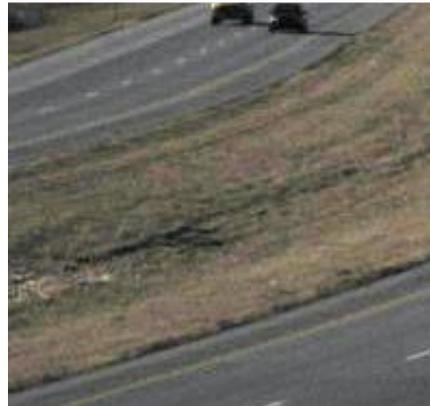


SW Connector

- Veterans Parkway

Southwest Connector Interchange and Corridor
Location Study

Warren County
July 2014



Tallgrass Historians L.C.



SW Connector

- *Veterans Parkway*

Southwest Connector Interchange and Corridor Location Study

Warren County, Polk County, Madison County,
Cities of Cumming, Norwalk, and West Des Moines,
Des Moines Area Metropolitan Planning Organization,
Iowa Department of Transportation, Federal Highway Administration

Prepared Under the Direction of



As of December 2013 the City of West Des Moines officially renamed the Southwest Connector. The name adopted by the City of West Des Moines City Council is Veterans Parkway. The City of Des Moines, Dallas County, Madison County, Polk County, and Warren County all recognize the name Veterans Parkway.

This document recognizes the roadway name change to Veterans Parkway, the name Southwest Connector is used for consistency with previous planning documents and technical memoranda.

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Contents

Executive Summary

Background.....	1
Alternative Development.....	1
<i>Interchange Alternatives</i>	2
Public Involvement.....	2
Recommendations, Implementation, and Cost.....	2
<i>Implementation</i>	6
<i>Planning Level Cost Estimate</i>	7

Introduction

Background.....	9
Project Development Process.....	10
Study Area.....	10

Guiding Principles

Purpose.....	13
Project Needs and Goals.....	13
<i>Enhance Regional Mobility and Connectivity</i>	13
<i>Improve Local Access and Provide Economic Development Opportunities</i>	14
<i>Community and Regulatory Considerations</i>	15
<i>Cost Effectiveness</i>	16

Multimodal Analysis

Existing and Future Roadway Network.....	19
Land Uses.....	19
Complete Streets.....	22
<i>Pedestrian Facilities</i>	22
<i>Bicycle Facilities</i>	23
<i>Transit Facilities</i>	23
<i>Safe Crossing Locations</i>	24

Travel Demand & Capacity Needs Analysis

Travel Demand Model Development.....	27
Model Alternative Scenarios.....	27
<i>Scenario 1</i>	28
<i>Scenario 2</i>	28
<i>Scenario 3</i>	28
Model Results.....	33
Capacity Analysis.....	33
<i>Design Level of Service</i>	33

Environmental Screening

Hazardous Material.....	37
National Wetland Inventory Review.....	37
Threatened and Endangered Species.....	37
Geology.....	37
Cultural Resources.....	39
Drainage Basins.....	39
<i>Drainage Areas West of I-35.....</i>	<i>39</i>
<i>Drainage Areas East of I-35.....</i>	<i>39</i>
Soils.....	39

Development of Build Alternatives

Project Termini.....	41
Alignment Alternatives Development.....	41
Facility Type.....	42
Alternatives Being Considered.....	43
<i>No Build Alternative.....</i>	<i>43</i>
<i>Build Alternative 1.....</i>	<i>43</i>
<i>Build Alternative 2.....</i>	<i>44</i>
Alternative Analysis.....	47
<i>Alternatives Being Eliminated.....</i>	<i>47</i>
<i>Most Feasible Alignment Alternative.....</i>	<i>47</i>
I-35 Interchange Alternatives.....	49
<i>SW Connector Crossing/Interchange Location.....</i>	<i>49</i>
<i>Interchange Alternative 1 – Diamond Interchange.....</i>	<i>49</i>
<i>Interchange Alternative 2 – Cloverleaf Interchange.....</i>	<i>51</i>
<i>Interchange Alternative 3 – Semi-Directional Interchange.....</i>	<i>53</i>

Public Involvement

Technical Advisory Committee.....	56
Project Advisory Committee.....	56
Public Meeting.....	57
Study Website.....	57

Recommendations & Implementation

Recommended Alternative.....	59
<i>Right-of-Way Needs</i>	<i>60</i>
Implementation	62
<i>Construction Phasing.....</i>	<i>62</i>
<i>Stormwater Management</i>	<i>64</i>
<i>Additional Environmental Analysis.....</i>	<i>64</i>
<i>Applicable Regulatory Permitting Considerations.....</i>	<i>64</i>
Planning Level Cost Estimation.....	65
<i>Interchange Planning Level Cost Estimate.....</i>	<i>65</i>

List of Appendices

Appendix A	66
Guiding Principles Technical Memorandum	
Appendix B	67
Multimodal Analysis Technical Memorandum	
Appendix C	68
Travel Demand & Capacity Needs Analysis Technical Memorandum	
Appendix D	69
Environmental Screening Overview Technical Memorandum	
Water Resource Technical Memorandum	
Appendix E	70
Build Alternative Analysis Technical Memorandum	
Future SW Connector/I-35 Interchange and Interstate Crossing Continuity Technical Memorandum	
Appendix F	71
Public Involvement	
Appendix G	72
Cost Estimations	

List of Figures

Figure 1 - Conceptual Design of Ultimate Vision for SW Connector East of I-35.....	3
Figure 2 - Conceptual Design of Ultimate Vision for SW Connector West of I-35.....	3
Figure 3 - SW Connector Recommended Alignment.....	4
Figure 4 - Semi-Directional Interchange Alternative.....	5
Figure 5 - General Schedule for SW Connector Interchange and Corridor Location Study.....	10
Figure 6 - Study Location.....	11
Figure 7 - Preliminary Corridor and Existing Roadway Network.....	20
Figure 8 - TDM Focused Model Area.....	28
Figure 9 - Travel Demand Model: Scenario 1 (Forecast Year 2035).....	30
Figure 10 - Travel Demand Model: Scenario 2 (Forecast Year 2035).....	31
Figure 11 - Travel Demand Model: Full Build-out Scenario (Forecast Year Post-2035).....	32
Figure 12 - Estimate LOS based on Lane Configuration and ADT of Freeway-type Facilities	34
Figure 13 - Estimated LOS based on Lane Configuration and ADT of Arterial-type Facilities.....	35
Figure 14 - Natural Resources Near Preliminary Corridor.....	38

Figure 15 - Feasibility Study Alignment Alternatives.....	42
Figure 16 - Build Alternative 1.....	45
Figure 17 - Build Alternative 2.....	46
Figure 18 - Diverging Diamond Interchange Alternative.....	50
Figure 19 - Cloverleaf Interchange Alternative.....	52
Figure 20 - Semi-Directional Interchange Alternative.....	54
Figure 21 - Conceptual Design of Ultimate Vision for SW Connector East of I-35.....	59
Figure 22 - Conceptual Design of Ultimate Vision for SW Connector West of I-35.....	60
Figure 23 - SW Connector Recommended Alignment.....	61
Figure 24 - Typical Section of SW Connector Concept Design.....	63

