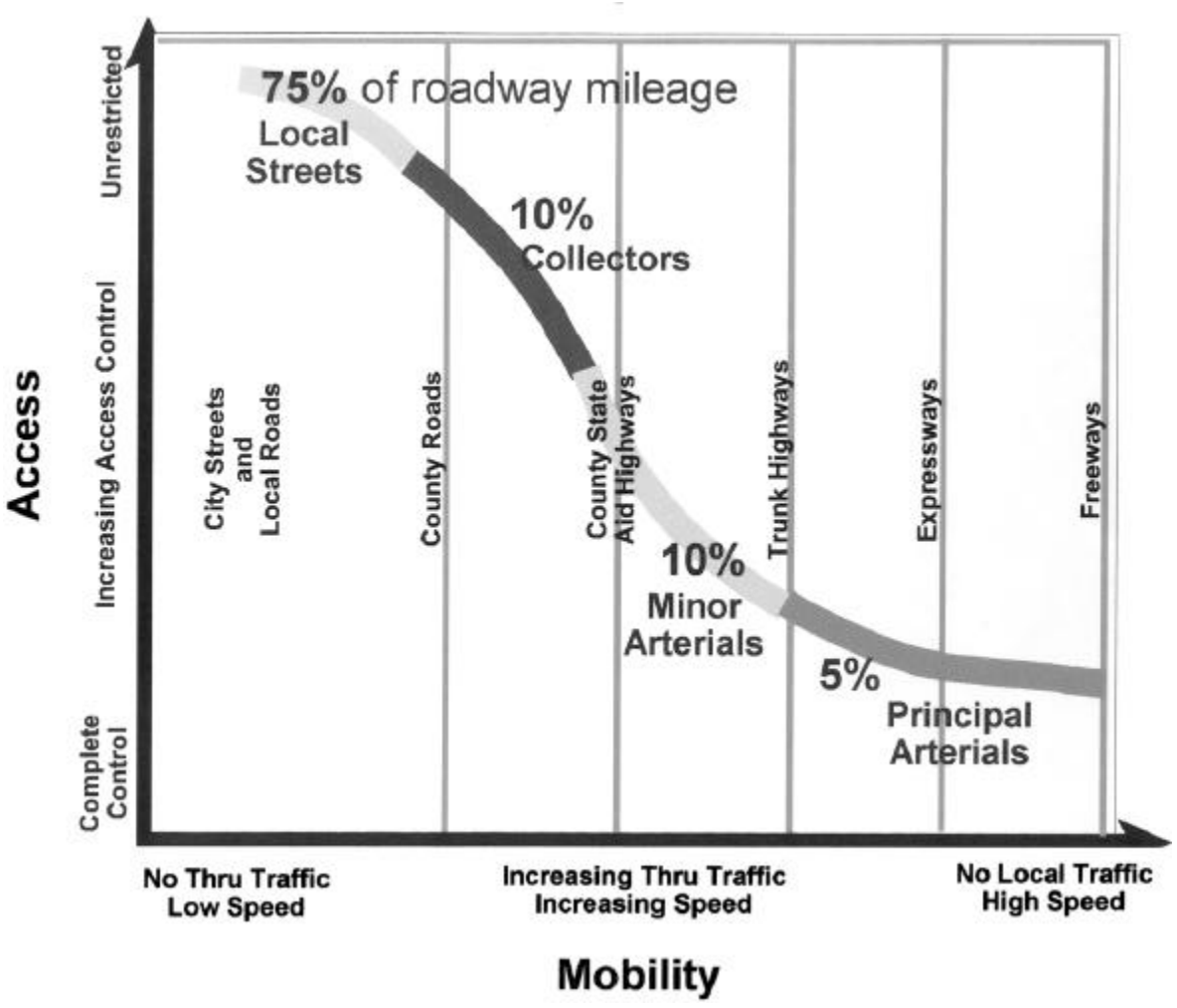
3.0 EXISTING AND FORECAST CONDITIONS

3.1 ROADWAY DESCRIPTION

3.1.1 Functional Classification and Facility Type

Roadways serve two major functions, access and mobility. The function of a roadway is dependent on its classification. Principal arterials provide the highest degree of mobility but are limited in providing land access. On the other end of the spectrum, local streets provide a high degree of land access but are not intended to move goods and people across long distances. **Figure 3.1-1** illustrates the degree to which different classes of roadways serve these functions.

Figure 3.1-1
Access / Mobility Relationship to Functional Classification



Source: Mn/DOT Safety Fundamentals Handbook (2001)

Trunk Highway (TH) 14 is classified as a principal arterial throughout the study area. This segment of TH 14 intersects one other principal arterial: TH 15 on the east side of New Ulm, and three minor arterials: CSAH 37 connecting to southwest New Ulm, TH 99 on the west side of Nicollet, and TH 111 within Nicollet. TH 14 is north of and parallel to the Minnesota River. TH 68, a minor arterial on the south side of the river, also serves as a connection from New Ulm to Mankato. Nicollet County has no other east/west principal arterials. The Nicollet County functional classification system map is shown on **Figure 3.1-2**.

TH 14 extends across Minnesota from South Dakota on the west to Winona on the eastern Minnesota border. The study area for this project is within the portion of TH 14 that is a two-lane roadway from CSAH 6 in North Mankato to the western border, except for a truck acceleration lane near the New Ulm Quartzite Quarry. In recent years, investments have been made in planning and construction on TH 14 from Mankato to Rochester because of increasing congestion and safety issues. Mn/DOT has identified a preferred alternative for a four-lane expressway from Mankato to Rochester. In the early 1990s, the section through Mankato to just west of TH 60 was improved to a four-lane expressway. From TH 60 to Dodge Center, TH 14 is currently a two-lane rural section, but the section from TH 60 to east of I-35 is scheduled for an upgrade to a four-lane expressway. TH 14 is an expressway from Dodge Center to Rochester.

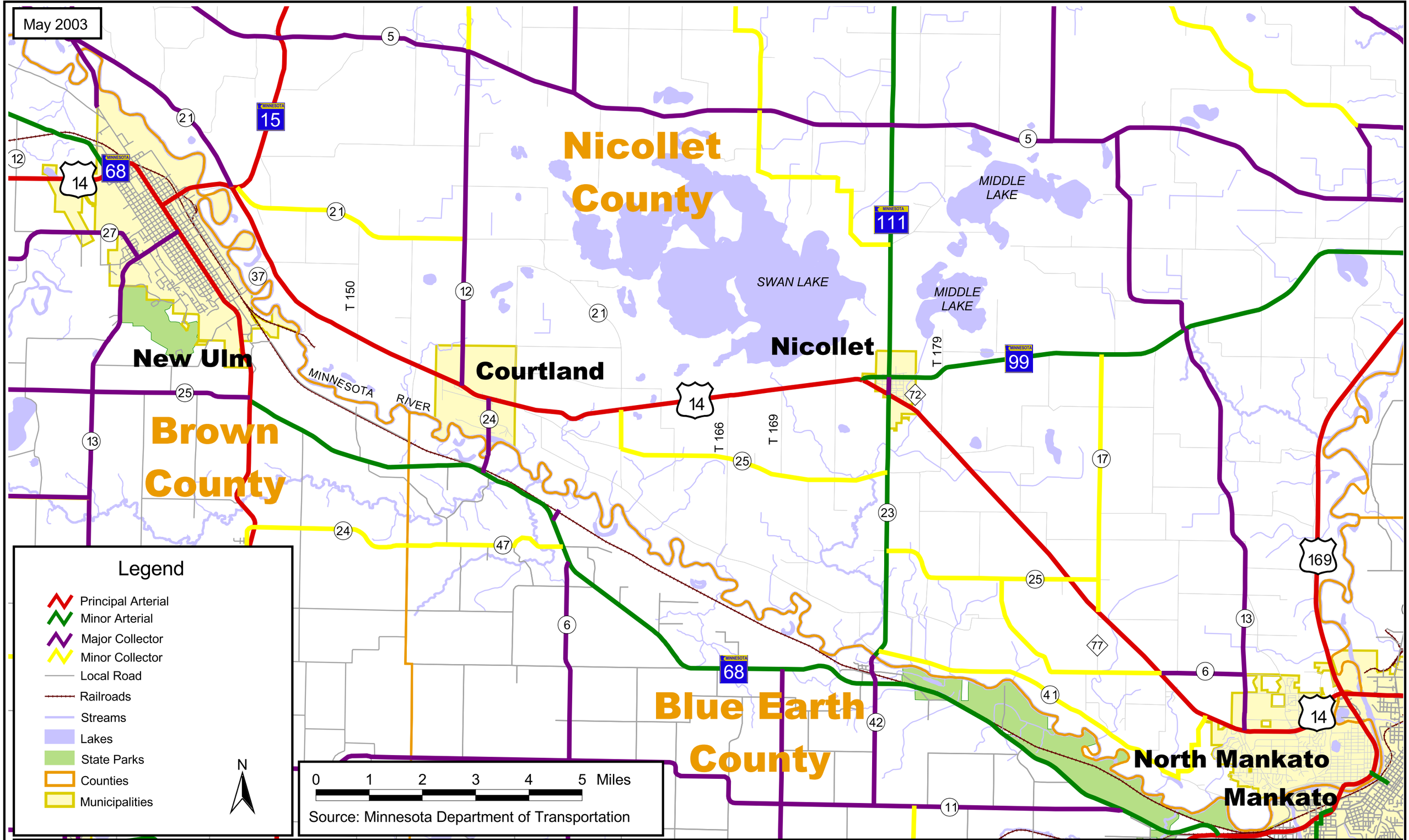
3.1.2 Interregional Corridor Priority Ranking

Mn/DOT has classified TH 14 as a Medium Priority Interregional Corridor (IRC) connecting the Cities of Mankato and New Ulm, both ranked as secondary regional trade centers. Mn/DOT has developed performance targets and guidelines for these corridors, including goals for mobility, access, and safety. The guidelines for medium priority IRCs are:

- Mobility performance target is an average speed of 55 mph or greater across the length of the corridor.
- Access guidelines range from 300 feet to one mile depending on the area type.
- Traffic signals are discouraged due to their impact on mobility.
- Recommended target crash rate for segments is below 1.0 per million vehicle miles.

3.1.3 Corridor Segments

According to Mn/DOT guidance, one of the initial tasks of developing a Corridor Management Plan is to divide the corridor into segments that reflect similar traffic characteristics, level of growth, adjacent land use, and access. The purpose for creating corridor segments is to help characterize the corridor and to present data using a consistent segmentation scheme. In addition, it allows for better identification of deficiencies, as well as development of alternative mitigation strategies.



14 West Interregional Corridor:
North Mankato to New Ulm

Figure 3.1-2
Nicollett County Functional Classification System

TH 14 segments were selected based upon differences in existing and future land use and change in traffic volumes. The growth area segments were determined by first reviewing current and future land use plans developed by the Cities of Nicollet and Courtland. Changes in land use indicated differences in the operational goals of that segment. Segments within rural areas typically have limited accesses per mile, and are focused on mobility, while urban areas have to provide accessibility. The segments were then divided at major intersections in which significant changes in traffic volumes occurred. The segments were classified into one of the following three categories:

- **Urban** - The Urban Growth Area segments of TH 14 are fully developed land areas adjacent to the highway with only limited growth or redevelopment expected.
- **Urbanizing** - The Urbanizing Growth Area segments occur where the adjacent land is only partially developed, the potential for significant growth exists, and should be contiguous with Urban Growth Area Segments.
- **Rural** - Rural Area Growth segments represent areas where the adjacent land area is primarily agricultural or forested and where limited development potential exists.

The growth area segments are shown on **Figure 3.1-3**, and the termini points, a description of the typical segment and segment length are given on **Table 3.1-1**.

Table 3.1-1
Corridor Segments

Segment	Location	Typical Section	Segment Length (Miles)
1	TH 15 / CSAH 21 to CSAH 37	Two-Lane Rural	1.8
2	CSAH 37 to Zieske Road	Two-Lane Rural	3.8
3	Zieske Road to CSAH 12	Two-Lane Urbanizing	0.4
4	CSAH 12 to CSAH 25	Two-Lane Urban	1.2
5	CSAH 25 to TH 99	Two-Lane Rural	6.5
6	TH 99 to TH 111 / CSAH 23	Two-Lane Urbanizing	0.6
7	TH 111 / CSAH 23 to CSAH 72	Two-Lane Urban	0.6
8	CSAH 72 to CSAH 6	Two-Lane Rural	6.8

Source: Howard R. Green Company and Mn/DOT Roadway Sufficiency and Reference Point Data

May 2003

Corridor Segments

- The corridor is divided into eight segments, each with unique operating characteristics.
- Operational goals are different for rural, urbanizing, and urban segments.
- Rural = agricultural or forested area with limited development.
- Urbanizing = area developed or planned for development with urban services.
- Urban = fully developed town center with short blocks and grid system of intersecting streets.

Segment 1
Rural 2 Lane

Segment 2
Rural 2 Lane

Segment 3
Urbanizing 2 Lane

Segment 4
Urban 2 Lane

Segment 5
Rural 2 Lane

Segment 6
Urbanizing 2 Lane

Segment 7
Urban 2 Lane

Segment 8
Rural 2 Lane

Nicollet County

Brown County

Blue Earth

New Ulm

Courtland

Nicollet

Saint Pe

MINNESOTA RIVER

SWAN LAKE

MIDDLE LAKE

MIDDLE LAKE

T 150

T 166

T 169

T 179

Legend

- U.S. and Minnesota Highways
- County State Aid Highways
- County, Township, and Local Roads
- Railroads
- Streams
- Lakes
- State Parks
- Counties
- Municipalities

N

0 1 2 3 4 5 Miles

Source: Minnesota Department of Transportation

Moving Minnesota

14 West Interregional Corridor:
North Mankato to New Ulm

Figure 3.1-3
Corridor Segments

3.1.4 Intersection Lane Geometry

Research has shown that roadway geometry at intersections has an impact on the safety and capacity of the roadway. Throughout the TH 14 corridor, over 200 public, residential, commercial, and field accesses exist, making it unfeasible to conduct an operations analysis at each access. In addition, the turning traffic volume at each access location, especially minor accesses, does not have a significant impact on roadway capacity. Therefore, intersections with TH 14 were selected throughout the corridor that had multiple vehicle crashes and high volumes for a minor roadway. At each of these intersections, an in-depth operations and crash analysis was completed. The approach lane geometry at each of the key intersections is documented in **Table 3.1-2**.

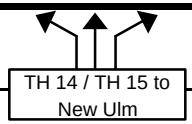
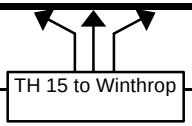
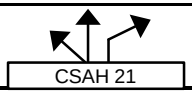
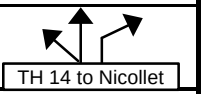
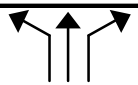
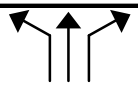
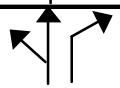
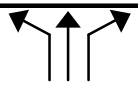
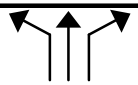
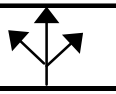
3.2 LAND USE

One of the key factors to consider when evaluating current or future functionality of any roadway is its relationship with adjacent and nearby land uses. As noted in the previous section, roadways perform two main functions. They provide mobility for traffic while simultaneously providing access to land development. While access can be important to the economic vitality of businesses located along a given roadway, sound management of access is necessary to balance this dual role. Furthermore, the type of land use and intensity of land development can have a significant effect on the level of necessary roadway access and how that development will ultimately impact the roadway. The same development can significantly influence traffic operations on a broader community level, depending on the level of traffic it generates.

In order to assess the potential impact of local land use on the TH 14 West Interregional Corridor, an understanding of demographics, local and regional economics, and future development plans is necessary. The 3-C Planning Approach was used to examine these issues, and involves: (1) being comprehensive in review, (2) coordinating with key stakeholders, and (3) continuing efforts to understand key issues. The most recent available planning documents were reviewed for Nicollet County, the City of Nicollet, and the City of Courtland, and include:

- Nicollet County Zoning Ordinance, 1981
- City of Courtland Comprehensive Plan, 1999
- City of Nicollet Land Use Plan and Zoning Ordinance, 1986

Table 3.1-2
Existing Lane Geometry at Studied Intersections

Intersection of:		Location	TH 14		Minor Street	
			West Approach	East Approach	North Approach	South Approach
TH 14	TH 15	Rural				
	CSAH 21					
TH 14	CSAH 37	Rural				NA
TH 14	CSAH 24	Courtland				
TH 14	TH 99	Nicollet				NA
TH 14	TH 111 / CSAH 23	Nicollet				
TH 14	CSAH 6	Rural				

Source: Howard R. Green Company

3.2.1 Nicollet County

Population

According to the 2000 US Census, Nicollet County has a population of 29,771 with 11,240 households. This corresponds to approximately 2.7 persons per household. The population density of the county is approximately 66 persons per square mile, with 25 households per square mile. As these numbers suggest, Nicollet County is largely a rural county.

Zoning Ordinance[1]

Nicollet County has not allowed urban land uses to be located in the agricultural districts of the county since 1981. This means that the county will not allow the rezoning of land for commercial, industrial, or platted residential subdivisions anywhere in the county except immediately adjacent to municipal boundaries where they can receive municipal services. This has allowed the cities to grow in an orderly manner without the urban sprawl that is so common, and has also allowed farms in the county to continue farming without the encroachment of large developments of non-farm houses going up "in their backyard". The county allows one new dwelling per quarter quarter in all the districts outside of the cities, provided that the building lot has access to a public road. The county does not permit "transfer of development rights", which gives the same result of allowing platted residential subdivisions within the agricultural district.

Land Uses

Existing land use and zoning in Nicollet County both reflect the county's rural character. For the most part, existing developed land is concentrated in incorporated municipalities and in small pockets of residential development along major highways. The eastern portion of the TH 14 corridor is zoned agricultural. West of Nicollet, the north side of TH 14 is under special protection to preserve the Swan Lake Wildlife Management Area. From approximately one mile east of the City of Courtland to the TH 15 intersection, land surrounding TH 14 is zoned as conservancy in recognition of the unique ecology associated with the Minnesota River Valley. Various areas associated with wetlands or streams are zoned as shore land; the existing TH 14 corridor crosses five of these shore land areas. Two and one-half miles west of Courtland is a small area zoned residential. More residential zones can be found along TH 14 between New Ulm and Courtland (**Figure 3.2-1**).

Nicollet County's development policy does not allow new subdivision development beyond established city limits. If a city desires a new subdivision outside existing city limits, the city must annex the proposed subdivision area and plan for water and sewer. This policy is intended to protect the county's agricultural resources, and to ensure that proper infrastructure is planned for new development. The policy will make it difficult for growth to migrate to a new TH 14 alignment without appropriate planning by the cities of Nicollet and Courtland.

[1] Nicollet County Zoning Ordinance, 1981, Environmental Services

Nicollet County Zoning

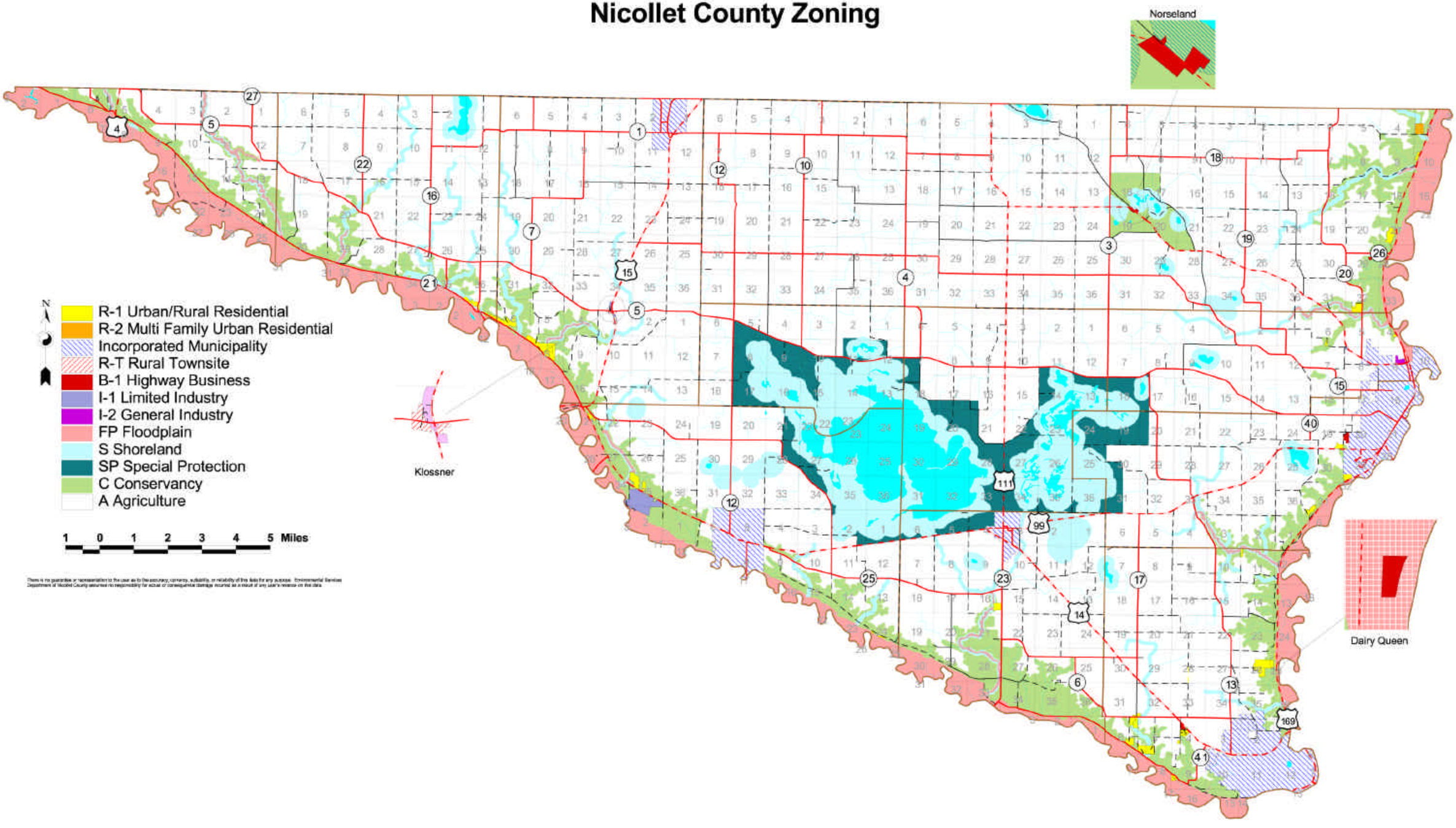


Figure 3.2-1
Nicollet County Zoning Map

3.2.2 City of Courtland

Population

Courtland is located on TH 14, approximately 25 miles west of Mankato and 6 miles east of New Ulm. According to the 2000 US Census, Courtland has a population of 538, with 190 households. These figures correlate to approximately 2.8 persons per household (typical of Nicollet County). Courtland covers an area of approximately 2.7 square miles, with a subsequent population density of about 72 households per square mile and 202 persons per square mile. An analysis of past growth trends has shown that Courtland has been increasing in population fairly steadily since 1960, with a very small increase during the 1980s, typical of many small rural communities during that decade. According to projections in the city's comprehensive plan, the population of Courtland is expected to steadily increase over the next 20 years. Courtland's proximity to both New Ulm and Mankato would reasonably support this projection, and the city's recent investments in infrastructure (ie: sewer lines to New Ulm) would, in turn, help support the growth.

