Dakota County CSAH 31

(Pilot Knob Road)

Corridor Transportation Study

FINAL REPORT

May 10, 2007

Prepared for

The City of Lakeville,
The City of Apple Valley
and
Dakota County

Prepared by

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Dakota County CSAH 31 (Pilot Knob Road) Corridor Transportation Study Report

1.0 Introduction and Background

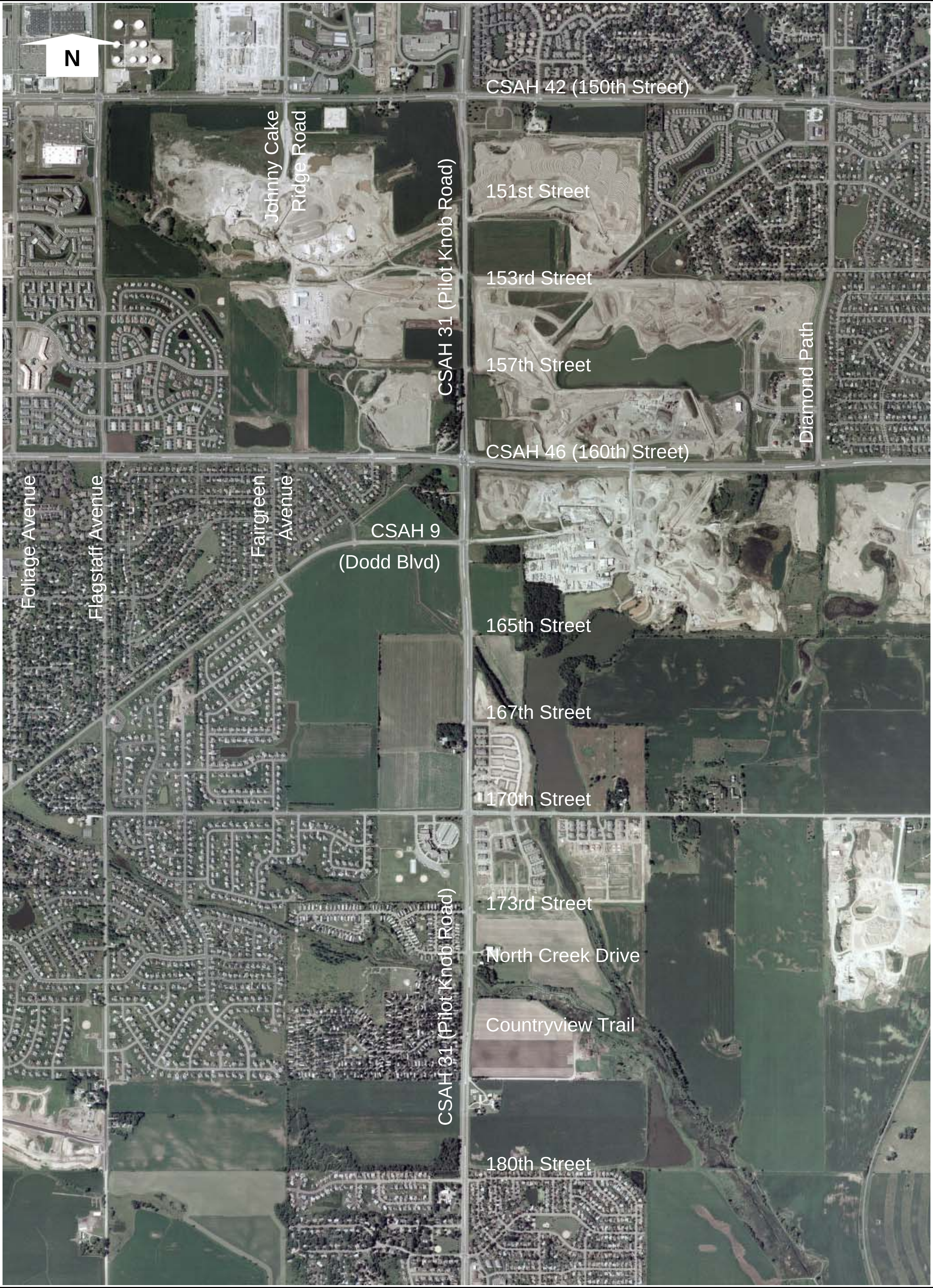
The City of Lakeville has commissioned this corridor study in partnership with the City of Apple Valley and Dakota County. The primary purpose of this study is to identify a long-term access strategy for a three-mile segment of CSAH 31 (Pilot Knob Road) from CSAH 42 (150th Street) to 180th Street (see Figure 1).

CSAH 31 is an "A" Minor Arterial (Expander) in the region's functional classification system. This classification provides connections to metro centers, regional business concentrations and major traffic generators. It should serve medium to long trips (two to greater than eight miles) at moderate speeds. Minimum average speeds should be managed to 20 mph for fully developed areas and 30 mph for developing areas. Management tools include; traffic signal progression and spacing, land-access management and control and preferential treatment for transit. Emphasis should be more on providing a higher level of mobility than on land access while accommodating added urban development (see Figure 2).

Due to the importance of preserving safety and mobility along the most highly traveled minor arterials in the county, Dakota County adjusted its access spacing guidelines as part of its last Transportation Plan (2004) to add a ½-mile full access spacing category for roadways with traffic projections over 35,000 ADT.

This policy change has caused some difficulties with respect to managing access on corridors where historically communities had developed their system and local networks for ¼ mile spacing (see Figure 3). While some segments of the corridor are currently undeveloped and some flexibility remains to adjust full access locations, other locations are more difficult due to previous roadway and land use decisions and/or commitments based upon the County's previous access spacing guidelines.

This segment of CSAH 31 is predominantly undeveloped; however, some pockets of previous growth are present, as well as a significant amount of new/proposed development. Historic development patterns and existing access along the corridor are in conflict with the County's current access spacing guidelines (see Figure 3). The intent of this study is to explore options (i.e., cross-section and access spacing) and their ramifications (i.e., trade-offs among mobility, safety, and convenience).



PRIMARY STUDY AREA

CSAH 31 (PILOT KNOB ROAD) CORRIDOR TRANSPORTATION STUDY
City of Lakeville, City of Apple Valley and Dakota County

Figure 1

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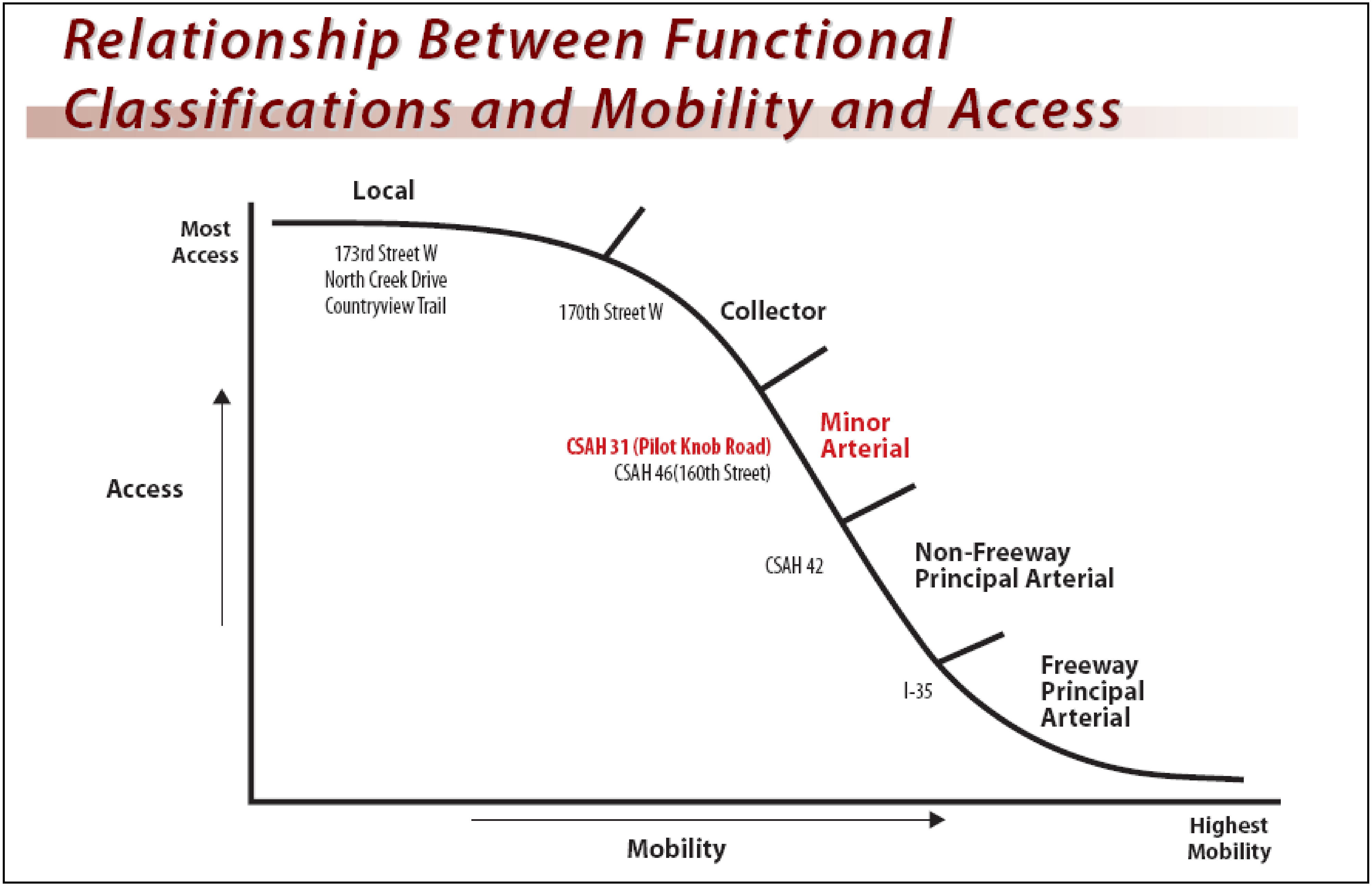

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MOBILITY VERSUS ACCESS RELATIONSHIP

CSAH 31 (PILOT KNOB ROAD) CORRIDOR TRANSPORTATION STUDY
City of Lakeville, City of Apple Valley and Dakota County

Figure 2

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Access Guidelines

County Access Management Guidelines

Access Management involves planning the location, design, and operation of streets, driveways, traffic control strategies, and median openings.

Access Management Objectives

Access Management Guidelines are designed to balance the safety and mobility needs of roadway users and the access needs of adjacent property owners.

Guidelines as Applied to Pilot Knob Road

1. Full access signalized intersections on Pilot Knob Road should be spaced 1/2 mile apart.
2. Partial access with median restrictions may be allowed.
3. Direct private residential or commercial access is not desirable.
4. Median openings may be removed or modified to address safety and operational issues.

1.1 Study Objectives

The focus of this effort was to work through a technical analysis of this corridor with the Cities of Lakeville and Apple Valley, and Dakota County. The intent of this process is to identify the appropriate location and level of access of the key intersections on CSAH 31 through the study corridor. These locations were identified by considering the current Dakota County Transportation Plan – Access Spacing Guidelines and by the analysis of the appropriate arterial operation measures of performance for a limited number of intersection spacing, access level and traffic control scenarios.

1.2 Public and Agency Involvement

The process was guided by a Project Management Team (PMT) that consisted of technical staff from Lakeville, Apple Valley, Dakota County and SRF Consulting Group, Inc. This group met regularly (approximately eight times) throughout the study to review data, analysis methodologies, assumptions, alternatives and study results.

In addition to the PMT meetings, three public open house meetings were held with local property owners, business owners/operators and developers along the corridor to discuss access issues and alternatives. Comments from these meetings were as follows:

1.3 Issues Identified by the Public

a. August 17, 2006 Public Open House Meeting Comments

1. Need for frontage roads along CSAH 31 (public)
2. Full access needed at 157th Street (Tradition/Ryan/Apple Valley)
3. Full access needed at Dodd Boulevard (Tradition/Ryan/Pulte/DR Horton/Lakeville)
4. ¾ access on PKR at 153rd Street and 165th Street would be acceptable (Tradition/Ryan)
5. ¾ access on CR 46 ¼ mile east and west of CSAH 31 would be acceptable (Tradition)
6. Full access needed at 165th Street and 170th Street (DR Horton/Lakeville)
7. No clear consensus on selection of Preliminary Alternatives (support varied widely)
8. Much general discussion with public, property owners, developers and other stakeholders

b. October 25, 2006 Public Open House Meeting Comments

1. No formal comments were received.
2. Much general discussion with public, property owners, developers and other stakeholders

c. April 10, 2007 Public Open House Meeting Comments

1. No formal comments were received.
2. Much general discussion with public, property owners, developers and other stakeholders

2.0 Corridor Issues and Needs

2.1 Land Use

a. Existing Land Use

Existing land use throughout the CSAH 31 study corridor (see Figure 4) can be characterized as primarily underdeveloped to developing (gravel mining and agriculture). North Trail Elementary School is in the southwest quadrant of CSAH 31 and 170th Street, some low- to medium-density residential development is in place and under construction primarily south of 165th Street, and a recently opened transit station is on the west side of CSAH 31 at 157th Street.

b. Future Land Use

Future land use within the CSAH 31 study corridor (see Figure 5) can be characterized as predominantly mixed density residential development with commercial development near the major intersections. Much of this future development will occur within the next five to ten years as evidenced by the recent submittal of numerous plats within the study corridor.

The land use assumed for the southwestern portion of the study area (south of 179th Street and along Cedar Avenue, identified as rural in the current land use plan) was generally assumed to be medium density residential (seven units per acre) for traffic forecasting purposes, except for the four forty-acre quadrants of Cedar Avenue and 185th Street. These four forty-acre quadrants were assumed as retail/commercial development.

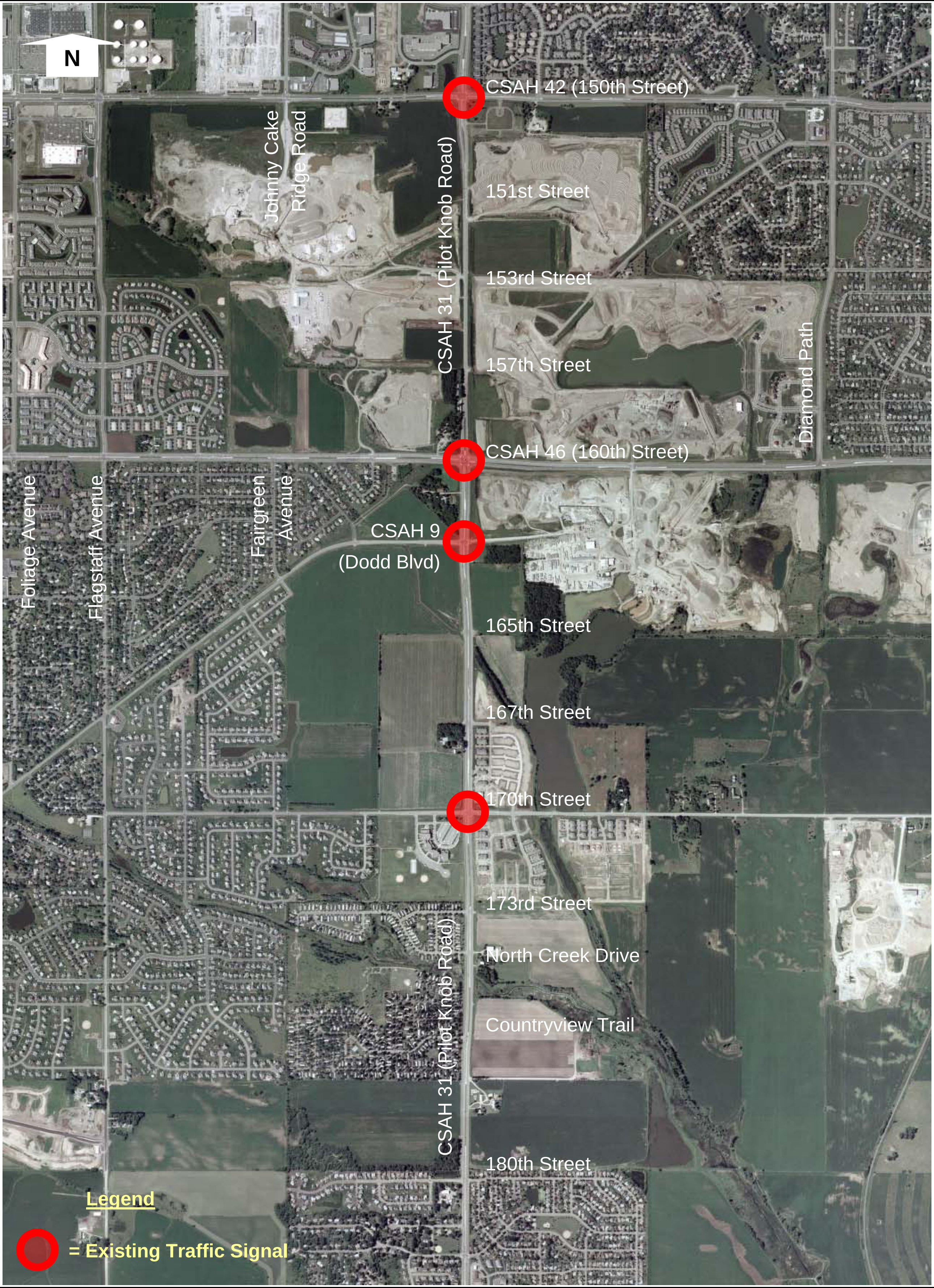
2.2 Facility Users

a. Commuter Traffic

The primary users of CSAH 31 through the study corridor are commuters traveling between the residential communities generally to the south and employment and commercial centers generally to the north. These geographic and origin-destination conditions result in a heavy directional split (75/25) in the traffic volumes (heavier northbound traffic in the morning and heavier southbound traffic in the afternoon peak periods). These geographic and travel patterns are expected to remain generally consistent in the future. Future commercial development within the study corridor and to the south may somewhat dampen this directional split.

b. Commercial Traffic

Significant gravel mining activity occurs adjacent to the corridor. This activity generates a significant volume of heavy-commercial traffic on CSAH 31 through the study corridor. As these gravel mining land uses are replaced by mixed density residential and commercial land uses, the heavy commercial traffic component will be reduced over the long term. However, for an interim period construction-related heavy commercial traffic will replace the gravel mining heavy commercial traffic and remain a significant component in the traffic on CSAH 31 until the development of the adjacent land is completed.



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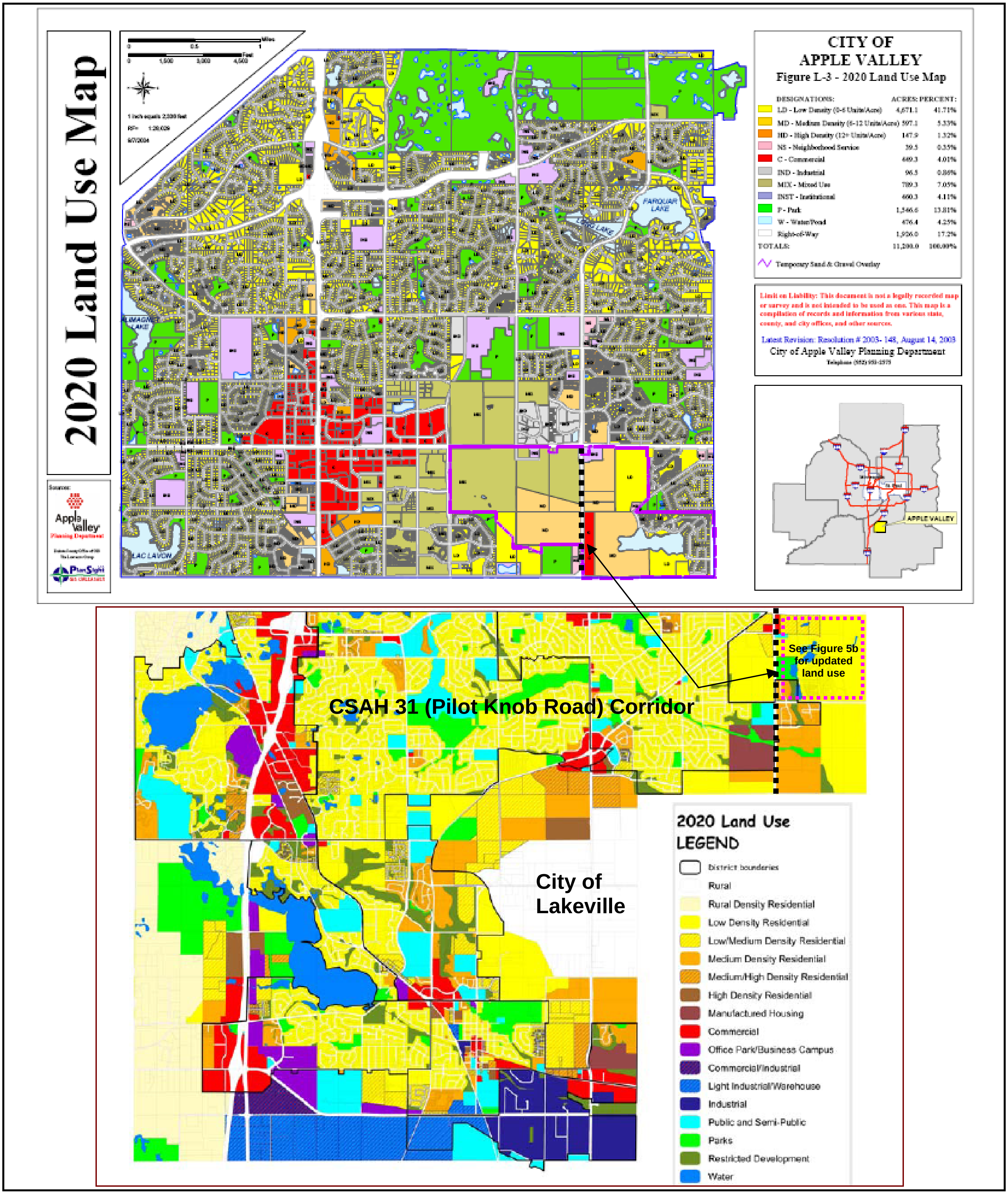
EXISTING CORRIDOR LAND USE AND TRAFFIC CONTROL

Figure 4

CSAH 31 (PILOT KNOB ROAD) CORRIDOR TRANSPORTATION STUDY
City of Lakeville, City of Apple Valley and Dakota County