List of Tables

Table 1 - Planning Level Cost Estimation for SW Connector Segments.....	7
Table 2 - Planning Level Cost Estimate for Recommended Interchange Alternative.....	7
Table 3 - Forecasted ADT Results from TDM.....	33
Table 4 - Lane Configuration to Achieve LOS D.....	34
Table 5 - Alternative Analysis.....	48
Table 6 - Lane Configuration to Achieve LOS D.....	60
Table 7 - Planning Level Cost Estimation for SW Connector Segments.....	65
Table 8 - Planning Level Cost Estimate for Recommended Interchange Alternative.....	65

Executive Summary

Background

Alternatives Development

Interchange Alternatives

Public Involvement

Recommendations, Implementation, and Cost

Implementation

Planning Level Cost Estimates

Background

In 2012, Warren County began work on the Southwest Connector Interchange and Corridor Location Study (Study) to identify a transportation alignment to serve the southwestern Des Moines Metropolitan Area. Working in collaboration with the Federal Highway Administration (FHWA), the Iowa Department of Transportation (Iowa DOT), the Des Moines Area Metropolitan Planning Organization (DMAMPO), the City of West Des Moines, and other Cities and Counties located in the anticipated project area, the Study determined an alignment that is technically preferred, environmentally permissible, and publicly acceptable in order to safely and efficiently accommodate existing and future transportation growth within the southwestern Des Moines Metropolitan Area while providing enhanced access to planned growth areas.

Alternatives Development

The location study process evaluated multimodal and environmental needs and concerns to provide guidance as the development of the corridor moves forward. Additionally, a travel demand model (TDM) was utilized to forecast the traffic capacity needs for the future roadway network. Through the Technical Committee of the DMAMPO, a vision for the Southwest Connector (Veterans Parkway) was approved to guide the development and analysis of build alternatives. The DMAMPO Technical Committee vision for the SW Connector (Veterans Parkway) is as follows:

- East of I-35, the SW Connector (Veterans Parkway) will be an expressway-type facility with at-grade intersections. The facility will ultimately become a 6-lane facility with landscaped boulevards, from the current IA 5/Veterans Parkway Interchange to I-35. This section would be consistent with the long-range planning and design for the existing Veterans Parkway facility between IA 5 and IA 28 in West Des Moines, and the proposed SW Diagonal, which is planned to extend from IA 28 to Downtown Des Moines. Intersection traffic control methods would be upgraded as traffic volumes dictate. In the DMAMPO's Horizon Year (HY) 2035 Metropolitan Transportation Plan (MTP), this facility is identified as a collector roadway.
- West of I-35, the SW Connector (Veterans Parkway) will be designed to accommodate higher travel speeds with limited local property access and has been referred to as "the SW Bypass" due to the higher speed design of the proposed facility. The combined SW Connector/SW Bypass (Veterans Parkway) is anticipated to ultimately become a freeway-type facility with grade-separated intersections spaced at intervals typically seen on urban freeways. This facility could possibly be constructed in stages and would likely begin as a two-lane rural section roadway expandable to 4 lanes, beginning with a future I-35 interchange and ending at a temporary terminus with the future Grand Prairie Parkway. It is anticipated this facility will extend west and northward to connect with I-80. The DMAMPO's HY 2035 MTP identifies this facility as an unclassified roadway.

Based on the vision outlined by the DMAMPO Technical Committee, the results of the TDM, and public involvement a recommended alternative for the SW Connector (Veterans Parkway) was determined. The alternative meets the needs of the southwestern Des Moines Metropolitan Area as planned development becomes a reality. While the vision states the SW Connector (Veterans Parkway) west of I-35 will begin at a future interchange, initially a bridge crossing at I-35 will be constructed.

Interchange Alternatives

In addition to roadway alternatives, alternatives for a future interchange on I-35 were analyzed to determine adequate spacing for the alignment alternative parallel to Adams Street. Three interchange alternatives were developed to access I-35 south of the Adams Street crossing. All three interchange alternatives will require additional roadway width on I-35 under the Adams Street crossing to accommodate merge and diverge lanes.

The three alternatives include a diverging diamond, a cloverleaf, and a semi-directional interchange. Both the cloverleaf and the semi-directional interchanges allow for phased construction of interchange components. An Interchange Justification Report (IJR) will require additional traffic operations analysis to demonstrate that adequate weaving distance exists prior to determining a preferred interchange alternative.

Public Involvement

Public involvement was completed throughout the Study to gather feedback from individuals interested in the SW Connector (Veterans Parkway). A Technical Advisory Committee (TAC) was established to review technical documents and provide guidance to the Study. The TAC included members of the collaborating agencies. A Project Advisory Committee (PAC) was also established for the Study through the Southwest Economic Development Cooperative.

On February 27, 2014, a public meeting was held at the Happy Apple Orchard in Norwalk. Approximately 100 persons, including members of the TAC, attended the public meeting with 65 persons signing the register upon entering the meeting. During the meeting attendees were able to view displays and discuss alternatives being considered with Warren County and their consultant staff, as well as members of the TAC. A presentation given by the consultant staff provided a summary of the work completed and the alternatives being considered.

Recommendations, Implementation, and Cost

The recommended facility design for the SW Connector (Veterans Parkway) is an arterial-type facility east of I-35 and a freeway-type facility west of I-35 with the ability to expand as land use intensifies along the corridor. The recommendation for the SW Connector (Veterans Parkway) east of I-35 includes at-grade intersections and will include multimodal facilities where appropriate. The portion of the SW Connector (Veterans Parkway) west of I-35 is recommended to feature either two-lanes or four-lanes depending on anticipated traffic volumes at the time of construction. The SW Connector (Veterans Parkway) west of I-35 will eventually transition to grade-separated interchanges as travel demand and development along the corridor warrant interchange access. In order to better visualize the recommendations for the SW Connector (Veterans Parkway), conceptual designs for the ultimate roadway construction are shown in Figures 1 and 2. Final right-of-way and roadway dimensions may vary.

The recommended alignment for the SW Connector (Veterans Parkway) follows the Great Western Trail south from the existing portion of Veterans Parkway, and then parallels Adams Street. West of I-35, the recommended alignment follows a ridgeline south of Adams Street to the planned extension of Grand Prairie Parkway into Madison County. Further evaluation will be completed during the design

phase to determine the alignment as the SW Connector (Veterans Parkway) nears Cherry Creek.

The recommended alignment for the SW Connector (Veterans Parkway) and conceptual street network are shown in Figure 3. The cross streets shown in Figure 3 are based on the Ultimate Streets Circulation Map for the City of West Des Moines and show potential future access points to the facility. Access to the SW Connector (Veterans Parkway) west of I-35 will follow appropriate spacing guidelines for urban interchanges.

