



CH 2 and I-35 Interchange Footprint Study

CH 2/I-35 Interchange Footprint Study Environmental Screening Document

Prepared For:
Minnesota Department of Transportation
Scott County
City of Elko New Market

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1.0 INTRODUCTION

Project Location

The CH 2/I-35 Interchange is located approximately one-half mile east of the City of Elko New Market, Scott County, Minnesota (**Figure 1, Figure 2**). The potential project is located within New Market Township – Sections 23, 24, 25, and 26, Township 115N, and Range 21W (**Figure 3**).

Project Background

Scott County, in coordination with the Minnesota Department of Transportation (Mn/DOT), Federal Highway Administration (FHWA), Dakota County, the City of Elko New Market, and New Market Township, are conducting a study of potential interchange concepts for the intersection of County State Aid Highway 2 (CH 2) and Interstate 35 (I-35). The primary objectives are to identify a footprint for the future interchange area and develop an access management plan that will provide the transportation infrastructure needed to support the anticipated growth in southeastern Scott County. A footprint is a broader area that encompasses several potential interchange designs. Selection of the future interchange type would occur closer to the time when the new interchange is needed, which will be based on the rate and pattern of development and resulting traffic flows in the area. By defining the footprint representing the maximum right-of-way needs now, Scott County, the City of Elko New Market, and New Market Township can plan future adjacent land uses and develop an access management plan for the interchange area. These plans will be used to influence future development patterns to preserve the right-of-way needed for the future interchange and establish development access that is consistent with the ultimate vision for the transportation network.

Purpose of the Document

The purpose of this document is to describe the resources reviewed as part of the environmental screening process conducted in conjunction with the Interchange Footprint Study. This document identifies the environmental resources surrounding the CH 2/I-35 Interchange and their potential influence on the development of alternatives. The CH 2/I-35 Interchange Footprint Study is in the Pre-National Environmental Policy Act (NEPA)/Minnesota Environmental Policy Act (MEPA) stage. Therefore, the purpose of this document is not to provide a determination of a preferred alternative, but only to document the background data for development of realistic alternatives to be considered during the NEPA and preliminary design phase of the project. Thus, several interchange concepts have been defined and screened for major issues or impacts to determine their feasibility.

2.0 TRAFFIC DATA

Traffic Operations

The existing AM and PM peak hour operations on CH 2 were analyzed and the operational results are summarized in **Table 1**. Overall, all intersections operated at level of service (LOS) A in both peak hours and all movements operated at LOS A/B except the left-turn movement from the northbound I-35 exit ramp in the AM peak hour. The delays on the ramp are primarily due to the heavy eastbound left-turn movement at the intersection, which leaves few available gaps for the left-turn traffic from the ramp. However, since the movement has less than 10 vehicles per hour, this is not considered to be a significant operational deficiency.

Table 1. Existing Level of Service Results

Intersection	Control	Intersection LOS		Notes
		AM Peak Hour	PM Peak Hour	
CH 2 & Xerxes Ave	North/ South Stop	A/A *	A/A *	
CH 2 & I-35 SB Ramps	Southbound Stop	A/A *	A/A *	
CH 2 & I-35 NB Ramps	Northbound Stop	A/B *	A/A *	Northbound left-turn operates at LOS E during AM peak
CH 2 & CSAH 46	East/ West Stop	A/B *	A/A *	

* Intersection LOS/Minor Approach LOS

The eastbound CH 2 to northbound I-35 movement in the AM peak hour operates well given that there are 612 vehicles making the left-turn movement in one hour. This is primarily due to the low volume of opposing westbound traffic in the AM peak (104 through vehicles and 129 right-turn vehicles). There are not currently any queuing issues with the left-turn movement in the AM peak hour. The reverse movement in the PM peak hour, the right-turn movement from the southbound I-35 exit ramp to westbound CH 2 also operates very well because of the free right-turn movement into an add lane on CH 2. A technical memorandum describing the complete operational analysis is found in **Appendix B**.

Crash History

Crash data for 2004 through 2008 was evaluated from the Minnesota Crash Mapping Analysis Tool (MnCMAT) system. Each crash record was reviewed to determine whether it was intersection-related. On CH 2 west of I-35 southbound, the crash data was analyzed before (2004-2005) and after (2007-2008) the reconstruction to a four-lane divided section, which was substantially completed in 2006. The results of the crash analysis are shown in **Table 2**. The only intersection in the after condition that had a crash rate indicating a potential safety issue is the CH 2/CH 46 intersection, which had a high number of crashes relative to the traffic volumes. Recent turn lane improvements have been made at the intersection that appear to have addressed the issue, and there was only one crash at the intersection in 2008.

Table 2. CH 2 Crash Analysis

Intersection	Number of Crashes	Entering AADT	Intersection Crash Rate	Mn/DOT Metro Average Crash Rate *	Critical Rate**
CH 2/ Xerxes Ave (before)	1	11,080	0.1	0.2	0.5
CH 2/Xerxes Ave (after)	1	11,080	0.1	0.2	0.5
CH 2/ Irving Ave (before)	0	10,720	0.0	0.2	0.5
CH 2/ Irving Ave (after)	0	10,720	0.0	0.2	0.5
CH 2/ I-35 SB (before)	11	12,030	1.3	0.2	0.5
CH 2/I-35 SB (after)	4	12,030	0.5	0.2	0.5
CH 2/ I-35 NB	6	8,940	0.4	0.2	0.4
CH 2/Dupont Ave	0	5,530	0.0	0.2	0.5
CH 2/CH 46	17	7,340	1.3	0.6	1.0
Segment	Number of Crashes	ADT	Segment Crash Rate	Mn/DOT Metro Average Crash Rate *	Critical Rate**
Xerxes Ave to I-35 SB (before)	1	10,470	0.1	0.5	1.0
Xerxes Ave to I-35 SB (after)	1	10,470	0.1	0.4	0.9
I-35 NB to CH 46	1	5,430	0.1	0.5	1.0

Source: Mn/DOT CMAT database (2004-2008 data)

Notes:

The "before" condition consisted of a 2-lane undivided section on CH 2 and includes crashes that occurred in 2004 and 2005. Reconstruction of the roadway occurred in 2006. The "after" condition consists of the current 4-lane divided section on CH 2 and includes crashes that occurred in 2007 and 2008.

The segment crashes exclude crashes that occurred at the key intersections listed above.

A 0.95 level of confidence was used to calculate the critical rates.

* Metro average crash rates based on 2005-2007 data. Source: Mn/DOT Data Toolkit.

** Crash Rate > Critical Crash Rate identifies a hazardous location. The observed crash rate is higher than can be accounted for due to the random nature of crashes, therefore there is a high probability that the intersection or roadway conditions are contributing to the crashes.

Traffic Forecasts

The 2030 daily traffic forecasts documented in the Scott County and City of Elko New Market Comprehensive Plans were used to develop the 2030 peak hour forecast volumes for the CH 2/I-35 interchange and the surrounding roadway network. The forecasts are consistent with the Metropolitan Council's land use projections for the area.

Traffic growth averaged over all the roadways in the study area is expected to be approximately 6.1 percent per year over the 20 year forecast period, reflecting expected development within the study area by 2030. A summary of the existing and 2030 traffic volumes is presented in **Table 3**. A technical memorandum describing the forecasting methodologies, assumptions, and results is included in **Appendix B**.

Table 3. Existing and Forecast Daily Traffic Volumes

Roadway	From	To	Average Daily Traffic Volumes		Annual Growth Rate
			Existing (2009)	2030 Forecast	
CH 2	Xerxes Ave	I-35 Southbound	11,500	26,200	4.0%
	I-35 Northbound	CH 46	5,000	14,800	5.3%
I-35	CH 70 (Dakota Co)	CH 2	43,000	71,000	2.4%
	CH 2	TH 19 (Rice Co)	38,000	56,000	1.9%
CH 46	CH 62	CH 2	1,750	3,900	3.9%
	CH 2	CH 86	3,450	12,400	6.3%

3.0 PURPOSE AND NEED

Project Purpose

The purpose of the CH 2 and I-35 interchange project is to address future capacity and operational deficiencies. The proposed project would address the need to upgrade this interchange and develop a supporting roadway network that will provide additional capacity and safely accommodate future traffic as the area urbanizes.

Depending on the rate at which development occurs in the project area, as well as funding availability, it is expected that interchange improvements will need to be phased, or interim improvements that will add needed capacity to the existing interchange will need to be facilitated until a new interchange is programmed.

Project Need

Traffic Operations and Mobility

The City of Elko New Market is within the 2030 Metropolitan Urban Service Area (MUSA) boundary and the population is expected to grow from 3,310 in 2005 to 20,800 in 2030. Traffic volumes on CH 2 are expected to grow from 10,500 vehicles per day in 2008 to 31,900 in 2030.

The existing CH 2 bridge over I-35 is 35 feet wide with one lane in each direction, and there is not sufficient space to increase the interchange capacity by adding turn lanes or additional through lanes across the bridge. The directional distribution of traffic at the interchange is primarily from eastbound to northbound in the AM resulting in a significant left-turn movement. The existing left-turn movement from eastbound CH 2 to northbound I-35 is 610 vehicles in the AM peak hour, with the 2030 volume projected to more than double to 1,460 vehicles.

The existing ramp terminal intersections currently operate at a level of service (LOS) A and do not impact traffic flow on I-35. However, the 2030 projections show that without improvements at the interchange, the ramp intersections will operate at LOS F and result in queues that would be expected to extend onto mainline I-35.

At the time of this study, traffic operations for I-35 were not specifically analyzed. However, a goal of the selected interchange design would be to minimize potential weaving conflicts from traffic entering or

exiting the freeway. The need for ramp metering or other measures to minimize impacts to traffic flow on I-35 would need to be evaluated as part of the preliminary design process.

Land Use

The CH 2/I-35 interchange is an important connection in southeast Scott County for the distribution of goods and services. The project needs to be consistent with local comprehensive plans for commercial development around the interchange, and limit the amount of right-of-way needed for public infrastructure.

Supporting Roadway Network

Currently there are 22 direct driveway or road access points on CH 2 in the segment between Xerxes Avenue and CH 46 (approximately 1.7 miles). As the area develops, there will be pressure to create additional accesses onto CH 2. A planned roadway network and access management plan are needed for CH 2 that are compatible with the future interchange to maintain the safety and mobility of the corridor and allow the interchange to operate at its designed capacity. Current standards require no intersections on CH 2 within ¼ mile of the ramp termini intersections, a standard which is not met in the existing conditions. Therefore, local and collector roadway plans are needed to provide local circulation and to distribute traffic from the planned development areas to the regional transportation system, setting the spacing of future local and collector roadways that will be built as part of the area's development.

Additionally, private driveways are currently provided full access to CH 2. Based on County standards, driveways need to be consolidated and/or modified to partial access to maintain safety and mobility on CH 2 as traffic volumes increase.

Accommodate Future Transit Facilities

Currently, Metro Transit does not have plans for park and ride or similar facilities at this location. However, based on the volume of commuter traffic, it is expected that there could be a need to accommodate a transit facility at CH 2/I-35 or a future interchange at CH 86/I-35. It is important to the community to select interchange designs that do not preclude future transit facility elements.

Pedestrian and Bicycle Access

The I-35 corridor currently presents a barrier to east-west pedestrians and bicyclist movements in southeastern Scott County. The CH 2 bridge does not currently include a sidewalk or trail and there is not sufficient width to add a pedestrian or bicycle facility. When CH 2 to the west of the interchange was reconstructed recently, a paved surface was constructed along the north side of the roadway. The Scott County 2030 Comprehensive Plan calls for a continuous trail along CH 2 across the entire county, including through the I-35 interchange. It is important that the future CH 2/I-35 interchange accommodates safe access for pedestrians and bicyclists across I-35.

4.0 PUBLIC STAKEHOLDER AND AGENCY INVOLVEMENT

Public Involvement

A variety of public involvement techniques were used to engage local residents as well as local government officials in the project. These techniques are summarized below.

City Council/Township Board Workshop

A joint workshop was held with the Elko New Market City Council and the New Market Township Board on January 28, 2010. The purpose of this work session was to inform the local decision-making bodies about the purpose and need for the project, as well as describing the process to date, the potential interchange alternatives, and concepts for the future roadway network.

Public Open Houses

A public open house was held on February 2, 2010 at Elko New Market City Hall. The purpose of this open house was to introduce the project, explain the need for the project, and to share illustrations of the interchange alternatives. Existing conditions were also reviewed and attendees were invited to speak with staff and share their own experiences and local knowledge of issues in the area. Notices of the open house were mailed to all property owners within a one-mile radius of the interchange. Approximately 25 people attended the open house.

A second open house was held on June 30, 2010, at Elko New Market City Hall. The focus of this open house was to share the four interchange concepts that make up the interchange footprint, the planned future roadway network, and options for interim interchange improvements. Approximately 5 people were in attendance. An additional open house focused on property owners in the project area was held on July 30, 2010.

Property Owner Meetings

Property owners that would be directly impacted by the interchange footprint were invited to schedule one-on-one meetings with the project staff to offer input and ask questions about the project. These meetings were held on Tuesday, May 11, 2010. Property owners were mailed an illustration of the interchange footprint with their meeting invitation, and additional information provided at the meetings included current interchange concepts, local roadway improvements, and access management plans. Staff met with property owners in each quadrant of the interchange, except the southeast quadrant. The primary concerns from the property owners were related to the footprint's impact on individual parcels and their access to CH 2. An open house type meeting was also held for property owners impacted by the proposed CH 2 realignment, with only a few people attending. The input and feedback from the property owner meetings did not result in any changes to the interchange designs or the right-of-way footprint.

Project Handouts and Website

Two project handouts were produced and distributed to the public in January 2010 and June 2010 to provide updates on the status of the project. The handouts were made available at the open houses and at Elko New Market City Hall. A project website was also created where a project overview, open house materials, project newsletters, and contact information were posted: www.co.scott.mn.us/2and35.

Agency Coordination and Review

Besides the agencies that were actively engaged throughout the project process, additional state and local agencies were consulted for data collection. The Minnesota Department of Natural Resources (DNR) was consulted to determine if any state-listed endangered, threatened, or special status species or ecological sensitive areas are within the project footprint. A "What's in my Neighborhood?" search was done through the Minnesota Pollution Control Agency website to determine if hazardous materials/contamination sites were present within the project area. A historic properties and archaeological site

review request was sent to the Minnesota Department of Transportation Cultural Resource Unit to determine if any National Register of Historic Places (NHRP) sites are located within the Study Area. Results of the Agency Coordination are included in **Section 5.0**.

5.0 EXISTING CONDITIONS

This section describes the resources that are known to occur within the project study area and interchange footprint area. **Figure 2** and **Figure 3** show the study and footprint area boundaries. This evaluation of resources was based on existing data sources obtained from agencies or via web/GIS sources. This was not intended to be a comprehensive review of all topics covered in a federal or state environmental review document, but rather to identify and address those resources that had an obvious potential to be located within the footprint or had potential for significant impacts.

Eight resource areas were reviewed, of which farmlands, public recreation lands (4f/6f), rare species, and floodplains were determined to not be of concern within or near the footprint area. Each of the remaining resources (parcels, structures, wetlands, and contamination) all had potential features identified within one or more of the interchange footprint quadrants. Therefore, the interchange footprint was defined with consideration to allow for some potential for avoiding and/or minimizing impacts to one or more of these resources by one or more of the concepts making up the footprint. Generally, the concepts requiring the least amount of new right of way would have the least impact on the majority of the resources.

Property Acquisition and Relocation

Eight parcels are either fully or partially located within the CH 2/I-35 interchange footprint (**Figure 4**). Based on the footprint, a maximum of three businesses and/or two farmsteads could be relocated due to the interchange ramp alignments. However, it is likely that the farmstead relocation impact could be avoided by some interchange concepts and minimized by the others.

Farmlands

Based on the United States Department of Agriculture (USDA) Web Soil Survey, prime and statewide important farmlands are present within the interchange area (**Appendix C**).

When a preferred interchange alternative is proposed for design and construction, further consultation with the Natural Resources Conservation Service (NRCS) should occur. A CPA-106 form will need to be filled out for the interchange, and the total amount of farmland being disturbed will need to be documented with the Regional NRCS office. Mitigation for minor farmland impacts is typically not required.

Section 4(f)/6(f)

A search and consultation with DNR Lands and Minerals Division was completed to determine if there was a potential that any property within the footprint would require a Section 6(f) evaluation. The conclusion was reached that no federal Land and Water Conservation (LAWCON) funds were used near the CH 2/I-35 interchange in Scott County, Minnesota. Two parcels within the footprint are currently listed as DNR property in the County Parcel Database, but the parcels are actually Mn/DOT right-of-way. It has been confirmed that the DNR has no records that these parcels are or were ever owned by the DNR, and it is likely a recording error. Mn/DOT has indicated they have records stating the property was purchased by Mn/DOT in 1961 and concur there is a recording error. It is recommended that Scott County

coordinate with the DNR and Mn/DOT to correct this error before preliminary design of the interchange is initiated.

No section 4(f) properties have been identified at this time. An archaeological and historic properties review has been requested but not reviewed by Mn/DOT Cultural Resources Unit due to a lack of state or federal funding currently associated with the project.

Cultural Resources

A state data request was submitted to Mn/DOT's Cultural Resources Unit. Due to the lack of programmed funding, this project could not be formally reviewed at this time. Agency Correspondence can be found in **Appendix D**. A county parcel records search was completed to determine if any potential historic properties were in the surrounding interchange area. To be considered a potential historic property, ages of the structures as listed in the county records were assessed. Structures that are currently at least 50 years old were determined to potentially be eligible for the NRHP. **Figure 4** shows two properties within the footprint that have structures estimated to be more than 50 years old.

Additional investigation will be required to determine if any of these structures meet the criteria to be considered eligible and coordination with the State Historic Preservation Office (SHPO) would be needed to determine eligibility and the potential for adverse effects as a result of the project.

Fish and Wildlife, Ecologically Sensitive Resources and Species of Special Status

Scott County does not have any known federally listed endangered, threatened, proposed or candidate species, or final or proposed critical habitat identified within the County boundary according to the County listings provided by the United States Fish and Wildlife Service (USFWS). To evaluate state records, a DNR Natural Heritage Information Search (NHIS) was conducted and no state-listed endangered, threatened or of special concern species were identified within one mile of the project area (**Appendix E**). A high quality native plant community was acknowledged by the NHIS search. This native plant community (dry oak forest) is located in the northeast corner of Section 23, which is 1.5 miles north of the project study area and therefore rare species impacts are not expected.

Wetlands

Three mapping services were used to determine if any wetlands were present within the interchange study area: the USFWS National Wetlands Inventory (NWI); the Scott County Interactive Geographic Information Systems (GIS) Mapping System; and the Minnesota DNR Public Waters Inventory (PWI) maps. Both the NWI and county data show many identified wetlands within the footprint area (**Figure 4**). One DNR protected wetland (5W) was identified outside the study area, southwest of the existing interchange, as shown in **Figure 4**.

During preliminary design and NEPA documentation, wetland delineation should be completed in the footprint area to aid in the selection of the preferred alternative.

Floodplain

Federal Emergency Management Agency (FEMA) floodplain maps were evaluated to determine if the study area is within a FEMA recognized floodplain. The study area and footprint are not within a recognized floodplain; therefore floodplain impacts are not expected.

Hazardous Materials/Contamination

A Minnesota Pollution Control Agency database search (“What’s in my Neighborhood?”) was conducted for potentially contaminated sites within the project area. Some business services within the area include auto salvage, auto service, racing team’s shops, and blacktopping/trucking shops. As expected with these types of businesses within the project area, there were a few records of known spills, tanks and leaks, and dump sites within or near the interchange. Results from the database search are found in **Appendix F**. There is an auto related use in the southwest, southeast and northeast corners of the footprint area. Based on preliminary MPCA records included in Appendix F, these sites do not appear to have high potential for concern, however, the County should consult with Mn/DOT for additional review.

A Phase I Environmental Site Assessment (ESA) should be completed prior to or in conjunction with preliminary design and NEPA documentation for the project to determine the effects these or other sites may have on alternative selection, final design, or construction.

6.0 CONCEPT DEVELOPMENT

Interchange Concept Development and Evaluation

Originally, seven potential interchange concepts were developed to address the anticipated future demands on the CH 2/I-35 interchange. These seven concepts were a result of a brainstorming session held during a design charette that included representatives from Scott County, the City of Elko New Market, Dakota County, Mn/DOT Central Office, Mn/DOT Metro Division, and consultant staff. At a subsequent Project Advisory Committee (PAC) meeting, three additional concept variations were added based on comments from the PAC members.

An evaluation matrix was developed to determine which alternatives warranted more in depth in study. This matrix incorporates the data collection and high-level interchange concept analysis, and evaluated interchange concepts based on project goals and measurable design, planning, and environmental criteria. The completed evaluation matrix can be found in **Appendix G**.

Results of the initial concept evaluation are summarized in **Table 4** on the following page. The interchange screening exercise resulted in five concept interchange concepts emerging as viable alternatives.

Table 4. Interchange Concept Evaluation

Proposed Interchange Concept	Results of Initial Evaluation
Alternative B – Standard Diamond Interchange	Retain as a feasible alternative.
Alternative C – Tight Diamond Interchange	Eliminate - poor operations. Capacity is insufficient and this concept inhibits the ability for future expansion.
Alternative D – Partial Cloverleaf Interchange	Eliminate – poor operations. Two-lane loop in the SE quadrant would cause merge issues on mainline I-35; one-lane loop would cause significant queuing on CH 2.
Alternative D1 – Partial Cloverleaf Interchange with Collector-Distributor	Retain as a feasible alternative. Develop further to understand right-of-way impacts.
Alternative E – Full Cloverleaf Interchange	Retain as a feasible alternative. Provides excess capacity but results in a larger footprint.
Alternative E1 – Flyover Interchange with Braided Ramps	Eliminate – cost. Requires several structures that would require costly construction and maintenance.
Alternative E2 – Flyover Interchange	Eliminate – cost. Requires several structures that would require costly construction and maintenance.
Alternative F – Single Point Urban Interchange	Retain as a feasible alternative. Does not require additional right-of-way.
Alternative G – Diverging Diamond Interchange	Retain as a feasible alternative. Does not require additional right-of-way. Relatively new interchange type in the United States.
Alternative H – Directional Interchange	Eliminate – cost. Requires significant right-of-way as well as structures for flyover.

Interchange Footprint

Each of the five remaining interchange concepts was considered for inclusion in the interchange footprint. A footprint accommodates each of the potential interchange configurations, and allows flexibility in what configuration may ultimately be chosen at the time when the interchange is needed. By defining future construction limits and right-of-way needs now, Scott County, the City of Elko New Market, and New Market Township can plan their land uses, develop an access management plan for the interchange area, and influence future development patterns to protect the right-of-way needed for the future roadway network. A footprint allows the ability to preserve right-of-way while still being flexible enough to accommodate future conditions and desires of developers. The overall goal of the footprinting process is to reduce the potential future costs and impacts of interchange reconstruction and roadway improvements, as well as to establish an access management plan for the interchange area.

Each of the five concepts was evaluated further to determine if they were appropriate alternatives to include in the interchange footprint. At this time, the capacity of the full cloverleaf concept was analyzed in greater detail compared to the 2030 forecasts. The loops on the north side of the interchange are not expected to be needed based on the 2030 forecasts and would not need to be considered until the 2030 forecast left-turn movements from the NB I-35 exit ramp and onto the SB I-35 entrance ramp were approximately doubled (200% growth above 2030 forecasts). However, the 2050 forecasts prepared as part of the Scott County Comprehensive Plan show that the expected growth on CH 2 and on I-35 south of CH 2 between 2030 and 2050 is expected to be approximately 125-130%. Therefore the loops on the north side of the interchange would not be expected to be needed until beyond 2050. In addition, it was shown that loops could be added on the north side of the interchange within the diagonal ramps of the partial cloverleaf concept. For these reasons, it was recommended that the full cloverleaf not be included in the interchange footprint.

The standard diamond, partial cloverleaf with collector-distributor roadways, single point urban interchange (SPUI), and diverging diamond interchange alternatives moved forward for inclusion in the footprint. Traffic modeling was completed for each of these alternatives assuming 2030 volumes, and concept level cost estimates were prepared. Additional advantages and disadvantages of each interchange type are summarized below, with the full evaluation shown in the matrix in **Appendix G**. Each of these alternatives are also illustrated in **Figures 5-8**.

Standard Diamond Interchange

The standard diamond concept is similar to the existing CH 2/I-35 interchange, but the bridge would need to be reconstructed to carry much higher traffic volumes and turning movements. Traffic studies indicate that queue storage needs may not be met by a standard diamond interchange beyond 2030.

Partial Cloverleaf Interchange with Collector-Distributor Roadway (Parclo)

This concept has an eastbound to northbound loop and includes a collector-distributor road to combine eastbound and westbound movements to northbound I-35, providing greater distance for vehicles from the ramps to merge. The partial cloverleaf alternative generally has the best 2030 intersection LOS and has the most flexibility to accommodate future traffic volumes and patterns since loops can be added in any of the quadrants. However, the partial cloverleaf also has the largest footprint of all of the alternatives, and

therefore has been developed to a greater level of design detail to capture the maximum right-of-way impacts of the feasible interchange options (**Figure 9**). The design includes a two-lane loop in the southeast quadrant based on the AM peak hour volume of 1,460 vehicles, which exceeds the theoretical capacity of 900 to 1,200 vehicles per hour on a single-lane loop.

Diverging Diamond Interchange

The diverging diamond accommodates heavy left-turn volumes by crossing the through movements to the left side of the bridge, reducing vehicle conflicts and creating free left-turn movements to and from the freeway ramps. However, to date only one such interchange has been constructed in the United States. This design did raise concerns with maintenance, design speeds (recommended 45 mile-per-hour (mph) maximum), and pedestrian accommodations across the “free” movements to and from the ramps.

Single Point Urban Interchange

The SPUI design brings traffic to one signal in the center of the bridge, which provides more efficient left-turn operations compared with the two signals that are common with a standard diamond design. While the SPUI concept minimizes the right-of-way needed for the interchange, it also has the highest construction cost due to the large bridge structure.

Each of the four interchange alternatives described above were determined to be reasonable options for the future CH 2/I-35 interchange and therefore were included in the interchange footprint. The interchange designs included in the study and shown in this document are for the purpose of establishing a preliminary right-of-way footprint based on expected future traffic volumes. However, the design details of the interchange alternatives, including changes to the interchange design, can be accommodated within the footprint and would need to be explored as part of the future study to select a preferred alternative.

