



CH 2 and I-35
Interchange Footprint Study

CH 2/I-35 Interchange Area Management Plan

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

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Appendix A – Reference Exhibits

1.0 Introduction

Scott County, the City of Elko New Market, and the Minnesota Department of Transportation (Mn/DOT) initiated this study to identify the right-of-way that may be required for an improved interchange at County State Aid Highway (CH) 2 and I-35, along with a concept supporting roadway network, to preserve these areas from being developed in the interim before future roadway improvements are initiated. **Figure 1** shows the location of the project, in the southern Twin Cities metropolitan area. The interchange is currently located in rural New Market Township. However, with the completion of the Elko New Market Interceptor and the inclusion of the City of Elko New Market within the 2030 Metropolitan Urban Service Area (MUSA) service boundary, significant urban growth is expected in southeast Scott County over the next 20 years.

1.1 Purpose of the Plan

The Interchange Area Management Plan (IAMP) is a land use, circulation and access plan that provides the framework for improvements in the interchange area and on the supporting local roadway network to accommodate the existing and planned land uses. At this stage of planning, the preferred alternative for the future interchange has not been identified, and therefore an environmental assessment and staff approved layout are not being completed at this time.

The purpose of the IAMP is to serve as a guide over the next 20 years, with the objective of creating an integrated land use and transportation system through the consistent and coordinated actions of Mn/DOT, Scott County, the City of Elko New Market, and New Market Township. The plan documents the existing and planned land uses in the interchange area, the interchange and roadway network improvements that will be needed to support the anticipated growth, and serves as a management tool for local agencies as development occurs. The IAMP does not identify specific improvements or the exact funding sources of these improvements, but provides a mutually agreed upon long-range vision and includes assigned responsibilities for implementation over time.

1.2 Project area

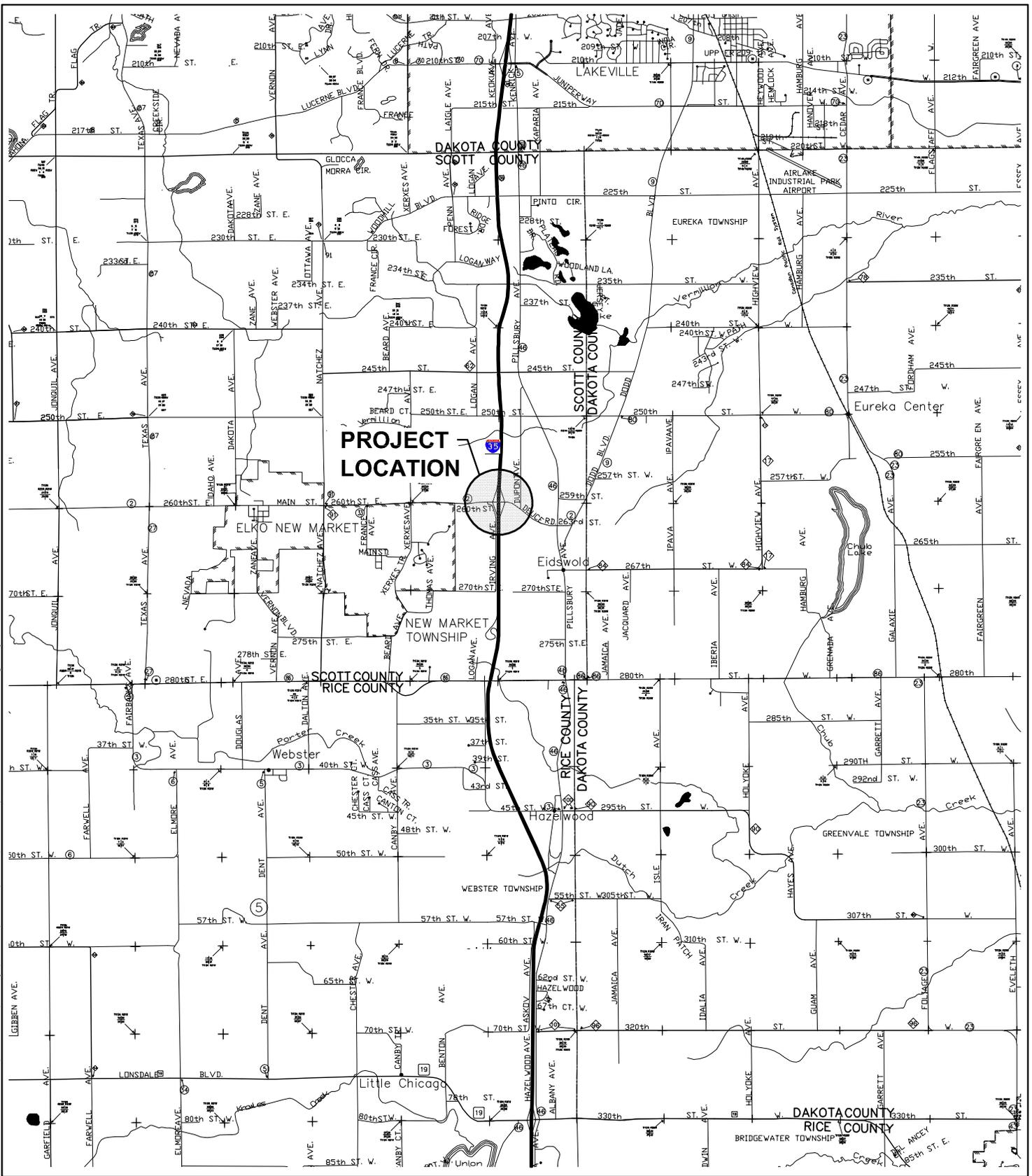
The boundaries of the CH 2/I-35 study area are shown in **Figure 2** and described as follows: County Road (CR) 91 to the west; approximately two miles east of I-35; approximately two miles north of CH 2; CH 86 to the south. The project area is primarily located in Scott County, with a portion in Dakota County to the east and adjacent to Rice County to the south.

1.3 Agency Stakeholders

A Project Advisory Committee (PAC) consisting of key agency stakeholders was convened to advise development of the IAMP. The PAC was made up of representatives from Mn/DOT, Scott County, Dakota County, the City of Elko New Market, New Market Township, and the Federal Highway Administration (FHWA).

As the land use and zoning jurisdictions within the project area, Scott County and the City of Elko New Market will be directly involved in guiding future land use and development, preserving right-of-way for the future interchange, and implementing access management on CH 2 and the collector roadway network. Mn/DOT and FHWA will be involved as the state and federal agencies regulating the operations, design and future improvements of the interchange.

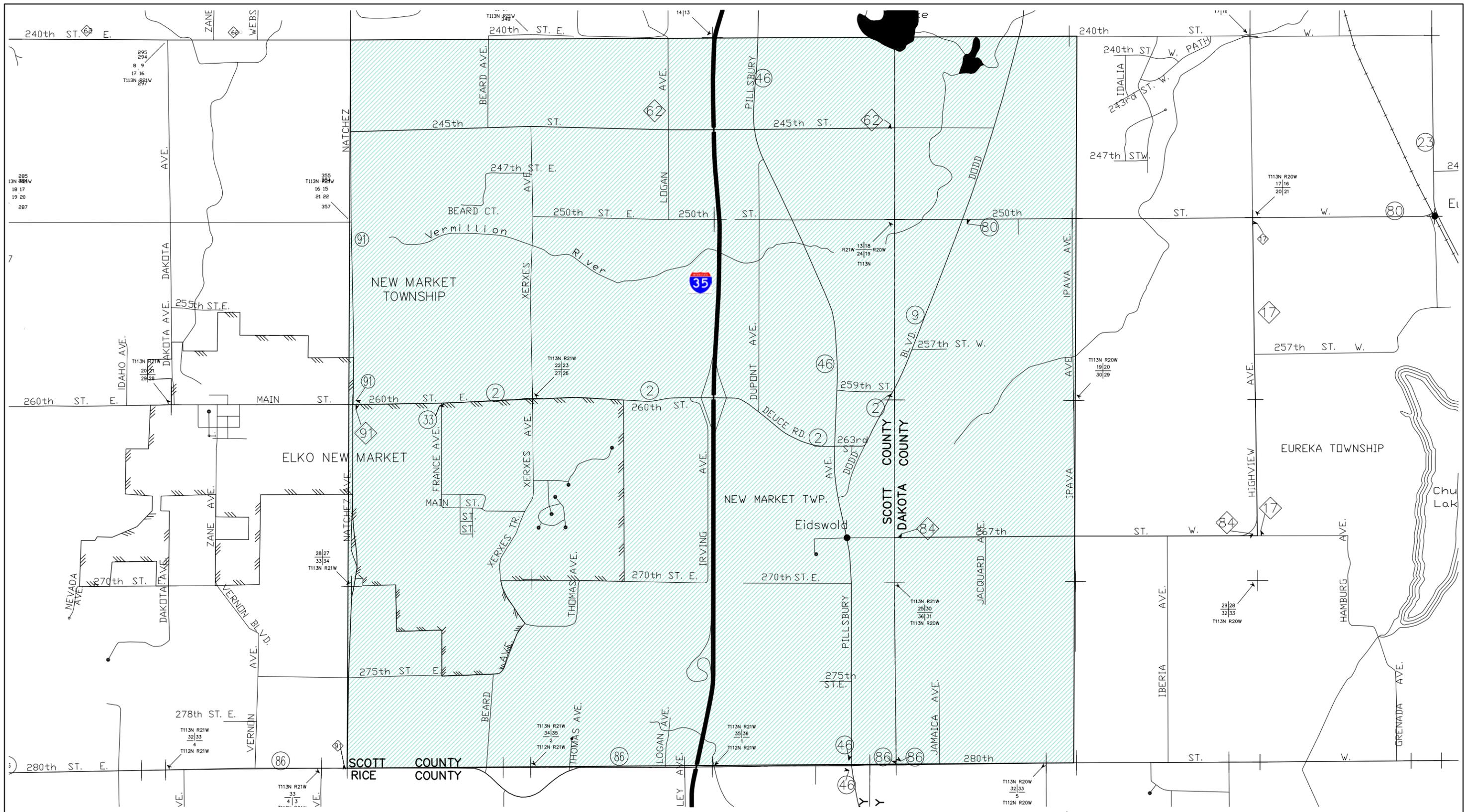
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**Kimley-Horn
and Associates, Inc.**

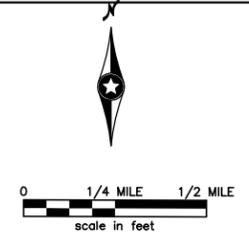
CH 2/I-35
Interchange Area Management Plan
Figure 1. Project Location Map

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 PROJECT STUDY AREA



2.0 Land Use

2.1 Existing Land Use and Zoning

The area surrounding the CH 2/I-35 interchange currently consists of commercial and agricultural uses, as shown in the existing land use inventory in **Figure 3**. None of the quadrants of the interchange are currently served by public utilities (water or sewer). Zoning is designated by Scott County as commercial in the southwest quadrant, and the area east of I-35 along CH 2 is designated as Rural Industrial. The remaining area around the interchange is zoned as Urban Business Reserve (UBR). According to the Scott County Zoning Ordinance, the UBR designation is intended to preserve land for the logical extension of urban commercial and industrial land uses served by public utilities. Until such time as the land is developed for future urban commercial or industrial use and public utilities are available, this district is intended to preserve a very low rural residential density.