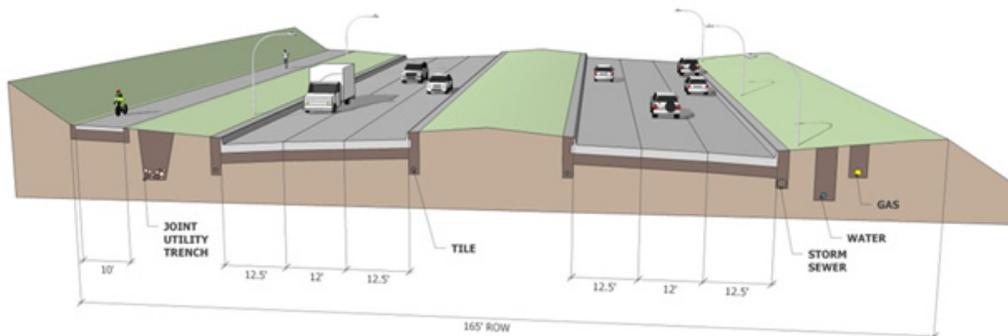


Figure 1 - Conceptual Design of Ultimate Vision for SW Connector East of I-35

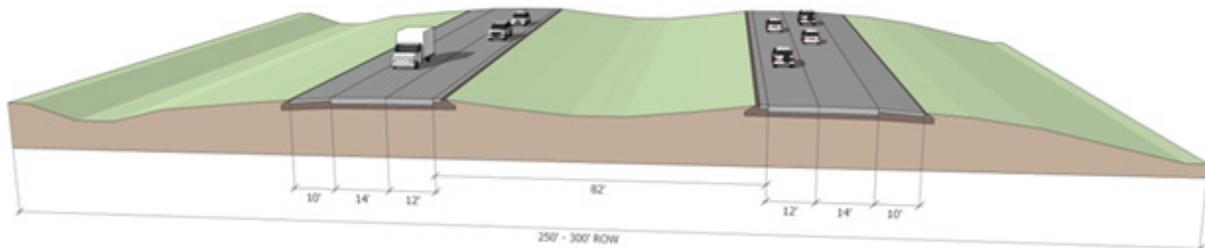


Figure 2 - Conceptual Design of Ultimate Vision for SW Connector West of I-35

Initially, the SW Connector (Veterans Parkway) will be constructed with a bridge crossing over I-35. When traffic volumes increase and interchange access is needed on I-35 additional analysis will be required. An Interchange Justification Report (IJR) approval process will be required to determine a preferred alternative. At this time, the recommended alternative for long-range planning purposes is a semi-directional interchange. This interchange alternative provides the most flexibility with its three-phased approach to construction as demand warrants and funding becomes available. This interchange alternative also takes into consideration the facility types envisioned for the SW Connector (Veterans Parkway) both east and west of I-35. The recommended interchange alternative is shown in Figure 4.

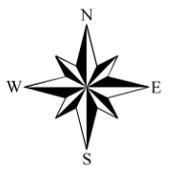
Figure 3

Recommended Alignment for SW Connector



Legend

- SW Connector Roadway Extent
- Proposed Right-of-Way
- Proposed Bridge Crossing
- Great Western Trail
- Grand Prairie Parkway (Planned)
- West Des Moines Ultimate Streets (Planned)
- Counties



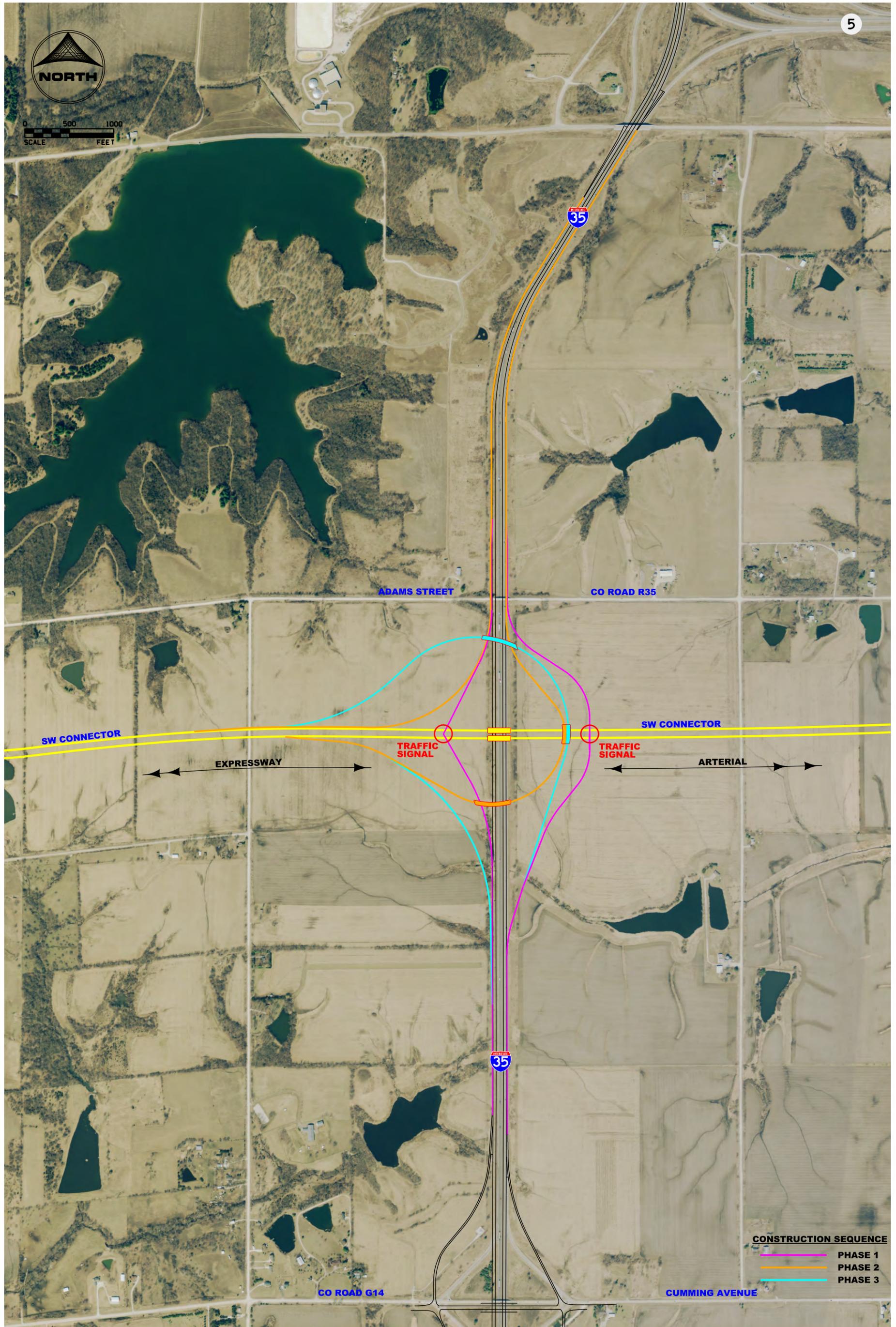
0 1,000 2,000 4,000 Feet

1 inch = 2,500 feet





0 500 1000
SCALE FEET



CONSTRUCTION SEQUENCE

- PHASE 1
- PHASE 2
- PHASE 3

Implementation

Construction of both the recommended facility alternative and the recommended interchange alternative can be phased to meet additional capacity and funding needs. The phased construction of the facility alternative is identified as initial and future construction. Construction phases are as follows:

Initial Construction

- East of I-35: A 37-foot wide (three lanes back-to-back) section consisting of one lane in each direction with left-turn lanes at intersections. Grading and utility construction may also be completed to facilitate future expansion.
- West of I-35: Either a two-lane road or a four-lane divided facility depending on traffic volumes at time of construction

Future Construction

- East of I-35: Add traffic signals at intersections as they become warranted. Build an additional three-lane section (eastbound) parallel to the initial construction. Re-stripe initial construction for westbound usage.
- West of I-35: Convert the four-lane facility to six-lanes by paving the median and installing concrete barriers.