The CH 2/I-35 interchange footprint, based on the partial cloverleaf design that has the greatest right-of-way needs of the interchange alternatives included in the footprint, is shown in **Figure 10**. The interchange footprint allows for transit enhancements such as a high occupancy vehicle (HOV) ramp meter bypass or direct access from a park and ride onto I-35. These elements will need to be further considered when the preferred interchange configuration is developed.

The existing right-of-way width on CH 2 east of I-35 is 80 feet, so additional right-of-way acquisition would likely be needed along CH 2 to accommodate the transition from a proposed four-lane section through the interchange to the existing two-lane section east of I-35. However, the interchange designs are based on an assumption that the segment of CH 2 between I-35 and CH 46 would eventually be reconstructed as a four-lane roadway. The design of the CH 2 section east of I-35 should be evaluated as part of the selection of the preferred interchange alternative to determine the appropriate number of lanes at the interchange and the necessary transitions to the existing CH 2 section. As such, potential right-of-way needs along CH 2 east of I-35 have not been included in the footprint.

7.0 CONCLUSION

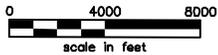
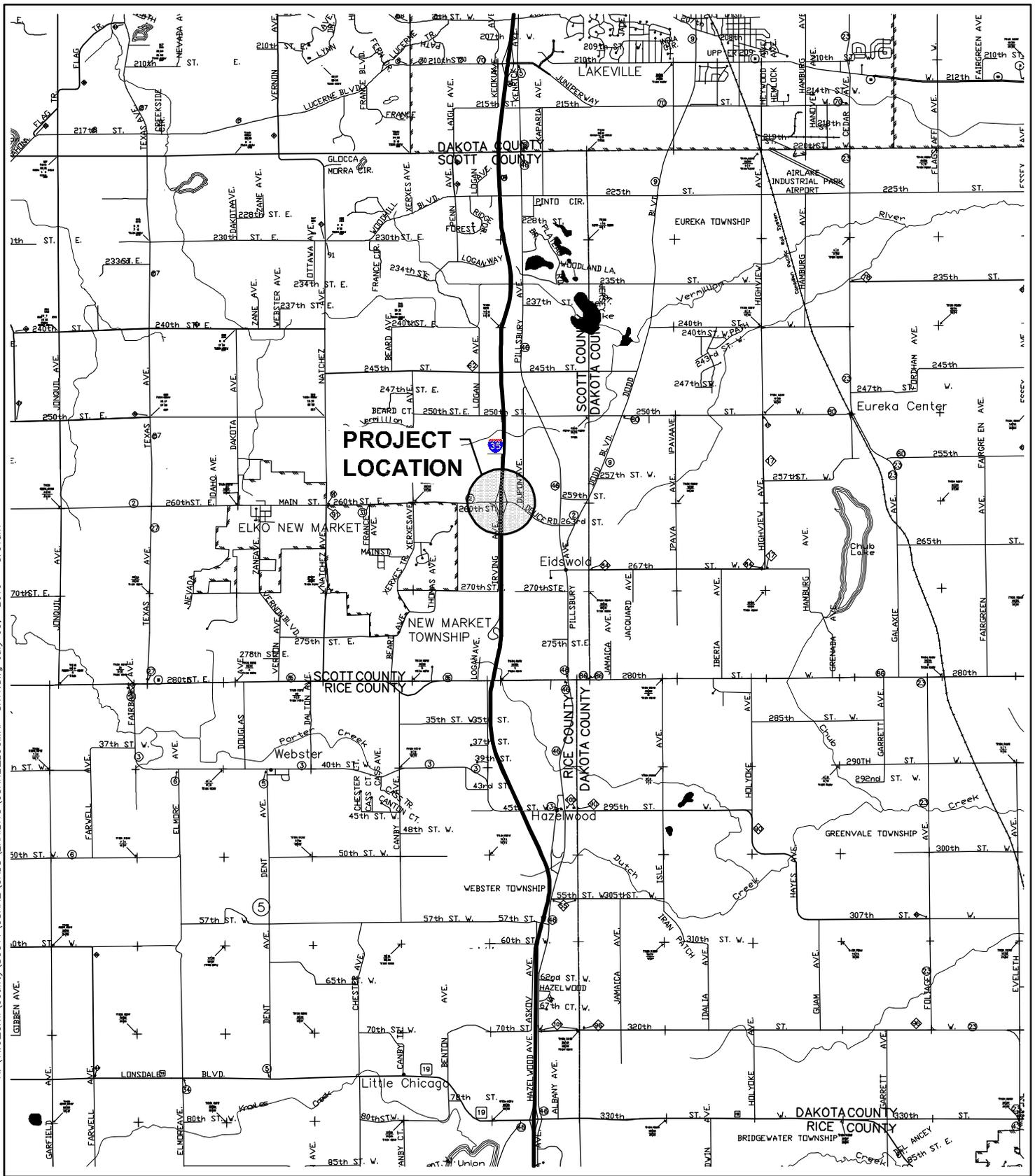
A CH 2/I-35 interchange footprint that is anticipated to accommodate the transportation infrastructure needed to support the projected growth in southeastern Scott County. This environmental screening

document discloses the process by which the footprint was developed, and provides high-level impact assessment of the footprint area. At the time a new interchange is warranted and the design process for the interchange is initiated, additional environmental review will be required based on the type of funding allocated to the project. It is anticipated that an Environmental Assessment (EA) may be required to satisfy the federal environmental review process (NEPA) and an Environmental Assessment Worksheet (EAW) may be required to satisfy the state environmental review process (MEPA). By defining the footprint representing the maximum right-of-way needs now, Scott County, the City of Elko New Market, and New Market Township can plan future adjacent land uses and influence future development patterns to protect the right-of-way needed for the future interchange.

APPENDIX A

Screening Document Figures

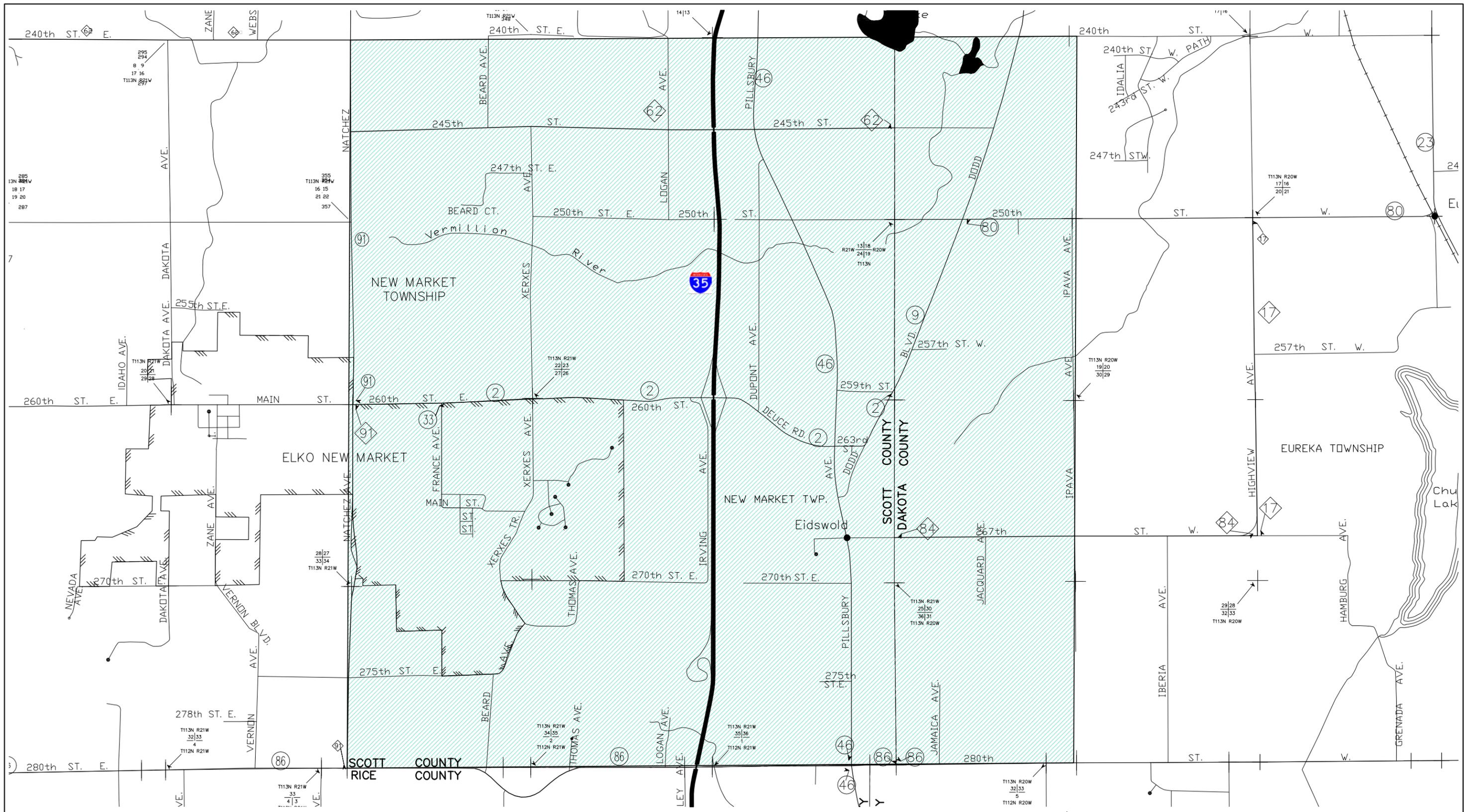
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**Kimley-Horn
and Associates, Inc.**

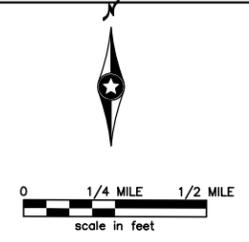
CH 2/I-35
Environmental Screening Document
Figure 1. Project Location Map

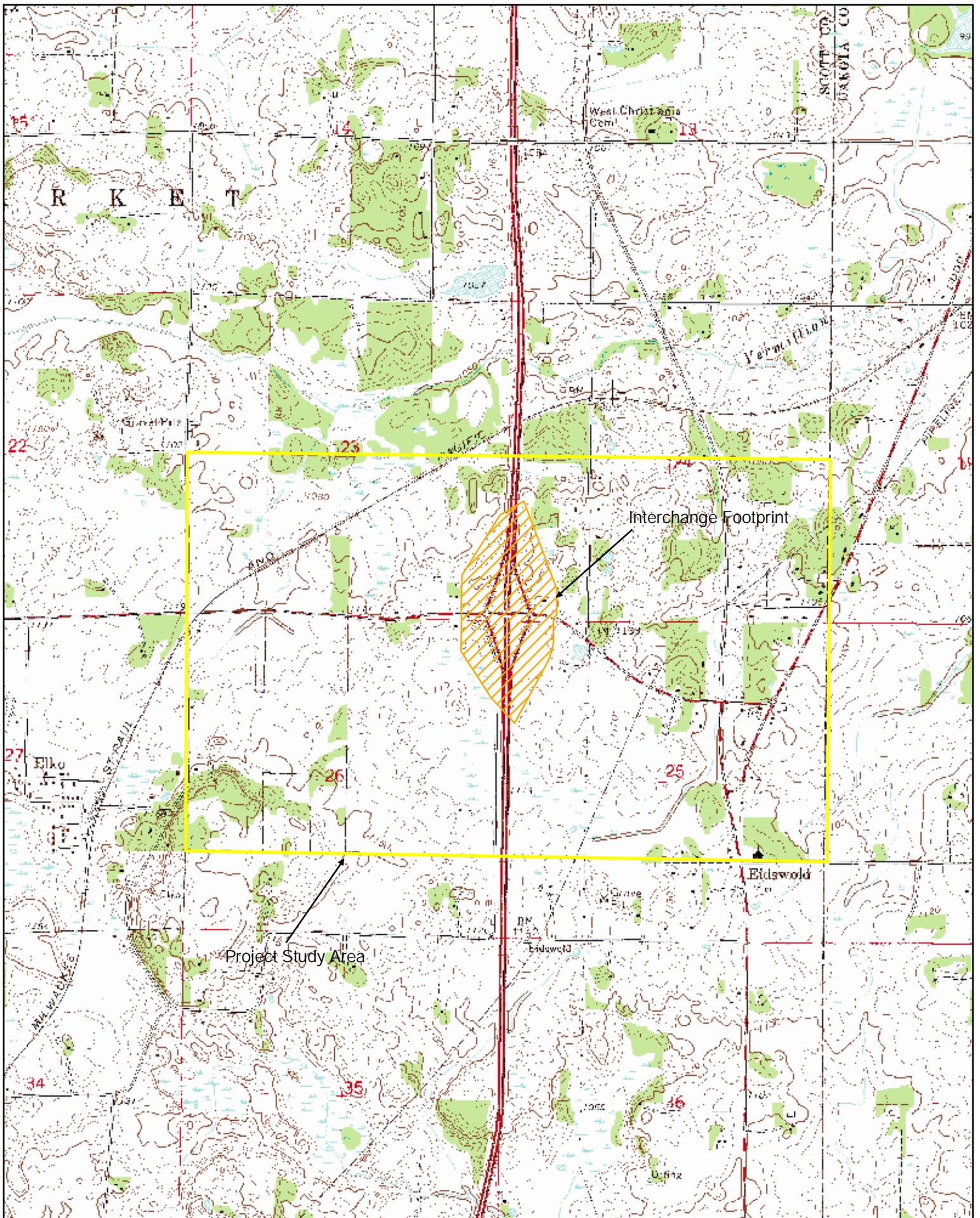
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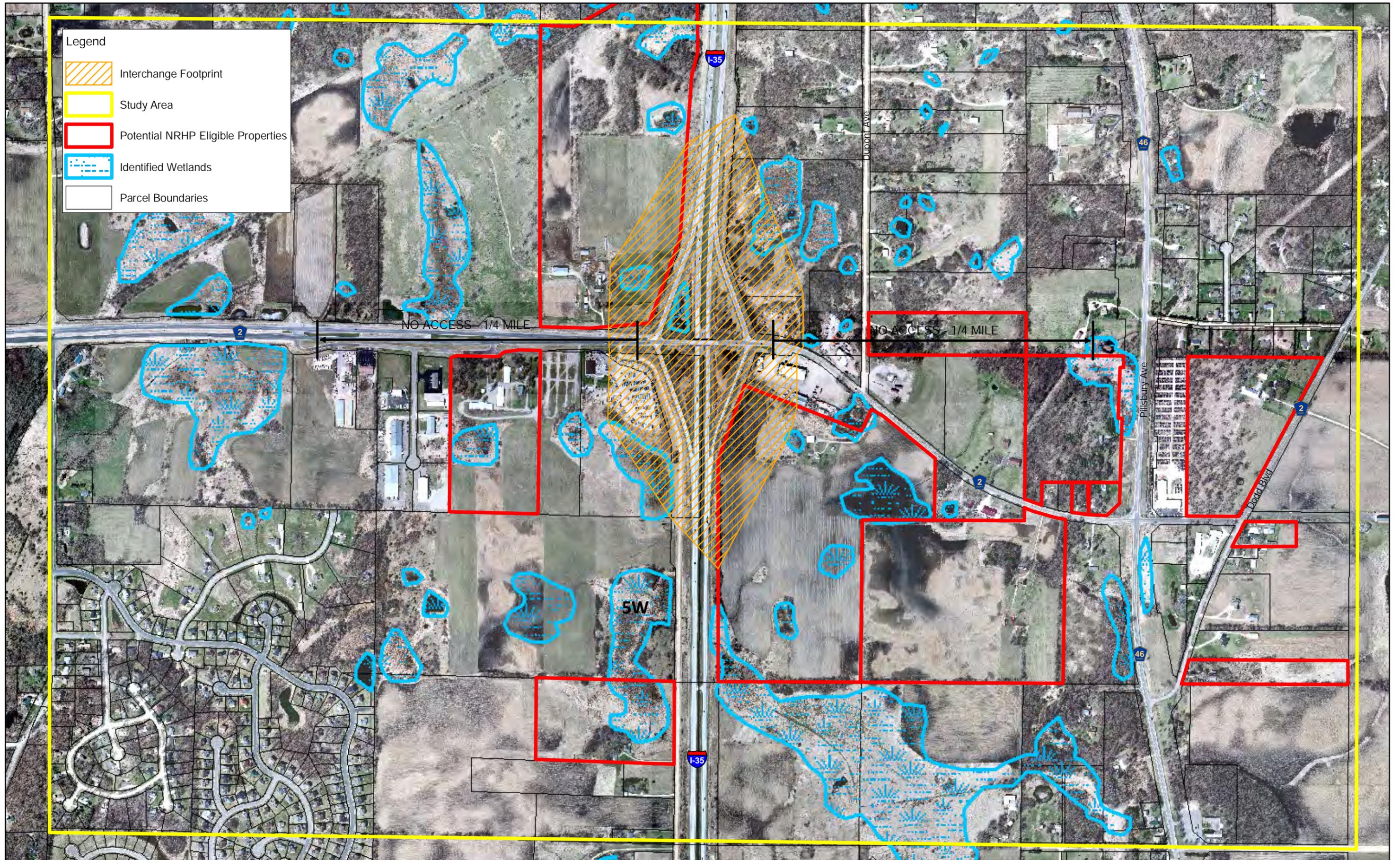


LEGEND

 PROJECT STUDY AREA

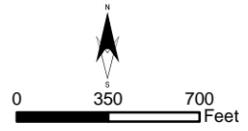


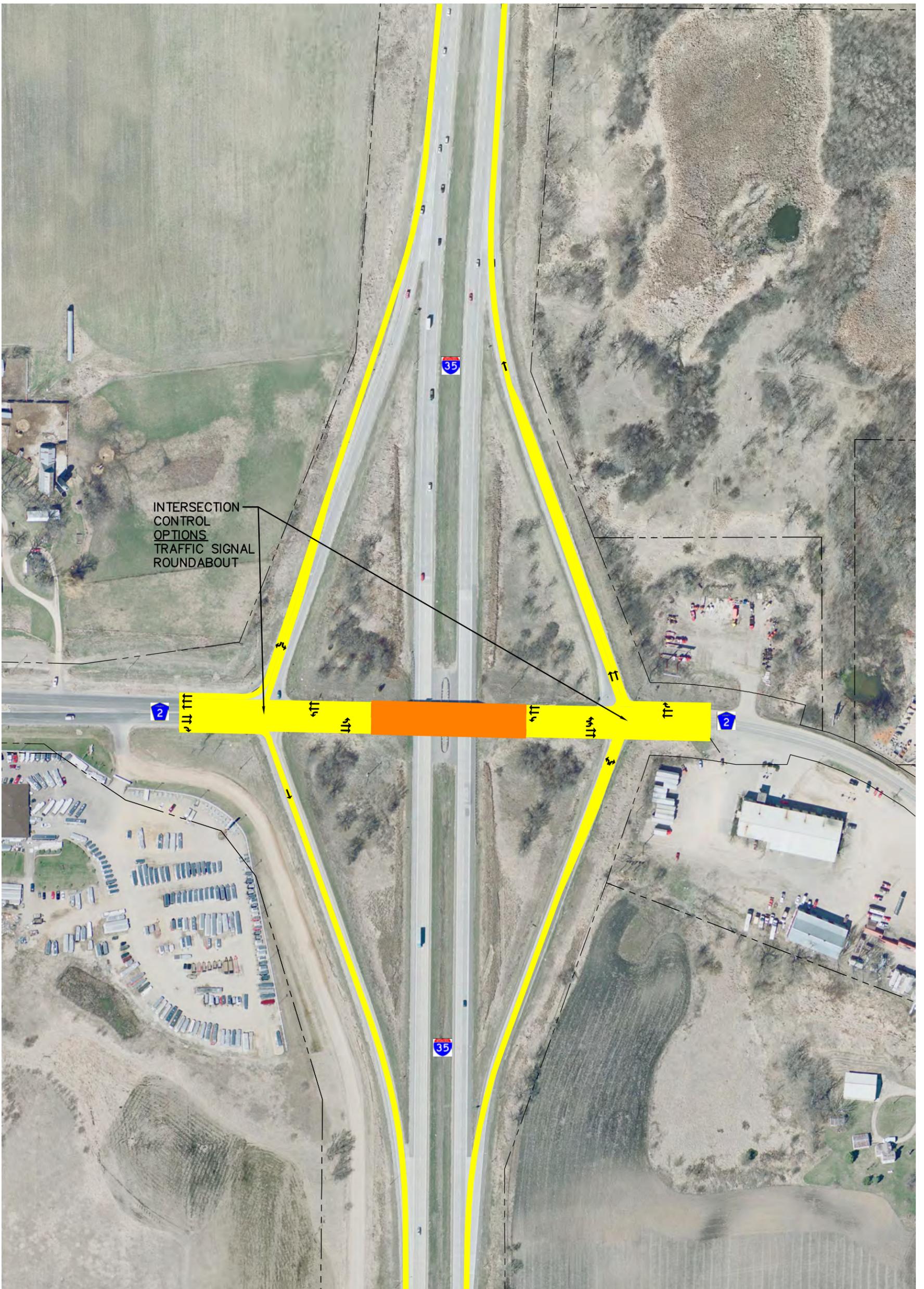




Legend

-  Interchange Footprint
-  Study Area
-  Potential NRHP Eligible Properties
-  Identified Wetlands
-  Parcel Boundaries





INTERSECTION
CONTROL
OPTIONS
TRAFFIC SIGNAL
ROUNDABOUT

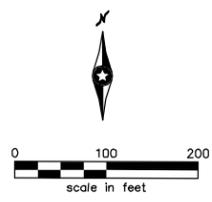
LEGEND



TRAFFIC LANES/DIRECTION



BRIDGE



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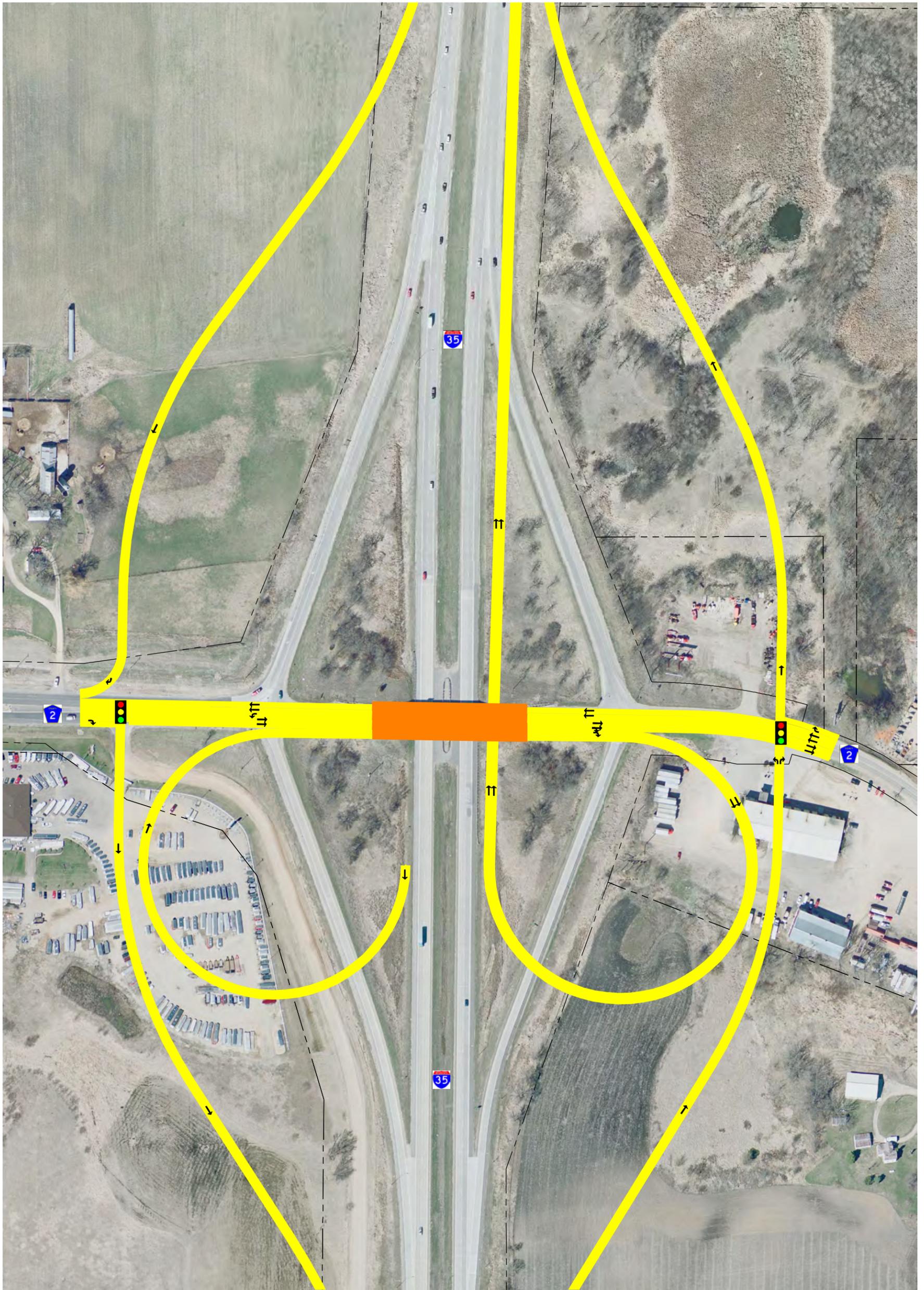


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CSAH 2/I-35

Environmental Screening Document
Figure 5. Interchange Concept - Standard Diamond

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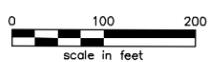


