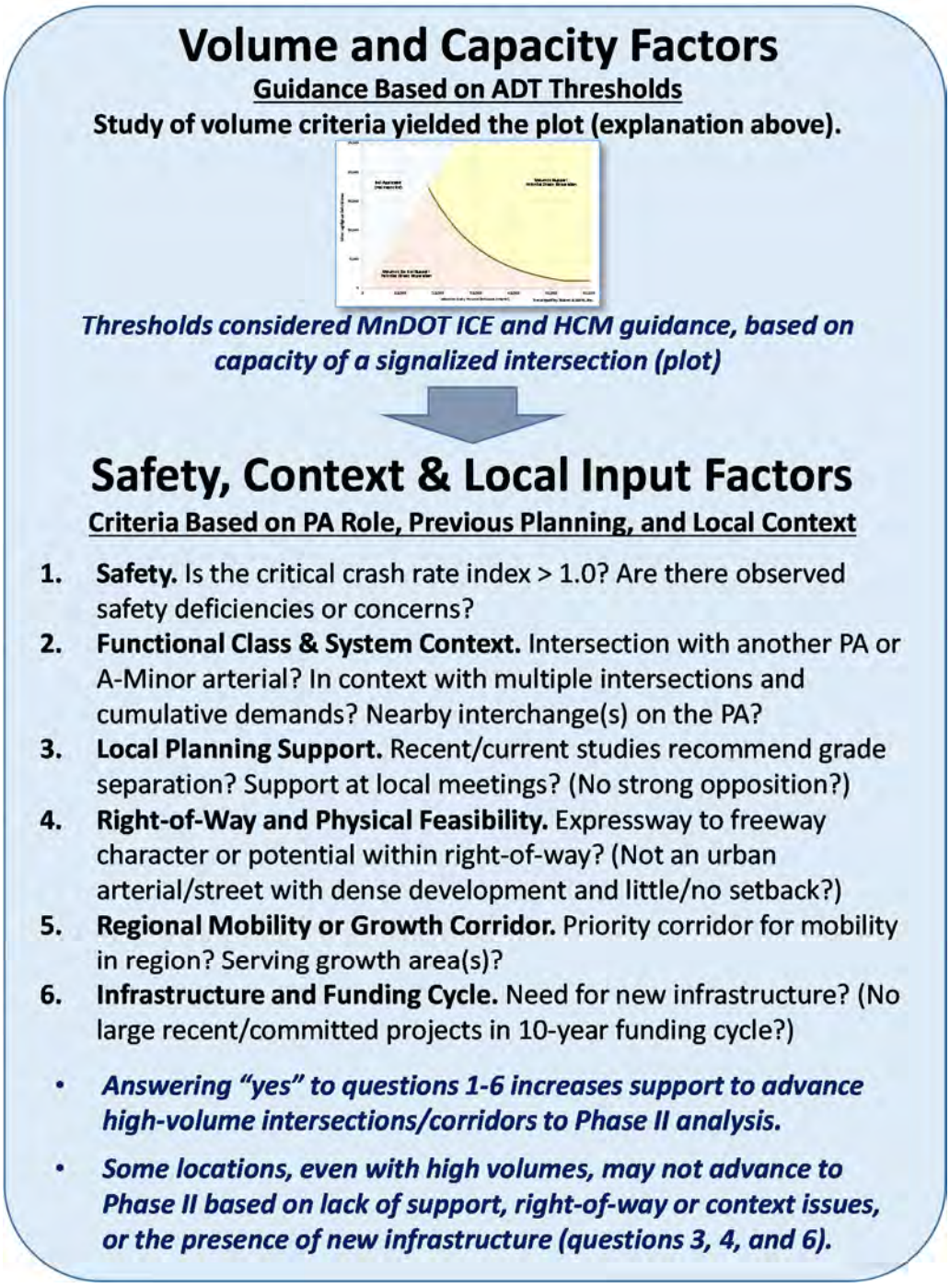
Intersection Volumes and Threshold Guidance for Potential Grade Separation

The fitted curve was developed based on the best fit to the range of volume, cycle length, and green time split scenarios. Results in the "higher" part of the plot, which supports potential for grade separation, exhibit greater potential for unacceptable delay and congestion (at or worse than level-of-service D/E).

5.2 Other Phase I Screening Criteria and Overall Screening Approach

The flowchart below (next page) outlines a series of criteria considered to formally complete the Phase I screening, both data-driven factors (e.g. volume and safety) and context-driven factors (based on the arterial's role in the system, previous planning, and local context). The flowchart structure and methodology was refined from the initial criteria in response to the outreach meetings, including screening discussions for specific intersections and related practical observations.

With reference to the flowchart, the refined approach was not intended to advance an intersection based on just one of the criterion. Instead, the approach was to build support for advancement to



Phase I Screening Flowchart

Phase II based on accumulated "yes" answers. This left opportunities open to be responsive to unique circumstances, local input, and even changing priorities and context over time. The "Infrastructure and Funding Cycle" factor (no. 6) was a noteworthy addition to the Phase I criteria, based on the outreach meetings. While this is the first time the *Intersection Conversion Study* has been undertaken, it was

identified in the current 2040 *Transportation Policy Plan* Work Program. Revised priorities are periodically anticipated, most likely during selected *Transportation Policy Plan* update cycles.[8] Therefore, this screening factor recognized the importance of the proper timeframe for advancement of a major intersection capacity project. As noted in Section 3.2, participants generally agreed there can be merit in screening locations out from further study when there were recent or current committed investments (in current funding cycles). Conversely, if the infrastructure is in poor condition and in need of reconstruction, this factor could help to justify advancement to Phase II.

The safety, context, and local input factors provided examples in the outreach meetings which transcended the volume and mobility factors in the Phase I screening process.

In practice, the safety, context, and local input factors provided examples in the outreach meetings which transcended the volume and mobility factors in the Phase I screening process. As noted on the Phase I Screening Flowchart, these examples were based especially on safety, local support, right-of-way or context issues, or the state of new infrastructure (questions 1, 3, 4, and 6). Such outcomes resulted in recommendations to not advance several high-volume locations. This was expected in the study because some principal arterial stretches (for example, the TH 55 Hiawatha corridor) present current context and constraints that are incompatible with planning for grade-separated intersections. In a few cases, the PMT recommended that some relatively low-volume locations advance to Phase II based on local/regional context and support in local planning.

5.3 Phase I Screening Summary and Recommendations

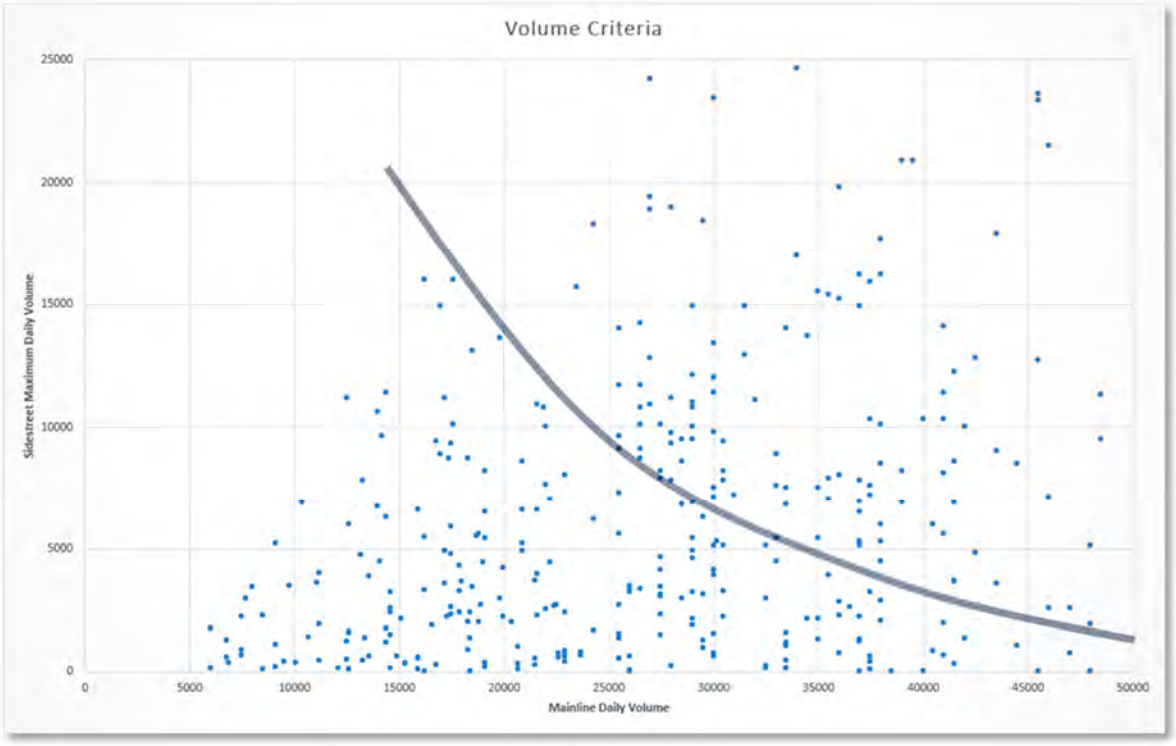
In summary, 374 at-grade intersections were initially identified for the study. These are at-grade intersections on principal arterials, including cross streets and intersections with ramps. Of these 104 intersections (28 percent) were ultimately advanced to Phase II analysis.

The Phase I screening result is that 104 of 374 intersections (28 percent) were identified for more detailed study in Phase II.

In total, out of the 374 intersections:

- 148 (38 percent) of the met the volume criteria based on the refined data analysis (see the plot on the next page as an illustration).
- Of those 148 intersections, 83 were not advanced to Phase II based on stakeholder input on context-based criteria. This left 65 intersections that meet the volume criteria for advancement to Phase II.
- 39 additional intersections were brought into Phase II which did not meet the volume criteria, but were proposed to advance based on potential needs and the strength of other criteria—safety, system context, local planning support, and other factors.

[8] *Transportation Policy Plan* updates are completed every four years. Major revisions to the intersection conversion priorities will be completed periodically when appropriate – not necessarily with each *Transportation Policy Plan* update.



Study Intersection Data with Volume Criteria Curve (GIS Data Set)

The above-noted screening initially resulted in a total of 117 intersections (31 percent) to be advanced for Phase II analysis. In preparing for the Phase II analysis, 13 other intersections were identified as not needing technical analysis, even though they are located along segments to be carried forward. These 13 intersections are minor connections that are incidental to nearby high-volume intersections (in most cases, these 13 locations are not fully directional intersections).

Therefore, the Phase I end result is that 104 of the 374 intersections (28 percent) were identified for more detailed study in Phase II.

Based on the local outreach meetings discussed in Section 3 and the refined screening procedures discussed above, the PMT recommended locations to advance to Phase II analysis at a TSC meeting held on January 14, 2016. The TSC members were substantially in agreement with the selected locations, with some minor adjustments (the adjustments are reflected in Tech Memo). The resulting final locations to be advanced to Phase II analysis are summarized on **Figure 1** (entire study; region, referenced in Section 2, above) and in more detail for each county in **Figures 2 to 9** (individual counties).

The screening recommendations are summarized for each county in the referenced figures, subsections, and tables below.