Land Use

As the population density figures suggest, a majority of existing land use within the incorporated bounds of Courtland remains agricultural or undeveloped. Much of the existing developed land is concentrated along TH 14, with a mix of mainly "older" residential uses and some commercial uses. Basically, the TH 14 right-of-way is narrow through the City of Courtland and splits the central business district and older residential areas acting much like a city street. Any expansion of the existing TH 14 right-of-way would have right-of-way acquisition impacts to homes and businesses. There is significant industrial use just to the south of the "older" part of town and west along TH 14, with the majority of newer residential development in the south and southeast areas of the city, adjacent to the Minnesota River Valley. Most of the western and northern parts of the incorporated city are undeveloped or agricultural uses (**Figure 3.2-2**).

The future land use plan for Courtland reflects a set of goals and policies established in the 1998 comprehensive plan, including:

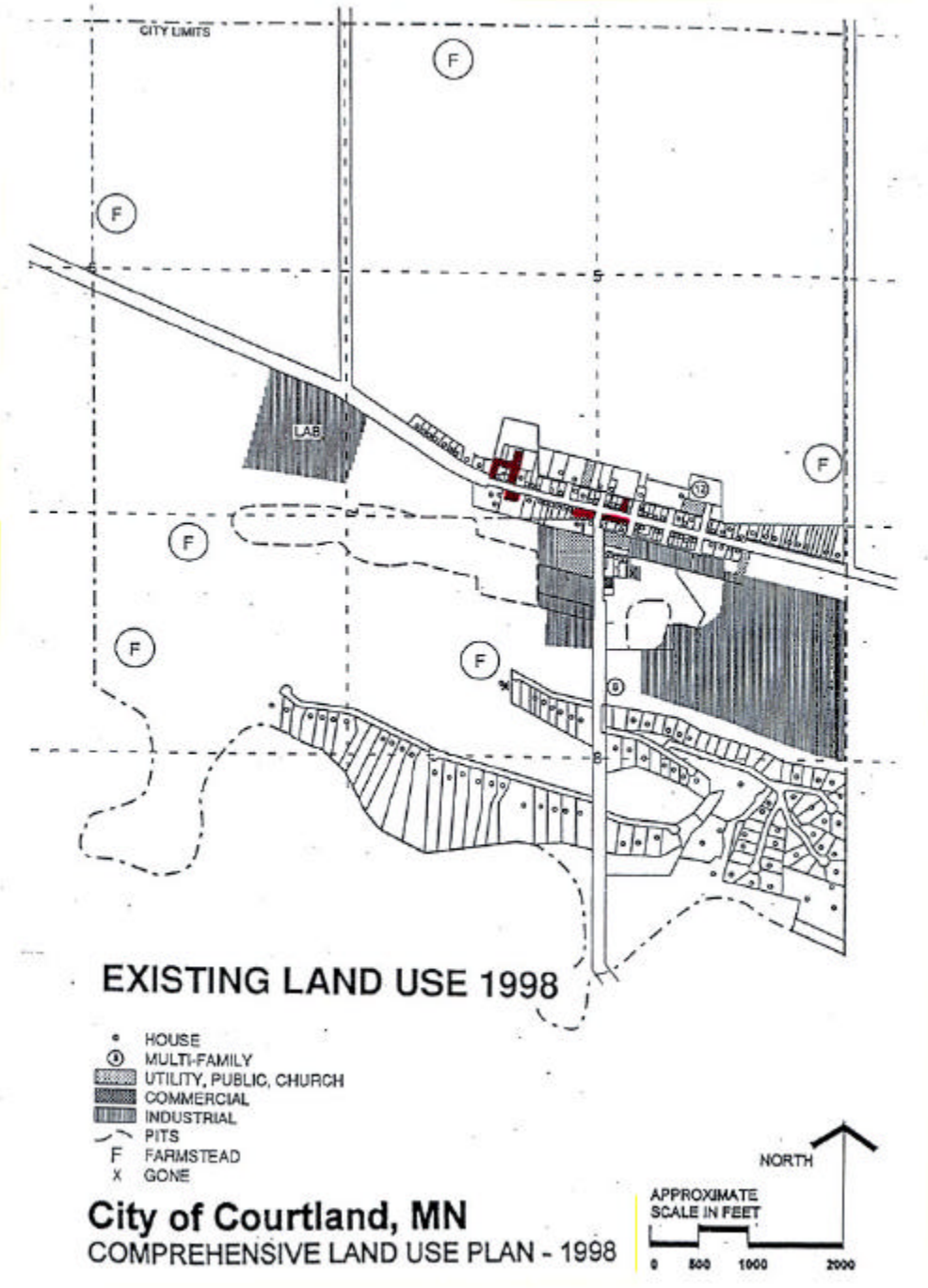
- Separate, or buffer, differing land uses to minimize conflict,
- Provide more commercial space in specified areas, and
- Reuse of past land uses, such as mining areas.

Included in the 1998 plan is the relocation of TH 14 to the north of future planned development areas. The future land use plan shows a relocated "new" TH 14 corridor approximately ½ mile north of the existing alignment (**Figure 3.2-3**), and expanded industrial uses to the south of, and on the west edge of, downtown along existing TH 14. Future commercial uses are concentrated along TH 14 in the existing "older' area of town and near the existing TH 14/CSAH 24 intersection. The plan calls for expanded residential development in the majority of the remaining parts of the city, south of the "new" TH 14 corridor. This new highway corridor would act as a development boundary, with property

north of the alignment remaining agricultural. A northerly extension of existing CSAH 24 between the new TH 14 alignment and the existing alignment is planned. In addition, commercial development is planned for the proposed new TH 14/CSAH 24 intersection. It should be noted that more recently the City has discussed the connection of CSAH 12 to a "new" TH 14 northern bypass. It will be important for access management guidelines to be in place for any new bypasses, before new connections are planned.

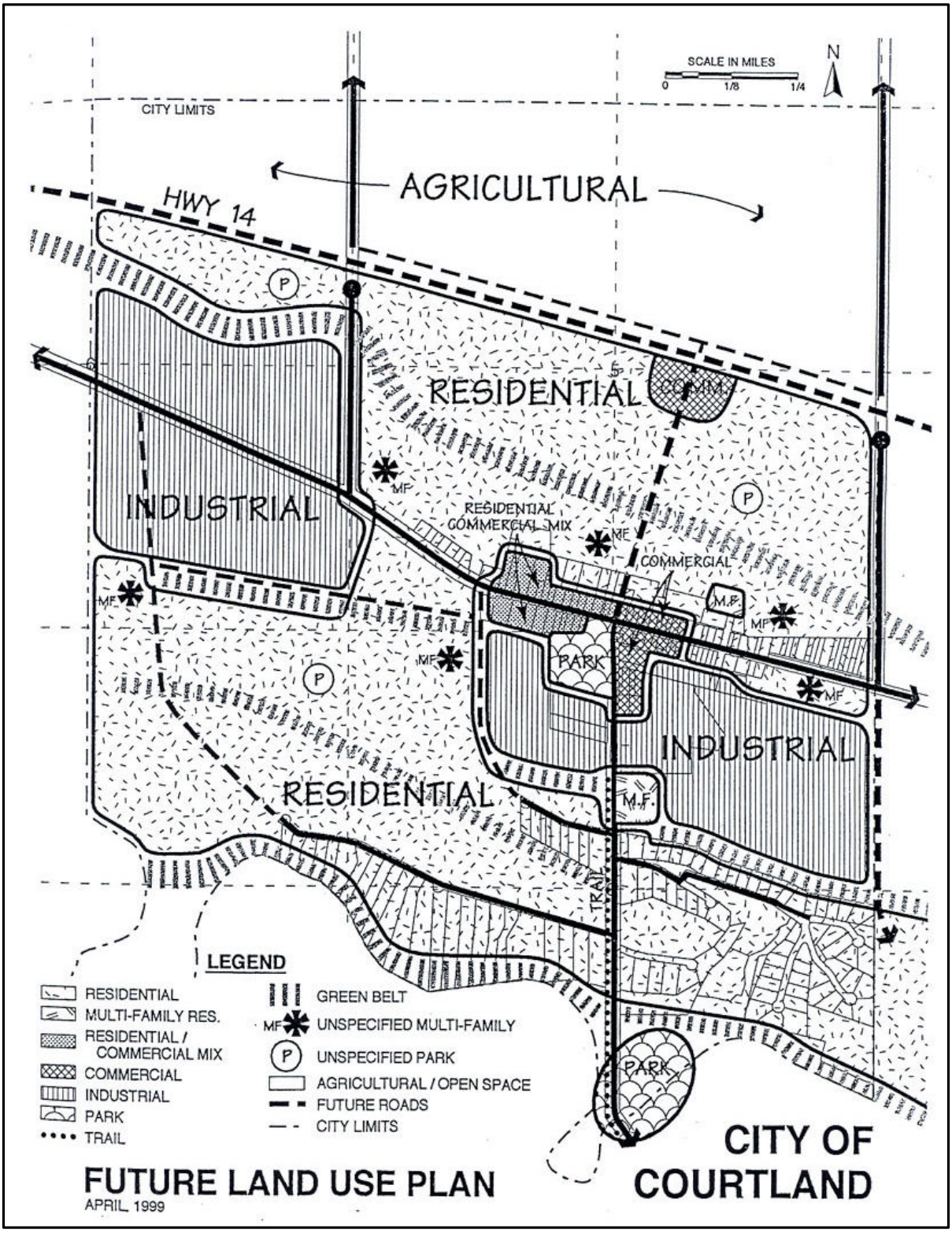
Connecting existing local roads to provide for local circulation and access to existing and future commercial development is part of a future local roadway system for Courtland. By providing a connecting collector road system, only a minimal number of access points will be allowed along "new" TH 14.

The City of Courtland Comprehensive Plan reflects the priority Nicollet County has placed on smart growth since 1981.



14 West IRC

Figure 3.2-2
Existing Land Use Plan - Courtland, MN



14 West IRC

Figure 3.2-3
Future Land Use Plan - Courtland, MN

3.2.3 City of Nicollet

Population

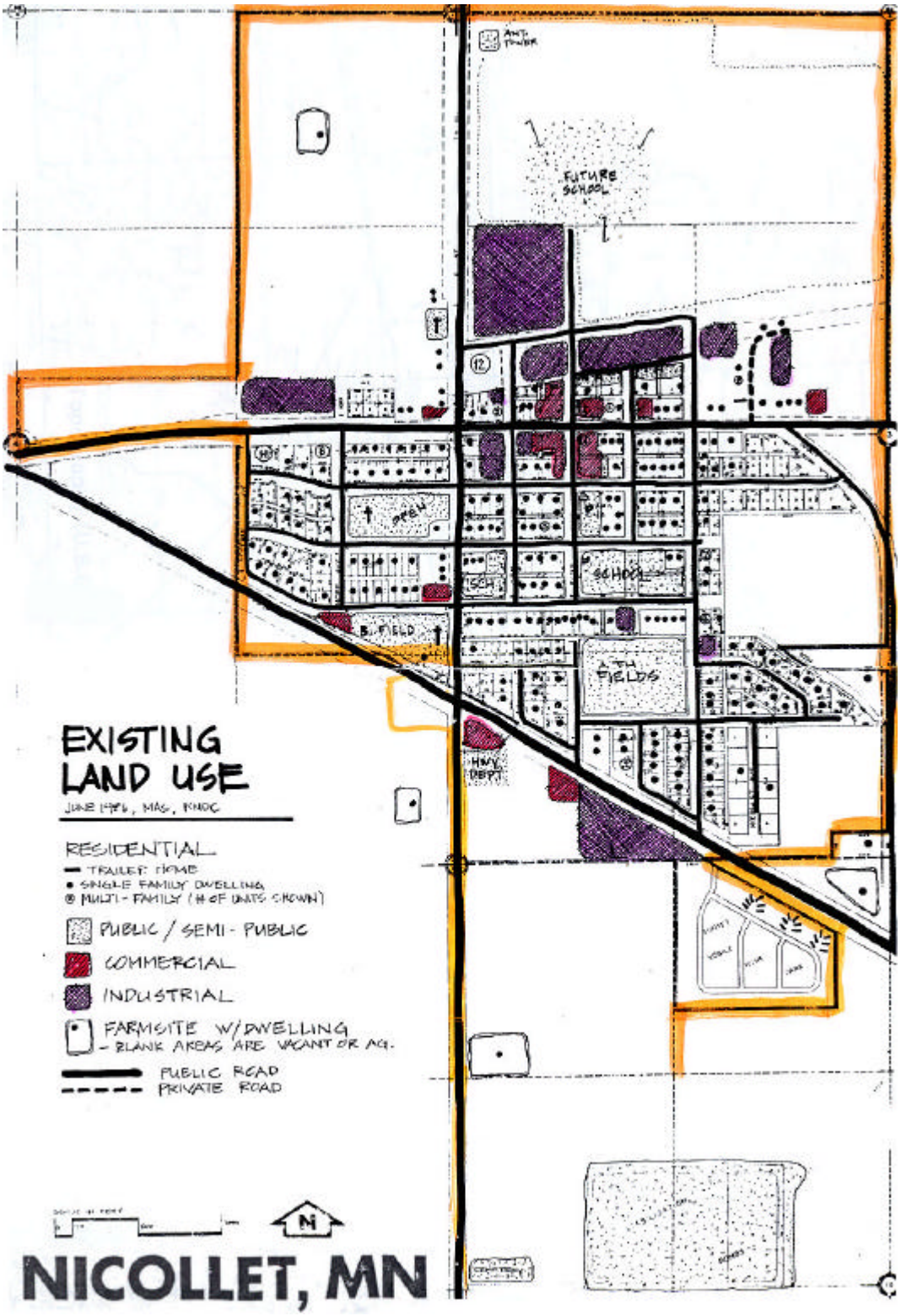
The 2000 US Census shows the population of Nicollet at 889. With 350 households, the city averages approximately 2.5 persons per household. The incorporated areas of Nicollet covers approximately 0.7 square miles, with a subsequent population density of 1270 persons per square mile and approximately 500 households per square mile. Nicollet is located along TH 14 approximately 15 miles west of Mankato and 7 miles east of Courtland. Past growth trends show that Nicollet has been increasing in population steadily over the past 40 years. Actual population numbers for recent years have considerably exceeded the projections from the 1986 Nicollet Land Use Plan. Nicollet grew about 25 percent in population between 1980 and 2000. Nicollet's construction of a new school instead of consolidating and its proximity to Mankato would reasonably support the assumption of continued steady growth similar to a rate in the past two decades.

Land Use

TH 14 is located on the south side of town and has turn lanes, wide right-of-way, and access control. TH 99 goes through the central business district. Existing land use in Nicollet consists primarily of development concentrated in the central portion of the city, between TH 14 and TH 99. Small pockets of commercial land uses can be found along both TH 14 and TH 99. Most of the central area of the city consists of single-family and multi-family residential uses. Industrial uses are found at one location on the southern edge of town, along TH 14, but can mostly be found on the northern edge of existing development, north of TH 99 and along TH 111. The largest share of undeveloped or agricultural lands with corporate boundaries can be found on the north end of town and south of TH 14 (**Figure 3.2-4**).

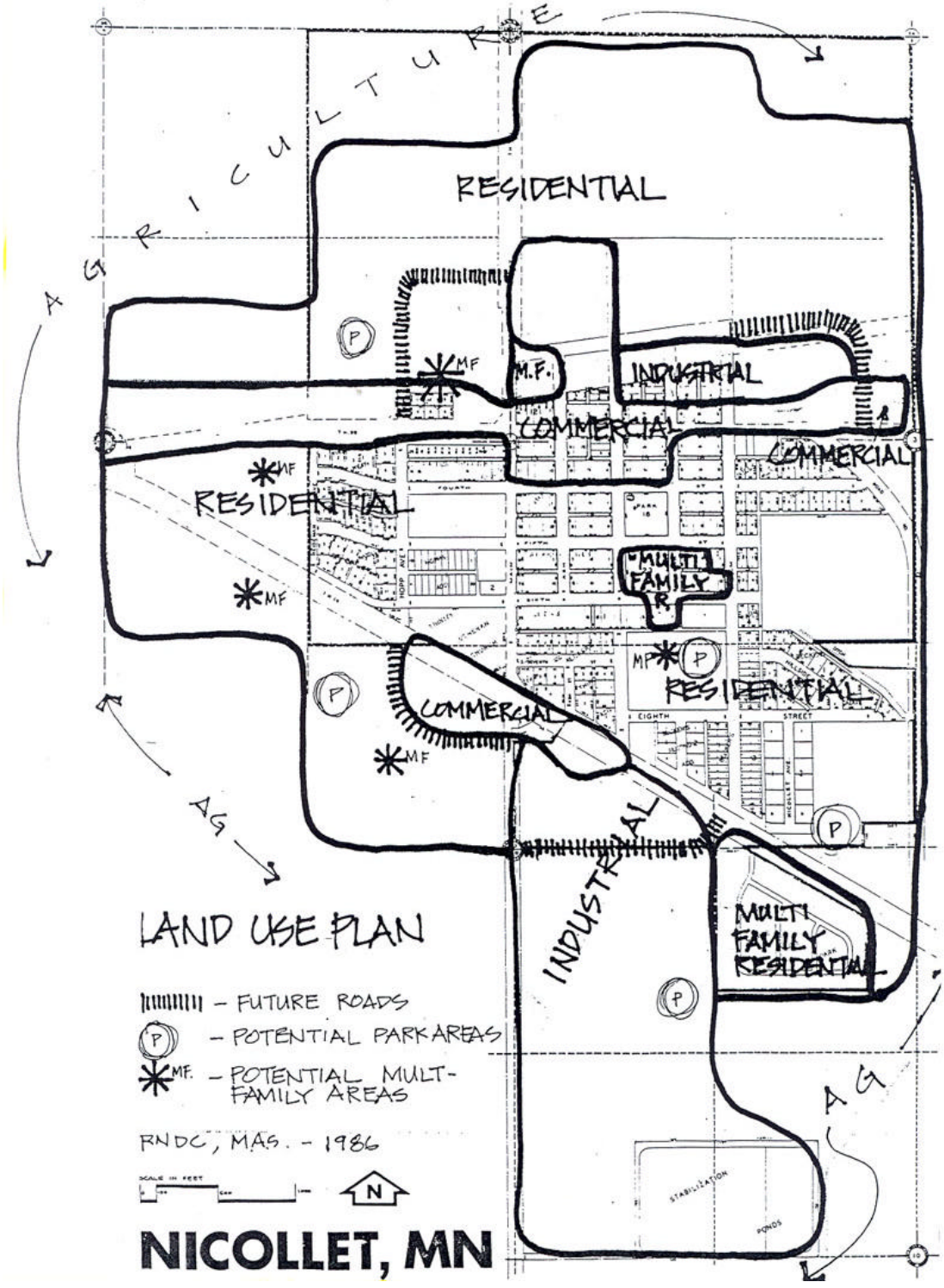
The future land use plan for Nicollet concentrates industrial development along the north side of TH 99, east of TH 111, and in a large area in the south part of town, along the east side of CSAH 23. According to the 1986 plan, Nicollet's future commercial development will be concentrated primarily along TH 99 through town, along TH 111 near TH 99, and along TH 14, near the intersection with CSAH 23. The remaining areas of Nicollet are primarily designated for residential development, with the north side of Nicollet slated for the most significant new residential development. In addition, multi-family residential development would occur at the city edges along existing TH 14. The land along the fringe of Nicollet is intended to remain agricultural (**Figure 3.2-5**).

Improvements to TH 14 on the existing alignment would not likely result in changes to existing land use plans. Relocation of TH 14 to a new alignment could result in changes to land use patterns; however, these changes would be influenced by Nicollet County land use and zoning policies. The relocation of TH 14 to the south would provide good access to the planned industrial development on the south end of town.



14 West IRC

Figure 3.2-4
Existing Land Use Plan - Nicollet, MN



14 West IRC

Figure 3.2-5
Future Land Use Plan - Nicollet, MN

3.3 ENVIRONMENTAL OVERVIEW

3.3.1 Purpose

The purpose of the environmental overview is to identify important social, economic, and environmental resources within the TH 14 West Interregional Corridor Study Area that could limit the available options for highway improvements or realignments. This environmental overview includes a review of readily available environmental and land use databases. A windshield survey of the corridor was taken, but no original data gathering efforts were undertaken.

It is important to note that the environmental overview does not take the place of formal environmental documentation. Environmental issues related to future specific highway improvement and/or realignment projects would be addressed through the proper environmental documentation in accordance with the National Environmental Policy Act (NEPA), the Minnesota Environmental Policy Act (MEPA), and the Minnesota Department of Transportation (Mn/DOT) Highway Project Development Process (HPDP).

3.3.2 Preliminary Environmental Review for Scoping Process

Even though the environmental overview does not constitute formal environmental review, the information obtained can be used to develop a TH 14 West Interregional Corridor Scoping Document (SD) and *Draft* Scoping Decision Document (SDD). These documents are the first formal documents required by the Mn/DOT HPDP. The SD and SDD also meet the Minnesota Environmental Quality Board (MEQB) rules for the Environmental Impact Statement (EIS) process established under MEPA and the scoping requirements of NEPA.

The SD will establish the purpose and need for the identified highway improvement projects; describe the proposed improvements and project setting, including location and design alternatives; identify the project cost and funding source(s); determine the schedule and project manager; identify the potential for social, economic, and environmental impacts; and discuss public and agency involvement, including permits and approvals likely to be necessary for the project. The *Draft* SDD will recommend which project alternatives should be carried forward for further review and which areas of social/economic/environmental impacts should be subjected to further analysis in the EIS.

The SD and *Draft* SDD will be distributed to the EQB Distribution list that includes state and federal regulatory agencies and to the public for review and comment. Formal scoping hearings will be held to allow the agencies and public to comment on the scope of the project. Once all comments have been received, the SDD will be finalized and distributed to all those that received the Scoping document and all those that commented on the scope of the project.

3.3.3 Environmental Overview – Social, Economic, and Environmental Impacts

This section presents a brief discussion of the social, economic, and environmental issues that may be analyzed in an EIS. For some issues, little information is available at this point in the corridor assessment; for others significant data was obtained and reviewed. More detailed analysis will be necessary for a future EIS.