2.2 Existing Traffic

Traffic counts were collected in 2008 and 2009 by Scott County in the project area. Traffic volumes on CH 2 from the past decade, as shown in **Table 1**, show the rapid growth in traffic volumes that has occurred on CH 2.

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.

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 peak hour volumes, displayed in **Figure 4**, show a very strong directional flow from the west to northbound I-35 in the AM peak and from southbound I-35 to the west in the PM peak. The existing AM and PM peak hour operations on CH 2 were analyzed and the level of service results are summarized in **Table 2** and also shown graphically on **Figure 4**.

Table 2. Existing Intersection Level of Service

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

Overall, the existing intersections operated at level of service (LOS) A in both peak hours, which represents free-flow conditions. The only movement with any operational deficiencies was the left-turn movement from the northbound I-35 ramp to westbound CH 2. This is due to the heavy eastbound left-turn movement (600+ vehicles per hour) 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. Given the good LOS at the intersections, queuing or stacking of vehicles is not currently an issue.

The eastbound CH 2 to northbound I-35 movement in the AM peak hour operates surprising well given the high left-turn volumes. This is primarily due to the low volume of opposing traffic in the AM peak (104 westbound through vehicles and 129 westbound right-turn vehicles). Detailed documentation of the existing conditions and traffic analysis are included as part of the *CH 2/I-35 Interchange Footprint Study Environmental Screening Document*.

2.3 Future Land Use

The Southeast Scott County Comprehensive Plan was completed in 2005 by the Metropolitan Council, Scott County, the City of Elko, and the City of New Market (subsequently merged as the City of Elko New Market) to understand the long-term impacts and growth demands in the area. The resulting 2030 land use plan, shown in **Figure 5**, has subsequently been incorporated into the 2030 Comprehensive Plans of the City of Elko New Market and Scott County. Higher density land uses are concentrated around the City of Elko New Market, along CH 2, and on CH 86. A future interchange at CH 86/I-35 is desired in the 2030 to 2050 timeframe, which is also shown in the comprehensive plans. The Elko New Market Comprehensive Plan also reflects the intent to extend public utilities to the areas west of I-35, while the areas east of I-35 is intended to remain non-sewered.

The socioeconomic data for the study area, including population and employment, were documented in the Scott County and City of Elko New Market 2030 Comprehensive Plans.

The 2005 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 3**. The data are in accordance with the Metropolitan Council’s projections for the area and are consistent with the patterns in the outer suburbs, where population typically grows at a greater rate while employment is still primarily located in the metropolitan core.

Table 3. Population and Employment Projections

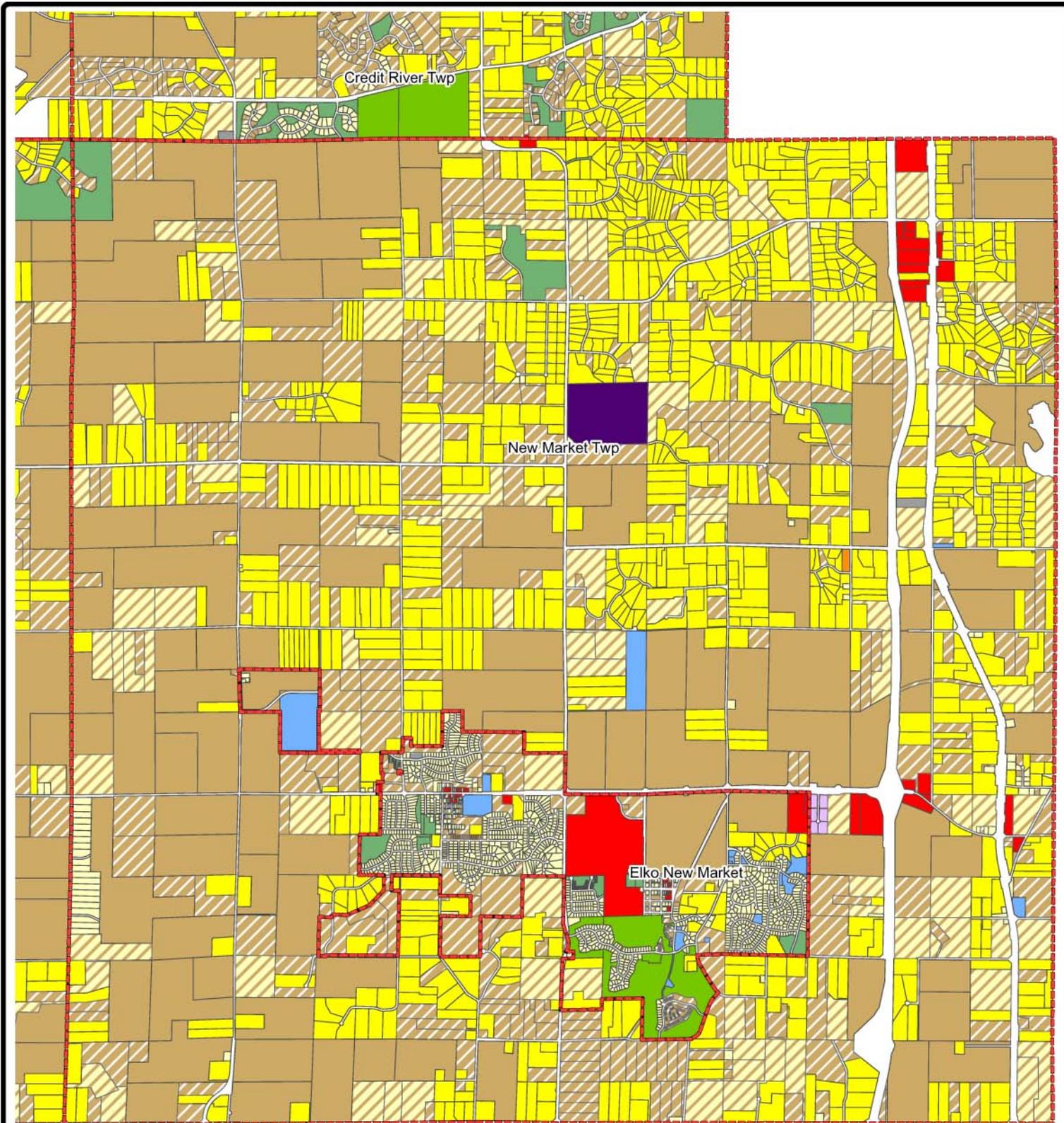
	2005		Projected 2030	
	Population	Employment	Population	Employment
City of Elko New Market	3,310	460	20,800	1,250
New Market Township	3,490	510	5,700	400
Subtotal	6,800	970	26,500	1,650
Scott County	119,660	41,180	221,770	58,190

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

2.6 Traffic Projections

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 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 forecast daily and peak hour volumes are shown in **Figure 6**. The 2030 projections do not assume a new interchange at CH 86/I-35, which is consistent with the 2030 Scott County Comprehensive Plan. However, that location has been identified as a locally desired interchange by 2050. The planned land uses around CH 86/I-35 reflect this desire for future access to I-35.

Growth in traffic in the study area was generally observed to be approximately 6.1 percent per year between existing conditions and 2030, which reflects expected development within the study area. 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, which is consistent with Mn/DOT travel demand forecast guidance and the existing traffic patterns on nearby arterials with access to I-35 (CH 60 and CH 70 in Dakota County). 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. Detailed documentation of the traffic forecasting methodology and results are provided as part of the *CH 2/I-35 Interchange Footprint Study Environmental Screening Document*.



Existing Land Use Inventory (2010)

Residential

- Single Family (2-15 Acres)
- Single Family (Under 2 Acres)
- Single Family / Farmstead (15-40 Acres)
- Mobile Home
- Multi-Family Residential

Non-Residential

- Commercial
- Industrial
- Extraction - Mining
- Utilities
- Institutional (Includes Public & Private Institutional Uses)

Agricultural / Undeveloped

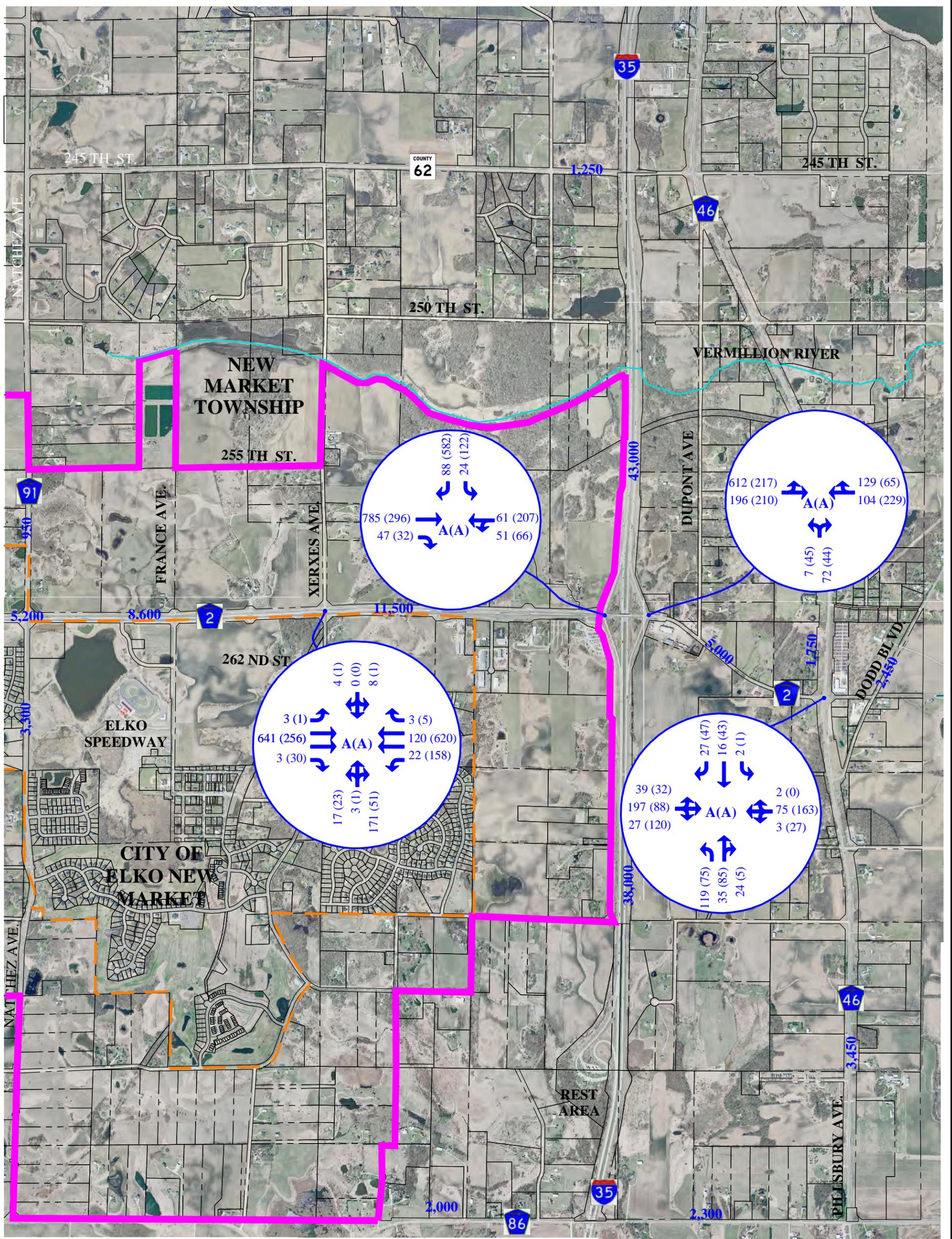
- Agricultural / Undeveloped (Over 40 Acres)
- Agricultural / Undeveloped (Under 40 Acres)