5.3.1 Anoka County (see Figure 2)

Table 1. Anoka County Locations Advanced for Phase II Analysis

PA	Location	Meet Vol. Criteria?	Contextual/Outreach Criteria, Remarks
CSAH 14	Hanson Blvd	Yes	• Locally identified grade separation
TH 10	CH 56 (Ramsey Blvd) to Fairoak Ave	Yes	• Follow TH 10 corridor study recommendations
TH 65	Between I-694 and TH 10	Yes	• May be good candidates for hybrid solutions
TH 65	North of TH 10 to CH 116 (Bunker Lake Blvd)	Yes	• Potential grade separations previously identified
TH 65	North of CH 116 (Bunker Lake Rd) to County boundary – CH 20 (Constance Blvd), CH 18 (Crosstown Blvd), CH 22 (Viking Blvd)	Yes	• Locally identified potential grade separations

Table 2. Anoka County Locations Screened Out of Phase II

PA	Location (s)	Meet Vol. Criteria	Contextual/Outreach Criteria, Remarks
CSAH 14	All except Hanson Blvd	Yes	• Existing interchange at TH 65 • Several recent at-grade investments have been made • Extension to east (I-35W, I-35E) should be studied in the future
TH 10	Between county boundary and CH 83 (Armstrong Blvd)	No	• No stakeholder grade-separation priorities identified
TH 65	North of CH 116 (Bunker Lake Rd) – other than CH 20 (Constance Blvd), CH 18 (Crosstown Blvd), CH 22 (Viking Blvd)	No	• Stakeholder input identifies at-grade solutions can likely work for many years, with the possible exceptions of CH 116, CH 20, and CH 22 which should be monitored
TH 169	County boundary to TH 10	Yes	• CH 14 (Main Street) – Lack of local support due to downtown Anoka context, potential adverse impacts, and environmental constraints • TH 10 – no current plans to remove TH 169 signals at TH 10 ramps

5.3.2 Carver County (see Figure 3)

Table 3. Carver County Locations Advanced for Phase II Analysis

PA	Location	Meet Vol. Criteria?	Contextual/Outreach Criteria, Remarks
TH 212	CR 43	No	• Local stakeholders identified that this location warrants Phase II consideration based on potential land use development and the overall TH 212 capacity expansion concept • Stakeholder input suggested that access modification between CR 43 and the existing interchange to the east at Jonathan Carver Parkway be considered

Table 4. Carver County Locations Screened Out of Phase II

PA	Location	Meet Vol. Criteria?	Contextual/Outreach Criteria, Remarks
TH 7	County boundary to county boundary	No	• Mainline investment needed prior to grade separations • Local stakeholders identified that current at-grade improvements are operating well
TH 41	Between county boundary and TH 212	Yes	• Only one location meets volume criteria (at CSAH 61 [Chaska Blvd]); 2019 at-grade improvements programmed through downtown Chaska
TH 212	Between county boundary and CH 43	No	• Potential interchange at CH 41/TH 284 (east of Cologne) has been studied; stakeholder input identified the need for these improvements is beyond the timeframe of the study

5.3.3 Dakota County (see Figure 4)

Table 5. Dakota County Locations Advanced for Phase II Analysis

PA	Location	Meet Vol. Criteria?	Contextual/Outreach Criteria, Remarks
CSAH 23 (Cedar Ave)	From CSAH 42 to 140th St	Yes	• High to very high volumes warrant inclusion in Phase II analysis • City of Apple Valley identified local impact concerns
CSAH 42	From Burnsville Pkwy to CSAH 11 (Lac Lavon Dr)	Yes	• Needs are present at I-35W and I-35E, but the context is challenging
CSAH 42	CSAH 23	Yes	• Very high volumes • City of Apple Valley does not support interchange
CSAH 42	From Johnny Cake Ridge Rd to CH 31 (Pilot Knob Rd)	Yes	• Future grade separation at CH 31 in plans
CSAH 42	From TH 3 to Biscayne Ave	No	• Future grade separation plans at TH 3 with rail grade separation
TH 13	From county boundary (Chowen Ave) to Washburn Ave	Yes	• Existing frontage road system tied to TH 13/CH 5 interchange to east
TH 13	From Nicollet Ave to Parkwood Dr/12th Ave	Yes	• CMSP evaluating at-grade options at Nicollet Ave
TH 52	190th St or CH 66 (200th St)	No	• Potential future interchange identified
TH 55	CH 63/CH 28 (Argenta Trl)	No	• Potential future interchange identified

Table 6. Dakota County Locations Screened Out of Phase II

PA	Location (s)	Meet Vol. Criteria?	Contextual/Outreach Criteria, Remarks
CH 32 (Cliff Rd)	From TH 13 to TH 35E	Yes	• Dakota County implementing advanced traffic management systems
CH 42	Between CH 11 (Lac Lavon Dr) and CH 23 (Cedar Ave)	Yes	• Only one location (Pennock Ave) meets volume criteria (proximity to CH 23) • Local stakeholders identified that future plans are for at-grade intersections
CH 42	Between CSAH 23 (Cedar Ave) and Johnny Cake Ridge Road	Yes	• No grade-separation priorities identified
CH 42	Between CH 31 (Pilot Knob Rd) and TH 3	No	• No stakeholder grade-separation priorities identified
CSAH 42	Between Biscayne Ave and TH 55	No	• Interchange reconstruction at TH 52 programmed
CH 13	From CH 11 (White River Hills Dr) to CH 32 (Cliff Rd)	Yes	• No grade-separation priorities identified
TH 52	Between county boundary and CH 66 (200th St)	No	• Grade-separation programmed at CH 86; no other local grade-separation priorities identified

PA	Location (s)	Meet Vol. Criteria?	Contextual/Outreach Criteria, Remarks
TH 52	Between 190th St and TH 55	No	• Reconstruction of TH 52/CH 42 interchange programmed; no other local grade-separation priorities identified
TH 55	Between TH 52 and TH 61	No	• Recent at-grade improvements at TH 55/TH 61; local outreach indicated grade separations unlikely due to context
TH 55	Between CH 63/CH 28 (Argenta Trl) and TH 110 *	Yes	• No grade-separation priorities identified
TH 61	From county boundary to TH 316	No	• No grade-separation priorities identified
TH 110	Between TH 55 and I-35E	No	• No grade-separation priorities identified
TH 316	From TH 61 to county boundary	No	• No grade-separation priorities identified
*Note: As a special case, a future interchange is planned at I-494/TH 55; this could help avoid a potential future grade separation at TH 149 and CH 26			

5.3.4 Hennepin County (see Figure 5)

Table 7. Hennepin County Locations Advanced for Phase II Analysis

PA	Location	Meet Vol. Criteria?	Contextual/Outreach Criteria, Remarks
TH 7	From CH 101 to Woodhill Rd	Yes	• Hennepin County identified that TH 7 west of I-494 warranted Phase II analysis at Williston Rd and Woodland Rd • There is significant development at TH 7 at CH 101, and it has not previously been studied for interchange conversion, but Hennepin County supports advance to Phase II at this location
TH 7	From Blake Rd to Texas Ave	Yes	• Hennepin County supports advance to Phase II analysis
TH 55	From CH 115/CH 116 (Hamel Rd) to Fernbrook Ln	Yes	• Locations previously identified as potential interchanges • Hennepin County supports advancing to Phase II analysis
TH 55	CH 102 (Douglas Dr)	Yes	• Local support for grade separation including considerable study of options; site issues are challenging
TH 169	From 101st Ave to 109th Ave	Yes	• Interchange at 101st Ave has been locally studied; north to 109th Ave should also be considered based upon stakeholder input
TH 169	Hayden Lake Rd	Yes	• Through Hennepin County, the City of Champlin requested that this location be advanced to Phase II analysis to see how it would rank
TH 252	Between I-694 and I-610	Yes	• Very high volumes and crash rates • Preliminary design is being advanced for the conversion of the intersections at 66th Ave to an interchange • Hennepin County requested that the 81st Ave/Humboldt Ave intersection and the 85th Ave interserction be considered as appropriate in the analysis

Table 8. Hennepin County Locations Screened Out of Phase II

PA	Location	Meet Vol. Criteria?	Contextual/Outreach Criteria, Remarks
TH 7	Between west county boundary and CH 101	Yes	• No grade-separation priorities identified
TH 7	Between I-494 and TH 169	Yes	• No grade-separation priorities identified
TH 12	Between county boundary and CH15 (Shoreline Dr)	No	• Hennepin County reported crash concerns at some locations resulting from rural to urban transition; mainline investment needed prior to grade separations
TH 55	Between county boundary and CH 115/CH 116 (Hamel Rd)	No	• No grade-separation priorities identified
TH 55	From I-494 to west of Douglas Dr	Yes	• Limited local support for grade separation due to context and potential land use impacts
TH 55	East of Douglas Dr to I-94	Yes	• Limited local support for grade separation due to context and potential land use impacts • Transit, non-motorized needs, and other issues have greater local prioritization
TH 55	Between CH 5 (Franklin Ave) and TH 62	Yes	• Grade separations unlikely due to urban context (beyond existing Lake St interchange) • Transit, non-motorized needs, and other issues have greater local prioritization
TH 62	From I-494 to Clearwater Dr	Yes	• No grade-separation priorities identified
TH 101	From I-94 to 147th St	Yes	• Substantial recent investment in grade-separation improvements
TH 169	Between 109th Ave and county limit, other than Hayden Lake Rd	Yes	• Stakeholder input identified that a conventional expressway may be the best solution for TH 169 north of 109th Ave based on land use and the high number of access points; a possible exception is at Hayden Lake Rd (see Table 7 Information)

5.3.5 Ramsey County (see Figure 6)

Table 9. Ramsey County Locations Advanced for Phase II Analysis

PA	Location	Meet Vol. Criteria?	Contextual/Outreach Criteria, Remarks
CH 38 (Shepard Rd)	I-35E	Yes	• There may be value in evaluating the interchange ramp intersections to inform current planning for improvements
TH 36	TH 120 (Century Ave)	Yes	• Previous plans have supported a new interchange
TH 61/TH 10	CH 36 (Warner Rd)	Yes	• Relatively high volumes including truck/intermodal operations near Fish Hatchery Rd
TH 280	Broadway St	Yes	• Current ¾ intersection warrants further study; grade separation identified in previous study

Table 10. Ramsey County Locations Screened Out of Phase II

PA	Location	Meet Vol. Criteria?	Contextual/Outreach Criteria, Remarks
CH 38/CH 36 (Shepard Rd/Warner Rd)	Between I-35E and TH 10/TH 61	Yes	• No specific needs identified in prior planning
TH 280	From north of Broadway St to County Rd B	No	• No connection of east leg at County Road B; west leg is a commercial driveway

5.3.6 Scott County (see Figure 7)

Table 11. Scott County Locations Advanced for Phase II Analysis

PA	Location	Meet Vol. Criteria?	Contextual/Outreach Criteria, Remarks
CH 42	From CH 21 to Pike Lake Trl	No	• CH 42/CH 21 is PA to PA connection
TH13	From CH 27 (Dakota Ave) to county boundary (Lynn Ave)	Yes	• Reference TH 13 Corridor Study and supplemental data
TH 169	From CH 59 (Delaware Ave) to CH 14 (150th St)	Yes	• Through outreach process, Scott County requested that the Bluff Dr intersection be advanced for Phase II analysis