While the SW Connector (Veterans Parkway) will initially be constructed with a bridge crossing over I-35, it is likely that Interstate System access will be requested as traffic volumes increase on the SW Connector (Veterans Parkway). Construction of an interchange will be fully evaluated during a future IJR process utilizing the updated DMAMPO travel demand model. At this time, the phasing of construction for the recommended interchange alternative is as follows:

Interchange Construction

- Phase 1: Construct a basic diamond interchange while the SW Connector (Veterans Parkway) functions as a local arterial street, with stop sign or traffic signal control at the ramp intersections with the SW Connector (Veterans Parkway).
- Phase 2: Construct a free-flow diagonal ramp from southbound I-35 to westbound SW Connector (Veterans Parkway) and a flyover structure from eastbound SW Connector (Veterans Parkway) to northbound I-35. The diamond interchange ramps from Phase 1 would remain in place.
- Phase 3: As the SW Connector (Veterans Parkway) is extended west and north to connect with I-80, and travel demand increases to the point where free-flow travel to/from the south and west is needed, an additional flyover ramp for northbound I-35 to westbound SW Connector (Veterans Parkway) will be constructed. The complimentary free-flow diagonal ramp for eastbound SW Connector (Veterans Parkway) to southbound I-35 could be constructed.

Planning Level Cost Estimate

As part of the Location Study process, an engineer’s opinion of probable construction cost estimate was completed for the SW Connector (Veterans Parkway) recommended facility alternative following the recommended alignment between IA 5 in Polk County and a future extension of Grand Prairie Parkway in Madison County. For the purpose of the cost estimating, the SW Connector (Veterans Parkway) alignment was divided into four potential construction segments and the existing section of Veterans Parkway provided guidance to develop a more accurate estimation of probable cost. In addition to the division of the alignment, estimations are presented as initial construction and future construction. The estimated cost for each section is provided in Table 1.

Table 1 - Planning Level Cost Estimation for SW Connector Segments

Segment	Length (Miles)	Initial Construction Estimate* (millions \$)	Future Construction Estimate* (millions \$)
IA 5 to S. 35th St.	1.7	9.9	3.4
S. 35th St. to S. 50th St.	1.0	6.7	2.5
S. 50th St. to S. 60th St.	1.0	7.9	5.4
S. 60th St. to Grand Prairie Parkway	3.0	20.3	5.7
Total	6.7	43.8	17.0

* Estimates in 2014 Dollars

The initial construction cost estimate for the South 50th Street to South 60th Street segment includes the construction of a bridge crossing I-35 without Interstate System access. A summary of an engineer’s opinion of probable construction cost for the recommended interchange alternative is presented in Table 2. Additional analysis will be required during the IJR process to determine a preferred alternative and the associated cost of the interchange.

Table 2 - Planning Level Cost Estimate for Recommended Interchange Alternative

	Construction Estimate* (millions \$)
Phase 1	13.1
Phase 2	17.9
Phase 3	15.3
Total	46.3

*Estimates in 2014 Dollars

Introduction

Background

Project Development

Study Area

As of December 2013 the City of West Des Moines officially renamed the Southwest Connector. The name adopted by the City of West Des Moines City Council is Veterans Parkway. The City of Des Moines, Madison, Polk, and Warren Counties all recognize the name Veterans Parkway.

In 2012, Warren County began work on the Southwest Connector Interchange and Corridor Location Study (Study) to identify a transportation alignment to serve the southwestern Des Moines Metropolitan Area. Working in collaboration with the Federal Highway Administration (FHWA), the Iowa Department of Transportation (Iowa DOT), the Des Moines Area Metropolitan Planning Organization (DMAMPO), the City of West Des Moines, and other Cities and Counties located in the anticipated project area, the Study will determine an alignment that is technically preferred, environmentally permissible, and publicly acceptable in order to safely and efficiently accommodate existing and future transportation growth within the southwestern Des Moines Metropolitan Area while providing enhanced access to planned growth areas.

Background

The City of West Des Moines and the DMAMPO recognized the need for a transportation alignment serving the southwestern Des Moines Metropolitan Area for more than two decades. Since 1990, the DMAMPO has documented the Southwest Connector (SW Connector) during long-range transportation planning. Planning studies conducted prior to the current effort to locate suitable corridor alignments and determine environmental impacts include:

- 1990 West Des Moines Comprehensive Plan – Southwest Bypass Future Alignment
- 1997 Southwest Connector Corridor Study (I-35 to Park Avenue)
- 1998 SW Diagonal Corridor Study (IA 28 to SW 9th St.)
- 2005-2009 Southwest Connector EA and Design (IA 5 to IA 28)
- 2007-2012 Southwest Connector-Warren County EIS/Feasibility Study (I-35 to IA 5)
- 2010 West Des Moines Comprehensive Plan Update – Ultimate Street Circulation

The City of West Des Moines Comprehensive Plan (2010) includes an approximate alignment with possible access locations for the future roadway through Warren and Madison Counties. The DMAMPO Year 2030 Long Range Transportation Plan recognizes the SW Connector as a component of the future federal functional classification system and included the proposed project in its travel demand model development. The most recent long range planning update, the Horizon Year 2035 Metropolitan Transportation Plan (HY 2035 MTP), identifies the proposed SW Connector for construction (2016-2025) from 10th Avenue to 40th Avenue. The “Southwest Bypass” from Interstate 35 (I-35) to Interstate 80 (I-80) is identified for corridor preservation (2016-2025) and construction (2025-2035).

With a previously completed location study, a congressional earmark enabled a preliminary design process and Environmental Impact Statement (EIS) to proceed for the SW Connector from IA 5 to I-35. In fall 2008, the EIS was proceeding through a federal review process, the FHWA determined the proposed project did not meet National Environmental Policy Act (NEPA) requirements for connecting logical termini, offering independent utility, or providing alternatives consideration that would not preclude other reasonable transportation improvements. The project did not receive approval to proceed after determining the purpose and need statement was not supported. In mid-2009, Warren

The National Environmental Policy Act (NEPA) of 1969 is a national policy to “encourage productive and enjoyable harmony between man and his environment” NEPA provides procedural guidance to federal agencies and/or projects utilizing federal funding. The NEPA process evaluates impacts of alternatives to determine potential mitigation and provides documentation of decisions made with public and interagency involvement.

County and the Iowa DOT suspended the EIS process and documented the efforts completed to date in the Southwest Connector Feasibility Study (2012).

In order to achieve the FHWA’s logical termini, independent utility, and alternatives consideration, the FHWA authorized Warren County to use a congressional earmark to complete the current Southwest Connector Interchange and Corridor Location Study. The outcome of the Study is to locate a reasonable alternative or alternatives for the corridor alignment and I-35 Interchange location and enable right-of-way preservation, preliminary and final design, and construction to proceed should parts of the project be privately funded, or to proceed toward further documentation (i.e. NEPA, IJR) should parts of the project be funded with federal dollars.