Park & Open Space

- Golf Course
- Parks/Open Space (Includes Federal, State, County, Township, City, & Private Land)

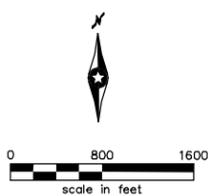
- City/Township Boundary
- Transportation/ROW

Source: Scott County

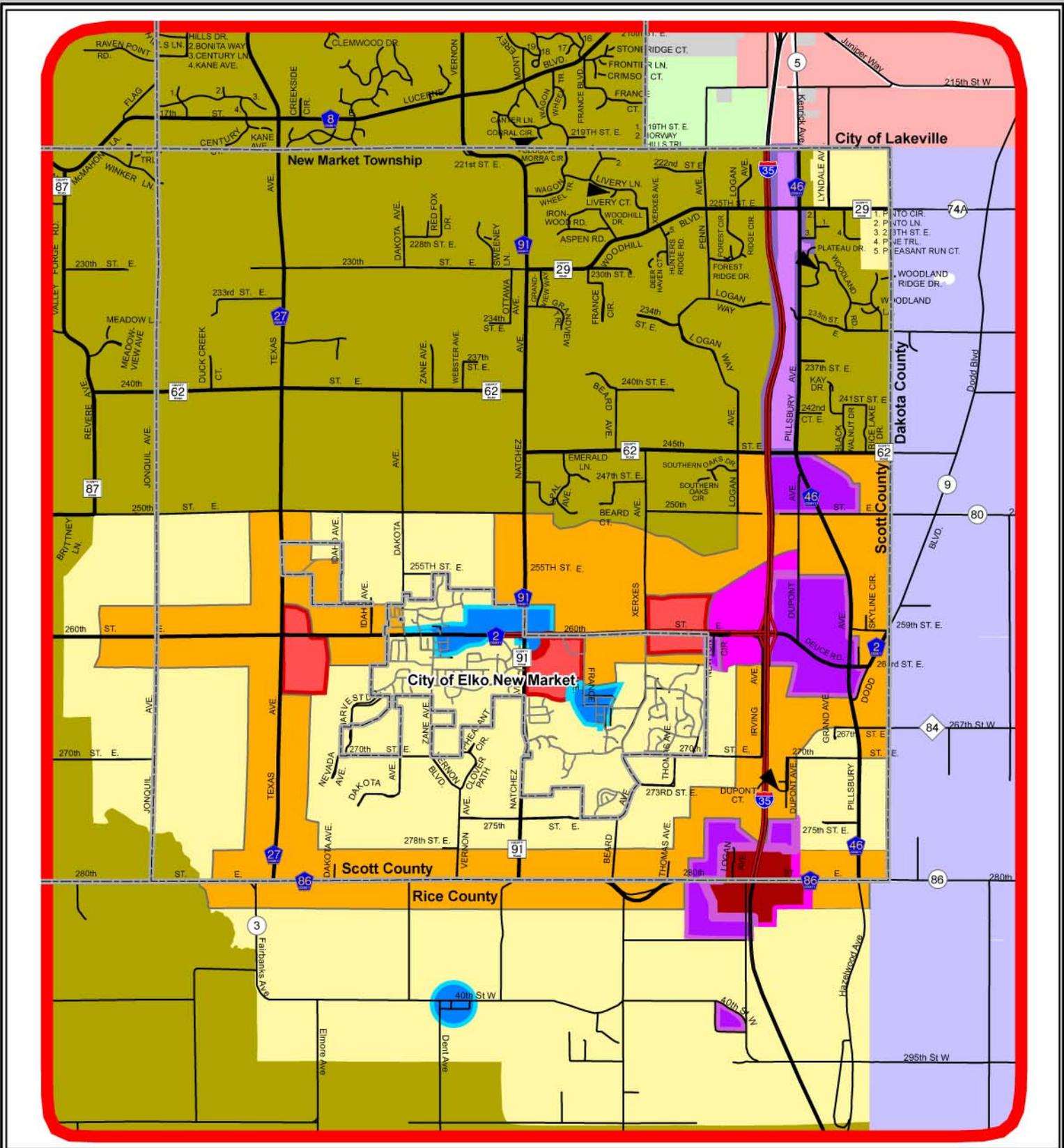


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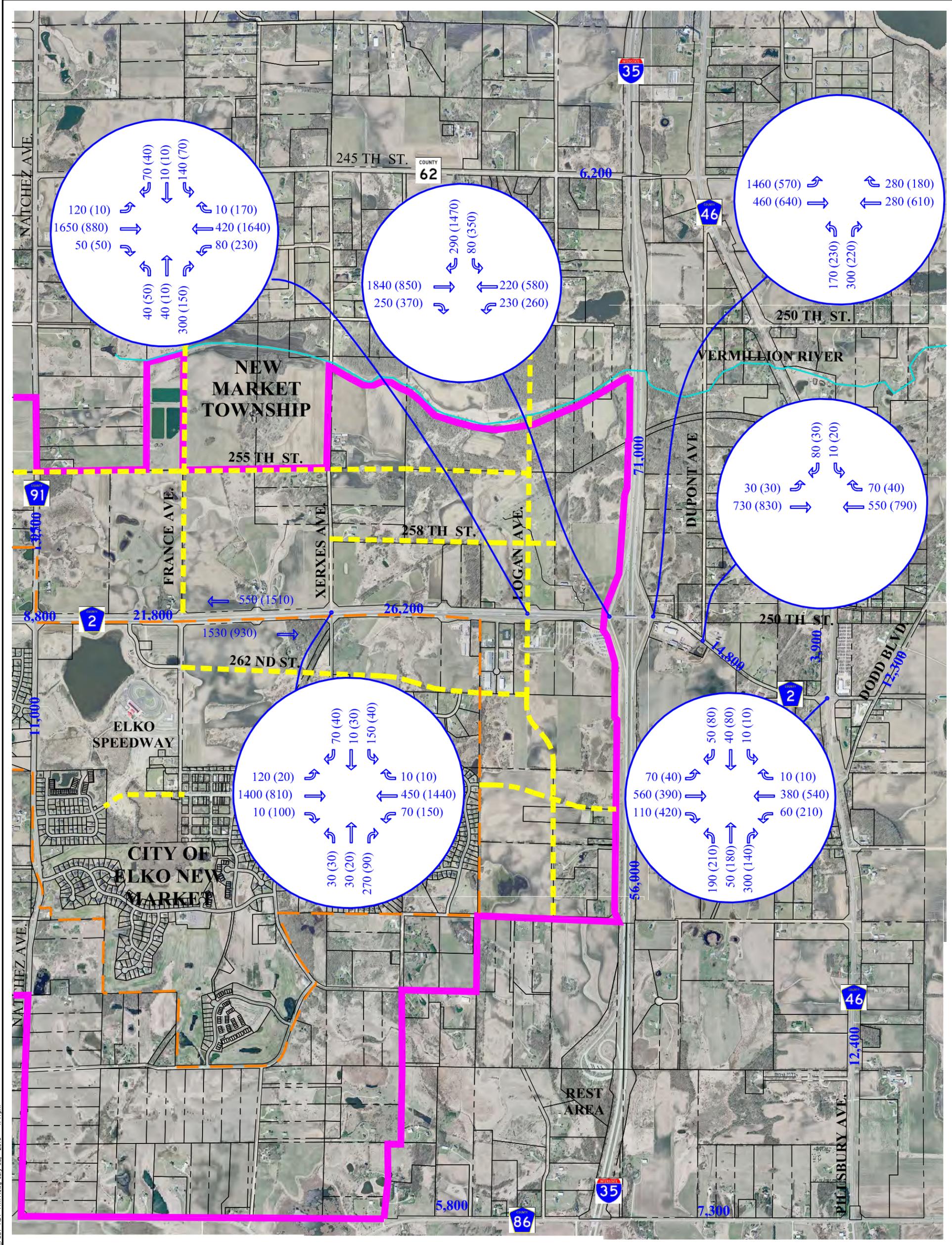
- 2,300** = EXISTING (2008/2009) AVERAGE DAILY TRAFFIC
- XX (XX)** = EXISTING AM (PM) PEAK HOUR
- = ELKO NEW MARKET CITY LIMITS
- = 2030 MUSA RESERVE BOUNDARY
- A (A)** = INTERSECTION LOS AM (PM) PEAK HOUR



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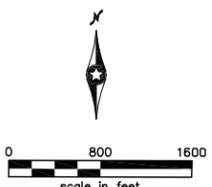
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|--|---|--|---|
| Southeast Scott County Study Area
County, City, Township Boundaries | Low Density (3-5 Units per Acre)
Residential Mixed Use (3-15 units per acre)
General Commercial
Commercial/Industrial (Sewered)
Town Center | Gateway/Transportation Orientated Commercial
Emphasis on Architecture & Physical Amenities
Rural Residential Medium Density
Commercial/Industrial Non-Sewered | Dakota County - Current Comprehensive Plans
Future City Residential
Rural (1/40 Density)
Single Family Residential Developed
<p>Source: Scott County</p> |
|--|---|--|---|



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

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- 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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3.0 Circulation

3.1 Existing Local Roadway Network

Serving as a primary east-west transportation corridor through a primarily undeveloped area, CH 2 serves as both a minor arterial for through traffic and a means to access individual properties. The speed limit on CH 2 is currently posted at 55 miles per hour (mph) through the study area. West of the southbound I-35 ramps, CH 2 was reconstructed in 2006 as a four-lane divided roadway with turn lanes.