Air Quality

Air quality is not expected to be a significant issue for the TH 14 corridor. Minnesota Pollution Control Agency (MPCA) rules indicate that an Indirect Source Permit (ISP) is required for a transportation project that:

- Results in 20,000 or more vehicles per day within ten years of the completion of construction on a new corridor or alignment
- Results in an increase of 10,000 or more vehicles per day within ten years after completion of the modification

Since existing traffic volumes along the TH 14 corridor range from 4,800 to 7,100 vehicles per day, and projected 2025 traffic volumes range from 9,000 to 12,800 vehicles per day, ISP requirements will not apply, and detailed air analyses should not be necessary.

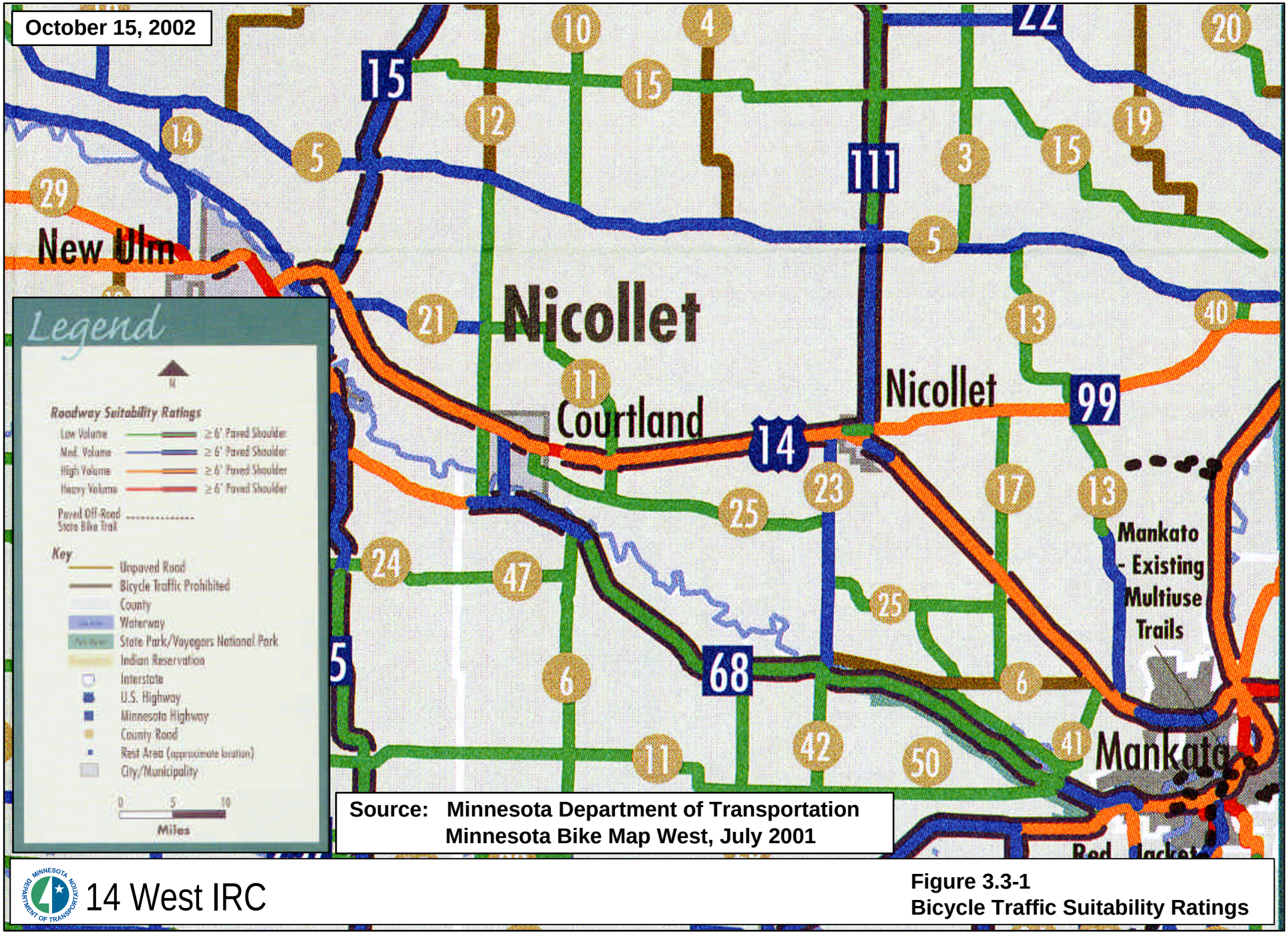
Benefit-Cost Analysis

Benefit-cost analyses allow evaluation of the financial efficiency of proposed project location and design alternatives.

Bikeways and Pedestrians

According to Mn/DOT and Federal Highway Administration (FHWA) policies, the safe accommodation of bicyclists and pedestrians should be given full consideration during the planning and development of all highway projects. The Federal requirement for bicycle and pedestrian facility evaluation and development is a part of the 1982 Surface Transportation Assistance Act (Congressional Record, Section 126). Establishment of the Minnesota Department of Transportation, in 1976, incorporated multi-model transportation planning and development in its operational functions (Minnesota Statute 174.01-174.03).

The Mn/DOT-produced 2001 "Minnesota Bike Map West" (**Figure 3.3-1**) was reviewed to determine the roadway suitability ratings of TH 14 for bicycle traffic. The map rated roadway suitability using two criteria: 1) Traffic volume, and 2) presence or absence of a paved shoulder of a width equal to or greater than six feet. TH 14 suitability ratings for bicycle traffic are summarized in **Table 3.3-1.** It should be noted that the sections of TH 14 identified in the table are not equivalent to the TH 14 Segments used in this corridor study report. In general, roadway shoulders are sufficient for accommodation of bicycles and other



Source: Minnesota Department of Transportation
Minnesota Bike Map West, July 2001

Figure 3.3-1
Bicycle Traffic Suitability Ratings

non-motorized traffic, but high traffic volumes may discourage bicyclists from using TH 14 as a travel route.

Table 3.3-1 – Roadway Suitability Ratings for Bicycle Traffic

TH 14 Section	Roadway Suitability Rating
Between TH 15 and the eastern corporate limits of Courtland	High traffic volume, paved shoulders generally = 6 feet
Extending 0.75 miles east of the eastern corporate limits of Courtland	Heavy traffic volume, paved shoulders = 6 feet.
0.75 miles east of the eastern corporate limits of Courtland to the eastern portion of Nicollet	High traffic volume, paved shoulders generally = 6 feet
Extending approximately 1 mile east of the eastern corporate limits of Nicollet	Medium traffic volume, paved shoulders generally = 6 feet
1 mile east of the eastern corporate limits of Nicollet to the western corporate limits of North Mankato	High traffic volume, paved shoulders generally = 6 feet

FHWA and Mn/DOT policy requires the review of suitable alternate parallel bicycle routes. TH 68, located across the Minnesota River to the south of the TH 14 corridor, provides an alternative parallel route that has a lower traffic volume than TH 14 and has paved shoulders greater than or equal to six feet in width.

Another issue is the potential for TH 14 to act as a barrier to bicycle or other non-motorized traffic. There are no signalized intersections or marked pedestrian crossings along the TH 14 corridor, which may complicate bicycle or pedestrian crossing of the roadway.

Construction Impacts

The Mn/DOT HPDP indicates "Typical issues that a construction impact analysis addresses includes construction noise and dust in urbanized areas; traffic; detours of a long duration which have access impacts; excess materials disposal; haul roads; and temporary bypasses." These potential impacts will be evaluated during the future EIS for TH 14 corridor improvements.

Contaminated Properties

The FHWA has established a policy for evaluating impacts of transportation projects on contaminated properties, including their "Interim Guidance – Hazardous Waste Sites Affecting Highway Project Development" and "Hazardous Wastes in Highway Rights of Way". In addition, the Mn/DOT HPDP has established procedures for identifying contaminated properties. These procedures were developed in response to the potential for State Departments of Transportation to incur significant liability for contaminated site cleanup under the Comprehensive Environmental Response, Compensation and Liability Act, and the Resource Conservation and Recovery Act.

To identify major known or potentially contaminated sites, a review of MPCA databases was conducted. The databases included sites falling under the following categories:

- National Priority List/Permanent List of Priorities (NPL/PLP - Federal and State Superfund)
- Comprehensive Environmental Response, Compensation and Liability Information System (CERCLIS)
- No Further Remedial Action Planned (NFRAP) – Sites removed from the CERCLIS or NPL lists
- Hazardous Waste Generator/Investigation and Cleanup List
- Voluntary Investigation and Cleanup (VIC) Program Sites
- 1980 Metro Area Disposal Sites/Outstate Dump Inventory
- Resource Conservation and Recovery Act (RCRA) Treatment, Storage and Disposal (TSD) Facilities
- Permitted Solid Waste Handling/Disposal Facilities
- Leaking Underground Storage Tank (LUST) Sites

Five LUST sites were identified in the corridor area, all within the City of Nicollet. Three dump sites were noted; one south of TH 14 and east of County Highway 23, one east of Nicollet just north of TH 99, and one just south of TH 14 at the eastern edge of the City of Courtland. A permitted solid waste facility was identified on the south side TH 14 approximately one mile west of Courtland. Several other database entries were noted, but were outside the corridor review area across the Minnesota River or within North Mankato city limits. **Figure 3.3-2** identifies the location of MPCA database sites.

A Phase I Environmental Site Assessment should be conducted during the TH 14 corridor EIS project. This will allow a complete assessment of the impacts of the types of sites identified during the MPCA database review, will identify leak and spill sites, and will also identify potentially contaminated sites not included in the MPCA databases.

May 2003

Contaminated Sites

- Moving ahead with a transportation project without identifying the known and potentially contaminated sites in the project area can result in project delays, unsafe working conditions, added project costs, and increased liability.

- Review of MPCA databases has identified relatively few contaminated sites in the project area. However, additional evaluation will be required for specific TH 14 improvement projects.

Nicollet County

New Ulm

Courtland

Nicollet

North Mankato

Mankato

SWAN LAKE

MIDDLE LAKE

MIDDLE LAKE

MINNESOTA RIVER

Legend

- U.S. and Minnesota Highways
- County State Aid Highways
- County, Township, and Local Roads
- Railroads
- Streams
- Lakes
- State Parks
- Counties
- Municipalities
- National Priority List (Superfund) Site
- Comprehensive Environmental Response, Compensation and Liability Information System Site
- No Further Remedial Action Planned Sites
- Voluntary Investigation and Cleanup Sites
- Hazardous Waste Investigation and Cleanup Sites
- Open Dump Inventory Sites
- Permitted Solid Waste Facilities
- Leaking Underground Storage Tank Sites

N

0 1 2 3 4 5 Miles

Sources: Minnesota Department of Transportation
Minnesota Pollution Control Agency

14 West Interregional Corridor:
North Mankato to New Ulm

Figure 3.3-2
Contaminated Sites

Critical Areas

The Mississippi River Critical area (as defined by Minnesota Statute §116G and Minnesota Executive Order No. 130) is the only designated critical area in the State of Minnesota. The TH 14 project will not impact this resource.

Cumulative Impacts

The environmental review process requires analysis of the overall impacts in the area of a transportation project, including impacts from other concurrent or future actions. This analysis is referred to as a cumulative impact analysis. Future environmental documentation will identify other reasonably foreseeable projects that will impact similar resources as those impacted by TH 14 improvements. The impacts of the conversion of natural systems for human use will be assessed. Any irreversible and irretrievable commitments of resources resulting from TH 14 improvements will be identified.

Energy

Evaluation of highway improvement alternatives to determine the most fuel-efficient option is required at the EIS level of environmental review. A detailed energy analysis will be conducted during the EIS.

Environmental Justice

Presidential Executive Order 12898 requires the evaluation of disproportionately high adverse impacts to minority and low-income populations. Census data from 1990 and 2000 was reviewed to identify the potential for such impacts. The cities of Nicollet and Courtland have minority populations that constitute less than 2 percent of each city's total population, while Nicollet County has a total minority population of 1,080 (about 3.6 percent of the county's total population. Data regarding income levels from the 2000 census had not been released at the time of this report. TH 14 improvement alternative alignments will need to be reviewed and analyzed to determine the potential for disproportionately impacting minorities and low-income populations in the project area.

Erosion Control

TH 14 improvements will involve the disturbance of more than one acre of existing ground cover, therefore a National Pollutant Discharge Elimination System (NPDES) general storm water permit will be necessary. This permit will require the establishment of temporary and permanent erosion control measures during roadway construction activities; details regarding these erosion control measures will be included in construction plan sets. Steep slope areas will receive special attention, since these areas are prone to erosion damage. **Figure 3.3-3** identifies steep slope areas within the TH 14 corridor study limits.

May 2003

Steep Slope Areas

- Some of the key environmental characteristics of the TH 14 corridor are the bluff areas adjacent to the Minnesota River and its tributaries. These areas are a unique habitat for a variety of plant and animal life, and provide some of the most striking scenery in the region.

- Steep slope areas will be an issue at the western end of the corridor.

Nicollet County

Brown County

New Ulm

Courtland

Nicollet

North Mankato

SWAN LAKE

MIDDLE LAKE

MIDDLE LAKE

MINNESOTA RIVER

Legend

- U.S. and Minnesota Highways
- County State Aid Highways
- County, Township, and Local Roads
- Railroads
- Streams
- Lakes
- State Parks
- Counties
- Municipalities
- Steep Slope Areas

N

0 1 2 3 4 5 Miles

Sources: Minnesota Department of Transportation Base Map Data
University of Minnesota - Duluth, Geology Department
Minnesota Geological Survey
Minnesota Department of Natural Resources

Moving Minnesota

14 West Interregional Corridor:
North Mankato to New Ulm

Figure 3.3-3
Steep Slope Areas

Excess Materials

Highway construction projects generate excess fill material, used concrete, used asphalt, and other materials from demolition activities. Disposal of such materials must be conducted in a manner that minimizes impact to human health and the environment. Excess materials should be kept within construction limits where possible, and in no case should excess materials be placed in wetlands, floodplains, or other environmentally sensitive locations.

Farmland Impacts

Nicollet County has a high percentage of prime and unique farmland, and has taken specific steps to preserve agricultural land by limiting land area available for urban or suburban development. To identify areas of prime or unique farmland, Nicollet County soil survey data were reviewed. **Figure 3.3-4** identifies prime and unique farmland as noted in the county soil survey for the TH 14 project area. Form AD-1006 will need to be completed during the environmental documentation phase of future improvement projects. Coordination with the Natural Resources Conservation Service (NRCS) and Nicollet County will continue to identify potential avoidance, minimization and mitigation strategies.

Fish and Wildlife

The TH 14 corridor crosses several minor tributaries to the Minnesota River; many of these tributaries are intermittent in nature and may not support significant fish populations. However, spawning may occur in portions of intermittent streams that are seasonally wet in spring. Construction of TH 14 on new alignment could impact bird nesting areas and other wildlife resources. Additional evaluation of fish and wildlife in the project area will be required as part of environmental documentation for TH 14 improvements, including coordination with the Minnesota Department of Natural Resources.

Floodplain Impacts

Presidential Executive Order 11988 (Floodplain Management) and Minnesota Statute 103F.101-103F.155 (the Floodplain Management law) were established to minimize the adverse impacts associated with the occupancy and modification of floodplains, and to preserve the natural and beneficial values provided by floodplains. Federal Emergency Management Administration (FEMA) maps were reviewed to identify floodplain areas. The majority of the project area lies outside the 100-year floodplain limits, with the exception of the westernmost two miles of the existing TH 14 corridor. These two miles lie immediately adjacent to the 100-year floodplain associated with the Minnesota River. A floodplain area associated with the Swan Lake Outlet is present roughly one mile south of the City of Nicollet. During future environmental documentation stages of the TH 14 project, floodplain impacts for each alternative will be quantified and evaluated. **Figure 3.3-5** identifies 100-year floodplain areas.

May 2003

Prime Farmland and Statewide Important Soils

- A high percentage of the land in Nicollet County is prime farmland.

- County policies limit the conversion of farmland to non-agricultural uses; farmland generally must be annexed by a city for commercial or residential development.

Limit of Environmental Review

Limit of Environmental Review

Nicollet County

Brown County

Blue Earth County

New Ulm

Courtland

Nicollet

North Mankato

Mankato

SWAN LAKE

MIDDLE LAKE

MIDDLE LAKE

MINNESOTA RIVER

Legend

- U.S. and Minnesota Highways
- County State Aid Highways
- County, Township, and Local Roads
- Railroads
- Streams
- Lakes
- State Parks
- Counties
- Municipalities
- Prime Farmland
- Statewide Important Soils

N

0 1 2 3 4 5 Miles

Sources: Minnesota Department of Transportation
Natural Resources Conservation Service

Moving Minnesota

14 West Interregional Corridor:
North Mankato to New Ulm

Figure 3.3-4
Prime Farmland and Statewide Important Soils

May 2003

Floodplains

- Floodplain areas msut be identified and avoided where possible to preserve the storage capacity of such areas. Where impacts to floodplains cannot be avoided, mitigation efforts may be required to minimize or eliminate potential increases in flooding or flood damage.

- Floodplains are an issue in the extreme western portion of the corridor near New Ulm.

Nicollet County

Brown County

Blue Earth County

New Ulm

Courtland

Nicollet

North Mankato

Mankato

SWAN LAKE

MIDDLE LAKE

MIDDLE LAKE

MINNESOTA RIVER

Legend

- U.S. and Minnesota Highways
- County State Aid Highways
- County, Township, and Local Roads
- Railroads
- Streams
- Lakes
- State Parks
- Counties
- Municipalities
- 100-Year Floodplain

N

0 1 2 3 4 5 Miles

Sources: Minnesota Department of Transportation
Federal Emergency Management Agency

Moving Minnesota

14 West Interregional Corridor:
North Mankato to New Ulm

Figure 3.3-5
Floodplains

Groundwater, Geology, and Earthborn Vibrations

Groundwater impacts may include the abandonment and replacement of water supply wells for properties that are acquired for TH 14 improvements and the need for significant dewatering of shallow groundwater during construction activities. Water supply well impacts will be evaluated when right of way requirements for improvement alternatives are available. No significant dewatering should be required in the corridor area based on likely excavation depths for TH 14 improvements.

Geology concerns include shallow bedrock, rock cuts, and sinkholes. The project area is not in a geologic setting characterized by sinkholes. Shallow bedrock is present along the Minnesota River bluffs and in tributary ravines. Rock excavation could be necessary to evaluate alternatives in these areas.

Blasting, pile driving, and heavy construction activities such as compaction or pavement/concrete removal may cause earthborn vibrations. The potential for such impacts to buildings in the project area will be assessed in the future environmental document.

Handicapped Design

Designs that are sensitive to the needs of handicapped persons provide easily negotiable street/sidewalk transitions. Any sections of TH 14 that will be improved using urban roadway design (i.e. curb and gutter) will be designed in accordance with applicable provisions of the Americans with Disabilities Act (ADA) of 1990.

Historical, Archaeological and Cultural Impacts

Under Section 4(f), transportation projects that use land of an historic site of national, state, or local significance can only be approved if there is no feasible and prudent alternative to such use and the project includes all possible planning to minimize harm. It is important to note that an historic site does not need to be publicly owned for Section 4(f) to apply. Under Section 106 of the National Historic Preservation Act, transportation project impacts on historic resources (including archaeological and historic sites) must be evaluated and the responsible governmental unit must coordinate with the State Historic Preservation Office (SHPO).

The Mn/DOT Cultural Resource Unit was contacted regarding Mn/Model information on the TH 14 corridor (Mn/Model is an archaeological predictive model).

Mn/DOT staff provided a printout of the Mn/Model output for the TH 14 corridor. In general, the existing TH 14 corridor has relatively few known cultural resource constraints. There are some historic structures located on TH 14 at the west end of the corridor and in the City of Courtland. The historic structures identified in the City of Nicollet are concentrated around TH 99 and not adjacent to TH 14. Future environmental documentation of the TH 14

corridor will include a Phase I Cultural Resource Survey to assess historic structures and potential archaeological resources.

Land Use Impacts

A common concern with transportation improvement projects is the potential for new or improved highways to enable large-scale development in areas that were previously undeveloped. For TH 14, this concern is mitigated by city and county development policies, as described in Section 3.2 Land Use.

A specific land use concern is the presence of cemeteries. Cemeteries pose unique problems for transportation projects. Acquisition and relocation issues associated with cemeteries usually result in such sites being avoided. In addition, the age of each cemetery and the number of persons interred at each cemetery can add cultural resource (Section 106) concerns to an already complex issue.

A preliminary review of the corridor for cemeteries was conducted. USGS topographic maps were reviewed to identify the locations of cemeteries within the TH 14 environmental overview area. A total of ten cemeteries were identified that could be impacted by relocation of TH 14. Additional cemeteries were noted north of Swan Lake, just west of TH 169, and south of the Minnesota River; TH 14 improvements would not impact these cemeteries. **Figure 3.3-6** identifies cemetery locations.

Noise

Proposed TH 14 improvement alternatives that are on a new location or increase the number of through lanes may require noise analyses, especially in the cities of Courtland and Nicollet. If necessary, such analyses will be conducted during the future environmental documentation of TH 14 alternatives.

Parks, Recreation Areas, Wildlife and Waterfowl Refuges [Section 4(f) and 6(f)]

Under 49 U.S.C. Section 303 [Section 4(f)], transportation projects that use publicly owned land of a public park, recreation area, or wildlife/ waterfowl refuges can only be approved if there is no feasible and prudent alternative to such use and the project includes all possible planning to minimize harm. Under 16 U.S.C. 4602-8(f)(3) [Section 6(f)], transportation projects that impact outdoor recreational land planned, developed or improved with funds provided by the Land and Water Conservation Fund Act of 1965 (LAWCON) must provide replacement land of at least equal fair market value and reasonably equivalent usefulness. To assist in the development and evaluation of corridor management plan alternatives for TH 14, a review of publicly owned park and recreation facilities, as well as wildlife areas, was conducted.

May 2003

Cemeteries

Cemeteries are almost always avoided during any transportation improvement project. While it is technically possible to acquire part or all of a cemetery, the requirments for notifying and obtaining approval from next of kin make acquisition of cemetery property a practical impossibility.

Nicollet County

Brown County

Blue Earth County

New Ulm

Courtland

Nicollet

North Mankato

Mankato

MINNESOTA RIVER

SWAN LAKE

MIDDLE LAKE

MIDDLE LAKE

Legend

- U.S. and Minnesota Highways
- County State Aid Highways
- County, Township, and Local Roads
- Railroads
- Streams
- Lakes
- State Parks
- Counties
- Municipalities
- Cemeteries

N

0 1 2 3 4 5 Miles

Sources: Minnesota Department of Transportation
USGS 7.5 Minute Quadrangle Mapping

14 West Interregional Corridor:
North Mankato to New Ulm

Figure 3.3-6
Cemeteries

The Mn/DOT "State of Minnesota Base Map '99", United States Geological Survey (USGS) Topographic Maps, Minnesota Department of Natural Resources (MnDNR) data, and city comprehensive plans were reviewed to identify parks and wildlife areas within the preliminary environmental overview area. The following resources were identified:

- City of Courtland:
  - Baseball field
  - Playground/picnic Area
  - Tennis court
- City of Nicollet:
  - Athletic field
  - Baseball field
- Nicollet County:
  - Swan Lake Wildlife Management Area

Other recreational resources were identified, but based on their location, would not likely be impacted by TH 14 improvements. These include DNR public landings at Courtland and south of Nicollet, the Little Lake Wildlife Management Area (WMA), and the Fritsche Creek WMA. **Figure 3.3-7** identifies parks, WMAs, and other recreational resources.