Table 12. Scott County Locations Screened Out of Phase II

PA	Location	Meet Vol. Criteria?	Contextual/Outreach Criteria, Remarks
CH 21	Between TH 169 and CH 42	Yes	• Recently constructed roadway
CH 42	Between Pike Lake Trl and east county boundary	Yes	• Reevaluate CH 27 (Dakota Ave) intersection as development occurs • Other potential grade separation priorities not identified
TH 41	Between TH 169 and county boundary (MN River)	No	• Interchange programmed for TH 169/TH 41
TH 169	Between south county boundary and CH 59 (Delaware Ave)	No	• Programmed grade separation at CH 3 (Meridian St) • Scott County advised that previously identified potential interchange at CH 66 need not be considered at this time; emphasis for advancement should shift to the northeast
TH 169	Between CH 14 (150th St) and CH 15 (Adams St/Marystown Rd)	Yes	• Programmed interchange at TH 41, completed interchange at CH 69

5.3.7 Sherburne County (see Figure 8)

Table 13. Sherburne County Locations Advanced for Phase II Analysis

PA	Location	Meet Vol. Criteria?	Contextual/Outreach Criteria, Remarks
TH 169	From TH 10 to 197th Ave	Yes	• Main St intersection is the highest volume intersection in the area and has been studied as a future interchange for some time; however, has not qualified for attempted funding to date • Upgrade of TH 169/TH 10 interchange to complete system interchange identified in TH 169 EA/EAW

Table 14. Sherburne County Locations Screened Out of Phase II

PA	Location (s)	Meet Vol.Criteria?	Contextual/Outreach Criteria, Remarks
TH 10	Between CH 15/CH 14 (156th St) and eastern county boundary	Yes	• Railroad realignment unlikely, and significant business impacts identified as concerns
TH 169	From north of 197th Ave to 225th Stand	No	• Prioritize analysis of TH 169 further to south

5.3.8 Washington County (see Figure 9)

Table 15. Washington County Locations Advanced for Phase II Analysis

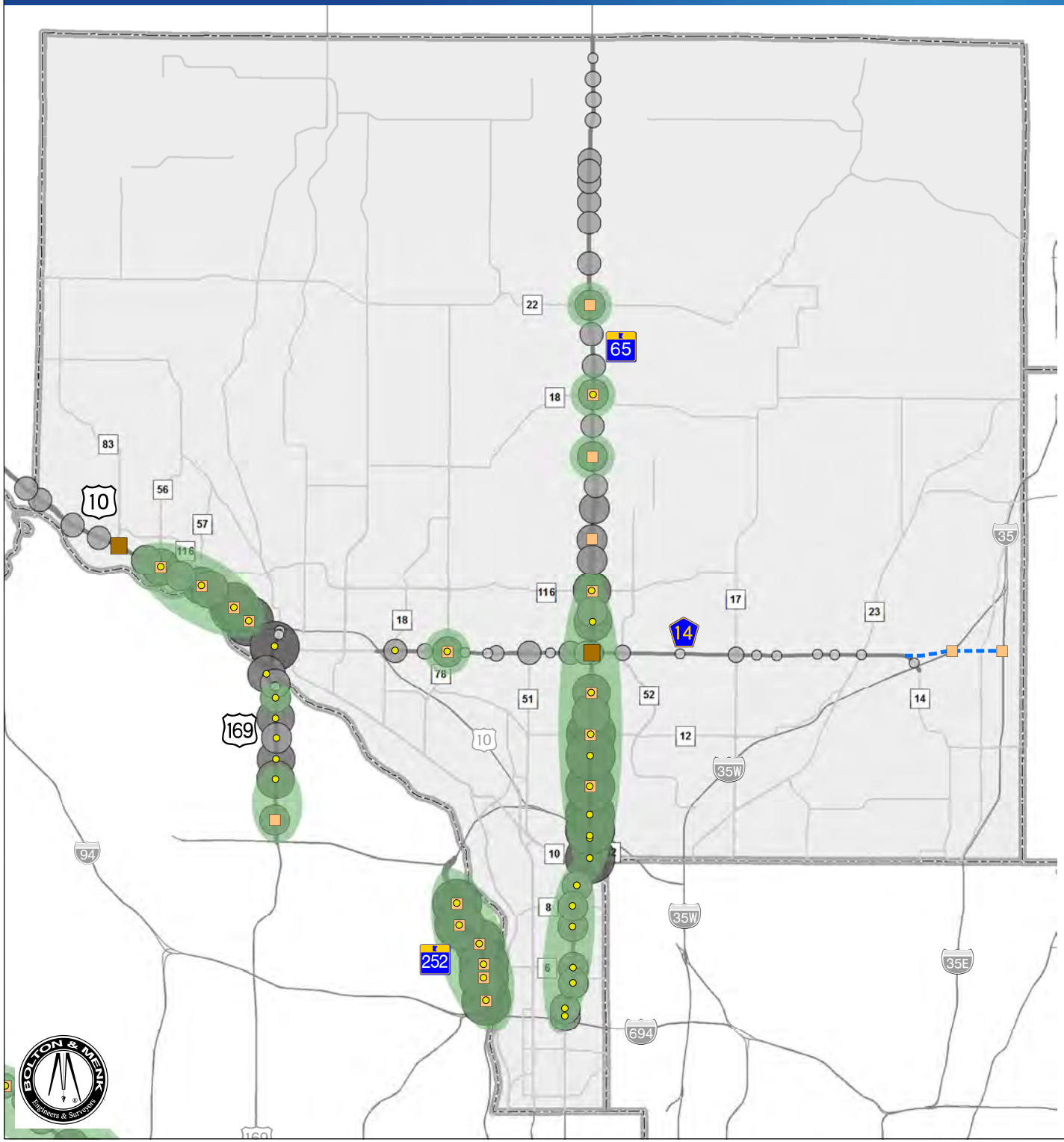
PA	Location	Meet Vol. Criteria?	Contextual/Outreach Criteria, Remarks
TH 36	TH 120 (Century Ave)	Yes	• Previous plans have supported a new interchange
TH 36	From De Montreville Trl to Manning Ave	Yes	• Manning Avenue is considered by Washington County a higher priority location than Lake Elmo Ave

PA	Location	Meet Vol. Criteria?	Contextual/Outreach Criteria, Remarks
TH 8	Short segment between TH 61 and north county boundary	No	• No grade separation priorities identified
TH 36	Between I-694 and De Montreville Trl	No	• Recent interchange at Hilton Trl • West of De Montreville Trl should be monitored for potential access/safety improvement needs
TH 36	Between CH 5 (Stillwater Blvd) and east county boundary	Yes	• Recent investments, some associated with the St. Croix River Bridge project • St. Croix River Bridge Final Environmental Impact Statement (EIS)did not identify grade separations in Oak Park Heights area
TH 61	From Kimbro Ave to south county boundary	Yes	• Volume threshold only exceeded at TH 10 (Point Douglas Dr) • At-grade intersection improvement and access management project programmed for 2016 at the TH 61/TH 10 split

Table 16. Washington County Locations Screened Out of Phase II

6 Next Steps

This technical memorandum/report provides the conclusions for the Phase I screening process and will remain the detailed record for that part of the study process. The content will also be summarized and adapted to support other study deliverables.



PRINCIPAL ARTERIAL INTERSECTION CONVERSION STUDY

METROPOLITAN COUNCIL

MINNESOTA DEPARTMENT OF TRANSPORTATION

Legend

- Intersections Meeting Volume Criteria
- Locally Identified Future Grade Separation
- Recent or Funded Grade Separation
- Planned Roads
- Phase II Study Area

Entering AADT

- 5000 - 20000
- 20001 - 25000
- 25001 - 35000
- 35001 - 45000
- 45001 - 55000
- 55001 - 68850

0 3 Miles

Source: MetroGIS, MnDOT

Figure 2

Anoka County
Phase II Study Areas

February 2016

BOLTON & MENK Engineers & Surveyors

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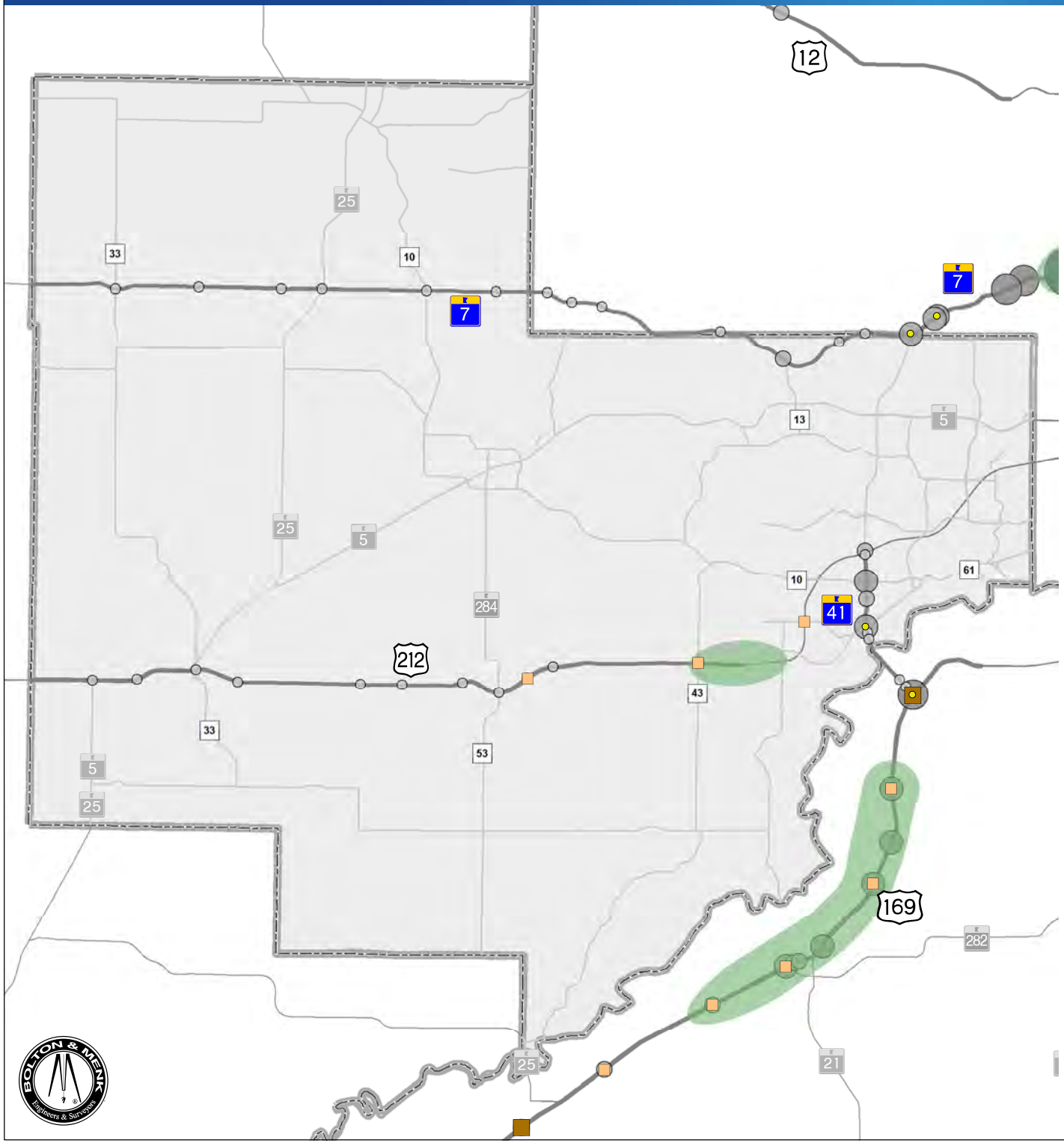
PRINCIPAL ARTERIAL
INTERSECTION CONVERSION STUDY