Xerxes Avenue is currently a two-lane paved roadway south of CH 2 that provides primary access from CH 2 to existing residential neighborhoods. North of CH 2, Xerxes Avenue is an unpaved two-lane roadway. The existing public street intersections on CH 2 between I-35 and Xerxes Avenue are located at:

- Future 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 an unpaved roadway that serves as a frontage road to I-35, south of CH 2.

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

East of the I-35 southbound ramps, CH 2 is a two-lane section. CH 46 is a two-lane undivided roadway with a speed limit of 55 mph, which connects to CH 86 and County Road 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 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.

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. As a result, there are no turn lanes on the bridge. The bridge was constructed in 1963 and the bridge was re-decked in 1988. Based on the most recent structural inventory, the bridge is in good condition and is estimated to have approximately 20 years of structural life remaining.

The existing roadway network and traffic volumes are shown in **Figure 4**. A map of the current functional classifications of each roadway, as documented in the City of Elko New Market 2030 Transportation Plan, is provided in **Appendix A**.

3.2 Future Roadway Network

The City of Elko New Market's 2030 Transportation Plan identifies future minor connector and future major and minor collector roadways west of I-35. A map of the city's proposed roadway network is provided in **Appendix A**. The City of Elko New Market and Scott County Comprehensive Plans both identify CH 86/I-35 as a future interchange in the 2030-2050 planning horizon.

The proposed future collector roadways generally establish a grid with $\frac{1}{4}$ -mile to $\frac{1}{2}$ -mile spacing, which provides the roadway network necessary to provide local access and provide adequate circulation and capacity to accommodate the traffic volumes generated by the planned build-out of the 2030 land use plan.

As part of the CH 2/I-35 study, the planned local roadway network was refined and expanded in the interchange area, as shown in **Figure 7**.

Dupont Avenue and Logan Avenue become the first full access intersections on CH 2 east and west of I-35, respectively. This requires realignment of a portion of the existing Dupont Avenue and a shifting of the existing median break for the future Logan Avenue to provide the minimum $\frac{1}{4}$ -mile spacing between the interchange ramp and the intersection. The $\frac{1}{4}$ -mile spacing is based on the widest potential interchange, the partial cloverleaf, in order to ensure that this criterion is met, regardless of which of the interchange concepts is ultimately chosen. Both Dupont Avenue and Logan Avenue were assumed to have 80-foot right-of-way corridors and would need intersection control at CH 2, such as traffic signals or roundabouts, in 2030. The intersections of Xerxes Avenue, the I-35 northbound and southbound ramp terminals, and CH 46 will also require intersection control at CH 2. For this study, traffic signals were modeled at each intersection. Further discussion of the 2030 traffic modeling is included as part of the *CH 2/I-35 Interchange Footprint Study Environmental Screening Document*.

The intersection of Irving Avenue at CH 2 is also shown to be closed, due to its proximity to the intersection. Instead, access to Irving Avenue from CH 2 is proposed via a local road connection to the future Logan Avenue. In addition, the system of collector roadways is continued east of I-35, again at approximately $\frac{1}{4}$ -mile spacing.

3.3 CH 2 Realignment

CH 2 is an important east-west arterial in southern Scott County based on access to I-35 and the lack of other continuous east-west roadways. The current CH 2 alignment between I-35 and CH 46 includes two horizontal curves, one of which is immediately adjacent to the interchange. While the existing CH 2 alignment does not currently impact the interchange operations and does not preclude future interchange reconstruction, the curve closest to I-35 presents sight distance and safety concerns as traffic volumes continue to grow.

As a result, an alignment alternative was created that would continue CH 2 due east to its intersection with Dodd Boulevard. This alignment would require the acquisition of a new 150-foot right-of-way corridor, which is conceptually represented on **Figure 7**. In this concept, the existing CH 2 alignment would likely become a local road and continue to provide local property access. The exact configuration of any future CH 2 realignment requires further study and evaluation, including access to properties that currently have driveways on the existing CH 2 and Dupont Avenue alignments, wetland impacts, the design of the intersection at Dodd Boulevard, and how the construction might be phased as development occurs.

It should be noted that the CH 2 realignment and interchange reconstruction are independent concepts. Although the existing curve does limit sight distance to the ramp, all of the interchange concepts are feasible whether or not the realignment occurs.

3.4 Access Management

In accordance with Scott County's intersection spacing guidelines for an arterial roadway, the minimum acceptable spacing for full access intersections on CH 2 is ¼-mile. Access to individual properties is to be provided from the local or collector road system and not from arterials (CH 2).

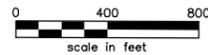
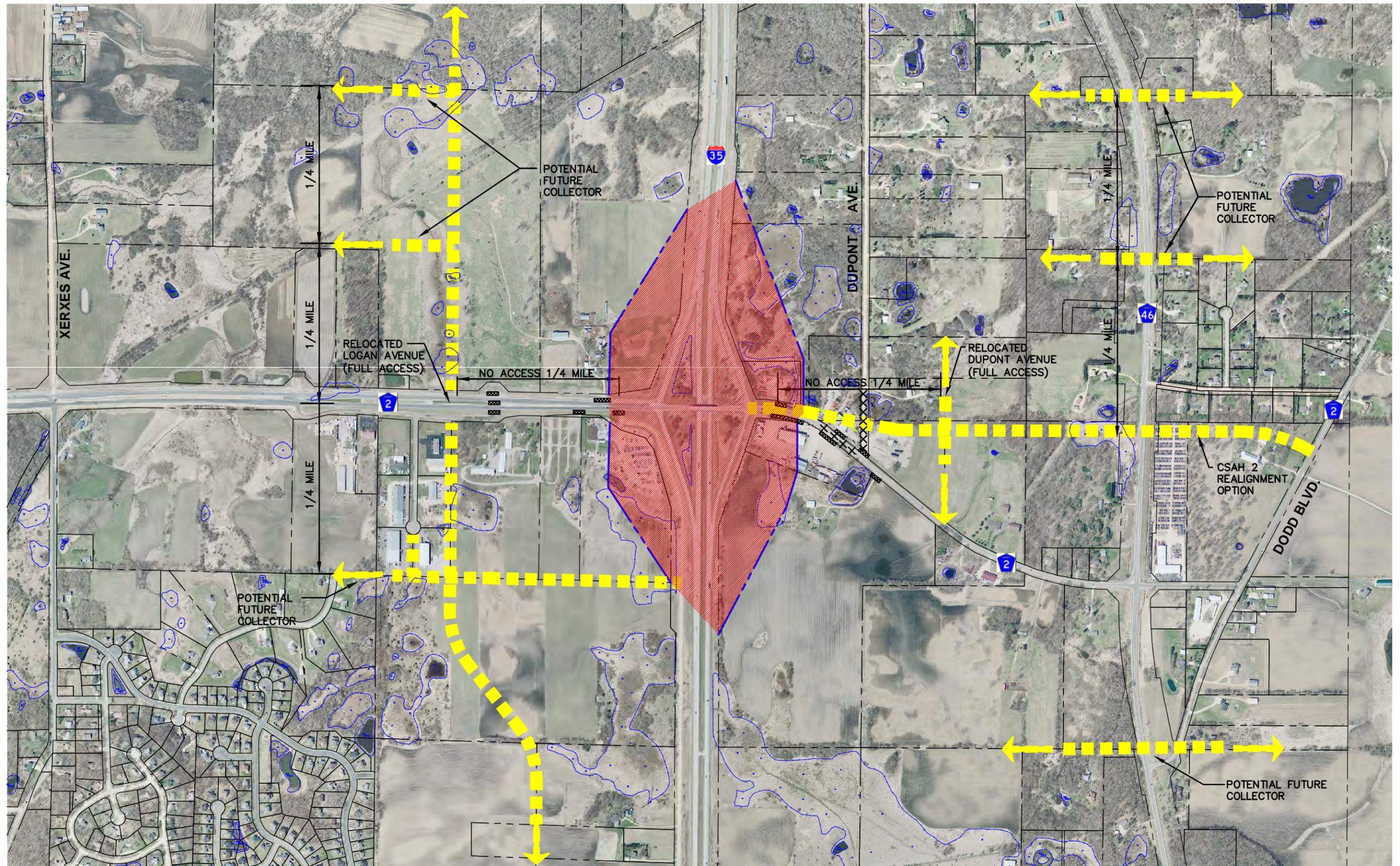
The ¼-mile access spacing standard is met west of I-35 through the use of the center median, but as noted previously, there are currently many full access driveways east of I-35. As development occurs, driveways between the proposed interchange ramp terminal intersections and the first full access intersection would be removed and even limited access (i.e., right-in/right-out) would not be allowed within this area. This is especially critical on CH 2 between I-35 and Logan Avenue due to the interchange options that include a free-right turn movement from the southbound I-35 ramp with an add/acceleration lane on westbound CH 2. This lane would merge into the two westbound through lanes on CH 2 prior to the Logan Avenue intersection, and any accesses in this area would create additional conflicts with traffic from the ramp, as well as through traffic on CH 2.

Based on the spacing between I-35 and CH 46, it is assumed that only one full access intersection (Dupont Avenue) will be provided in that segment. No right-in/right-out access would be allowed between the ramp intersection and the first full access intersection. The location of the future Dupont Avenue intersection, and transition back to the existing Dupont Avenue alignment, will require further study and is dependent on the patterns of future development.

The access management standards for the project area are summarized as follows:

- No access allowed on CH 2 between I-35 and the first public intersections, which will be at least ¼ mile from the ramp intersections
- One full access on CH 2 allowed between I-35 and CH 46 (Dupont Avenue)

- East/west collector roadways to be provided at approximately ¼-mile intervals north and south of CH 2
- Access to individual properties or developments should be provided from the local or collector roadway network, not the arterial system



LEGEND

-  FUTURE ACCESS CLOSURE
-  PRELIMINARY INTERCHANGE RIGHT-OF-WAY FOOTPRINT
-  EXISTING RIGHT-OF-WAY/PROPERTY LINE
-  FUTURE RIGHT-OF-WAY/PROPERTY LINE
-  POTENTIAL FUTURE ROADWAY
-  WETLAND



4.0 Alternative Transportation Modes

4.1 Pedestrian and Bicycle Access

Pedestrian and bicycle facilities are important not only for transportation, but also for recreation and fitness. Given that CH 2 is a high volume, high-speed facility, a separated bike/pedestrian facility is an important element of a safe and efficient transportation system.

Currently there is a paved bituminous trail on the north side of CH 2, which ends just west of I-35. There are not currently any pedestrian or bicycle provisions on the CH 2 bridge over I-35, and the addition of a trail or sidewalk would not be feasible without structural modifications due to the narrow existing shoulders (less than 4 feet). However, pedestrian and bicycle access will become increasingly important as commercial and residential development occurs.

CH 2 is included in Scott County's comprehensive plan as a proposed trail corridor search area, with the potential for regional status, as shown on the map in **Appendix A**. Accommodation of this proposed facility would need to be considered in the design of the future interchange.