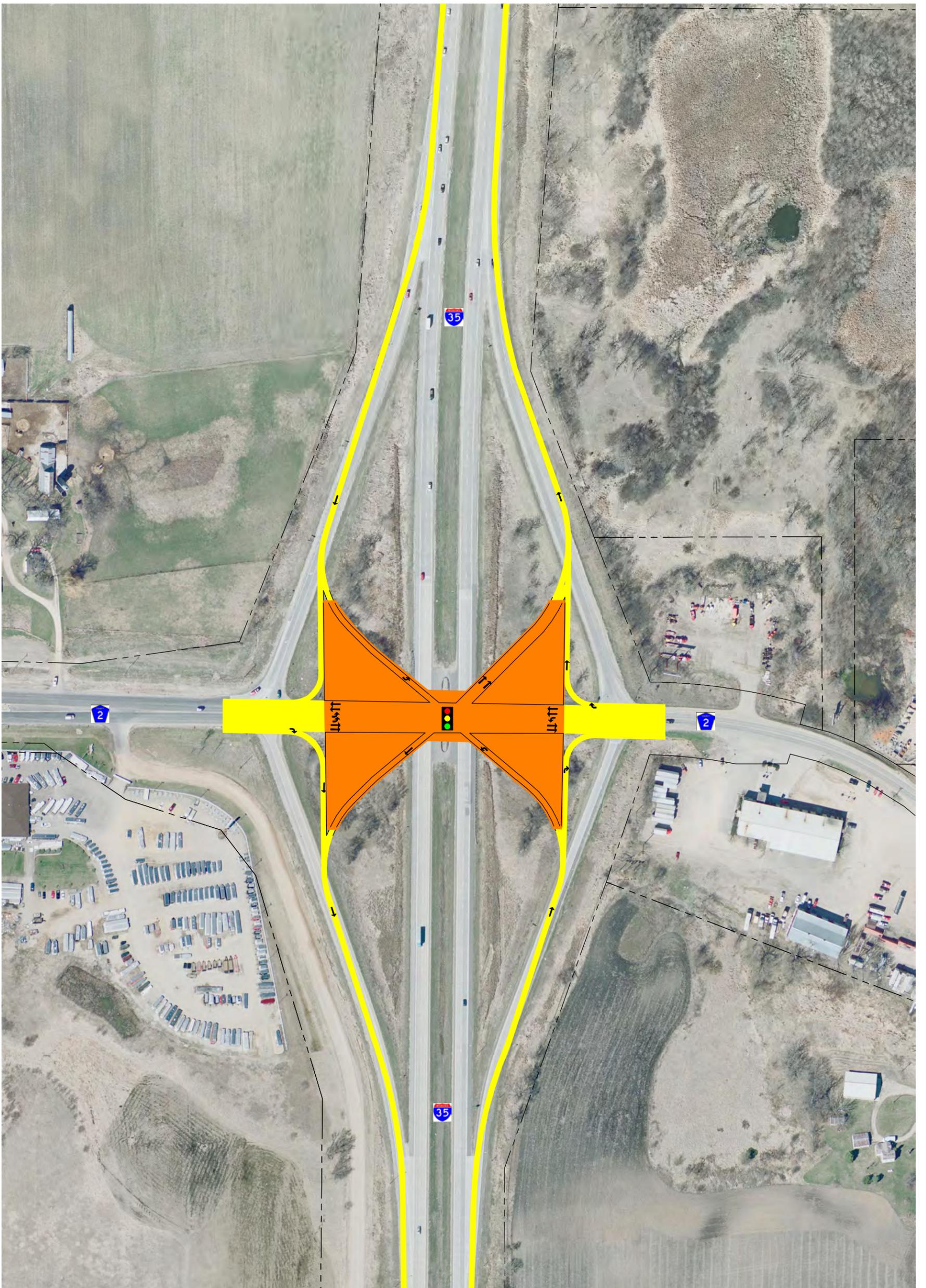
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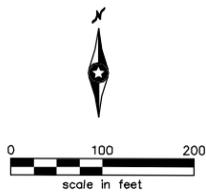
🚦 SIGNALIZED INTERSECTION

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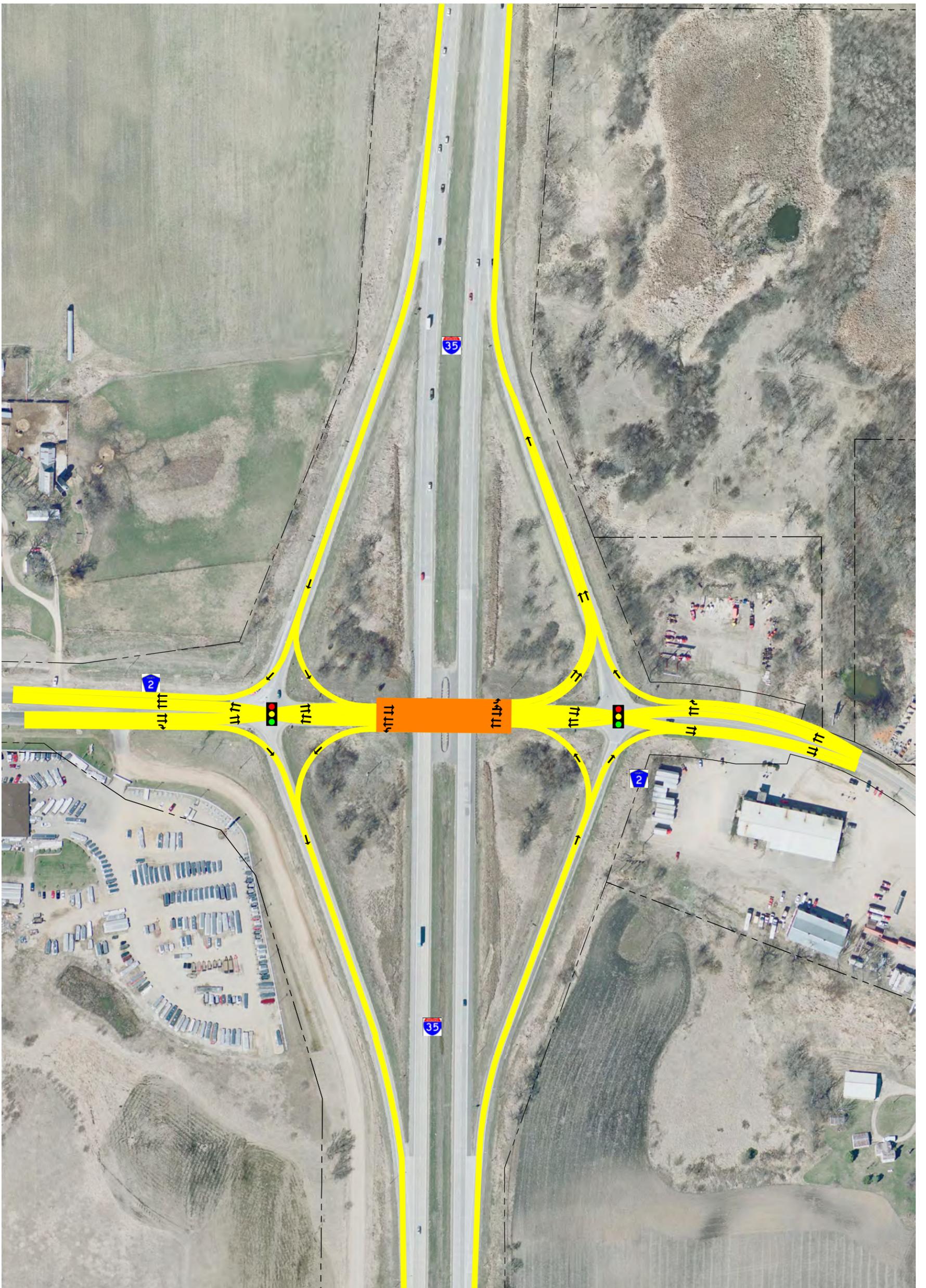
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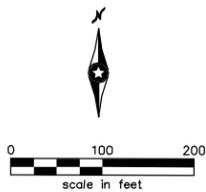
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	SIGNALIZED INTERSECTION
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**Kimley-Horn
and Associates, Inc.**



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LEGEND

⇔ TRAFFIC LANES/DIRECTION

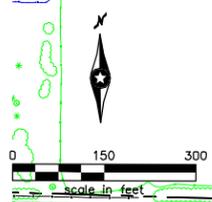
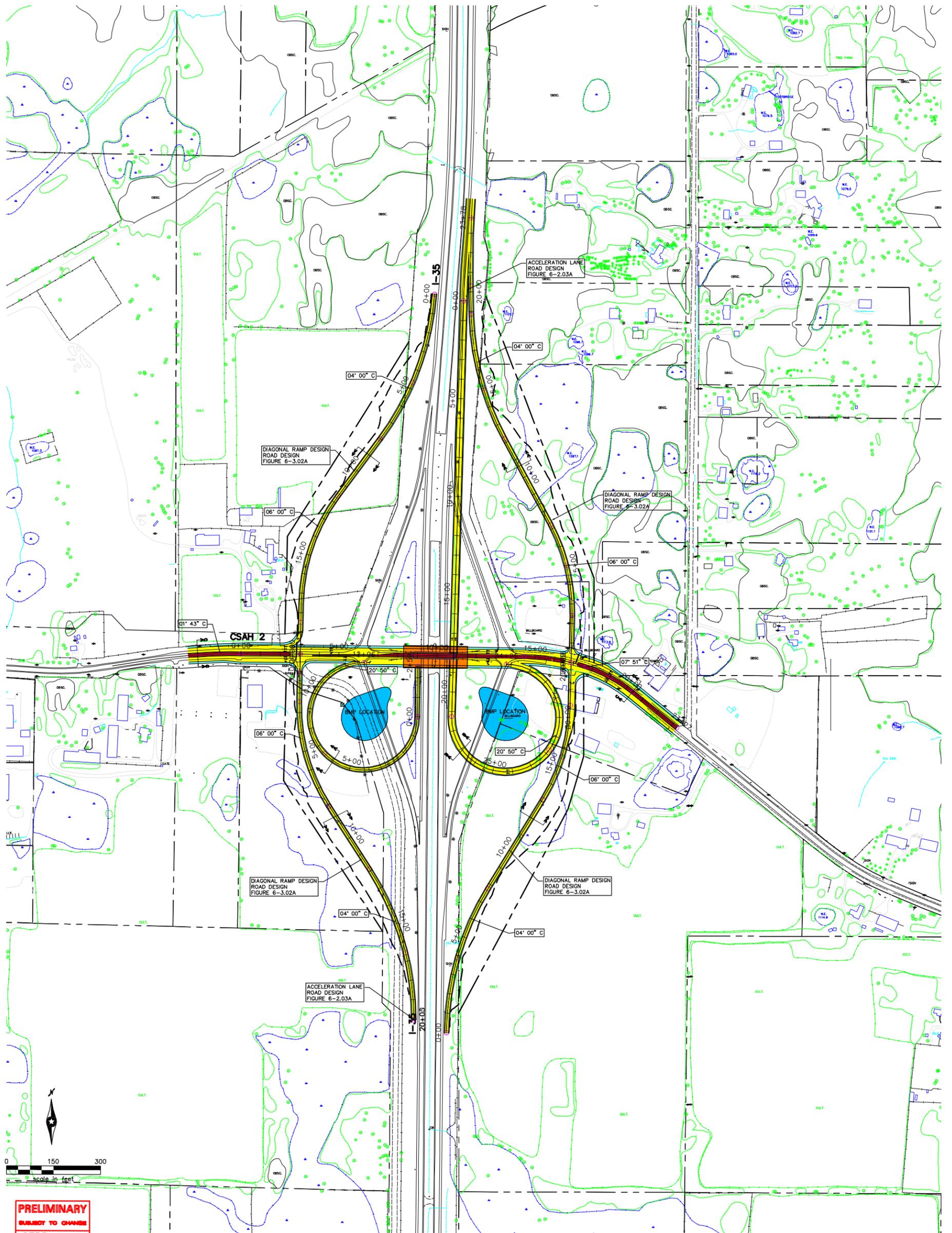
🚦 SIGNALIZED INTERSECTION

▬ BRIDGE

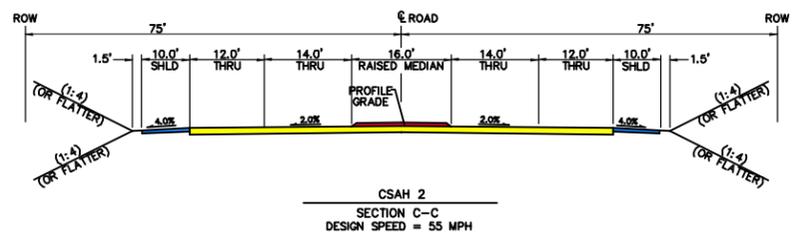
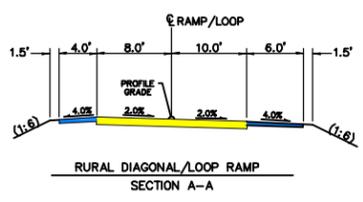
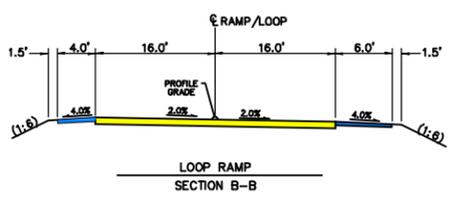


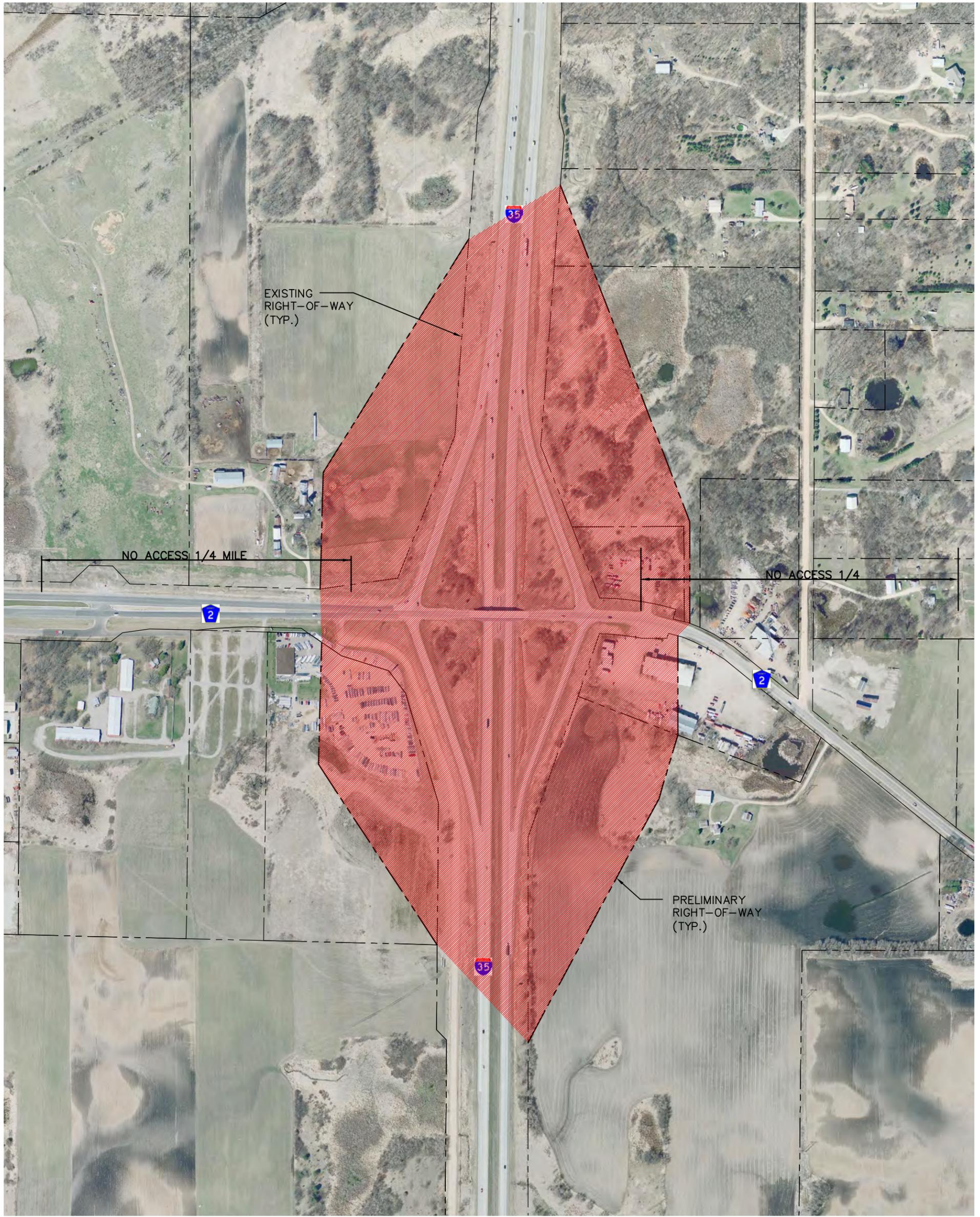
**Kimley-Horn
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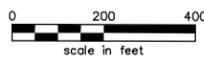


PRELIMINARY
 SUBJECT TO CHANGE
 SEPT. 2010





INTERCHANGE TYPES COMPATIBLE WITH FOOTPRINT
 STANDARD DIAMOND INTERCHANGE
 DIVERGING DIAMOND INTERCHANGE
 SINGLE POINT URBAN INTERCHANGE
 PARTIAL CLOVERLEAF INTERCHANGE WITH COLLECTOR-DISTRIBUTOR



**Kimley-Horn
and Associates, Inc.**

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APPENDIX B

Traffic Technical Memoranda



Memorandum

To: Craig Jenson, Transportation Planner
Tony Winiecki, Traffic Engineer
Scott County Public Works

■
Suite 345N
2550 University Avenue West
St. Paul, Minnesota
55114

From: JoNette Kuhnau, P.E., PTOE

Date: October 15, 2010

Subject: Scott County CH 2 & I-35 Interchange Footprint Study
Traffic Analysis Technical Memorandum

The purpose of this memorandum is to document the traffic analysis completed for the CH 2 and I-35 Interchange Footprint Study. This memorandum includes a summary of the existing conditions and operations, the forecast traffic volumes, and the results of the operations analysis of each of the roadway/interchange alternatives.

EXISTING CONDITIONS

The focus of the study area is on CH 2 between Xerxes Avenue, 0.9 mile west of I-35, and CH 46, 0.7 mile east of I-35. The following sections document the existing roadway conditions, traffic volumes, traffic operations, and safety data.

Roadway Conditions

The speed limit on CH 2 is 55 miles per hour (mph) through the study area. I-35 in this area has a four-lane rural section. The adjacent interchanges on I-35 are located at Dakota CH 70, 5 miles north of CH 2, and at TH 19, 7 miles south of CH 2. There is a rest area on southbound I-35 approximately 1¼ miles south of CH 2.

West of the southbound I-35 ramps, CH 2 is a four-lane divided roadway with turn lanes. The roadway was reconstructed in 2006 and has existing average daily traffic (ADT) volumes of approximately 10,470 vehicles per day in this segment. The CH 2/Xerxes Avenue and CH 2/I-35 southbound ramps intersections both have thru-stop control, with stop signs on Xerxes Avenue and the southbound I-35 exit ramp. Xerxes Avenue is currently a two-lane paved roadway south of CH

2 that provides primary access from CH 2 to existing residential neighborhoods, with an estimated average daily traffic volume of approximately 2,350 vehicles per day¹ and a speed limit of 30 mph. North of CH 2, Xerxes Avenue is an unpaved two-lane roadway with an estimated ADT of 190 vehicles per day¹. The four-lane divided section on CH 2 starts at the I-35 southbound ramp terminal intersection, creating a lane add (i.e., no yield) condition for the southbound right-turn movement from the ramp to westbound CH 2. The left-turn movement from the ramp onto eastbound CH 2 has stop control. On eastbound CH 2, the second lane ends approximately ¼-mile west of the interchange. The only existing public street intersections on CH 2 between I-35 and Xerxes Avenue are at:

- Future location of Logan Avenue S, approximately ¼-mile west of the existing I-35 southbound ramps. Currently provides access to the CH 2 south frontage road.
- Irving Avenue, approximately 350 feet west of the I-35 southbound ramps. Currently is an unpaved roadway that serves as a frontage road to I-35, south of CH 2.

There are 2 private driveways with direct access onto CH 2 in this segment, one with full access and one that is right-in/right-out only.

With the reconstruction of CH 2 west of the interchange, a bituminous paved surface was added on the north side of the roadway, which ends at the southbound ramps. There are no pedestrian or bicycle facilities on the CH 2 bridge over I-35. The CH 2 bridge over I-35 is 35 feet wide, including barrier on each side, resulting in one driving lane plus a narrow shoulder in each direction. There are also no turn lanes on the bridge due to the width.

East of the I-35 southbound ramps, CH 2 is a two-lane section with an existing ADT of approximately 5,430 vehicles per day. The CH 2/I-35 northbound ramps intersection has stop control on the northbound exit ramp, while the CH 2/CH 46 intersection has stop control on CH 2 only. CH 46 is a two-lane undivided roadway with a speed limit of 55 mph and an existing ADT of 2,270 vehicles per day north of CH 2 and 4,220 vehicles per day south of CH 2. CH 46 connects to CH 86 and CH 62, which are the nearest I-35 overpasses south and north of CH 2, respectively. There is one public street intersection on CH 2 between I-35 and CH 46: Dupont Avenue is an unpaved roadway north of CH 2, approximately 0.2

¹ ADT volume estimated from peak hour counts.

mile east of the I-35 northbound ramp intersection. However, there are 13 private driveways with direct full access onto CH 2 in this segment.

Traffic Counts

Tube counts collected in 2008 and 2009 were provided by Scott County for the roadways in the project area. Peak hour turning movements were also collected at the CH 2/Xerxes Avenue, CH 2/I-35 southbound ramps, CH 2/I-35 northbound ramps, and CH 2/CH 46 intersections in September 2009. The existing traffic counts are shown in **Figure 1**. Historic traffic volumes on CH 2 have also been collected to show the growth in traffic volumes over the past decade, as seen in **Table 1**.

Table 1. CH 2 Historic Traffic Volumes

CH 2 Segment	Average Annual Daily Traffic (AADT) Volumes							Average Annual Growth Rate
	1996	1998	2000	2003	2005	2007	2009	
Xerxes Avenue to I-35 Southbound	4,750	5,200	6,700	5,800	9,000	11,500	10,000	5.9%
I-35 Northbound to CH 46	3,350	3,500	4,100	4,200	4,850	5,000	4,950	3.0%

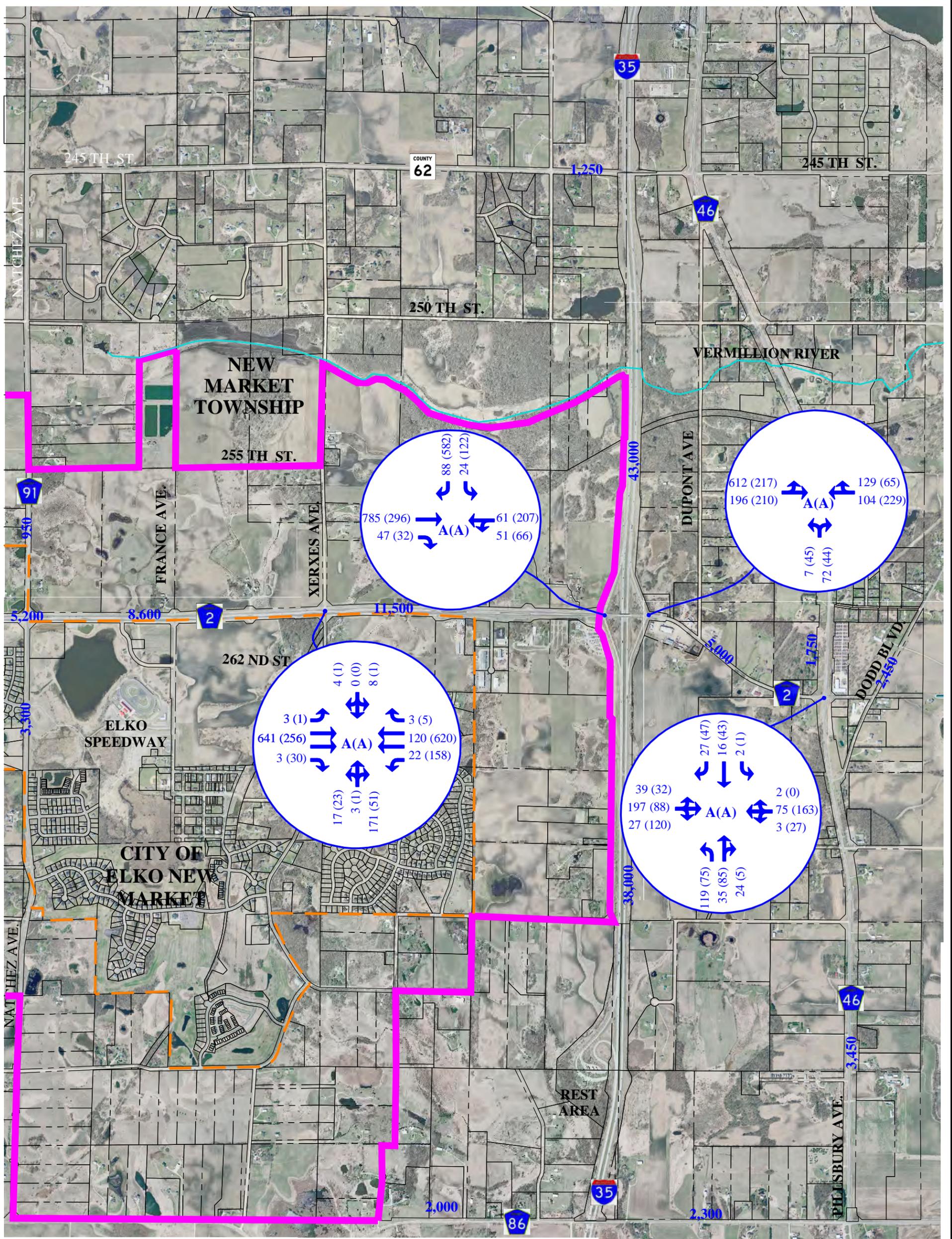
Source: Mn/DOT Average Annual Daily Traffic Volume maps.

Traffic Operations

The existing AM and PM peak hour operations on CH 2 were analyzed in Synchro/SimTraffic. The level of service boundaries, as documented in the 2004 *Highway Capacity Manual*, are shown in **Figure 2** and the existing operational results are summarized in **Table 2**.

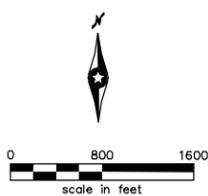
The delay and LOS shown are based on the average of five one-hour simulations in SimTraffic. Overall, all intersections operated at level of service (LOS) A in both peak hours and all movements operated at LOS A/B except:

- Northbound I-35 exit ramp in the AM peak. The delay on this movement is due to the heavy eastbound left-turn movement at the intersection in the AM peak hour, which leaves few available gaps for the left-turn traffic from the ramp. However, since the movement has less than 10 vehicles per hour, this is not considered to be a significant operational deficiency.