METROPOLITAN COUNCIL

MINNESOTA DEPARTMENT OF TRANSPORTATION



Legend

- Intersections Meeting Volume Criteria
- Locally Identified Future Grade Separation
- Recent or Funded Grade Separation
- Planned Roads
- Phase II Study Area

Entering AADT

- 5000 - 20000
- 20001 - 25000
- 25001 - 35000
- 35001 - 45000
- 45001 - 55000
- 55001 - 68850

0 3 Miles

Source: MetroGIS, MnDOT

Figure 3

Carver County
Phase II Study Areas

February 2016

EOLTON & MENK Engineers & Surveyors

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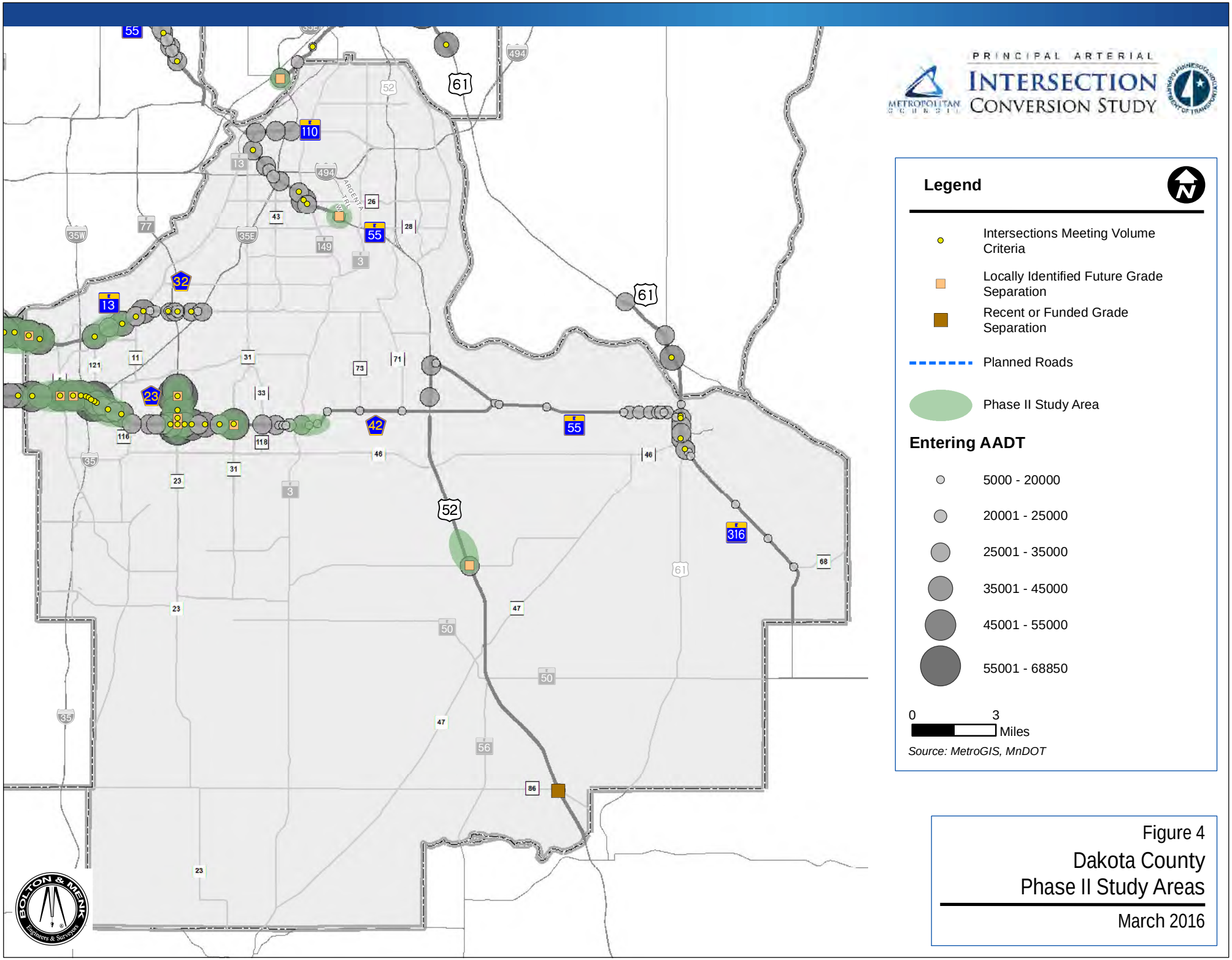
PRINCIPAL ARTERIAL
INTERSECTION CONVERSION STUDY
METROPOLITAN COUNCIL
Legend
Intersections Meeting Volume Criteria
Locally Identified Future Grade Separation
Recent or Funded Grade Separation
Planned Roads
Phase II Study Area
Entering AADT
5000 - 20000
20001 - 25000
25001 - 35000
35001 - 45000
45001 - 55000
55001 - 68850
0
3
Miles
Source: MetroGIS, MnDOT
Figure 4
Dakota County
Phase II Study Areas
March 2016
BOLTON & MENK
Engineers & Surveyors
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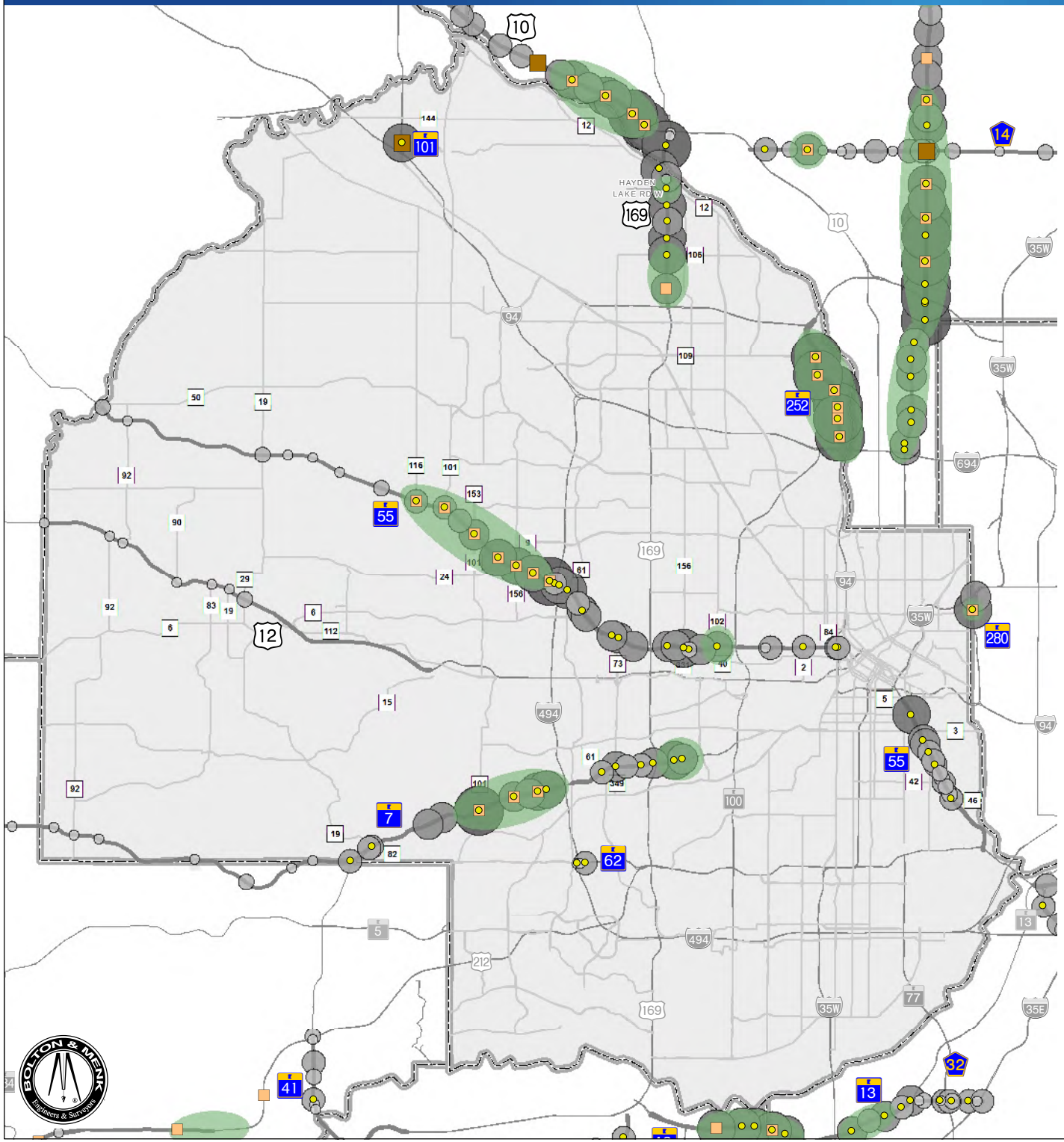

Legend

- Intersections Meeting Volume Criteria
- Locally Identified Future Grade Separation
- Recent or Funded Grade Separation
- Planned Roads
- Phase II Study Area

Entering AADT

- 5000 - 20000
- 20001 - 25000
- 25001 - 35000
- 35001 - 45000
- 45001 - 55000
- 55001 - 68850

0 3 Miles

Source: MetroGIS, MnDOT

Figure 5
Hennepin County
Phase II Study Areas
February 2016

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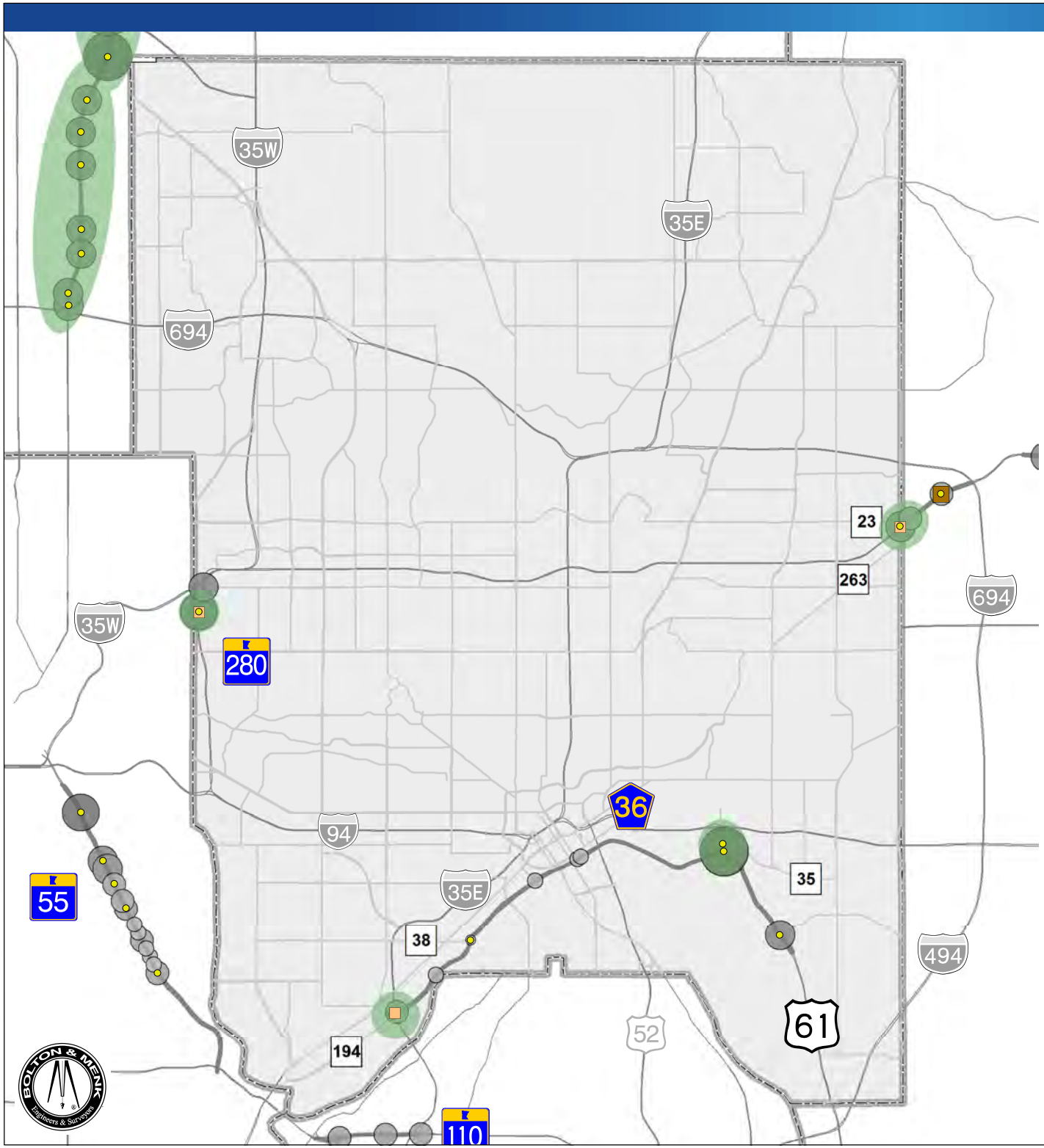