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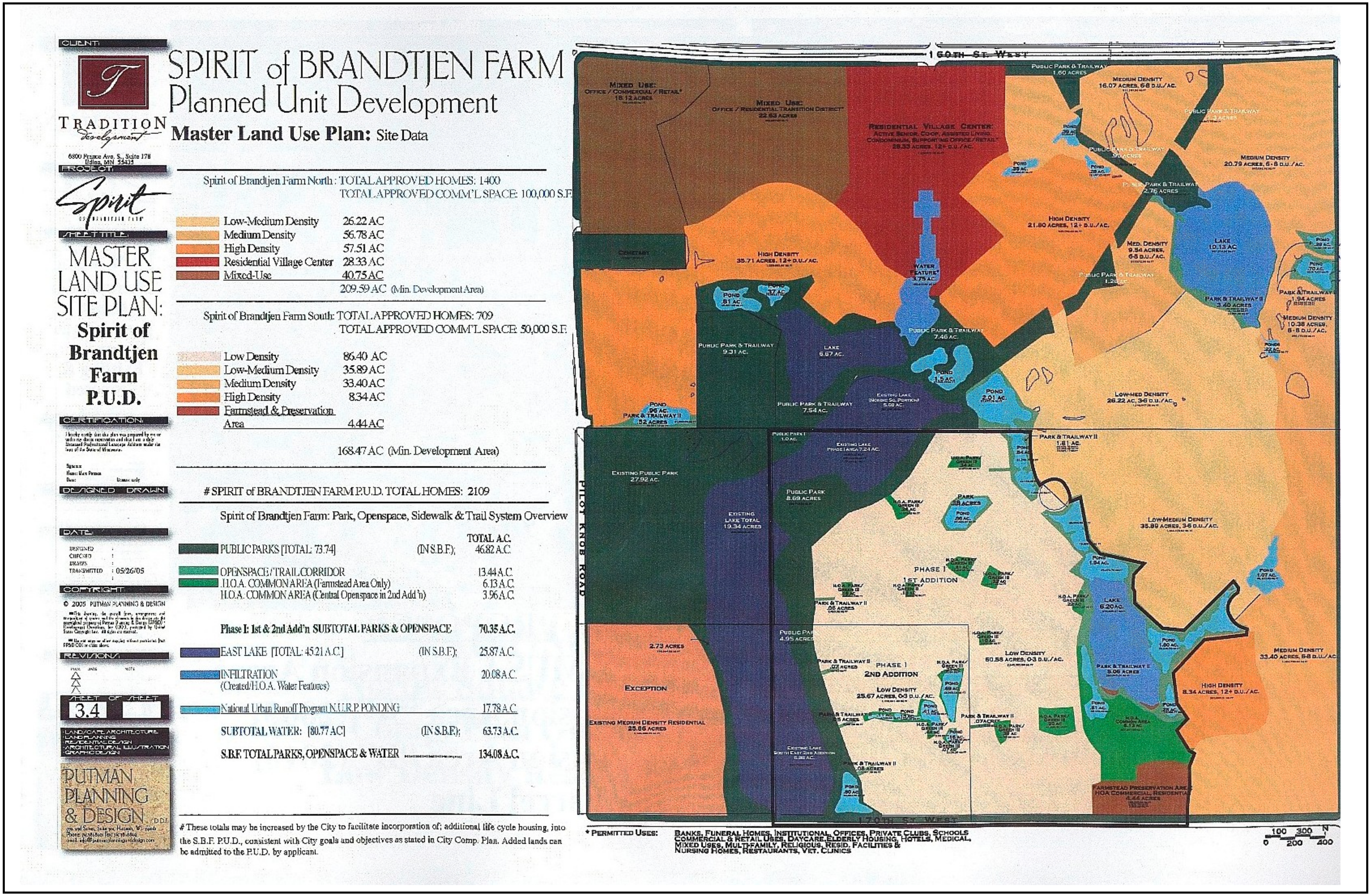
FUTURE LAND USE

CSAH 31 (PILOT KNOB ROAD) CORRIDOR TRANSPORTATION STUDY
City of Lakeville, City of Apple Valley and Dakota County

Figure 5



SPIRIT OF BRANDTJEN FARM LAND USE PLAN

Figure 5b

CSAH 31 (PILOT KNOB ROAD) CORRIDOR TRANSPORTATION STUDY
City of Lakeville, City of Apple Valley and Dakota County

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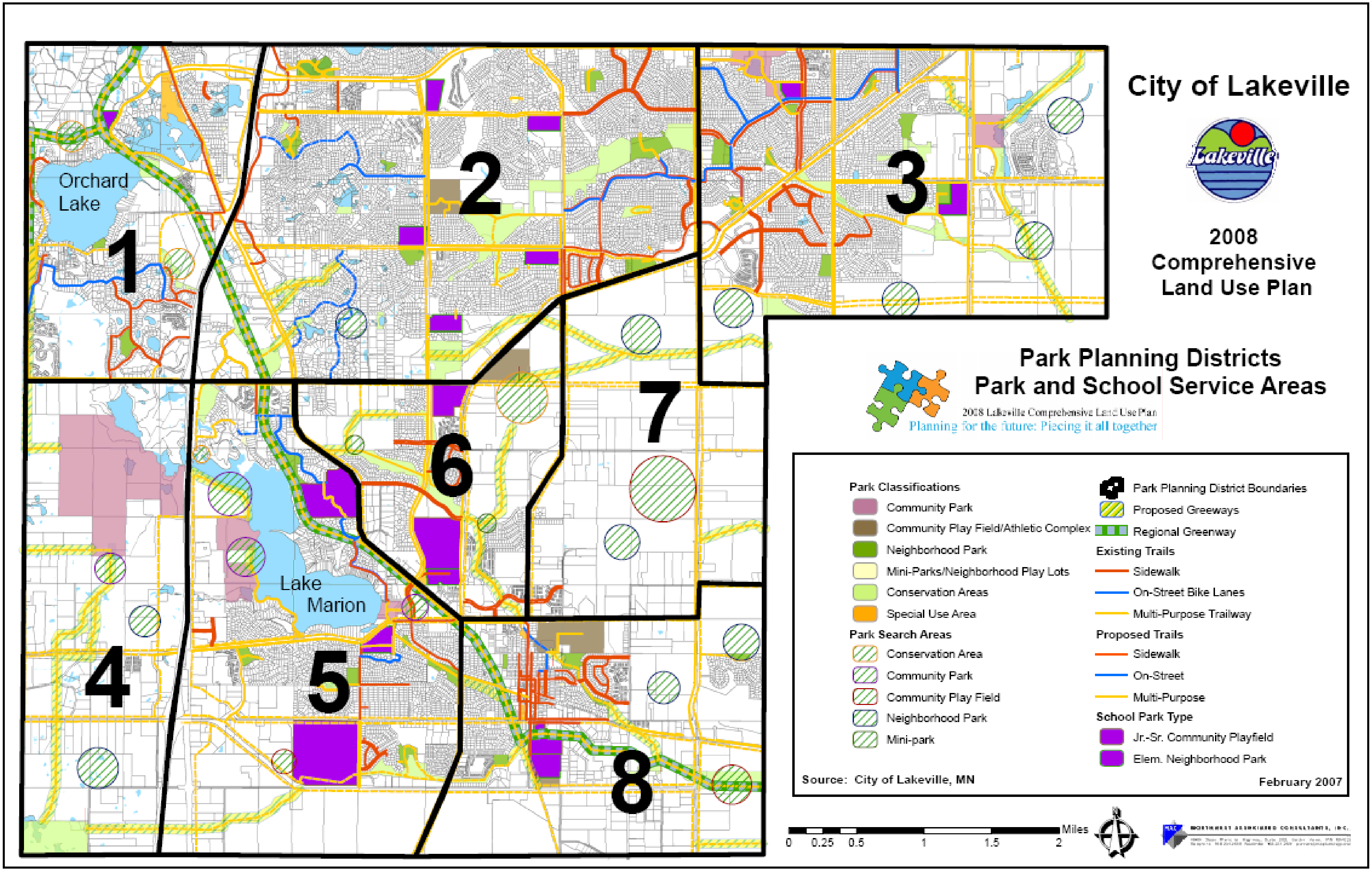

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LAKEVILLE PARKS/OPEN SPACE LAND USE PLAN

CSAH 31 (PILOT KNOB ROAD) CORRIDOR TRANSPORTATION STUDY
City of Lakeville, City of Apple Valley and Dakota County

Figure 5c

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c. Transit

The transit system serving the CSAH 31 study corridor is currently anchored by the recently completed (2006) 157th Street Transit Station located on CSAH 31 between CSAH 46 and 157th Street. This transit station provides 250 parking spaces (park and ride), an indoor, climate-controlled waiting shelter and bike lockers. The Minnesota Valley Transit Authority (MVTA) operates two bus routes serving this station; Route 420 (local area flex route with limited peak period service only) and Route 477F (limited peak period service to Downtown Minneapolis).

This transit station is served by an existing full-access intersection at 157th Street. This primary access for the station is located ¼-mile north of the major intersection of CSAH 31 and CSAH 46. There is a strong interest in ensuring an access environment that will allow this transit station to be viable into the future.

d. Pedestrians and Trails

Trails are currently in place on both sides of CSAH 46 west of CSAH 31, and on both sides of CSAH 31 north of 173rd Street. All other segments of county road in the study area have a trail on one side of the road. There is an existing pedestrian underpass beneath CSAH 31 between 157th Street and CSAH 46.

It is assumed, based on local input, that multi-use trails for bicyclists and pedestrians will be located on both sides of CSAH 31 and CSAH 46. These trails/sidewalks are intended to provide an effective trail/sidewalk system throughout the study corridor in the development of the arterial alternatives for this study.

2.3 Access

a. Existing Access

The CSAH 31 corridor currently has access at approximately 20 locations within the three-mile study corridor. At these locations, CSAH 31 intersects county roads, local roads and private driveways. The traffic control at these intersections varies from traffic signals (e.g., CSAH 46 intersection) to no intersection control (private driveways). The amount of existing access is an issue in the corridor. As a Minor Arterial, the role of CSAH 31 within the transportation system is to provide a high level of mobility with a limited amount of local access.

b. Future Access

The goal with respect to access is to balance mobility with land use accessibility. The ideal solution would be to meet the County access guidelines while providing sufficient ability to access property and not overloading intersections (i.e., as more restrictions occur, greater volumes are pushed to fewer intersection locations; and more robust frontage/backage roadway systems are needed to replace reduced access).

2.4 Traffic Safety

a. Crash History

The crash history to date and associated crash rates for the CSAH 31 corridor (0.7 crashes per million vehicle miles of travel [MVMT]) can be characterized as lower than most comparable minor arterial roadways (1.9 per Mn/DOT MVMT and 2.15 per Hennepin County MVMT). This is likely because with the current lack of development along the corridor, conflicting cross-street volumes are relatively low.

b. Future Safety

While it is difficult to predict future crash locations and causes for individual events, one can identify potential factors and characteristics that contribute to overall crash experience. In high-volume arterial corridors, crashes typically concentrate at intersections where weaving and/or driver decisions need to be made. A goal of the study was to reduce conflict points and recommend access conditions that allow for good traffic flow and safety.

2.5 Existing Traffic Volumes, Patterns, and Intersection Operations

a. Traffic Volumes and Patterns

Existing traffic volumes along the CSAH 31 corridor can be characterized as moderate to high considering the amount of underdeveloped and developing land adjacent to the study segment. Average Daily Traffic (ADT) volumes on the study segment of CSAH 31 range from 15,200 north of CSAH 46 to 32,000 south of CSAH 46 (see Figure 6). ADT volumes on the study segment of CSAH 46 range from 18,000 east of CSAH 31to 21,300 west of CSAH 31.

The significant difference in traffic volume north and south of CSAH 46 on CSAH 31 is indicative of heavy turning movements to and from the south at the CSAH 31 intersection with CSAH 46. This is also true at the intersection of CSAH 31 with Dodd Boulevard (CSAH 9) where there are heavy turning movements to and from the north on CSAH 31. These heavy turning movement patterns represent an intersection operations challenge in terms of intersection geometrics, lane use and traffic control.

b. Intersection Operations

An operations analysis of existing morning and afternoon peak hour conditions was not included in the scope of this CSAH 31 corridor study. However, based on experience and observation of the corridor segment, it appears that all of the corridor study key intersections are operating at acceptable levels at the current time.

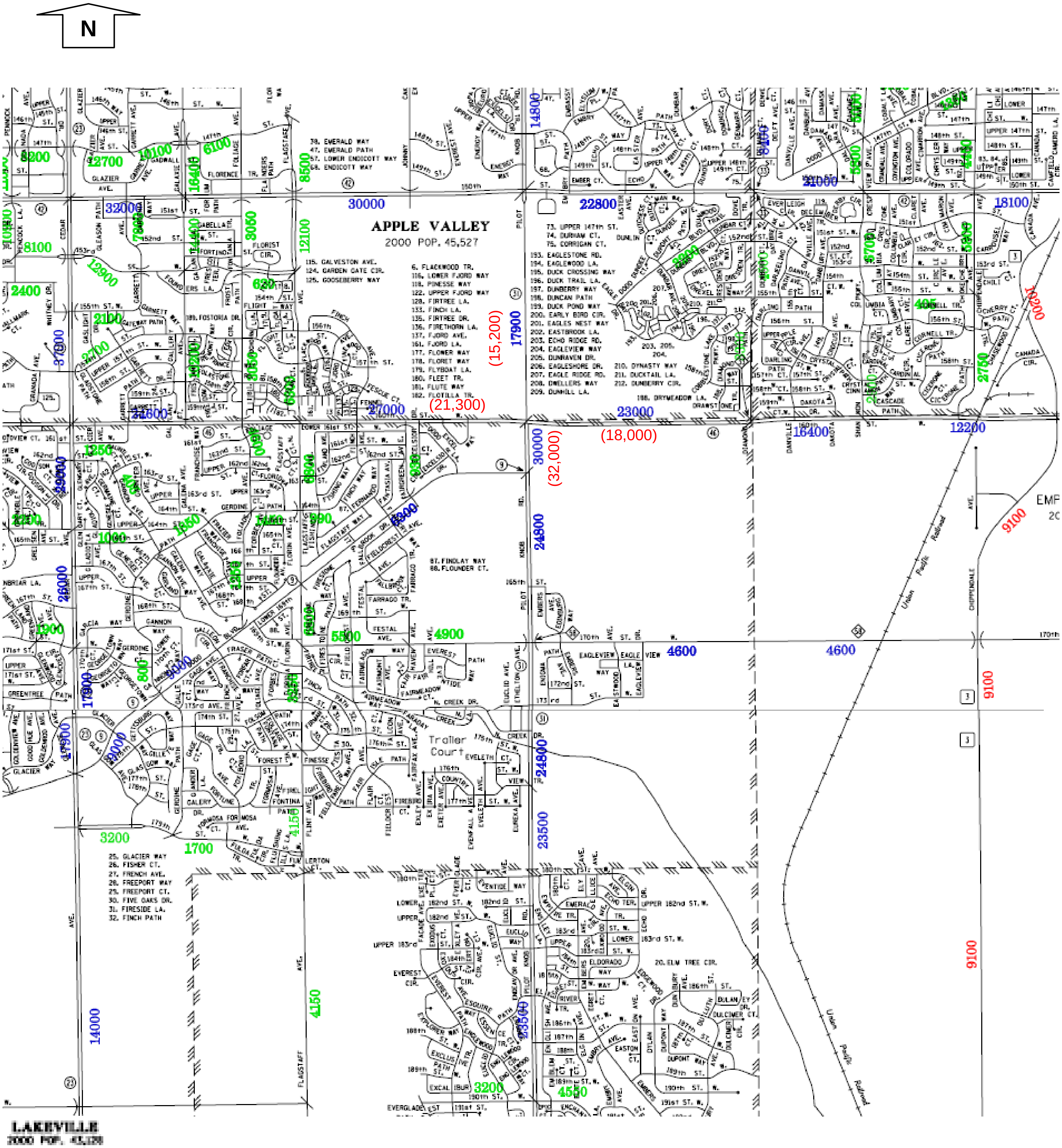
2.6 Local Supporting Roadway System

a. Local Transportation Plans

The existing and future roadway systems assumed within the study corridor were based on the current Dakota County and Cities of Apple Valley and Lakeville Transportation Plans and specifically the associated Transportation Functional Classification Systems (see Figure 7).

b. Parallel and Crossing Collector Street System

In order to develop the traffic forecasts for the various arterial alternatives, particularly those that required access restriction and diversion of traffic, a system of Parallel and Crossing Collector Streets was assumed (see Figure 8).



Based on the Mn/DOT 2005 Traffic Flow Map except as modified for 2006 counts = (2006) counted by Dakota County

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EXISTING AVERAGE DAILY TRAFFIC VOLUMES

Figure 6

CSAH 31 (PILOT KNOB ROAD) CORRIDOR TRANSPORTATION STUDY
City of Lakeville, City of Apple Valley and Dakota County

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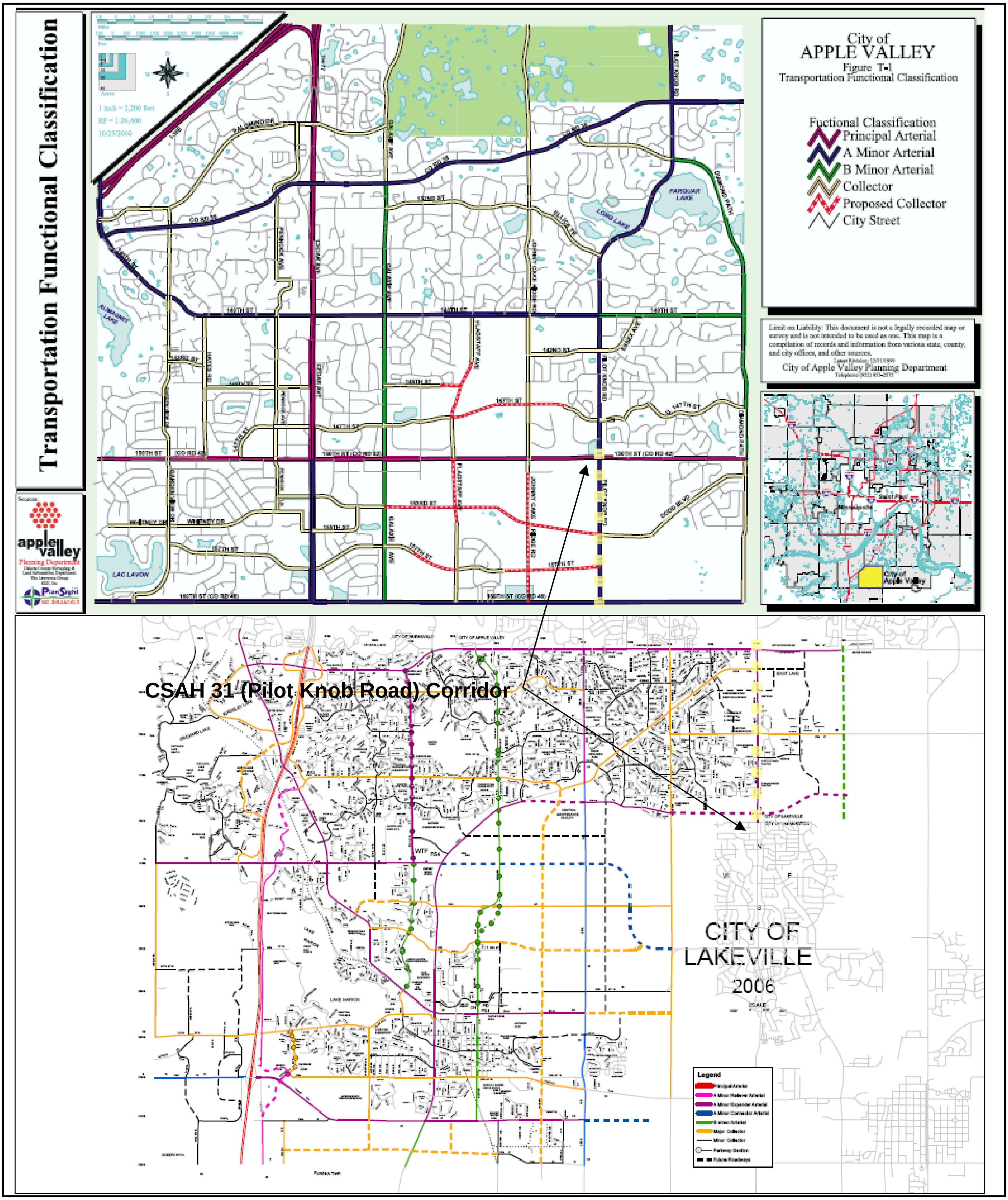

ROADWAY FUNCTIONAL CLASSIFICATION SYSTEM

Figure 7

CSAH 31 (PILOT KNOB ROAD) CORRIDOR TRANSPORTATION STUDY

City of Lakeville, City of Apple Valley and Dakota County

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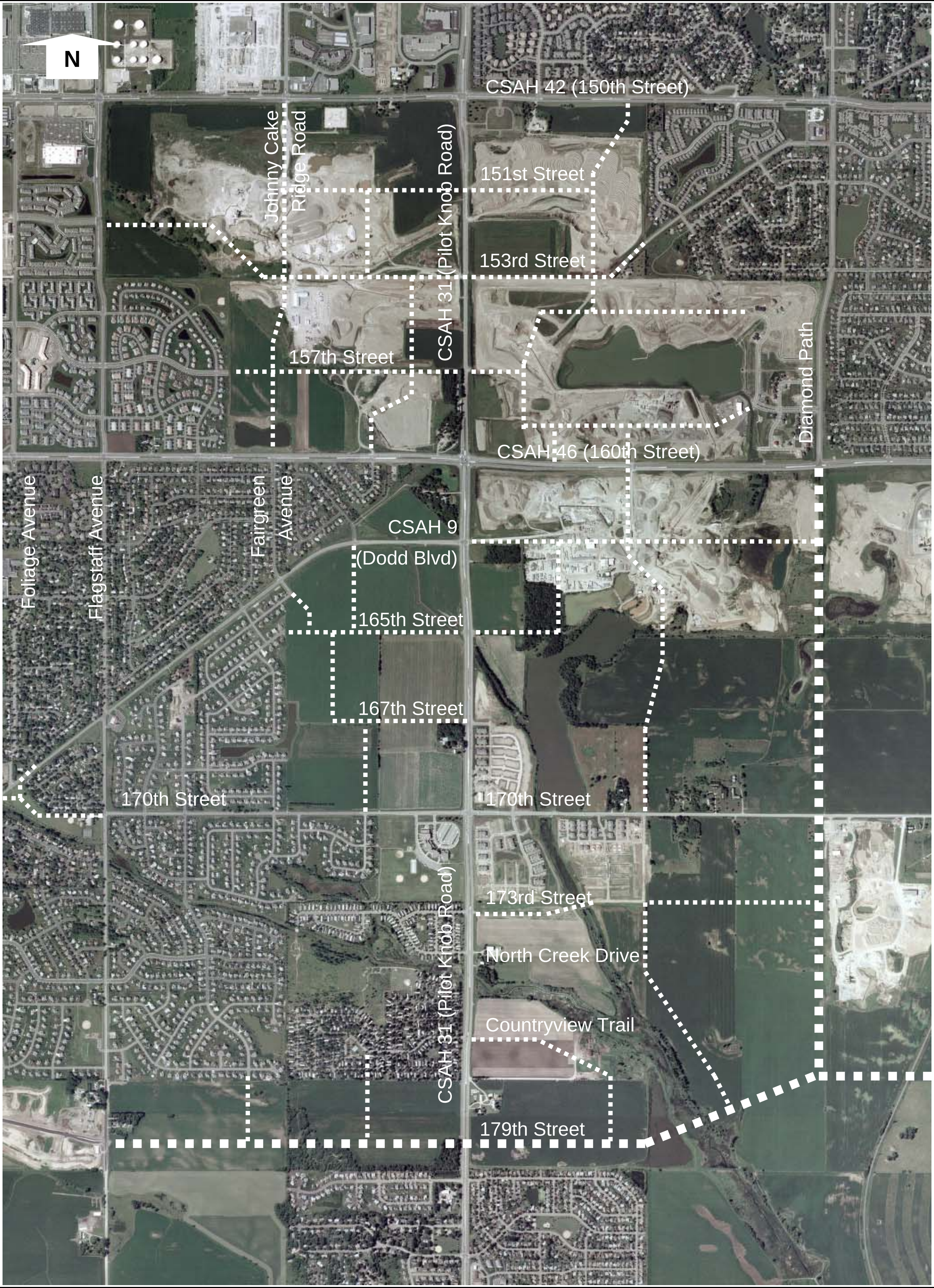

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PARALLEL & CROSSING COLLECTOR STREETS

Figure 8

CSAH 31 (PILOT KNOB ROAD) CORRIDOR TRANSPORTATION STUDY
City of Lakeville, City of Apple Valley and Dakota County

3.0 Alternative Identification

The alternatives identified for the CSAH 31 Corridor were developed by SRF based on meetings with the PMT early in the study process. The initial focus in the design of the study was to identify the alternatives for the CSAH 31/CSAH 46 intersection area since this was the most critical intersection in the corridor. Then depending on the specific elements of the CSAH 31/CSAH 46 intersection area alternatives, the access alternatives for the remainder of the corridor were identified and developed.