4.2 Transit Facilities

There are currently no express or local transit routes in the study area and the current Metropolitan Council 2030 plans do not identify any planned future transit facilities. However, with the heavy use of the existing park and ride facility in Lakeville, a few miles north on I-35, it is expected that the demand for transit service in southeast Scott County will grow as development occurs. While no specific transit facilities have been identified as part of this project, CH 2/I-35 or CH 86/I-35 provide opportunities for a future park and ride site based on the population concentration and the proximity and access to I-35. The northeast quadrant of either interchange offers operational benefits since a substantial portion of transit riders would be expected to come from areas south of Elko New Market, but a future study would be needed to establish the most appropriate interchange location and quadrant for a transit facility.

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. In the interim, a park and pool could potentially be established within the footprint prior to the interchange reconstruction.

5.0 Recommendations

As a result of the development and continued growth in southeast Scott County, particularly in and around the City of Elko New Market, traffic volumes and congestion on CH 2 are expected to increase over the next 20 years. The following sections describe the proposed improvements that have been considered.

5.1 Concept Interchange Alternatives

Several interchange concepts were developed to address the anticipated future demands on the I-35/CH 2 interchange. Evaluation based project goals and measurable design, planning, and environmental criteria resulted in four concept interchange alternatives that emerged as viable alternatives that could move forward. These concept interchange alternatives are shown in **Figures 8-11**.

The traffic operations modeling demonstrates that all interchange options would be expected to provide LOS D or better operations at the key intersections during the 2030 peak hours. The eastbound left-turn 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 operation, 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 CH 2 design speed would be necessary for the diverging diamond to remain a feasible interchange option. As the area develops, it is likely that vehicle speeds on CH 2 would be reduced, at which time Scott County can request that Mn/DOT perform a speed study to establish a lower statutory speed limit.

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 volume demands and traffic patterns. Capacity could be added to the other interchange types as well, but increases in left-turn capacity would be constrained by the width of the reconstructed bridge, whereas additional right-turn capacity could generally be added off the bridge at lower construction cost.

5.2 Interchange Footprint

An interchange footprint for CH 2/I-35 has been developed based on a composite of the right-of-way needs of the four feasible interchange types identified in the previous section, as shown in **Figure 12**. The footprint is based on the Mn/DOT Road Design Manual, using the “desirable” criteria rather than the minimum allowable design standard for the various design elements such as slope, tangent distance, and curve radii. This results in a conservative design that preserves the right-of-way that would reasonably be expected to be needed. The CH 2/I-35 interchange footprint shown in **Figure 12** includes a maximum of approximately 47 additional acres of right-of-way and was based on the following general assumptions and design criteria:

- 70 mph design speed on I-35
- 55 mph design speed on CH 2
- Construction limits based on GIS contour information (two-foot intervals)
- Minimum of 10 feet between estimated construction limits and proposed right-of-way line
- Straight proposed right-of-way line (i.e., does not mirror construction limits, which are variable)
- No retaining walls were assumed as part of the standard diamond, partial cloverleaf, or diverging diamond concepts
- Loop radii of 275 feet (30 mph)
- 1:6 fill slopes
- Storm water treatment features were based on current Vermillion River Watershed Joint Powers Organization standards and are expected to be accommodated within the interchange footprint

It was noted that based on the arterial speeds at other interchange locations in developed or developing areas, the design speed on CH 2 is likely to be lowered from 55 mph by the time an interchange alternative is being designed. However, this would be dependent on a

speed study that supported a change in the statutory speed limit and consequently, the design speed. The footprint was based on a 55 mph design speed to be conservative.

A footprint allows the ability to preserve right-of-way and set access spacing standards while still being flexible enough to accommodate future conditions and desires of developers. By defining future construction limits, right-of-way needs, and access control now, Scott County, the City of Elko New Market, and New Market Township can plan their land uses, influence future development patterns to preserve the right-of-way needed for the future interchange, and reduce future costs and impacts associated with a future reconstructed interchange. Scott County and the City of Elko New Market should assess the current zoning and planned land use designations for parcels in and around the interchange study area and determine if any reguiding or rezoning is necessary to preserve the recommended footprint area to the greatest extent possible.

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 right-of-way width on CH 2 east of I-35 is 80 feet, so additional right-of-way acquisition would also be needed along CH 2 to accommodate the transition from a proposed four-lane section at the interchange to the existing two-lane section to the east of I-35. However, it is assumed that the segment of CH 2 between I-35 and CH 46 would eventually be reconstructed as a four-lane roadway.

5.3 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 study that it would not be cost effective to widen the existing bridge in order to provide turn lanes or other capacity improvements on the bridge.

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 analysis showed that the AM peak hour would be expected to first need improvements to address operational issues on the following movements:

- Left-turn movement from I-35 northbound ramp to westbound CH 2
- Left-turn movement from eastbound CH 2 to northbound I-35

The traffic modeling showed that a traffic signal at the CH 2/I-35 northbound ramps intersection, 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. Based on operations, either a roundabout or a loop in the southeast quadrant would be expected to extend the life of the intersection and provide acceptable operations for approximately 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 radius (190 feet) for the loop would require right-of-way acquisition in the southeast 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:

- Left-turn movement from I-35 southbound ramp to eastbound CH 2

The traffic modeling showed that 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 this option was not analyzed further.

Another 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.

Concept level designs for each of the improvement options listed above are shown in **Figures 13-15**. A pedestrian/bicycle facility was not assumed to be added across I-35 on any of the options because of the bridge widening that would be necessary to accommodate even

a minimum width five-foot sidewalk on one side of the roadway. In addition, there are currently no pedestrian or bicycle facilities east of I-35.

The roundabout option includes right-turn bypass lanes from the I-35 ramps onto CH 2, which provide greater capacity and result in less delay where there are heavy traffic volumes passing in front of the approach (for example, the eastbound left-turn traffic that passes in front of the I-35 northbound exit ramp).

The traffic signals with turn lanes and roundabout options can be constructed within the existing right-of-way, but the loop ramp option would require right-of-way acquisition in the southeast quadrant of the interchange. The loop ramp shown in **Figure 15** could be considered to be a phased improvement, rather than an interim measure. The radius shown is larger than the minimum required radius of 190 feet in order to fit better with the location of the loop location if the interchange was reconstructed as a partial cloverleaf. While requiring more up-front construction and right-of-way investment, the diagonal and loop ramp could remain in place as part of the partial cloverleaf design. The loop ramp option shown in **Figure 15** includes a maximum of approximately 9 additional acres of right-of-way in the southeast quadrant of the interchange. If an interim improvement were desired, a minimum radius loop could be constructed and less right-of-way acquisition would be needed, but reconstruction of the diagonal ramp would still be required.

It should be noted that the improvements at the two 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. More detailed analysis and design, which should include mainline freeway modeling and coordination with Mn/DOT and FHWA, 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.

5.4 Cost Estimates

Planning level cost estimates were prepared for each of the interchange concepts, as well as the interim improvement concepts, to provide a basis for future budgeting and funding requests. The interchange estimates, shown in **Table 4**, assume 2010 construction costs, four percent per year inflation to 2030, and 20 percent for engineering and construction administration. It should be noted that the cost estimates do not include right-of-way costs due to the difficulty of estimating what land prices might be at the time the right-of-way would be acquired.

Table 4. Concept Interchange Cost Estimates

Interchange Concept	2030 Construction and Engineering Cost Estimate
Standard Diamond	\$38-42 million
Partial Cloverleaf	\$41-46 million
Single Point Urban Interchange	\$66-73 million
Diverging Diamond	\$36-40 million

The interim improvement cost estimates shown in **Table 5** assume 2010 construction costs, four percent per year inflation to 2015 (the earliest time point when improvements might be needed), and 20 percent for engineering and construction administration.

Table 5. Interim Improvement Cost Estimates

Interim Improvement Concept	2015 Construction and Engineering Cost Estimate
Traffic Signals with Turn Lanes	\$1.0-1.1 million
Roundabouts	\$1.8 -2.0 million
Loop Ramp	\$1.7-1.9 million

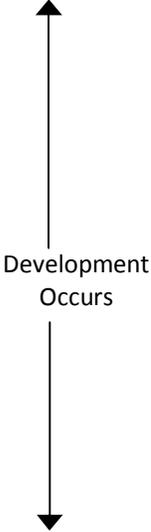
The right-turn bypass lanes on the roundabout option significantly increase the pavement area at each roundabout. If the roundabouts were constructed without the bypass lanes, it would be expected to result in a cost reduction of approximately \$0.7-0.8 million (including construction, engineering, and inflation). However, this would also reduce the capacity of the roundabouts and their potential useful life until interchange reconstruction is needed.

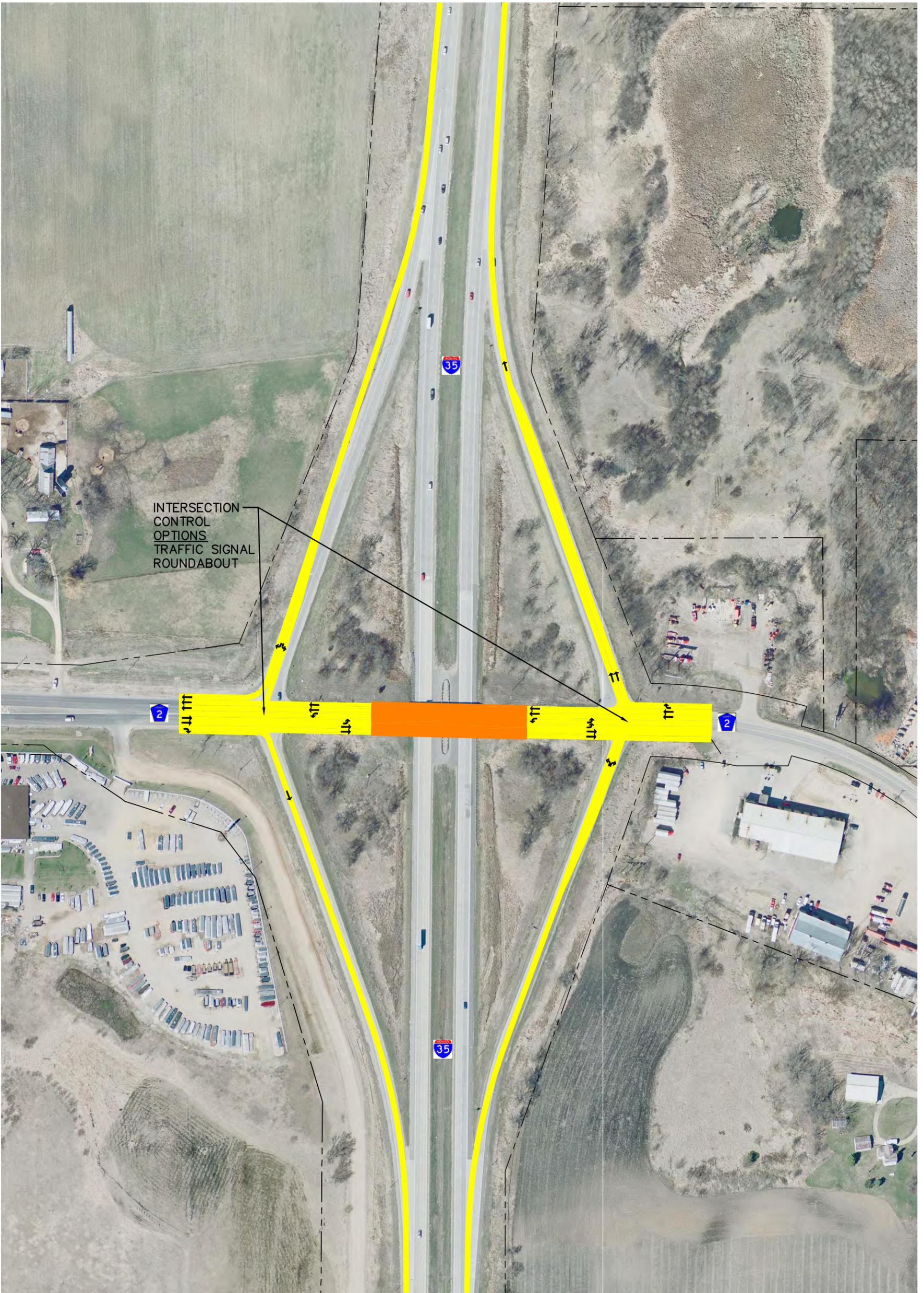
The estimated loop ramp cost shown above does not reflect right-of-way acquisition or business relocation costs.