LEGEND

- 2,300** = EXISTING (2008/2009) AVERAGE DAILY TRAFFIC
- XX (XX)** = EXISTING AM (PM) PEAK HOUR
- = ELKO NEW MARKET CITY LIMITS
- = 2030 MUSA RESERVE BOUNDARY
- A (A)** = INTERSECTION LOS AM (PM) PEAK HOUR



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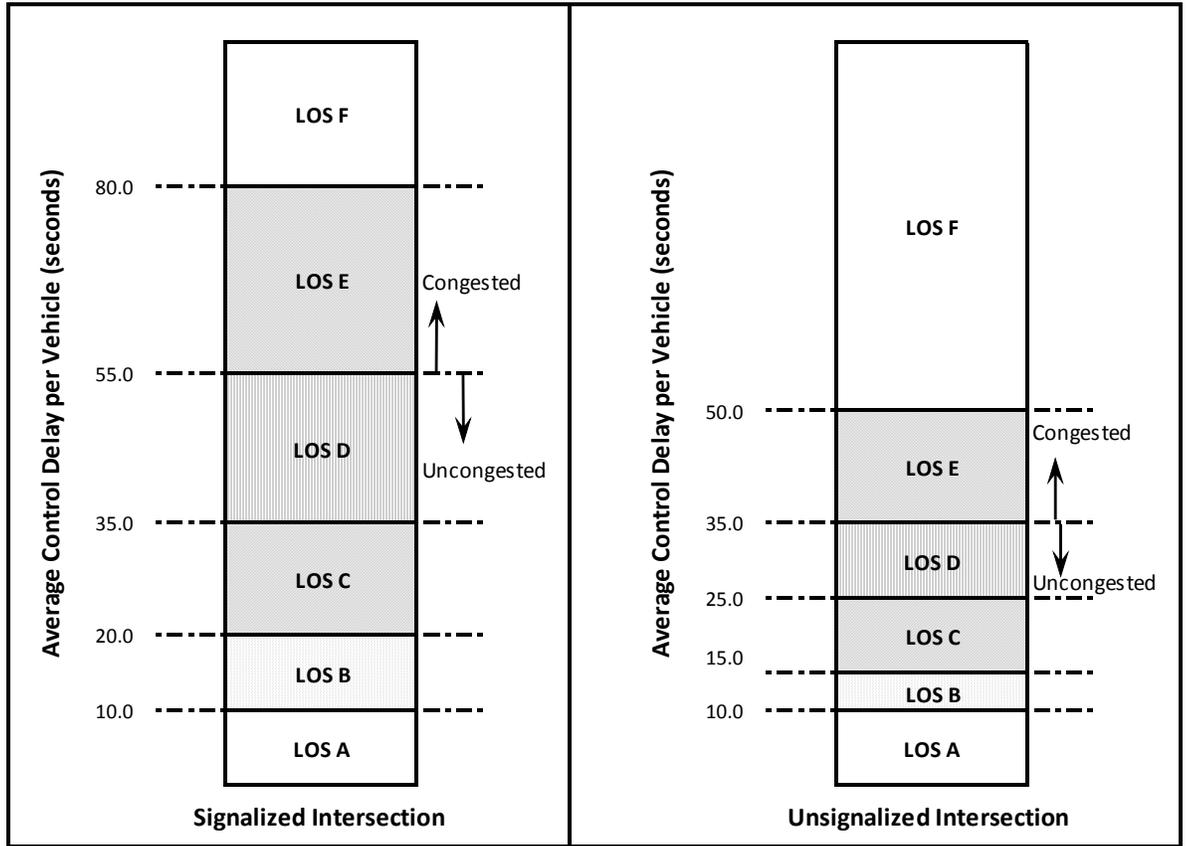


Figure 2. Intersection Level of Service Definitions

Table 2. Existing (2009) Level of Service Results

Intersection	Control	Intersection LOS		Notes
		AM Peak Hour	PM Peak Hour	
CH 2 & Xerxes Ave	North/ South Stop	A/A *	A/A *	
CH 2 & I-35 SB Ramps	Southbound Stop	A/A *	A/A *	
CH 2 & I-35 NB Ramps	Northbound Stop	A/B *	A/A *	Northbound left-turn operates at LOS E during AM peak
CH 2 & CH 46	East/ West Stop	A/B *	A/A *	

* Intersection LOS/Minor Approach LOS

There are no turn lanes at the existing intersections, so a comparison of the 95th percentile queues to the available turn lane lengths was not necessary.

The eastbound CH 2 to northbound I-35 movement in the AM peak hour operates surprising well given that there are 612 vehicles making the left-turn movement in one hour. This is primarily due to the low volume of opposing traffic in the AM peak (104 through vehicles and 129 right-turn vehicles). The 95th percentile queues on the eastbound movements are approximately 170 feet in the AM peak hour and 70 feet in the PM peak hour, therefore there are currently not any queuing issues.

Safety Data

Crash data for 2004 through 2008 was evaluated from the Minnesota Crash Mapping Analysis Tool (MnCMAT) system. Each crash record was reviewed to determine whether it was intersection-related. On CH 2 west of I-35 southbound, the crash data was analyzed before (2004-2005) and after (2007-2008) the reconstruction to a four-lane divided section, which was substantially completed in 2006. The results of the crash analysis are shown in **Table 3**. The only intersection that had a crash rate indicating a safety issue is the CH 2/CH 46 intersection, which had a high number of crashes relative to the traffic volumes. The right-angle crashes at the intersection were the predominant crash type and of greatest concern due to the increased severity associated with right-angle crashes. Recent turn lane improvements have been made at the intersection that appear to have addressed the issue, and there was only one crash at the intersection in 2008.

Table 3. CH 2 Crash Analysis

Intersection	Number of Crashes	Entering AADT	Intersection Crash Rate	Mn/DOT Metro Average Crash Rate *	Critical Rate**
CH 2/ Xerxes Ave (before)	1	11,080	0.1	0.2	0.5
CH 2/Xerxes Ave (after)	1	11,080	0.1	0.2	0.5
CH 2/ Irving Ave (before)	0	10,720	0.0	0.2	0.5
CH 2/ Irving Ave (after)	0	10,720	0.0	0.2	0.5
CH 2/ I-35 SB (before)	11	12,030	1.3	0.2	0.5
CH 2/I-35 SB (after)	4	12,030	0.5	0.2	0.5
CH 2/ I-35 NB	6	8,940	0.4	0.2	0.4
CH 2/Dupont Ave	0	5,530	0.0	0.2	0.5
CH 2/CH 46	17	7,340	1.3	0.6	1.0
Segment	Number of Crashes	ADT	Segment Crash Rate	Mn/DOT Metro Average Crash Rate *	Critical Rate**
Xerxes Ave to I-35 SB (before)	1	10,470	0.1	0.5	1.0
Xerxes Ave to I-35 SB (after)	1	10,470	0.1	0.4	0.9
I-35 NB to CH 46	1	5,430	0.1	0.5	1.0

Source: Mn/DOT CMAT database (2004-2008 data)

Notes:

The "before" condition consisted of a 2-lane undivided section on CH 2 and includes crashes that occurred in 2004 and 2005. Reconstruction of the roadway occurred in 2006. The "after" condition consists of the current 4-lane divided section on CH 2 and includes crashes that occurred in 2007 and 2008.

The segment crashes exclude crashes that occurred at the key intersections listed above.

A 0.95 level of confidence was used to calculate the critical rates.

* Metro average crash rates based on 2005-2007 data. Source: Mn/DOT Data Toolkit.

** Crash Rate > Critical Crash Rate identifies a hazardous location. The observed crash rate is higher than can be accounted for due to the random nature of crashes, therefore there is a high probability that the intersection or roadway conditions are contributing to the crashes.

FUTURE CONDITIONS

Traffic Forecasts

Both Scott County and the City of Elko New Market completed their 2030 Comprehensive Plans in 2008, including modeling of future year traffic volumes using the Twin Cities regional travel demand model, developed by the Metropolitan Council. The primary inputs used in the model are employment, household and socioeconomic characteristics, and roadway characteristics. The

model simulates travel on the entire transit and highway system within the Twin Cities metropolitan area.

The 2030 daily traffic forecasts documented in the Scott County and City of Elko New Market Comprehensive Plans were used to develop the 2030 peak hour forecast volumes for the CH 2/I-35 interchange and the surrounding roadway network. The 2030 peak hour volumes were derived by applying the peak hour percentages, directional splits and turn movement percentages, which were based on the existing count data, to the 2030 daily forecast volumes. The resulting values were then adjusted to balance the volumes between intersections and account for expected changes in future traffic patterns, such as more balanced directional splits.

Peak hour traffic forecasts were prepared using the methods and procedures as described in Mn/DOT's *Travel Demand Forecast Model Guidelines* (April 2006). A more detailed presentation of the forecast assumptions, methodologies, and results are included in the *Traffic Forecast Memorandum* (October 2009). The 2030 forecasts are summarized in **Table 4** and **Figure 3**. The existing eastbound/westbound directional splits on CH 2 are approximately 75/25 to 85/15 in the AM peak hour (with the exception of the link between I-35 and CH 46) and the reverse in the PM peak hour. With the commercial development expected in the project area, a slightly higher percentage of traffic would be anticipated in the "off-peak" direction. For CH 2, the 2030 directional splits were adjusted slightly to be approximately 65/35 to 75/25, which still reflect dominant travel patterns towards I-35 in the AM peak and from I-35 in the PM peak. The adjustments are consistent with the guidance from the Mn/DOT *Travel Demand Forecast Model Guidelines* (2006) and the current directional splits on CH 70 and CH 60 at I-35 in Dakota County are approximately 65/35 and 60/40, respectively. Therefore, the projected 2030 directional splits on CH 2 are consistent with Mn/DOT guidance and with other growing arterials with interchange access in the area.

Table 4. 2030 Forecast Traffic Volumes

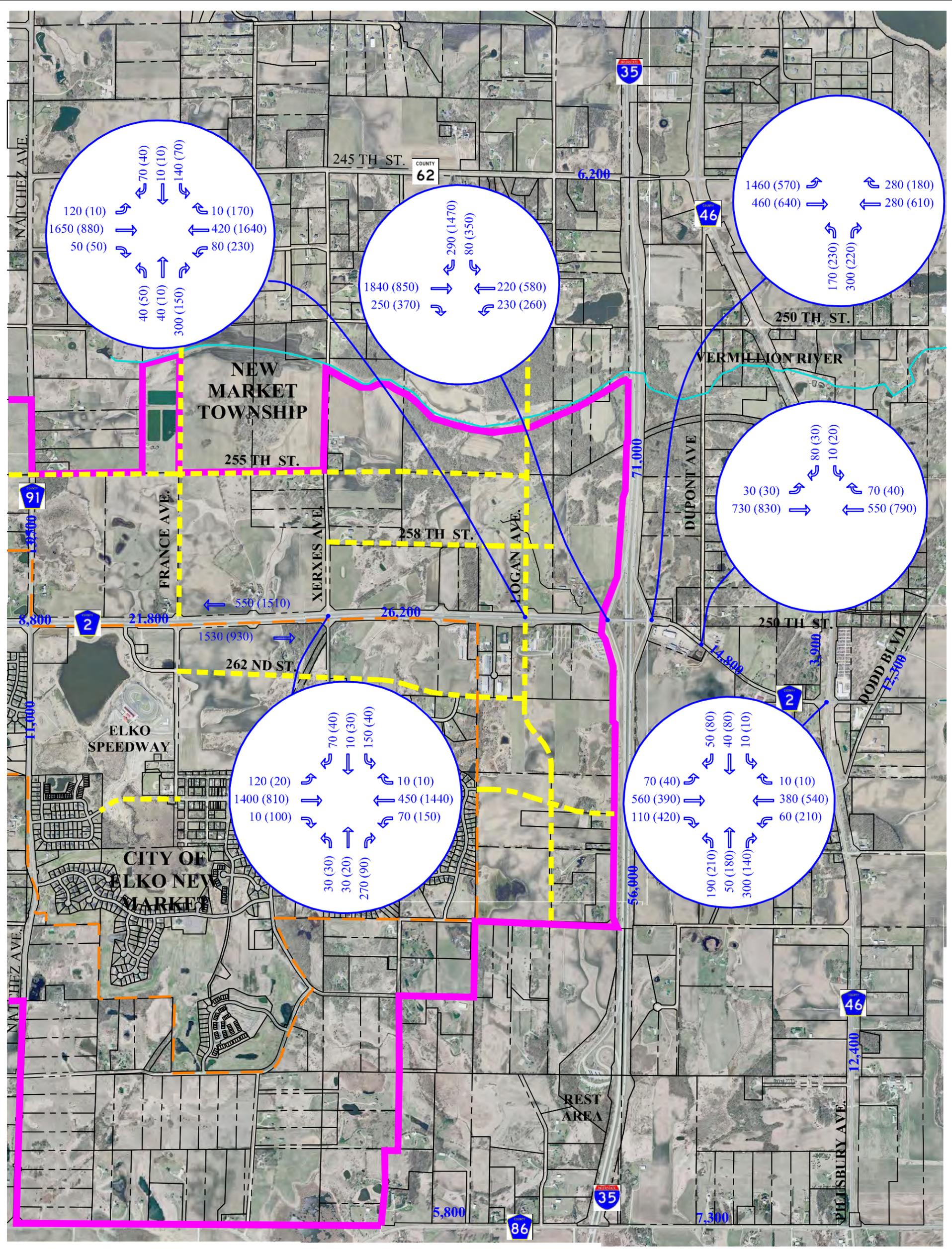
	From	To	Existing (2009)			2030			
			ADT	AM Peak Hour Volume ¹	PM Peak Hour Volume ¹	ADT	Annual Growth Rate	AM Peak Hour Volume ¹	PM Peak Hour Volume ¹
CH 2 Links	CH 91	Xerxes Ave	9,150	788	911	24,600	4.8%	1,540	930
								550	1,540
	Xerxes Ave	Logan Ave	10,470	965	1,088	26,200	4.5%	1,820	940
								530	1,730
	Logan Ave	I-35 Southbound	10,470	964	1,106	31,900	5.4%	2,090	1,100
							510	2,090	
	I-35 Northbound	CH 46	5,429	501	560	14,800	4.9%	740	850
								620	830
	CH 46	Dodd Blvd	2,754	303	294	12,300	7.4%	870	540
								450	760
Crossing Links	Xerxes Ave ²								
		North of CH 2	190	21	14	3,500	14.9%	160	150
								230	110
		South of CH 2	2,350	216	232	4,500	3.1%	320	140
								90	280
	Logan Ave ³								
		North of CH 2	N/A	N/A	N/A	3,600	N/A	170	190
								220	120
		South of CH 2	N/A	N/A	N/A	5,900	N/A	380	210
								140	340
	Dupont Ave ⁴								
		South of CH 2	N/A	N/A	N/A	1,500	N/A	100	70
								90	50
CH 46									
	North of CH 2	2,274	136	177	3,900	2.6%	130	130	
							100	170	
	South of CH 2	4,221	272	390	12,400	5.3%	540	430	
							210	710	

¹ AM Peak Hour = 6:30-7:30 AM. PM Peak Hour = 4:45-5:45 PM.

² No tube count available. Existing ADT estimated from peak hour volumes.

³ Future collector roadway.

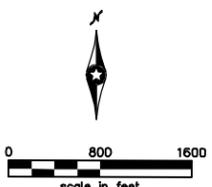
⁴ Local roadway. No existing count data available.



NOTE:
FORECASTS HAVE A LIKELY CONFIDENCE RANGE OF ±15 PERCENT

LEGEND

- 7,300** = FORECAST 2030 AVERAGE DAILY TRAFFIC
- XX (XX)** = 2030 AM (PM) PEAK HOUR
- = FUTURE COLLECTOR
- = ELKO NEW MARKET CITY LIMITS
- = 2030 MUSA RESERVE BOUNDARY



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Traffic Operations

A 2030 No Build scenario was analyzed using the forecast 2030 peak hour volumes and assuming only minor improvements on the existing CH 2 geometrics. The modeling showed that the eastbound queues on CH 2 from the left-turn movement onto northbound I-35 would be expected to spill back to the Logan Avenue intersection and result in LOS F operations at the I-35 ramp intersections, as well as the Logan Avenue intersection. This is primarily due to the one-lane capacity of eastbound CH 2 from Logan Avenue through the I-35 interchange, resulting in volume/capacity ratios that exceeded 1.6 in the peak hour. In the PM peak hour, the queues on the I-35 northbound and southbound exit ramps are expected to extend onto mainline I-35 due to the limited capacity on the bridge that tends to lock up the left-turn movements from the ramps onto CH 2. Without additional capacity on the bridge, the poor operations on CH 2 would be expected to impact operations on I-35, as well as negatively impact safety on CH 2 and on I-35.

Following the initial screening of the interchange concepts, 2030 traffic operations modeling was completed in Synchro/SimTraffic for the five remaining interchange types: standard diamond, partial cloverleaf with northbound collector-distributor, full cloverleaf, single point urban interchange, and diverging diamond. For the standard diamond and the partial cloverleaf, several options were modeled for the heavy southbound right-turn movement from the I-35 southbound ramp onto westbound CH 2. With the right-turn movement going through the signalized intersection, the overall intersection delay is greater because of the green time needed for that movement. However, the free right-turn movement can create conflicts with pedestrians and bicyclists on the north side of CH 2 and the free right-turn was assumed to include an add/acceleration lane on westbound CH 2, which widens the roadway cross-section. The final determination of the operations of the southbound right-turn movement will need to be determined once the preferred alternative has been selected for the interchange. Minimal modeling of the partial cloverleaf option was completed in CORSIM for the purpose of determining the necessary length of the northbound collector-distributor roadway and the merge section onto mainline northbound I-35. Due to the limited capabilities of Synchro/SimTraffic for modeling of the diverging diamond interchange, future detailed modeling should be conducted in VISSIM or some other software that can better simulate the crossovers at the interchange. The 2030 intersection LOS results are shown in **Table 5**.

Table 5. 2030 Level of Service Results

Interchange Type	Intersection	Control	Intersection LOS		Notes
			2030 AM Peak Hour	2030 PM Peak Hour	
No-Build Scenario					
N/A	CH 2 & Logan Ave	Signal **	F	D	
	CH 2 & I-35 SB Ramps	Signal **	F	F	Exit ramp queued onto I-35 during PM peak.
	CH 2 & I-35 NB Ramps	Signal **	F	F	EB LT queued past Logan Ave in AM peak. Exit ramp queued onto I-35 during PM peak.
	CH 2 & Dupont Ave	N/S Stop	A/D *	F/F *	Queue from CH 46 intersection impacted Dupont Ave intersection.
Build Scenarios					
N/A	CH 2 & Logan Ave	Signal **	C	B	
	CH 2 & Dupont Ave	Signal **	A	A	
Standard Diamond	CH 2 & I-35 SB Ramps	Signal **	D	C	Assumes SB RT at signal.
	CH 2 & I-35 NB Ramps	Signal **	D	C	
	CH 2 & I-35 SB Ramps	Signal **	C	B	Assumes SB free RT with add lane on WB CH 2.
	CH 2 & I-35 NB Ramps	Signal **	D	C	
Partial Cloverleaf	CH 2 & I-35 SB Ramps	Signal	B	D	Assumes dual SB RT at signal.
	CH 2 & I-35 NB Ramps	Signal	A	B	
	CH 2 & I-35 SB Ramps	Signal	B	A	Assumes SB free RT with add lane on WB CH 2.
	CH 2 & I-35 NB Ramps	Signal	A	B	
Full Cloverleaf	No controlled intersections - all movements accommodated with loops		N/A	N/A	
Single Point (SPUI)	CH 2 & I-35 SB/NB Ramps	Signal	C	C	
Diverging Diamond	CH 2 & I-35 SB Ramps	Signal	C	C	
	CH 2 & I-35 NB Ramps	Signal	B	C	Assumes 3 lanes on NB ramp, merging to one lane entering I-35.

* Intersection LOS/Minor Approach LOS

** Intersection control could be either traffic signal or roundabout. The modeling assumed a traffic signal.

The modeling showed that all the interchange options would be expected to provide LOS D or better operations at the key intersections during the 2030 peak hours. The eastbound movement from CH 2 onto northbound I-35 in the AM peak hour was one of the most significant determining factors in the overall interchange operations, due to the very high forecast traffic volumes on that movement. The partial cloverleaf, full cloverleaf, single point, and diverging diamond all can accommodate heavy eastbound to northbound movements efficiently. However, the standard diamond had an overall LOS D for the CH 2/I-35 northbound ramp intersection, which may be a concern in terms of flexibility of the design and providing acceptable LOS through the anticipated design year of 2050.

Two potential design options were evaluated for the southbound right-turn movement at the CH 2/I-35 southbound ramp intersection— one with the southbound right-turn movement at the traffic signal and one with a channelized right-turn, away from the signal, and a westbound add lane on CH 2. The first option resulted in overall LOS D intersection operations due to the signal green time that was allocated to the ramp approach. The second option improved the intersection to LOS C, but would create potential issues with a pedestrian/bicycle crossing of the free movement and would necessitate a lane drop prior to the introduction of the right-turn lane at the Logan Avenue intersection (¼ mile west of the southbound ramp intersection). Both right-turn options are feasible, and this issue will need to be considered further as part of the selection of the preferred alternative for the interchange.

It was noted during the analysis that the diverging diamond is a relatively new interchange type in the United States, although a few dozen are currently under study or in design. To date, the recommended practice is that the maximum speed limit of the cross street (i.e., CH 2) should be 45 mph due to the drop in speeds required to safely negotiate the reverse curves through the interchange. As the current speed limit on CH 2 is 55 mph, a reduction in the 85th percentile speeds and the statutory speed limit would be necessary for the diverging diamond to remain a feasible interchange option.

During the evaluation process, the full cloverleaf was excluded from the interchange footprint because of its large right-of-way needs while providing capacity for movements where it was not needed. The loops on the north side of the interchange are not expected to be needed until those left-turn movements were approximately doubled from the 2030 forecasts (i.e., twice as much traffic on those movements over what is expected in 2030).

To accommodate growth in traffic volumes beyond 2030, the partial cloverleaf provided the most flexibility in terms of the ability to add additional loops in the north quadrants or create two-lane loops, depending on future traffic volumes and traffic patterns. Capacity could be added to the other interchange types as well, but increases in left-turn capacity would be constrained by available bridge width whereas additional right-turn capacity could generally be added off the bridge at lower construction cost.

Interim Improvements

While the existing interchange operates efficiently under existing conditions, it was recognized that as traffic volumes grow, interim improvements may be necessary to maintain operations and safety at the interchange, as well as to maximize the life of the existing bridge and interchange. Based on input from Mn/DOT, it was determined early in the project that it would not be feasible to widen the existing bridge in order to provide turn lanes or other capacity improvements on the bridge. Improvement options that were considered for the ramp terminal intersections included:

- All-way stop control
- Traffic signals
- Turn lanes
- Roundabouts
- Loop ramps

Assuming straight line growth of traffic volumes on CH 2 between existing and 2030 conditions (approximately 5 percent per year), it is expected that improvements would be needed based on peak hour intersection operations in the next five to ten years. The modeling showed that the AM peak hour would be expected to first need improvements to address operational issues on the following movements:

- Northbound left-turn movement from I-35 northbound ramp to westbound CH 2. The addition of approximately 200 eastbound left-turn vehicles or 100 westbound through vehicles resulted in LOS F operations on the ramp.
- Eastbound left-turn movement from eastbound CH 2 to northbound I-35. The addition of 220 total vehicles to the westbound through/right movements resulted in the LOS F operations of the left-turn movement onto the ramp.

The stop control, signal, and loop options were modeled in Synchro/SimTraffic, while the roundabout was modeled in RODEL.

Of the interim improvement options listed above, the all-way stop was quickly eliminated due to failing operations at the overall intersection and queuing that extended through the CH 2/I-35 southbound ramps intersection during the AM peak hour. A traffic signal, combined with turn lanes, resulted in improved LOS on the I-35 northbound exit ramp, but would not be expected to improve the LOS for the eastbound movements. Either a roundabout or a loop in the southeast quadrant would be expected to extend the life of the existing interchange by 10 years. Single lane roundabouts were analyzed based on the existing two-lane configuration on CH 2 east of the southbound I-35 ramps, however, right-turn bypass lanes were added to the design on the I-35 exit ramp approaches. The lower operating speeds in the roundabout would be expected to provide more gaps than the existing side-street stop control condition, but may still have some operational issues in the AM peak hour as traffic continues to grow because the eastbound to northbound traffic enters the roundabout prior to the other approaches, which then must yield.

The loop provided the largest increase in capacity and consequently the longest expected time until full interchange reconstruction would be needed, however even the minimum allowable radius for the loop (190 feet) would require right-of-way acquisition in that quadrant and realignment of the I-35 northbound exit ramp. In addition, structural modifications would need to be made to remove the slope paving on the east side of the bridge to fit a one-lane loop under the bridge. The lane would then merge onto northbound I-35 north of CH 2.

At the CH 2/I-35 southbound ramps intersection, improvements would be needed to address the following issues:

- Southbound left-turn movement from I-35 southbound ramp to eastbound CH 2. An increase of approximately 400 total eastbound/westbound vehicles resulted in LOS F operations on the ramp during both AM and PM peak hours.

Again, the all-way stop option was quickly eliminated due to the resulting increase in overall intersection delay and queuing. Either a traffic signal with turn lanes or a roundabout would provide acceptable operations for approximately 10 years. Based on the expected traffic volumes, a loop would not be needed in either the northwest or southwest quadrants, and due to the right-of-way impacts was not analyzed further.

It should be noted that the improvements at each ramp terminal intersection do not have to be the same. For example, a roundabout could be constructed at the CH 2/I-35 northbound ramps intersection with a signal installed at the CH 2/I-35 southbound ramps intersection. Due to the limitations of the RODEL software, the roundabout options could not be modeled for both intersections together. However, the AM peak hour modeling showed that the maximum eastbound queue of 30 vehicles at the northbound I-35 ramp would not be expected to extend to the southbound I-35 ramp intersection.

One final consideration in terms of implementing interim interchange improvements would be available mainline capacity on I-35. As traffic volumes are expected to continue to grow on I-35, congestion on the mainline freeway may reduce or negate the additional capacity gained from the construction of a loop. The mainline volumes and capacity will need to be considered as part of the development of the interim improvements, in coordination with Mn/DOT and FHWA. More detailed analysis and design, which should include mainline freeway modeling, will be necessary as the intersections and I-35 start to reach capacity, in order to determine the most appropriate improvement measures. Again, this will be dependent on traffic demands and development patterns that may cause some traffic movements to grow faster than others.