3.1 Alternatives at CSAH 31/CSAH 46

The full listing of identified alternatives for the CSAH 31/CSAH 46 intersection area is as follows:

a. Alternative A – No Build – Four-Lane At-Grade Signal Controlled Intersection

b. Arterial Alternative B – Six-Lane At-Grade Signal Controlled Intersection (see Figure 9)

c. Alternative C – ½ Single Point Urban and ½ Tight Diamond Interchange (see Figure 10)

d. Alternative D – ½ Single Point Urban and ½ Arterial Interchange (see Figure 11)

   1. With 170th Street Realignment/Connection to Dodd Boulevard (see Figure 8)
   2. Without 170th Street Realignment/Connection to Dodd Boulevard

e. Alternative E – Four Exit Ramp Split Level Single Point Urban Interchange (see Figure 12)

f. Alternative F – Four Entrance Ramp Single Point Urban Interchange (see Figure 13)

Based on input from the public during the first open house meeting and the meetings with the PMT, the alternatives with the most potential for addressing the corridor needs were selected for analysis from the full listing of identified alternatives.

3.2 Preliminary Arterial Alternatives Selected for Analysis

The arterial alternatives selected for analysis for the CSAH 31 Corridor were as follows:

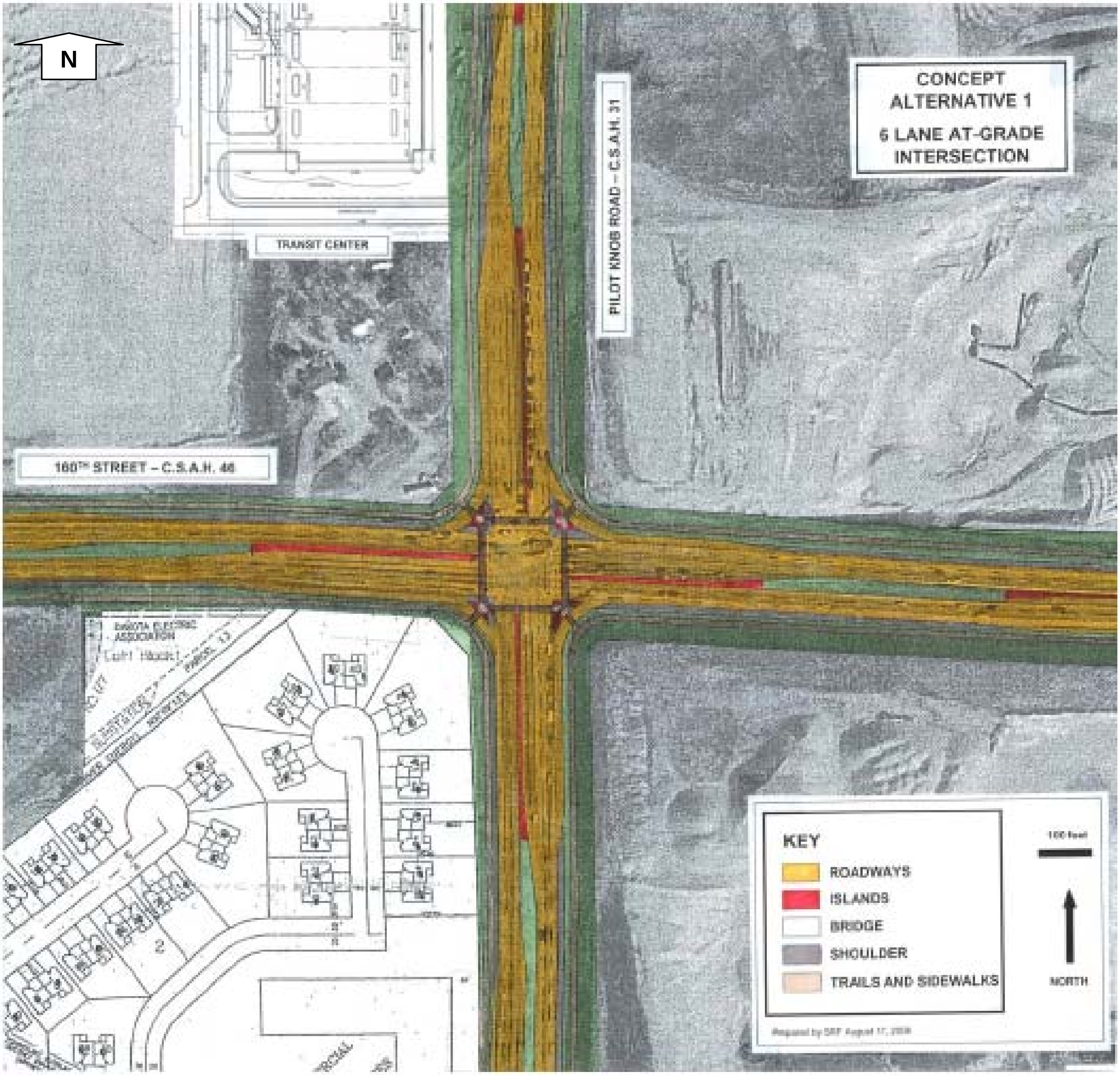
a. Alternative A – Six-Lane with At-Grade Signal Controlled Intersection at CSAH 46 and full access at 157th and Dodd

b. Alternative B – Six-Lane with At-Grade Signal Controlled Intersection at CSAH 46 and ¾ access at 157th and Dodd

c. Alternative C – Six-Lane with ½ Single Point Urban and ½ Tight Diamond Interchange at CSAH 46

d. Alternative D – Six-Lane with ½ Single Point Urban and ½ Arterial Interchange at CSAH 46

   1. With 170th Street Realignment/Connection to Dodd Boulevard
   2. Without 170th Street Realignment/Connection to Dodd Boulevard



CSAH 31 / CSAH 46 INTERSECTION AREA
SIX-LANE AT-GRADE ARTERIAL INTERSECTION CONCEPT

CSAH 31 (PILOT KNOB ROAD) CORRIDOR TRANSPORTATION STUDY
City of Lakeville, City of Apple Valley and Dakota County

Figure 9

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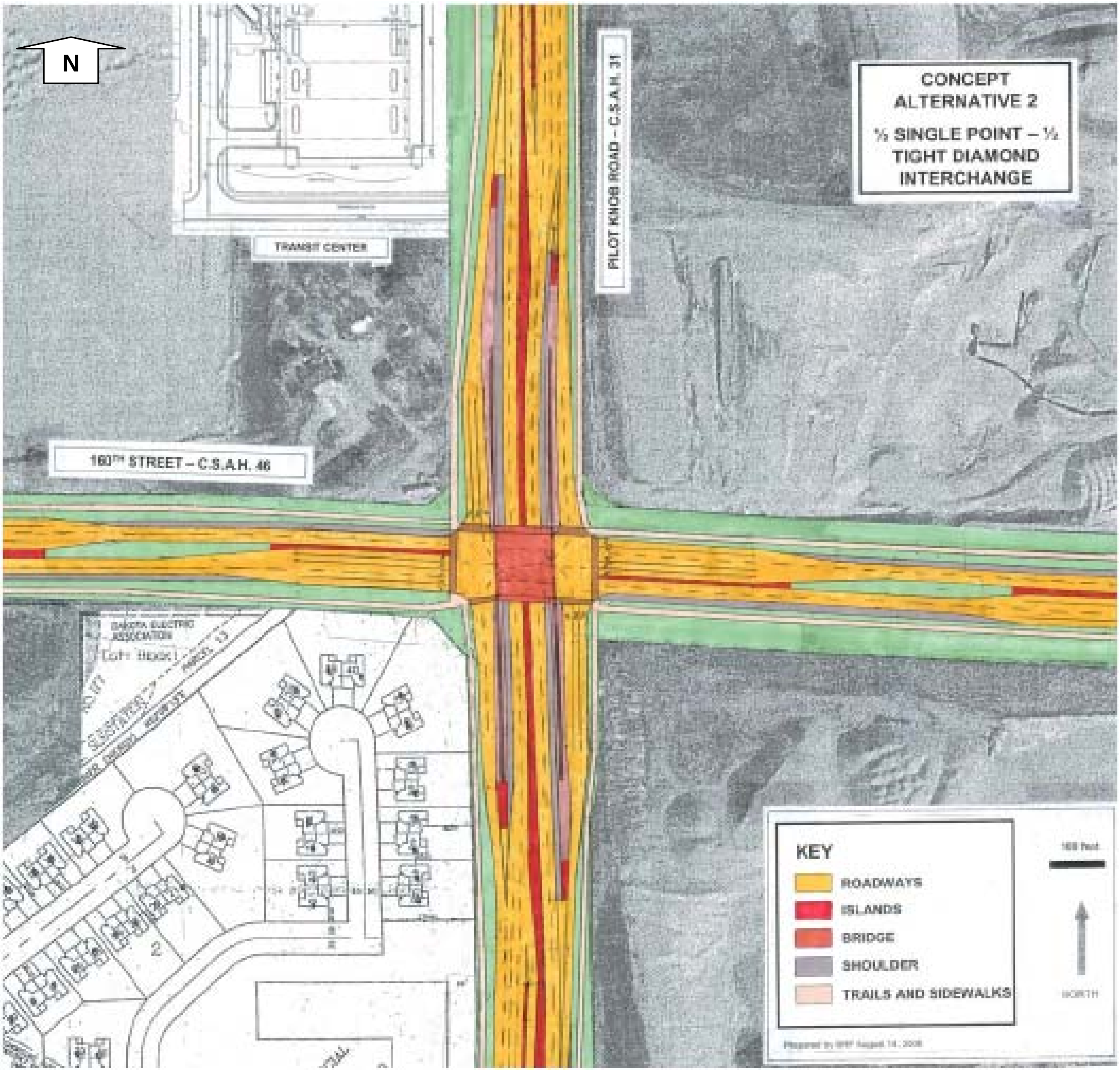

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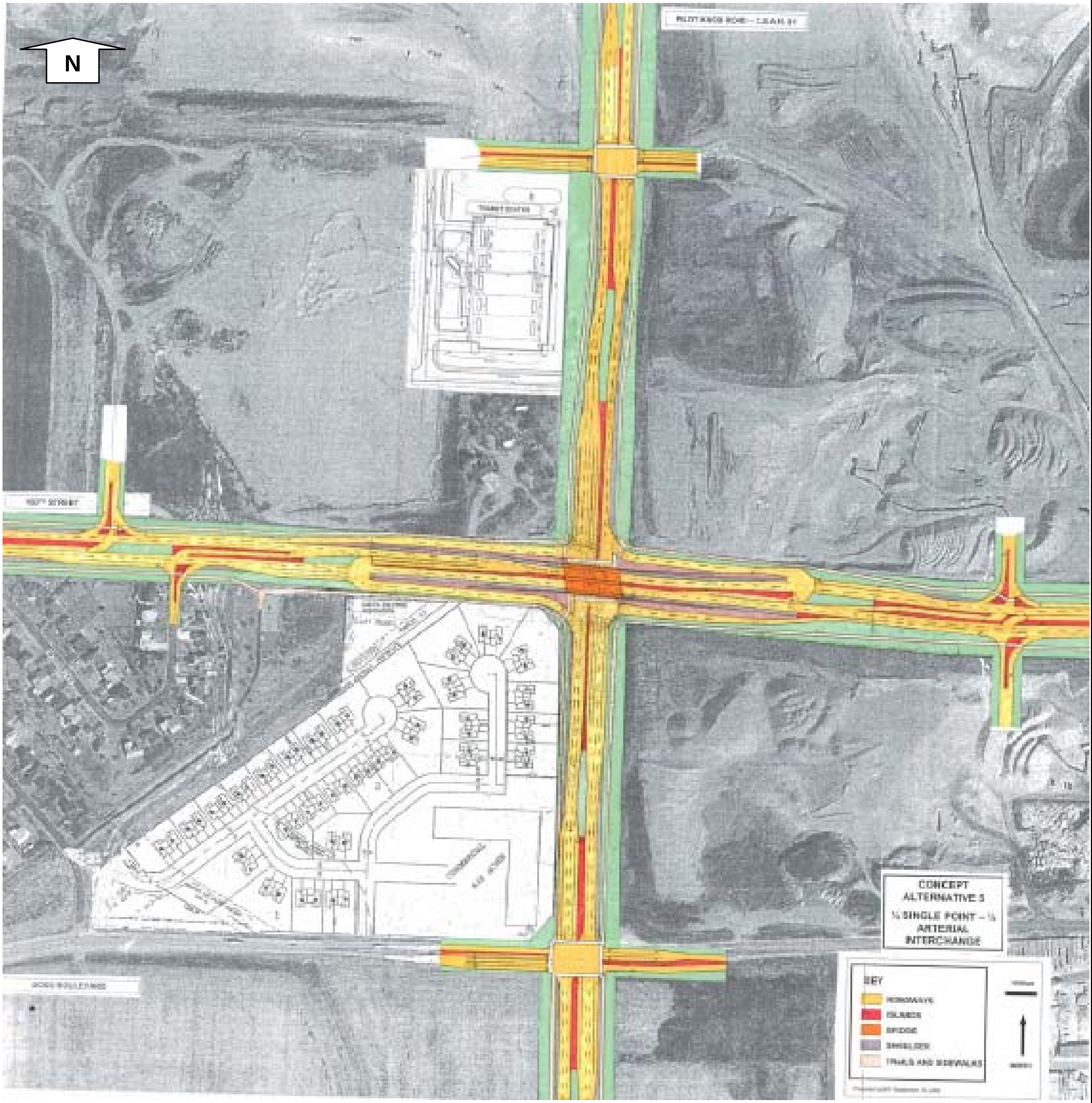
CSAH 31 / CSAH 46 INTERSECTION AREA
1/2 SPUI 1/2 TIGHT DIAMOND INTERCHANGE CONCEPT

Figure 10

CSAH 31 (PILOT KNOB ROAD) CORRIDOR TRANSPORTATION STUDY
City of Lakeville, City of Apple Valley and Dakota County



CSAH 31 / CSAH 46 INTERSECTION AREA
1/2 SPUI 1/2 ARTERIAL INTERCHANGE CONCEPT

CSAH 31 (PILOT KNOB ROAD) CORRIDOR TRANSPORTATION STUDY
City of Lakeville, City of Apple Valley and Dakota County

Figure 11

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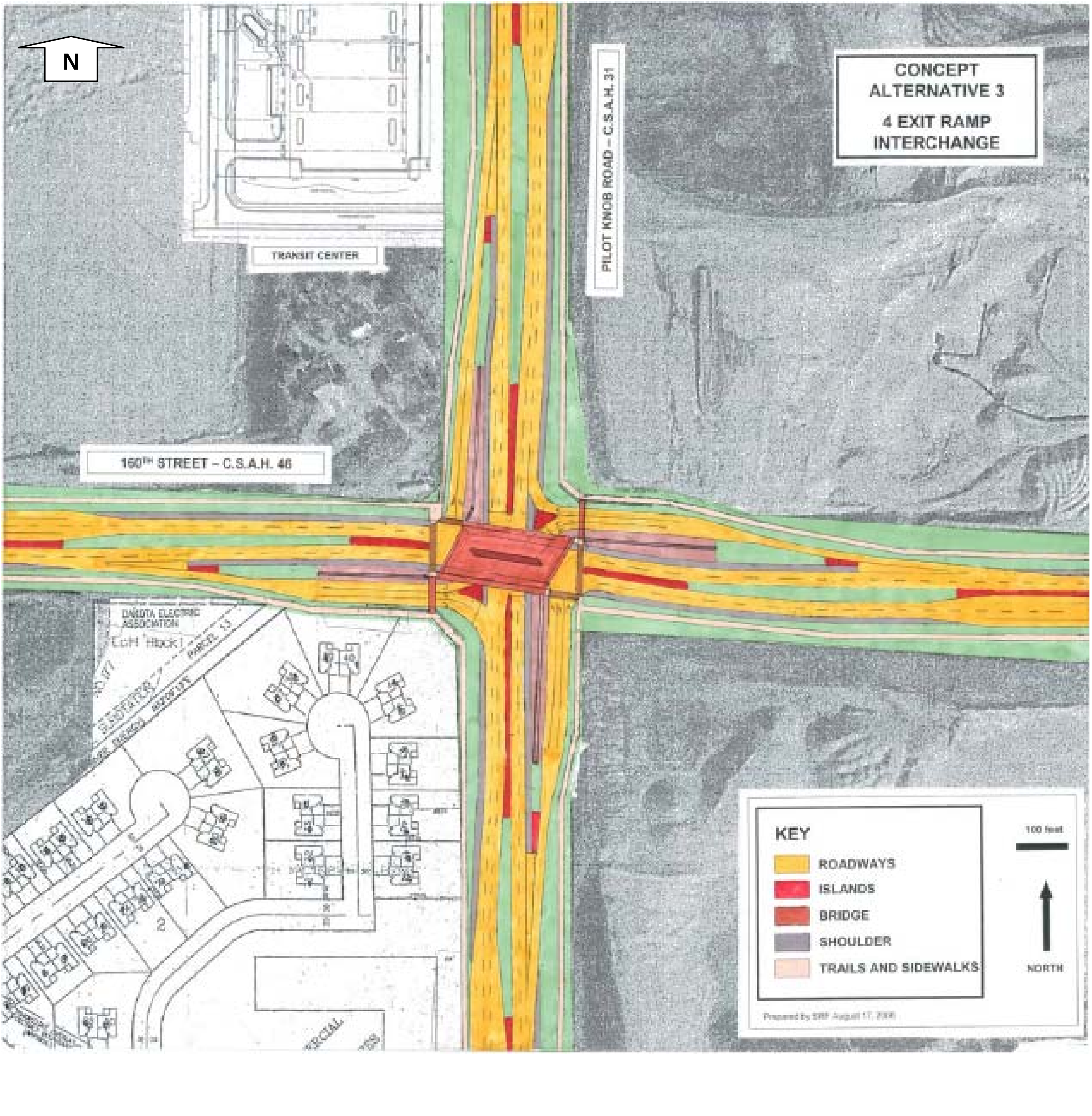

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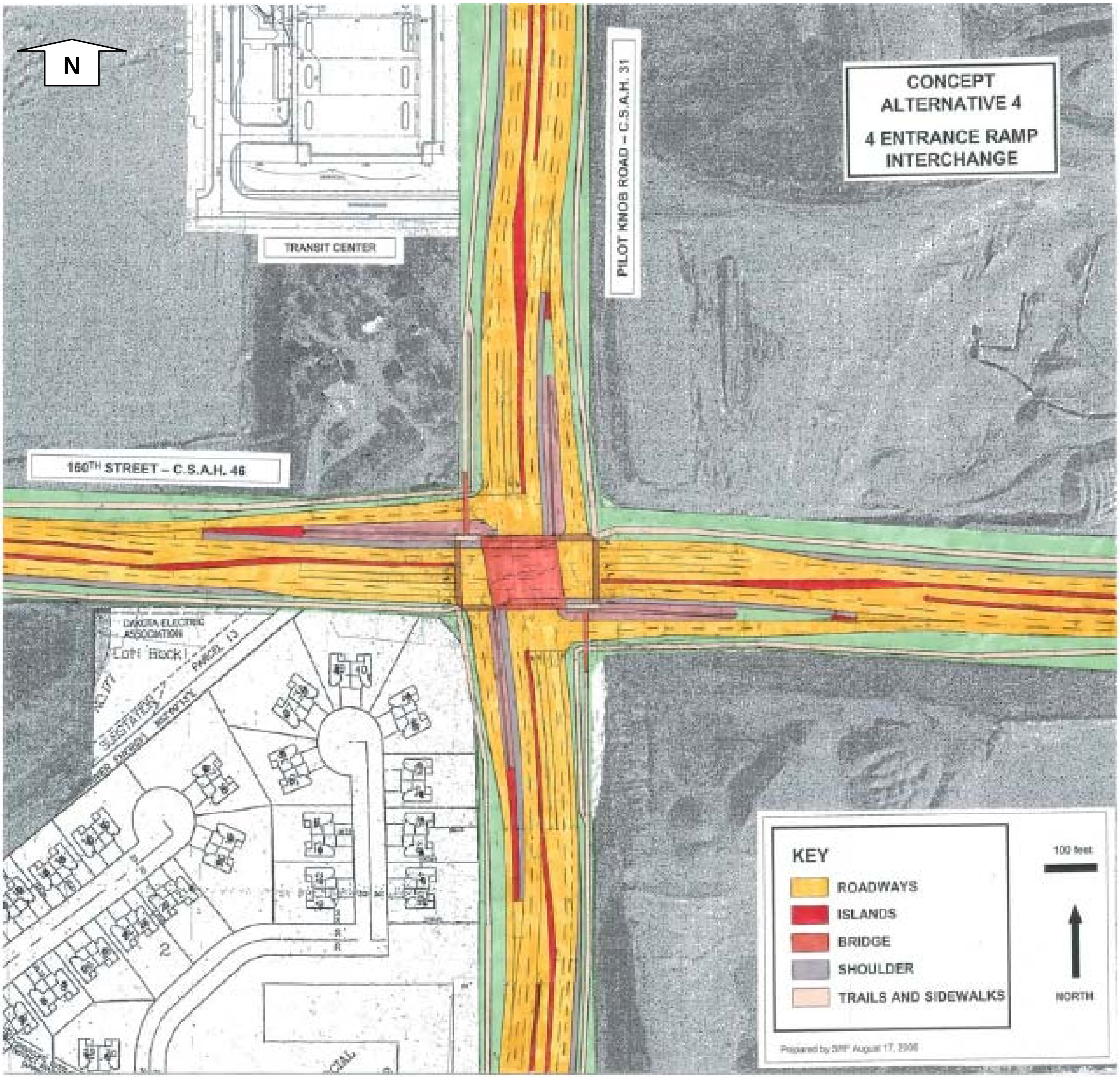
CSAH 31 / CSAH 46 INTERSECTION AREA
FOUR EXIT RAMP ARTERIAL INTERCHANGE CONCEPT

CSAH 31 (PILOT KNOB ROAD) CORRIDOR TRANSPORTATION STUDY
City of Lakeville, City of Apple Valley and Dakota County

Figure 12



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CSAH 31 / CSAH 46 INTERSECTION AREA
FOUR ENTRANCE RAMP INTERCHANGE CONCEPT

Figure 13

CSAH 31 (PILOT KNOB ROAD) CORRIDOR TRANSPORTATION STUDY
City of Lakeville, City of Apple Valley and Dakota County

4.0 Future Traffic Volumes

4.1 Daily Traffic Forecasting Methodology

In order to analyze specific project alternatives, it was necessary to have detailed forecast traffic volumes in this area. The Twin Cities Regional Travel Demand Model is the accepted forecasting tool across the Metropolitan area, but does not include a high level of detail in the study area. Dakota County has also developed a travel demand model with greater detail than the regional model, but it covers a smaller geographic area and it is based on an older version of the regional model.