5.5 Summary

The nature of the expected growth in southeast Scott County, driven by development patterns and rates that cannot be predicted for the full 20-year life of the plan, makes it difficult to anticipate what events might trigger the need for improvements. The timeline shown in **Table 6** generally describes the expected progression of actions assuming a steady growth rate from existing conditions to 2030. The funding sources and lead agency for each action have not been identified at this time and will require further discussion and coordination as the project progresses. The future reconstruction of the interchange will also need to be coordinated with the timing for replacement of the CH 2 bridge over I-35, which is expected to be approximately 20 years based on the current structural rating of the bridge.

Table 6. CH 2/I-35 Estimated Timeline

Years	Expected Trigger		Location	Expected Improvement
2010-2015		20% increase in CH 2 traffic, AM peak	I-35 NB exit ramp	<ul style="list-style-type: none"> - NB RT lane on exit ramp - Begin planning for interim intersection improvements
2015-2020		40% increase in CH 2 traffic	CH 2/ I-35 NB ramps	<ul style="list-style-type: none"> - Roundabout or loop ramp (SE quadrant) - Traffic signal could be used as a temporary condition
			CH 2/ I-35 SB ramps	<ul style="list-style-type: none"> - Roundabout or traffic signal with turn lanes
2020-2025		Secure funding for interchange reconstruction		
2025-2030	1600 vehicles per hour per lane on CH 2 bridge over I-35 (75% increase)	CH 2 bridge over I-35	<ul style="list-style-type: none"> - Interchange reconstruction needed 	

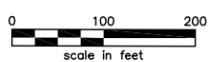


INTERSECTION CONTROL
 OPTIONS
 TRAFFIC SIGNAL
 ROUNDABOUT

LEGEND

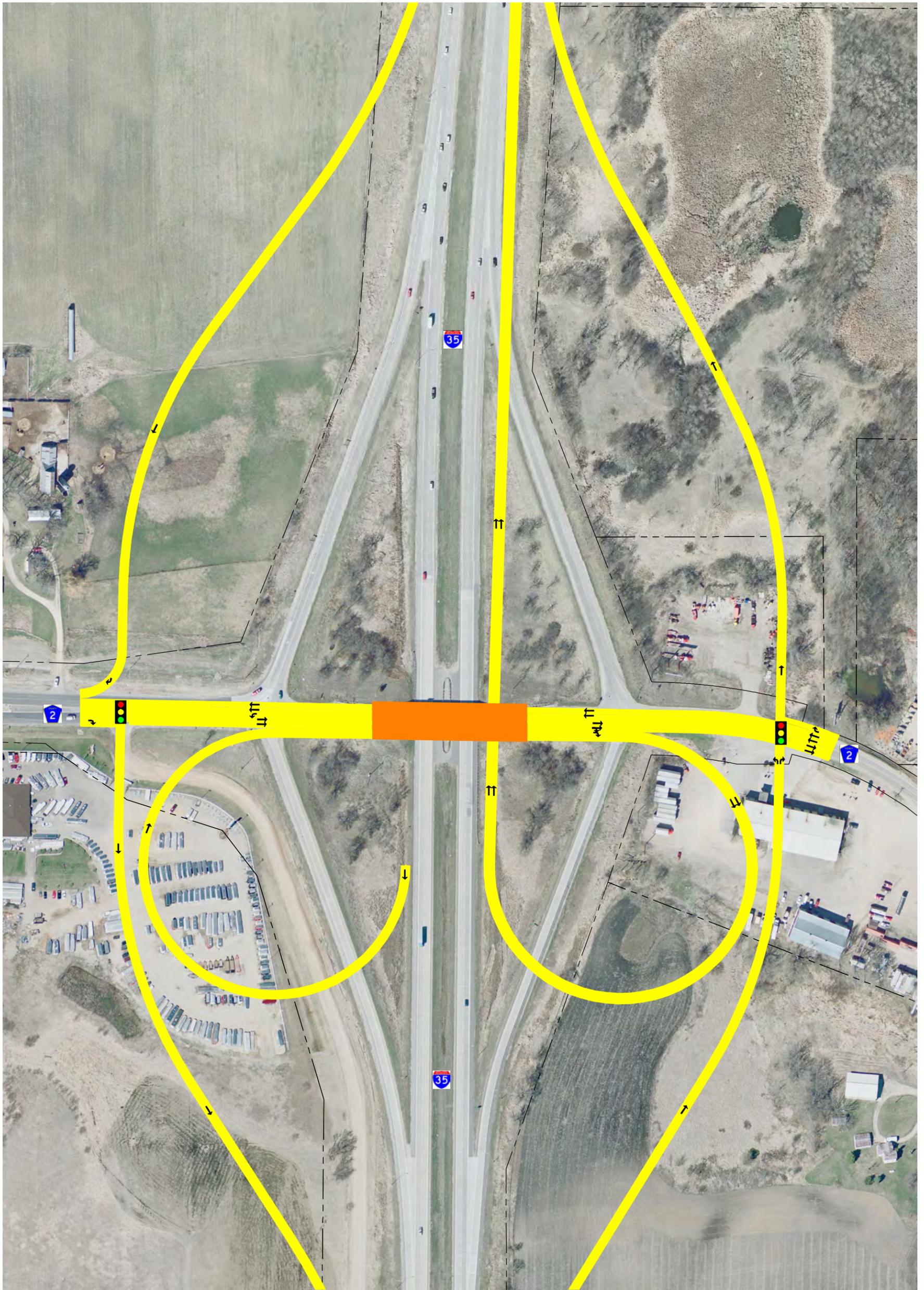
⇔ TRAFFIC LANES/DIRECTION

BRIDGE



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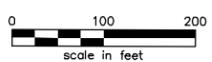


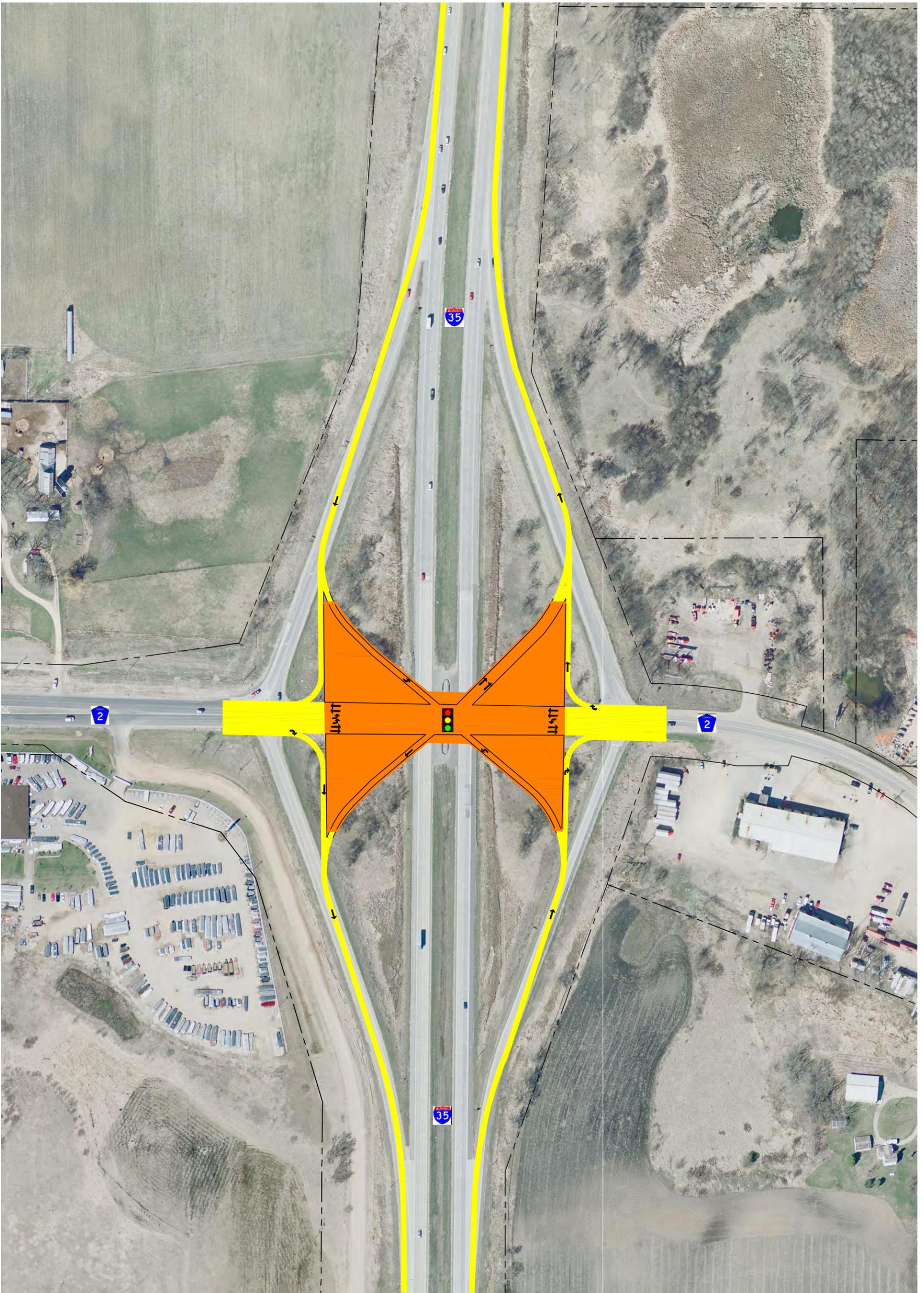
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⇄ TRAFFIC LANES/DIRECTION