Right-of-Way and Relocation Impacts

Improvements to the existing alignment could require the acquisition of permanent right-of-way and temporary easements, while reconstruction of TH 14 on a new alignment would require significant right-of-way acquisition. All persons and businesses impacted by right-of-way acquisition are entitled to fair and equitable treatment in regard to the purchase of their property and the assistance provided for relocation; this is guaranteed under the "Uniform Relocation Assistance and Real Property Acquisition Policies Act" of 1970 as amended. During the future environmental documentation, each of the alternatives will be reviewed to determine the number of properties that will be impacted by right-of-way acquisition, the approximate acres of right-of-way required (both permanent and temporary), and the number of residential and business relocations required.

Social and Economic Impacts

In general, improvements to the existing TH 14 would have temporary negative impacts to the communities and local businesses during construction as traffic is detoured around construction zones. The long-term impacts of an improved TH 14 on the existing alignment may be positive for the cities of Courtland and Nicollet as the new highway would be a safer facility for pedestrian and vehicular traffic. Permanent economic impacts could result from the relocation of TH 14 to a new alignment, these impacts would likely be limited to convenience business that might need to relocate closer to the new highway to maintain an acceptable level of business.

May 2003

Parks and Wildlife Management Areas

- Parks and wildlife refuges need to be considered for possible 4(f) impacts any time a transportation project acquires or otherwise impacts such properties. If impacts will occur as a result of a transportation improvement project, mitigation will almost certainly be required.

- The wildlife management areas near the project corridor and the park facilities in the cities of Courtland and Nicollet will require further evaluation during future project stages.

Nicollet County

Brown County

Earth County

New Ulm

Courtland

Nicollet

North Mankato

Mankato

SWAN LAKE

MIDDLE LAKE

MIDDLE LAKE

MINNESOTA RIVER

Legend

- U.S. and Minnesota Highways
- County State Aid Highways
- County, Township, and Local Roads
- Railroads
- Streams
- Lakes
- Counties
- Municipalities
- State Parks
- Local or Regional Park
- Fritsche Creek Wildlife Management Area
- Little Lake Wildlife Management Area
- Swan Lake Wildlife Management Area
- Other Public Recreation Facility

N

0 1 2 3 4 5 Miles

Sources: Minnesota Department of Transportation Base Map Data
Minnesota Department of Natural Resources
City of Courtland 1999 Comprehensive Plan
City of Nicollet 1986 Land Use Plan
United States Geological Survey 7.5 Minute Quadrangle Maps

14 West Interregional Corridor:
North Mankato to New Ulm

Figure 3.3-7
Parks and Wildlife Management Areas

Community facilities in the project area include schools, and a community center in the City of Courtland. The Courtland Community Center would not likely be impacted by TH 14 improvements. The impact of TH 14 reconstruction or relocation of schools is of greater concern. Transportation impacts to school facilities can require Section 4(f) evaluation, which are often controversial. Additionally, pedestrian and bicycle traffic is often an issue of concern when transportation improvements are close to school facilities. Schools are often considered sensitive noise receptors, and are often subject to tighter regulations regarding air quality. Information regarding the location of school facilities within the TH 14 environmental overview area was obtained from Land Management Information Center (LMIC) geographic information system (GIS) data. A total of two public and three private schools were identified on or near the TH 14 corridor. These schools include:

- Public
  - Nicollet Elementary
  - Nicollet Secondary
- Private
  - Immanuel Lutheran
  - Minnesota Valley Lutheran
  - Trinity Lutheran

Several schools identified within the cities of Mankato, North Mankato, and New Ulm; would not likely be impacted by changes within the TH 14 corridor limits. **Figure 3.3-8** identifies school locations in the project area.

Stream or Water Body Modification

The TH 14 corridor crosses several drainage ways. Improvements to the existing corridor will require modifications to these crossings; construction of TH 14 on new alignment will require several new crossings. Coordination with MnDNR, MPCA, and the U.S. Army Corps of Engineers (COE) will be required during the environmental review process.

Permits may be required from the MnDNR for Protected Water impacts, and from the COE for wetland impacts (see Wetland Impacts discussion).

Threatened and Endangered Species

Fish and wildlife resources are subject to the Fish & Wildlife Coordination Act (16 U.S.C. 661-666), the Federal Migratory Bird Treaty Act (50 CFR 113 and 50 CFR 21), the Federal Endangered Species Act of 1973 as amended (16 USC 1531-1543) and Minnesota Statute 84.0895. The MnDNR Natural Heritage Information System (NHIS) database was reviewed to identify significant natural communities and rare species resources within the TH 14 environmental overview area. **Figure 3.3-9** depicts noted occurrences of rare species (point data in red). Specific species observations cover a wide variety of plants and animals, including various species of insects, mussels, fish, reptiles, and birds.

May 2003

Schools

- Schools need to be considered during any transportation study. Proposed improvements can alter traffic patterns, affect the safety of children walking to school, and alter school bus routes. The use of public school land can also trigger additional environmental review requirements.

- 3 private schools and 1 public school were identified along the corridor; several schools are present in New Ulm and Mankato.

Nicollet County

Brown County

New Ulm

Courtland

Nicollet

North Mankato

SWAN LAKE

MIDDLE LAKE

MIDDLE LAKE

MINNESOTA RIVER

Earth

unty

Mankato

Legend

- U.S. and Minnesota Highways
- County State Aid Highways
- County, Township, and Local Roads
- Railroads
- Streams
- Lakes
- State Parks
- Counties
- Municipalities
- Public Schools
- Private Schools

N

0 1 2 3 4 5 Miles

Sources: Minnesota Department of Transportation Base Map Data
Minnesota Department of Children, Families, and Learning
Minnesota Planning Land Management Information Center

14 West Interregional Corridor:
North Mankato to New Ulm

Figure 3.3-8
Schools

May 2003

Data included here were provided by the Natural Heritage and Nongame Research Program of the Division of Ecological Services, Minnesota Department of Natural Resources (DNR), and were current as of January 2002. These data are not based on an exhaustive inventory of the state. The lack of data for any geographic area shall not be construed to mean that no significant features are present. In addition, there may be inaccuracies in the data, of which the DNR is not aware and shall not be held responsible for. Permission to use these data does not imply endorsement or approval by the DNR of any interpretations of products derived from the data.

Rare Natural Features

- Minnesota Department of Natural Resources data indicate that several rare natural features are located in the project area, including several plant and animal species that are on the state threatened and endangered lists.

- The majority of these species have been observed in or near the Minnesota River valley.

Nicollet County

Brown County

Blue Earth County

New Ulm

Courtland

Nicollet

North Mankato

Mankato

MINNESOTA RIVER

SWAN LAKE

MIDDLE LAKE

MIDDLE LAKE

Legend

- U.S. and Minnesota Highways
- County State Aid Highways
- County, Township, and Local Roads
- Railroads
- Streams
- Lakes
- State Parks
- Counties
- Municipalities
- Observed Rare Natural Features
- Significant Prairie Communities on Railroad Right of Way

N

0 1 2 3 4 5 Miles

Sources: Minnesota Department of Transportation Base Map Data
Minnesota Department of Natural Resources

Moving Minnesota

14 West Interregional Corridor:
North Mankato to New Ulm

Figure 3.3-9
Rare Natural Features

The biological survey of Nicollet County had not been completed as of the date of this report, therefore limited information was available regarding specific natural community areas. In general, the river bluff areas on the Nicollet County side of the Minnesota River are of moderate biodiversity significance, which is defined as "sites containing significant occurrences of rare species, and/or moderately disturbed native plant communities and landscapes that have a strong potential for recovery." The Swan Lake WMA is listed as having high biodiversity significance, which is defined as "sites with very good quality occurrences of the rarest species, high quality examples of the rarest native plant communities, and/or important functional landscapes."

The databases reviewed do not constitute a complete inventory of significant natural resources within the project area. The TH 14 corridor improvement project will require coordination with the MnDNR and the USFWS at a minimum, and will likely require detailed biological/ecological assessments.

Vegetation

The Mn/DOT HPDP indicates "impacts to vegetation can significantly affect soil erosion, water quality, rare/endangered species, wildlife and visual quality during and following highway construction. To preserve vegetation resources, impacts shall be kept to a minimum and impacted areas shall be restored." During the future environmental documentation of TH 14 improvement project, vegetation impacts will be analyzed with a focus on native plant communities. Revegetation requirements will be established in the mitigation section of the future environmental document.

Visual Impacts

The western portion of the TH 14 corridor has significant scenic qualities where travelers and adjacent residents overlook the Minnesota River Valley. Reconstruction or relocation of TH 14 must consider impacts to the visual experience provided to travelers and neighbors of the roadway. A visual impact assessment will be conducted during the environmental documentation of the TH 14 project. This process will qualitatively assess the scenic resources of the corridor and who would be impacted by changes to the corridor.

Water Quality Impacts

Highway improvement projects must consider the impact that runoff will have on the quality of wetlands, lakes, streams and rivers once construction is complete. Increases in impervious surfaces and changes to water body crossings can impact water quality and should be assessed. However, the rural nature of the corridor may provide ample water quality mitigation since the grassy ditches associated with typical rural highway sections remove the majority of pollutants in highway runoff.

Wetland Impacts

Wetlands are subject to a wide variety of regulations, including President's Executive Order 11990, Section 404 of the Clean Water Act (33 U.S.C. 1344), the Governor's Executive Order 91-3 (no net loss of wetlands), the Wetland Conservation Action (Minnesota Statute 103G.222-2373 amended 1996 and Minnesota Rules Chapter 8420), and Minnesota Water Quality Rules (Minnesota Rules Chapter 7050). Any transportation project that impacts wetlands must mitigate such impacts through wetland restoration or the creation of replacement wetlands; this is accomplished through on-site or off-site mitigation, or through the use of wetland credits from other mitigation projects. National Wetland Inventory (NWI) information was obtained for the project corridor. Wetlands were identified throughout the environmental overview area.

In addition, the MnDNR has designated certain waters of the state as Public Waters (also referred to as Public Waters and/or Public Waters Wetlands) under Minnesota Statute 103G and Minnesota Rules Chapter 6115. Most lakes and rivers and many wetlands and drainage ways are classified as Public Waters. Minnesota Rules Chapter 6115.0190, subpart 3, paragraph F places strong restrictions on the filling of Public Waters to facilitate transportation projects. A permit must be obtained from the MnDNR to allow work in Public Waters. **Figure 3.3-10** provides the results of the NWI review and identifies Public Water resources.

Wild and Scenic Rivers

No state or federally designated Wild and Scenic Rivers have been identified in the project area.

May 2003

Wetlands and Public Waters

- The highest concentration of wetlands and protected waters is found north of the corridor. However, there are several wetlands and public water-courses south of the corridor between Courtland and Nicollet.

Nicollet County

Brown County

Blue Earth County

New Ulm

Courtland

Nicollet

North Mankato

Mankato

SWAN LAKE

MIDDLE LAKE

MIDDLE LAKE

MINNESOTA RIVER

Legend

- U.S. and Minnesota Highways
- County State Aid Highways
- County, Township, and Local Roads
- Railroads
- Streams
- Lakes
- State Parks
- Counties
- Municipalities
- Public Waters (Lakes and Wetlands)
- Public Waters (Rivers and Streams)
- Wetlands (National Wetland Inventory)

N

0 1 2 3 4 5 Miles

Sources: Minnesota Department of Transportation
Minnesota Department of Natural Resources
United States Fish and Wildlife Service

Moving Minnesota

14 West Interregional Corridor:
North Mankato to New Ulm

Figure 3.3-10
Wetlands and Public Waters

3.4 CORRIDOR TRAFFIC CHARACTERISTICS

3.4.1 Existing and Historic Traffic Volumes

One of the key factors in determining the quality of traffic operations on any roadway is the volume of traffic. Documenting traffic volumes (i.e. the number of vehicles using the roadway) is typically expressed in two methods:

> ***Annual Average Daily Traffic (AADT)****:* The number of vehicles using a specific segment of roadway during a typical 24-hour period. The volume is adjusted to account for seasonal variations throughout the year and typically represents weekday (Tuesday-Wednesday-Thursday) conditions.
>
> ***Peak Hour Turning Movements****:* The number of vehicles passing through a specific intersection during the highest volume 60-continuous minutes of traffic. The data reflects vehicles turning left, right, and going through at each intersection. In most cases, the peak one hour of traffic occurs in the afternoon around 4:00 or 5:00 PM.

Passenger Average Daily Traffic (ADT)

The historical Annual Average Daily Traffic (AADT) on TH 14 is shown on **Table 3.4-1**. (Segments are shown on **Figure 3.1-3**.) Over the past twenty years, daily traffic volumes on TH 14 have increased approximately two percent per year.

Intersection Turning Movements

In order to determine the existing quality of traffic operations throughout the corridor, a representative sample of typical intersections was selected for analysis. PM peak hour turning movements were collected at these intersections on a Tuesday in April 2002 to reflect average weekday traffic conditions. In general the PM peak hour occurred between 4:00 and 6:00 PM. The intersection PM peak hour turning movements are documented in **Table 3.4-2**

3.4.2 Heavy Commercial Average Daily Traffic (HCADT)

A key factor in determining the quality of traffic operations on roadway segments is the percentage of the vehicle flow that is defined as "Heavy Commercial" or HCADT. Heavy commercial vehicles refer to a wide assortment of vehicle combinations, which include semi-trucks with trailers, cement trucks, or other similar vehicle classifications. The flow of heavy commercial vehicles can be expressed in terms of raw frequency or by percentage of total vehicle flow. For use in operations analyses, the percentage of heavy commercial vehicles is most commonly used.

Table 3.4-1
Historical and Existing Average Annual Daily Traffic (AADT)

Year	Segment AADT							
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**
1980	2700	3100	3100	3600	2900	2100	3350	3350
1982	2500	3200	3200	3750	2900	1900	3200	3200
1984	2900	3650	3650	3900	3300	2350	3900	3900
1986	2950	3600	3600	4400	3200	2000	3400	3400
1988	4100	4770	4770	4770	3550	2700	4350	4350
1990	4150	4800	4800	5100	4800	3600	4350	4350
1992	3550	5000	5000	5600	4700	4000	5400	5400
1994	3850	5200	5200	5100	4450	3900	5900	5900
1996	4650	6200	6200	6100	5300	4550	6500	6500
1998	5500	6600	6600	5100	5400	4400	6500	6500
2000	**5500**	**6800**	**6800**	**6500**	**5300**	**4800**	**7100**	**7100**

Source: Mn/DOT Office of Transportation Data and Analysis

On the TH 14 corridor, approximately 15 percent of the vehicle flow is comprised of heavy commercial vehicles (trucks), based on Mn/DOT Average Daily Traffic information. East of Nicollet, trucks account for approximately 13 percent of the vehicle flow. West of the junction of TH 99 in Nicollet, TH 14 vehicle traffic consists of over 16 percent trucks. Traditionally the highest make-up of trucks occurs on Interstate highways. For example, I-35 between Fairbault and Owatonna carries approximately 16 percent trucks.

Unlike I-35, TH 14, in the study area, is only a two-lane highway with limited passing opportunities. Therefore, the presence of trucks on TH 14 has a larger impact on the capacity of the roadway compared to a four-lane divided facility.

Table 3.4-2
Existing PM Peak Hour Intersection Turning Movements

Intersection of:		Location	West Approach			East Approach			North Approach			South Approach		
			Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
TH 14	TH 15	Rural	39	159	155	44	153	0	—	—	—	—	—	—
	CSAH 21		—	—	—	—	—	—	0	18	19	185	19	42
TH 14	CSAH 37	Rural	—	162	43	166	166	—	—	—	—	53	—	155
TH 14	CSAH 24	Courtland	0	255	43	18	270	1	0	0	0	29	5	13
TH 14	TH 99	Nicollet	67	163	—	—	235	1	0	—	71	—	—	—
TH 14	TH 111 / CSAH 23	Nicollet	5	152	4	12	232	96	63	40	5	4	56	10
TH 14	CSAH 6	Rural	5	241	1	48	463	1	2	2	5	0	5	32

Source: Traffic Data Inc. (April 2002)

3.4.3 Forecast Traffic Volumes

Average Daily Traffic (ADT) forecasts were developed for the TH 14 corridor using least-squares regression analysis. The primary assumption in developing traffic forecasts using regression analysis is that the growth (or decline) in traffic volumes observed in the past twenty years will continue over the same amount of time in the future. Also, regression analysis is typically used by Mn/DOT to develop ADT forecasts on state highways. This is particularly true for highway corridors in rural areas. For this project, the TH 14 corridor consists mainly of the rural area between the urban areas of Mankato and New Ulm. As a result, Mn/DOT's least squares regression analysis worksheet template (as part of Mn/DOT's MNESALS workbook) was used along with historical ADT counts (from Mn/DOT) to develop the ADT forecasts for the TH 14 corridor.

Table 3.4-3 displays the year 2000 traffic counts and 2025 traffic forecasts for the eight highway segments in the TH 14 corridor. The table shows that, between TH 15 east of New Ulm to CSAH 6 west of Mankato, the 2000 ADT ranges from 4,800 to 7,100 vehicles per day (vpd). The percent of vehicles that are heavy commercial vehicles ranges from 10 to 15 percent.

By 2025, the ADT in the TH 14 corridor is forecast to range from 9,000 vpd to 12,800 vpd. This means daily traffic volumes are expected to increase by 60 to 80 percent over year 2000 volumes. The forecasted volume translates into an increase of over 2 percent per year, on average. Assuming the percentage of heavy commercial vehicles will remain the same in the future, the number of heavy commercial vehicles is forecast to approach 1,400 vpd by 2025. **Figure 3.4-1** displays the 2000 and 2025 forecast ADT for each segment.

Table 3.4-3
Year 2025 Average Daily Traffic (ADT) Forecasts for the TH 14 Corridor

Segment Number	From	To	2000 ADT[1]	2000 Heavy Commercial ADT[1]	2000 Heavy Commercial ADT %	2025 ADT Forecast (cars and trucks combined)		2025 Heavy Commercial ADT Forecast[3]
						Forecast[2]	Annualized Growth Rate	
1	TH 15/CSAH 21 East of New Ulm	CSAH 37 East of New Ulm	5,500	730	13%	9,700	2.3%	1,260
2	CSAH 37 East of New Ulm	Zieske Road West of Courtland	6,800	730	11%	12,300	2.4%	1,350
3	Zieske Road West of Courtland	CSAH 12 in Courtland	6,800	730	11%	12,300	2.4%	1,350
4	CSAH 12 in Courtland	CSAH 25 East of Courtland	6,500	730	11%	10,400	1.9%	1,140
5	CSAH 25 East of Courtland	TH 99 in Nicollet	5,300	740	14%	9,400	2.3%	1,310
6	TH 99 in Nicollet	TH 111/CSAH 23 in Nicollet	4,800	730	15%	9,000	2.6%	1,350
7	TH 111/CSAH 23 in Nicollet	CSAH 72 East of Nicollet	7,100	730	10%	12,800	2.4%	1,280
8	CSAH 72 East of Nicollet	CSAH 6 West of Mankato	7,100	730	10%	12,800	2.4%	1,280

[1]Year 2000 Mn/DOT traffic flow maps

[2]2025 ADT forecasts were calculated using least squares regression analysis worksheet found in Mn/DOT MNESALS workbook. The resulting coefficient of determination (R^2) was 0.85 or higher for all segments even without removing any outlying traffic counts. Historic traffic count data collected after 1986 were adjusted using an axle correction factor of 0.87. The correction factor of 0.87 was determined using historic vehicle class counts in the corridor.

[3]Heavy commercial ADT forecasts were developed assuming the heavy commercial ADT % is the same in 2025 as it is today.

May 2003

Average Daily Traffic (ADT)

- Current average daily traffic volumes along the corridor range from 4,800 vehicles per day in Nicollet to 7,100 vehicles per day near CSAH 6.
- Future traffic is expected to increase at an average traffic growth rate of slightly over 2% per year.
- Forecast traffic is a key component in determining the appropriate improvements for Highway 14.

Segment 1
5,500
9,700

Segment 2
6,800
12,300

Segment 3
6,800
12,300

Segment 4
6,500
10,400

Segment 5
5,300
9,400

Segment 6
4,800
9,000

Segment 7
7,100
12,800

Segment 8
7,100
12,800

New Ulm
Courtland
Nicollet
Brown County
Blue Earth
Saint Pe
SWAN LAKE
MIDDLE LAKE
MINNESOTA RIVER
T 150
T 166
T 169
T 179

Legend

- U.S. and Minnesota Highways
- County State Aid Highways
- County, Township, and Local Roads
- Railroads
- Streams
- Lakes
- State Parks
- Counties
- Municipalities

2000 ADT Counts
2025 Forecast ADT Counts

N

0 1 2 3 4 5 Miles

Source: Minnesota Department of Transportation

14 West Interregional Corridor:
North Mankato to New Ulm

Figure 3.4-1
Existing and Future Average Daily Traffic

3.4.4 Origin-Destination Study

An origin-destination study was conducted to understand travel patterns in the 14 West IRC study area and how those patterns influence the need for, and location of, a bypass. Origin-destination studies provide data on vehicle origins and destinations within a study area. The surveys can be conducted a number of different ways, ranging from stopping drivers along key roadways to ask them about their travel patterns to recording license plates of vehicles at select roadway locations and matching them against license plate data collected at other roadway locations. The method selected for the 14 West IRC study was to conduct a license plate match survey, collecting license plate data at select locations and looking for plate matches to determine trip patterns. This type of survey is considered to be the safest for the surveyor and driver and also the least intrusive to the driver.

A total of seven origin-destination survey stations were selected on TH 14 and adjacent major roadways leading into and out of New Ulm, as shown on **Figure 3.4-2.** The station locations were selected to determine the following:

- What percent of vehicles are traveling through New Ulm versus starting or stopping their trip in New Ulm?
- What percent of vehicles are traveling through the study area on TH 14 versus stopping or starting their trip within the study area?
- What percent of vehicles leave the study area during the morning commute towards Mankato and then return the same way during the evening commute?
- What does the distribution of through trips on TH 14 and TH 15 look like through New Ulm?