Project Development Process

The Study followed the process for location studies outlined in the Iowa DOT Office of Location and Environment (OLE) Manual (2009). The elements of the Study and the general time frame for completion are shown in Figure 5. Technical memorandums completed during the OLE location study process are attached as appendices and are meant to provide reference and addition detail to the Study.

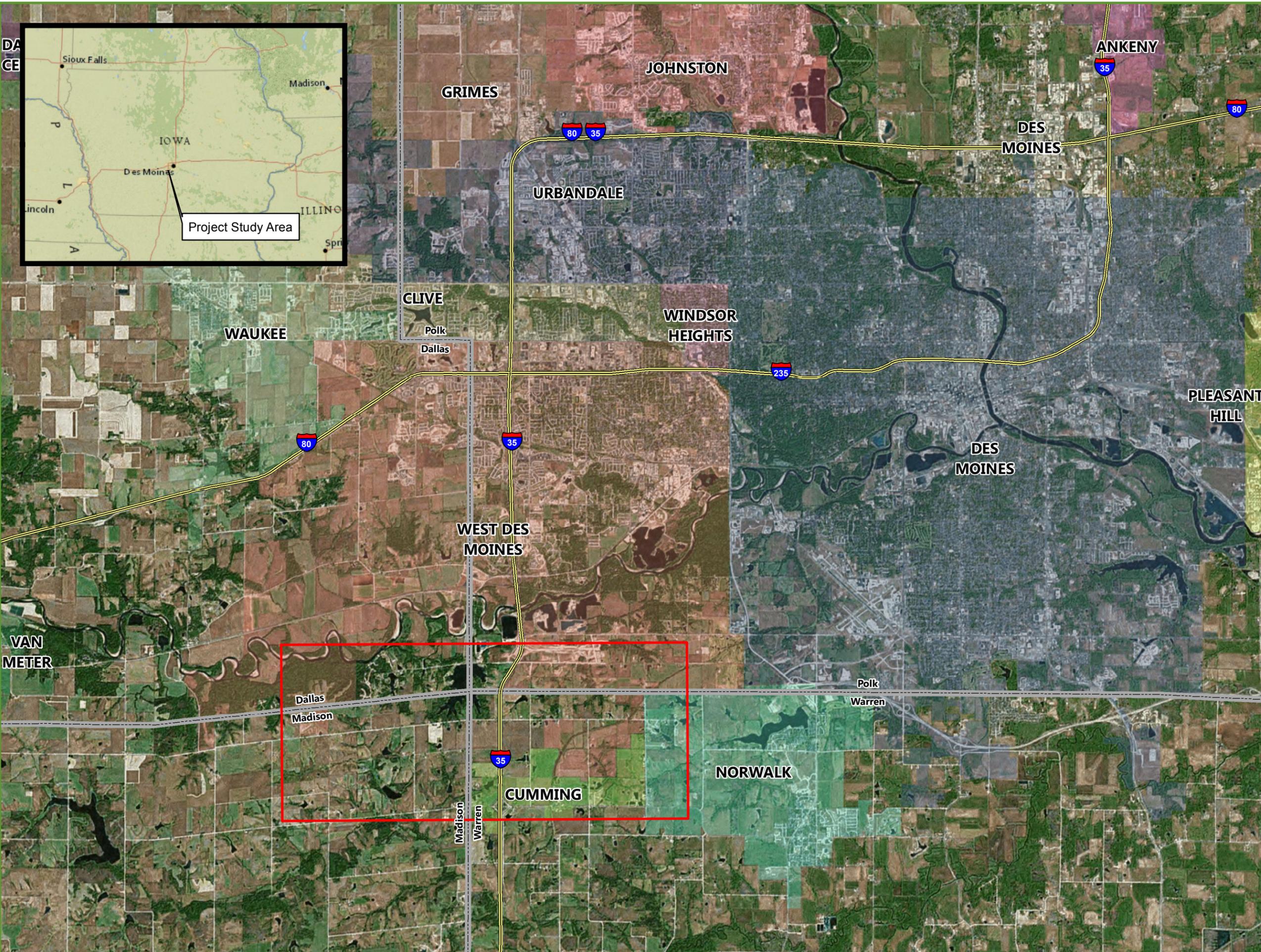


Figure 5 - General Schedule for SW Connector Interchange and Corridor Location Study

Study Area

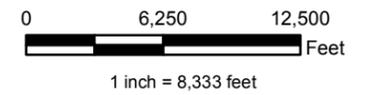
The study area for the SW Connector corridor spans four counties (Polk, Warren, Madison, and Dallas) providing enhanced regional connectivity and access to the south and west of the Des Moines Metropolitan Area. Figure 6 shows the study area for the SW Connector. The Study will evaluate alternatives for an interim segment of the overall SW Connector with independent utility and logical termini, located in the City of West Des Moines, Warren County, and Madison County. The study area extends from IA 5 in West Des Moines on the east to a future extension of Grand Prairie Parkway in West Des Moines (Madison County) on the west.

Figure 6
Study Location



Legend

- Project Study Area
- Interstate
- Counties



Guiding Principles

Purpose

Project Needs and Goals

Enhance Regional Mobility and Connectivity

Improve Local Access and Provide Economic Development Opportunities

Community and Regulatory Considerations

Cost Effectiveness

The Study is guided by the project purpose and need framework. The purpose and need framework entails a purpose statement, followed by several needs statements which are intended to clearly define the issues and opportunities the project seeks to address. Additional information on the Guiding Principles of the Study can be found in Appendix A.

Purpose

The purpose of the Study is to identify a transportation alignment serving the southwestern Des Moines Metropolitan Area, connecting IA 5 in West Des Moines with the planned extension of the City's Grand Prairie Parkway into Madison County, in order to safely and efficiently accommodate existing and future traffic growth within the area while providing enhanced access to planned growth areas.

Project Needs and Goals

Enhance Regional Mobility and Connectivity

There is a need for a continuous and cohesive arterial corridor through the southwestern Des Moines Metropolitan Area in order to increase east-west traffic capacity and improve connectivity between regional routes and destinations such as I-35, IA 5, high employment areas, large commercial areas, and the Des Moines International Airport. This additional regional capacity is needed in order to sustain the growth and productivity that the area is expecting and to relieve congestion on the existing regional roadway network.

The regional roadway network within the Des Moines Metropolitan area comprises a network of Interstate, state, and U.S. highways. The primary regional roadways within the study area are I-35 and IA 5. These roadways serve the regional mobility needs of the area; however, there are no continuous east-west arterial roadways within the southwestern Des Moines Metropolitan Area linking I-35 and IA 5 with the adjacent local and regional roadway network, creating a gap in the regional system.



Existing Veterans Parkway Interchange on IA 5

Existing access to the regional system within the study area is limited to an interchange on IA 5 where the existing segment of Veterans Parkway terminates. This access point is intended as a regional systems interchange and does not adequately serve local access needs. Access to I-35 within the study area is limited and inconvenient, with the nearest interchange located approximately 2.5 miles south of IA 5, at County Road G14.