PRINCIPAL ARTERIAL
INTERSECTION CONVERSION STUDY

METROPOLITAN COUNCIL

MINNESOTA DEPARTMENT OF TRANSPORTATION

Legend

- Intersections Meeting Volume Criteria
- Locally Identified Future Grade Separation
- Recent or Funded Grade Separation
- Planned Roads
- Phase II Study Area

Entering AADT

- 5000 - 20000
- 20001 - 25000
- 25001 - 35000
- 35001 - 45000
- 45001 - 55000
- 55001 - 68850

0 3 Miles

Source: MetroGIS, MnDOT

Figure 6
Ramsey County
Phase II Study Areas
February 2016

BOLTON & MENK Engineers & Surveyors

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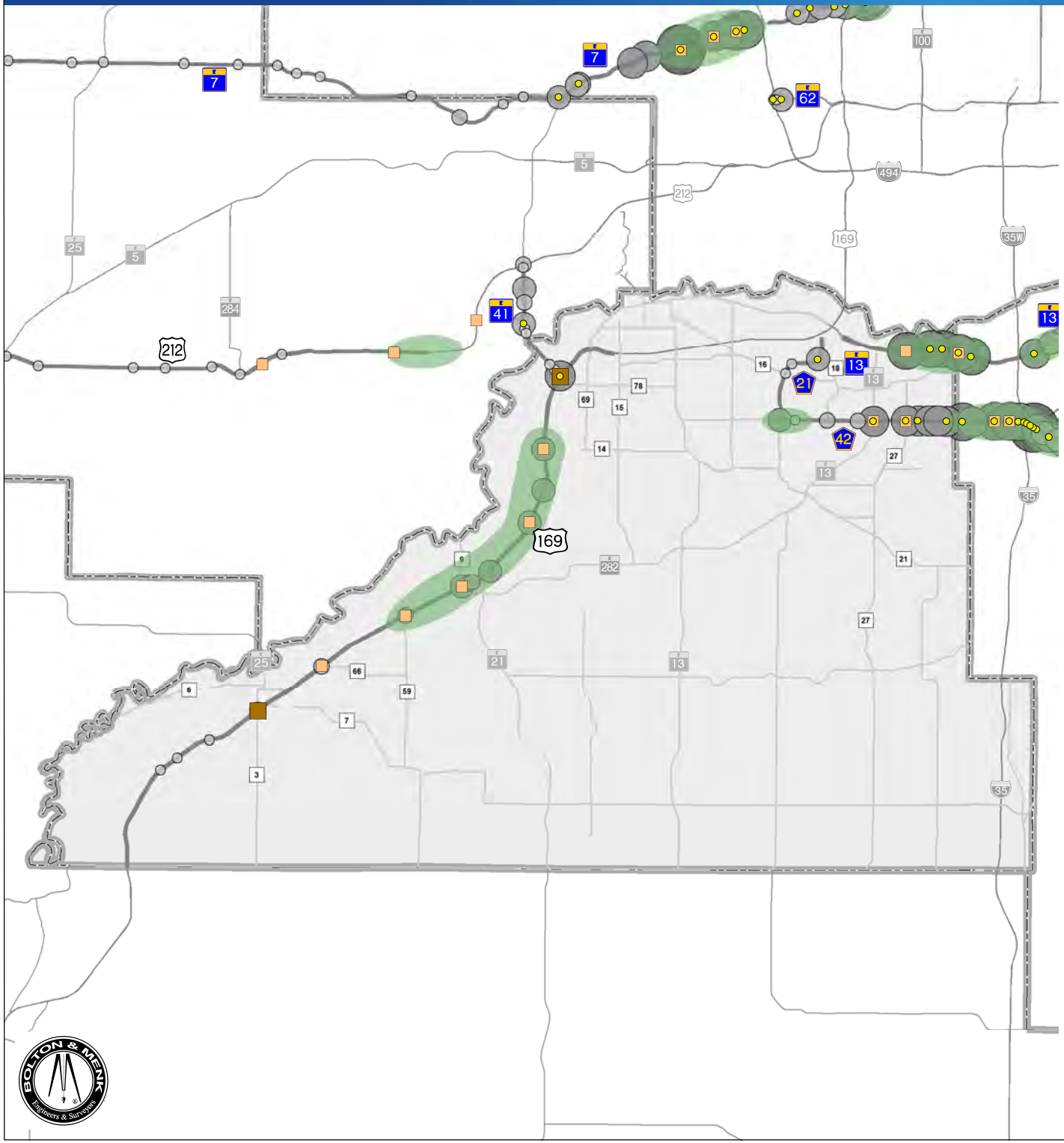

PRINCIPAL ARTERIAL INTERSECTION CONVERSION STUDY

METROPOLITAN COUNCIL

MINNESOTA DEPARTMENT OF TRANSPORTATION

Legend

- Intersections Meeting Volume Criteria
- Locally Identified Future Grade Separation
- Recent or Funded Grade Separation
- Planned Roads
- Phase II Study Area

Entering AADT

- 5000 - 20000
- 20001 - 25000
- 25001 - 35000
- 35001 - 45000
- 45001 - 55000
- 55001 - 68850

0 3 Miles

Source: MetroGIS, MnDOT

Figure 7

Scott County
Phase II Study Areas

February 2016

BOLTON & MENK Engineers & Surveyors

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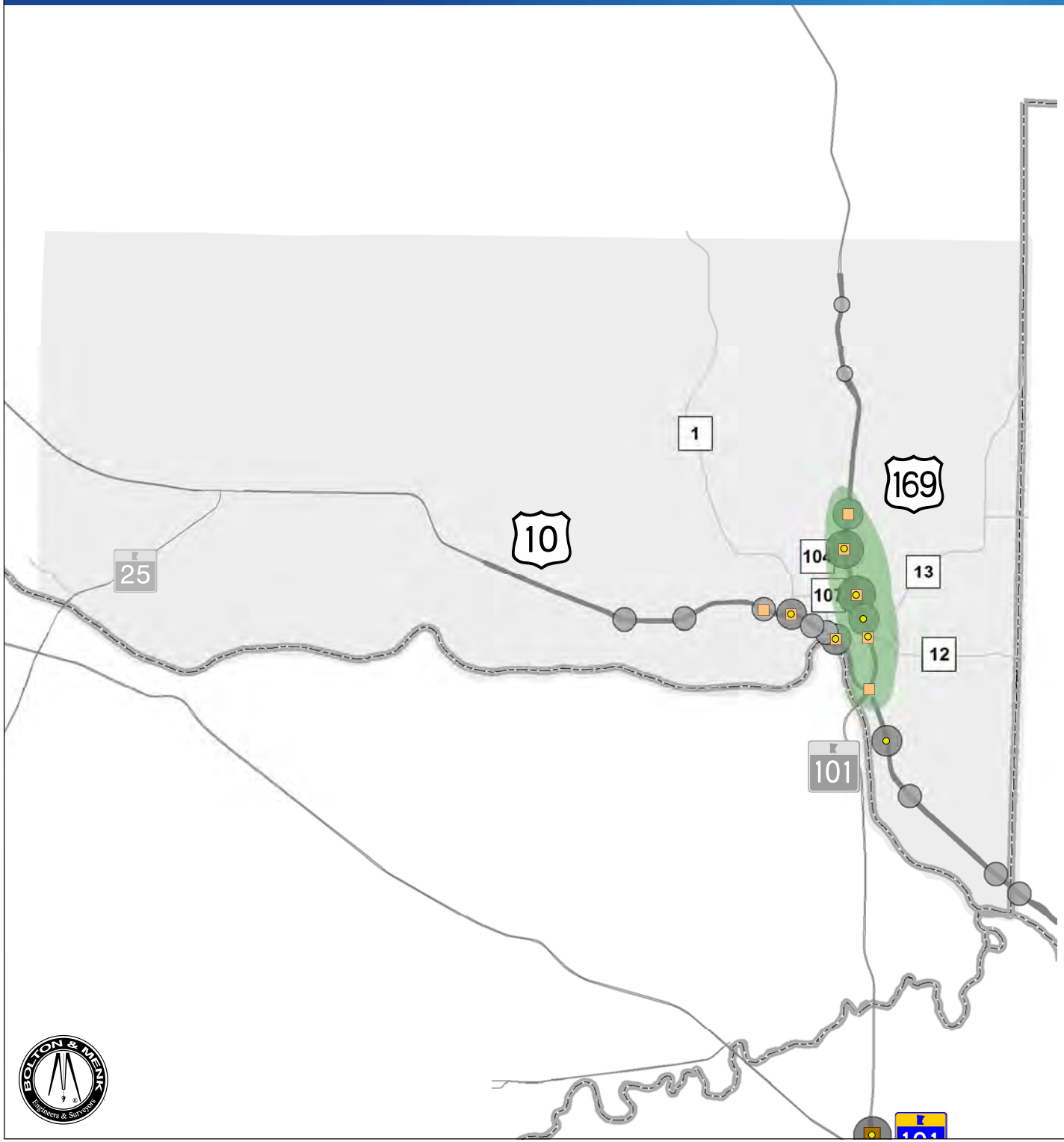
PRINCIPAL ARTERIAL
INTERSECTION CONVERSION STUDY

METROPOLITAN COUNCIL

MINNESOTA DEPARTMENT OF TRANSPORTATION



Legend

- Intersections Meeting Volume Criteria
- Locally Identified Future Grade Separation
- Recent or Funded Grade Separation
- Planned Roads
- Phase II Study Area

Entering AADT

- 5000 - 20000
- 20001 - 25000
- 25001 - 35000
- 35001 - 45000
- 45001 - 55000
- 55001 - 68850