License Plate Data Collection

High-resolution video cameras were used to record license plates of vehicles passing by each of the stations on Wednesday, August 14, 2002, from 7:00 AM to 7:00 PM. Wednesday was selected to best reflect typical weekday conditions. The time period of 7:00 AM to 7:00 PM was selected because it maximizes the daylight conditions needed to record the license plates. An examination of the traffic count data collected indicated that about 75 to 80 percent of the daily traffic travels through the study area between 7:00 AM and 7:00 PM**.**

A total of 25,694 license plate records were collected on August 14, 2002, from 7:00 AM to 7:00 PM. This total represents over 88 percent of the total vehicles recorded on tape passing by each station. It is common for 10 to 15 percent of vehicles on the road to have license plates that are missing, covered up, or unreadable. Therefore a total read rate of 88 percent for license plates is considered to be at or above expectations. **Appendix B** contains a full report of the origin-destination study including a detailed comparison of the plates read to the traffic counts obtained from the video and the traffic counts obtained from tube count collectors. The report describes the data collection results, adjustments based on the read rates, and license plate matches in more detail. **Figure 3.4-3** displays the read rate

May 2003

Origin-Destination Study: Station Locations

- An Origin-Destination Study was conducted to understand and evaluate travel patterns relative to the need for community bypasses.

- Seven survey stations were selected on TH 14 and on major roadways leading into and out of New Ulm.

- The stations were selected to determine the travel patterns of vehicles traveling on TH 14 and other major roadways in the area.

Brown County

New Ulm

Courtland

Nicollet

MINNESOTA RIVER

LAKE

Legend

- U.S. and Minnesota Highways
- County State Aid Highways
- County, Township, and Local Roads
- Railroads
- Streams
- Lakes
- State Parks
- Counties
- Municipalities
- O-D Study Count Locations

N

0 1 2 3 4 5 Miles

Source: Minnesota Department of Transportation and Howard R. Green Company

14 West Interregional Corridor:
North Mankato to New Ulm

Figure 3.4-2
Origin-Destination Study: Station Locations

May 2003

Origin-Destination Study: Data Collection

- Video cameras were used to record the license plates of vehicles passing by each station

- Vehicle plates were video taped on August 14, 2002 from 7:00 AM to 7:00 PM.

- A total of 25,694 license plate records were collected, representing more than 88% of the 29,007 vehicle movements passing the survey sites.

1431
1546
93%

3225
3565
90%

3556
4030
88%

5453
6588
83%

4167
4724
88%

1566
1742
90%

5337
5724
93%

Nicollet County

New Ulm

Courtland

Nicollet

SWAN LAKE

MIDDLE LAKE

MINNESOTA RIVER

Legend

- U.S. and Minnesota Highways
- County State Aid Highways
- County, Township, and Local Roads
- Railroads
- Streams
- Lakes
- State Parks
- Counties
- Municipalities
- O-D Study Count Locations
- XXX Total Number of License Plates Collected
- *XXX* Total Number of Vehicles Observed
- XX % Percent of Total

N

0 1 2 3 4 5 Miles

Source: Transfomation Systems, Inc. (Transfo).

14 West Interregional Corridor:
North Mankato to New Ulm

Figure 3.4-3
Origin-Destination Study: Data Collection

percentages for each station. The figure shows that Station 4 on County Highway 29 and Station 7 on TH 14 have the highest read rates at 93 percent. Station 6 on TH 14 has the lowest read rate at 83 percent.

Travel Time Information

In order to determine the number of vehicles in the study area that are traveling through versus stopping or starting a trip in the study area, matches of license plates observed between stations were compiled. To be considered a through trip between stations, vehicles had to be observed at both stations within a pre-determined amount of time. Travel time data between stations was collected during the day the survey was conducted. **Table 3.4-4** displays the recorded travel times along with the maximum time limits allowed to occur between stations in order to be counted as a through trip. As indicated in the table, the maximum travel time limits are 6 to 13 minutes longer than the actual travel times recorded during the day of the survey. The extra time allows for things like brief stops at gas stations and convenience stores but would consider stops of more than a few minutes to be a local trip with a start or end point within the study area.

Local Versus Through Trips in New Ulm

Stations 1-6 form a boundary, or cordon line, around the City of New Ulm. Vehicles entering or exiting New Ulm at Stations 1-6 were tracked to determine what percent have an origin or destination in New Ulm (local trips) versus what percent are passing through New Ulm (through trips). A review of the vehicle types at all six stations revealed that 92 percent of the vehicles entering and exiting New Ulm were passenger vehicles (cars, SUV's, and pickup trucks) and the remaining 8 percent were heavy commercial vehicles (semis, dump trucks, buses, etc.). After examining all of the passenger vehicles entering and exiting New Ulm, about 80 percent were found to have started or stopped in New Ulm. The remaining 20 percent were found to be traveling through New Ulm. Examining all of the heavy commercial vehicles entering and exiting New Ulm revealed that about 65 percent started and stopped in the city and the remaining 35 percent traveled through.

Figure 3.4-4 illustrates the percent of through versus local trips broken out by passenger and heavy commercial vehicles for each of the six stations surrounding New Ulm. The figure shows that Station 3, on TH 14 west of New Ulm, had the highest number of through trips for both passenger vehicles and heavy commercial vehicles. About 25 percent of the passenger vehicles exiting or entering New Ulm on TH 14 were passing through the city. In contrast, about 40 percent of heavy commercial vehicles were making this through trip. At the low end of the through trip spectrum, only about 5 percent of the vehicles entering or exiting Station 2 on County Highway 13 were traveling through New Ulm.

Table 3.4-4
Observed Travel Times Between Stations and Through Trip Time Limits

To or From Station	From or To Station	Actual Travel Time Recorded (min)[1]	Maximum Travel Time Limits for Determining Through Trips (min)
1	2	10	Less than 16
1	3	12	Less than 21
1	4	11	Less than 21
1	5	11	Less than 21
1	6	5	Less than 11
1	7	19	Less than 31
2	3	8	Less than 16
2	4	9	Less than 16
2	5	9	Less than 16
2	6	10	Less than 16
2	7	24	Less than 36
3	4	5	Less than 11
3	5	9	Less than 16
3	6	10	Less than 16
3	7	24	Less than 36
4	5	8	Less than 16
4	6	9	Less than 16
4	7	23	Less than 36
5	6	4	Less than 11
5	7	18	Less than 26
6	7	14	Less than 21

[1]Data collected by Howard R. Green Company on 8/14/02.

May 2003

Origin-Destination Study: Through Versus Local Trips in New Ulm

- Vehicles entering or exiting New Ulm (Stations 1- 6) were tracked to determine what percent have an origin or destination in New Ulm (local trips) versus what percent are passing through New Ulm (through trips).

- About 92% of the total vehicles passing by the six stations surrounding New Ulm were passenger vehicles and 8% were heavy trucks.

- About 80% of all of the passenger vehicles passing by the six stations had an origin or destination in New Ulm.

- About 65% of all of the heavy trucks passing by the six stations had an origin or destination in New Ulm.

73%	57%
27%	43%

76%	73%
24%	27%

77%	61%
23%	39%

94%	100%
6%	0%

79%	67%
21%	33%

88%	67%
12%	33%

New Ulm

Courtland

Nicollet

SWAN LAKE

MIDDLE LAKE

MIDDLE LAKE

MINNESOTA 15

MINNESOTA 68

MINNESOTA 111

MINNESOTA 99

14

Legend

- U.S. and Minnesota Highways
- County State Aid Highways
- County, Township, and Local Roads
- Railroads
- Streams
- Lakes
- State Parks
- Counties
- Municipalities
- O-D Study Count Locations
- 88% / 12% — % of Local / Through Passenger Vehicle Trips Passing By Station
- 67% / 33% — % of Local / Through Heavy Commerical (Truck) Trips Passing By Station

N

0 1 2 3 4 5 Miles

Source: Transfomation Systems, Inc. (Transfo) and Howard R. Green Company

14 West Interregional Corridor:
North Mankato to New Ulm

Figure 3.4-4
Origin-Destination Study: Through Versus Local Trips in New Ulm

More detailed information such as the distribution of through trips to and from Stations 1-6 can be found in the full report in **Appendix B.** However, it should be noted that, in the appendix, the through movements are only shown for the inbound direction of each station. This differs from the data shown here that is based on the combination of both travel directions at each station. As a result, the percentage of local versus through trips shown in the appendix may differ slightly from what is shown in **Figure 3.4-4**.

Local Versus Through Trips on TH 14

Vehicles traveling past Stations 3, 6, and 7 on TH 14 were examined to determine how many are traveling through the study area on TH 14 (through trips) and how many start or stop their trips along TH 14 (local trips). This was completed by matching the license plates of vehicles traveling between the three stations. A review of the vehicle types indicate that about 90 percent of the total vehicles on TH 14 are passenger vehicles and the remaining 10 percent are heavy commercial vehicles.

Figure 3.4-5 displays a breakdown of the local and through trips on TH 14. Only about 10 percent of the passenger vehicles observed passing by Station 3 west of New Ulm were observed traveling in the same direction by Station 7 east of Nicollet in less than 36 minutes. About 15 percent of the heavy commercial vehicles were seen making this through trip. Examining the matched license plates between Stations 3 and 6 on either side of New Ulm revealed that the through trip percentage for passenger vehicles and heavy commercial vehicles were slightly higher at about 15 percent and 20 percent, respectively.

In contrast to the through trips between Stations 3 and 7 and also 3 and 6, the through trips between Station 6 west of Courtland and Station 7 east of Nicollet are much higher. For passenger and heavy commercial vehicles, the through trip percentage is about 45 percent. This indicates that only about half of the vehicles traveling on TH 14 have an origin or destination in either Courtland or Nicollet.

Commuting Patterns

At Stations 1, 6, and 7, vehicles traveling south or eastbound towards Mankato from 7:00 AM to 9:00 AM were matched up with vehicles traveling in the opposite direction through the same station from 4:00 PM to 7:00 PM. This was completed to examine commuting patterns to Mankato from the study area. **Figure 3.4-6** displays the results of this analysis. The figure shows that almost 40 percent of the vehicles traveling towards Mankato through Station 7 on TH 14 (east of Nicollet) in the morning hours were seen traveling back through the station in the evening. For Stations 1 and 6 just east of New Ulm, the percent of vehicles making a morning commute towards the Mankato area that return in the evening is over 25 percent.

November 20, 2002

Origin-Destination Study: Through Versus Local Trips on TH 14

- Vehicles traveling on TH 14 in the study area were tracked to determine how many are traveling through the study area on TH 14 (through trips) versus stopping or starting their trip along TH 14 (local trips).

- About 90% of the total vehicles passing by the three stations on TH 14 were passenger vehicles and the remaining 10% were heavy trucks.

- The results of the O-D Study indicate:
  - * 80% or more of the trips start or stop in New Ulm.
  - * About 50% of the trips travel through Courtland and Nicollet.

Stations 3 and 6

86%	79%
14%	21%

Stations 3 and 7

89%	86%
11%	14%

Stations 6 and 7

53%	56%
47%	44%

New Ulm

Courtland

Nicollet

Legend

- U.S. and Minnesota Highways
- County State Aid Highways
- County, Township, and Local Roads
- Railroads
- Streams
- Lakes
- State Parks
- Counties
- Municipalities
- O-D Study Count Locations
- 88% / 12% — % of Local Passenger Vehicles Trips Passing By One of the Two Stations / % of Through Passenger Vehicle Trips Traveling Between the Two Stations
- 67% / 33% — % of Local Heavy Commerical (Truck) Trips Passing by One of the Two Stations / % of Through Heavy Commerical (Truck) Trips Traveling Between the Two Stations

N

0 1 2 3 4 5 Miles

Source: Transfomation Systems, Inc. (Transfo) and Howard R. Green Company

Figure 3.4-5
Origin-Destination Study: Through Versus Local Trips on TH 14

May 2003

Origin-Destination Study: Commuting Patterns

- At Stations 1, 6 and 7, vehicles traveling south or eastbound towards Mankato from 7:00 AM to 9:00 AM were compared to vehicles traveling in the opposite direction through the same station from 4:00 PM to 7:00 PM. This was done to examine commuting patterns to Mankato from the study area.

- Almost 40% of the vehicles traveling towards Mankato through Station 7 (east of Nicollet) between 7:00 AM to 9:00 AM were seen traveling back from Mankato into the study area through Station 7 between 4:00 PM to 7:00 PM.

- For Stations 1 and 6, just east of New Ulm, the percent of vehicles observed making the"return commute" described above was over 25%.

Nicollet County

Brown County

New Ulm

Courtland

Nicollet

SWAN LAKE

MIDDLE LAKE

MINNESOTA RIVER

28%

28%

38%

Legend

- U.S. and Minnesota Highways
- County State Aid Highways
- County, Township, and Local Roads
- Railroads
- Streams
- Lakes
- State Parks
- Counties
- Municipalities
- O-D Study Count Locations
- XX% % of Vehicles Traveling from Study Area Towards Mankato in the Morning (7-9 AM) that Return Through the Same Station in the Afternoon (4-7 PM)

N

0 1 2 3 4 5 Miles

Source: Transfomation Systems, Inc. (Transfo) and Howard R. Green Company

14 West Interregional Corridor:
North Mankato to New Ulm

Figure 3.4-6
Origin-Destination Study: Commuting Patterns

Distribution of Through Trips on TH 14 and TH 15 in New Ulm

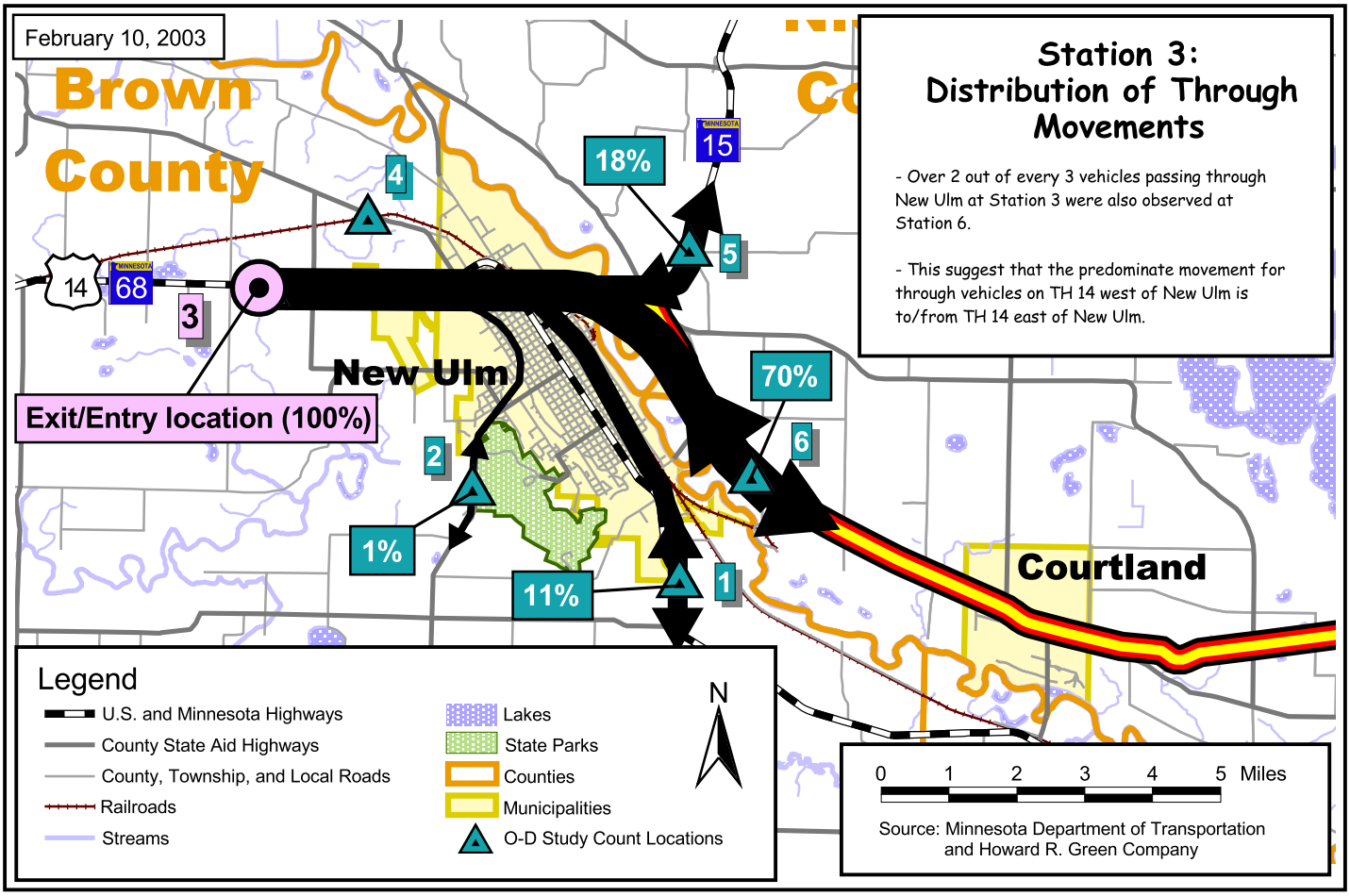
Figure 3.4-4 shows the percentage of trips on TH 14 and TH 15 in and out of New Ulm that are through trips range from 12 to 27 percent of the total for passenger vehicles and 33 to 43 percent of the total for heavy commercial vehicles. This section focuses on the distribution of these trips *through* New Ulm on the state highways.

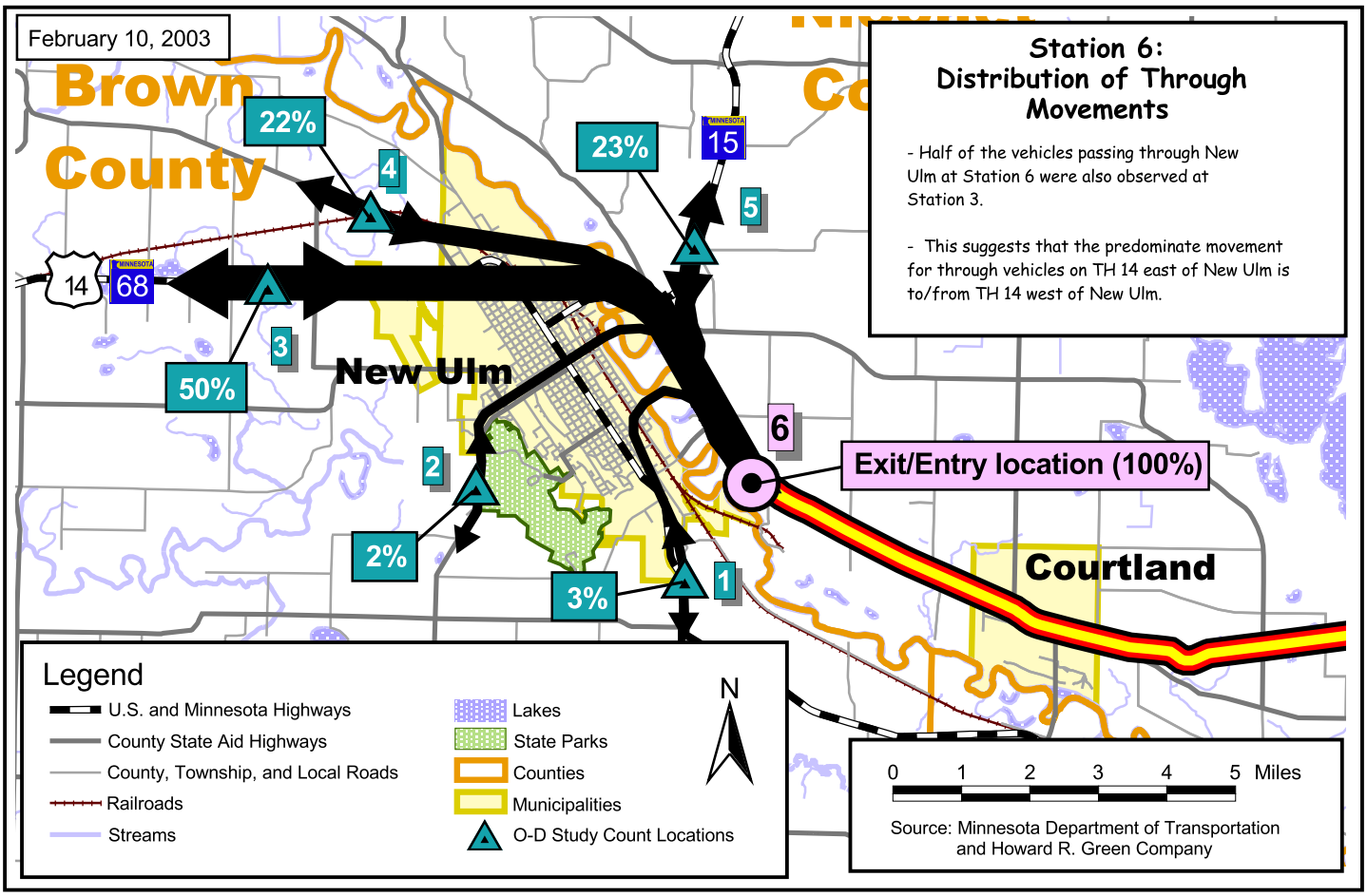
Figure 3.4-7 shows the distribution of through trips entering and exiting Station 3 on TH 14 west of New Ulm as well as Station 6 east of New Ulm. The top half of the figure shows that, of all the total vehicle trips passing by Station 3 to or from Stations 1,2,4,5, and 6, about 70 percent of the through trips are traveling to or from Station 6 on TH 14 east of New Ulm. In contrast, only 18 percent of the through trips passing by Station 3 are traveling through to or from Station 5 on TH 15 north of New Ulm. This indicates that almost 3 out of every 4 vehicles traveling through New Ulm on TH 14 east of the city came from or is going to TH 14 west of the city.

The bottom half of **Figure 3.4-7** shows the distribution of through trips entering and exiting Station 6 on TH 14 east of New Ulm. Similar to the above paragraph, the majority of the vehicles passing by Station 6 (on TH 14 east of New Ulm) that travel through New Ulm traveled to or from Station 3, which is on TH 14 west of the city. Specifically, 50 percent of the Station 6 through trips came from or went to Station 3. In contrast, only 23 percent of the through trips seen at Station 6 came from or went to Station 5 on TH 15 north of the city. The data for both distributions shown on **Figure 3.4-7** suggest the majority of through vehicles seen on TH 14 west of New Ulm are vehicles traveling to or from TH 14 east of New Ulm and vice versa.

Figure 3.4-8 shows the distribution of through trips entering and exiting Station 1 on TH 15 south of New Ulm as well as Station 5 on TH 15 north of New Ulm. The top half of the figure shows the distribution of through vehicles passing by Station 1 on TH 15 south of New Ulm. The figure shows that almost two-thirds of the through vehicles passing by this station came from or went to Station 5, which is TH 15 north of New Ulm. The remainder is spread out to the other four stations with Station 3, TH 14 west of New Ulm getting the next highest percentage of 18 percent of the total through vehicles.