Where the existing segment of Veterans Parkway currently terminates at IA 5, the east-west travel demands in the area are carried by County Line Road, 40th Avenue, and Adams Street; however, these roadways are not designed to accommodate regional and Interstate System traffic. Moreover, the previous Adams Street overpass at I-35 did not meet Iowa DOT standards for bridge width or vertical clearance, making the structure functionally obsolete and was removed in 2013. A new Adams Street overpass at I-35 is planned for construction in 2015 and will meet Iowa DOT standards for bridge width and vertical clearance.



Current terminus of the Veterans Parkway segment at IA 5

As population and employment within the Des Moines Metropolitan Area continue to grow, operations on the regional system are expected to further deteriorate in areas currently experiencing operational deficiencies; including, the I-35/IA 5 Interchange, the shared segment of I-35 and I-80, and the interchanges at either side of the I-35/I-80 shared segment. Potential increases in congestion may also lead to safety problems.

Goal: Improve regional roadway system linkages to enhance local and regional mobility.

Objectives:

- Connect IA 5, I-35, and I-80 (via West Des Moines planned Grand Prairie Parkway extension) with a new roadway designed to serve regional traffic.
- Enhance mobility on the regional roadway network, including I-35, IA 5, and I-80.
- Provide adequate traffic capacity to serve projected growth in regional travel demand.
- Improve safety and operations at other interchanges by relieving traffic congestion.
- Provide direct destination routes to keep destination traffic off local roadways.

Improve Local Access and Provide Economic Development Opportunities

There is a need to develop a well-connected transportation system within the study area, including a new high-volume/high-functioning roadway to provide local access to the regional system. The additional access is needed to sustain connectivity in an area experiencing rapid growth in population and employment. The City of West Des Moines Comprehensive Plan (2010) calls for intensification of land uses within the study area leading to increased demand for east-west roadway capacity serving the developing land uses.

In addition to serving access and mobility needs, any new roadways within the area should serve as a catalyst for economic development providing new local access, improved visibility, and the opportunity to create large, congruent, developable parcels.

Goal: Create new property access in conformance with future land use plans of the City of West Des Moines, Warren County, and Madison County.

Objectives:

- Provide adequate traffic capacity to serve projected growth within the study area.
- Provide adequate local roadway access connections.
- Create access to accommodate planned future land uses.
- Provide adequate access to existing land uses in the interim.
- Improve local access to regional systems.
- Improve operations on surrounding local roadways.

Community and Regulatory Considerations

There is a need to recognize physical and regulatory constraints as roadway improvements are implemented. Potential constraints within the study area include impacts to social, economic, and environmental resources. Additionally, opportunities for multimodal transportation should be evaluated as a feature of roadway improvements.

Goal: Minimize social and natural environmental impacts.

Objectives:

- Minimize impacts to the social and natural environments.
- Include natural feature enhancements in the design of the new corridor.
- Improve multimodal transportation options within the study area.



Farm operations and natural features currently dominate the landscape

Cost Effectiveness

There is a need to propose improvement alternatives that are cost effective and flexible in order to ensure a maximum return on investment for both the roadway and future redevelopment opportunities.

Goal: Maximize cost effectiveness of improvements to be implemented over time.

Objectives:

- Implement cost effective solutions in terms of capital and maintenance costs.
- Provide beneficial returns on investments by leveraging economic development.
- Develop a plan for staging the proposed improvements over time.



The Great Western Trail is a regional multimodal resource that must be preserved or integrated into the SW Connector's planned design



Multimodal Analysis

Existing and Future Roadway Network

Land Uses

Complete Streets

Pedestrian Facilities

Bicycle Facilities

Transit Facilities

Safe Crossing Locations

This chapter analyzes the current multimodal issues within the study area to address identified needs and opportunities as planning for the Southwest Connector (Veterans Parkway) moves forward.

In order to develop meaningful transportation solutions it is important to understand the existing characteristics of the study area. A range of issues and needs within the study area for the SW Connector were identified and mapped using data provided by the Cities of West Des Moines, Norwalk, and Cumming, the DMAMPO, the Iowa DOT, and other pertinent plans and studies. The data was used to develop an understanding of opportunities for future roadway, sidewalk, bicycle, and transit elements that will support planned land use changes and integrate with the proposed SW Connector Corridor project.

Existing and Future Roadway Network

The existing roadway network includes a system of regional highways and rural arterial roadways. The network lacks a fully developed local roadway network to support planned future land uses. Currently, the primary east-west routes serving local traffic are County Line Road, 40th Avenue, and Adams Street. North-south routes within the study area include South 20th Street, 30th Avenue, Woodland Avenue, and Vintage Avenue.

Existing access to the regional system is limited to an interchange on IA 5 where the existing segment of Veterans Parkway to the northeast ends. There is no convenient access to I-35 within the study area. The nearest interchange is located approximately 2.5 miles south of IA 5 at County Road G14.

The City of West Des Moines Comprehensive Plan acknowledges the need to develop a well-connected transportation system within the area to support future development. The West Des Moines Ultimate Street Circulation Map (2010) proposes major roadway improvements including the SW Connector, the extension of Grand Prairie Parkway into Madison County, and future extensions of the Veterans Parkway north to I-80. The West Des Moines Ultimate Street Circulation Map also presents a supporting local roadway network within the study area.

According to local planning documents, the proposed SW Connector is planned to be a high-volume/high-functioning regional route. While the final configuration of the SW Connector corridor has not been determined, it is envisioned to be an access-controlled expressway to the west of I-35 and a minor arterial east of I-35. The visions of the local agencies for the SW Connector guided the development of alternatives.

The location of the preliminary SW Connector Corridor is shown in Figure 7. The preliminary corridor map shows the potential location of the SW Connector in relation to the existing roadway network.