🚦 SIGNALIZED INTERSECTION

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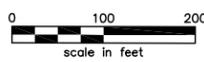
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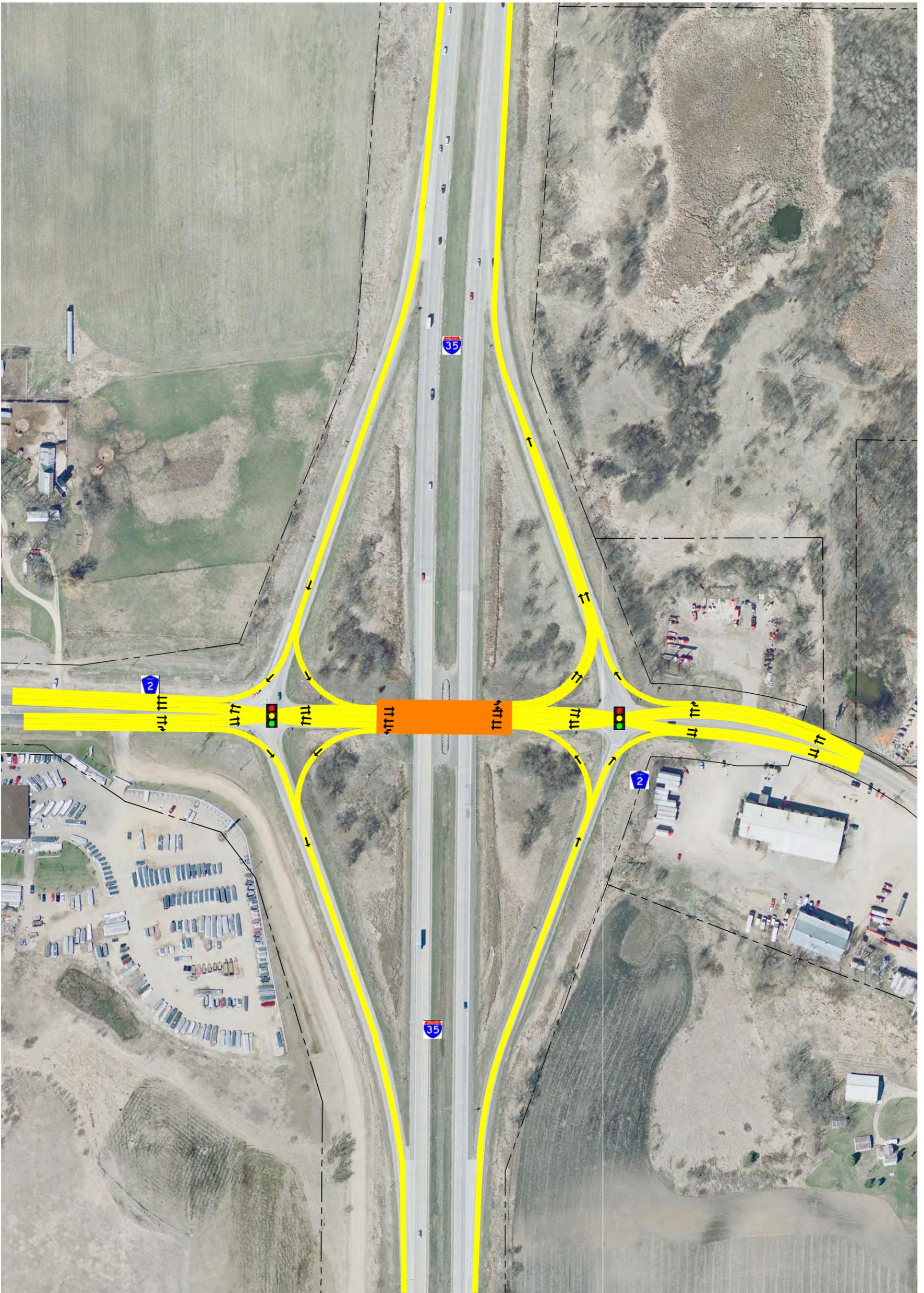
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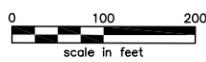
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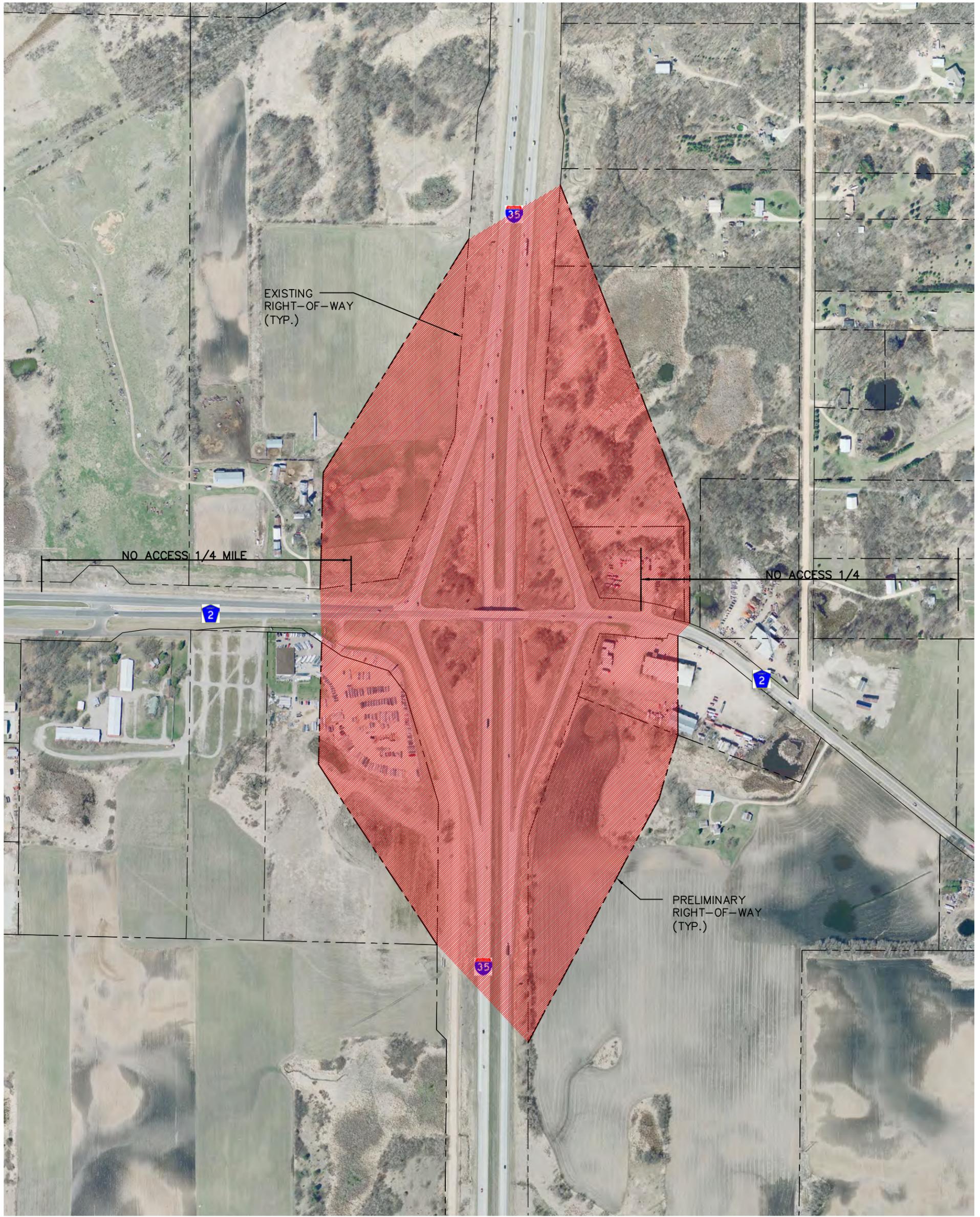
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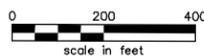
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**Kimley-Horn
and Associates, Inc.**

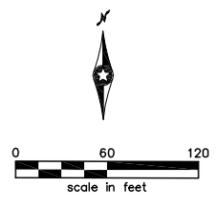


INTERCHANGE TYPES COMPATIBLE WITH FOOTPRINT
 STANDARD DIAMOND INTERCHANGE
 DIVERGING DIAMOND INTERCHANGE
 SINGLE POINT URBAN INTERCHANGE
 PARTIAL CLOVERLEAF INTERCHANGE WITH COLLECTOR-DISTRIBUTOR



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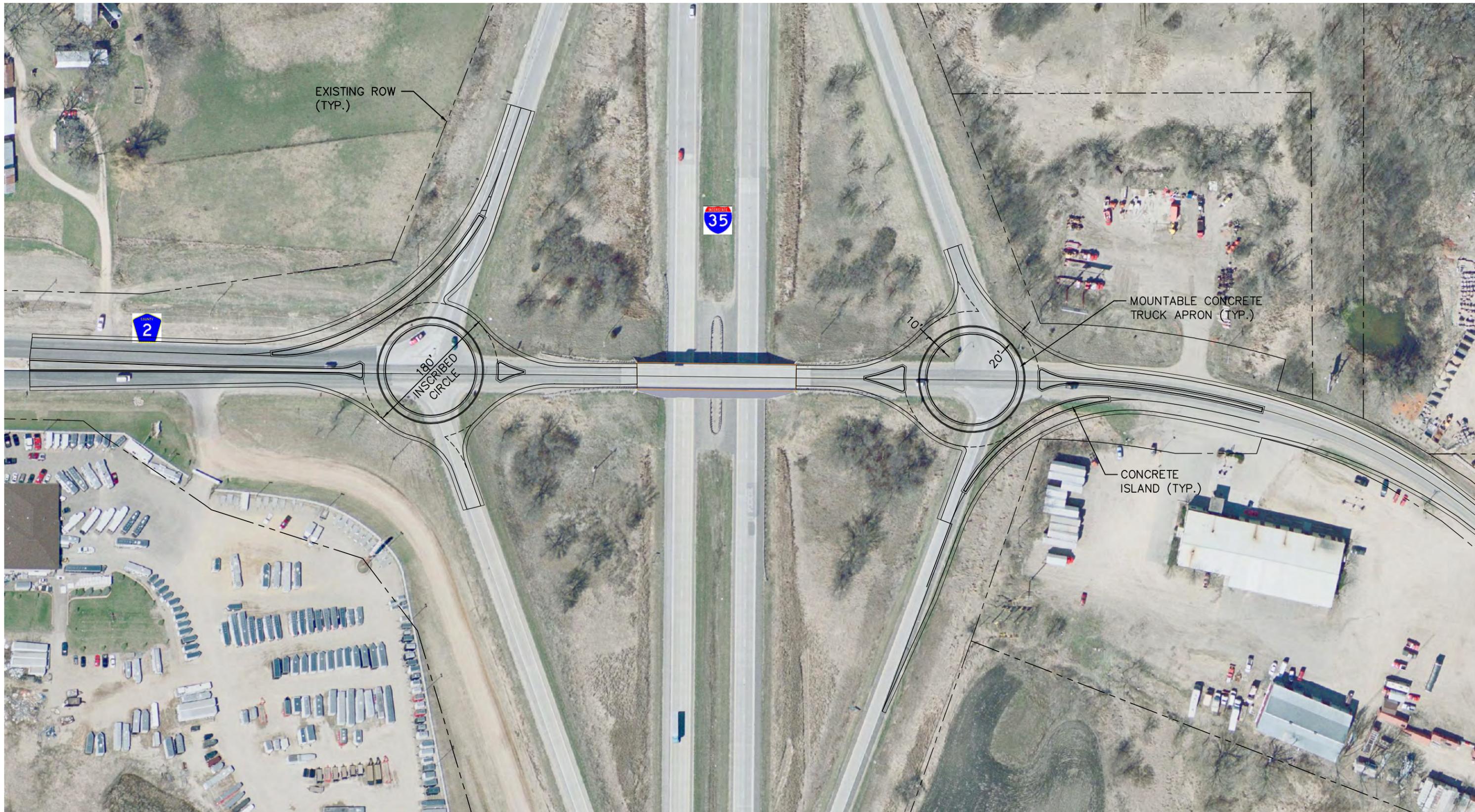
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- LEGEND**
- ⇒ TRAFFIC LANES/DIRECTION
 - 🚦 SIGNALIZED INTERSECTION