SUMMARY

The CH 2 corridor and the CH 2/I-35 interchange generally have safe and free-flowing operations in the existing conditions. As traffic is expected to grow at an average rate of five to six percent per year over the next few years, capacity improvements, including reconstruction of the interchange, will be necessary to maintain an acceptable level of service on CH 2 and avoid impacts on the freeway. Four interchange concepts have been identified that could provide adequate capacity for the anticipated 2030 traffic volumes, as well as interim improvements that can extend the life of the existing infrastructure. As traffic volumes grow, additional analysis and modeling will need to be done based on the actual development patterns and resulting traffic flows.

Kuhnau, JoNette

From: Jim Henricksen [Jim.Henricksen@dot.state.mn.us]
Sent: Tuesday, October 27, 2009 3:35 PM
To: Kuhnau, JoNette
Cc: CJenson@co.scott.mn.us; Brian Isaacson; Nicole Peterson
Subject: RE: Scott County forecasting - CSAH 2/I-35

Jonette,

I reviewed your changes to the Final CSAH2-Traffic-Forecast-Memo dated 10/16/2009. I accept the traffic forecast results based on the methodology, assumptions and reasonableness checks outlined in the memo.

Please let me know if you have any questions or need further clarification.

Thanks.

Jim Henricksen, AICP
Traffic Forecaster
MnDOT Metropolitan District
1500 West County B2
Roseville, MN 55113
ph. 651.234.7782
jim.henricksen@dot.state.mn.us

>>> <JoNette.Kuhnau@kimley-horn.com> 10/15/2009 8:49 AM >>>

Hi Jim,

Thanks for the quick review.

In response to your comments/questions:

- * You are correct about how the model considers operations. Inaccurate choice of wording on my part.
- * Peak hour forecasts were based on applying the peak hour percentages to the ADTs. They did not come out of the travel demand model.
- * Agreed. Some of the growth rates appear very high because there is just very little traffic there today.

We will incorporate your comments into the document and issue it as final.

Thanks again,

JoNette Kuhnau, PE, PTOE
Kimley-Horn and Associates, Inc.
2550 University Ave W, Ste 345N
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jonette.kuhnau@kimley-horn.com
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-----Original Message-----

From: Jim Henricksen [mailto:Jim.Henricksen@dot.state.mn.us]



Memorandum

To: Jim Henricksen, AICP
Minnesota Department of Transportation (Mn/DOT)

From: JoNette Kuhnau, P.E., PTOE

Date: October 16, 2009

Subject: Scott County CSAH 2 & I-35 Interchange Footprint Study
Traffic Forecast Memorandum

■
Suite 345N
2550 University Avenue West
St. Paul, Minnesota
55114

The purpose of this memorandum is to document the peak hour travel demand forecasts for the CSAH 2 and I-35 Interchange Footprint Study. This memorandum includes a summary of the development of the peak hour forecasts, as well as documentation from the Scott County and City of Elko New Market Comprehensive Plans, which were the source of the daily forecast volumes.

BACKGROUND

The purpose of the CSAH 2 and I-35 Interchange Footprint Study is to identify the necessary footprint area for a future improved interchange that will serve the planned growth in the Elko New Market area. With the completion of the Elko New Market Interceptor and the Metropolitan Urban Service Area (MUSA) service boundary that includes the City of Elko New Market, significant growth is expected over the next 20 years. Scott County, the City of Elko New Market, and the Minnesota Department of Transportation (Mn/DOT) have initiated this study to identify the right-of-way that may be required for an improved interchange, along with a concept supporting roadway network, to preserve these areas from being developed in the interim before the roadway improvements are made. A composite interchange footprint will be created, as a preferred alternative for the interchange will not be selected at this stage of the project, and the appropriate environmental documentation and staff approved layout are not being completed.

Study Area

The CSAH 2 and I-35 study area includes the existing interchange and extends approximately one mile in each direction to include the local roadway network necessary to support the interchange and development in the interchange area. The study area includes both New Market Township and the City of Elko New Market, as shown in **Figure 1**.

Data Collection

Scott County provided 48-hour tube counts from 2008 and 2009 for the key roadways surrounding the CSAH 2/I-35 interchange. AM and PM peak hour counts were taken at four intersections in September 2009:

- CSAH 2/Xerxes Avenue
- CSAH 2/I-35 southbound ramps
- CSAH 2/I-35 northbound ramps
- CSAH 2/CSAH 46

The existing count data was used to establish existing peak hour percentages and directional distributions of traffic on CSAH 2 and the other key roadways. Traffic counts were not taken for Logan Avenue, which is a future roadway, or Dupont Avenue, which is currently a very low volume gravel road. In the future, these roadways will be the first full-access intersections east and west of the CSAH 2/I-35 interchange.

METHODOLOGY

Both Scott County and the City of Elko New Market completed their 2030 Comprehensive Plans in 2008, including modeling of future year traffic using the Twin Cities regional travel demand model, developed by the Metropolitan Council. The model uses the standard four-step planning process of trip generation, trip distribution, mode choice, and traffic assignment. The model documentation for the Scott County and City of Elko New Market models are provided as a reference in **Appendix A** and **Appendix B**, respectively.

The primary inputs used in the model are employment, household and socioeconomic characteristics, and roadway characteristics. The model simulates travel on the entire transit and highway system within the Twin Cities metropolitan area. As such, it contains existing freeways, express highways, principal arterial roadways, and many minor arterial and collector roadways, as well as existing and planned rail and bus lines. The CSAH 2/I-35 study area is encompassed by one traffic analysis zone (TAZ) in the Metropolitan Council model, which was subdivided into more than 40 zones in both the Scott County and City of Elko New Market models.

The 2030 daily traffic forecasts documented in the Scott County and City of Elko New Market Comprehensive Plans were used to develop the 2030 peak hour forecast volumes for the CSAH 2/I-35 interchange and the surrounding roadway network. The 2030 peak hour volumes were derived by applying the peak hour percentages, directional splits and turn movement percentages, which were based on the existing count data, to the 2030 daily forecast volumes. The resulting values were then adjusted to balance the volumes between intersections and account for changes in traffic patterns, such as more balanced directional splits. Peak hour traffic forecasts were prepared using the methods and procedures as described in Mn/DOT's *Travel Demand Forecast Model Guidelines* (April 2006).

FUTURE DEVELOPMENT ASSUMPTIONS

The socioeconomic data in the regional model, including population and employment, were documented in the Scott County and City of Elko New Market 2030 Comprehensive Plans. The 2000 and 2030 population and employment data for the City of Elko New Market and New Market Township, as documented in the Scott County Comprehensive Plan, are shown in **Table 1**.

Table 1. Population and Employment Projections.

	2005		Projected 2030	
	Population	Employment	Population	Employment
City of Elko New Market	3,310	460	20,800	1,250
New Market Township	3,490	510	5,700	400
Subtotal	6,800	970	26,500	1,650
Scott County	119,660	41,180	221,770	58,190

Source: Scott County Traffic Model Final Report and Documentation, March 2008.

FUTURE NETWORK ASSUMPTIONS

The forecasting analysis year used for this study is 2030, based on the availability of forecast average daily traffic (ADT) volumes. Improvements to the CSAH 2/I-35 interchange are not currently programmed; therefore an opening year and design year for the project have not been established. The 2030 forecast models included the following roadway improvements near the study area, which are included in the Scott County or Mn/DOT Transportation Improvement Programs (TIP) and for which funding has been committed:

- CSAH 2 expand to 4-lanes between I-35 and CR 33
- Interchange reconstruction at I-35 and CSAH 70 (Dakota Co)

The 2030 model does not include an interchange at CSAH 86/I-35, approximately 2 miles south of CSAH 2. A future interchange at CSAH 86/I-35 has been identified by Scott County as a potential improvement in the 2030 to 2050 timeframe.

The 2030 model does not include any capacity improvements in the CSAH 2/I-35 study area; however the City of Elko New Market Transportation Plan does include the development of several new collector roadways:

- 255th Street – East/west collector, north of CSAH 2
- 258th Street – East/west collector, north of CSAH 2 and east of Xerxes Avenue
- 262nd Street – East/west collector, south of CSAH 2 and east of France Avenue
- Logan Avenue – North/south collector, west of I-35

FORECAST RESULTS

Daily forecast volumes for the year 2030, as documented in the Scott County and City of Elko New Market 2030 Comprehensive Plans, were used for this study. While the growth in employment and households was consistent for the study area in both plans, the City of Elko New Market modeling contained greater refinement in terms of the geographic distribution of new development. For example, the City of Elko New Market plan concentrates the planned growth along the CSAH 2 corridor whereas the Scott County plan showed some growth further south in the TAZ. As a result of these differences, the 2030 forecast ADT volumes from the City of Elko New Market plan were used west of I-35, while the Scott County 2030 ADT volumes were used for the area east of I-35, which is outside the city limits.

Summaries of existing and 2030 ADT volumes, as well as the AM and PM volumes resulting from the calculations, are shown in **Figure 2** and **Figure 3**. Checks for reasonableness were performed for segments of CSAH 2, Xerxes Avenue, Logan Avenue, Dupont Avenue and CSAH 46 and documented in **Table 2**. Freeway modeling is not being completed as part of this phase of the CSAH 2/I-35 study, therefore volumes on mainline I-35 have not been included in the current analysis.

Based on the *Twin Cities Forecast Guidelines*, the checks include comparing the base year and future year volumes on four criteria: peak hour percentage of daily traffic, directional split of peak hour traffic, daily growth factors, and capacity of road segments beyond the project limits.

Peak Hour Percent of Daily Traffic, Directional Split

The peak hour percentages on CSAH 2, Xerxes Avenue, and CSAH 46 are generally less than existing, with an average of eight percent of daily traffic. The directional splits remain commuter-based, with traffic movements oriented towards northbound I-35 in the AM peak and from southbound I-35 in the PM peak. However, the forecast volumes are generally more balanced than the existing volumes. The pattern of traffic flow towards I-35 is expected to continue in the future, with strong demand between southern Scott County and the central Twin Cities metropolitan area.

Daily Growth Factors

The daily volumes on all segments of CSAH 2, Xerxes Avenue, and CSAH 46 are expected to grow by an average of approximately six percent per year. This is a significant growth rate, but not unexpected given that the study area is currently relatively undeveloped. In addition, the City of Elko New Market population is projected to grow at an average rate of more than seven percent per year and employment is projected to grow at an average rate of more than four percent per year.

Xerxes Avenue, north of CSAH 2, is projected to have a growth rate of approximately 15 percent per year. The existing roadway is unpaved and has an estimated daily volume of less than 200 vehicles. As development occurs, Xerxes Avenue is expected to be paved and designated as a major collector with a forecast volume of 3,500 vehicles per day, which explains the resulting high growth rate.

Capacity of Road Segments Beyond Project Limits

The forecasted volumes on the roadways within the study area are all higher than the upstream roadway segments outside of the project limits due to the location of I-35 and the concentration of proposed development within the study area. As a result, the peak hour forecasted traffic volumes on the roadway segments beyond the limits of the project do not exceed their capacities. For example, the peak hour directional capacity of the four-lane segment of CSAH 2 west of Xerxes Avenue could be as high as 3,160 vehicles per hour per direction and the two-lane segments of Dodd Boulevard east of the CSAH 2 t-intersection could have a directional capacity as high as 1,460 vehicles per hour¹. Neither of these capacities has been exceeded in the 2030 model, therefore the forecasts would be considered to be reasonable based on capacity.

CONCLUSIONS

Growth in traffic in the study area was generally observed to be approximately 6.1 percent per year, which reflects significant expected development and growth within the study area by 2030. The next step of the CSAH 2/I-35 project will be to use the peak hour forecasts to model various arterial and interchange configurations in Synchro/SimTraffic, with the goal of identifying a range of potential solutions that will accommodate the forecast traffic volumes.

Cc: Craig Jenson – Scott County Project Manager
Nicole Peterson – Mn/DOT Area Engineer
File

¹ Highway Capacity Manual 2000, Chapter 12 – Highway Concepts.

Table 2. Traffic Forecasting Results.

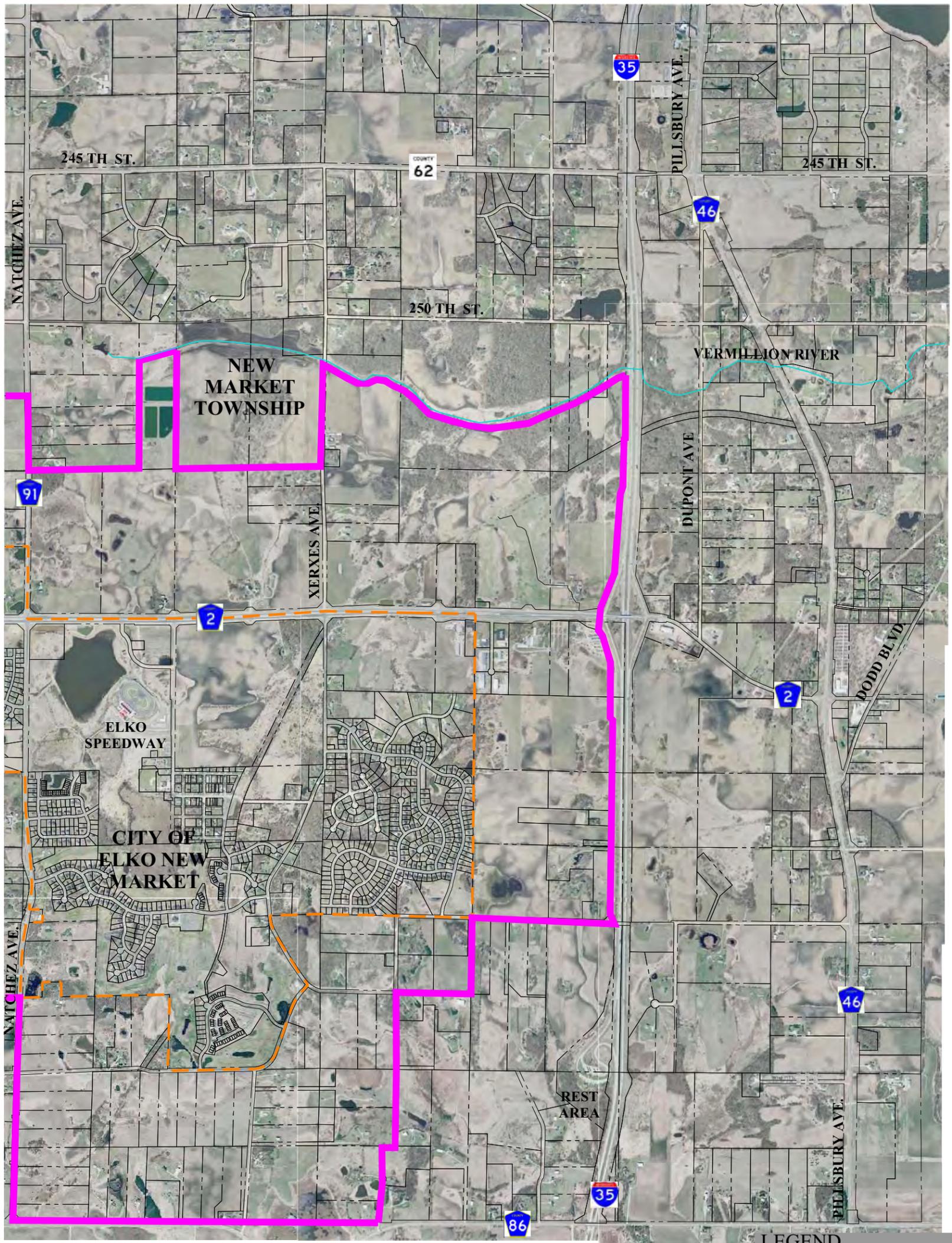
	From	To		Existing							2030							
				ADT	AM Peak Hour Volume ¹	AM % of Daily	AM Directional Split	PM Peak Hour Volume ¹	PM % of Daily	PM Directional Split	ADT	Yearly Growth	AM Peak Hour Volume ¹	AM % of Daily	AM Directional Split	PM Peak Hour Volume ¹	PM % of Daily	PM Directional Split
CSAH 2 Links	CSAH 91	Xerxes Ave	Eastbound	9,150	788	8.6%	82%	911	10.0%	32%	24600	4.8%	1,540	8.5%	74%	930	10.0%	38%
			Westbound				18%			68%			550		26%			1,540
	Xerxes Ave	Logan Ave	Eastbound	10,470	965	9.2%	85%	1,088	10.4%	30%	26200	4.5%	1,820	9.0%	77%	940	10.2%	35%
			Westbound				15%			70%			530		23%			1,730
	Logan Ave	I-35 Southbound	Eastbound	10,470	964	9.2%	85%	1,106	10.6%	31%	31900	5.4%	2,090	8.2%	80%	1,100	10.0%	34%
			Westbound				15%			69%			510		20%			2,090
	I-35 Northbound	CSAH 46	Eastbound	5,429	501	9.2%	53%	560	10.3%	47%	14800	4.9%	740	9.2%	54%	850	10.3%	51%
			Westbound				47%			53%			620		46%			830
	CSAH 46	Dodd Blvd	Eastbound	2,754	303	11.0%	74%	294	10.7%	33%	12300	7.4%	870	10.7%	66%	540	10.6%	42%
			Westbound				26%			67%			450		34%			760
Crossing Links	Xerxes Ave ²																	
		North of CSAH 2	Northbound	190	21	11.1%	43%	14	7.4%	64%	3500	14.9%	160	11.1%	41%	150	7.4%	58%
			Southbound				57%			36%			230		59%			110
		South of CSAH 2	Northbound	2,350	216	9.2%	88%	232	9.9%	28%	4500	3.1%	320	9.1%	78%	140	9.3%	33%
			Southbound				12%			72%			90		22%			280
	Logan Ave ³																	
		North of CSAH 2	Northbound	N/A	N/A	N/A	N/A	N/A	N/A	N/A	3600	N/A	170	10.8%	44%	190	8.6%	61%
			Southbound				N/A			N/A			220		56%			120
		South of CSAH 2	Northbound	N/A	N/A	N/A	N/A	N/A	N/A	N/A	5900	N/A	380	8.8%	73%	210	9.3%	38%
			Southbound				N/A			N/A			140		27%			340
	Dupont Ave ⁴																	
		South of CSAH 2	Northbound	N/A	N/A	N/A	N/A	N/A	N/A	N/A	1500	N/A	100	12.7%	53%	70	8.0%	58%
			Southbound				N/A			N/A			90		47%			50
	CSAH 46																	
	North of CSAH 2	Northbound	2,274	136	6.0%	63%	177	7.8%	38%	3900	2.6%	130	5.9%	57%	130	7.7%	43%	
		Southbound				37%			62%			100		43%			170	57%
	South of CSAH 2	Northbound	4,221	272	6.4%	79%	390	9.2%	37%	12400	5.3%	540	6.0%	72%	430	9.2%	38%	
		Southbound				21%			63%			210		28%			710	62%

¹ AM Peak Hour = 6:30-7:30 AM. PM Peak Hour = 4:45-5:45 PM.

² No tube count available. Existing ADT estimated from peak hour volumes.

³ Future collector roadway.

⁴ Local roadway. No existing count data available.

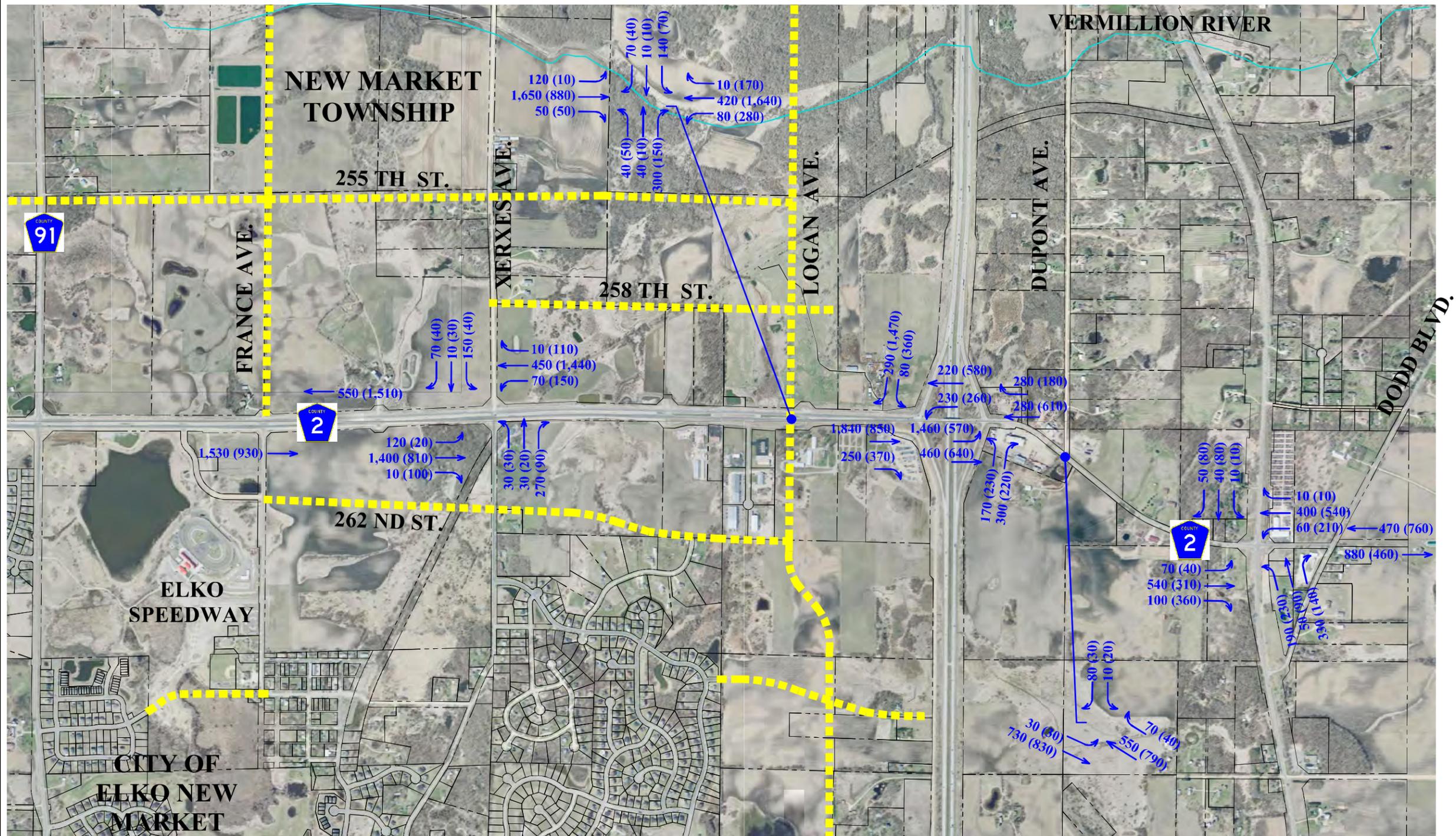


LEGEND

- = ELKO NEW MARKET CITY LIMITS
- = 2030 MUSA RESERVE BOUNDARY

FIGURE 1. STUDY AREA
CSAH 2 AND I-35 FOOTPRINT STUDY

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NOTE: FORECASTS HAVE A LIKELY CONFIDENCE RANGE OF ±15 PERCENT.