As a result, a combined model was used to forecast future traffic volumes. All of the zone and highway network information within the Dakota County border was separated from the rest of the regional model; then, the Dakota County model was inserted into the regional model to replace its Dakota County information. The new combined model was then checked to ensure that highway connections to Dakota County were complete. This process was performed for both the 2000 base model and the 2030 forecast year model.

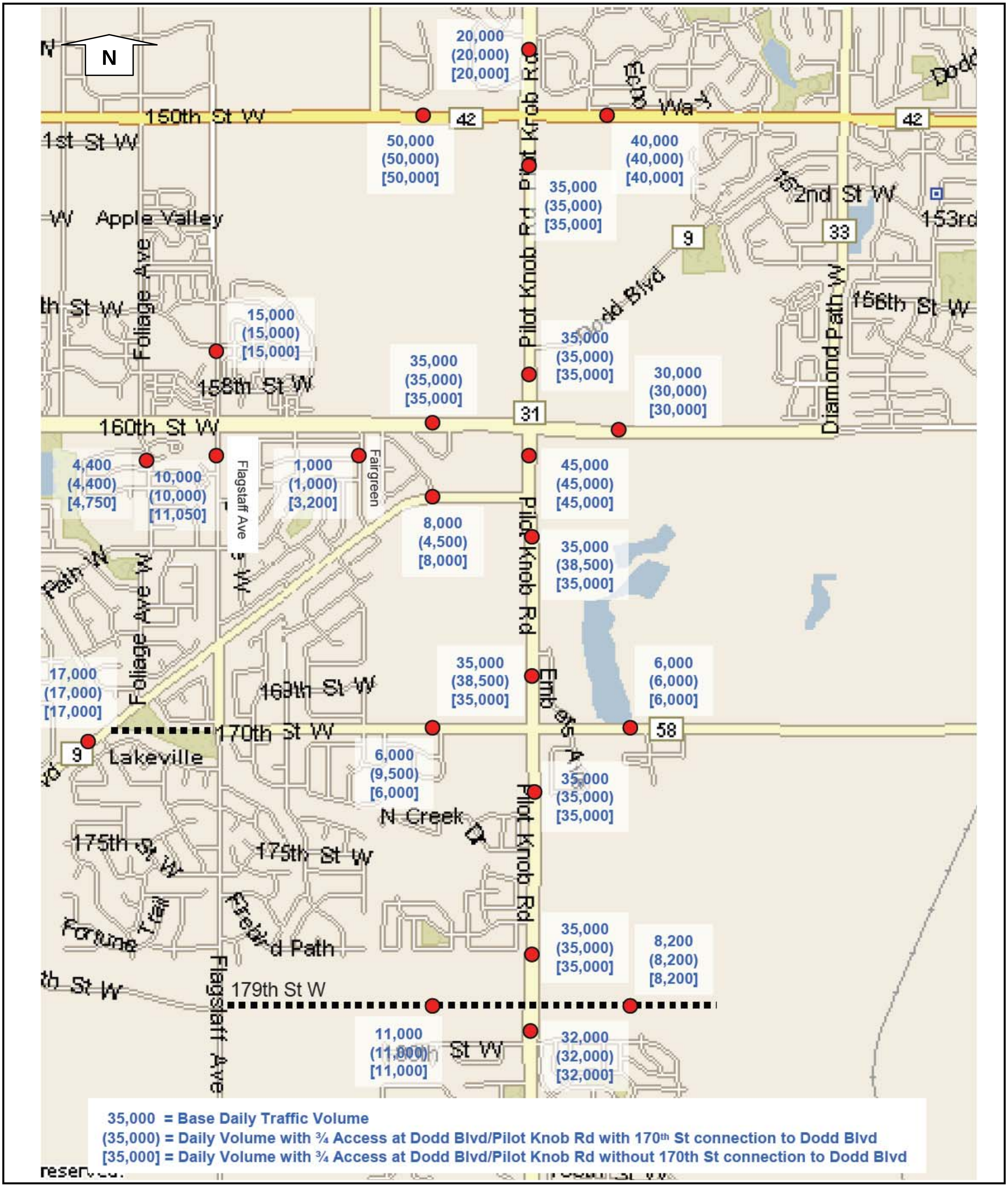
For specific alternatives the coding of Dodd Boulevard between Cedar Avenue and Pilot Knob Road was altered from the original Dakota County model to reflect changes illustrated in the project scope. The west connection of Dodd Boulevard with Cedar Avenue was moved to the south to create a four-legged, right-angle intersection with 179th Street. Dodd Boulevard was also realigned at 170th Street. Finally, an arterial east-west corridor was added to the east of Pilot Knob Road at 179th Street.

4.2 Future Daily Traffic Volumes

The future daily volumes along the CSAH 31 corridor range from 32,000 vpd to 45,000 vpd (Figure 14). The forecasts for some of the local east-west and north-south streets are further discussed below:

The forecast east-west through traffic volumes crossing CSAH 31 at the intersections of 153rd and 157th Streets were identified as a concern (i.e., forecasts seem too low). The City's intent for these collector streets is to serve as local trip relievers for CSAH 42 and CSAH 46, and therefore they are expected to carry more east-west through traffic than the forecasts are showing.

Forecasts on these local routes may have been underestimated because the forecasting model and methodology used for this study is more regional in nature. However, from a traffic operations perspective, traffic volume should not make a significant difference (i.e., the forecast eastbound through volume at one of these subject intersections is 10 vehicles during the peak hour; however, more realistically it may be 100 eastbound through vehicles). Assuming 100 through vehicles, a 90-second traffic signal cycle and 40 cycles in the hour, there would be an average of only two to three vehicles per cycle to serve. This number of through vehicles would be easily served by the minimum through green time for that approach; therefore, no significant operations issue results with this magnitude of change.



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YEAR 2030 DAILY TRAFFIC VOLUMES

Figure 14

CSAH 31 (PILOT KNOB ROAD) CORRIDOR TRANSPORTATION STUDY
City of Lakeville, City of Apple Valley and Dakota County

Forecasts for the north-south collector streets in the City of Lakeville were also the subject of some concern due to the existing and potential future through traffic volume levels. For those arterial alternatives that would restrict access at Dodd Boulevard/CSAH 31 the potential for additional north-south through traffic increased. As a result, additional analysis was done to estimate diversions based on a travel-time differential traffic assignment methodology. It was estimated that Fairgreen Avenue would receive 60 percent of the traffic diverted away from the intersection of Dodd Boulevard/CSAH 31 if it is restricted to a ¾ access intersection. Of the remaining diverted traffic, Flagstaff Avenue would receive 30 percent and Foliage Avenue would receive 10 percent (see Figure 14).

For those arterial scenarios which assumed that Dodd Boulevard would be realigned to connect to 170th Street through Dodd Trail Park (between Dodd Boulevard and Flagstaff Avenue – see Figure 8), the potential for additional north-south through traffic on the north-south local collector streets was reduced. However, the Dodd Boulevard realignment to 170th Street had significant negative impacts associated with it (i.e. acquisition of a number of homes required and the loss of park and trail facilities). From the forecasts, it appeared that not enough traffic would be diverted by this connection to offset these negative impacts. For this reason, it is unlikely that this alternative will be carried forward.

4.3 Peak Hour Turning Movement Traffic Forecasting Methodology

The peak-hour turning movement volume forecasts for the CSAH 31 corridor were based on the latest turn movement counts provided by Dakota County. These counts were utilized to calculate AM and PM peak hour approach/departure link volumes at intersections. The 2005 ADT flow map was compared to the 2030 forecast link volumes to calculate the growth factor for each leg of the existing intersection to be modeled. The existing turning movement volumes were multiplied by the corresponding approach leg growth factors to determine new turning movement volumes.

Current turn movement counts were not available for all intersections since some of the intersections analyzed in this process are planned for the future. The calculated approach/ departure volumes on each leg of each intersection were compared to the current ADT flow map in order to calculate the percentage of daily traffic on each leg during the AM and PM peak hours. The average of these approach and departure volume percentages was then taken and multiplied by the forecast link ADT volumes in order to calculate 2030 peak hour directional link volumes.

A program named “Turns W32” (a turning movement propensity model) was utilized to calculate new turning movements from the approach and departure volumes. The program allows adjustments to be made to the percentage of travelers going through, right or left while balancing the needed approach and departure volumes. This provided a distribution of the volumes appropriately onto the arterial and collector routes. Because CSAH 31 at CSAH 46 is considered to be a crucial intersection and existing counts were available for both the AM and PM peak periods at this intersection, the volumes were balanced to the North and South along the CSAH 31 corridor beginning at this point.

After balancing the volumes, the link approach and departure volumes were re-examined in order to determine whether they accurately reflected the forecast ADT's, using the rule of thumb that the PM peak hour traffic volume is typically 10 percent of the ADT, and the AM peak hour traffic volume is typically 8 percent of the ADT. Since the link volumes exceeded these expected percentages, all volumes across the network were reduced to reflect more accurate 2030 AM and PM peak hour movements. Additional manual adjustments were made for some alternatives.

4.4 Future Peak Hour Turning Movement Forecasts by Alternative

Year 2030 traffic forecasts for the peak hour turning movement volumes were developed for the following Selected Arterial Alternatives (see Appendix A for the volume figures):

1. Preliminary Arterial Alternative A – Six-Lane with At-Grade Signal Controlled Intersection at CSAH 46 and full access at 157th and Dodd.
2. Preliminary Arterial Alternative B – Six-Lane with At-Grade Signal Controlled Intersection at CSAH 46 and ¾ access at 157th and Dodd.
3. Preliminary Arterial Alternative C – Six-Lane with ½ Single Point Urban and ½ Tight Diamond Interchange at CSAH 46.
4. Preliminary Arterial Alternative D – Six-Lane with ½ Single Point Urban and ½ Arterial Interchange at CSAH 46.
    a. With 170th Street Realignment/Connection to Dodd Boulevard.
    b. Without 170th Street Realignment/Connection to Dodd Boulevard.

5.0 Alternatives Analysis and Evaluation

5.1 Traffic Operations

An operational analysis of the selected alternatives was completed for the year 2030 forecast traffic volumes, applying the Synchro/SimTraffic traffic operations simulation model. The results of this analysis are shown in Figures 15-18. For each alternative, the program was allowed to optimize traffic signal timing parameters. The individual intersection peak hour level of service results show that there are some intersections in some alternatives that would be problematic even with identified improvements. Alternative D – ½ SPUI and ½ Arterial Interchange provided the best results of the alternatives selected for detailed analysis, in terms of acceptable levels of service throughout the corridor for the morning and afternoon peak hours.

The above methodology allowed for comparison between alternatives. However, it was noted that for Alternatives A and B, the signal cycle length selected by the program (70 seconds) was less than the minimum cycle length Dakota County would consider using in this type of environment. These two alternatives were subsequently simulated using a 120-second cycle length. The resulting 2030 PM peak hour intersection levels of service appear in the column to the right on Figures 15 and 16.

5.2 Alternatives Evaluation

As part of the study process an evaluation methodology and evaluation criteria were developed with input from the PMT. Each of the alternatives was evaluated based on these criteria and summarized in a matrix (see Figure 19).

The results of the analysis were scrutinized by the PMT and shown to the public. Since no funding is available or programmed for this corridor, the capital-intensive Alternatives C and D (Figures 17 and 18, respectively) were assumed to represent a longer-range improvement. Conversely, Alternatives A and B (Figures 15 and 16, respectively), with a lower-cost at-grade intersection at CSAH 31 and CSAH 46, represent more interim-range improvements. The results of the operations analysis using 120-second cycle lengths suggest that an at-grade intersection could be an adequate solution until some time beyond the 2030 forecast year.

6 Lane Full Access

2030 AM/PM Peak Hour Levels of Service

Level of Service (LOS) is a measure of average vehicular delay at an intersection.

LOS A represents little or no delay.

LOS F suggests an over-capacity environment with excessive delay.

X/X = AM/PM Overall Optimized LOS

LEGEND

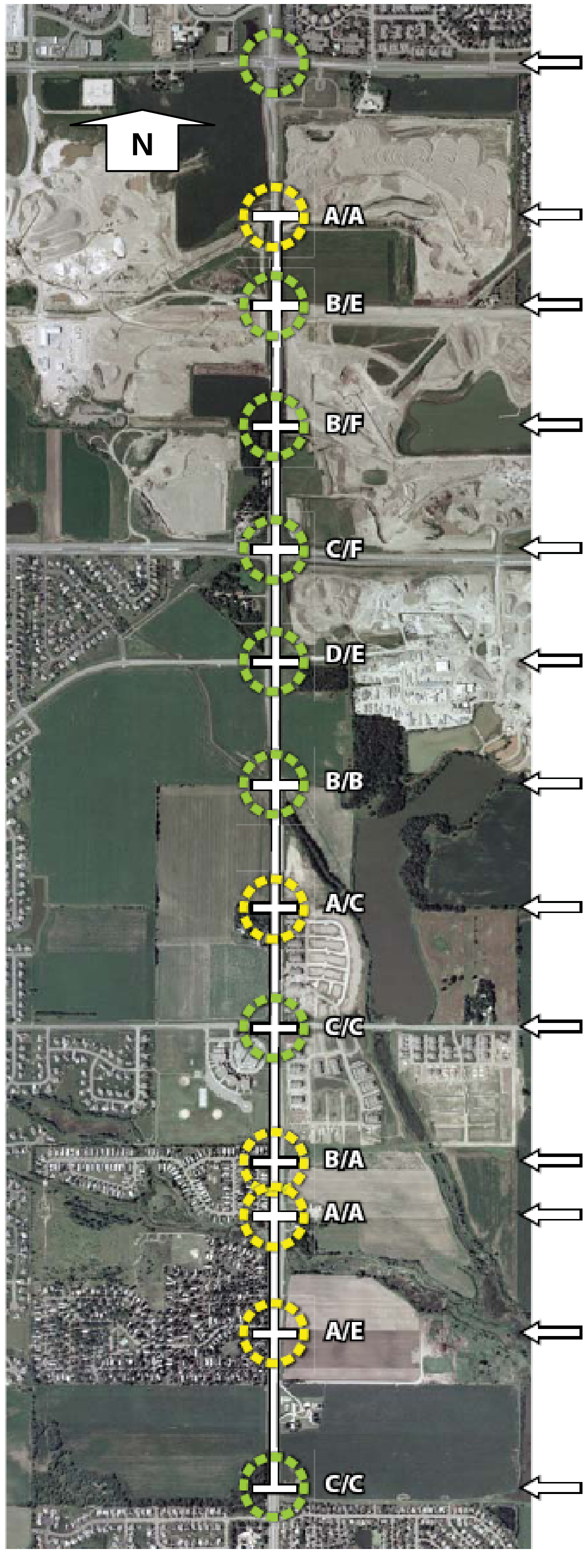
= Public Connection in place as area develops

= Traffic Signal/Full Access

= Right-in/Right-out

= Full Access with Side Street Stop Signs

= Unsignalized 3/4 Access (No Left Turns/Thrus from Side Street)



Intersection	2030 PM Peak Hour LOS (120 sec cycle)
CSAH 31 at CSAH 42	D
CSAH 31 at 151st	A
CSAH 31 at 153rd	C
CSAH 31 at 157th	B
CSAH 31 at CSAH 46	D
CSAH 31 at Dodd	B
CSAH 31 at 165th	B
CSAH 31 at 167th	A
CSAH 31 at 170th	B
CSAH 31 at 173rd	A
CSAH 31 at North Creek	A
CSAH 31 at Countryview	A
CSAH 31 at 179th	B

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ALTERNATIVE A
SIX-LANE AT-GRADE ARTERIAL ALTERNATIVE EVALUATION

CSAH 31 (PILOT KNOB ROAD) CORRIDOR TRANSPORTATION STUDY
City of Lakeville, City of Apple Valley and Dakota County

Figure 15

6 Lane 3/4 Access at 157th and Dodd

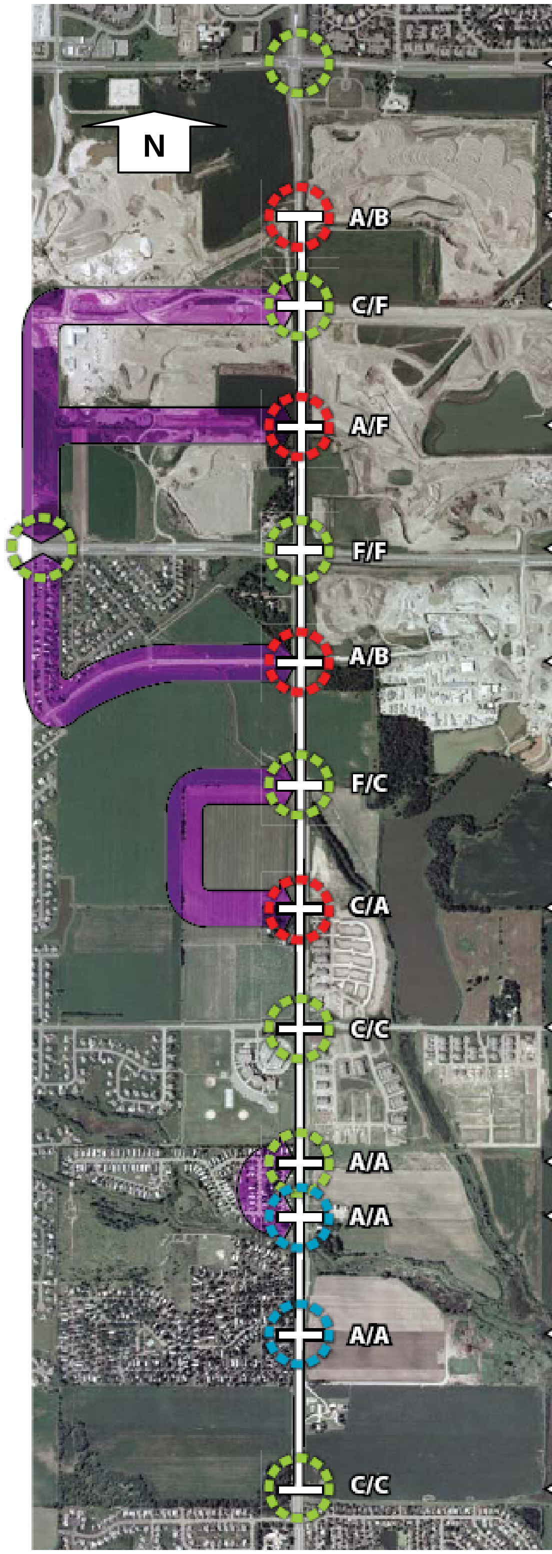
2030 AM/PM Peak Hour Levels of Service

Level of Service (LOS) is a measure of average vehicular delay at an intersection.

LOS A represents little or no delay.

LOS F suggests an over-capacity environment with excessive delay.

X/X = AM/PM Overall Optimized LOS



	2030 PM Peak Hour LOS (120 sec cycle)
CSAH 31 at CSAH 42	D
CSAH 31 at 151st	A
CSAH 31 at 153rd	B
CSAH 31 at 157th	A
CSAH 31 at CSAH 46	D
CSAH 31 at Dodd	A
CSAH 31 at 165th	B
CSAH 31 at 167th	A
CSAH 31 at 170th	B
CSAH 31 at 173rd	A
CSAH 31 at North Creek	A
CSAH 31 at Countryview	A
CSAH 31 at 179th	B

LEGEND

= Public Connection in place as area develops

= Traffic Signal/Full Access

= Right-in/Right-out

= Full Access with Side Street Stop Signs

= Unsignalized 3/4 Access (No Left Turns/Thrus from Side Street)

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ALTERNATIVE B

SIX-LANE 3/4 ACCESS ARTERIAL ALTERNATIVE EVALUATION

CSAH 31 (PILOT KNOB ROAD) CORRIDOR TRANSPORTATION STUDY

City of Lakeville, City of Apple Valley and Dakota County

Figure 16

½ SPUI, ½ Tight Diamond

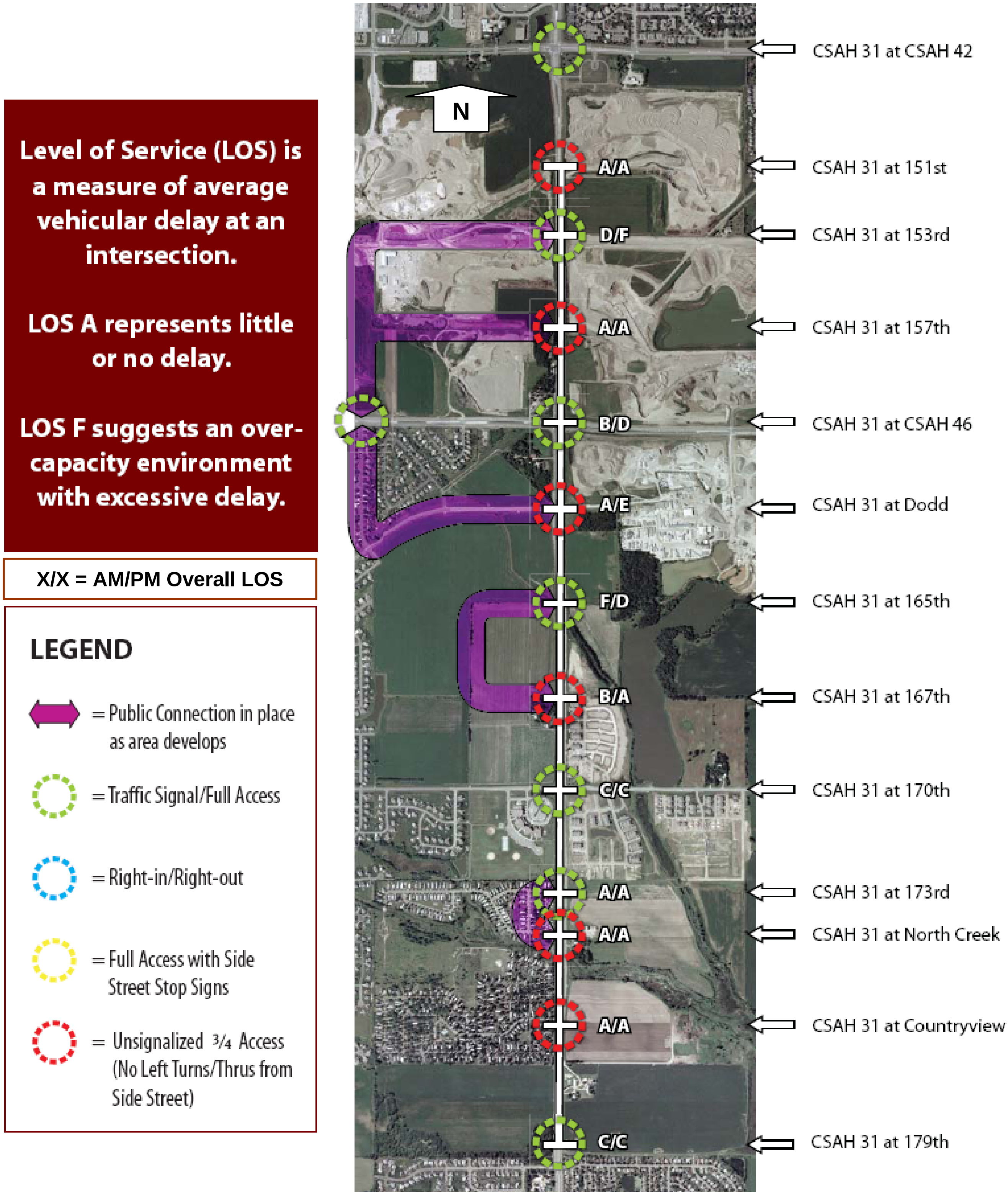
2030 AM/PM Peak Hour Levels of Service

Level of Service (LOS) is a measure of average vehicular delay at an intersection.