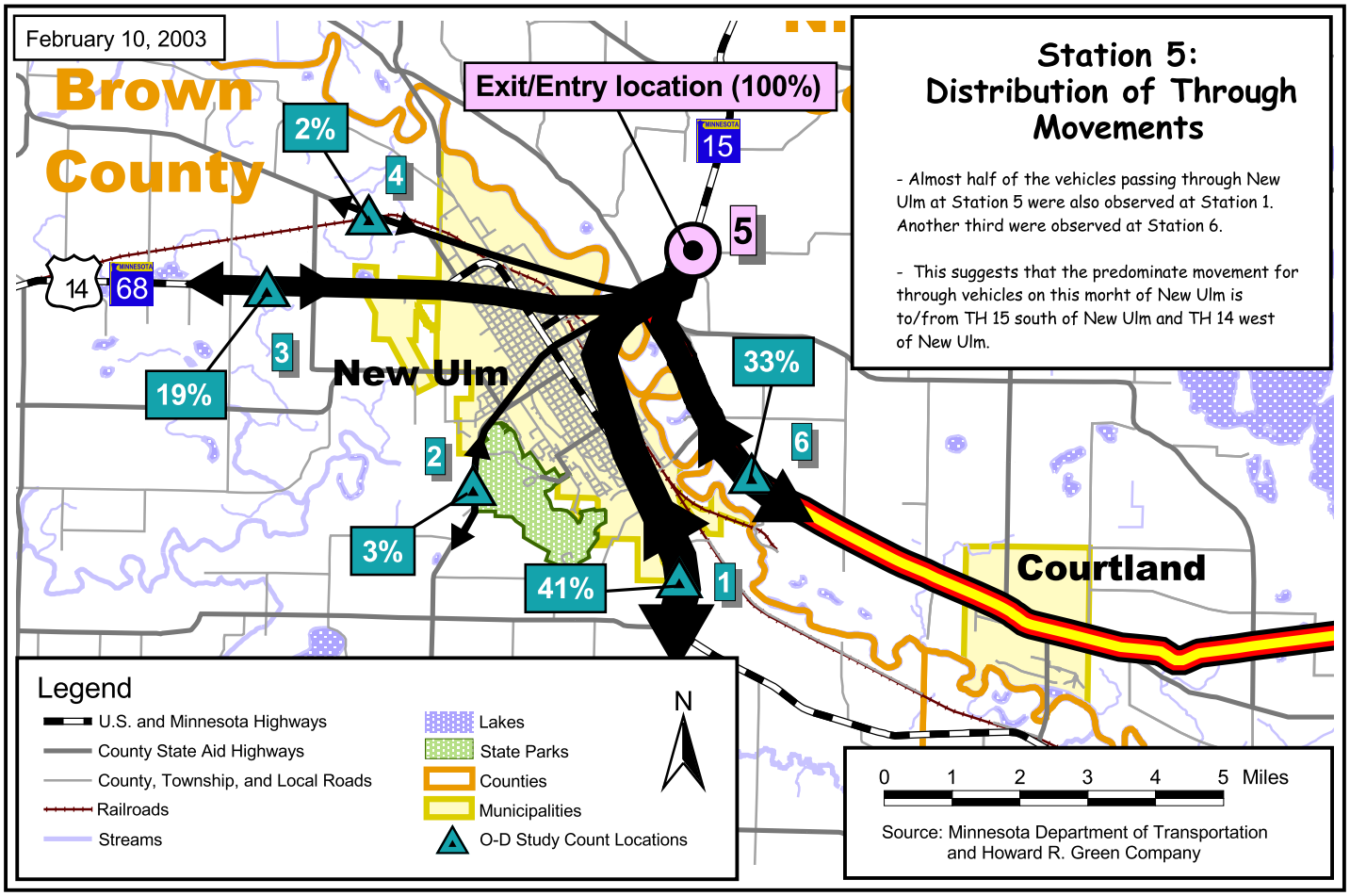
The bottom half of **Figure 3.4-8** shows the distribution of through trips entering and exiting Station 5 on TH 15 north of New Ulm. The figure shows a somewhat greater distribution of trips passing by TH 15 north of New Ulm to the other five stations. About 41 percent of the through trips passing by this station are seen at Station 1 on TH 15 south of New Ulm and 35 percent are seen at station 6 on TH 14 east of New Ulm. Also, about 20 percent of the through trips are seen at TH 14 west of New Ulm with the remaining percentage split between Stations 2 and 4 on county roads. The data for both distributions shown on **Figure 3.4-8** suggest that the largest number of through vehicles seen on TH 15 south of New Ulm are vehicles traveling to or from TH 15 north of New Ulm and vice versa.

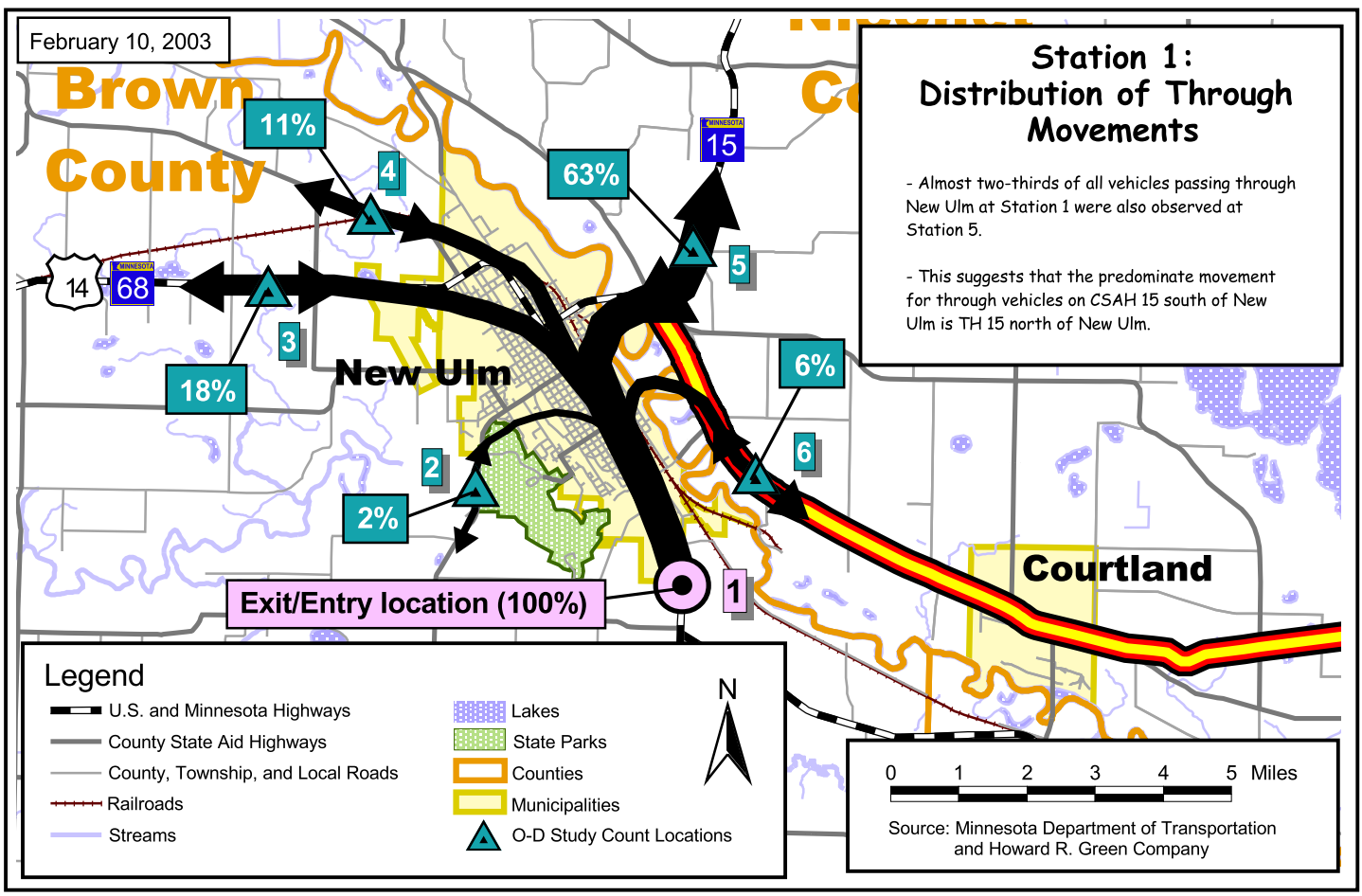




14 West IRC

Figure 3.4-7 Distribution of Through Movements to and from Station 3 and Station 6





14 West IRC

Figure 3.4-8 Distribution of Through Movements to and from Station 5 and Station 1

Use of CSAH 37 as a TH 15 Bypass of New Ulm

As shown on **Figure 3.4-8**, many of the through movements observed on TH 15 north of New Ulm were observed on TH 15 south of New Ulm and vice versa. Even though there is a strong through trip orientation on TH 15 through New Ulm, it is likely that most of the vehicles traveling through on TH 15 actually used the CSAH 37 Minnesota River crossing and TH 14 to bypass central New Ulm. The travel distance between TH 15 south (Station 1) and TH 15 north (Station 5) is approximately six miles along the signed TH 15 alignment on Broadway Street through the city. The travel distance between the same two points using CSAH 37 and TH 14 as a bypass of the central city is less than five miles. Given the higher travel speeds on TH 14, the estimated travel time to go between TH 15 south (Station 1) and TH 15 north (Station 5) is approximately seven minutes. In comparison, the estimated travel time between the same points on the existing TH 15 alignment through the city is approximately 11 minutes.

Because the CSAH 37/TH 14 route option between TH 15 north and south is shorter both in distance and travel time, it is the route a vast majority of TH 15 through travelers likely use (assuming they are familiar with traveling through New Ulm). This suggests that consideration should be given to rerouting TH 15 along the present CSAH 37/TH 14 route option. It is recommended that Mn/DOT and Nicollet County staff begin discussions on how this route conversion could be implemented over time.

Conclusions

Based on the results of the origin-destination study given above, a number of conclusions can be drawn about travel patterns and the need for a bypass(es) on TH 14. They are as follows:

- Almost 90 percent of the vehicles passing by all of the stations had their license plates recorded. The high rate of plate capture provides a high level of confidence in the survey results.
- The survey results show that about 80 percent of the vehicles entering and exiting New Ulm have an origin or destination in the city. This indicates that New Ulm is either an origin or destination point for most vehicles traveling on major roadways in the study area.
- The survey results show that only 10 to 20 percent of the vehicles traveling on TH 14 are traveling through New Ulm. This suggests that a TH 14 bypass of New Ulm may not be feasible, as most vehicles would probably not divert off of the existing alignment.
- The survey results show that approximately half of the vehicles traveling on TH 14 are traveling through Courtland *and* Nicollet combined. This suggests that a bypass(es) of these communities would likely be feasible from a travel pattern perspective.
- It would be likely that more than 50 percent of the vehicles traveling on TH 14 would use at least one of the bypasses if two separate bypasses were built. The number of vehicles using the bypass(es) would also increase over time if land development

occurred in the vicinity of the bypass and if vehicles were required to travel at least partially on the bypass(es) to get to Courtland and/or Nicollet.

- The survey results show that the majority of vehicles traveling through New Ulm on TH 14 from the western city boundary stay on TH 14 past the eastern city boundary and vice versa. In other words, continued travel on TH 14 through New Ulm is the predominant movement. This suggests a realignment of TH 14 in the western portion of the corridor would provide benefit by making TH 14 the through movement at the intersection of TH 15 and CSAH 21. This is because the vehicles traveling on TH 14 constitute the predominant intersection movement and would no longer have to stop or turn in order to continue their trip along TH 14.
- There is a strong travel orientation between TH 15 south (Station 1) and TH 15 north (Station 5). Given that the fastest and shortest travel route between these two points consists of the CSAH 37 Minnesota River crossing and TH 14, the existing TH 15 route should be moved from Broadway Avenue through the city to the CSAH 37/TH 14 route. Mn/DOT and Nicollet County should begin discussions on how this route change could be implemented.

3.4.5 Highway Access (Type and Density)

An access point is defined as any location where motor vehicles can enter and/or exit the highway driving surface, regardless of function or size of access. For example, a T-intersection with a public street counts as one access point, just as a private driveway accessing one side of the highway counts as one access point. In contrast, a four-legged intersection counts as two access points. Further classification of access points is based on the classification of movements allowed to/from the access. On divided highways without median crossovers, only right turns into the access and right turns out of the access are permitted. This is defined as a right-in/right-out access. Access points where left turns are allowed into the access, but not out of, are defined as ¾-accesses. Any other access point is considered to be a standard, or full access.

TH 14 is functionally classified as a principal arterial between TH 15 and CSAH 6, and therefore is considered to serve a primary function of mobility over access (see **Figure 3.1-1**). However, high levels of access to TH 14 do exist along select portions of the corridor. These high degrees of access are due to a variety of reasons including, but not limited to, historical access rights granted prior to the implementation of access management practices.

Using the latest available video log information from Mn/DOT, each individual access point along the TH 14 corridor was documented and categorized by growth area segment. The access count was completed using Federal Highway Administration (FHWA) standards. The access inventory for the 22-mile TH 14 corridor can be broken out as follows:

- Total number of access points: 221
- Number of signalized access points: 0
- Number of public access points: 57 (26%)
- Number of private access points: 164 (74%)
- Number of private access points which are commercial access: 16 (7% of total)

Over the entire corridor, the average access density is just above ten access points per mile. Although this density would be consistent with the Minnesota Statewide Average for rural highways (8.0 access points per mile, *Source: Mn/DOT Traffic Safety Fundamentals Handbook*), there are several urban areas along the corridor that have considerably higher access densities. The highest density of access is through the Courtland Central Business District (CBD), which has 58 access points within one mile. This density is twice as high as the Minnesota Statewide Average for developed urban areas of 28 accesses per mile (*Source: Mn/DOT Traffic Safety Fundamentals Handbook*).

Each access point was categorized into the corridor segment in which it is located in order to identify the density by segment for purposes of operational and safety comparisons. Over the 21.6 miles within the TH 14 study area, there are 136 accesses in rural areas and 85 in urban areas, as documented in **Table 3.4-5**. The average density of access in rural areas ranges from 6 access points per mile near New Ulm to nearly 10 access points per mile between CSAH 37 and Courtland. In the urban areas, the average segment access density ranges from 58 accesses per mile within Courtland to nearly 20 access points per mile in Nicollet. Access density by corridor segment is shown on **Figure 3.4-9**.

Table 3.4-5
Summary of Access Inventory by Segment

Segment	Segment Type	Segment Length (Miles)	Total Number of Access Points	Access Density
1	Rural Area	1.8	11	6
2	Rural Area	3.8	36	10
3	Urbanizing Growth Area	0.4	3	7
4	Urban Growth Area	1.2	70	58
5	Rural Area	6.5	40	6
6	Urbanizing Growth Area	0.6	1	2
7	Urban Growth Area	0.6	11	19
8	Rural Area	6.8	49	7
Total		**21.6**	**221**	**10**

Notes:
The statewide average is 8 accesses per mile in rural areas and 28 accesses per mile in urban areas.
(Source: Mn/DOT Traffic Safety Fundamentals Handbook)
Source: Mn/DOT Travel Log

May 2003

Access Density

- The level of access is an important consideration, because access density is directly correlated with safety.

- Access points are public streets and residential, farm, or commercial driveways.

- Courtland averages 58 access points per mile, above the Mn/DOT's average of 28 for developed urban areas.

- Rural segments are near Mn/DOT's average of 8 per mile for rural areas, although Segment 2 has 10 accesses per mile.

Segment 1
6 Accesses per Mile

Segment 2
10 Accesses per Mile

Segment 3
7 Accesses per Mile

Segment 4
58 Accesses per Mile

Segment 5
6 Accesses per Mile

Segment 6
2 Accesses per Mile

Segment 7
19 Accesses per Mile

Segment 8
7 Accesses per Mile

Nicollet County

Brown County

Blue Earth

New Ulm

Courtland

Nicollet

MIDDLE LAKE

SWAN LAKE

MINNESOTA RIVER

T 150

T 166

T 169

T 179

Legend

- U.S. and Minnesota Highways
- County State Aid Highways
- County, Township, and Local Roads
- Railroads
- Streams
- Lakes
- State Parks
- Counties
- Municipalities

Segment
Accesses per Mile

N

0 1 2 3 4 5 Miles

Source: Minnesota Department of Transportation

Moving Minnesota

14 West Interregional Corridor:
North Mankato to New Ulm

Figure 3.4-9
Access Density

3.4.6 Traffic Operations

The quality of traffic operations was evaluated using two key criteria: (1) travel time and (2) level-of-service (LOS). The LOS calculations were categorized into intersections and roadway segments. Both existing and forecast 2025 conditions were analyzed for both categories of each of the criteria.

Existing Peak Hour Travel Speed

One of the main performance measures developed by Mn/DOT for the IRCs is average travel speed along the corridor. Existing average travel speeds were computed after compiling a series of travel time runs collected. The field collection of existing travel times were obtained along the TH 14 corridor by the Howard R. Green Company during April 2002 using the methodology specified by Mn/DOT. The travel times were collected during the PM peak travel times in both travel directions.

The floating car methodology used to collect travel time data is based on a vehicle driving at approximately the same speed as vehicles around it. For example, if the posted speed limit is 55 mph and traffic is moving at 60 mph, the data collection vehicle would also travel 60 mph and the travel speed documented would be 60 mph. The travel speed documented is the average speed by growth area segment for both directions and not an instantaneous speed. Therefore, the average travel speed may be much less than the maximum attained speed due to delay from congestion and traffic signals.

The existing peak hour travel speeds are documented in **Table 3.4-6**. Mn/DOT's goal for a medium priority IRC corridor is above 55 mph. The existing average travel speed on TH 14 was 57 mph.

Table 3.4-6
Existing Peak Hour Travel Speeds

Segment	Segment Length (Miles)	Average Travel Time mm:ss	Average Speed (mph)
1	1.8	2:01	55.0
2	3.8	3:46	60.7
3	0.4	0:26	56.6
4	1.2	1:44	41.9
5	6.5	6:31	59.8
6	0.6	0:38	53.5
7	0.6	0:40	53.0
8	6.8	6:54	58.8
Total	**21.6**	**22:40**	**57.3**

Source: Howard R. Green Company

Level-of-Service Methodology

The quality of traffic operations in the TH 14 corridor was evaluated using the LOS methodology. LOS calculations were performed for roadway segments as well as for key intersections. A discussion of the capacity of TH 14 including LOS is included in the following paragraphs.

The concept of LOS is a method to estimate the quality of traffic flow through intersections or on roadway segments. The LOS methodology is standardized by the Transportation Research Board (TRB) and is applied uniformly regardless of jurisdictional boundaries of other such factors. The method uses algorithms that are based on delay and drivers' expectations of acceptable delay to assign a LOS for particular conditions.

Much like an academic report card, LOS A represents high quality traffic operations where motorists experience little or no delay (i.e. free flow conditions). Conversely, LOS F corresponds to low quality operations with high delays and congestion. In urban areas, such as the Twin Cities Metropolitan Area, the LOS D/E boundary has been selected as the index of congestion, where LOS A-D represent acceptable levels of operation during peak periods and LOS E-F represent unacceptable conditions. In smaller urban centers, such as New Ulm and Mankato, the LOS C/D boundary has been selected as the index of congestion. Balancing the need for the quality of operations, along with the unique operational and access needs of TH 14, Mn/DOT has selected the LOS C/D boundary as the index of congestion for this segment of TH 14.

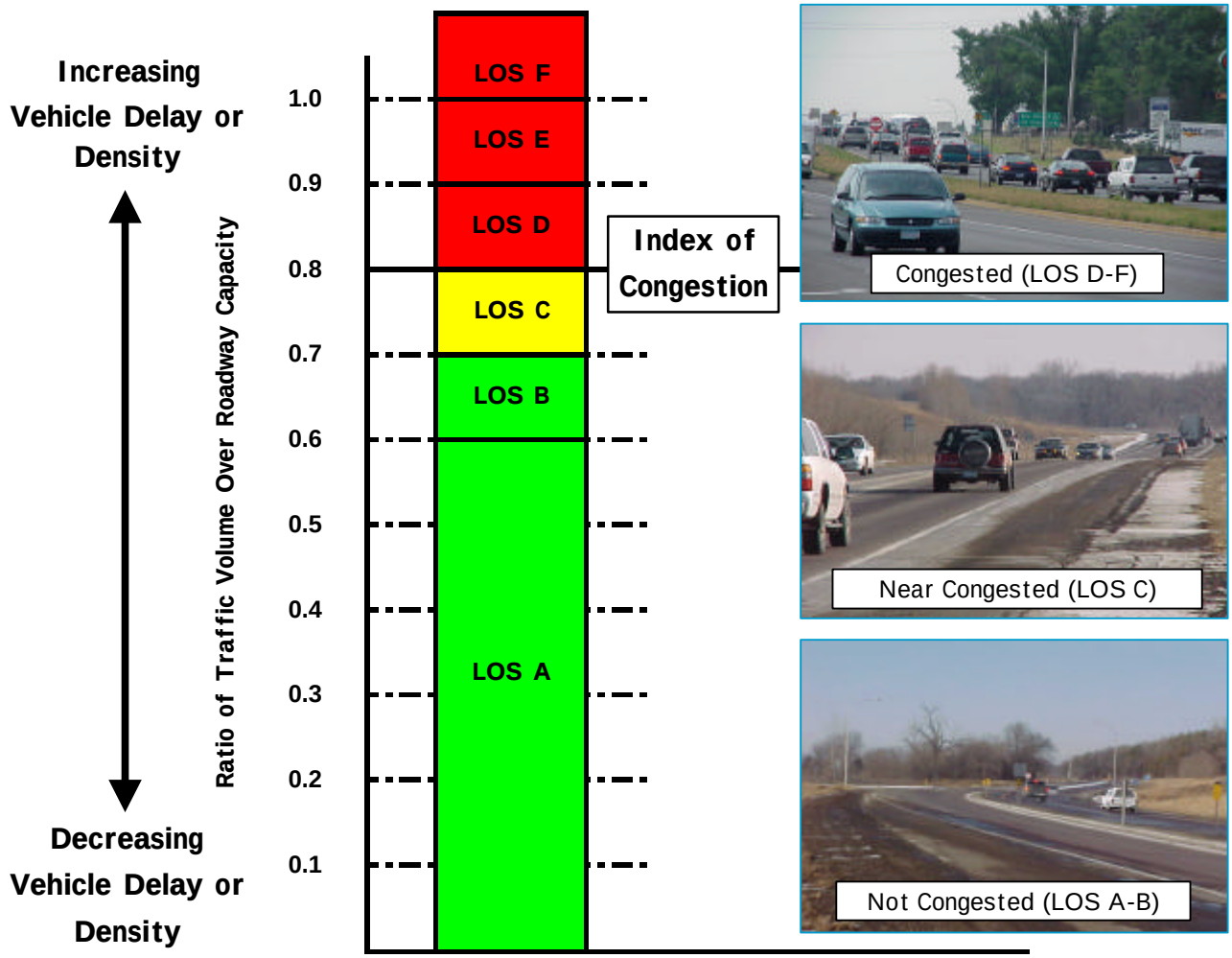
The general relationship between capacity and LOS, along with typical traffic conditions representative of each letter grade, is documented in **Figure 3.4-10**.