LEGEND

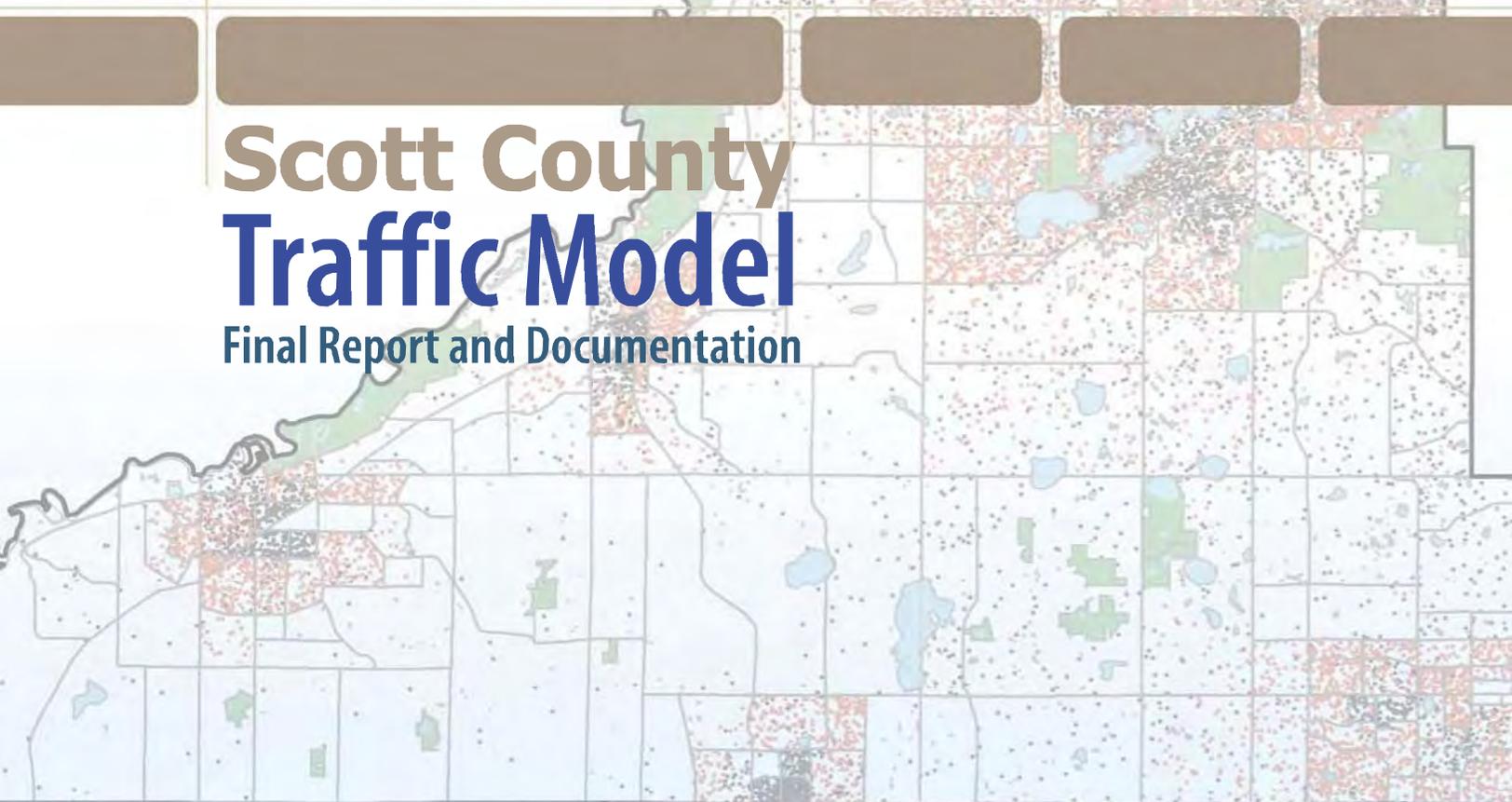
2,300 = FORECAST 2030 AM(PM) PEAK HOUR VOLUME

--- = FUTURE COLLECTOR

APPENDIX A:
Scott County Traffic Model
Final Report and Documentation

Scott County Traffic Model

Final Report and Documentation



March 2008

The *Scott County Traffic Model Final Report and Documentation* is included as Appendix C-6 of the Scott County 2030 Comprehensive Plan Update and can be found at the following location:

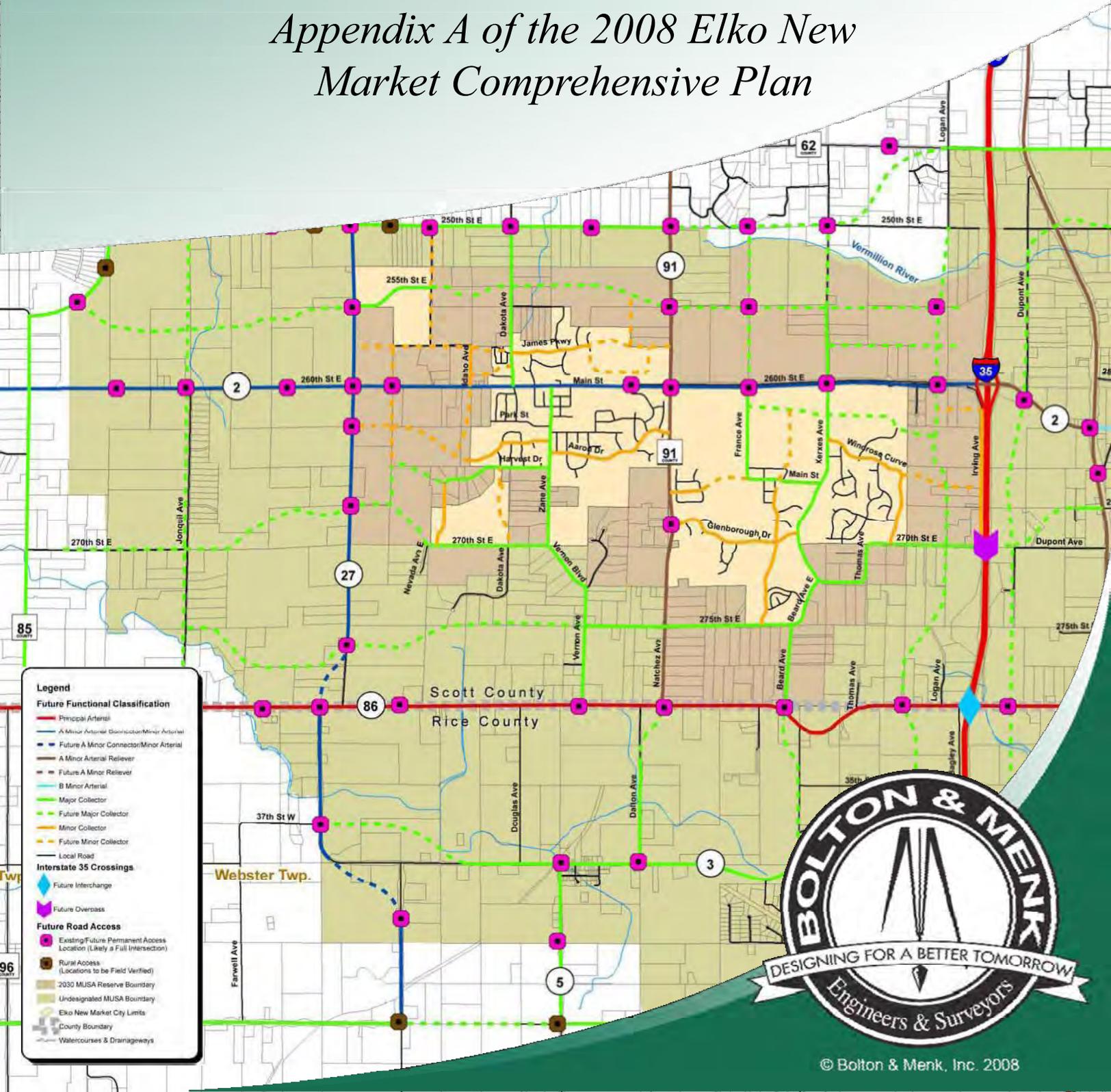
<http://www.co.scott.mn.us/wps/portal/ShowPage?CSF=977>

APPENDIX B:
City of Elko New Market
2030 Transportation Plan
Excerpt of Traffic Forecast Modeling Section

City of Elko New Market

2030 Transportation Plan

Appendix A of the 2008 Elko New Market Comprehensive Plan



Legend

Future Functional Classification

- Principal Arterial
- A Minor Arterial (Discontin./Minor Arterial)
- Future A Minor Connector/Minor Arterial
- A Minor Arterial Reliever
- Future A Minor Reliever
- B Minor Arterial
- Major Collector
- Future Major Collector
- Minor Collector
- Future Minor Collector
- Local Road

Interstate 35 Crossings

- ◆ Future Interchange
- ◆ Future Overpass

Future Road Access

- Existing/Future Permanent Access Location (Likely a Full Intersection)
- Rural Access (Locations to be Field Verified)
- 2030 MUSA Reserve Boundary
- Undesignated MUSA Boundary
- Elko New Market City Limits
- County Boundary
- Watercourses & Drainageways



VI. TRAFFIC FORECAST MODELING

The following describes the general approach to traffic forecasting efforts and resulting outputs for this Transportation Plan. Developers will use the traffic volume forecast data to include in the individual development traffic study.

A. MODEL USED

The Twin Cities Regional Model was used. The Existing Model is year 2000. The Future Model is year 2030. The demographics, metropolitan highway system, and metropolitan transit system are consistent with current Regional Transportation Policy Plan adopted by the Metropolitan Council

B. MODELS

The Existing Model provides the basis of the roadway connections and existing capacity, speed, and functional class. The Future Model uses the existing model parameters to set-up a no-build scenario. New roadways are added to provide additional connections throughout the city. Planned improvements are also included for existing roadways. These improvements and new roadways provide for the anticipated future roadway network to handle the citywide growth.

C. MODEL METHODOLOGY

The general approach to forecasting the traffic volumes consisted of the following:

- | Utilize the Twin Cities regional travel demand model and model parameters, maintained by Metropolitan Council, as the primary instrument for forecasting the volumes.
- | Collect year 2000 and current year traffic count data and basic roadway attribute information in the study area for the purpose of validating the regional model, run for the base year (2000).
- | Collect year 2000 census data from the U.S. Census Bureau.
- | Determine Traffic Analysis Zones based on roadways, land use data, and land features.
- | Split regional model Traffic Analysis Zones into smaller zones for basis of projections.
- | Add additional county and other major local roadways to the roadway network in the regional model.
- | Apply the regional model for the base year and validate its projections against the observed traffic count information; make appropriate adjustments as necessary to reach an acceptable validation.

- | Apply the regional model for the forecast year (2030), taking into account the adjustments made to the 2000 model run, to generate the projected volumes.
- | Analyze traffic patterns that ultimately comprise the elements themselves, through a series of special selected link analyses; use this information as a basis for adjusting the forecasted volumes if determined to be necessary.
- | Prepare the final set of forecast volumes.

D. DETAILS

Additional details concerning the methodology follow:

Regional Model – The regional model provides a systematic procedure for forecasting volumes, taking into account the projected changes in regional land use/socioeconomic data and the regional transportation network. The regional model was obtained from Metropolitan Council for 2000 and 2030 conditions.

Historical and Current Year Traffic Count Data – Traffic count data in the study area was collected from the Minnesota Department of Transportation (Mn/DOT) and recent traffic studies in the area. This included A.M. and P.M. peak hour, as well as average daily traffic volumes.

Current Roadway Attribute Information – The regional model highway network was reviewed in detail for conformity to current conditions. A thorough check of roadway functional classification, speed, number of through lanes, and roadway capacity was completed. Several roadways were added to the network to assist in the future network analysis. These roadways were populated with the appropriate attributes based on regional model documentation, so as to be consistent with the regional model parameters.

Census Data – Year 2000 census data was collected from the U.S. Census Bureau. This data includes population and households by census block.

Employment Data – Employment figures were obtained from the City of Elko New Market to identify trip attractions within the City.

Traffic Analysis Zones (TAZs) – Based on the census blocks, land use, roadway network, and land features (including railroads, waterways, and bluffs), zones were identified for traffic to enter and exit from the roadway network. These zones include both traffic productions and attractions. These zones were split from the regional model traffic analysis zones, which cover a much larger area and were broken apart to allow for additional roadway traffic volume projections, which would not have been available in the base regional model. These zones and their relevant information were added to the regional model.

Socioeconomic Data – Land Use data for year 2030 was received from the land use consultant. The projected population, households, and employment data was aggregated into the TAZs.

Base Model Validation – The 2000 model was validated using many resources, including: 2000 traffic count data, Scott County Transportation Plan, aerial photos, and field observations. The assigned volumes from the 2000 regional model were then compared to the 2000 traffic counts. Adjustments were made to centroid locations and additional centroid connectors were added to help smooth volumes along individual roadways and more closely match ground counts. Additionally, because of the “regional” nature of the regional model, roadways are categorized into a select number of functional classifications. Thus, roadways that have minor differences may have the same functional classification. Some roadways in the study area were refined to reflect these minor differences. Specifically, local gravel roadways were defined as minor collectors but were adjusted with a lower capacity and speed than a typical paved minor collector.

Future Model Forecasts – The 2030 model was updated to include the existing roadways and the additional TAZ’s as used in the 2000 model. Future roadways within the urban growth boundary were added and centroid connectors were adjusted as required to connect with the newly proposed roadways. Additionally, functional classifications, speed, and capacities were adjusted based on the expected future roadway attributes.

Review of Forecasts – The traffic forecasts were reviewed for reasonableness. As with any travel demand model, it would be inappropriate to rely solely on direct model output for design volumes. The modeled volumes were reviewed and adjusted based on existing and historic travel patterns and also through some additional selected link analysis of model output. A series of selected link assignments were performed and the model estimated volumes were adjusted to more accurately reflect future traffic patterns within the study area. The checks for reasonableness of the projected volumes follow the procedures as outlined in the Mn/DOT Metro: Model Output Checks for Reasonableness and Post Processing Adjustments (Revised 5 January, 2006). These include:

- | Peak Hour Percentage of Daily Traffic: The peak hour percentages of daily traffic produced by the model for the forecast year were compared to existing/observed peak hour percentages within the project limits and on other routes nearby with the same functional classification.
- | Directional Split of Peak Hour Traffic: The directional splits of peak hour traffic forecasts produced by the model for the forecast year were compared to existing/observed directional splits within the project limits and on other routes nearby with the same functional classification.
- | Capacity of Road Segments Beyond Limits of Project: Peak hour traffic forecast volumes assigned to road segments beyond the limits of the study area were reviewed to determine if the projected growth from the area affects the capacities of those road segments. On roadways outside of the study area with volume to capacity ratios over 1.00, the model results were compared to the regional model results from Met Council and Mn/DOT. The capacities of feeder roadways were not exceeded near the study area, except on I-35 and CSAH 91, north of CSAH 2. Both roadways provide an important connection north to the twin cities metro area and are expected to be severely congested during the peak hours. This would extend the congestion currently being seen on I-35 further to the

- | Daily Traffic Growth Factors: The daily traffic forecasts from the model on the state roadways were compared with the last 20 years record of daily volumes and with the regional model results from Met Council and Mn/DOT. The projections are consistent with the general expectation that the model should yield forecast values which are lower than those based on an extrapolation of the last 20 years of increases in daily traffic.

E. POST PROCESSING

The post-processing of the projected volumes follow some of the procedures as outlined in the Mn/DOT Metro: Model Output Checks for Reasonableness and Post Processing Adjustments (Revised 5 January, 2006). The post processing includes:

- | Traffic forecast volumes were rounded to the closest 10 if less than 1,000 or to the nearest 100 if more than 1,000.
- | All products depicting the forecast numbers (maps, tables, layouts, etc.) contain a very visible caution that the forecast numbers depicted have a likely confidence range of plus or minus 15 percent.
- | Traffic smoothing and corridor diversion adjustments were accomplished using the procedures described in Chapter 9 of NCHRP Report 365, "Travel Estimation Techniques for Urban Planning".

APPENDIX A - 2030 Transportation Analysis Zone Breakdown
City of Elko New Market 2030 Transportation Plan

Within Land Use Boundary

TAZ	Population	Households	Retail	Non-Retail	Employment
1037-A	20,800	8,000	589	661	1,250

Outside of Land Use Boundary

TAZ	Population	Households	Retail	Non-Retail	Employment
1037-B	5,700	1,952	24	376	400

Appendix B: Existing and Forecasted Traffic Volumes and Capacity Analysis

Major Collectors and Above
City of Elko-New Market

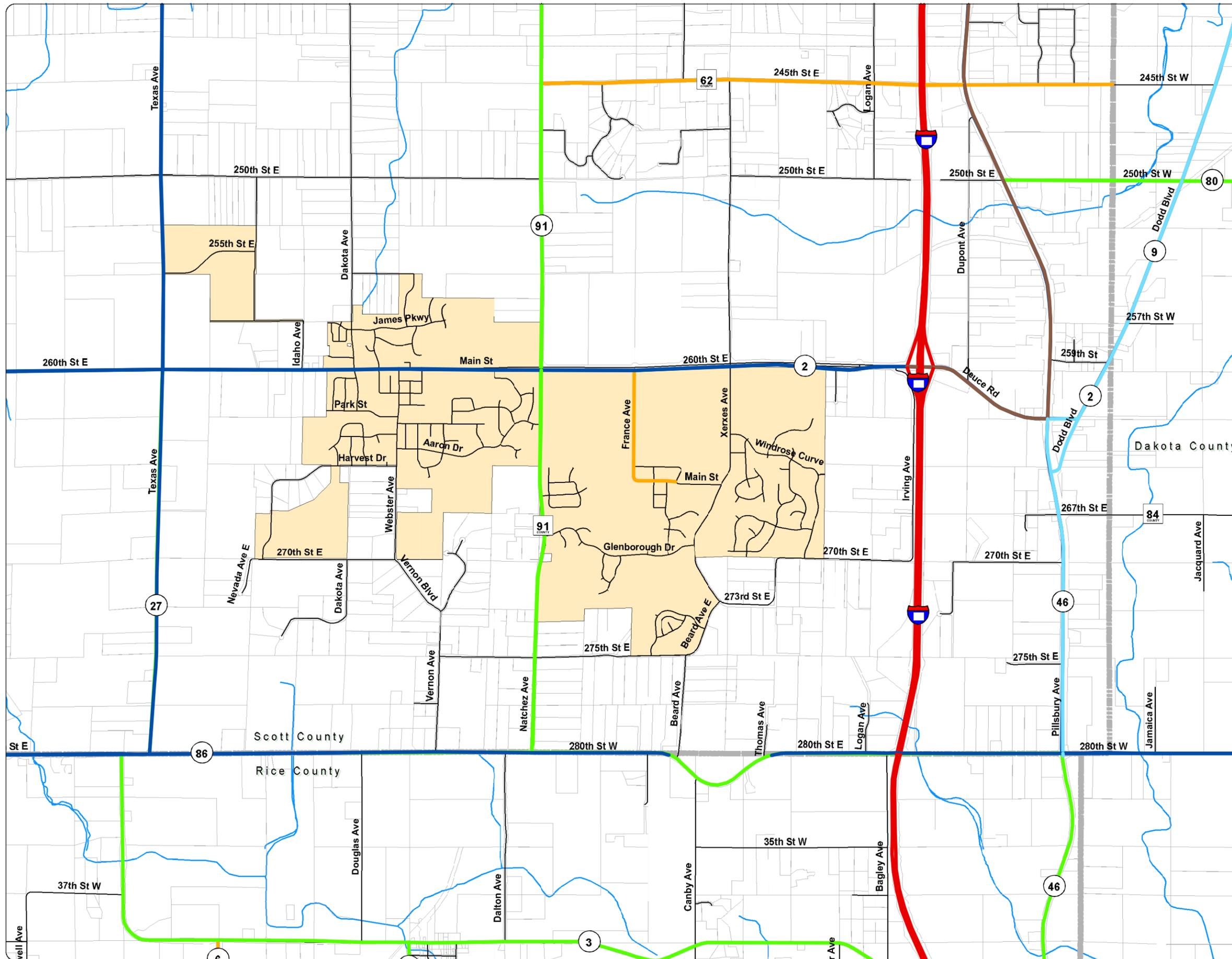
Roadway			Existing Characteristics					Historical Traffic										Forecasted Traffic												
SYS	NUM	ROADWAY SEGMENT	Functional Class	Lanes	Left Turn Lanes or Metered?	Roadway Type	Posted Speed	2000 ADT	2001 ADT	2002 ADT	2003 ADT	2004 ADT	2005 ADT	2006 ADT	Annual Growth	Existing D-Factor	Existing K-Factor	Directional Capacity	2005-6 V/C Ratio	Proposed Functional Class	Lanes	Left Turn Lanes or Metered?	Roadway Type	2030 ADT	Annual Growth	Forecasted D-Factor	Forecasted K-Factor	2030 V/C Ratio		
I	35	North of CR 62	PA	4	no	Freeway	70	39,000		40,000		46,000		42,000	1.24%	0.503	0.087	3500	0.53	PA	4	no	Freeway	71,000	2.21%	0.589	0.092	1.40		
		CR 62 to 250th St. E	PA	4	no	Freeway	70	39,000		40,000		46,000		42,000	1.24%	0.503	0.087	3500	0.53	PA	4	no	Freeway	71,000	2.21%	0.589	0.092	1.40		
		250th St. E to CSAH 2 Ramps	PA	4	no	Freeway	70	39,000		40,000		46,000		42,000	1.24%	0.515	0.088	3500	0.55	PA	4	no	Freeway	71,000	2.21%	0.589	0.092	1.40		
		CSAH 2 Ramps to CSAH 86	PA	4	no	Freeway	70	34,500		36,500		39,000		40,000	2.50%	0.515	0.088	3500	0.52	PA	4	no	Freeway	57,000	1.49%	0.532	0.088	0.76		
		South of CSAH 86	PA	4	no	Freeway	70	34,500		36,500		39,000		40,000	2.50%	0.515	0.088	3500	0.52	PA	4	no	Freeway	57,000	1.49%	0.532	0.088	0.76		
		SB Exit to CSAH 2	PA	1	no	Ramp										-	-	-	1450		PA	1	no	Ramp	13,300	NA	1.000	0.152	1.39	
I	35 Ramps	CSAH 2 to SB On-Ramp	PA	1	no	Ramp									-	-	-	1450		PA	1	no	Ramp	6,100	NA	1.000	0.127	0.53		
		NB Exit to CSAH 2	PA	1	no	Ramp									-	-	-	1450		PA	1	no	Ramp	5,900	NA	1.000	0.122	0.50		
		CSAH 2 to NB On-Ramp	PA	1	no	Ramp										-	-	-	1450		PA	1	no	Ramp	12,800	NA	1.000	0.145	1.28	
		CSAH 9 to CSAH 46	B-MIA	2	no	Undivided	55	1,800			2,100	2,400	2,350			5.48%	0.532	0.116	935	0.15	B-MIA	2	no	Undivided	4,800	2.90%	0.554	0.124	0.37	
		CSAH 46 to I-35	B-MIA	2	no	Undivided	55	4,100			4,200	4,650	4,850			3.42%	0.565	0.125	935	0.37	A-MIA-R	2	no	Undivided	11,900	3.66%	0.513	0.122	0.83	
		I-35 Ramps to I-35	B-MIA	2	no	Undivided	55	1,611					1,611			-	-	-	935		A-MIA-R	2	no	Undivided	20,800	NA	0.702	0.099	1.61	
CSAH	2	I-35 to Logan Ave.	A-MIA-C	4	yes	Divided	55	6,700.22			5,800	7,650	9,000.2		6.08%	0.599	0.143	1900	0.41	A-MIA-C	4	yes	Divided	31,900	5.19%	0.651	0.118	1.22		
		Logan Ave. to West Frontage Road	A-MIA-C	4	yes	Divided	55	6,700.83			5,800	7,650	9,000.3		6.08%	0.598	0.144	1900	0.41	A-MIA-C	4	yes	Divided	26,200	4.37%	0.602	0.105	0.83		
		West Frontage Road to Xerxes Ave.	A-MIA-C	4	yes	Divided	55	6,700.82			5,800	7,650	9,000.2		6.08%	0.578	0.145	1900	0.40	A-MIA-C	4	yes	Divided	25,900	4.32%	0.602	0.105	0.82		
		Xerxes Ave. to Beard Ave.	A-MIA-C	4	yes	Divided	55	5,400.77			5,800	7,650	7,600.7		7.07%	0.577	0.145	1900	0.33	A-MIA-C	4	yes	Divided	24,600	4.81%	0.596	0.105	0.77		
		Beard Ave. to France Ave.	A-MIA-C	4	yes	Divided	55	5,400.72			5,800	7,650	7,600.2		7.07%	0.576	0.145	1900	0.33	A-MIA-C	4	yes	Divided	22,400	4.42%	0.594	0.108	0.72		
		France Ave. to CSAH 91/Natchez Ave.	A-MIA-C	4	yes	Divided	55	5,400.72			5,800	7,650	7,600.2		7.07%	0.576	0.147	1900	0.34	A-MIA-C	4	yes	Divided	21,800	4.31%	0.595	0.111	0.72		
		CSAH 91/Natchez Ave. to Webster Ave.	A-MIA-C	2	no	Undivided	30	3,000.83			3,100	4,575	5,400.3		12.47%	0.582	0.154	990	0.49	A-MIA-C	2	yes	Undivided	8,800	1.97%	0.606	0.129	0.83		
		Webster Ave. to Dakota Ave.	A-MIA-C	2	no	Undivided	30	3,000.63			3,100	4,575	5,400.3		12.47%	0.590	0.162	825	0.63	A-MIA-C	2	yes	Undivided	7,200	1.16%	0.580	0.126	0.63		
		Dakota Ave. to CSAH 27/Texas Ave.	A-MIA-C	2	no	Undivided	55	3,000.59			3,100	4,575	5,400.9		12.47%	0.596	0.167	990	0.54	A-MIA-C	2	yes	Undivided	7,800	1.48%	0.596	0.126	0.59		
		West of CSAH 27/Texas Ave.	A-MIA-C	2	no	Undivided	55	3,000.52			3,100	3,375	5,400.2		12.47%	0.586	0.166	990	0.53	A-MIA-C	2	no	Undivided	4,600	-0.64%	0.585	0.174	0.52		
		CSAH	27 (Texas Ave.)	North of 250th St. E	A-MIA-C	2	no	Undivided	55	1,250.49			2,100	2,350	2,300.9		12.97%	0.541	0.170	990	0.21	A-MIA-C	2	no	Undivided	6,600	4.31%	0.576	0.116	0.49
				250th St. E to 255th St. E	A-MIA-C	2	no	Undivided	55	1,250.48			2,100	2,350	2,300.8		12.97%	0.506	0.177	990	0.21	A-MIA-C	2	no	Undivided	5,100	3.24%	0.580	0.146	0.48
255th St. E to CSAH 2	A-MIA-C			2	no	Undivided	55	1,250.49			2,100	2,350	2,300.9		12.97%	0.506	0.177	990	0.21	A-MIA-C	2	no	Undivided	5,200	3.32%	0.578	0.146	0.49		
CSAH 2 to Harvest Dr.	A-MIA-C			2	no	Undivided	55	880.0.35			1,300	1,350	1,450.6		10.50%	0.600	0.146	990	0.13	A-MIA-C	2	no	Undivided	3,700	3.82%	0.524	0.165	0.36		
Harvest Dr. to 270th St. E	A-MIA-C			2	no	Undivided	55	880.0.31			1,300	1,350	1,450.1		10.50%	0.600	0.146	990	0.13	A-MIA-C	2	no	Undivided	3,000	2.95%	0.512	0.177	0.31		
270th St. E to CSAH 86	A-MIA-C			2	no	Undivided	55	880.0.29			1,300	1,350	1,450.9		10.50%	0.600	0.146	990	0.13	A-MIA-C	2	no	Undivided	2,700	2.52%	0.530	0.183	0.29		
CSAH	46 (Pillsbury Ave.)	North of CR 62/245th St. E	A-MIA-R	2	no	Undivided	55	2,600.84			3,000		2,800.4		1.49%	0.721	0.094	990	0.19	A-MIA-R	2	no	Undivided	6,500	3.43%	0.703	0.167	0.84		
		CR 62/245th St. E to 250th St. E	A-MIA-R	2	no	Undivided	55	1,650.39			1,800	3,775	1,800.9		1.76%	0.597	0.125	990	0.14	A-MIA-R	2	no	Undivided	3,800	3.03%	0.577	0.159	0.39		
		250th St. E to CSAH 2	A-MIA-R	2	no	Undivided	55	1,650.42			1,800	3,775	1,800.2		1.76%	0.603	0.148	990	0.16	A-MIA-R	2	no	Undivided	2,700	1.64%	0.677	0.208	0.42		
		CSAH 2 to CSAH 9	B-MIA	2	no	Undivided	55	3,550.55			3,700	4,350	3,850.5		1.64%	0.597	0.122	990	0.28	B-MIA	2	no	Undivided	7,800	2.86%	0.700	0.093	0.56		
		CSAH 9 to CSAH 86	B-MIA	2	no	Undivided	55	3,550.71			3,700	4,350	3,850.1		1.64%	0.578	0.122	990	0.27	B-MIA	2	no	Undivided	9,100	3.50%	0.562	0.125	0.71		
		South of CSAH 86	B-MIA	2	no	Undivided	55	1,950.25					2,100.5			1.49%	0.559	0.116	990	0.14	B-MIA	2	no	Undivided	3,200	1.70%	0.579	0.124	0.26	
CSAH	86 (280th E, 30th W)	East of CSAH 46	A-MIA-C	2	no	Undivided	55	2,600.74			2,850	3,100	3,300.4		4.88%	0.595	0.146	990	0.29	A-MIA-C	2	no	Undivided	6,800	2.93%	0.585	0.166	0.74		
		CSAH 46 to Bagley Ave.	A-MIA-C	2	no	Undivided	55	1,600.01			1,900	2,000	2,300.1		7.53%	0.582	0.156	990	0.21	A-MIA-C	2	no	Undivided	7,300	4.73%	0.767	0.161	1.01		
		Bagley Ave. to Beard Ave.	A-MIA-C	2	no	Undivided	55	1,200.71			1,500	1,750	2,050.1		11.30%	0.573	0.152	990	0.18	A-MIA-C	2	no	Undivided	5,800	4.25%	0.749	0.148	0.71		
		Beard Ave. to CR 91/Natchez Ave.	A-MIA-C	2	no	Undivided	55	1,200.67			1,500	1,750	2,050.7		11.30%	0.569	0.156	990	0.18	A-MIA-C	2	no	Undivided	5,600	4.10%	0.743	0.146	0.67		
		CR 91/Natchez Ave. to Vernon Ave.	A-MIA-C	2	no	Undivided	55	2,700.49			3,000	3,825	4,350.9		10.01%	0.534	0.139	990	0.33	A-MIA-C	2	no	Undivided	5,100	0.64%	0.579	0.150	0.49		
		Vernon Ave. to CSAH 27/Texas Ave.	A-MIA-C	2	no	Undivided	55	2,700.54			3,000	3,825	4,350.4		10.01%	0.533	0.139	990	0.33	A-MIA-C	2	no	Undivided	5,200	0.72%	0.597	0.155	0.54		
CSAH	91 (Natchez Ave.)	West of CSAH 27/Texas Ave.	A-MIA-C	2	no	Undivided	55	3,000.45			3,200	4,400	4,550.5		8.69%	0.542	0.129	990	0.32	A-MIA-C	2	no	Undivided	4,900	0.30%	0.575	0.144	0.45		
		North of CR 62/245th St. E	MC	2	no	Undivided	55	640.0.85			1,000	1,750	1,450.6		17.77%	0.659	0.145	660	0.21	MC	2	no	Undivided	8,200	7.18%	0.521	0.121	0.86		
		CR 62/245th St. E to 250th St. E	MC	2	no	Undivided	55	640.1.11			1,000	1,750	1,450.1		17.77%	0.651	0.128	660	0.18	MC	2	no	Undivided	10,300	8.16%	0.659	0.098	1.11		
		250th St. E to 255th St. E	MC	2	no	Undivided	55	640.1.03			1,000	1,750	1,450.3		17.77%	0.599	0.130	660	0.17	MC	2	no	Undivided	9,700	7.90%	0.533	0.120	1.03		
		255th St. E to CSAH 2	MC	2	no	Undivided	55	640.1.27			1,000	1,750	1,450.7		17.77%	0.599	0.130	660	0.17	MC	2	no	Undivided	13,700	9.40%	0.542	0.102	1.27		
		CSAH 2 to Aaron Dr.	MC	2	no	Undivided	55	1,950.01			3,500	3,050	4,050.1		15.74%															