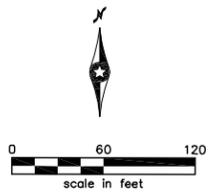
CH 2/I-35
Interchange Area Management Plan
Figure 13. Interim Improvement Concept - Traffic Signals with Turn Lanes

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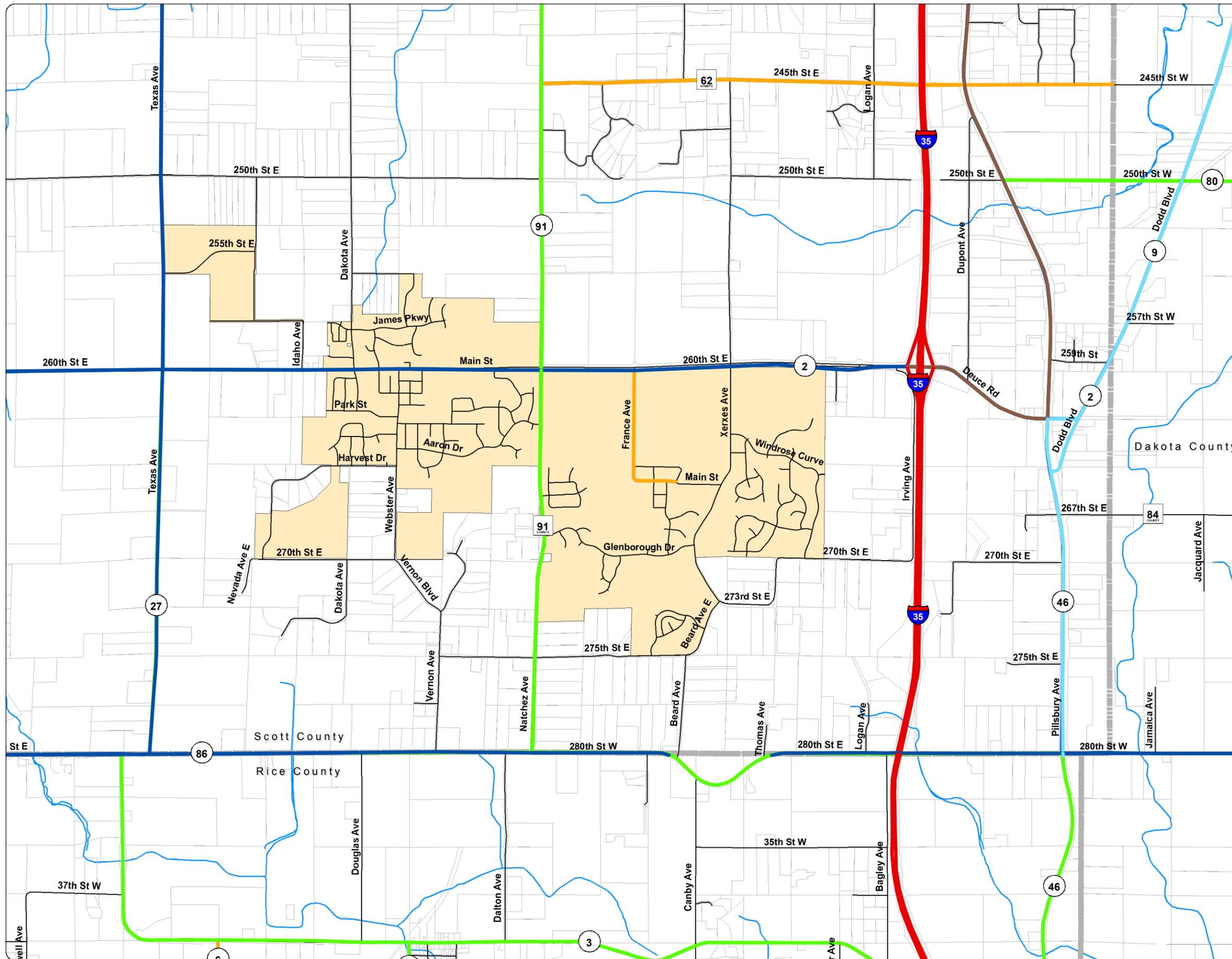


**Kimley-Horn
and Associates, Inc.**

Appendix A – Reference Exhibits

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

FIGURE 2.1
2008

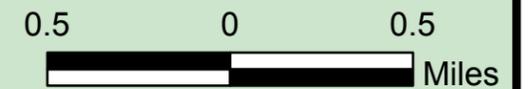


Legend

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

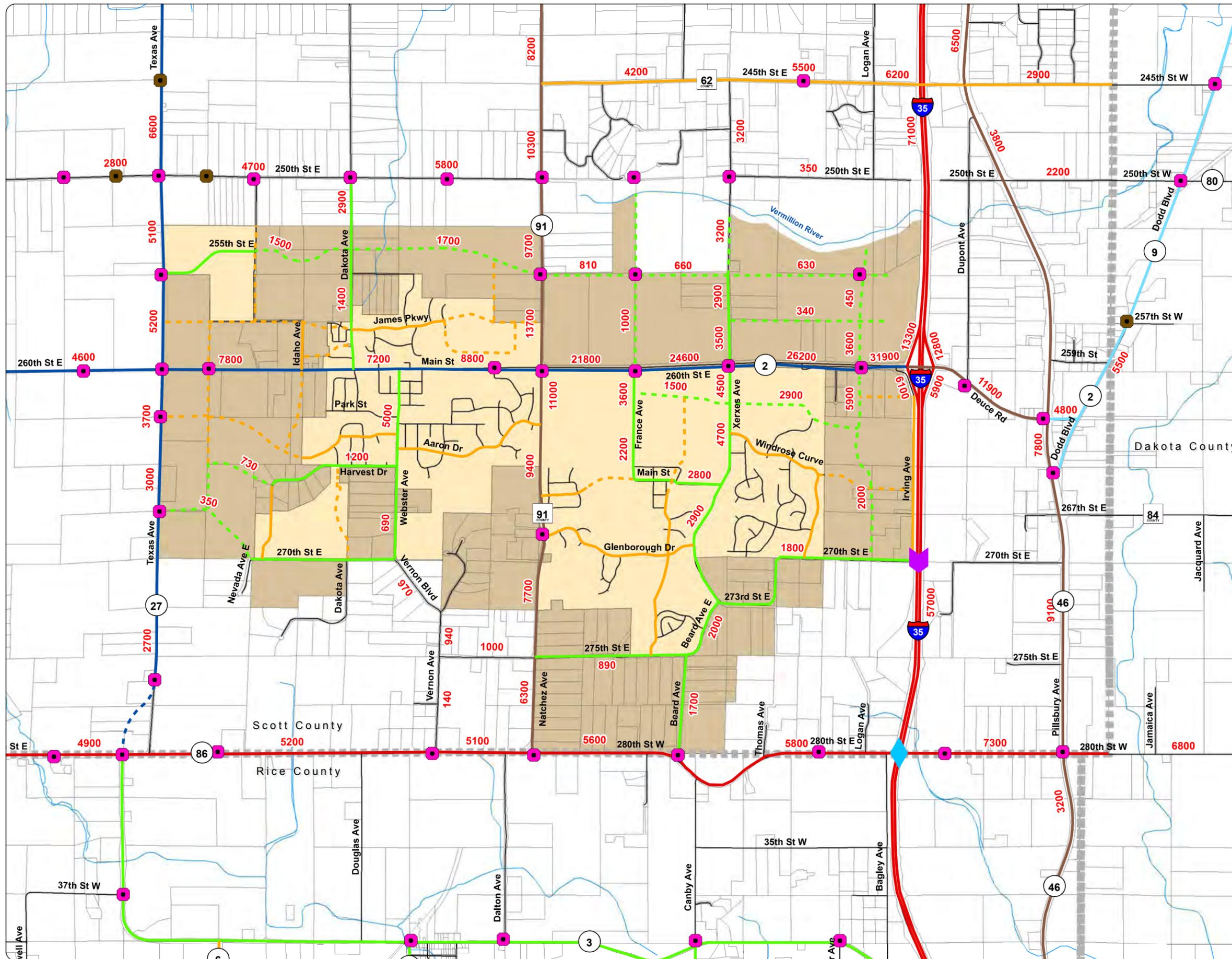
Source:
Functional Classification - Metropolitan Council and The Lawrence Group (TLG) Date: 10-5-2007



BOLTON & MENK, INC.
Consulting Engineers & Surveyors
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**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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Scott County 2030 Comprehensive Plan Update



Scott County Regional and County Trail System

Legend

- Regional Trail Corridor Search Area*
- Proposed Trail Corridor Search Area (will seek regional status)
- County Trail Corridor** (unincorporated area)
- State Trail Corridor
- State Grant-In-Aid Snowmobile Trails (2007 route)
- Snowmobile Park and Rides
- Regional Park
- Regional Park Search Area
- U.S. & State Highway
- County Highway (paved)
- County Highway (gravel)
- Railroad
- Trail River Crossing

*As identified in the Metropolitan Council 2030 Regional Parks Policy Plan. A master plan has been approved for the Scott County West Regional Trail.
 **All County roadways within urban areas are designated as County Trail Corridors.