LOS A represents little or no delay.

LOS F suggests an over-capacity environment with excessive delay.

X/X = AM/PM Overall LOS



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ALTERNATIVE C
1/2 SPUI 1/2 TIGHT DIAMOND ARTERIAL ALTERNATIVE EVALUATION

CSAH 31 (PILOT KNOB ROAD) CORRIDOR TRANSPORTATION STUDY
City of Lakeville, City of Apple Valley and Dakota County

Figure 17

½ SPUI, ½ Arterial

2030 AM/PM Peak Hour Levels of Service

Level of Service (LOS) is a measure of average vehicular delay at an intersection.

LOS A represents little or no delay.

LOS F suggests an over-capacity environment with excessive delay.

X/X = AM/PM Overall LOS

LEGEND

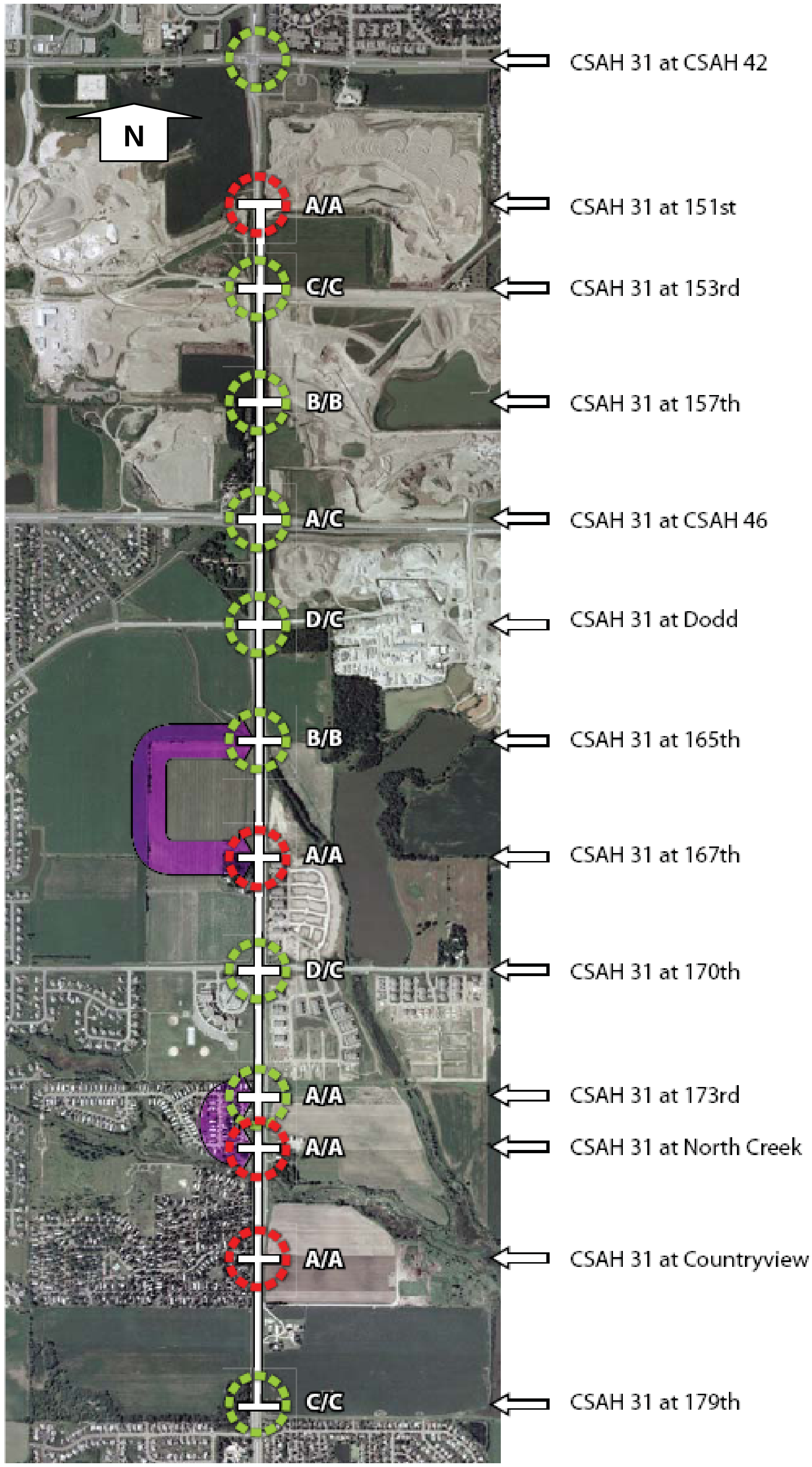
= Public Connection in place as area develops

= Traffic Signal/Full Access

= Right-in/Right-out

= Full Access with Side Street Stop Signs

= Unsignalized ¾ Access (No Left Turns/Thrus from Side Street)



Arterial Alternative Evaluation Criteria

RANKING

- ○ = 1
- ◓ = 2
- ◒ = 3
- ● = 4

Suburban Arterial

Alternative	Arterial Travel Time & Speed (CSAH 31)	Arterial Travel Time (CSAH 46)	Reserve Capacity	Consistency with Arterial Vision	Interchange / Intersection Cost	Corridor Cost	Access To/From Development	Safety: Total Arterial Conflict Points	Meets Driver Expectations	Right-of-Way Impacts	Intersection Delay	Transit System Accommodation	Pedestrian/Bicycle Accommodation
ALTERNATIVE A 6 Lane At-Grade, Full Access, Dual Left-Turns	715 sec; 4; 15.6 mph	3; 162 sec	3; 31% R	4	1; $2,400,000	3; $9,500,000	1	4; 393	1	1	3; 832 hrs	1	3
ALTERNATIVE B 6 Lane At-Grade, ¾ Access at 157th, Dodd	696 sec; 3; 16.1 mph	4; 220 sec	4; 29% R	1	1; $2,400,000	4; $9,700,000	3	2; 272	2	1	4; 892 hrs	2	3
ALTERNATIVE C ½ SPUI - ½ Tight Diamond Interchange	465 sec; 1; 24.0 mph	2; 115 sec	2; 35% R	1	3; $12,100,000	2; $9,200,000	4	1; 251	3	1	2; 453 hrs	2	1
ALTERNATIVE D ½ SPUI - ½ Arterial Interchange	488 sec; 2; 22.9 mph	1; 73 sec	1; 42% R	3	4; $12,800,000	1; $8,800,000	2	3; 293	4	2	1; 321 hrs	1	2

6.0 Study Findings

The following is a summary of the study findings. A number of these findings had significant debate or discussion among members of the Project Management Team. Where contrary views were presented, we have attempted to characterize and/or clarify these points of view using *italics*.

6.1 Traffic Volumes

a. CSAH 31 (Pilot Knob Road) and the surrounding adjacent supporting roadways are currently carrying significant traffic volumes (average daily traffic volume on CSAH 31 is 15,200 to 32,000). Projected traffic volumes (year 2030) on CSAH 31 and the supporting roadways are expected to grow to levels that are generally one and one half to two times the current traffic levels (2030 average daily traffic volume forecast on CSAH 31 is 32,000 to 45,000).

b. The CSAH 31 peak period volumes currently exhibit a heavy directional split (the morning northbound volume is more than twice the southbound volume and reversed in the afternoon). This heavy directional split is due to the existing regional distribution of households and employment (primarily residential land use to the south with the employment concentrations primarily to the north within and outside of the study corridor area). The future directional split for year 2030 is less directional than it is today (i.e., 66/34 versus 75/25). This model information is consistent with our experience and the general location of the corridor with respect to residential and employment concentrations.

c. As part of developing forecasts for the corridor, volumes were developed for local east-west collector routes as well as parallel north-south routes. Concerns were raised that forecasts on these local routes were low. These concerns were investigated, and the investigation found that the forecasting methodology may underestimate use of these local routes; however, it was determined that increasing volumes on these local approaches would not change the intersection operations (volumes are low enough to be accommodated by minimum green times.) Therefore, no change in corridor operations is expected with reasonable adjustments to local street volumes. Concerns were also raised with respect to north-south diversions due to access restrictions assumed under an alternative that considered the realignment of Dodd Boulevard to 170th Street. These concerns were analyzed using travel-time diversion curves. Based on analysis and potential negative impacts to neighborhoods and park as well as limited traffic volume relief, the realignment of Dodd Boulevard to 170th Street was not recommended by the PMT.

6.2 Traffic Operations

a. An at-grade traffic signal controlled six-lane section is needed to accommodate the magnitude of volume forecast on CSAH 31; however, this type of roadway might reach capacity prior to 2030 (based on present land use assumptions).

b. When the Synchro model was allowed to optimize signal timing parameters, the CSAH 31/CSAH 42 intersection appeared to be over capacity as an at-grade intersection. This condition starved the study area roadway network of traffic. When the corridor signal cycle length was made longer (120 seconds) to more closely represent the expected cycle length for this type of corridor, operations at this intersection improved. The operations analysis results were similar to those for the CSAH 31/CSAH 46 intersection.

c. Due to the directionality of peak hour volumes, better progression was achieved for mainline flows. It was possible to focus signal timing on the predominant direction of traffic flow. This somewhat dampened the negative impacts on mainline performance of ¼ -mile full intersection-spacing, when compared to ½-mile spacing.

d. Due to existing development and other barriers, parallel service roads or other north-south routes are limited. This limits the ability to divert trips to other facilities. As a result, closing or restricting access tends to shift trips from one intersection to another along the corridor, and with additional volume at side-street approaches, more side-street green time is needed, thereby reducing performance for mainline through traffic.

e. Limited differences were identified in mainline performance measures (e.g., average speed: 16.1mph vs. 15.6 mph) between ½ mile and ¼ mile full intersection spacing. The small difference is attributed to limited local collector cross-street volumes and fairly high directional volume splits which enable one to get better mainline progression (see (c) above).

f. The interchange (grade-separation) alternatives at the CSAH 31/CSAH 46 intersection generally improved overall corridor performance (i.e., travel speeds and travel times). Alternative D – ½ SPUI and ½ Arterial Interchange resulted in acceptable levels of service D or better at all corridor key intersections for both the morning and afternoon peak hours. However, Alternative C – ½ SPUI and ½ Tight Diamond had intersections at or near failure with this grade-separated alternative (e.g., 153rd, 165th Streets and Dodd Boulevard) when the program was allowed to optimize signal timing parameters.

g. Several modifications were made to the model when the alternatives incorporating an at-grade intersection at CSAH 31/CSAH 46 were analyzed with a longer cycle length.

   (1) The optimized cycle length in the alternatives analysis was 70 seconds. Dakota County typically operates similar corridors with 80- to 120-second cycle lengths during peak periods. The at-grade intersection alternatives were run with 120-second cycle lengths to gain a more realistic perspective on expected traffic operations.

   (2) U-turns were handled differently. They were coded as left turns, because the model was showing excessive delays when they were coded as u-turns.

   (3) Minimum splits were reduced from 14.5 to 11.5 seconds. The effect of this change on overall operations was minimal.

   (4) The eastbound yield sign-controlled free right turn at the CSAH 31/CSAH 46 intersection was replaced with a dual right controlled by the traffic signal. This change was made to be consistent with Dakota County practice where right-turning volumes are at the forecast level.

   The operations analysis results (intersection levels of service) with the above changes in place appear in the column on the right side of Figures 15 and 16. They suggest that compact urban interchanges might not be necessary at the CSAH 31 intersections with CSAH 42 and CSAH 46 until some time after the 2030 forecast year. However, considering the longer term needs of the corridor, particularly as the cities update their comprehensive land use plans with possibly higher development densities, implementation of compact urban interchanges at these intersections should be considered for the period beyond 2030.

6.3 Traffic Safety

a. Traffic safety throughout the corridor and how each arterial alternative was evaluated for traffic safety was addressed in two ways:

   1. Arterial Intersection Conflicts – the total number of vehicular conflict points at all corridor intersections (see Figure 19) given the specific geometric configuration, traffic control and level of access (full or restricted access) was determined. These vehicular conflict points represent the most likely potential crash occurrence locations along the corridor for a given arterial alternative and provide a reasonable traffic safety evaluation index.

   2. Potential Crash Reduction – two analyses were performed (based on assumed crash rates for selected future corridor intersections and diversion of traffic throughout the roadway network for the restricted access scenarios) to ascertain the potential reduction in crashes within the corridor (see Appendix C – Crash Reduction Analysis). These analyses were completed for the six-lane at-grade signal control at CSAH 31 and CSAH 46 alternative, for scenarios with full access (¼ mile signal spacing) and restricted access (½ mile signal spacing with ¾ access at the ¼ mile intersections).

b. The full access arterial alternative (¼ mile signal spacing) scenario with a six-lane at-grade signal-controlled intersection at CSAH 31 and CSAH 46 has significantly more vehicular conflict points than the other alternatives (see Figure 19). Based on this evaluation the ¼ mile signal spacing scenario represents the worst performing alternative in terms of traffic safety.

c. The traffic safety analysis based on the potential reduction in crashes and associated costs indicates that the full access arterial alternative (¼ mile signal spacing) scenario represents the worst performing alternative in terms of traffic safety. The reduction in crashes associated with the restricted access scenario (½ mile signal spacing with ¾ access at the ¼ mile intersections) is less than 15 percent. This is due to the diversion of traffic away from the arterial at the restricted locations, thereby adding to the traffic demand at nearby intersections. In this scenario some of the traffic safety benefit associated with the restricted access becomes a traffic safety detriment transferred to nearby or adjacent intersections. While local street crash rates tend to be higher, crashes along higher speed roadways are generally more severe.

6.4 Access and System Analysis

a. The local system of collector streets and roadways has been in effect for many years. This system was originally planned for ¼-mile full access spacing. A few years ago, Dakota County revised its access spacing guidelines to improve overall safety and mobility on key corridors. The County's guidelines now call for full access at ½ mile spacing along this segment of CSAH 31.

b. The distance between nearby north-south principal arterials (CSAH 23 and TH 52) is nine miles, and with no continuous north-south collector streets in the corridor, aside from Flagstaff Avenue, the CSAH 31 traffic volume is higher than would typically be expected.

c. Access at Dodd Boulevard is extremely difficult to restrict and/or eliminate. The study evaluated changes at this location and found no feasible alternatives to the present access location. The alternatives studied generally diverted traffic to Fairgreen and Flagstaff Avenues, which serve residential neighborhoods and were not designed to carry much higher traffic volumes. Both have residential driveways with direct access, and are intended to be lower speed, pedestrian-friendly environments and provide a safe environment for the neighborhood residents and pedestrians.

d. Access at 157th Street serves a new MVTA transit station. MVTA has indicated that full access at CSAH 31 and 157th Street is important to the viability of the transit station and they will terminate operations or use of this facility if access at 157th Street is restricted, without a viable alternative access. They have also indicated that a local street connection from CSAH 46 to the west side of the transit station is important.

e. Restricting access at CSAH 31 and 157th Street resulted in additional traffic being diverted to CSAH 46, degrading operations at the intersection of CSAH 31 and CSAH 46.

f. The County's access spacing guidelines (½ mile) can be achieved in most parts of the corridor: all intersections except 157th Street, Dodd Boulevard and 173rd Street.

g. One-quarter mile full access spacing in the vicinity of CSAH 46 limits the options for type of future interchange. However, Alternative D, the ½ SPUI and ½ Arterial Interchange, can physically work with ¼ -mile spacing, and has been demonstrated to operate satisfactorily in the model. Additional detailed design and operational analysis will need to be completed before a specific interchange design alternative is selected by the Cities and County.

h. While no specific interchange design has been selected, this corridor study's preliminary interchange design concept assessment identifies the need for a minimum of 250 feet of right-of-way for 1/4 mile in each direction from the intersection of CSAH 31 and CSAH 46 (see Figure 22).

6.5 Recommendations

Based on the CSAH 31 Corridor Study alternatives evaluation, local land use plans, currently approved and pending development plans, local transportation plans, and additional analysis of the traffic model by the County, the following is recommended by SRF for consideration by the study partners (see Figure 20):

a. It is recommended that the Cities and County plan for a future six-lane divided roadway throughout the study corridor.

b. The recommended Corridor Access and Supporting Roadway System Framework includes:

    1. Plan for the CSAH 31 and CSAH 42 intersection to accommodate a future (long-range) compact urban interchange. It is recommended that additional preliminary design and operational analysis be completed before a specific interchange design alternative is selected by the City of Apple Valley and Dakota County. As an interim measure reserving or protecting an appropriate right-of-way footprint for a compact urban interchange is recommended.

2. Plan for the CSAH 31 and 151st Street intersection to be restricted to a ¾ access intersection (see Figure 21).

3. Plan for a system of north-south parallel and east-west crossing collector streets throughout the CSAH 31 corridor, to be implemented as part of the development of the corridor area land uses (see Figure 20).

4. Plan for the CSAH 31 and 153rd Street intersection to be a full access intersection.

5. Plan for the CSAH 31 and 157th Street intersection to be a full access intersection.

6. Plan for the CSAH 31 and CSAH 46 intersection to be an at-grade full access intersection in the interim. However, it is recommended that the Cities and County plan for a future (long-range) compact urban interchange at this location, including the need to consider pedestrian crossings in the area of the future interchange. As an interim measure, reserving or protecting an appropriate right-of-way footprint for a compact urban interchange is recommended. While no specific interchange design has been selected, this corridor study's preliminary interchange design concept assessment identifies the need for a minimum of 250 feet of right-of-way for 1/4 mile in each direction from the intersection of CSAH 31 and CSAH 46. Additional preliminary design and operational analysis will need to be completed before a specific interchange design alternative is selected by the Cities and County. See Figure 22 for the recommended right-of-way footprint.

7. Plan for the CSAH 31 and Dodd Boulevard intersection to remain a full access intersection.

8. Plan for the CSAH 31 and 165th Street intersection to be a full access intersection if it is determined that full access is needed to accommodate pedestrian and vehicular traffic generated by a planned regional park east of the intersection. If pedestrian and vehicular demand doesn't materialize, or can be addressed by other means, full access might not be needed and could be reevaluated.

9. Plan for the CSAH 31 and 167th Street intersection to be restricted to a ¾ access intersection.

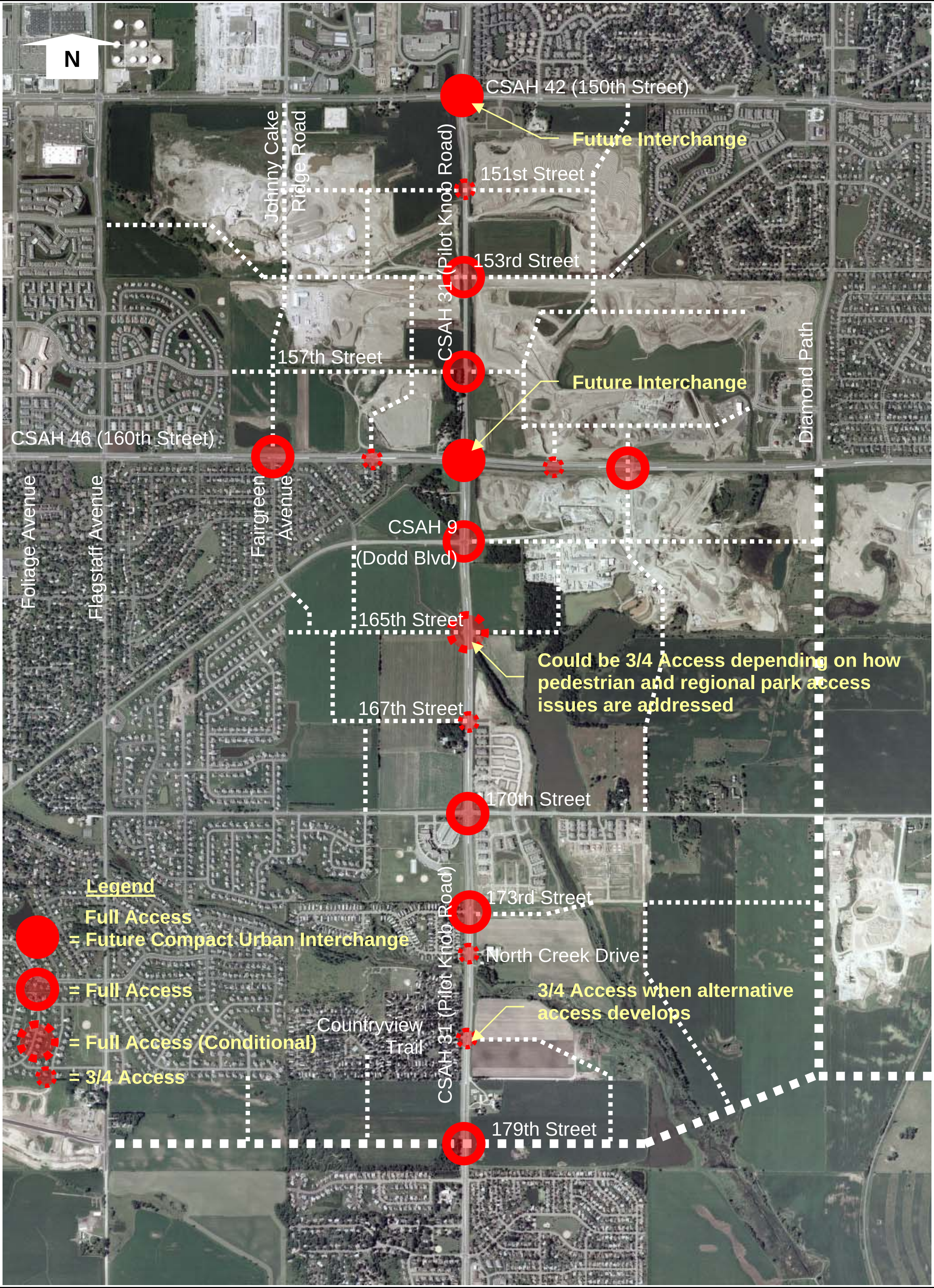
10. Plan for the CSAH 31 and 170th Street intersection to remain a full access intersection.

11. Plan for the CSAH 31 and 173rd Street intersection to be a full access intersection.

12. Plan for the CSAH 31 and North Creek Trail intersection to be restricted to a ¾ access intersection.

13. Plan for the CSAH 31 and Countryview Trail intersection to be restricted to a ¾ access intersection, provided that alternative access to the mobile home park is developed or if the mobile home park is redeveloped. Until alternative access is provided, or redevelopment occurs, full access at this intersection is necessary.