SYS	Roadway		Existing Characteristics				Historical Traffic								Forecasted Traffic													
	NUM	ROADWAY SEGMENT	Functional Class	Lanes	Left Turn Lanes or Metered?	Roadway Type	Posted Speed	2000 ADT	2001 ADT	2002 ADT	2003 ADT	2004 ADT	2005 ADT	2006 ADT	Annual Growth	Existing D-Factor	Existing K-Factor	Directional Capacity	2005-6 V/C Ratio	Proposed Functional Class	Lanes	Left Turn Lanes or Metered?	Roadway Type	2030 ADT	Annual Growth	Forecasted D-Factor	Forecasted K-Factor	2030 V/C Ratio
	245th St. E	CSAH 46 to Logan Ave.	MIC	2	no	Undivided	55								-	-	-	660		MIC	2	no	Undivided	6,200	NA	0.672	0.144	1.00
		Logan Ave. to Xerxes Ave.	MIC	2	no	Undivided	55								-	-	-	660		MIC	2	no	Undivided	5,500	NA	0.666	0.144	0.88
		Xerxes Ave. to CSAH 91/Natchez Ave.	MIC	2	no	Undivided	55								-	-	-	660		MIC	2	no	Undivided	4,200	NA	0.620	0.162	0.71
	250th St. E	CSAH 91/Natchez Ave. to Dakota Ave.	Local	2	no	Undivided									-	-	-	303		MIC	2	no	Undivided	5,800	NA	0.590	0.126	0.71
		Dakota Ave. to CSAH 27/Texas Ave.	Local	2	no	Undivided									-	-	-	303		MIC	2	no	Undivided	4,700	NA	0.593	0.120	0.56
		West of CSAH 27/Texas Ave.	Local	2	no	Undivided									-	-	-	303		MIC	2	no	Undivided	2,800	NA	0.600	0.150	0.41
	255th St. E	Logan Ave. to Xerxes Ave.	New	2	no	Undivided									-	-	-	-		MC	2	no	Undivided	630	NA	0.739	0.260	0.22
		Xerxes Ave. to France Ave.	New	2	no	Undivided									-	-	-	-		MC	2	no	Undivided	660	NA	0.754	0.234	0.21
		France Ave. to CSAH 91/Natchez Ave.	New	2	no	Undivided									-	-	-	-		MC	2	no	Undivided	810	NA	0.694	0.213	0.22
		CSAH 91/Natchez Ave. to Dakota Ave.	New	2	no	Undivided									-	-	-	-		MC	2	no	Undivided	1,700	NA	0.527	0.142	0.24
		Dakota Ave. to CSAH 27/Texas Ave.	New	2	no	Undivided									-	-	-	-		MC	2	no	Undivided	1,500	6.25%	0.622	0.145	0.25
	257th St. E	Logan Ave. to Xerxes Ave.	New	2	no	Undivided									*	*	*	*		MC	2	no	Undivided	340	NA	0.766	0.237	0.12
	263rd St. E	Logan Ave. to Xerxes Ave.	New	2	no	Undivided									-	-	-	-		MC	2	no	Undivided	2,900	NA	0.685	0.113	0.45
		Xerxes Ave. to CR 33/France Ave.	New	2	no	Undivided									-	-	-	-		MC	2	no	Undivided	1,500	NA	0.560	0.129	0.22
	270th St. E	Logan Ave. to Beard Ave.	New	2	no	Undivided									-	-	-	-		MC	2	no	Undivided	1,800	NA	0.707	0.166	0.37
	275th St. E	Beard Ave. to CR 91/Natchez Ave.	Local	2	no	Undivided									-	-	-	303		MC	2	no	Undivided	890	NA	0.694	0.190	0.20
		CR 91/Natchez Ave. to Vernon Ave.	Local	2	no	Undivided									-	-	-	303		MC	2	no	Undivided	1,000	NA	0.678	0.147	0.17

PA: Principal Arterial
 A-MIA-R: A - Minor Arterial Reliever
 A-MIA-C: A - Minor Arterial Connector
 B-MIA: B - Minor Arterial
 MC: Major Collector
 MIC: Minor Collector
 Local: Local Collector (Existing Gravel or Paved Road, or Unknown Designation)
 New: New Roadway that Currently Does Not Exist

**ELKO NEW MARKET
2030 TRANSPORTATION PLAN
EXISTING ROADWAY
FUNCTIONAL CLASSIFICATION**

FIGURE 2.1
2008

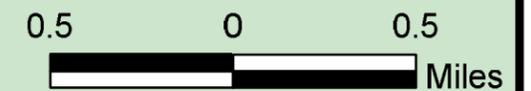


Legend

Existing Functional Classification

- Principal Arterial
- A Minor Arterial-Connector
- A Minor Arterial-Reliever
- B Minor Arterial
- Major Collector
- Minor Collector
- Local Roads
- + Elko New Market City Limits
- County Boundary
- ~ Watercourse Or Drainageway

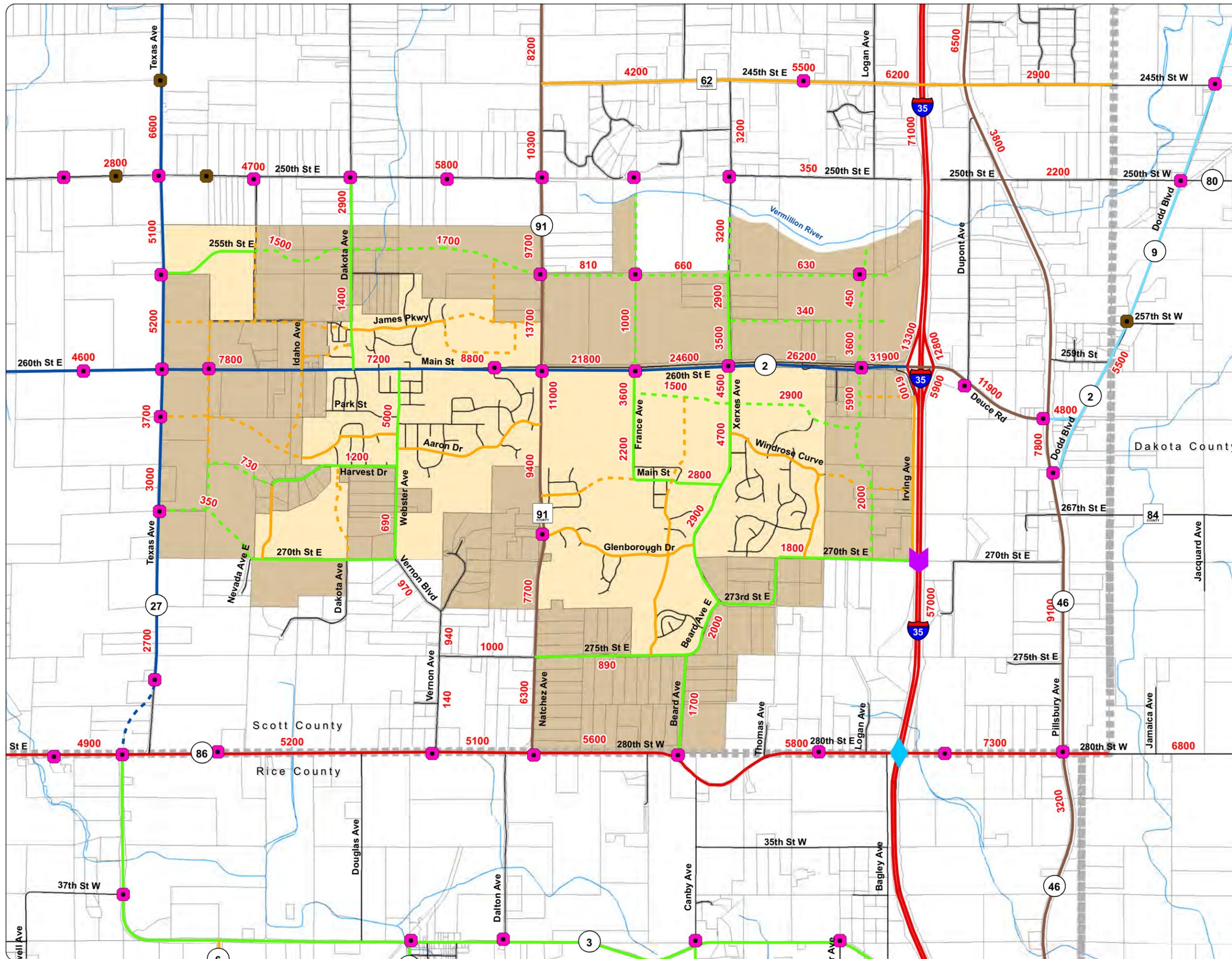
Source:
Functional Classification - Metropolitan Council and The Lawrence Group (TLG) Date: 10-5-2007



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Consulting Engineers & Surveyors
www.boltonmenk.com

**ELKO NEW MARKET
2030 TRANSPORTATION PLAN
2030 FORECASTED AVERAGE
DAILY TRAFFIC VOLUMES**

FIGURE 4.2
2008



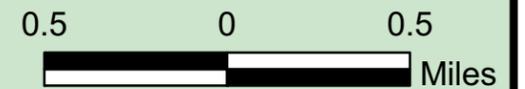
Legend

- XXXX 2030 Average Daily Traffic Volumes
- Future Functional Classification**
 - Future A Minor Connector/Minor Arterial
 - Future Major Collector
 - Future Minor Collector
- Existing Functional Classification**
 - Principal Arterial
 - A Minor Arterial Connector/Minor Arterial
 - A Minor Arterial Reliever
 - B Minor Arterial
 - Major Collector
 - Minor Collector
 - Local Road
- Interstate 35 Crossings**
 - Future Interchange
 - Future Overpass
- Future Road Access**
 - Permanent Access
 - Rural Access
- 2030 MUSA Reserve Boundary
- Parcels
- Elko New Market City Limits
- Township Boundaries
- County Boundary
- Watercourses & Drainageways

Notes:
Traffic volumes rounded as follows:
<1000, Nearest 10
>1000, Nearest 100

Forecast numbers depicted have a confidence range of plus or minus 15%.

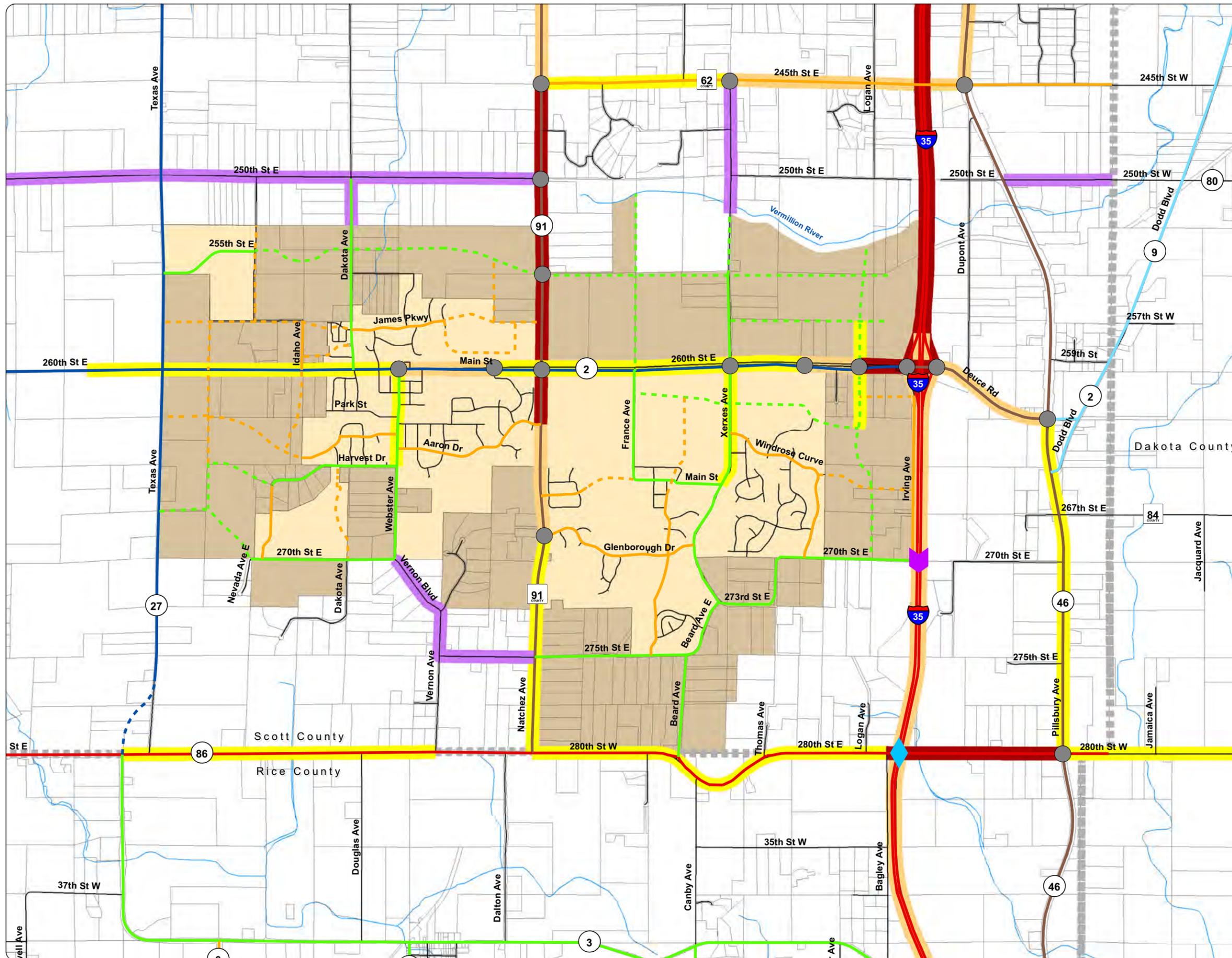
Forecasts follow procedures as documented in the Twin City Travel Demand Forecasts Prepared for Mn/DOT Metro: Model and Parameters for Adjustments to Model Inputs (Revised January 5, 2006).



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ELKO NEW MARKET 2030 TRANSPORTATION PLAN 2030 MAXIMUM PEAK HOUR LEVELS OF CONGESTION

FIGURE 4.3
2008



Legend

Levels Of Congestion

- Periodically Congested V/C=0.50 - 0.75
- Near Congested V/C=0.75 - 1.00
- Congested V/C>1.00 (With 2-Lane Road)
- Gravel Maintenance Threshold Exceeded > 500 ADT

Potential Intersection Control Evaluation

- Potential Intersection Control Evaluation

Existing Functional Classification

- Principal Arterial
- A Minor Arterial Connector/Minor Arterial
- A Minor Arterial-Reliever
- B Minor Arterial
- Major Collector
- Minor Collector
- Local Road

Future Functional Classification

- Future A Minor Connector/Minor Arterial
- Future Major Collector
- Future Minor Collector

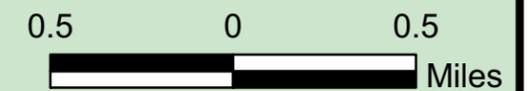
Interstate 35 Crossings

- Future Interchange
- Future Overpass

Other Features

- 2030 MUSA Reserve Boundary
- Parcels
- Elko New Market City Limits
- Township Boundaries
- County Boundary
- Watercourses & Drainageways

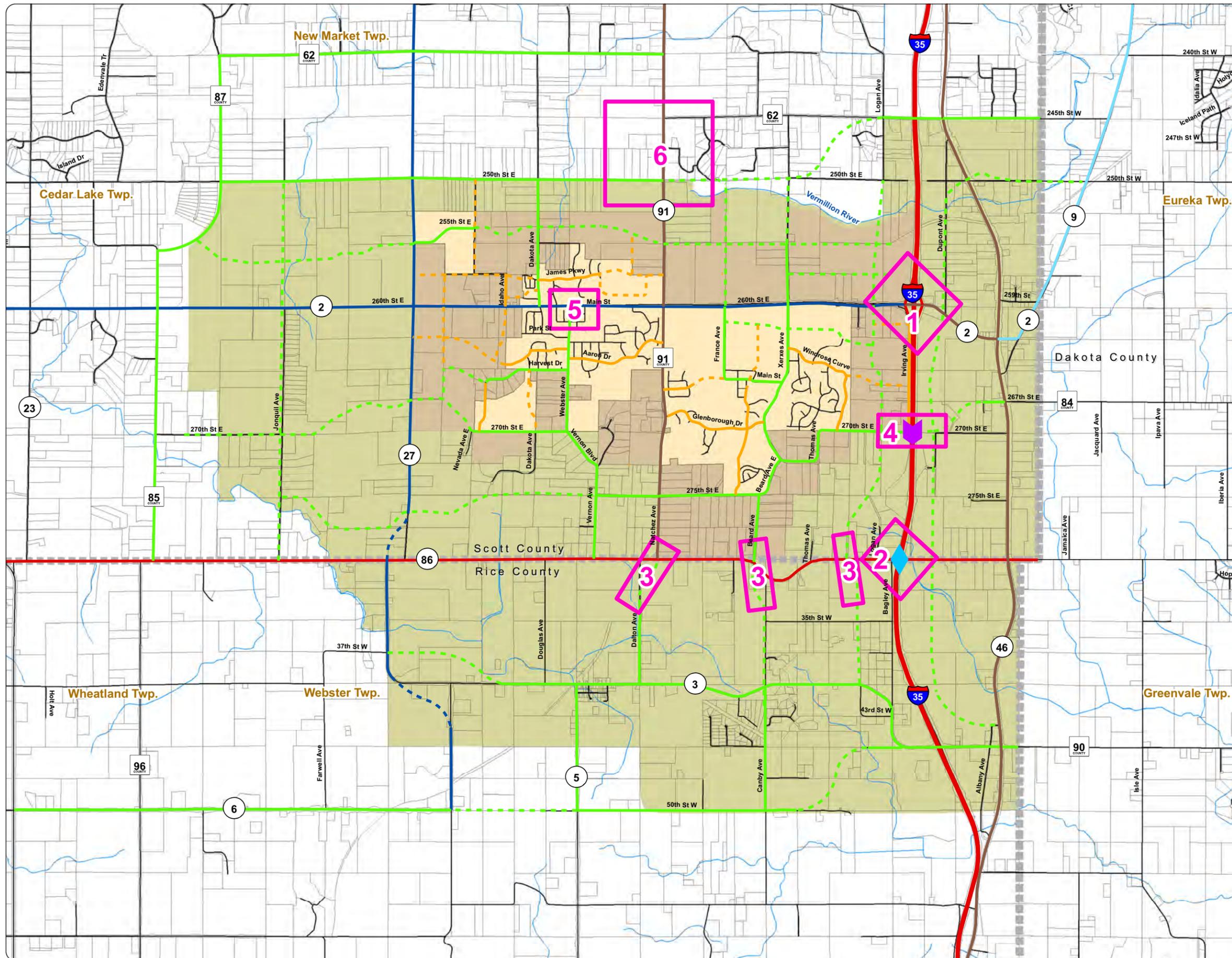
Note: The corridor alignments identified are conceptual to illustrate general connectivity and continuity needs to serve post 2030 growth. It is understood that environmental, feasibility, and traffic studies are necessary for each corridor identified, and that these studies may require coordination with Scott County, Mn/DOT, and adjacent townships. Actual alignments may vary.



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ELKO NEW MARKET 2030 TRANSPORTATION PLAN FUTURE STUDY AREAS

FIGURE 4.4
2008



Legend

Future Functional Classification

- Principal Arterial
- A Minor Arterial Connector/Minor Arterial
- Future A Minor Connector/Minor Arterial
- A Minor Arterial Reliever
- Future A Minor Reliever
- B Minor Arterial
- Major Collector
- Future Major Collector
- Minor Collector
- Future Minor Collector
- Local Road

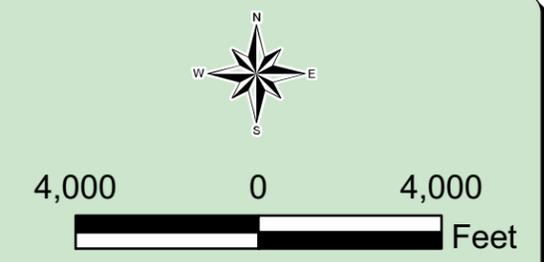
Interstate 35 Crossings

- Future Interchange
- Future Overpass

Other Features

- Future Study Area
- 2030 MUSA Reserve Boundary
- Undesignated MUSA Boundary
- Elko New Market City Limits
- County Boundary
- Watercourses & Drainageways

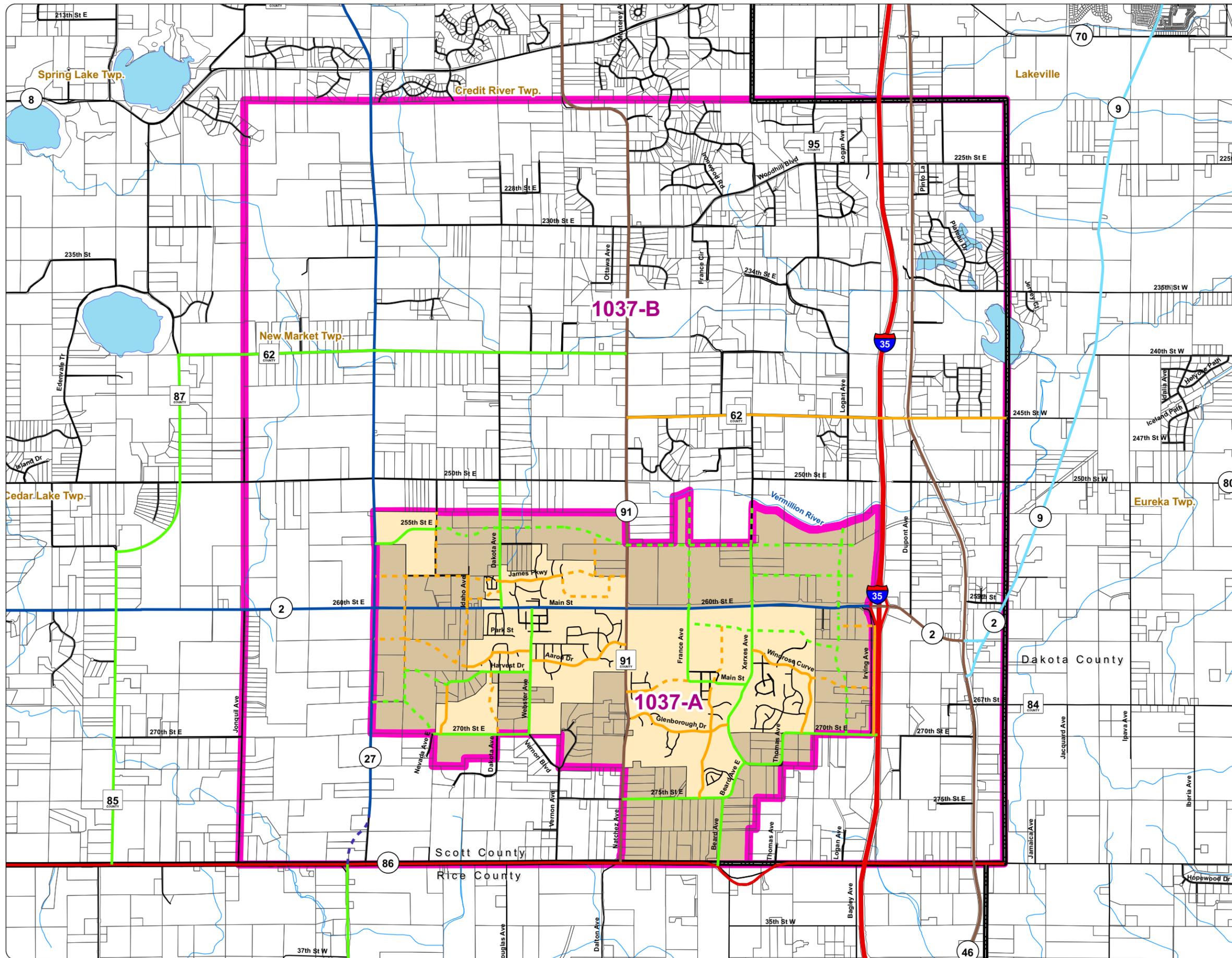
Note: The corridor alignments identified are conceptual to illustrate general connectivity and continuity needs to serve post 2030 growth. It is understood that environmental, feasibility, and traffic studies are necessary for each corridor identified, and that these studies may require coordination with Scott County, Mn/DOT, and adjacent townships. Actual alignments may vary. Future Road Accesses with Scott County roads were field reviewed by Scott County through the Southeast Scott County Comprehensive Plan Update (April 2005).