Land Uses

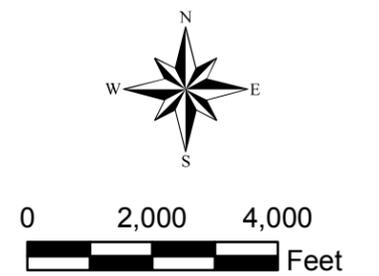
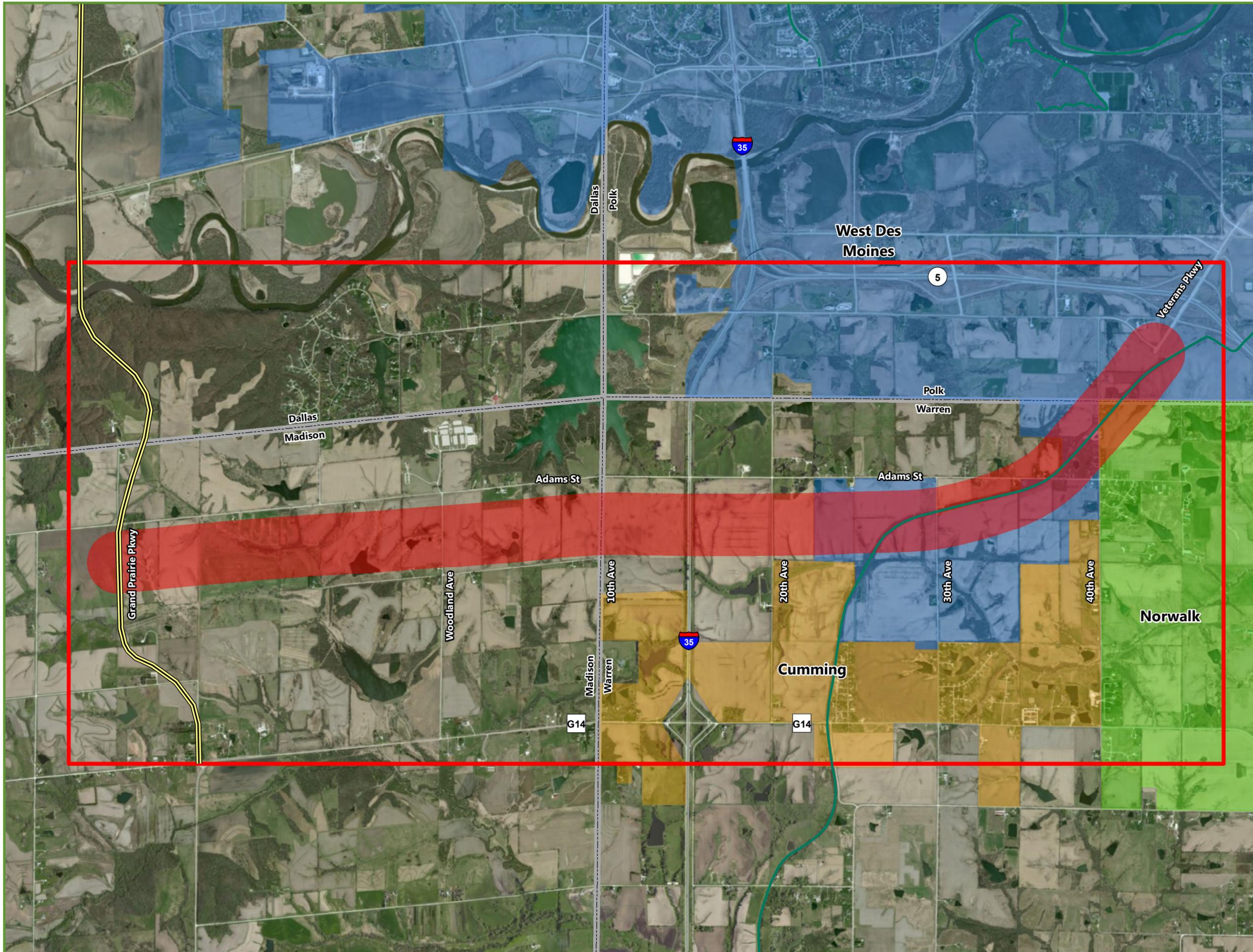
The entire study area is currently within the City of West Des Moines or Norwalk, or the long-range planning areas of West Des Moines, Norwalk, and Cumming in Warren and Madison Counties. Currently, the primary land uses within the study area are undeveloped rural or agricultural. Although the study area is primarily rural, there are points of interest and multimodal transportation facilities that are important to the alternative development process. The existing features include:

Figure 7

Preliminary Corridor and Existing Roadway Network

Legend

- Grand Prairie Parkway (Planned)
- Great Western Trail
- Preliminary Concept Alignment (2,000 ft)
- Project Study Area
- Counties



Maffitt Reservoir:

The reservoir is located west of I-35 in the northern portion of the study area. The reservoir is a major source of drinking water as part of the Des Moines area water system and a well-used recreational amenity, featuring popular trails and open spaces. The area surrounding the reservoir has also attracted residential development.

Parks:

There are several existing and planned parks and environmentally sensitive areas within the study area, including DNR lands, conservation areas, and regionally identified environmental protection corridors. Major parks within or adjacent to the study area include the Raccoon River Park, Walnut Woods State Park, and Brown's Woods Forest Preserve.

Schools:

There are two schools located in the study area. Both schools are located in the City of Cumming in the southern portion of the study area. Connections to these schools will be important in the future as planned development occurs within the study area.

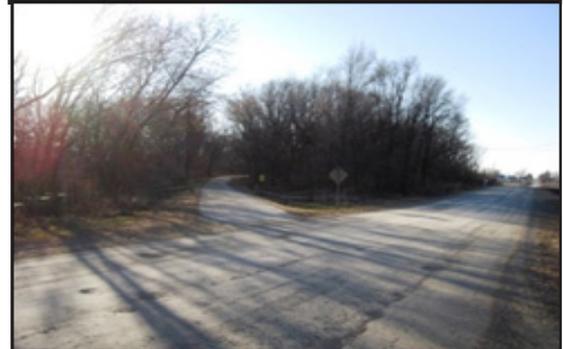
Great Western Trail:

The non-motorized trail connects the City of Des Moines to the City of Cumming and continues south to the City of Martensdale. The facility is part of the regional trail system and is widely used and supported.

Trails and Bike Lanes:

A system of off-street trails and on-street bike lanes are located within the study area. The Cities of West Des Moines, Des Moines, Cumming, and Norwalk all have existing or planned bicycle facilities that would connect to both the local and potential regional facilities; however, there is currently no cohesive regional trail system within the study area.

Land use within the study area is planned to intensify according to the City of West Des Moines Comprehensive Plan. Land within or adjacent to the study area will likely include retail, restaurants, services, office, institutional, public, and residential uses. Additionally, the April 2014 announcement of a new Microsoft data center located adjacent to the study area will potentially encourage development to occur in the study area at a more rapid rate. The future land uses described above are typical of developing urban areas.



(Top to Bottom) Maffitt Reservoir meets municipal water and recreational needs within the study area; A shelter house at Walnut Woods State Park located north of the study area; The Great Western Trail provides multimodal connections between the City of Des Moines and the City of Martensdale; Bicyclists currently use rural roadways due to gaps in the regional trail network.

Complete Streets

Non-motorized transportation facilities are an important component of the transportation system, providing a designated space for people to safely walk and bike. In accordance with the City of West Des Moines Comprehensive Plan – Policy 6.19 and the objectives established by the purpose and need of this Study, the SW Connector and the supporting local roadway network within the study area will be designed with components of complete streets. This includes provisions for efficient, comfortable, safe, and equitable movement and access along all public ways through a variety of modes of transportation including: automobiles, bicycles, pedestrians, and bus transit.

West Des Moines Comprehensive Plan (Policy 6.19)

Provide for an orderly and comprehensive sidewalk/multipurpose trail system in existing and new development that will safeguard the public health, safety, and general welfare.

These complete streets will be developed in a context-sensitive and affordable manner for all stakeholders to accommodate all potential users of the streets and rights-of-way such that the interests of a single mode of transportation do not unnecessarily compromise other modes of transportation. This includes integration of vehicular, pedestrian, bicycle, transit, and environmental considerations to develop a system which serves the needs of all users across all modes.

While the specific complete street elements will vary based on the ultimate design of the SW Connector, the following are typical considerations that apply:

- The pedestrian zone is comfortable, effectively separated from moving traffic with designated and safe crossings, and barriers to mobility minimized
- Space is allocated for bicycles to safely use the facility
- The design does not preclude transit service
- Vehicle access, speeds, and geometrics are designed with the pedestrian in mind.
- Boulevards, street trees, and impervious services provide enhanced storm water treatment.