14. Plan for the CSAH 31 and 179th Street intersection to become a full access intersection.



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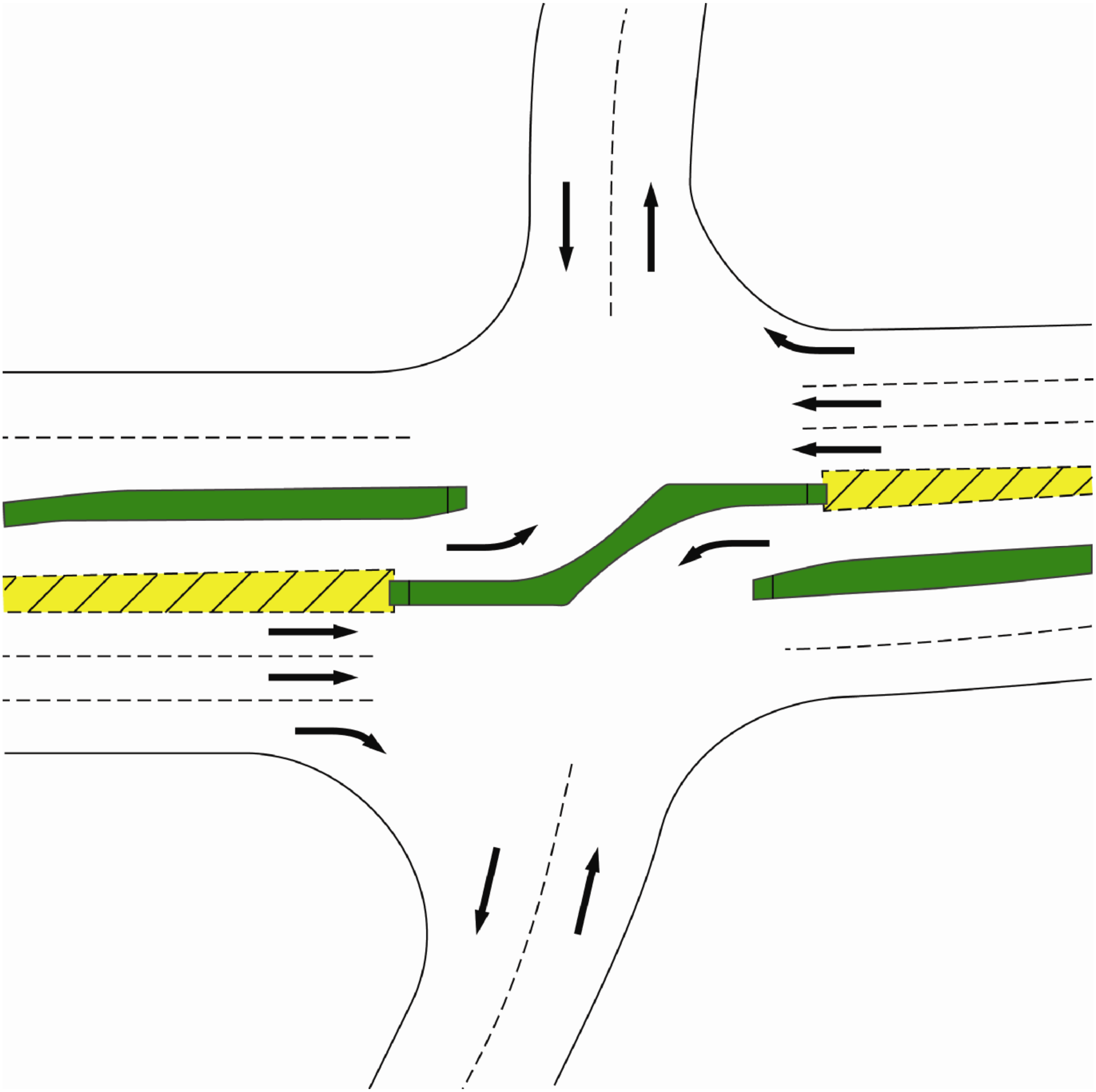
RECOMMENDED CORRIDOR ACCESS AND SUPPORTING ROADWAY SYSTEM FRAMEWORK

Figure 20

CSAH 31 (PILOT KNOB ROAD) CORRIDOR TRANSPORTATION STUDY
City of Lakeville, City of Apple Valley and Dakota County



3/4 ACCESS INTERSECTION CONFIGURATION

CSAH 31 (PILOT KNOB ROAD) CORRIDOR TRANSPORTATION STUDY
City of Lakeville, City of Apple Valley and Dakota County

Figure 21

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RECOMMENDED ARTERIAL INTERCHANGE CONCEPT
GENERALIZED RIGHT-OF-WAY FOOTPRINT

CSAH 31 (PILOT KNOB ROAD) CORRIDOR TRANSPORTATION STUDY
City of Lakeville, City of Apple Valley and Dakota County

Figure 22

c. The Cities should consider development of infrastructure fees or other financial methods for capturing funds from adjacent development (i.e., development is generating traffic that is contributing to the need for improvements).

d. The Cities will need to review their land use plans along the corridor in order to consider the implications of the corridor recommendations, particularly relating to the level of access and the collector street system throughout the corridor.

    1. Near the intersection of CSAH 31 and Dodd Boulevard, the first full access on Dodd Boulevard west of CSAH 31 is Dodd Lane. This leaves no full access location to the area planned/zoned commercial in the northwest corner of CSAH 31 and Dodd Boulevard. The city should review the area land use plan and zoning considering this limited access.

    2. The land use plan and zoning of the area around the 157th Street Transit Station should be reviewed in order to consider the opportunity to develop in a manner that will encourage transit ridership. This has direct implications for improving operations along the CSAH 31 Corridor by reducing the number of vehicles traveling the corridor.

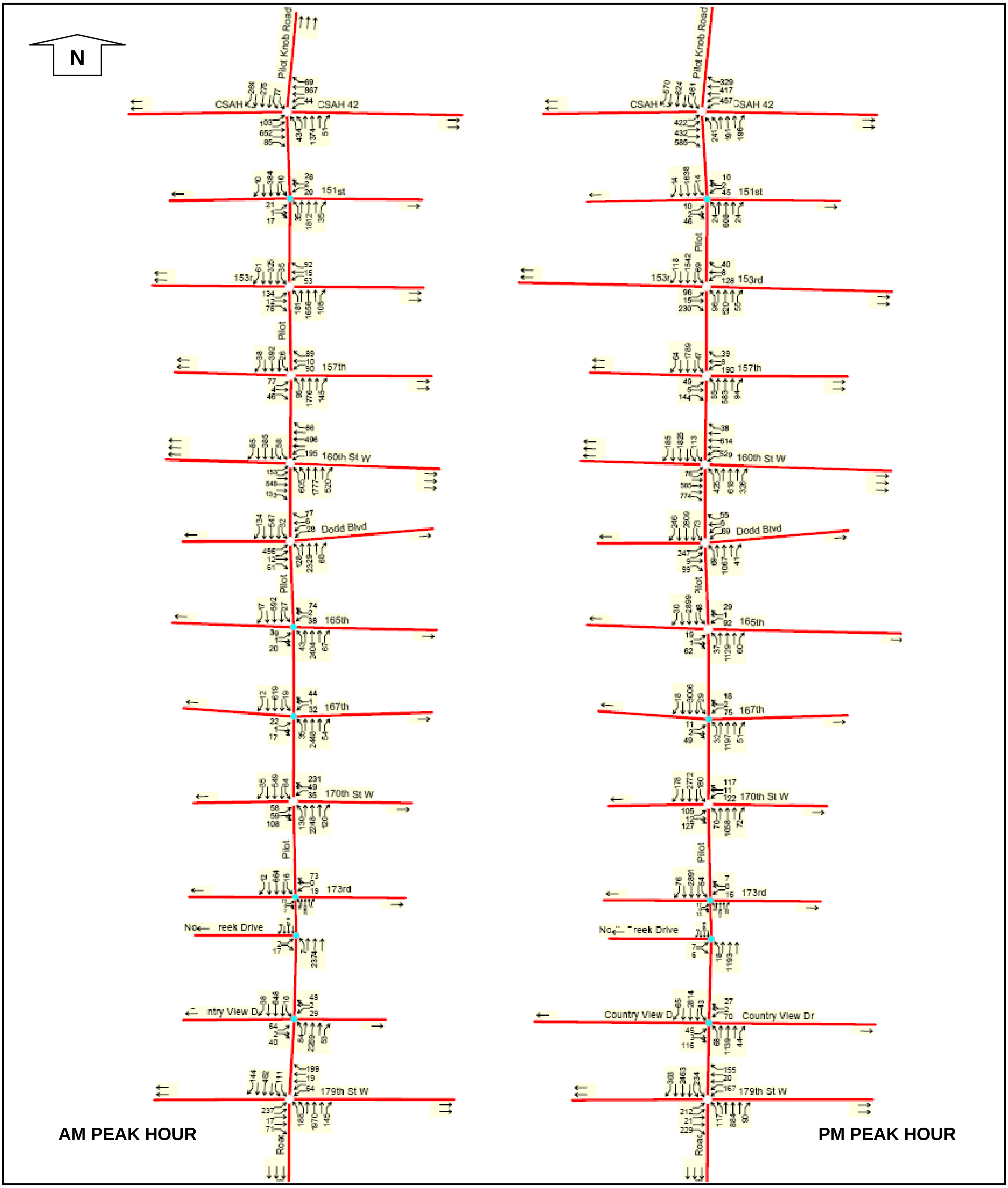
Note: For each intersection, the appropriate type of traffic control (traffic signal, side-street stop sign control, etc.) shall be determined by the roadway authority as traffic conditions dictate. Therefore, specific types of intersection control are not specified herein.

Note: Dakota County is considering renaming 153rd Street in the area of CSAH 31 to 155th Street in order to better fit the street naming convention and 1/2 mile spacing interval.

APPENDICES

APPENDIX A

Future Peak Hour Turning Movement Forecasts for Selected Alternatives



YEAR 2030 PEAK HOUR TRAFFIC VOLUMES
SIX-LANE AT-GRADE FULL ACCESS ARTERIAL ALTERNATIVE

CSAH 31 (PILOT KNOB ROAD) CORRIDOR TRANSPORTATION STUDY
City of Lakeville, City of Apple Valley and Dakota County

Figure A-1

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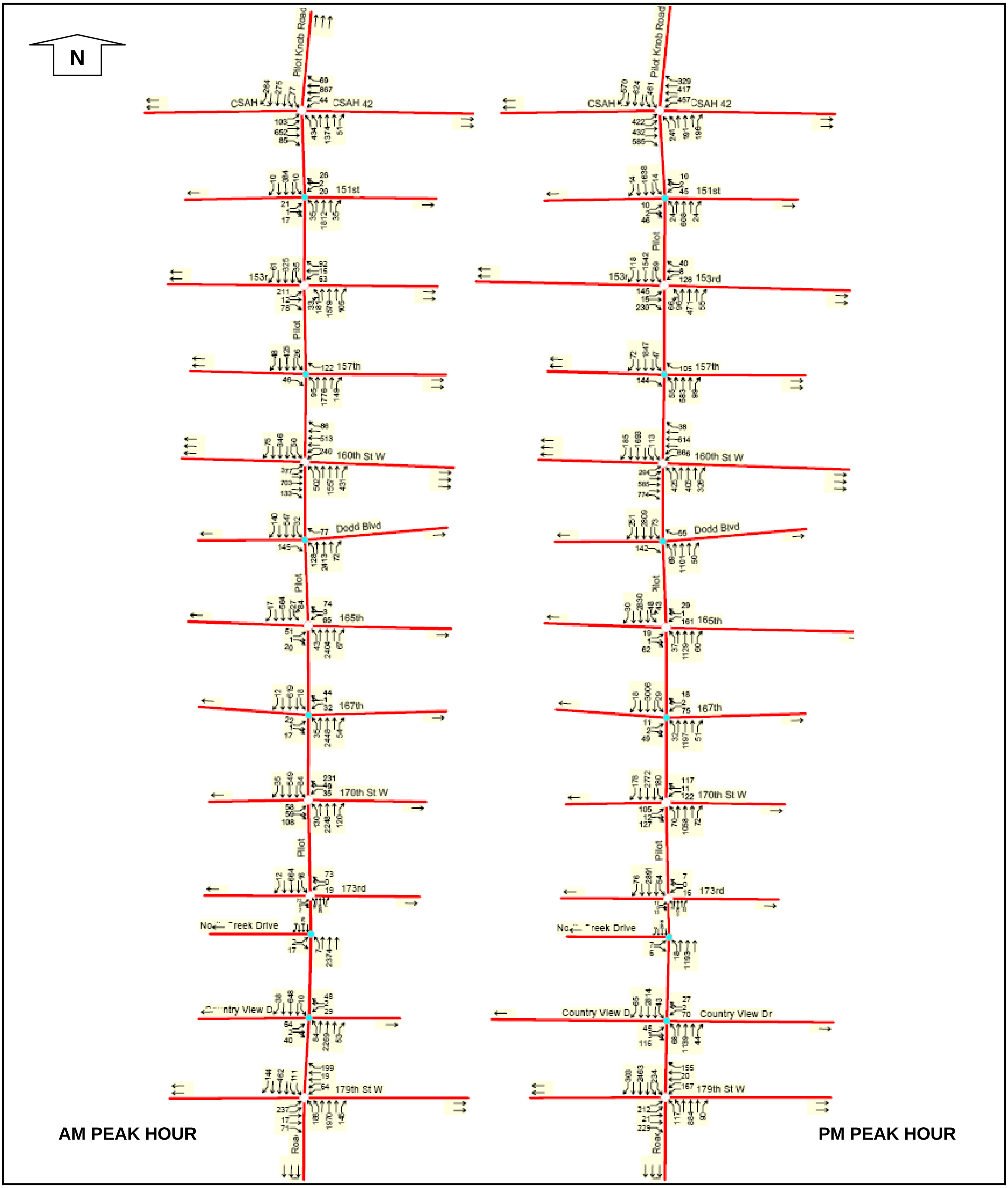

YEAR 2030 PEAK HOUR TRAFFIC VOLUMES SIX-LANE AT-GRADE 3/4 ACCESS ALTERNATIVE

CSAH 31 (PILOT KNOB ROAD) CORRIDOR TRANSPORTATION STUDY
City of Lakeville, City of Apple Valley and Dakota County

Figure A-2

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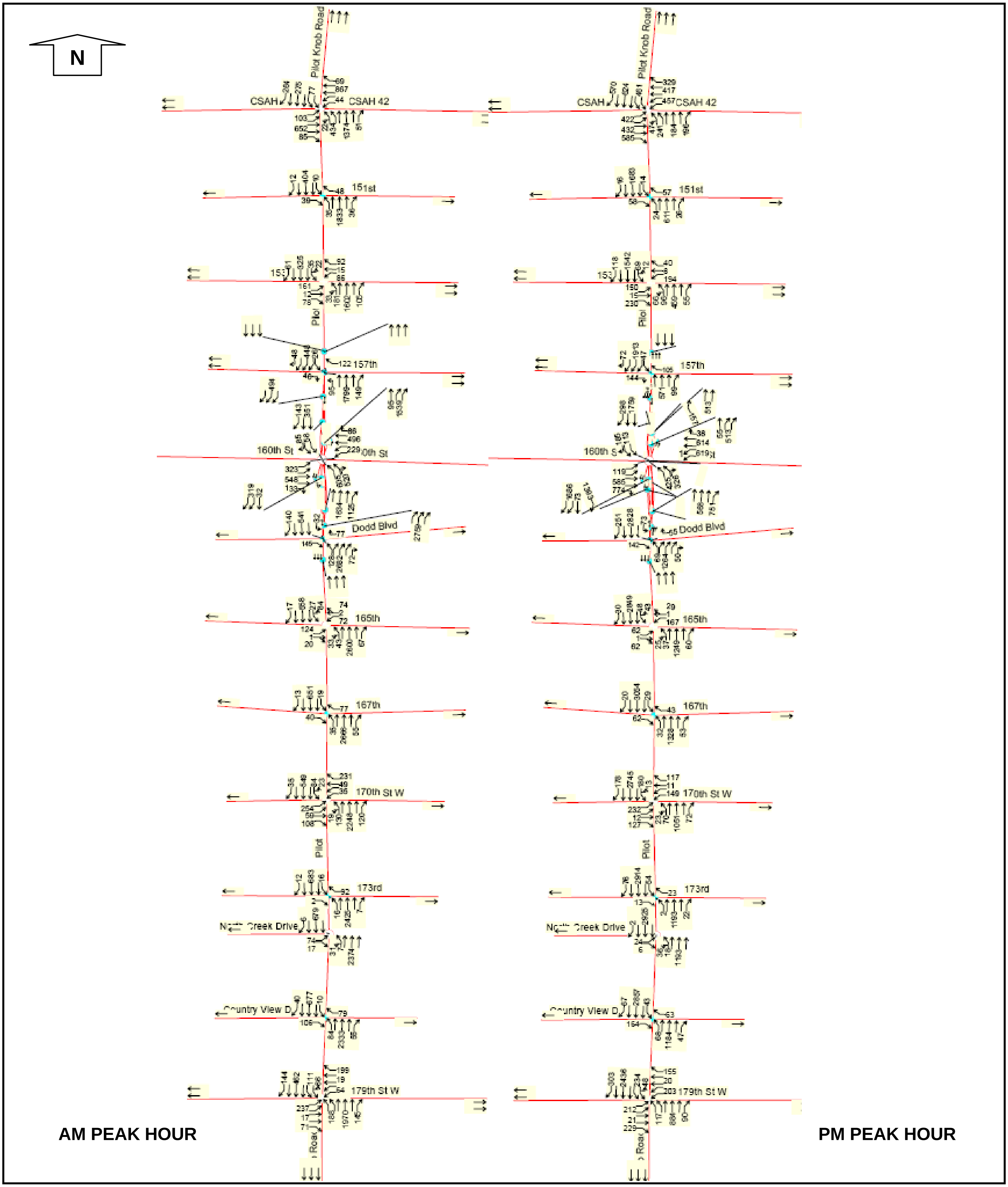

YEAR 2030 PEAK HOUR TRAFFIC VOLUMES
1/2 SPUI 1/2 TIGHT DIAMOND INTERCHANGE ALTERNATIVE

CSAH 31 (PILOT KNOB ROAD) CORRIDOR TRANSPORTATION STUDY
City of Lakeville, City of Apple Valley and Dakota County

Figure A-3

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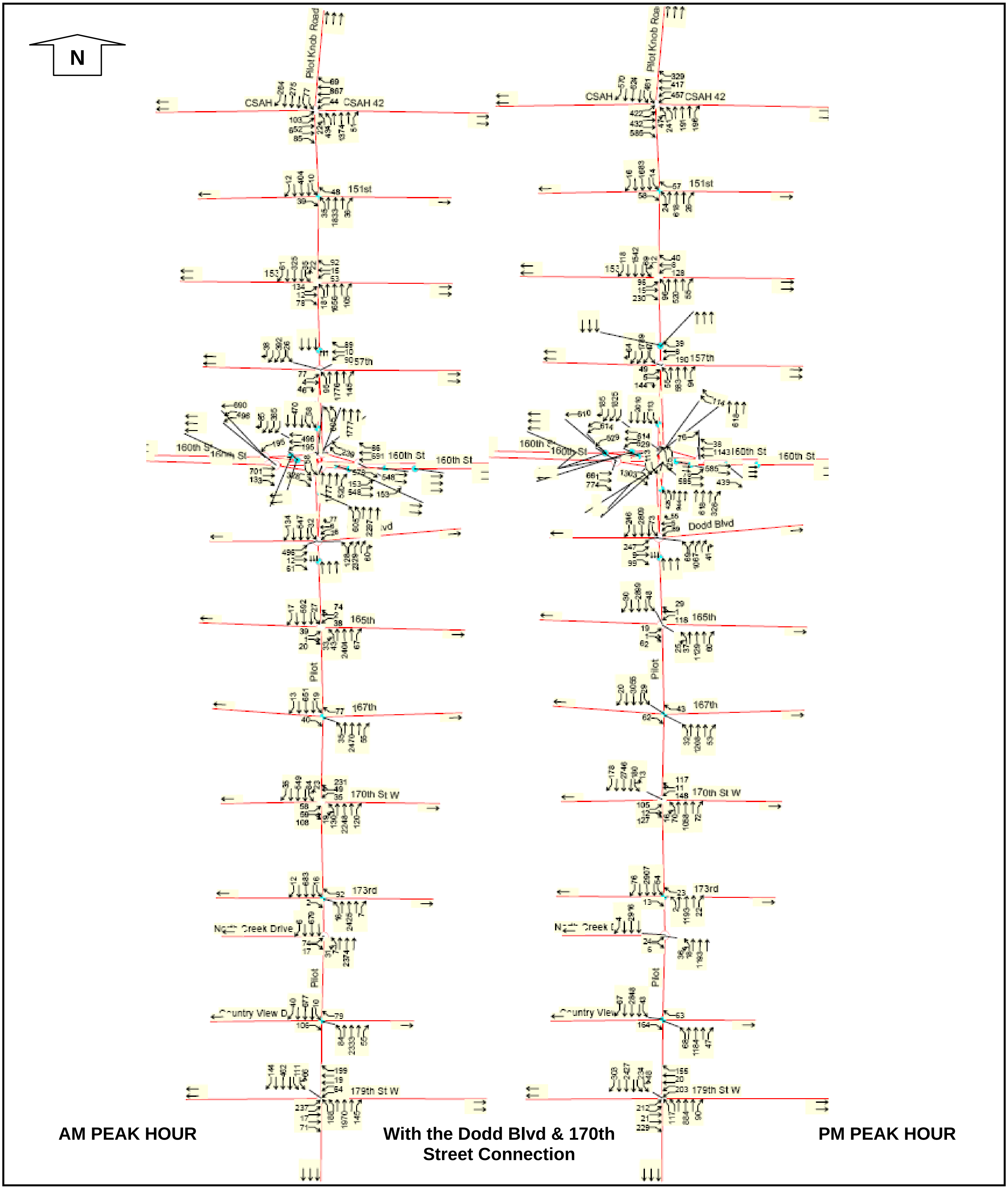

YEAR 2030 PEAK HOUR TRAFFIC VOLUMES
1/2 SPUI 1/2 ARTERIAL INTERCHANGE ALTERNATIVE

CSAH 31 (PILOT KNOB ROAD) CORRIDOR TRANSPORTATION STUDY
City of Lakeville, City of Apple Valley and Dakota County