0 3 Miles

Source: MetroGIS, MnDOT

Figure 8

Sherburne County
Phase II Study Areas

February 2016

EOLTON & MENK Engineers & Surveyors

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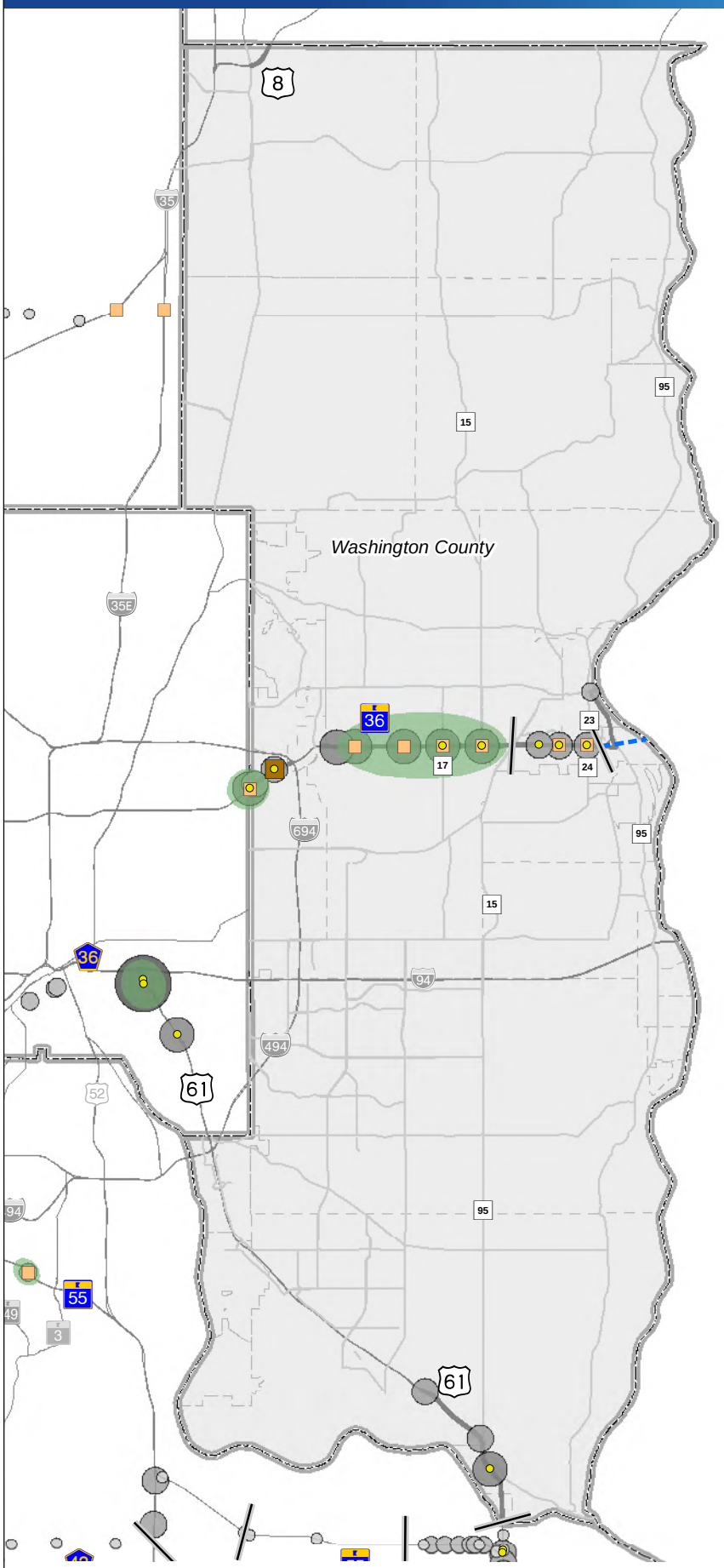

Legend

- Intersections Meeting Volume Criteria
- Locally Identified Future Grade Separation
- Recent or Funded Grade Separation
- Planned Roads
- Phase II Study Area

Entering AADT

- 5000 - 20000
- 20001 - 25000
- 25001 - 35000
- 35001 - 45000
- 45001 - 55000
- 55001 - 68850

0 3 Miles

Source: MetroGIS, MnDOT

PRINCIPAL ARTERIAL INTERSECTION CONVERSION STUDY

BOLTON & MENK Engineers & Surveyors

METROPOLITAN COUNCIL

MINNESOTA DEPARTMENT OF TRANSPORTATION

Figure 9
Washington County
Phase II Study Areas
February 2016

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Attachment A
Previous Document Review Summaries by County

Anoka County
Carver County
Dakota County
Hennepin County
Ramsey County
Scott County
Sherburne County
Washington County

Principal Arterial Intersection Conversion Study
Grade-Separated Treatments Identified – Previous Plans/Studies and/or Programming (readily available documents, from last ten years)
Anoka County

I. IMPROVEMENTS IDENTIFIED

A. County State Aid Highway 14 (Main St/125th Ave NE)

Crossing Roadway	Recommendation	Document (Date)	Source/Lead Agency
Hanson Boulevard	Grade-separated intersection	2030 Transportation Plan (2009)	Anoka County
TH 65	Interchange	2030 Comprehensive Plan (2009)	Anoka County
I-35W (CSAH 14 east extension)	Overpass	2030 Comprehensive Plan (2009)	Anoka County
I-35W (CSAH 14 east extension)	Interchange	2030 Comprehensive Plan (2011)	City of Lino Lakes
I-35E (CSAH 14 east extension)	Interchange	2030 Comprehensive Plan (2009)	Anoka County
I-35E (CSAH 14 east extension)	Interchange	2030 Comprehensive Plan (2011)	City of Lino Lakes

B. Trunk Highway 10

Crossing Roadway	Recommendation	Document (Date)	Source/Lead Agency
Potential river crossing west of CSAH 83	Interchange	2030 Transportation Plan (2009)	City of Ramsey
CSAH 83 (Armstrong Blvd)	Interchange (under construction)	Numerous documents	Met Council, MnDOT, Anoka County, City of Ramsey
CSAH 56 (Ramsey Blvd)	Interchange	2030 Transportation Plan (2009)	Anoka County
CSAG 56 (Ramsey Blvd)	Assumed interchange	2030 Transportation Plan (2009)	City of Ramsey
CSAH 56 (Ramsey Blvd)	Grade separation	TH 10 Access Planning Study (2014)	MnDOT
CSAH 57 (Sunfish Lake Blvd)	Interchange	2030 Transportation Plan (2009)	Anoka County
CSAH 57 (Sunfish Lake Blvd)	Assumed interchange	2030 Transportation Plan (2009)	City of Ramsey
CSAH 57 (Sunfish Lake Blvd)	Grade separation	TH 10 Access Planning Study (2014)	MnDOT

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Thurston Ave	Interchange/grade separation	Congestion Management Plan Study – Phase I (2007)	MnDOT
Thurston Ave	Assumed Interchange	2030 Comprehensive Plan (2008)	City of Anoka
Thurston Ave	Interchange	2030 Transportation Plan (2009)	Anoka County
Thurston Ave	Grade separation	TH 10 Access Planning Study (2014)	MnDOT

C. Trunk Highway 65

Crossing Roadway	Recommendation	Document (Date)	Source/Lead Agency
CSAH 10	Upgraded interchange	2030 Transportation Plan (2009)	Anoka County
CSAH 12 (109th Ave)	Interchange	2030 Transportation Plan (2009)	Anoka County
CSAH 14 (Main St)	Interchange	2030 Transportation Plan (2009)	Anoka County
CSAH 116 (Bunker Lake Blvd)	Interchange	2030 Transportation Plan (2009)	Anoka County
CR 16 (Andover Blvd)	Grade-separated intersection	2030 Transportation Plan (2009)	Anoka County
CR 60 (Constance Blvd)	Grade-separated intersection	2030 Transportation Plan (2009)	Anoka County
CSAH 18 (Crosstown Blvd)	Grade-separated intersection	2030 Transportation Plan (2009)	Anoka County
CSAH 22 (Viking Blvd)	Grade-separated intersection	2030 Transportation Plan (2009)	Anoka County

D. Trunk Highway 169

Crossing Roadway	Recommendation	Document (Date)	Source/Lead Agency
TH 10	Upgraded interchange	2030 Transportation Plan (2009)	Anoka County

II. DOCUMENTS REVIEWED (documents which would identify specific projects)

Metropolitan Council
• Draft 2016-2019 Transportation Improvement Program (2015)
Metropolitan Council/MnDOT
• Metropolitan Highway System Investment Study (2010)
MnDOT Document/Lead
• 2016-2019 State Transportation Improvement Program (2015) • Congestion Management Planning Study, Phase I (2007) • Congestion Management Planning Study, Phase III Final Report (2013) • TH 10 Access Planning Study (2014)
Anoka County
• 2015-2019 Capital Improvement Program (2014) • 2030 Comprehensive Transportation Plan (2009)
Local Agencies
• Anoka 2030 Comprehensive Plan (2008) • Blaine 2030 Comprehensive Plan (2009) • Ham Lake 2030 Comprehensive Plan (2008) • Lino Lakes 2030 Comprehensive Plan (2011) • Ramsey 2030 Comprehensive Plan (2009) • Spring Lake Park 2030 Comprehensive Plan (2009)

Principal Arterial Intersection Conversion Study
Grade-Separated Treatments Identified – Previous Plans/Studies and/or Programming (readily available, from last ten years)
Carver County

I. IMPROVEMENTS IDENTIFIED

A. Trunk Highway 7

No grade-separation improvements recommended within the last ten years for the TH 7 study area within Carver County.

B. Trunk Highway 41

No grade-separation improvements recommended within the last ten years for the TH 41 study area within Carver County.

C. Trunk Highway 212

Crossing Roadway	Recommendation	Document (Date)	Source/Lead Agency
CH 53/Market Ave	Potential interchange preservation location	2030 Comprehensive Plan – Roadway Systems Plan (2010, amended 2014)	Carver County
CH 43	Potential interchange preservation location	2030 Comprehensive Plan – Roadway Systems Plan (2010, amended 2014)	Carver County
CH 140	Potential interchange preservation location	2030 Comprehensive Plan – Roadway Systems Plan (2010, amended 2014)	Carver County

II. DOCUMENTS REVIEWED (documents which would identify specific projects)

Metropolitan Council
• Draft 2016-2019 Transportation Improvement Program (2015)
Metropolitan Council/MnDOT
• Metropolitan Highway System Investment Study (2010)
MnDOT Document/Lead
• 2016-2019 State Transportation Improvement Program (2015) • Congestion Management Planning Study, Phase I (2007) • Congestion Management Planning Study, Phase III Final Report (2013) • Metro District 10-Year Capital Highway Work Plan (2015)
Carver County
• Five-year Capital Improvement Program (2014) • 2030 Comprehensive Plan – Roadway Systems Plan (2010, amended 2014)

Principal Arterial Intersection Conversion Study
Grade-Separated Treatments Identified – Previous Plans/Studies and/or Programming
Dakota County

I. IMPROVEMENTS IDENTIFIED

A. CSAH 23 (Cedar Ave)

Crossing Roadway	Recommendation	Document (Date)	Source/Lead Agency
CSAH 42	Interchange	2030 Transportation Plan (2012)	Dakota County
147th St	Interchange	2030 Transportation Plan (2012)	Dakota County
140th St	Interchange	2030 Transportation Plan (2012)	Dakota County

B. CSAH 32 (Cliff Rd)

No grade-separation improvements recommended within the last ten years for the CSAH 32 study area within Dakota County.