At intersections, the quality of traffic operations is a function of three key components: (1) traffic volume, (2) lane geometry, and (3) intersection traffic control. The combination of these three items was used to compute the LOS for each key intersection along the corridor.

Existing and Future Segment Capacity

The analytical procedure used to estimate the LOS on roadway segments is defined in the Highway Capacity Manual (HCM). For roadway segments the key traffic input variables to estimate the LOS include:

Figure 3.4-10
Level of Service Concept



Definition of LOS: Level-of-Service (LOS) is an Estimate of the Quality of Traffic Flow.

Calculations Based On: 2000 Highway Capacity Manual (Transportation Research Board)

Key Factors in Determining LOS:

1. Roadway Geometry
2. Traffic Volume Characteristics
3. Intersections / Interchanges

LOS Used to Describe Traffic Flow at or on:

1. Segments - 2-Lane Rural Highway vs. Urban Arterial, etc…
2. Intersections - Signalized vs. Unsignalized

- Number of Driving Lanes (Typical Section)
- Travel Speed (Speed Limit)
- Hourly Lane Flow Volume
- Lane Width
- Shoulder Width
- Access Points per Mile
- Terrain Conditions
- Percentage of Commercial / Heavy Vehicles
- Sight Distance Restrictions
- Percent No-Passing Zones

The existing segment capacity was computed for the average weekday PM peak hour. Two segments, Segment 2 from CSAH 37 to Zieske Road and Segment 7 from TH 111 / CSAH 23 to CR 72 are performing at a LOS D below the target of the LOS C/D boundary, as documented in **Table 3.4-7**.

The future (2025) conditions were analyzed only for the typical weekday conditions, which is consistent with other planning studies and design practices throughout the State. Future conditions are all expected to operate below the goal at a LOS E.

Existing and Future Intersection Capacity

The analytical procedure used to estimate the LOS at intersections is defined in the HCM just as that for segments. The quality of traffic operations through intersections (LOS) is primarily a function of three key components:

1. Traffic Volume (Peak Hour Turning Movements)
2. Lane Geometry (Number and Function of Lanes)
3. Intersection Traffic Control (STOP vs. signal – and timing information if signalized)

For all of the corridor key intersections identified in Section 3.4.1, the LOS was calculated for the 2002 existing weekday PM peak hour and the 2025 forecast weekday PM peak hour. The forecasts for the intersection turning movements are shown on **Table 3.4-8**. The existing LOS for the existing and future scenarios is documented on **Table 3.4-9**.

All studied unsignalized intersections within the corridor were documented to operate at acceptable (LOS C/D boundary or better) levels during existing average weekday peak hour conditions. Under future (2025) conditions, all intersections are expected to operate at an acceptable level except the intersection of TH 14 / TH 15 / CSAH 21. This intersection will operate at a LOS F if signage remains as a Thru-STOP. The intersection was also analyzed with the traffic control increased to a four-way stop, which indicates the intersection would then operate at LOS B.

Table 3.4-7
Year 2000 and Future Year 2025 Segment Capacity

Segment	Start Point (West)	End Point (East)	Typical Section	2000 ADT	2025 ADT	Existing Percent No Passing	2000 Segment LOS	2025 Segment LOS
1	TH 15 / CSAH 21	CSAH 37	2 Lane Rural	5,500	9,700	35.5%	C	E
2	CSAH 37	Zieske Road	2 Lane Rural	6,800	12,300	59.4%	D	E
3	Zieske Road	CSAH 12	2 Lane Urbanizing	6,800	12,300	0.0%	C	E
4	CSAH 12	CSAH 25	2 Lane Urban	6,500	10,400	0.0%	C	E
5	CSAH 25	TH 99	2 Lane Rural	5,300	9,400	47.5%	C	E
6	TH 99	TH 111 / CSAH 23	2 Lane Urbanizing	4,800	9,000	100.0%	C	E
7	TH 111 / CSAH 23	CR 72	2 Lane Urban	7,100	12,800	100.0%	D	E
8	CR 72	CSAH 6	2 Lane Rural	7,100	12,800	1.9%	C	E

Source: Howard R. Green Company

Table 3.4-8
2025 Intersection Turning Movement Forecasts

Intersection of:		Location	West Approach			East Approach			North Approach			South Approach		
			Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
TH 14	TH 15	Rural	39	159	155	44	153	0	—	—	—	—	—	—
	CSAH 21		—	—	—	—	—	—	0	18	19	185	19	42
TH 14	CSAH 37	Rural	—	162	43	166	166	—	—	—	—	53	—	155
TH 14	CSAH 24	Courtland	0	255	43	18	270	1	0	0	0	29	5	13
TH 14	TH 99	Nicollet	67	163	—	—	235	1	0	—	71	—	—	—
TH 14	TH 111 / CSAH 23	Nicollet	5	152	4	12	232	96	63	40	5	4	56	10
TH 14	CSAH 6	Rural	5	241	1	48	463	1	2	2	5	0	5	32

Source: Howard R. Green Company

Table 3.4-9
Existing and Future Intersection Capacity

Intersection of:		Location	Traffic Control	2002 Intersection Level of Service	2025 Intersection Level of Service
TH 14	TH 15 / CSAH 21	Rural	Thru Stop	A	F
			All Stop	A	B
TH 14	CSAH 37	Rural	Thru Stop	A	B
TH 14	CSAH 24	Courtland	Thru Stop	A	A
TH 14	TH 99	Nicollet	Thru Stop	A	A
TH 14	TH 111 / CSAH 23	Nicollet	Thru Stop	A	C
TH 14	CSAH 6	Rural	Thru Stop	A	B

Source: Howard R. Green Company

3.4.7 Existing No Passing Zones

A key factor in determining the quality of traffic operations on roadway segments is the percentage of zones in which passing is not allowed. No passing zones on TH 14 are located near intersections and in areas where there is limited sight distance due to horizontal or vertical curvature of the roadway. Mn/DOT's goal for this type of corridor is less than 10 percent no passing zones. The percentage of no passing zones is shown by segment on **Table 3.4-10** and **Figure 3.4-11.** Within the study area, 33 percent of the TH 14 corridor is striped as no passing.

Table 3.4-10
Existing No Passing Zones

Segment	Segment Length (miles)	Length of No Passing Zones (miles)	Percentage No Passing
1	1.8	0.7	35.5%
2	3.8	2.2	59.2%
3	0.4	0.0	0.0%
4	1.2	0.0	0.0%
5	6.5	3.1	47.5%
6	0.6	0.6	100.0%
7	0.6	0.6	100.0%
8	6.8	0.1	1.9%
Total	**21.6**	**7.2**	**33.5%**

Source: Mn/DOT Travel Log

3.4.8 Existing Roadway Safety Characteristics

In order to analyze safety characteristics of any roadway, it is important to understand where and why crashes are occurring. The most accurate and timely method of completing this analysis is to utilize historical crash data, maintained and provided by Mn/DOT. In the State of Minnesota, every reported crash is entered by the Department of Public Safety into a master database, and is then accessed by Mn/DOT using the Traffic Information System (TIS).

May 2003

No Passing Zones

- Mn/DOT's goal for this type of roadway is less than 10% no passing zones.
- Between Courtland and New Ulm, almost 60% of the roadway is no passing.
- Between Courtland and Nicollet, almost 50% of the roadway is no passing.

Segment 1
36%

Segment 2
59%

Segment 3
0%

Segment 4
0%

Segment 5
48%

Segment 6
100%

Segment 7
100%

Segment 8
2%

Nicollet County

Brown County

Blue Earth County

New Ulm

Courtland

Nicollet

North Mankato

Mankato

MINNESOTA RIVER

MIDDLE LAKE

LAKE

T 166

T 169

T 179

Legend

- U.S. and Minnesota Highways
- County State Aid Highways
- County, Township, and Local Roads
- Railroads
- Streams
- Lakes
- State Parks
- Counties
- Municipalities

Segment
% No Passing

N

0 1 2 3 4 5 Miles

Source: Minnesota Department of Transportation

Moving Minnesota

14 West Interregional Corridor:
North Mankato to New Ulm

Figure 3.4-11
No Passing Zones

Methodology

For this study, every reported crash over the five-year period between 1996 and 2000 was compiled within the entire corridor. Over 22 miles and five years, hundreds of crashes occurred, and each crash was sorted into the proper segment and specific intersection along the corridor.

Crashes were categorized into segments and intersections. In order to analyze these crashes, four key factors were considered: (1) crash rates, (2) critical crash rates, (3) crash severity, and (4) distribution of crash types.

Crash Rate

History has proven that crashes are a function of exposure, i.e., roadways with higher traffic volumes will experience more crashes than similar roadways with lower traffic volume. Therefore, rather than simply documenting the number of crashes that occur at specific locations, it is important to consider a crash rate, which normalizes locations with varying traffic volumes for purposes of comparison.

The crash rate for any intersection is defined as number of crashes per million entering vehicles. Therefore, intersections with higher volumes can be compared to similar intersections with lower volumes to identify safety deficiencies. For roadway segments, crash rates are computed in crashes per million vehicle miles of travel. Similar to intersections, this allows for comparison of safety characteristics between different segments. The actual crash rates at specific locations are then compared to "average" or "typical" values, which are based on the aggregate of similar locations within the State of Minnesota.

Critical Crash Rate

Since crashes are also somewhat random in their nature, identifying every intersection or segment that has a crash rate above the average value would statistically include one-half of all locations. Therefore, a further statistical check is used, called a critical crash rate. The critical crash rate builds on the idea of being confident to a certain level that the actual crash rate is statistically above the average crash rate. Although varying confidence levels can be utilized, the 95th percentile confidence interval was utilized for all safety calculations for TH 14. In other words, at locations where the actual crash rate exceeds the critical crash rate, it is 95 percent certain that the intersection or segment is statistically deficient, which would indicate a safety deficiency.

Crash Severity

The most simplified definition of crash severity is "How bad are the crashes?" In the crash information database maintained by Mn/DOT, crashes are categorized into three major categories of increasing severity:

- Property Damage (No Injuries Occurred) – Not Severe
- Injury Crashes (Injuries Occurred, but No Fatalities) – More Severe
- Fatal Crashes – Most Severe

The purpose for analyzing this statistic is to identify locations that may experience a low crash rate but have a high percentage of injury or even fatal crashes. Conversely, locations which have higher crash rates, but have a larger majority of property damage-only crashes, may not be as much of a deficiency as the rate would indicate.

Distribution of Crash Type

Each crash is also further classified as a crash type, which is indicative of how the crash occurred. Crashes can be categorized into one of the following nine categories:

1. Rear End
2. Left Turn into Oncoming Traffic
3. Run Off Road
4. Right Angle
5. Right Turn into Cross Street Traffic
6. Head On
7. Sideswipe (Same Direction)
8. Sideswipe (Opposite Direction)
9. Other/Unknown

For each intersection or segment, typical values of crash type distribution have been compiled from data across the State of Minnesota. Specific locations that have differing distribution of crash types from the average also aid in the identification of deficiencies and the development of alternative mitigation strategies.

Segment Safety Analysis

A summary documenting the segment beginning and end points, typical section, average daily traffic (ADT), crash rate, and severity rate is shown on **Table 3.4-11** for each corridor growth segment.

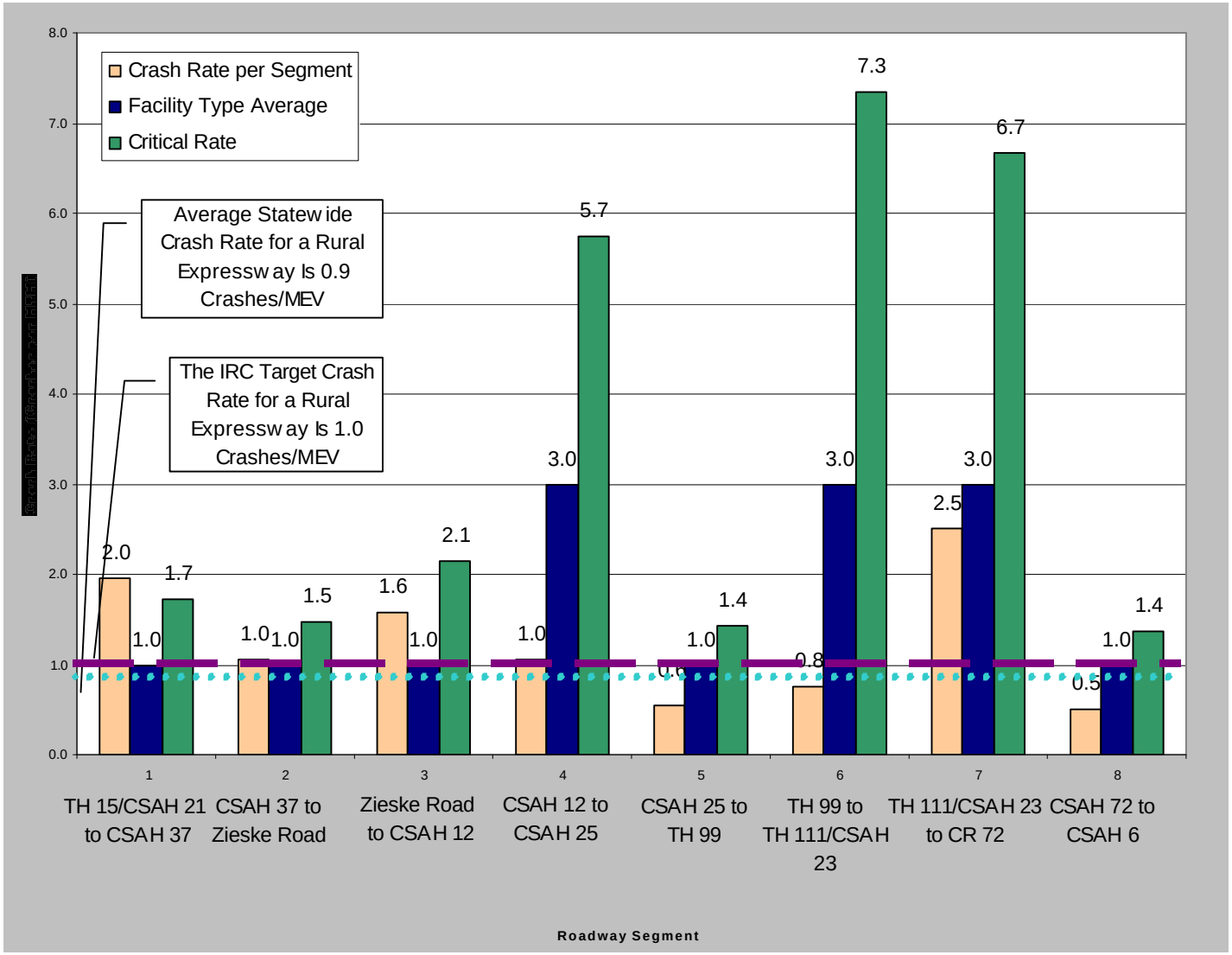
A comparison of the crash rate to the critical crash rate and facility type average is shown in **Figure 3.4-12**. As shown between Years 1996-2000, only Segment 1 had an actual rate above the critical rate. For the other seven segments, actual crash rates were below the critical crash rate. This indicates that the majority of the corridor is not statistically deficient from a safety perspective. Actual crash rates range from 0.5 to 2.5 crashes per million vehicles miles traveled (MVM). It should be noted the Mn/DOT IRC safety goal for rural expressways is 1.0 crashes per MVM. Segment 1 from TH 15/CSAH 21 to CSAH 37, Segment 3 from Zieske Road to CSAH 12, and Segment 7 from TH 111/CSAH 23 to CR 72 within the City of Nicollet, fail to meet this goal.

Table 3.4-11
Existing Crash and Severity Rates by Growth Segment (1996-2000)

Segment:	Start Point (West)	End Point (East)	Typical Section	A.D.T.	Crash Rate	Severity Rate
1	TH 15 / CSAH 21	CSAH 37	2 Lane Rural	5,500	2.0	6.5
2	CSAH 37	Zieske Street	2 Lane Rural	6,800	1.0	2.5
3	Zieske Street	CSAH 12	2 Lane Urbanizing	6,800	1.6	6.4
4	CSAH 12	CSAH 25	2 Lane Urban	6,500	1.0	2.6
5	CSAH 25	TH 99	2 Lane Rural	5,300	0.6	1.1
6	TH 99	TH 111 / CSAH 23	2 Lane Urbanizing	4,800	0.8	2.8
7	TH 111 / CSAH 23	CSAH 72	2 Lane Urban	7,100	2.5	7.8
8	CSAH 72	CSAH 6	2 Lane Rural	7,100	0.5	1.3

Source: Howard R. Green Company

Figure 3.4-12
Existing Crash Rates by Growth Segment (1996-2000)



Source: Howard R. Green Company

The severity of each segment is also documented in **Figure 3.4-13** As shown, the severity rate for Segment 1 between TH 15 and CSAH 37 is well above the expected rate. Segment 2 from CSAH 37 to Zieske Road is at the expected rate.

In order to determine the distribution of crash types along the corridor, crashes were summarized by crash type for each segment. **Table 3.4-12** documents the number of crashes and **Table 3.4-13** documents the distribution percentage for comparison with typical values compiled from data across the State of Minnesota. Segments having crash rate distributions differing from the average are further used to identify deficiencies and develop alternative mitigation strategies. Crash types with percentages that are significantly higher than Minnesota averages are shaded. Analysis of these locations concluded the following:

- A high distribution of off road – left/right crashes was noted within Segment 6. This percentage is high because of the limited number of crashes (two out of four total crashes) that occurred in this Segment. A review of the two off road crashes indicated no correlations between these incidents.
- About 80 percent of crashes within Segment 7 were right angle crashes, significantly higher than Minnesota's average of 26 percent. Almost all (14 out of a total 15) occurred at the intersection of TH 14 / TH 111 / CSAH 23. Analysis of this intersection indicated a large portion of the crashes occurred on the far side of the intersection when motorists were attempting to cross TH 14 from the minor street.
- The percentage of passing related crashes (head-on and sideswipe) were compared on **Figure 3.4-14**. As shown, most passing related crashes occurred in areas in which passing was allowed (only two of these crashes occurred where roadway was striped for no passing). Most crashes occurred during daylight, clear, and dry conditions. The percentage of head-on and sideswipe crashes within Segment 4 (the urban area within the City of Courtland) was significantly higher than Minnesota averages. This is the only segment in which parking is allowed along the roadway.

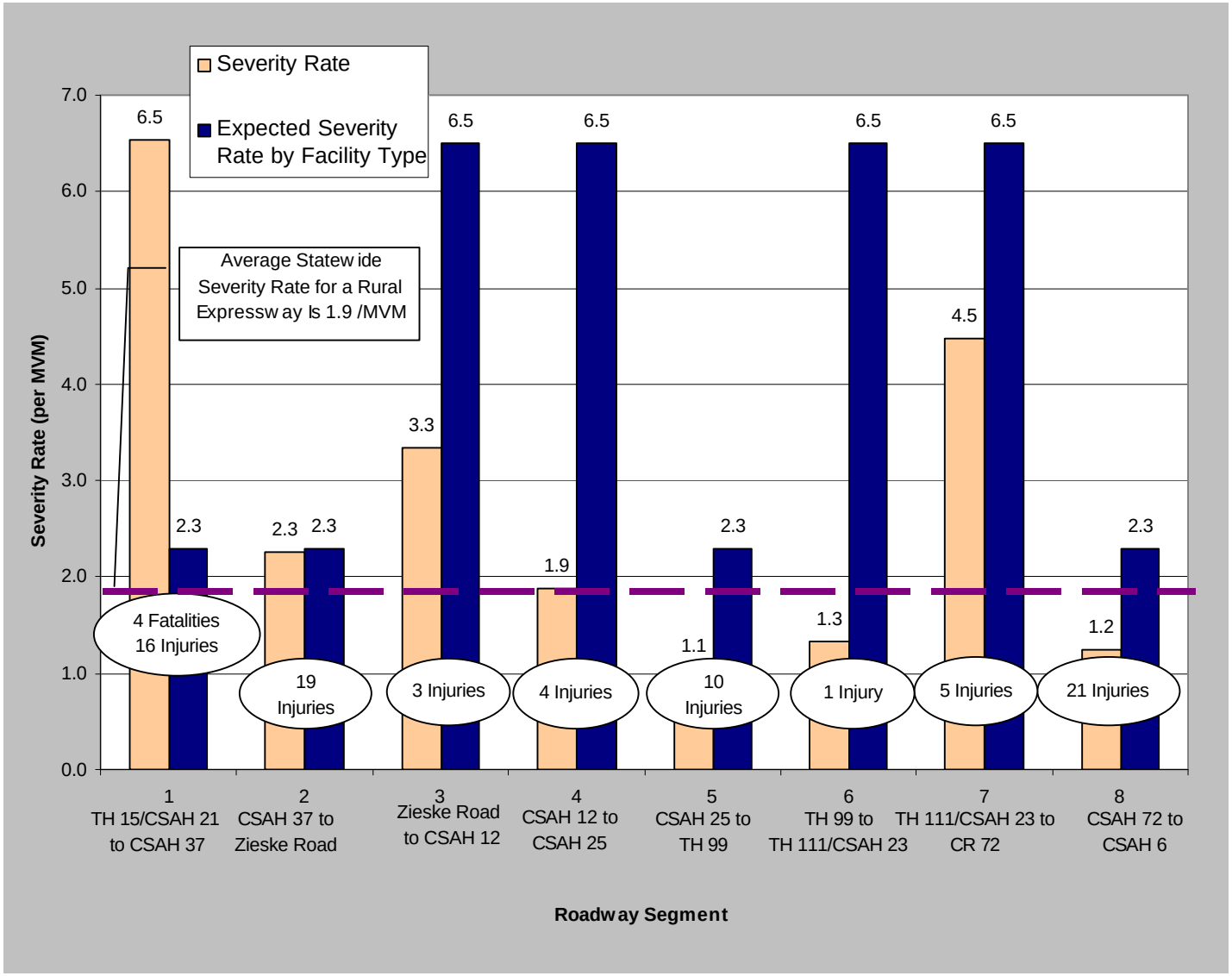
Intersection Safety Analysis

A summary documenting the intersection, type of traffic control, approach volume, crash rates, and severity rates is shown on **Table 3.4-14**. A comparison of the crash rate to the critical rates for these intersections is documented on **Figure 3.4-15**. Of the unsignalized intersections analyzed, three had crash rates above the critical rate: TH 15/CSAH 21, CSAH 37, and TH 111/CSAH 23.

The severity of each segment is also documented in **Figure 3.4-16**. As shown, the severity rates were also above the average severity rate for similar intersections at TH 15/CSAH 21, CSAH 37, and TH 111/CSAH 23.