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**ELKO NEW MARKET
2030 TRANSPORTATION PLAN
TRANSPORTATION ANALYSIS ZONES**

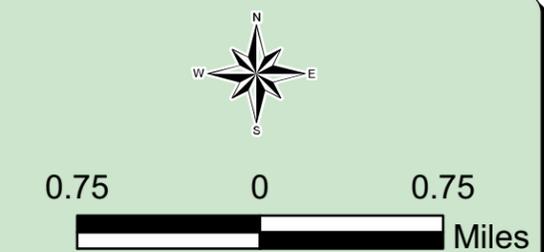
FIGURE 6.1
2008



Legend

- Outer TAZ Boundaries
- Future Functional Classification**
 - Future A Minor Connector/Minor Arterial
 - Future Major Collector
 - Future Minor Collector
- Existing Functional Classification**
 - Principal Arterial
 - A Minor Arterial Connector/Minor Arterial
 - A Minor Arterial Reliever
 - B Minor Arterial
 - Major Collector
 - Minor Collector
 - 2030 MUSA Reserve Boundary
 - Elko New Market City Limits
 - County Boundary
 - Lakes
 - Streams
 - Local Roads

Source:
Base Data - Scott County, Rice County, Dakota County, MnDNR
Existing Functional Classification-MnDOT Date: 10-19-2007



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APPENDIX C

Farmlands Data

MAP LEGEND

Area of Interest (AOI)

 Area of Interest (AOI)

Soils

 Soil Map Units

Soil Ratings

-  Not prime farmland
-  All areas are prime farmland
-  Prime farmland if drained
-  Prime farmland if protected from flooding or not frequently flooded during the growing season
-  Prime farmland if irrigated
-  Prime farmland if drained and either protected from flooding or not frequently flooded during the growing season
-  Prime farmland if irrigated and drained
-  Prime farmland if irrigated and either protected from flooding or not frequently flooded during the growing season

-  Prime farmland if subsoiled, completely removing the root inhibiting soil layer
-  Prime farmland if irrigated and the product of I (soil erodibility) x C (climate factor) does not exceed 60
-  Prime farmland if irrigated and reclaimed of excess salts and sodium
-  Farmland of statewide importance
-  Farmland of local importance
-  Farmland of unique importance
-  Not rated or not available

Political Features

 Cities

Water Features

-  Oceans
-  Streams and Canals

Transportation

-  Rails
-  Interstate Highways

-  US Routes
-  Major Roads
-  Local Roads

MAP INFORMATION

Map Scale: 1:11,600 if printed on A size (8.5" x 11") sheet.

The soil surveys that comprise your AOI were mapped at 1:20,000.

Please rely on the bar scale on each map sheet for accurate map measurements.

Source of Map: Natural Resources Conservation Service
 Web Soil Survey URL: <http://websoilsurvey.nrcs.usda.gov>
 Coordinate System: UTM Zone 15N NAD83

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Scott County, Minnesota
 Survey Area Data: Version 6, Mar 23, 2009

Date(s) aerial images were photographed: 7/18/2003

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Farmland Classification

Farmland Classification— Summary by Map Unit — Scott County, Minnesota				
Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
Bc	Blue Earth mucky silty clay loam, 0 to 1 percent slopes	Prime farmland if drained	9.0	1.4%
Ga	Glencoe silty clay loam	Prime farmland if drained	69.4	11.0%
HaB	Hayden loam, 0 to 6 percent slopes	All areas are prime farmland	34.8	5.5%
HaB2	Hayden loam, 2 to 6 percent slopes, moderately eroded	All areas are prime farmland	131.4	20.8%
HaC	Hayden loam, 6 to 12 percent slopes	Farmland of statewide importance	32.6	5.2%
HaC2	Hayden loam, 6 to 12 percent slopes, moderately eroded	Farmland of statewide importance	117.7	18.6%
HaD	Hayden loam, 12 to 18 percent slopes	Not prime farmland	62.6	9.9%
HaD2	Hayden loam, 12 to 18 percent slopes, moderately eroded	Not prime farmland	25.6	4.1%
HaE2	Hayden loam, 18 to 25 percent slopes	Not prime farmland	14.3	2.3%
HcC3	Hayden soils, 6 to 12 percent slopes, severely eroded	Farmland of statewide importance	2.5	0.4%
HcD3	Hayden soils, 12 to 18 percent slopes, severely eroded	Not prime farmland	14.9	2.4%
INT	Water, intermittent	Not prime farmland	0.8	0.1%
LbD	Estherville-Burnsville complex, 12 to 50 percent slopes	Not prime farmland	6.9	1.1%
LcB2	Lester loam, 2 to 6 percent slopes, moderately eroded	All areas are prime farmland	10.3	1.6%
Ma	Marsh	Not prime farmland	3.2	0.5%
PaA	Palms muck, 0 to 2 percent slopes	Not prime farmland	6.7	1.1%
PaB	Palms muck, sloping, 2 to 12 percent slopes	Not prime farmland	1.2	0.2%
PbA	Houghton muck, 0 to 2 percent slopes	Not prime farmland	34.9	5.5%
TcB	Terril loam, 2 to 6 percent slopes	All areas are prime farmland	1.8	0.3%
Wb	Webster-Glencoe silty clay loams	Prime farmland if drained	51.2	8.1%
Totals for Area of Interest			631.8	100.0%

Description

Farmland classification identifies map units as prime farmland, farmland of statewide importance, farmland of local importance, or unique farmland. It identifies the location and extent of the soils that are best suited to food, feed, fiber, forage, and oilseed crops. NRCS policy and procedures on prime and unique farmlands are published in the "Federal Register," Vol. 43, No. 21, January 31, 1978.

Rating Options

Aggregation Method: No Aggregation Necessary

Tie-break Rule: Lower

APPENDIX D

Cultural Resources Agency Coordination

Fosmo, Ashley

From: Fosmo, Ashley
Sent: Friday, June 25, 2010 10:24 AM
To: Fosmo, Ashley
Subject: FW: SP Number and Funding Source

From: Hudak, Joseph (DOT) [mailto:Joseph.Hudak@state.mn.us]
Sent: Monday, December 28, 2009 7:17 AM
To: Fosmo, Ashley
Cc: Kling, Laura (DOT); Hudak, Joseph (DOT)
Subject: RE: SP Number and Funding Source

Ashley: We are unable to process this request without a State Project Number and Funding Source. Joe

From: Ashley.Fosmo@kimley-horn.com [mailto:Ashley.Fosmo@kimley-horn.com]
Sent: Tuesday, December 22, 2009 12:33 PM
To: Hudak, Joseph (DOT)
Subject:

Good Afternoon Joe,

Per our telephone discussion yesterday about the CSAH 2 Interchange Study in Scott County, I have attached an Early Request Form, USGS Topographical Map, and an Aerial.

The project description is as follows:

Scott County is evaluating the potential options for improving the capacity at the CSAH 2 interchange with I-35 in eastern Scott County. The proposed project would address the need to provide additional capacity and accommodate future traffic volumes and solve projected operational deficiencies. The purpose of this study is to identify preliminary interchange concepts, and to identify and preserve the right-of-way needed for a future interchange project. This study is a screening level (Pre-NEPA) document which will act as the foundation for future environmental documentation.

We are looking for information regarding the potential for historic sites or resources.

Please let me know if you have any other questions.

Thanks and Happy Holidays !

Ashley Fosmo
Environmental Scientist
Kimley-Horn and Associates, Inc.
2550 University Avenue West Suite 345N
St. Paul, MN 55114
Direct: (651) 643-0490
Office: (651) 645-4197
ashley.fosmo@kimley-horn.com



STATE AID FOR LOCAL TRANSPORTATION
 HISTORICAL/ARCHAEOLOGICAL REVIEW REQUEST

Sept 2007

Page 1 of 2

DATE: December 22, 2009

SEND TO: G. Joseph Hudak 651-366-3612
 Mn/DOT Chief Archaeologist Fax: 651-366-3603
 Office of Environmental Services joseph.hudak@dot.state.mn.us
 395 John Ireland Blvd, MS 620
 St Paul, MN 55155

SP/SAP No.: NO FUNDING AT THIS TIME

Include all tied State &/or State Aid project numbers: N/A

Does the project have Federal funds? Yes No

Document Being Prepared: PM EA EAW EIS OTHER –
PRE-NEPA ENVIRONMENTAL SCREENING DOC

Desired Bid Opening Date: N/A

Mn/Dot District No.: Metro County: Scott City: Elko/New Market

Highway No./Street Name: I-35 / CSAH 2

Project Termini: 1/4 mile radius around current interchange

Highway Type: TH CSAH County Road Township Road
 MSAS City Street Trail

Legal location: Twp. 113 Range 21 Section 23-26

Current land use: rural, agricultural, commercial, existing ROW

Does the project require a federal permit?
 Yes No Permitting Agency: _____

Is any part of the project within a reservation/on Tribal lands?
 Yes No Describe: _____

Bridge Number: _____

Name of Feature Crossed: _____

Are there any borrow or disposal areas associated with this project?

Borrow: Yes No Disposal: Yes No

New area Within limits of existing area Expanded portion of existing area

Current land use: _____

Legal location: Twp. _____ Range _____ Section _____

Project is in scoping stage or pre-design stage.

Plan drawings are: not yet available available attached



Project Contact person: Ashley Fosmo
Environmental Scientist
Kimley-Horn and Associates, Inc.
2550 University Ave West
Suite 345 N
St. Paul, MN 55114

direct: (651) 643-0490
fax: (651) 645-5116
ashley.fosmo@kimley-horn.com

The project will likely include:

<input type="checkbox"/> Resurfacing / Rehabilitation	<input type="checkbox"/> Realignment	<input type="checkbox"/> Widening of road/shoulder
<input type="checkbox"/> Major grading	<input type="checkbox"/> Grading for curve correction	<input type="checkbox"/> Ditch grading
<input type="checkbox"/> Bridge demolition, rehabilitation or replacement	<input type="checkbox"/> Bypass lane or turn lane construction	<input type="checkbox"/> Wetland fill or excavation
<input type="checkbox"/> Permanent stream diversion	<input type="checkbox"/> Temporary stream diversion	<input type="checkbox"/> DNR stream/water Xings
<input type="checkbox"/> Work outside existing RW	<input type="checkbox"/> Work outside ex. shoulder	
<input type="checkbox"/> Culvert replacement	<input type="checkbox"/> Culvert extension or lining	<input type="checkbox"/> Stormwater pond construction
<input type="checkbox"/> Right of way acquisition	<input type="checkbox"/> Relocations	<input type="checkbox"/> Temporary easement
<input type="checkbox"/> Guardrail replacement	<input type="checkbox"/> Guardrail improvement	<input type="checkbox"/> Signals / lighting
<input type="checkbox"/> Building demolition/relocation	<input type="checkbox"/> Erosion repair	<input type="checkbox"/> Construction bypass

Brief, but Complete Project Description:

Scott County is evaluating the potential options for improving the capacity at the CSAH 2 interchange with I-35 in eastern Scott County. The proposed project would address the need to provide additional capacity and accommodate future traffic volumes and solve projected operational deficiencies. The purpose of this study is to identify preliminary interchange concepts, and to identify and preserve the right-of-way needed for a future interchange project. This study is a screening level (Pre-NEPA) document which will act as the foundation for future environmental documentation.

Additional comments or information: _____

ATTACH THE FOLLOWING:

- Project location map
- An 8 ½ " x 11" or 11" x 17" photocopy from a USGS 7.5-minute topographic map showing the project location; include the name of map quadrangle.
- Preliminary layout or Project plan showing
Construction limits
R/W limits—existing and proposed
Temporary Easements
- Aerial photograph of project area
- Photos of standing structures within a ¼ mile.

APPENDIX E

DNR Correspondence

Minnesota Department of Natural Resources



Division of Ecological Resources, Box 25

500 Lafayette Road

St. Paul, Minnesota 55155-4025

Phone: (651) 259-5107 Fax: (651) 296-1811 E-mail: heidi.cyr@state.mn.us

April 5, 2010

Correspondence # ERDB 20100610

Ms. Ashley Fosmo
Kimley-Horn and Associates, Inc.
2550 University Avenue West, Suite 345N
St. Paul, MN 55114

RE: Natural Heritage information in the vicinity of the proposed CSAH 2/I-35 Interchange Study, T113N R21W Sections 23-26, Scott County

Dear Ms. Fosmo,

As requested, the Minnesota Natural Heritage Information System has been queried to determine if any rare species or other significant natural features are known to occur within an approximate one-mile radius of the proposed project. Based on this query, a rare feature has been documented within the search area (for details, please see the enclosed database reports). However, given the project details that were provided with the data request form, I do not believe the proposed project will negatively affect any known occurrences of rare features.

The Natural Heritage Information System (NHIS), a collection of databases that contains information about Minnesota's rare natural features, is maintained by the Department of Natural Resources, Division of Ecological Resources. The NHIS is continually updated as new information becomes available, and is the most complete source of data on Minnesota's rare or otherwise significant species, native plant communities, and other natural features. However, the NHIS is not an exhaustive inventory and thus does not represent all of the occurrences of rare features within the state. Therefore, ecologically significant features for which we have no records may exist within the project area.

The enclosed results include an Index Report and a Detailed Report of records in the Rare Features Database, the main database of the NHIS. To control the release of specific location information, which might result in the destruction of a rare feature, both reports are copyrighted.

The Index Report provides rare feature locations only to the nearest section, and may be reprinted, unaltered, in an environmental review document (e.g., EAW or EIS), municipal natural resource plan, or report compiled by your company for the project listed above. If you wish to reproduce the index report for any other purpose, please contact me to request written permission. **The Detailed Report is for your personal use only as it may include specific location information that is considered nonpublic data under *Minnesota Statutes*, section 84.0872, subd. 2. If you wish to reprint or publish the Detailed Report for any purpose, please contact me to request written permission.**

This letter does not constitute review or approval by the Department of Natural Resources as a whole. Instead, it identifies issues regarding known occurrences of rare features and potential effects to these rare features. Additional rare features for which we have no data may be present in the project area, or there may be other natural resource concerns associated with the proposed project. For these concerns, please contact your DNR Regional Environmental Assessment Ecologist, Melissa Doperalski at (651-259-5738). Please be aware that additional site assessments or review may be required.

Thank you for consulting us on this matter, and for your interest in preserving Minnesota's rare natural resources. An invoice will be mailed to you under separate cover.

Sincerely,

A handwritten signature in black ink, appearing to read 'Heidi Cyr', enclosed within a hand-drawn oval.

Heidi Cyr
Endangered Species Environmental Review Specialist

enc. Rare Features Database: Index Report
Rare Features Database: Detail Report
Rare Features Database Reports: An Explanation of Fields

Printed March 2010
Data valid for one year

Minnesota Natural Heritage Information System
Index Report of records within 1 mile radius of:
ERDB #20100610 - CSAH 2/I-35 Interchange
T113N R21W Sections 23-26
Scott County

Rare Features Database:

Element Name and Occurrence Number	Federal Status	MN Status	State Rank	Global Rank	Last Observed Date	EO ID #
Terrestrial Community - Other Classification						
<u>Native Plant Community, Undetermined Class</u> #464 T113N R21W S14, T113N R21W S23 ; Scott County		(NPC Code:)	N/A	SNR	GNR	1995-10-12 21777

Records Printed = 1

Minnesota's endangered species law (*Minnesota Statutes*, section 84.0895) and associated rules (*Minnesota Rules*, part 6212.1800 to 6212.2300 and 6134) prohibit the taking of threatened or endangered species without a permit. For plants, taking includes digging or destroying. For animals, taking includes pursuing, capturing, or killing.

APPENDIX F

MPCA Database Search

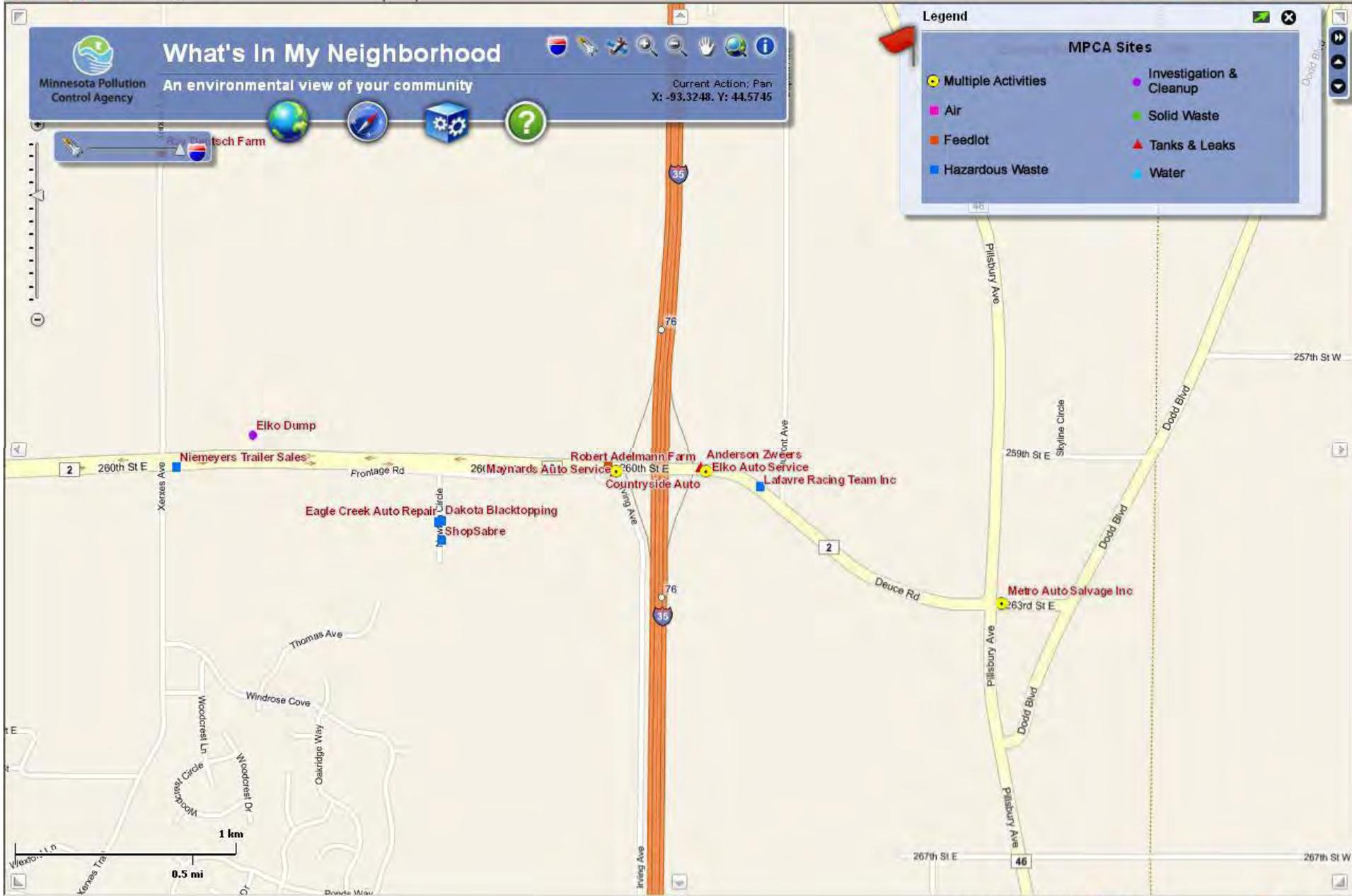
What's In My Neighborhood
 Minnesota Pollution Control Agency
 An environmental view of your community

Current Action: Pan
 X: -93.3248, Y: 44.5745

Legend

MPCA Sites

- Multiple Activities
- Air
- Feedlot
- Hazardous Waste
- Investigation & Cleanup
- Solid Waste
- Tanks & Leaks
- Water



Site Name	Address	City	County	Type	ID
Robert Adelman Farm	10880 E 260th St	Elko	Scott	Feedlot	1396315
Elko Dump	See location description	Elko	Scott	Unpermitted Dump Site	REM0396
ShopSabre	26151 Newton Cir	Elko	Scott	Hazardous Waste, Small to Minimal	MNS000
Anderson Zweers	11110 Deuce Rd	Elko	Scott	Tank Site	12096
Niemeyers Trailer Sales	10405 E 260th St	Elko	Scott	Hazardous Waste, Small to Minimal	MND985
Countryside Auto	10881 E 260th St	Elko	Scott	Multiple Activities	Multiple
Dakota Blacktopping	26105 Newton Cir	Elko	Scott	Hazardous Waste, Small to Minimal	MNR000
Maynards Auto Service	10881 E 260th St	Elko (new	Scott	Tank Site	12883
Elko Auto Service	11111 Deuce Rd Ste 5	Elko	Scott	Multiple Activities	Multiple
Metro Auto Salvage Inc	11710 E 263rd St	Lakeville	Scott	Multiple Activities	Multiple
Lafavre Racing Team Inc	11236 Deuce Rd	Elko	Scott	Hazardous Waste, Small to Minimal	MND985
Eagle Creek Auto Repair	26106 Newton Cir	Elko	Scott	Hazardous Waste, Small to Minimal	MNR000

APPENDIX G

Interchange Concept Evaluation Matrix

CH 2/I-35 Evaluation Matrix

Study Goal	Project Goals	Measurable Criteria	Alternatives											
			No Build	B - Standard Diamond	C - Tight Diamond	D - Partial Cloverleaf	D1- Parclo with Collector-Distributor	E - Full Cloverleaf	E1 - Flyover with Braided Ramps	E2- Flyover	F - SPUJ	G - Diverging Diamond	H - Directional	
<p>Develop an interchange footprint and supporting roadway network to allow the City and County to preserve necessary right-of-way as development occurs in the CSAH 2/I-35 interchange area.</p>	<p>Provide a facility (roadways and bridges) that will have sufficient capacity to effectively accommodate future traffic volumes and meet safety requirements.</p>	Provides adequate arterial capacity (v/c) to accommodate 2030 traffic volumes.	--	++	--	+	+	+	+	+	++	++	+	
		Meets CSAH 2 design speed of 55 mph.	+	+	+	+	+	+	+	+	+	-	+	
		Provides for safe pedestrian and bicycle crossing of I-35 on CSAH 2.	--	++	++	+	+	+	+	+	+	+	+	
		Provides adequate interchange capacity (v/c) to accommodate 2030 traffic volumes.	--	++	--	+	+	+	+	+	++	++	++	
		Minimizes impacts to freeway operations, such as speed, density, and weaving.	--	++	-	--	++	++	++	++	+	+	+	
		Accommodates future expansion on I-35.	--	+	+	+	+	+	+	+	+	+	+	
		Meets Mn/DOT freeway design standards.	+	+	+	+	+	+	+	+	+	+	+	
	Provide a facility that meets current access management standards.	Provides a minimum of 1/4-mile spacing between full-access intersections on CSAH 2.	--	++	++	+	+	+	+	+	++	++	-	
	<p>Provide a facility that allows for flexibility to accommodate future changes to development and traffic patterns.</p>	Provides feasible and cost-effective options for increasing interchange and/or ramp capacity.	--	+	-	+	+	+	-	-	+	+	+	
		Provides opportunities for phased implementation or interim improvements.	--	++	-	+	+	+	-	-	-	-	--	
		Is cost-effective to construct and maintain.	++	+	-	+	+	+	--	--	-	++	--	
		Does not preclude interchange at CSAH 86.	+	++	++	+	+	+	+	+	+	+	+	
	<p>Provide a facility that supports local and regional economic development goals and objectives</p>	Consistency with local comprehensive plans.	--	+	+	+	+	+	+	+	+	+	-	
		Retains developable parcels in all quadrants of the interchange.	+	++	++	+	+	-	-	+	++	++	--	
		Ability for footprint to accommodate changes in traffic characteristics over time with minimal additional impacts	-	+	--	+	+	++	++	+	-	+	+	
	<p>Provide a facility based on sound environmental practices</p>	Avoids and/or minimizes impacts to sensitive environmental resources such as wetlands, historic properties, streams, 4(f) and 6(f) properties and any other known sensitive resource.	++	++	+	-	-	-	-	-	++	--	-	
		Avoids and/or minimizes impacts to known contaminated site(s)	++	++	++	++	++	++	++	++	++	++	++	
		Avoids and/or minimizes right-of-way acquisition	++	+	++	-	-	--	--	-	++	+	--	
	ALTERNATIVES TO BE CARRIED FORWARD			NO	YES	NO	NO	YES	NOT INCLUDED IN FOOTPRINT	NO	NO	YES	YES	NO
	WHY ALTERNATIVE ELIMINATED			Does not provide sufficient capacity.	N/A	Does not provide sufficient capacity.	SE loop requires two-lane merge onto freeway or single lane loop with insufficient capacity. Neither has good operations.	N/A	Provides unneeded capacity, leading to larger ROW footprint. The alternative is not eliminated, but is not included in the interchange footprint.	Number of bridges - construction and maintenance costs.	Number of bridges - construction and maintenance costs.	N/A	N/A	Right-of-way impacts. Number of bridges. Lack of flexibility.

Evaluation Scoring: ++
+
N/A
-
--

Fatal Flaw