C. CSAH 42

Crossing Roadway	Recommendation	Document (Date)	Source/Lead Agency
Burnhaven Dr	Interchange	2030 Transportation Plan (2012)	Dakota County
Aldrich Ave	Interchange consideration warranted by volumes but construction unlikely due to excessive implementation costs	2030 Transportation Plan (2012)	Dakota County
CSAH 5	Interchange	2030 Transportation Plan (2012)	Dakota County

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Nicollet Ave	Interchange consideration warranted by volumes but construction unlikely due to excessive implementation costs	2030 Transportation Plan (2012)	Dakota County
CSAH 31	Interchange	2030 Transportation Plan (2012)	Dakota County
CSAH 31	Interchange	CSAH 31 (Pilot Knob Road) Corridor Study (2007)	Dakota County
TH 52	Interchange reconstruction assumed (Dakota County lead identified)	2030 Transportation Plan (2009)	City of Rosemount

D. Trunk Highway 13

No grade-separation improvements recommended within the last ten years for the TH 13 study area within Dakota County.

E. Trunk Highway 52

Crossing Roadway	Recommendation	Document (Date)	Source/Lead Agency
CSAH 42	Interchange Reconstruction	TH 52 Freeway Partnership TZD Summary Information (2007)	Dakota County and other corridor counties in association with MnDOT
CSAH 42	Interchange reconstruction assumed (Dakota County lead identified)	2030 Transportation Plan (2009)	City of Rosemount
CSAH 66	Interchange	TH 52 Freeway Partnership TZD Summary Information (2007)	Dakota County and other corridor counties in association with MnDOT

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CSAH 47	Interchange	TH 52 Freeway Partnership TZD Summary Information (2007)	Dakota County and other corridor counties in association with MnDOT
CSAH 86	Interchange	TH 52 Freeway Partnership TZD Summary Information (2007)	Dakota County and other corridor counties in association with MnDOT
CSAH 86	Grade separation	Metro District 10-Year Capital Highway Work Plan	MnDOT
CSAH 86	Overpass with connecting local roadways	5-Year Capital Improvement Program (2014)	Dakota County

F. Trunk Highway 55

Crossing Roadway	Recommendation	Document (Date)	Source/Lead Agency
CSAH 63 (Argenta Trl)	Interchange	2030 Transportation Plan (2010)	City of Inver Grove Heights

G. Trunk Highway 110

No grade-separation improvements recommended within the last ten years for the TH 110 study area within Dakota County.

H. Trunk Highway 316

No grade-separation improvements recommended within the last ten years for the TH 316 study area within Dakota County.

II. DOCUMENTS REVIEWED (documents which would identify specific projects)

Metropolitan Council
• Draft 2016-2019 Transportation Improvement Program (2015)
Metropolitan Council/MnDOT
• Metropolitan Highway System Investment Study (2010)
MnDOT Document/Lead
• 2016-2019 State Transportation Improvement Program (2015) • Congestion Management Planning Study, Phase I (2007) • Congestion Management Planning Study, Phase III Final Report (2013) • Metro District 10-Year Capital Highway Work Plan (2015)
Dakota County
• 2015-2019 Capital Improvement Program (2014) • 2030 Comprehensive Plan (2012) • TH 52 Freeway Partnership TZD Summary Information (2007; includes Goodhue and Olmsted Counties in association with MnDOT)
Local Agencies
• Lakeville 2030 Comprehensive/Transportation Plan (2008) • Apple Valley 2030 Comprehensive/Transportation Plan (2009) • Eagan 2030 Comprehensive/Transportation Plan (2009) • Burnsville 2030 2030 Comprehensive/Transportation Plan (2010) • Inver Grove Heights Comprehensive/Transportation Plan (2010) • Mendota Heights Comprehensive/Transportation Plan (2008) • Rosemount Comprehensive/Transportation Plan (2009)

Principal Arterial Intersection Conversion Study
Grade-Separated Treatments Identified – Previous Plans/Studies and/or Programming (readily available, from last ten years)
Hennepin County

I. IMPROVEMENTS IDENTIFIED

A. Trunk Highway 7

Crossing Roadway	Recommendation	Document (Date)	Source/Lead Agency
CSAH 101	Interchange	Congestion Management Planning Study – Phase I (2007)	MnDOT
Tonkawood Rd	Remove signal system, provide grade separation and use right in-right out connections as ramps	Congestion Management Planning Study – Phase I (2007)	MnDOT
Williston Rd	Remove signal system, provide grade separation and use right in-right out connections as ramps	Congestion Management Planning Study – Phase I (2007)	MnDOT

B. Trunk Highway 12

No grade-separation improvements recommended within the last ten years for the TH 12 study area within Hennepin County.

C. Trunk Highway 55

Crossing Roadway	Recommendation	Document (Date)	Source/Lead Agency
CSAH 115/CR 116 (Pinto Dr)	Interchange (ultimate vision)	CSAH 115/CR 116 at TH 55 project website (2015)	Hennepin County/City of Medina
CSAH 115/CR 116 (Pinto Dr)	Interchange	TH 55 EA/EAW (2008)	Hennepin County
CSAH 101 North	Interchange	TH 55 EA/EAW (2008)	Hennepin County
CSAH 101 South (Peony La)	Interchange	TH 55 EA/EAW (2008)	Hennepin County
CSAH 9/CSAH 24 (Rockford Rd)	Interchange	TH 55 EA/EAW (2008)	Hennepin County

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Vicksburg Lane	Interchange	TH 55 EA/EAW (2008)	Hennepin County
Niagara Lane	Grade separation with "button hook ramps"	TH 55 EA/EAW (2008)	Hennepin County
Fernbrook Lane	Grade separation with "button hook ramps"	TH 55 EA/EAW (2008)	Hennepin County

D. Trunk Highway 62

No grade-separation improvements recommended within the last ten years for the TH 62 study area within Hennepin County.

E. Trunk Highway 101

No grade-separation improvements recommended within the last ten years for the TH 101 study area within Hennepin County.

F. Trunk Highway 169

Crossing Roadway	Recommendation	Document (Date)	Source/Lead Agency
101st Ave	Interchange	TH 169/101st Ave Interchange Study (2014)	Brooklyn Park
101st Ave	Interchange	2030 Comprehensive/Transportation Plan	Brooklyn Park

G. Trunk Highway 252

- The Brooklyn Center-led 252 Corridor Study appears to be concluded. An interchange at 66th Ave was recommended. Opposition to this location exists.
- MnDOT, Brooklyn Center, and Brooklyn Park have agreed to prepare a long-term freeway vision study. MnDOT has initiated this study. Multiple corridor scenarios are under consideration. All involve an interchange at CSAH 109 (85th Ave).
- The Brooklyn Park 2030 Comprehensive/Transportation Plan recommends reconstruction of TH 252 from I-94 in Brooklyn Center to TH 610 to a freeway design (highest priority rating).

- The Brooklyn Center 2030 Comprehensive/Transportation Plan identifies that system capacity/operational improvements are required in the TH 252 corridor. At 66th Avenue, this potentially includes an interchange to support infill and redevelopment in the Gateway area along TH 252 north of I-694.

II. DOCUMENTS REVIEWED (documents which would identify specific projects)

Metropolitan Council
• Draft 2016-2019 Transportation Improvement Program (2015)
Metropolitan Council/MnDOT
• Metropolitan Highway System Investment Study (2010)
MnDOT Document/Lead
• 2016-2019 State Transportation Improvement Program (2015) • Congestion Management Planning Study, Phase I (2007) • Congestion Management Planning Study, Phase III Final Report (2013) • Metro District 10-Year Capital Highway Work Plan (2015) • TH 252 Conversion Study – Hennepin County Briefing Document (November 17, 2015)
Hennepin County
• 2015-2019 Capital Improvement Program (2014) • 2030 Transportation Systems Plan (2011) • TH 55 at CSAH 115/CR 116 Design Study (2012) • TH 55 from Rockford to Plymouth EA/EAW (2008)
Local Agencies
• 2030 Brooklyn Park Comprehensive/Transportation Plan • TH 169/101st Avenue Interchange Study (2014), City of Brooklyn Park • 2030 Brooklyn Center Comprehensive/Transportation Plan • Blake Road Corridor Study, City of Hopkins (at-grade improvement recommendations for TH 7/Blake Rd/Aquila Ave)

Principal Arterial Intersection Conversion Study
Grade-Separated Treatments Identified – Previous Plans/Studies and/or Programming
Ramsey County

I. IMPROVEMENTS IDENTIFIED

A. Shepard Rd/Warner Rd – I-35E to TH 61 (St. Paul street/CSAH 37/CSAH 36)

No grade-separation improvements recommended within the last ten years for the Shepard Rd/Warner Rd study area within Ramsey County.

B. Trunk Highway 61

No grade-separation improvements recommended within the last ten years for the TH 61 study area within Ramsey County.

C. Trunk Highway 280

Crossing Roadway	Recommendation	Document (Date)	Source/Lead Agency
NE Broadway St	Overpass	Congestion Management Planning Study – Phase I (2007)	MnDOT
CSAH 25 (County Road B)	Overpass	Congestion Management Planning Study – Phase I (2007)	MnDOT

D. Trunk Highway 36

Crossing Roadway	Recommendation	Document (Date)	Source/Lead Agency
TH 120 (Century Ave)	Interchange	Hwy 36 Corridor Study (2014)	MnDOT
TH 120 (Century Ave)	Interchange	2030 Comprehensive Plan (2008)	City of North St Paul

II. DOCUMENTS REVIEWED (documents which would identify specific projects)

Metropolitan Council
• Draft 2016-2019 Transportation Improvement Program (2015)
Metropolitan Council/MnDOT
• Metropolitan Highway System Investment Study (2010)
MnDOT Document/Lead
• 2016-2019 State Transportation Improvement Program (2015) • Congestion Management Planning Study, Phase I (2007) • Congestion Management Planning Study, Phase III Final Report (2013) • Metro District 10-Year Capital Highway Work Plan (2015) • Highway 36 Corridor Study (2014; study partners: Ramsey County, Washington County, City of North St. Paul, City of Oakdale)
Ramsey County
• 2015-2019 Capital Improvement Program (2014) • 2030 Comprehensive Plan (2009)
Local Agencies
• North St. Paul 2030 Comprehensive Plan (2008)

Principal Arterial Intersection Conversion Study
Grade-Separated Treatments Identified – Previous Plans/Studies and/or Programming (readily available documents, from last ten years)
Scott County

I. IMPROVEMENTS IDENTIFIED

A. County State Aid Highway 21

No grade-separation improvements recommended for the CSAH 21 study area within Scott.

B. County State Aid Highway 42

Crossing Roadway	Recommendation	Document (Date)	Source/Lead Agency
CSAH 27	Continuous flow intersection or Interchange (additional study required)	CSAH 27 Corridor Study (2014)	Scott County

C. Trunk Highway 13

Grade separation at TH 13/CSAH 101 recently completed; no other grade-separation improvements recommended for the TH 13 study area within Scott County.

D. Trunk Highway 41

Scott County has secured federal funding to construct an interchange at TH 169; no other grade-separation improvements recommended for the TH 41 study area in Scott County.