Figure A-4

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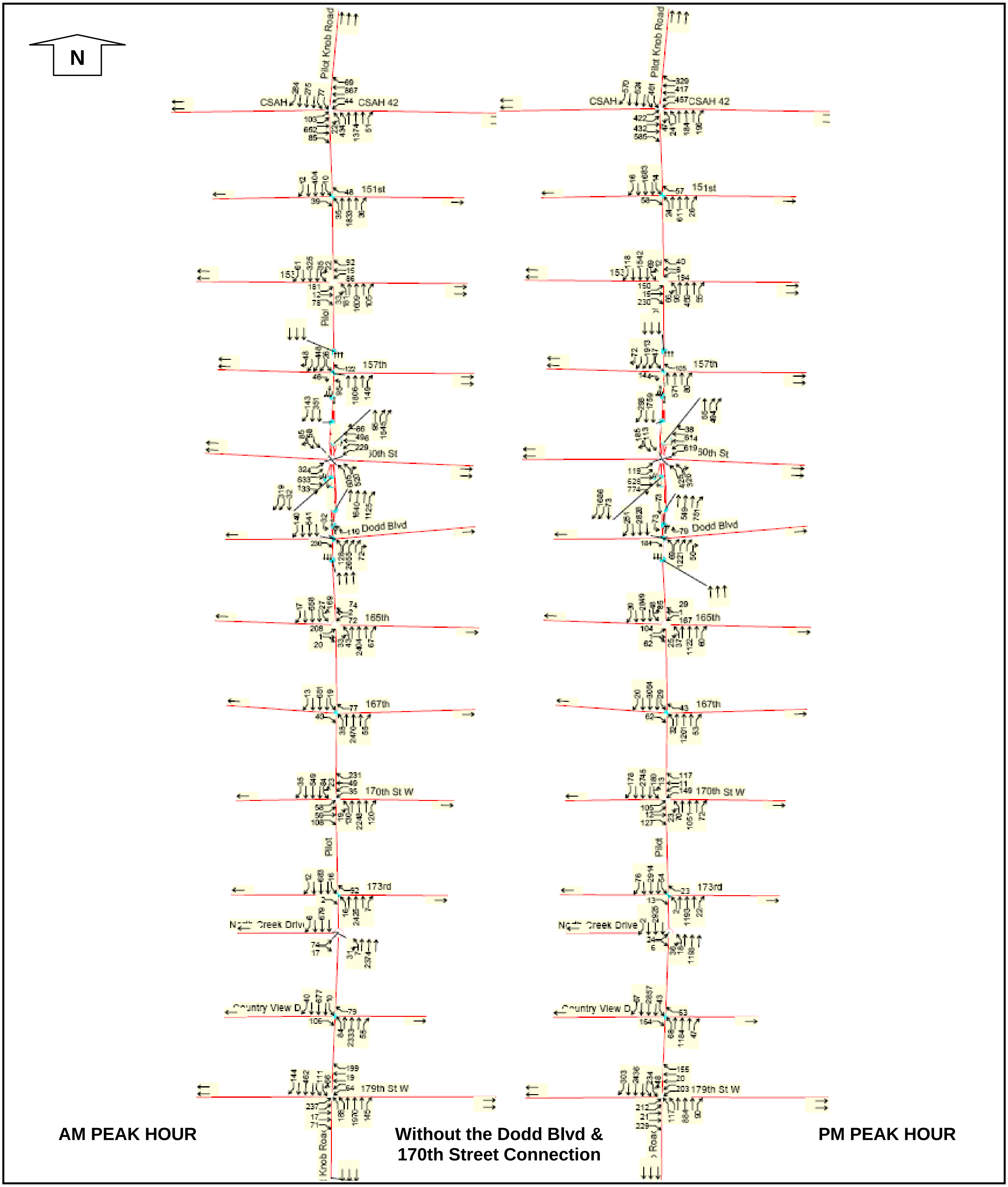

YEAR 2030 PEAK HOUR TRAFFIC VOLUMES
1/2 SPUI 1/2 ARTERIAL INTERCHANGE ALTERNATIVE

CSAH 31 (PILOT KNOB ROAD) CORRIDOR TRANSPORTATION STUDY
City of Lakeville, City of Apple Valley and Dakota County

Figure A-5

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APPENDIX B

Traffic Operations Analysis Review

Appendix B

a. Evaluation Methodology

1. Operations Analysis: A computer traffic operations and simulation model (Synchro/SimTraffic) was used to analyze the Pilot Knob Road corridor operations for the year 2030. Synchro was used to build the model and SimTraffic was used to extract the Measures of Effectiveness (MOE's). SimTraffic was chosen to obtain the MOE's because the network was assumed to operate at near-capacity conditions and SimTraffic provides more accurate MOE's in near-capacity since it models traffic microscopically versus macroscopically as is the case with Synchro.

2. Four network scenarios were selected for morning (AM) and afternoon (PM) peak hour analysis:

   - 6 Lane At-Grade, Full Access, Dual Left Turns
   - 6 Lane At-Grade ¾ Access at 157th and Dodd
   - ½ SPUI, ½ Tight Diamond Interchange
   - ½ SPUI, ½ Arterial Interchange

3. For each of these scenarios, system-wide measures of effectiveness such as arterial travel time, system delay, and cost were determined for use in completing the improvement alternatives evaluation. Synchro was allowed to optimize both the signal timing and the offsets for each arterial alternative. The average of three model runs was used for each of these arterial alternative evaluations.

4. Arterial travel time (seconds) was computed by summing the totals of the link distances divided by the average link speeds as output by SimTraffic. The average corridor speed was calculated by totaling the corridor distance divided by the entire corridor travel time.

5. Reserve Capacity was taken directly from the output for the PM model, as the PM model was the worst case scenario.

6. Consistency with arterial vision was measured subjectively in terms of how the arterial alternative fit the "A" Minor Arterial (Expander) criteria and Dakota County's signalized intersection spacing guidelines.

7. The intersection costs were calculated for each scenario. The distance along CSAH 46 (160th Street) and CSAH 31 (Pilot Knob Road) remained constant for each scenario. The cost of improvements between the two nearest intersections east and west of Pilot Knob Road and 160th Street were included in these calculations.

8. The corridor costs were calculated by summing the improvement costs that would be incurred over the remainder of the corridor (excluding the 160th and Pilot Knob Road intersection/ interchange area).

9. Access to the development depended on the number of full and ¾ intersections and their location in relation to the proposed development.

10. Safety: Total arterial conflict points were counted at each intersection and summed network-wide. An example of how conflict points are computed at an intersection is illustrated in the attached Conflict Points (see Figure B-1). Conflict points are not an all-encompassing representation of safety. Criteria such as the amount of opposing traffic, the number of lanes a vehicle/pedestrian needs to cross, and sight distance are also important aspects that are not accounted for in conflict points.

11. Meets Driver Expectations: Meeting driver expectations is simply a measure of what typical drivers of the corridor would be accustomed to, such as, does it make sense to a driver to navigate an interchange on an arterial route.

12. Right of way impacts are simply a measure of how much right of way will need to be obtained in each arterial alternative scenario.

13. Intersection delay was taken as a direct output from SimTraffic. The total network-wide intersection delay was used for this calculation. The delay from CSAH 42 and Pilot Knob Road was not used in this calculation, as it was reporting unrealistic delays due to being at the end of the network.

14. Transit System Accommodation: There is a new park and ride located along Pilot Knob Road and 157th. This is a measure of how well the scenario supports the bus movements to and from this transit station.

15. Pedestrian/Bicycle Accommodation: This is a measure of how well pedestrians are accounted for in each arterial alternative scenario.

b. Evaluation Criteria Definitions

1. Arterial Travel Time (CSAH 31) – Average travel time (average of northbound and southbound travel times) for a thru vehicle traversing the length of the study area on the CSAH 31 corridor in the SimTraffic model in the 2030 PM peak hour

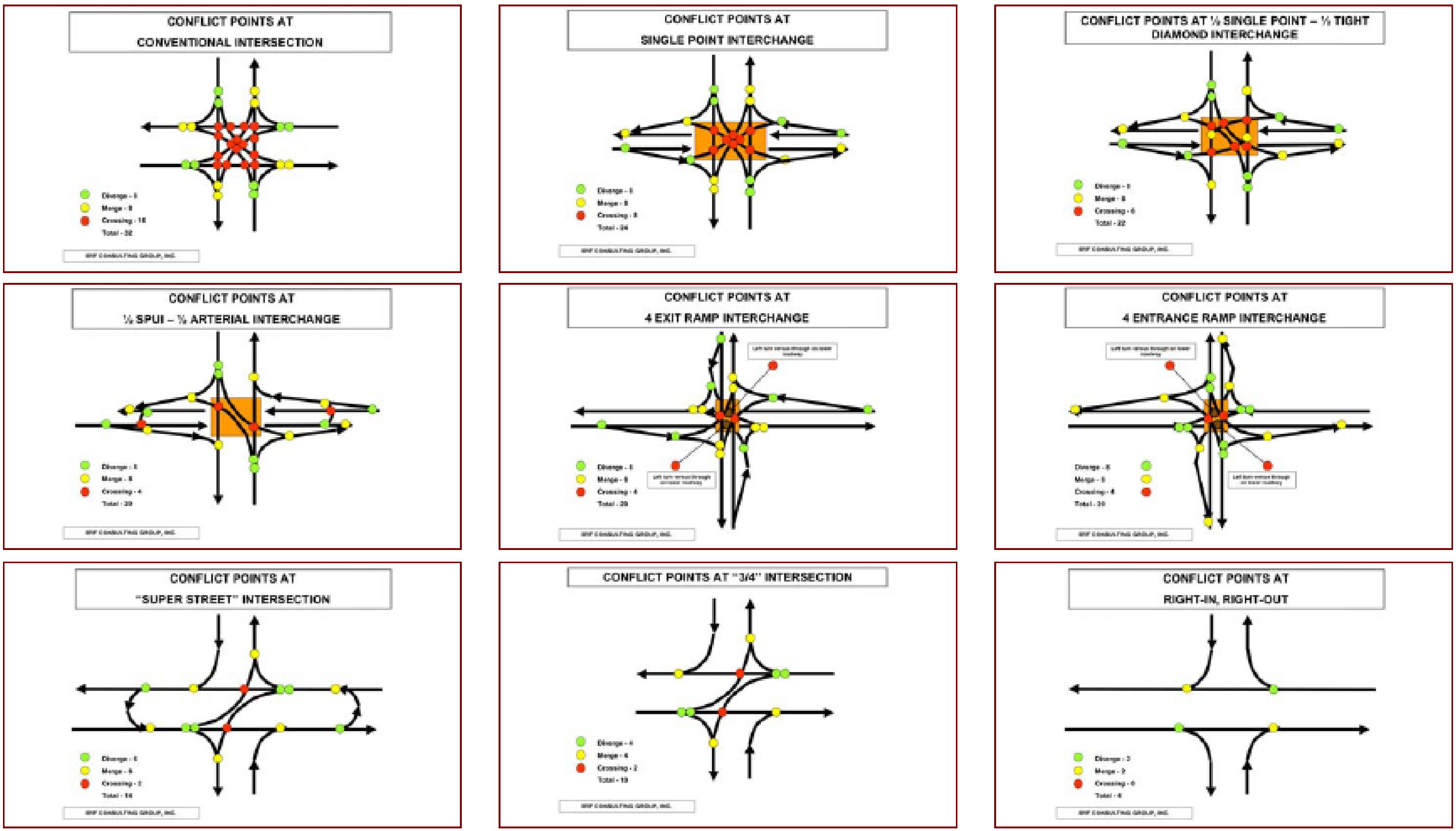
2. Arterial Travel Time (CSAH 46 (160th Street) – Average travel time (average of eastbound and westbound travel times) for a thru vehicle traversing the length of the CSAH 46 (160th Street) corridor in the SimTraffic model in the 2030 PM peak hour

3. Reserve Capacity – Average unused capacity for all intersections within the study area, both 2030 AM and PM peak hours

4. Consistency with Arterial Vision – Consistency with Dakota County access spacing guidelines and the "A" Minor Arterial (Expander) criteria

5. Interchange/Intersection Cost – Estimated cost to construct the CSAH 31/46 interchange/ intersection

Conflict Points



CONFLICT POINTS TRAFFIC SAFETY EVALUATION

CSAH 31 (PILOT KNOB ROAD) CORRIDOR TRANSPORTATION STUDY
City of Lakeville, City of Apple Valley and Dakota County

Figure B-1

SRF Consulting Group, Inc.

0065792 January 2007

6. Corridor Cost – Estimated cost to construct the remainder of the corridor, excluding the CSAH 31/46 interchange/intersection

7. Accessibility: to/from Development – Prevalence of full-access intersections along the corridor

8. Safety Analysis

a. Sum of vehicle conflict points for all intersections along the corridor

b. Crash Costs/Reduction based analysis

9. Meets Driver Expectations – Likelihood of turns being made from the expected location (i.e., left turns from left side of road, as opposed to left turns from a right exit)

10. Right-of-Way Impacts – Relative amount of additional right-of-way acquisition necessary

11. Intersection Delay – Total cumulative vehicular delay at all intersections in the study area, 2030 PM peak hour

12. Transit System Accommodation – Measure of access to/from existing transit station at 157th Street

13. Pedestrian/Bicycle Accommodation – Relative exposure of pedestrians/bikes to vehicular traffic while traversing the CSAH 31/46 interchange/intersection

APPENDIX C

Crash Reduction Analysis

SRF Consulting Group Inc. Crash Reduction Analysis

Dakota County Crash Reduction Analysis

Corridor Transportation Study

Safety Analysis

PM Peak hour volume x 10	=	average weekday volume
Weekday volume x 6.5	=	weekly volume
Weekly volume x 52	=	annual volume

∴ Annual volume = Peak hour volume x 3,380

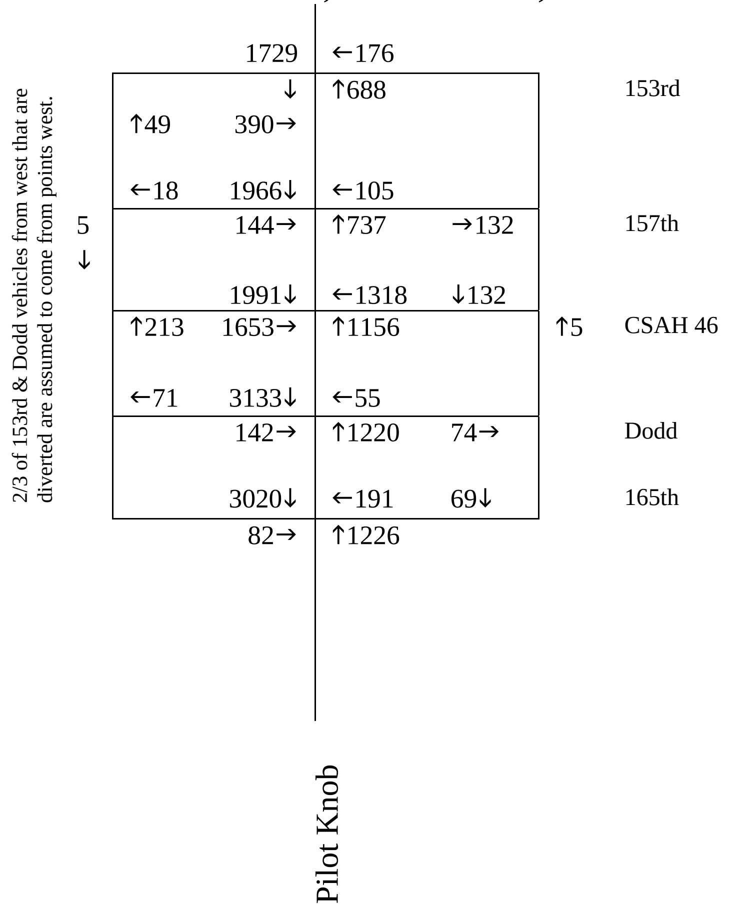
- Assume for each vehicle diverted from 157th or Dodd to another access point, the vehicle traverses two local intersections.

(All SG-E ints.)

6-Lane Full Access

153rd	1729 ↓	←176	341→	↑671	2,917 x 3,380 = 9,859,000
157th	1900 ↓	←237	198→	↑732	3,067 x 3,380 = 10,366,000
CSAH 46	2123 ↓	←1181	1435→	↑1369	6,108 x 3,380 = 20,645,000
Dodd	3128 ↓	←129	355→	↑1177	4,789 x 3,380 = 16,187,000
165th	2977 ↓	←122	82→	↑1226	4,407 x 3,380 = 14,896,000

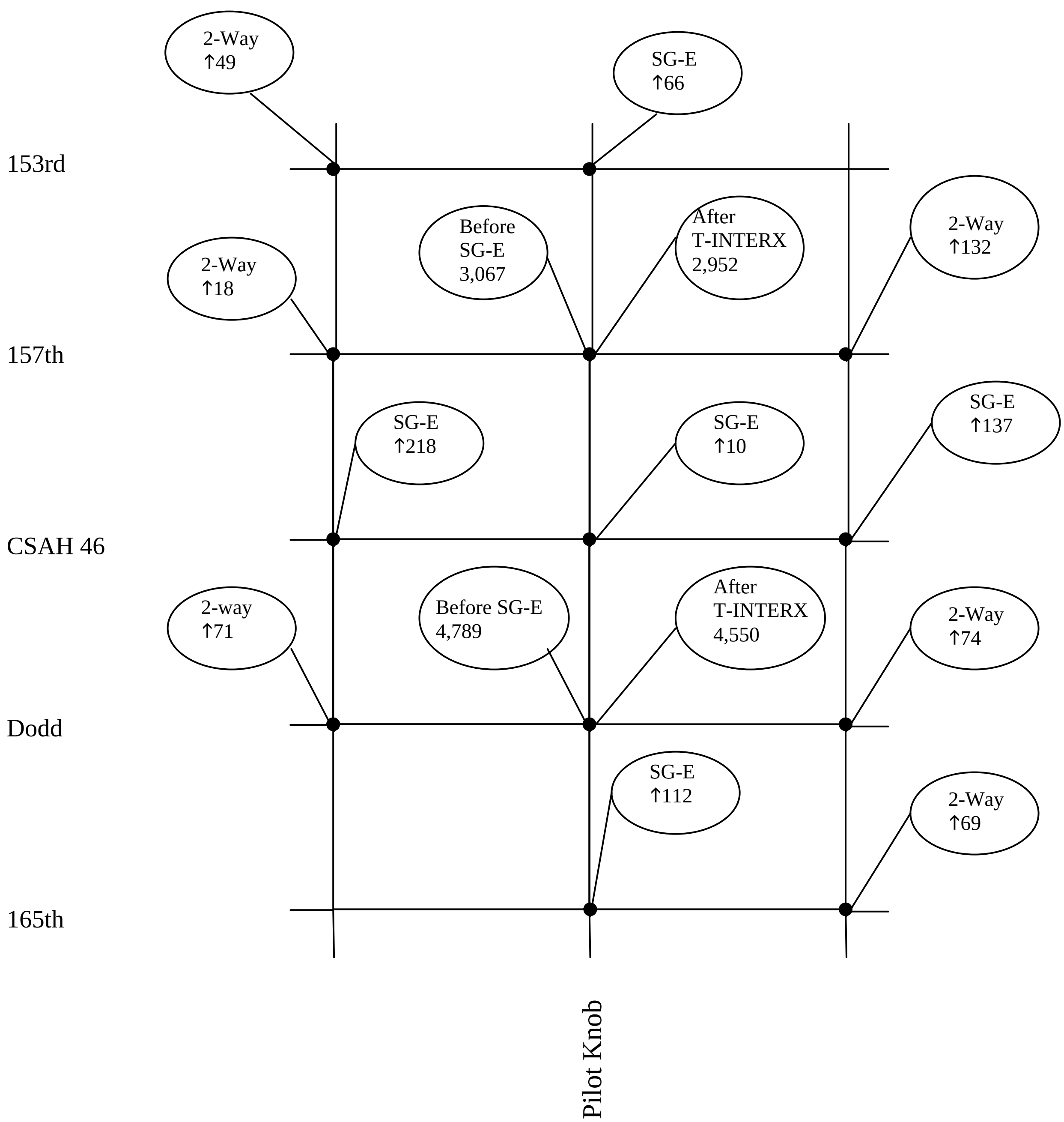
6-Lane, ¾ Access at 157th, Dodd



Corridor Transportation Study

Safety Analysis

Change in Peak Hour Entering Volume at Each Intersection,
From 6-Lane Full Access to 6-Lane ¾ Access at 157th, Dodd



Corridor Transportation Study

Safety Analysis Applying Hennepin County Crash Rates

From Hennepin County Suburban Crash Data, 2001 – 2004:

<u>2-way stop</u> [internal (2 city streets) intersections]
0.41 acc/ MV entering
38.0% personal injury
62.0% property damage } $18,900/acc

<u>SG-E (one road channelized)</u> [full-access ints. on Pilot Knob, CSAH 46]
0.52 acc/ MV entering
34.8% personal injury
65.2% property damage } $17,900/acc

<u>T-INTERX</u> (assume similar crash rate to ¾ int)
0.28 acc/ MV entering
37.3% personal injury
62.7% property damage } $18,700/acc

*Assumes $38,400 for personal injury,
$6,900 for property damage

(Median values from Paul F. Hanley, State Departments of Transportation's Use of Crash Costs is Safety Analysis, TRB Annual Meeting (www.trb.org), 2005.