In order to determine the distribution of crash types along the corridor, crashes were summarized by crash type for each intersection. **Table 3.4-15** documents the number of crashes and **Table 3.4-16** documents the distribution percentage for comparison with typical values compiled from data across the State of Minnesota.

Figure 3.4-13
Existing Severity Rates by Growth Segment (1996-2000)



Source: Howard R. Green Company

Table 3.4-12
Crash Distribution by Growth Segments (1996-2000)

Segment	Number of Crashes												
	N/A	Rear End	Sideswipe-Passing	Left Turn	Off Road-Left	Right Angle	Right Turn	Off Road-Right	Head On	Sideswipe-Opposite	Other	Unknown	Total
1	4	3	0	9	1	9	0	2	0	1	5	2	**36**
2	11	8	1	4	1	3	0	2	1	1	11	6	**49**
3	1	3	1	0	0	0	0	1	0	0	2	0	**8**
4	1	5	2	0	1	1	1	0	0	2	2	0	**15**
5	6	3	0	0	1	1	0	6	1	0	8	7	**33**
6	1	1	0	0	0	0	0	2	0	0	0	0	**4**
7	0	2	0	0	0	15	0	0	0	0	0	2	**19**
8	7	7	1	0	8	2	0	7	3	5	3	2	**45**
Total	**31**	**32**	**5**	**13**	**12**	**31**	**1**	**20**	**5**	**9**	**31**	**19**	**209**

Source: Mn/DOT Crash Data (1996-2000)

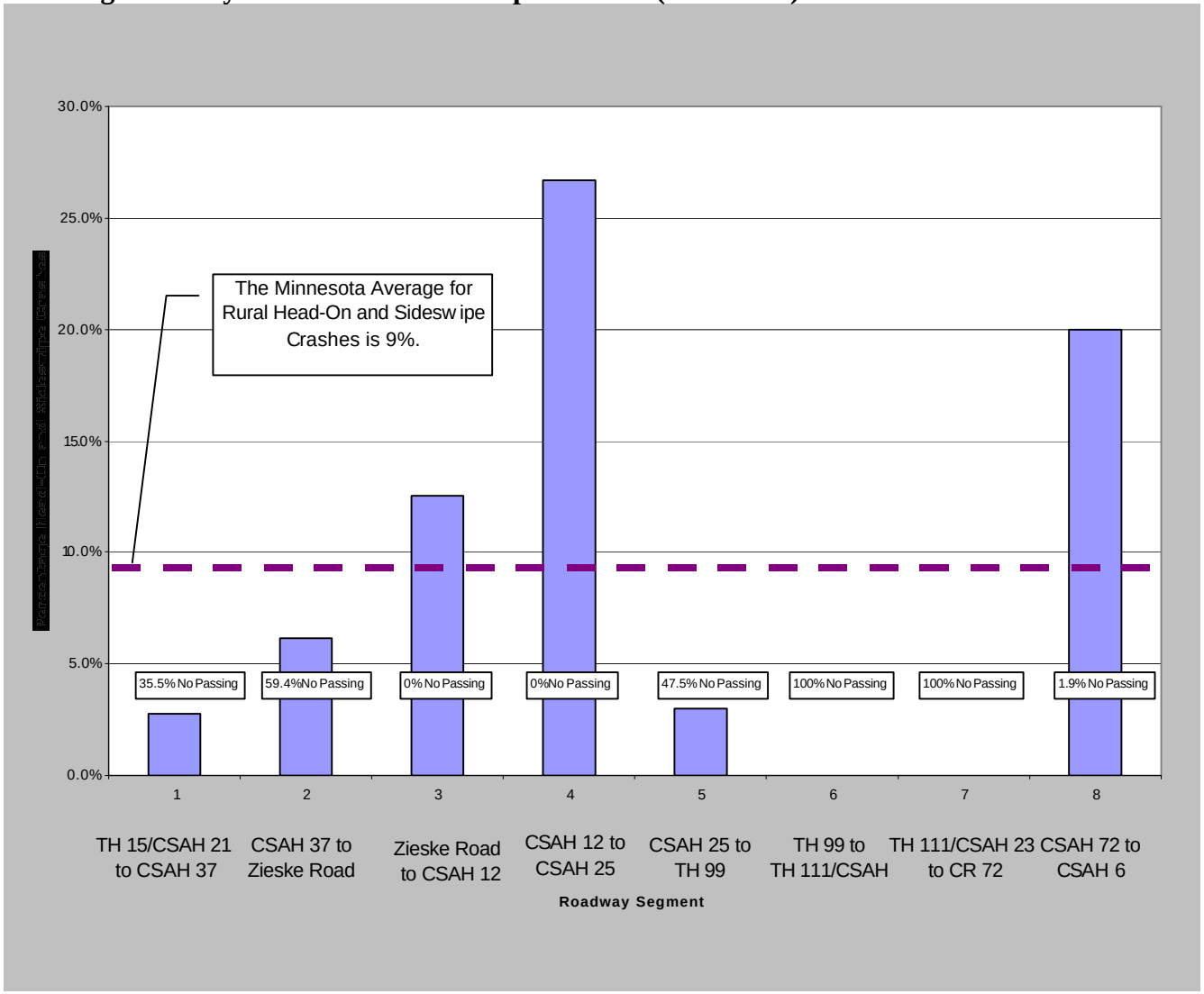
Table 3.4-13
Percentage of Crash Distribution by Growth Segments (1996-2000)

Segment	Rear End	Sideswipe-Passing	Left Turn	Off Road-Left/Right	Right Angle	Right Turn	Head On	Sideswipe-Opposite	N/A, Other, Unknown	Total
1	8%	0%	25%	8%	25%	0%	0%	3%	31%	100%
2	16%	2%	8%	6%	6%	0%	2%	2%	57%	100%
3	38%	13%	0%	13%	0%	0%	0%	0%	38%	100%
4	33%	13%	0%	7%	7%	7%	0%	13%	20%	100%
5	9%	0%	0%	21%	3%	0%	3%	0%	64%	100%
6	25%	0%	0%	50%	0%	0%	0%	0%	25%	100%
7	11%	0%	0%	0%	79%	0%	0%	0%	11%	100%
8	16%	2%	0%	33%	4%	0%	7%	11%	27%	100%
Minnesota Average (Urban)	36%	7%	8%	4%	26%	1%	1%	1%	16%	100%
Minnesota Average (Rural)	14%	6%	2%	21%	11%	1%	2%	1%	42%	100%[(1)]

Notes:
(1) Animal crashes account for 24% of the other type category.
Shaded areas crash type percentages that are significantly higher than Minnesota averages.

Source: Mn/DOT Crash Data (1996-2000)

Figure 3.4-14
Existing Roadway Head-On and Sideswipe Crashes (1996-2000)



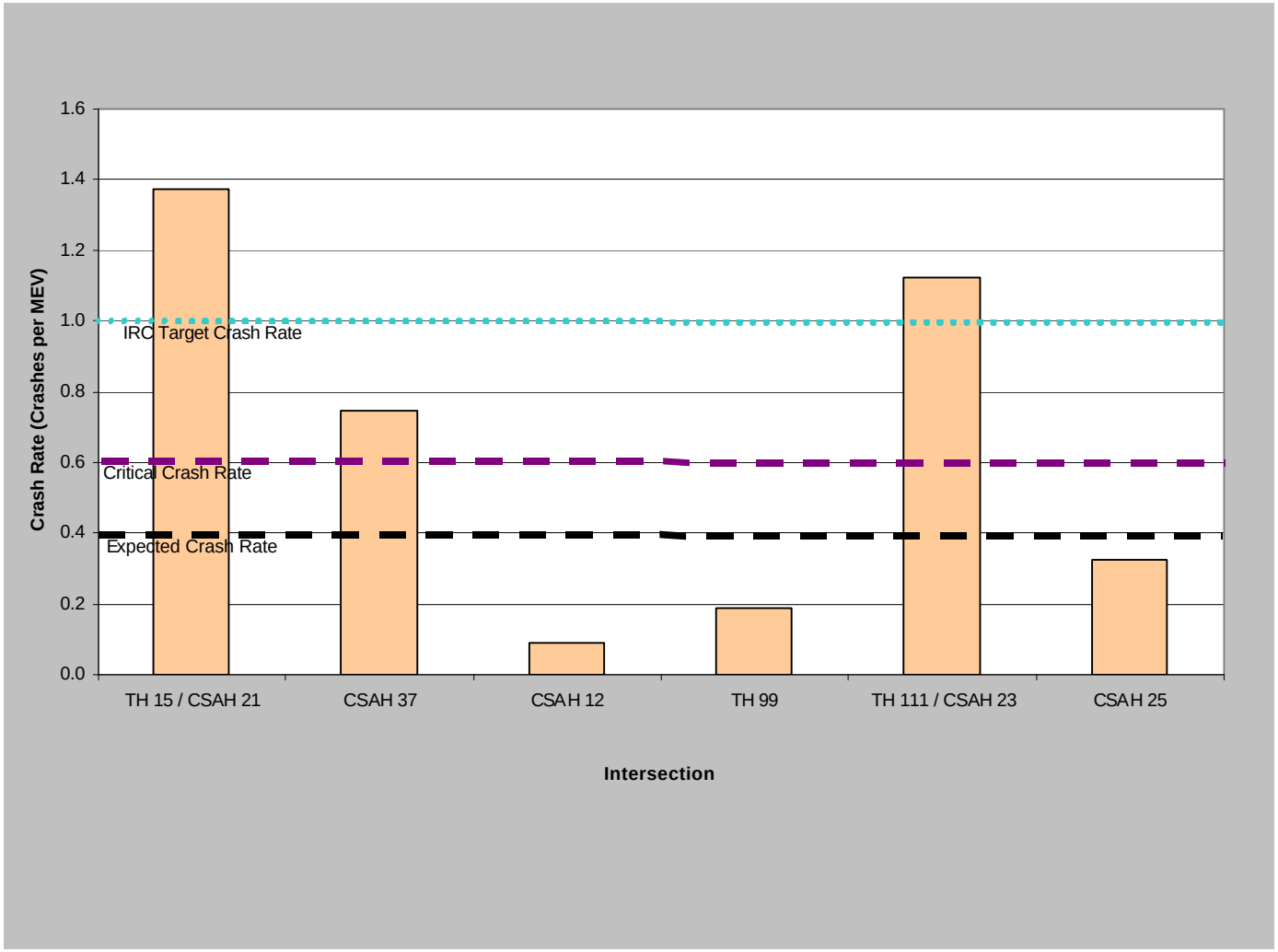
Source: Howard R. Green Company

Table 3.4-14
Existing Intersection Crash and Severity Rates (1996-2000)

Intersection of:		Traffic Control	Approach Volume	Crash Rate	Severity Rate
TH 14	TH 15 / CSAH 21	Thru-Stop	9,175	1.4	5.5
TH 14	CSAH 37	Thru-Stop	8,800	0.7	2.2
TH 14	CSAH 12	Thru-Stop	6,025	0.1	0.4
TH 14	TH 99	Thru-Stop	5,875	0.2	0.5
TH 14	TH 111 / CSAH 23	Thru-Stop	7,325	1.1	2.2
TH 14	CSAH 25	Thru-Stop	6,740	0.3	0.6

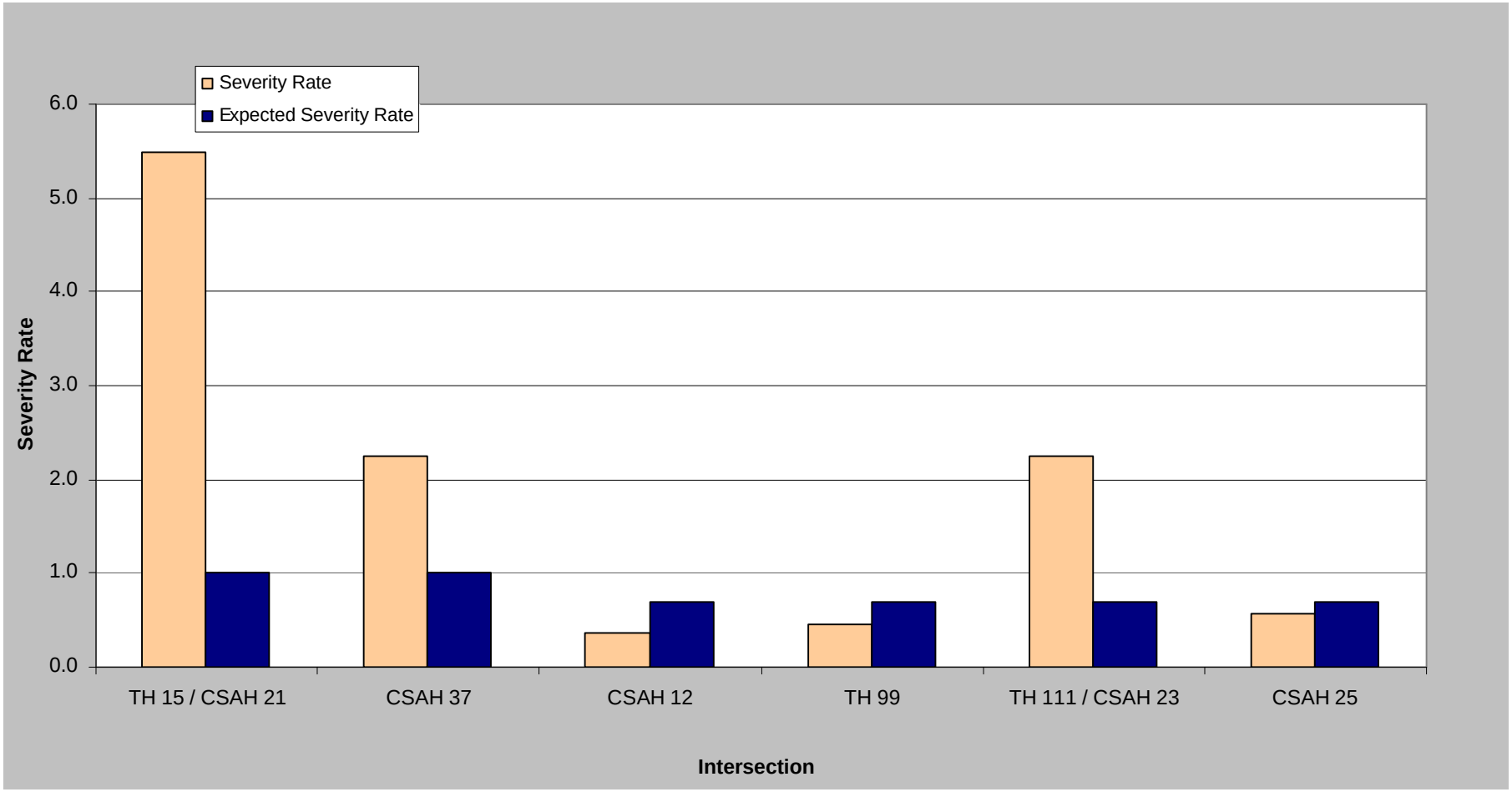
Source: Howard R. Green Company

Figure 3.4-15
Existing Intersection Crash Rates (1996-2000)



Source: Howard R. Green Company

Figure 3.4-16
Existing Intersection Severity Rates (1996-2000)



Source: Howard R. Green Company

Table 3.4-15
Total Number of Crashes with Distribution at Intersections

Location	Number of Crashes													
	N/A	Rear End	Sideswipe-Passing	Left Turn	Off Road-Left	Right Angle	Right Turn	Off Road-Right	Head On	Sideswipe-Opposite	Overturn	Other	Unknown	Total
TH 15 / CSAH 21	0	2	0	9	1	9	0	0	0	0	1	1	0	23
CSAH 37	1	3	0	4	0	3	0	1	0	0	0	0	0	12
CSAH 12	0	1	0	0	0	0	0	0	0	0	0	0	0	1
TH 99	0	1	0	0	0	0	0	1	0	0	0	0	0	2
TH 111 / CSAH 23	0	1	0	0	0	14	0	0	0	0	0	0	0	15
T110	0		0	0	0	1	0	0	0	0	0	0	1	2
CSAH 25	0	4	0	0	0	0	0	0	0	0	0	0	0	4

Source: Mn/DOT Crash Data (1996-2000)

11/13/2002

Table 3.4-16
Percentage of Distribution of Intersection Crashes (1996-2000)

Location	Crash Distribution									
	Rear End	Sideswipe-Passing	Left Turn	Off Road-Left/Right	Right Angle	Right Turn	Head On	Sideswipe-Opposite	N/A, Other, Unknown	Total
TH 15 / CSAH 21	9%	0%	39%	4%	39%	0%	0%	0%	9%	100%
CSAH 37	25%	0%	33%	8%	25%	0%	0%	0%	8%	100%
CSAH 12	100%	0%	0%	0%	0%	0%	0%	0%	0%	100%
TH 99	50%	0%	0%	50%	0%	0%	0%	0%	0%	100%
TH 111 / CSAH 23	7%	0%	0%	0%	93%	0%	0%	0%	0%	100%
T 110	0%	0%	0%	0%	50%	0%	0%	0%	50%	100%
CSAH 25	100%	0%	0%	0%	0%	0%	0%	0%	0%	100%
Minnesota Average (Urban)	28%	5%	8%	6%	28%	1%	2%	1%	21%	100%
Minnesota Average (Rural)	18%	5%	5%	16%	28%	0%	3%	2%	23%	100%

Source: Mn/DOT Crash Data (1996-2000)

3.4.9 Snow Traps

One other type of deficiency identified along TH 14 is the existence of stretches of roadway that have persistent blowing and drifting snow problems during the winter months that can potentially contribute to both safety and operations problems for travelers. According to the Minnesota Division of Emergency Management, the primary natural disaster that claims the most lives in Minnesota is winter weather. From 1984-2001, hazardous driving conditions during the months of November through March resulted in 487 fatalities. The cost to close Minnesota's transportation corridors for 24 hours is $118 million including lost wages and salaries, federal, state, and local taxes, and retail sales (North American Snow Conference, 1999.)

To assist in the identification of blowing and drifting snow problem on segments of TH 14, Mn/DOT provided snow trap inventory data. The data identified the location of the road segments with persistent blowing and drifting snow-related problems. **Figure 3.4-17** shows the location of road segments that have been identified as having snow-trap deficiencies. As shown, a large portion of TH 14 between Courtland and Nicollet experiences snow traps. In the section from Nicollet to CSAH 6, snow traps are located near locations where there are intersecting roadways.

One method to limit the number of snow traps is to develop living snow fences. Living snow fences are designed plantings of trees and/or shrubs and native grasses located along roadways or around communities and farmsteads. Properly designed and placed, these living barriers trap snow as it blows across fields, piling it up before it reaches a roadway, waterway, farmstead, or community. Mn/DOT along with the United States Department of Agriculture – Farm Service Agency, the United States Department of Agriculture – Natural Resources Conservation Service, and the Minnesota Association of Soil and Water Conservation Districts developed a Memorandum of Understanding giving direction to the Living Snow Fence Program. The goals of the program are noted as follows:

- Address the blowing and drifting snow problems along state highways
- Promote increased participation in problem area by maintaining a close working relationship with landowners
- Create a consistent program throughout the state by combining separate programs
- Design living snow fence projects based on determining factors
- Demonstrate agency cooperation in promoting and implementing the Program
- Establish county work groups
- Utilize technology to aid in coordination and cooperation
- Respect landowners, their property rights and their personal relationship with the land, including gaining their support and trust
- Consider grassland nesting bird habitat issues when designing a living snow fence adjacent to Nature Conservancy, U.S. Fish and Wildlife Service and Department of Natural Resource managed lands
- Provide aesthetically pleasing and fully functional projects that are well received by the community
- Track the location and number of miles of living snow fence installed in the state

May 2003

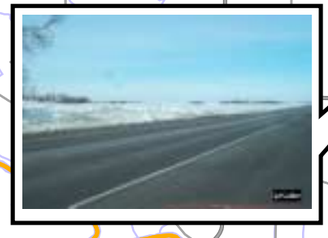
Nicollet County

Snow Trap Locations

- Snow trap locations are areas of the roadway which have been identified as problem sites with drifting snow and ice.

- Living snow fences improve problem areas by improving safety, reducing costs of snow plowing, and reducing shipping delays.

- Funding has been created through a partnership between the Minnesota Department of Transportation, the United States Department of Agriculture, and the Minnesota Association of Soil and Water Conservation Districts.



New Ulm

Courtland

Nicollet

North Mankato

MINNESOTA RIVER

MIDDLE LAKE

MIDDLE LAKE

T 179

Legend

- U.S. and Minnesota Highways
- County State Aid Highways
- County, Township, and Local Roads
- Railroads
- Streams
- Lakes
- State Parks
- Counties
- Municipalities
- Snow Trap Locations

N

0 1 2 3 4 5 Miles

Source: Minnesota Department of Transportation

Moving Minnesota

14 West Interregional Corridor:
North Mankato to New Ulm

Figure 3.4-17
Snow Trap Locations

There is a six-year time period to implement the Living Snow Fence Program under the US Department of Agriculture Conservation Reserve Program contained within the 2002 Farm Bill.

3.4.10 Local and Supporting Roadway System

The ability of TH 14 to continue to meet the speed, mobility, access, and safety objectives established by Mn/DOT is dependent in part on the existence of the local and supporting road system. For descriptive purposes, the local and supporting road system along TH 14 can be broken out into three components:

- Frontage Roads
- Parallel Minor Arterial/Collector Roads
- "Across Highway" Roads

The presence of frontage roads along portions of TH 14 would allow direct vehicle access to TH 14 to be primarily limited to public road intersections. This can maximize safety and mobility on the highway. Parallel Minor Arterials and Collectors provide drivers options for making shorter trips in the corridor without getting on TH 14. This allows TH 14 to function according to its classification of Principal Arterial because it would primarily serve longer, high-speed trips. Public roadways that provide direct access across TH 14 spaced at regular intervals may facilitate movement across the highway. These intersections can be clearly marked so that vehicles crossing the highway are more easily seen. Also, the intersections may be placed at locations where sight distance is maximized, thereby allowing crossing vehicles to more easily see opposing vehicles on TH 14 that are passing through the intersection. At select intersections under certain conditions, traffic signals or roadway grade separations can be employed to facilitate safe and efficient movement across the highway.

Currently, the only frontage road along TH 14 in the study area is the Hewitt Service Road in southern Nicollet. Most of the corridor is rural, making frontage roads infeasible. However, other roadways such as 6th Street in Nicollet act as frontage roads by providing east-west circulation along TH 14.

In the study area, TH 68 is a Minor Arterial that runs parallel to TH 14 along its entire length. Several miles to the north CSAH 5 is a Major Collector that also runs roughly parallel to TH 14. CSAH 21, CSAH 11, and CSAH 25 also provide some parallel alternatives.

Outside of Courtland and Nicollet, CSAH 17/CR 77 and the occasional township road provide direct access across TH 14. In Courtland, 1st Street, 2nd Street, 3rd Street, and 4th Street provide direct access across the highway. In Nicollet, Main Street and Elm Street provide direct access for vehicles crossing the highway.