E. Trunk Highway 169

Crossing Roadway	Recommendation	Document (Date)	Source/Lead Agency
CSAH 3/Meridian St	Overpass (under construction)	Multiple documents	Multiple agencies
CR 66 (Old Hwy 169 Blvd)	References IRC recommendation of interchange or overpass – supportive	2030 Transportation Plan (2008)	City of Jordan
CSAH 59 (Delaware Ave)	References IRC recommendation of interchange – supportive	2030 Transportation Plan (2008)	City of Jordan
TH 282/CSAH 9 (2nd St W/Quaker Ave)	Interchange – City has participated with MnDOT to develop interchange concepts	2030 Transportation Plan (2008)	City of Jordan
173rd St	References IRC recommendation of overpass or interchange – supportive, but site constraints	2030 Transportation Plan (2008)	City of Jordan
173rd St	Interchange or overpass site constraints – further study needed; potential location to north for 173rd/170th (CR 70) connection at TH 169	2030 Transportation Plan (2009, 2011 amendments)	Scott County
CSAH 14 (150th St W)	Interchange anticipated	2030 Transportation Plan (2009, 2011 amendments)	Scott County
TH 41/CSAH 78	Interchange under development	Multiple documents	Multiple agencies
CSAH 69	Interchange "strongly desired"	2030 Transportation Plan (2008)	City of Shakopee
CSAH 69	Endorses land use planning in support of future interchange	2030 Transportation Plan (2009, 2011 amendments)	Scott County

II. DOCUMENTS REVIEWED (documents which would identify specific projects)

Metropolitan Council
• Draft 2016-2019 Transportation Improvement Program (2015)
Metropolitan Council/MnDOT
• Metropolitan Highway System Investment Study (2010)
MnDOT Document/Lead
• 2016-2019 State Transportation Improvement Program (2015) • Congestion Management Planning Study, Phase I (2007) • Congestion Management Planning Study, Phase III Final Report (2013)
Scott County
• 2015-2019 Capital Improvement Program (2014) • 2030 Transportation Plan (2009, 2011 Amendments) • CSAH 27 Corridor Study (2014) • CSAH 42 Vision and Implementation Plan (2008) • CSAH 21 Extension EIS (2002-2008)
Local Agencies
• Jordan 2030 Comprehensive/Transportation Plan (2008) • Shakopee 2030 Comprehensive/Transportation Plan (2008)

Principal Arterial Intersection Conversion Study
Grade-Separated Treatments Identified – Previous Plans/Studies and/or Programming
Sherburne County

A. Trunk Highway 10

Trunk Highway 10 Project within Elk River Environmental Assessment/Environmental Assessment Worksheet (2012)

- EA/EAW covered the conversion of TH 10 to a freeway design between Upland Avenue/County Road 44 and the TH 101/169 interchange.
- Project includes grade-separated interchange at Upland/Proctor Avenues and a half interchange at Main Street (interchange ramps to and from the east); a one-way pair of frontage roads would connect the interchange ramps at Upland Avenue and Proctor Avenue.
- EA/EAW was conducted to facilitate future land use and development planning and decision making, since no funding is identified for the improvements.

B. Trunk Highway 169

Sherburne County Long-Range Transportation Plan (2007)

- Within the study area for TH 169 within Sherburne County, interchanges were identified as "Unprogrammed Long Range Projects" at the following locations:
    - CSAH 12
    - Jackson Avenue
    - 196th Avenue
    - 221st Avenue

Trunk Highway 169 Environmental Assessment/Environmental Assessment Worksheet (2012)

- The EA/EAW covered the removal of at-grade access and replacement with interchanges, overpasses, and frontage/backage roads between the TH 10 interchange in Elk River and CSAH 4 in Zimmerman.
- Within Elk River, a collector-distributor road design would be constructed supporting full access interchanges at Main Street and School Street in Elk River; interchanges would also be provided at Jackson Avenue/193rd Avenue/197th Avenue, and 221st Avenue in Elk River.
- The TH 101/10/169 interchange would be upgraded to a system interchange all free movements.
- The roadway improvements were defined to help inform local land use and transportation planning decisions, as no funding is identified for the construction of the improvements.

Principal Arterial Intersection Conversion Study
Grade-Separated Treatments Identified – Previous Plans/Studies and/or Programming
Washington County

I. IMPROVEMENTS IDENTIFIED

A. Trunk Highway 61

No-grade separation improvements recommended within the last ten years for the TH 61 study area within Washington County.

B. Trunk Highway 36

Crossing Roadway	Recommendation	Document (Date)	Source/Lead Agency
TH 120 (Century Ave)	Interchange	Hwy 36 Corridor Study (2014)	MnDOT
TH 120 (Century Ave)	Interchange	2030 Comprehensive Plan (2010)	City of Oakdale
Hadley Ave	Interchange or Overpass	Hwy 36 Corridor Study (2014)	MnDOT
Hadley Ave	Interchange	Draft 2016-2019 Transportation Improvement Program (2015)	Met Council
Hadley Ave	Interchange	2016-2019 Statewide Transportation Improvement Program	MnDOT
Hadley Ave	Interchange	2015-2019 Capital Improvement Program (2014)	Washington County
Hadley Ave	Interchange	2030 Comprehensive Plan (2010)	City of Oakdale
De Montreville Trl	Overpass	2030 Comprehensive Plan (2009)	City of Lake Elmo
Keats Ave	Overpass	2030 Comprehensive Plan (2009)	City of Lake Elmo
CSAH 17 (Lake Elmo Ave)	Interchange	2030 Comprehensive Plan – Transportation (2009)	Washington County
CSAH 17 (Lake Elmo Ave)	Interchange	2030 Comprehensive Plan (2009)	City of Lake Elmo

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CSAH 15 (Manning Ave)	Interchange	2015-2019 Capital Improvement Program	Washington County
CSAH 15 (Manning Ave)	Interchange	2030 Comprehensive Plan – Transportation (2009)	Washington County
CSAH 15 (Manning Ave)	Interchange	2030 Comprehensive Plan (2009)	City of Lake Elmo
CR 66 (Greeley St/60th St)	Interchange	2030 Comprehensive Plan – Transportation (2009)	Washington County
CSAH 24 (Osgood Ave)	Interchange	2030 Comprehensive Plan – Transportation (2009)	Washington County

C. Trunk Highway 8

No-grade separation improvements recommended within the last ten years for the TH 8 study area within Washington County.

II. DOCUMENTS REVIEWED (documents which would identify specific projects)

Metropolitan Council
• Draft 2016-2019 Transportation Improvement Program (2015)
Metropolitan Council/MnDOT
• Metropolitan Highway System Investment Study (2010)
MnDOT Document/Lead
• 2016-2019 State Transportation Improvement Program (2015) • Congestion Management Planning Study, Phase I (2007) • Congestion Management Planning Study, Phase III Final Report (2013) • Highway 36 Corridor Study (2014; study partners: Ramsey County, Washington County, City of North St. Paul, City of Oakdale) • Metro District 10-Year Capital Highway Work Plan (2015)
Washington County
• 2015-2019 Capital Improvement Program (2014) • 2030 Comprehensive Transportation Plan (2010)

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Local Agencies
• Oakdale 2030 Comprehensive Plan (2010) • Lake Elmo 2030 Comprehensive Plan (2009)

Attachment B

Local Outreach Meeting Attendees (December 2015)

Anoka County
Carver County
Dakota County
Hennepin County
Ramsey County
Scott County
Sherburne County
Washington County

Anoka County

Attendees (Mon, 12/14/15 afternoon):

Doug Fischer, Anoka County
Andrew Witter, Anoka County
Jack Forslund, Anoka County
Kurt Ulrich, City of Ramsey
Nate Ayshford, City of East Bethel
Jack Davis, City of East Bethel
Jim Kosluchar, City of Fridley
Jean Keely, City of Blaine
Paul Czech, MnDOT
Steve Peterson, Met Council
Carl Ohrn, Met Council
Chris Chromy, Bolton & Menk
Angie Bersaw, Bolton & Menk
Eric Johnson, Bolton & Menk

Carver County

Attendees (Mon, 12/14/15 morning):

Lyndon Robjent, Carver County
Darin Mielke, Carver County
Kate Miner, Carver County
Jon Solberg, MnDOT
Paul Czech, MnDOT
Steve Peterson, Met Council
Chris Chromy, Bolton & Menk
Angie Bersaw, Bolton & Menk
Eric Johnson, Bolton & Menk

Dakota County

Attendees (Wed, 12/02/15):

Mark Krebsbach, Dakota County
Brian Sorenson, Dakota County
Jon Solberg, MnDOT
Paul Czech, MnDOT
Steve Peterson, Met Council
Chris Chromy, Bolton & Menk
Angie Bersaw, Bolton & Menk
Eric Johnson, Bolton & Menk

Hennepin County

Attendees (Tue, 12/08/15):

Jim Grube, Hennepin County
Chris Sagsveen, Hennepin County
Carla Stueve, Hennepin County
Greg Chock, Hennepin County
Jon Kreig, Hennepin County
Nelrae Succio, Hennepin County
Jeff Oliver, City of Golden Valley
Jeff Holstein, City of Brooklyn Park
Doran Cote, City of Plymouth
Steve Lillehaug, City of Brooklyn Center
Gary Kroells, West Hennepin Public Safety
Tony Fischer, MnDOT
Paul Czech, MnDOT
Steve Peterson, Met Council
Chris Chromy, Bolton & Menk
Angie Bersaw, Bolton & Menk
Doug Abere, Bolton & Menk
Ross Harris, Stonebrooke

Ramsey County

Attendees (Tue, 12/01/15 morning):

Joe Lux, Ramsey County
Eriks Ludins, City of St. Paul
Morgan Dawley, City of North St. Paul/WSB
Paul Ammerman, City of North St. Paul
Paul Czech, MnDOT
Steve Peterson, Met Council
Chris Chromy, Bolton & Menk
Angie Bersaw, Bolton & Menk
Doug Abere, Bolton & Menk
Ross Harris, Stonebrooke

Scott County

Attendees (Tue, 12/15/15):

Lisa Freese, Scott County
Lezlie Vermillion, Scott County
Tony Winiecki, Scott County
Craig Jenson, Scott County
Andy Hingevold, Scott County
Brad Davis, Scott County
John Powell, City of Savage/WSB
Tom Nikunen, City of Jordan
Mike Waltman, City of Jordan/Bolton & Menk
Jon Solberg, MnDOT
Paul Czech, MnDOT
Steve Peterson, Met Council
Chris Chromy, Bolton & Menk
Angie Bersaw, Bolton & Menk
Doug Abere, Bolton & Menk

Sherburne County

Attendees (Thur, 12/10/15):

John Menter, Sherburne County
Rhonda Lewis, Sherburne County
Justin Femrite, City of Elk River
Steve Voss, MnDOT D3
Jim Hallgren, MnDOT D3
Paul Czech, MnDOT
Steve Peterson, Met Council
Chris Chromy, Bolton & Menk
Angie Bersaw, Bolton & Menk
Doug Abere, Bolton & Menk

Washington County

Attendees (Tue, 12/01/15 afternoon):

Wayne Sandberg, Washington County
Ann Pung-Terwedo, Washington County
Frank Ticknor, Washington County
Joe Gustafson, Washington County
Jan Lucke, Washington County
Adam Josephson, MnDOT
Paul Czech, MnDOT
Steve Peterson, Met Council
Chris Chromy, Bolton & Menk
Angie Bersaw, Bolton & Menk
Doug Abere, Bolton & Menk
Ross Harris, Stonebrooke