Corridor Transportation Study

Safety Analysis Applying Hennepin County Crash Rates

		6-Lane Full Access		6-Lane ¾ Access	
	Intersection	**Number of Accidents**	**Cost**	**Number of Accidents**	**Cost**
	Pilot Knob @ 153rd	5.1	$ 92K	5.2	$ 94K
	Pilot Knob @ 157th	5.4	$ 96K	2.8	$ 52K
	Pilot Knob @ 160th	10.7	$192K	10.8	$192K
	Pilot Knob @ Dodd	8.4	$151K	4.3	$ 81K
	Pilot Knob @ 165th	7.7	$139K	7.9	$142K
		37.3	**$670K**	**31.0**	**$561K**
*	153rd west of Pilot Knob	2.1	$ 39K	2.1	$ 41K
*	157th west of Pilot Knob	2.1	$ 39K	2.1	$ 40K
*	157th east of Pilot Knob	2.1	$ 39K	2.3	$ 43K
*	Dodd west of Pilot Knob	2.1	$ 39K	2.2	$ 41K
*	Dodd east of Pilot Knob	2.1	$ 39K	2.2	$ 41K
*	165th east of Pilot Knob	2.1	$ 39K	2.2	$ 41K
		12.6	**$234K**	**13.1**	**$247K**
@	CSAH 46 west of Pilot Knob	7.9	$142K	8.3	$148K
@	CSAH 46 east of Pilot Knob	7.9	$142K	8.1	$146K
		15.8	**$284K**	**16.4**	**$294K**
		65.7	**$1,188K**	**60.5**	**$1,102K**

*Assume background traffic at int. of 2 city streets is 15,000 ADT

15,000 veh/day x 6.5 days/wk x 52 wks/yr = 5,070,000 veh/yr
5.070 MV entering x 0.41acc/MV entering = 2.1 acc/yr

@Assume background traffic at CSAH 46 int. with city street is 45,000 ADT

45,000 veh/day x 6.5 days/wk x 52 wks/yr = 15,210,000 veh/yr
15.210 MV entering x 0.52 acc/MV entering = 7.9 acc/yr

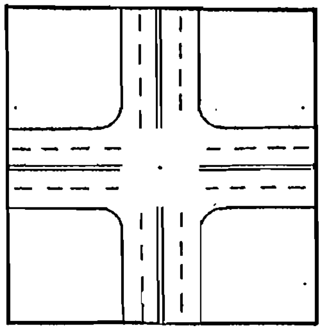
Effect of converting to ¾ access at 157th & Dodd:

Total system accidents reduced from 65.7 to 60.5, a reduction of 5.2 accidents (8% reduction)

Total cost of accidents reduced from $1,188K to $1,102K, a reduction of $86K (7% reduction)

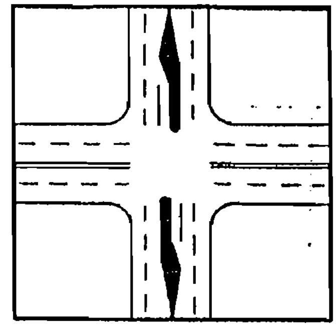
SIGNALIZED INTERSECTION TYPES

No Channelization



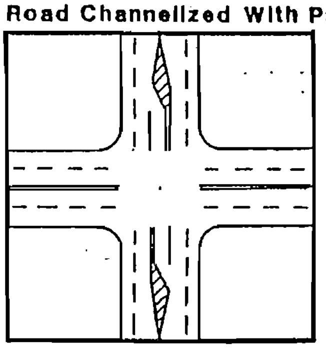
SG-A

One Road Channelized



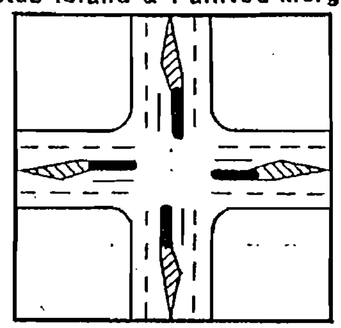
SG-B

One Road Channelized With Paint



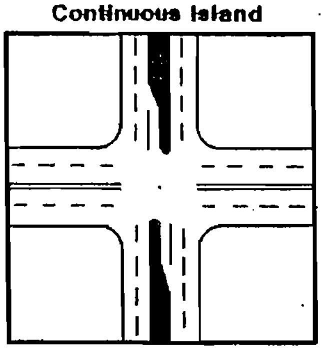
SG-C

Both Roads Channelized With Stub Island & Painted Merge



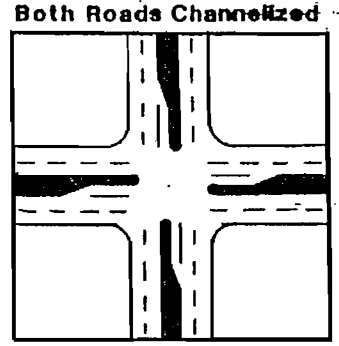
SG-D

One Road Channelized Continuous Island



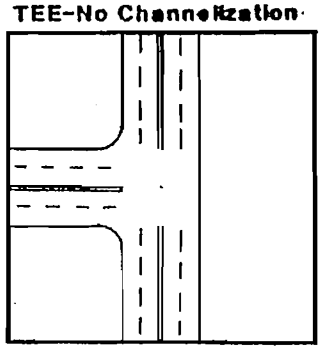
SG-E

Both Roads Channelized



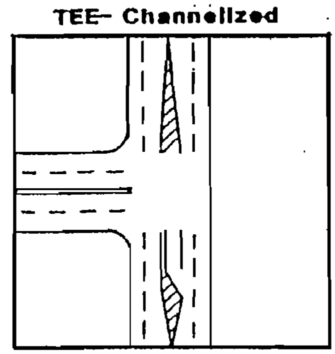
SG-F

TEE-No Channelization



SG-T

TEE- Channelized



S-TC

HENNEPIN COUNTY PUBLIC WORKS

TRANSPORTATION DEPARTMENT-TRANSPORTATION PLANNING DIVISION

DATE: 09/14/06 2001-2004 AVERAGE CRASH RATES BY INTERSECTION TYPE - SUBURBAN

TYPE OF CRASH CODES:
1 = MOTOR VEHICLE IN TRAFFIC
2 = PARKED MOTOR VEHICLE
3 = RAILROAD TRAIN
4 = BICYCLIST
5 = PEDESTRIAN
6 = ANIMAL
7 = FIXED OBJECT
8 = OTHER OBJECT
9 = OVERTURN
10 = OTHER

INTERX OR ROAD TYPE	NO SEG	ANNUAL TOT VEHICLE	RD TYPE TOT LGTH	ANNUAL VEHICLE MILES	ANNUAL CRASHES BY TYPE 1	2	3	4	5	6	7	8	9	10	**SEVERITY*** FAT	PI	PD	TOT CRSH	AVE RATE /MV
RAMP TERM	10	49,275,000			13	0	0	0	0	0	1	0	0	0	0	3	11	15	0.29
2WAY STOP	92	390,659,500			147	1	0	2	1	4	7	0	1	0	1	61	101	163	0.41
T INTERX	151	562,797,167			123	2	0	4	1	5	19	1	7	1	1	59	101	161	0.28
BRANCH	12	36,804,167			5	0	0	0	0	0	0	0	0	0	0	1	4	5	0.15
OFFSET	17	79,119,833			24	1	0	1	0	0	1	0	0	0	0	9	19	27	0.34
4WAY STOP	48	180,334,333			65	1	0	1	1	2	5	0	0	0	0	21	54	75	0.41
3WAY STOP	7	21,109,167			4	0	0	0	0	0	0	0	0	0	0	0	4	4	0.18
SG-A 0 CH	59	368,418,833			270	4	0	4	2	0	5	0	1	0	0	103	182	285	0.77
SG-B 1 CH	86	718,660,667			321	1	0	5	4	2	12	0	1	1	1	132	215	348	0.48
SG-C 1 CH	20	126,046,667			63	1	0	1	2	0	1	0	0	0	0	26	41	67	0.53
SG-D 2 CH	192	2,032,161,833			1074	3	0	11	6	4	31	0	5	1	1	402	733	1136	0.55
SG-E 2 CH	17	130,584,833			65	0	0	1	1	0	1	0	0	0	0	24	45	59	0.52
SG-J	2	22,885,500			5	0	0	0	0	0	0	0	0	0	0	1	4	5	0.20
SG-T 0 CH	21	134,478,167			38	0	0	1	0	0	2	0	0	1	0	14	27	42	0.30
SG-RMP TM	88	823,951,000			467	1	0	4	1	1	11	0	3	1	0	153	335	489	0.59
S-TC CH	40	290,187,167			78	2	0	1	0	2	4	0	0	0	0	31	57	88	0.30
S-PNT-DIA	2	26,389,500			18	0	0	0	1	0	1	0	0	0	0	5	15	20	0.75
INTERSECTION TOTALS:					2780	17	0	37	20	20	101	1	18	5	4	1045	1948	3000	

LAST 3 YEAR AVERAGE RATE FOR ALL INTERSECTION SEGMENTS: 0.50

LAST 3 YEAR AVERAGE RATE FOR ALL SIGNALIZED INTERSECTION SEGMENTS: 0.54

LAST 3 YEAR AVERAGE RATE FOR ALL NON-SIGNALIZED INTERSECTION SEGMENTS: 0.34

ALL ABOVE DATA BASED ON CURRENT ROAD SEGMENT FILE.

Corridor Transportation Study

Safety Analysis Applying Mn/DOT Crash Rates

From Mn/DOT Traffic Safety Fundamentals Handbook:

Full-Access Signalized Int. crash rate = 0.7; $17,400/acc.
¾ Int. crash rate = 0.2; $17,000/acc.
Full-Access Unsignalized Int. crash rate = 0.4; $17,800/acc.

	6-Lane Full Access		6-Lane ¾ Access	
Intersection	**Number of Accidents**	**Cost**	**Number of Accidents**	**Cost**
Pilot Knob @ 153rd	6.9	$120K	7.1	$ 123K
Pilot Knob @ 157th	7.3	$126K	2.0	$ 34K
Pilot Knob @ 160th	14.5	$251K	14.5	$252K
Pilot Knob @ Dodd	11.3	$197K	3.1	$ 52K
Pilot Knob @ 165th	10.4	$181K	10.7	$186K
	50.4	**$875K**	**37.4**	**$647K**
153rd west of Pilot Knob	2.03	$ 36K	2.09	$ 37K
157th west of Pilot Knob	2.03	$ 36K	2.05	$ 37K
157th east of Pilot Knob	2.03	$ 36K	2.21	$ 39K
Dodd west of Pilot Knob	2.03	$ 36K	2.12	$ 38K
Dodd east of Pilot Knob	2.03	$ 36K	2.13	$ 38K
165th east of Pilot Knob	2.03	$ 36K	2.12	$ 38K
	12.2	**$216K**	**12.7**	**$227K**
CSAH 46 west of Pilot Knob	10.6	$185K	11.2	$194K
CSAH 46 east of Pilot Knob	10.6	$185K	11.0	$191K
	21.2	**$370K**	**22.2**	**$385K**
	83.8	**$1,461K**	**72.3**	**$1,259K**

Effect of converting to ¾ access at 157th & Dodd

On Pilot Knob Road: 13.0 fewer acc., $228K less cost

On CSAH 46: 1.0 more acc., $15K more cost

On city streets: 1.0 more acc., $22K more cost
(these numbers doubled from above calculations to account for ↑ in accidents at driveways and other minor ints.)

By changing 157th & Dodd to ¾ access,

Total system accidents are reduced from 83.8 to 72.3,
a reduction of 11.5 accidents (14% reduction)

Total cost of accidents is reduced from $1,461K to $1,259K,
a reduction of $202K (14% reduction)

Transportation Department
Western Service Center · 14955 Galaxie Avenue · Apple Valley, MN 55124
952.891.7000 · Fax 952.891.7031 · www.dakotacounty.us

TECHNICAL MEMORANDUM

To: George Stuempfig PE, PTOE, Principal, SRF Consulting Group, Inc
From: Suzanne Danen, Assistant Dakota County Traffic Engineer
Date: December 21, 2006
Subject: CSAH 31 (Pilot Knob Road) Corridor Study - Safety

For the CSAH 31 Corridor Study, SRF is analyzing the reduction of accidents and related costs for changing access at 157th and CSAH 9 from signalized to 3/4 access traffic intersection control. The County reviewed the information and has conclusions from the data and also recommendations.

Crash Rates:
SRF is using 2001-2004 rates calculated by Hennepin County for various suburban intersection control types in Hennepin County. The rates are:

Signalized Full Access Crash Rate	0.52	(SG-E rate for both roadways channelized with painted islands)
Side Street Stop Crash Rate	0.41	
T-Intersection Crash Rate	0.28	(Used for ¾ access)

For a ¾ access, SRF is using the crash rate for a T-intersection because Hennepin County does not have data on these types of intersections.

Mn/DOT's rates for the same types of intersections are:

Signalized Full Access Crash Rate	0.8
Side Street Stop Crash Rate	0.31
¾ Access Crash Rate	0.2

After reviewing available Dakota County crash rate data, it is recommended to use the rates of:

Signalized Full Access Crash Rate	0.55	(Hennepin County's SG-D rate for both roadway channelized with continuous or stub islands)
Side Street Stop Crash Rate	0.31	(Mn/DOT rate)
¾ Access Crash Rate	0.2	(Mn/DOT rate)

Recommendations

- After reviewing Dakota County signalized intersections having similar AADTs and entering vehicle volumes, the rate of 0.55 more closely reflects the rates occurring at signalized intersections in the County and also the Mn/DOT rate of 0.31 for side-street stops within the county, and these rates should be used.
- Dakota County has four ¾ access locations along CSAH 42 with AADTs between 23,000 and 43,700 vehicles. These intersections are:
  CSAH 42 & Dundee Ave. Crash rate: 0.16

CSAH 42 & Foliage Ave.	Crash rate:	0.21 (Right turning rear-end accidents were removed due to less than desirable turning lane geometric design)
CSAH 42 & Burnsville Cntr Entr	Crash rate:	0.08
CSAH 42 & Southcross Dr	Crash rate:	0.22

This limited data is showing to be similar to Mn/DOT's ¾ access rate and is data from actual ¾ access locations versus T-intersections and the 0.2 rate should be used.

Crash Rate Analysis and Reduction of Accidents:
When analyzing the crash number differences between changing 157th Street and CSAH 9 from signalized intersections to ¾ access, SRF also analyzed how trips would change in distribution at affected intersections. Table 1 is a summary of SRF's analysis using the Hennepin County crash rates and results in and reduction of 5.1 accidents. Table 2 is a summary using SRF's AADT data, but using the crash rates Dakota County recommends. This comparison results in a reduction of 8.1 accidents. These analyses also result in an 8% reduction in crashes for analysis of only the affected system of intersections by the change in two intersection's control using SRF's rates and a 12% reduction using the County's rates.

<u>Recommendations</u>
The overall reduction percentage of the affected intersections does not show the impact of the reductions specifically at the intersections that changed traffic control. It needs to be more noted that at 157th Street and CSAH 9, the reduction of accidents are actually 65%, which is a significant reduction, than the overall affected system reduction.

Crash Severity and Costs For Intersection Type
The Hennepin County data shows the crash severity percentage for personal injury accidents at a 2-way stop is 38% and the personal injury percent at SG-E type signalized intersections is 34.8%. This number shows a severity index versus a severity rate. Severity indexes show higher values for personal injury accidents at 2-way stops than for signalized intersections, though severity rates are lower at 2-way stops than at signalized intersections. Severity index is being used to calculate an average cost per accident at the different types of intersections, for estimated costs.

<u>Recommendations</u>
- Other alternative to calculating crash cost per intersection is to use the severity index percentages multiplied by number of crashes at intersection then multiplied by corresponding assumed cost per personal injury or property damage. Differences between the two ways of calculations are small and are estimates only, so either way can be used.
- Show severity rates and describe the difference between severity rates and indexes.
- SG-D type signalized intersection data should be used instead of SG-E.

Crash Comparisons Between City and County Roadways
Table 3 shows that there are more accidents on the County highways/per mile in Apple Valley and Lakeville than there are on city streets.

Summary Discussion:

- There is a 65% reduction in accidents when signalized intersections are changed to ¾ access control intersections.
- There is not significant change in the number of accidents along the side streets when there is a traffic control change to ¾ access at 157th Street and CSAH 9 and trips are redistributed.
- Severity of accidents is greater on higher speed roadways.
- The crash rates on County highways are higher than on city streets.

CSAH 31 Corridor Study - Accident Analysis for Difference Between Signalized and 3/4 Access

SRF Crash Rates and AADTS:

Full Access Signalized: 0.52
3/4 Access: 0.28
2-Way Stop: 0.41

15,000 ADT on side streets
45,000 ADT on CSAH 46 & side street

TABLE 1

Location	Peak Hour Ent Veh Vol	Estmtd AADT	Annual Entering Veh	Traffic Control	Crash Rate	# Accidents	Peak Hour Ent Veh Vol	Daily Trips Diverted/ Added	Estmtd AADT	Annual Entering Veh	Traffic Control	Crash Rate	# Accidents	Intersect. Crash Differnce (#)	Intersect. Crash Differnce (%)
153rd	2,917		9,859,460	Signal	0.52	5.1	2,983	660		10,082,540	Signal	0.52	5.2	-0.1	-2
157th	3,067		10,366,460	Signal	0.52	5.4	2,952	-1,150		9,977,760	3/4 access	0.28	2.8	2.6	48
CSAH 46 (160th St)	6,108		20,645,040	Signal	0.52	10.7	6,118	100		20,678,840	Signal	0.52	10.8	0.0	0
CSAH 9 (Dodd)	4,789		16,186,820	Signal	0.52	8.4	4,550	-2,390		15,379,000	3/4 access	0.28	4.3	4.1	49
165th	4,407		14,895,660	Signal	0.52	7.7	4,519	1,120		15,274,220	Signal	0.52	7.9	-0.2	-3
153rd W of 31		15,000	5,070,000	2-Way Stop	0.41	2.1		490	15,490	5,235,620	2-Way Stop	0.41	2.1	-0.1	-3
157th W of 31		15,000	5,070,000	2-Way Stop	0.41	2.1		180	15,180	5,130,840	2-Way Stop	0.41	2.1	0.0	-1
157th E of 31		15,000	5,070,000	2-Way Stop	0.41	2.1		1,320	16,320	5,516,160	2-Way Stop	0.41	2.3	-0.2	-9
Dodd W of 31		15,000	5,070,000	2-Way Stop	0.41	2.1		710	15,710	5,309,980	2-Way Stop	0.41	2.2	-0.1	-5
Dodd E of 31		15,000	5,070,000	2-Way Stop	0.41	2.1		740	15,740	5,320,120	2-Way Stop	0.41	2.2	-0.1	-5
165th E of 31		15,000	5,070,000	2-Way Stop	0.41	2.1		690	15,690	5,303,220	2-Way Stop	0.41	2.2	-0.1	-5
46 W of 31(Fairgreen)		45,000	15,210,000	Signal	0.52	7.9		2,360	47,360	16,007,680	Signal	0.52	8.3	-0.4	-5
46 East of 31		45,000	15,210,000	Signal	0.52	7.9		1,370	46,370	15,673,060	Signal	0.52	8.1	-0.2	-3
Total:						65.7							60.6		

Difference in Crashes: **5.1**
% Reduction: **7.8 %** **Analyzed for affected system of intersections only**

CSAH 31 Corridor Study - Accident Analysis for Difference Between Signalized and 3/4 Access

Dakota County Preferred Crash Rates:
Full Access Signalized: 0.55
3/4 Access: 0.2
2-Way Stop: 0.31

TABLE 2

Location	Peak Hour Ent Veh Vol	Estmtd AADT	Annual Entering Veh	Traffic Control	Crash Rate	# Accidents	Peak Hour Ent Veh Vol	Daily Trips Diverted/ Added	Estmtd AADT	Annual Entering Veh	Traffic Control	Crash Rate	# Accidents	Intersect. Crash Differnce (#)	Intersect. Crash Differnce (%)
153rd	2,917		9,859,460	Signal	0.55	5.4	2,983	660		10,082,540	Signal	0.55	5.5	-0.1	-2
157th	3,067		10,366,460	Signal	0.55	5.7	2,952	-1,150		9,977,760	3/4 access	0.2	2.0	3.7	65
CSAH 46 (160th St)	6,108		20,645,040	Signal	0.55	11.4	6,118	100		20,678,840	Signal	0.55	11.4	0.0	0
CSAH 9 (Dodd)	4,789		16,186,820	Signal	0.55	8.9	4,550	-2,390		15,379,000	3/4 access	0.2	3.1	5.8	65
165th	4,407		14,895,660	Signal	0.55	8.2	4,519	1,120		15,274,220	Signal	0.55	8.4	-0.2	-3
153rd W of 31		15,000	5,070,000	2-Way Stop	0.31	1.6		490	15,490	5,235,620	2-Way Stop	0.31	1.6	-0.1	-3
157th W of 31		15,000	5,070,000	2-Way Stop	0.31	1.6		180	15,180	5,130,840	2-Way Stop	0.31	1.6	0.0	-1
157th E of 31		15,000	5,070,000	2-Way Stop	0.31	1.6		1,320	16,320	5,516,160	2-Way Stop	0.31	1.7	-0.1	-9
Dodd W of 31		15,000	5,070,000	2-Way Stop	0.31	1.6		710	15,710	5,309,980	2-Way Stop	0.31	1.6	-0.1	-5
Dodd E of 31		15,000	5,070,000	2-Way Stop	0.31	1.6		740	15,740	5,320,120	2-Way Stop	0.31	1.6	-0.1	-5
165th E of 31		15,000	5,070,000	2-Way Stop	0.31	1.6		690	15,690	5,303,220	2-Way Stop	0.31	1.6	-0.1	-5
46 W of 31(Fairgreen)		45,000	15,210,000	Signal	0.55	8.4		2,360	47,360	16,007,680	Signal	0.55	8.8	-0.4	-5
46 East of 31		45,000	15,210,000	Signal	0.55	8.4		1,370	46,370	15,673,060	Signal	0.55	8.6	-0.3	-3
Total:						65.7							57.7		

Difference in Crashes: **8.1**
% Reduction: **12.3 %** **Analyzed for affected system of intersections only**

APPENDIX D

Correspondence

MVTA
Minnesota Valley Transit Authority

February 9, 2007

Mr. Brian Sorenson
Dakota County
14955 Galaxie Avenue
Apple Valley, MN 55124

Dear Mr. Sorenson:

As you know, the Minnesota Valley Transit Authority (MVTA) operates transit service from the 157th St. Station recently constructed by Dakota County. We are aware of the study along Pilot Knob Road (CSAH 31) and the implications for the transit facility as the County considers limiting access along this busy corridor.

We appreciate the County's challenges in making this traffic corridor function well for all who use it. Further, we are heartened to know that the County shares our concerns about the implications of access changes on Pilot Knob Road for transit users and the MVTA.

You should be aware that the MVTA has read the SRF draft report and are pleased to note that it recommends full access be maintained at both 153rd and 157th streets on Pilot Knob Road. Full access at those intersections makes operation and use of 157th Street Transit Station viable and functional. It also signals a commitment to the riding public to making transit a viable option in this important corridor.

The MVTA also prefers and recommends that, for reasons of safety and functionality, both intersections be signalized. Additionally, the MVTA supports the connecting road from 160th St. (CSAH 46) into the area behind the Transit Station. We are always open to discussion and appreciate the collaboration with Dakota County. I further understand that MVTA staff will be attending the next CSAH 31 Corridor Transportation Study team meeting on February 16th.

Brian, we appreciate your efforts on this project. We look forward to continuing our dialogue, and to reaching a mutually agreeable solution.

Sincerely,

Jon Ulrich

Jon Ulrich
Chair, MVTA Board
Scott County Commissioner

RECEIVED
FEB 16 2007
TRANSPORTATION DEPT.

100 East Highway 13 Burnsville, Minnesota 55337 www.mvta.com MVTA office 952-882-7500 fax 952-882-7600

March 21, 2007

George Stuempfig
SRF Consulting Group, Inc.
One Carlson Parkway North, Suite 150
Minneapolis, MN 55447-4443

Re: Dakota County CSAH 31 Corridor Transportation Study Draft Report

Dear George:

As requested, I am forwarding Lakeville staff comments on the Dakota County CSAH 31 Corridor Transportation Study Draft Report. Our outstanding issue that has not been addressed to date pertains to the draft report's recommendation concerning the CSAH 31/165th Street intersection. City staff strongly recommends that this intersection remain full access, with possible future signalization if warrants are met, for the following reasons:

- The City has purchased land and is putting forth considerable expense toward the development of a major community park with regional significance on the east side of CSAH 31 along East Lake (see attached PDF file of the City's recently updated park and trail system plan). The City has received approximately $1,000,000 in grant funds (including a $690,000 Dakota County Natural Areas Grant) to acquire property for the development of this community park. The City plans to invest $1,380,000 in 2007 and another $2,000,000 by 2010 to develop recreational facilities and trails for this community park, which will serve residents from Lakeville and surrounding communities.

  The main access to this park will be off of CSAH 31 at 165th St. Since it is intended to serve all Lakeville residents, restricting access across CSAH 31 to the west on 165th St. will hinder Lakeville residents in the neighborhoods immediately west of CSAH 31 and to the south from accessing the community park. In addition, major greenway corridor trails are planned to be constructed in this area that will connect with existing and planned park and trail facilities in Apple Valley, Farmington, and Empire Township.

- As shown on the Spirit of Brandtjen Farm PUD land use plan (see attached JPG file), multiple family and mixed office/commercial/residential development is planned for the northwest portion of the Spirit of Brandtjen Farm PUD that will utilize the CSAH 31/165th Street intersection as a main access through the development.

Please incorporate Lakeville's staff comments into the Dakota County CSAH 31 Corridor Transportation Study Draft Report. Thank you.

Sincerely,

Daryl Morey, Planning Director
(952) 985-4422
dmorey@ci.lakeville.mn.us

c: Keith Nelson, City Engineer

(misc-csah31studyletter)