Pedestrian Facilities

There are currently no sidewalks or other pedestrian facilities within the SW Connector study area. As development occurs, the provision of safe and efficient pedestrian facilities will be considered and can provide opportunities to develop a cohesive sidewalk network within the area. Where appropriate, the SW Connector's crossings with adjacent streets will provide opportunities to extend and connect sidewalks. In addition to providing sidewalks, there are a range of elements which can be considered in order to make walking not only safe, but also beneficial and enjoyable.



Providing safe crossing locations is an important component of the transportation system and will be incorporated into the design of the SW Connector.

Bicycle Facilities

The condition of the existing bicycle facilities network varies greatly throughout the study area and surrounding region. There are existing trails in the northern portion of the study area including trails and bike lanes in the City of Norwalk; however, there are no connections between cities within the study area, creating gaps in the regional system. In addition to the existing municipal trail systems, the Great Western Trail is a very prominent and widely used regional trail facility which crosses the east end of the study area.



Bicycle facilities will be incorporated along the SW Connector where appropriate to improve connectivity within the study area

Bicycle accommodations such as off-street trails and on-street bicycle lanes are an important element of the non-motorized transportation system. Bicycle accommodations will be designed to improve network connectivity in the study area. Attempts will be made to provide not only recreational trail facilities, but also a connected grid of non-motorized facilities. Connections to the existing trail systems will occur where feasible as development continues. Also, providing linkages to regional destinations such as the Great Western Trail will be considered a priority. Bicycle facilities that may be considered can be found in Appendix B.

Transit Facilities

Transit service in the Des Moines Metropolitan Area is operated by Des Moines Area Regional Transit (DART). Currently, DART does not provide fixed-route or dial-a-ride service within the study area. Dial-a-ride service within the study area is currently provided by Heart of Iowa Regional Transit Agency (HIRTA). Presently, DART has no plans to expand service into the SW Connector study area.



DART does not currently provide service within the study area, but opportunities for expansion will be evaluated as land use intensifies

The City of West Des Moines Comprehensive Plan includes policy guidance to evaluate options for transit service. As land use within the study area intensifies, the provision of transit service will be considered. Transit service within the study area will provide extensions to existing routes and connections to points of interest in and around the study area. The potential of future park-and-ride facilities will be considered as development and travel demand needs increase.

Safe Crossing Locations

As design concepts are developed and evaluated, considerations will be given to creating strong pedestrian and bicycle connections in order to ensure the SW Connector Corridor does not create a barrier to multimodal travel as development occurs within the study area. The type of crossing treatments utilized will depend on the ultimate design of the SW Connector Corridor. Special consideration will be given to the crossing treatment in order to provide a safe and efficient environment for non-motorized users. Additional information on crossing treatments can be found in Appendix B.



Crossing treatments will be evaluated during design to provide safe crossing locations along the SW Connector corridor



Great Western
Trail

MOTORCYCLES, VEHICLES,
HORSES, AND HUNTING
PROHIBITED

PETS MUST BE
LEASHED



Travel Demand & Capacity Needs Analysis

Travel Demand Model Development

Model Alternative Scenarios

Scenario 1

Scenario 2

Scenario 3

Model Results

Capacity Analysis

Design Level of Service

This chapter summarizes the process of travel demand model development, scenarios generated for the SW Connector, and results of the travel demand model for the study area. This chapter also summarizes the capacity needs of the SW Connector based on forecasted traffic volumes. Additional detail on the creation and validation of the travel demand model can be found in the attached Appendix C.

Travel Demand Model Development

The Travel Demand Model (TDM) developed for the Study used the DMAMPO's 2035 TDM as the "parent" model for future projections. The model was updated as part of the transportation planning process to develop a SW Connector focused model to provide an enhanced method for the evaluation of the SW Connector and associated interchanges. The area of focus for the focused SW Connector model is shown in Figure 8. The TDM includes base year (2012) and forecast year (2035) models based on 2010 and 2035 socioeconomic data (SED) provided by DMAMPO.

Development of the focused model was completed using four main steps:

1. Disaggregation of traffic analysis zones (TAZs)
2. Highway network development and detail refinement
3. Land use to socioeconomic data (SED) conversion and person-trip generation refinement
4. Trip distribution and trip assignment application

In addition to these models, a Full Build-Out (post 2035) model was created to provide an illustrative forecast using full build-out SED generated using data provided by the City of West Des Moines including the City's Land Use Map and Ultimate Street Circulation Map. Future roadway network information was gathered and used by the project team per directions from Iowa DOT staff.

Model Alternative Scenarios

Three scenarios were generated to evaluate the facility needs and future demand of the SW Connector. The models provided a comparison between what the transportation network currently looks like and what it could look like in the future. It should be noted that the models provide "high-level" information on traffic forecasts for corridor planning.

The facility type selected for the SW Connector model scenarios is consistent with planning documents throughout the Des Moines metropolitan area. The SW Connector was designated an arterial-type

Travel Demand Model (TDM)

A computer software tool used to develop reasonable traffic volume forecasts for freeways, interchanges, and roadway segments throughout a region of interest. A TDM consists of a network of streets and traffic analysis zones (TAZs) with existing and forecasted socioeconomic data (SED), such as population and planned land uses. Traffic volumes are generated and distributed based on the characteristics of these data. Volumes are then routed on the entire network so that daily traffic volumes can be analyzed along various roadway segments. First an "existing conditions" model is developed and calibrated against actual traffic counts for the network. Then a variety of future scenarios are modeled to identify the impacts of anticipated growth on daily traffic patterns. This modeling process is a crucial tool in planning the location and size of future transportation facilities.

facility with at-grade intersections east of I-35 and a freeway-type facility west of I-35 with grade separated intersections. The facility type for the SW Connector model scenarios was confirmed in January 2013 by the Technical Committee of the DMAMPO.

Scenario 1

The first scenario developed for the Study has a forecast year of 2035. The scenario features six lanes of traffic on I-35/I-80. Scenario 1 utilizes SED prepared and provided by the DMAMPO. The SW Connector terminates at Grand Prairie Parkway for this scenario. The network for Scenario 1 is shown in Figure 9.

Scenario 2

The second scenario developed for the Study also has a forecast year of 2035. The scenario features eight lanes of traffic on I-35/I-80. Scenario 2 utilizes SED prepared and provided by the DMAMPO. The SW Connector terminates at Grand Prairie Parkway for this scenario. The network for Scenario 2 is shown in Figure 10.

Scenario 3¹

The final scenario developed for the Study has a post-2035 forecast year and was created as an illustrative forecast of potential traffic demand if the City of West Des Moines fully developed following its Comprehensive Plan. The scenario features eight lanes of traffic on I-35/I-80. Scenario 3, or the Full Build-Out Scenario, utilizes SED provided by DMAMPO and then converted to represent the land uses provided in the West Des Moines Comprehensive Plan. The area of focus for this model is the SW Connector study area west of I-35 and south of the Raccoon River. The developed areas of the City of West Des Moines and the surrounding area remained the same as the 2035 projection

¹ - Based on discussion between the Iowa DOT, FHWA, and Warren County, Scenario 3 forecasted traffic volumes are acceptable to be used to determine right-of-way preservation. As no specific forecast year can be assigned to Scenario 3, the use of the scenario forecasts for initial roadway design was unsupported. The DMAMPO accepted the process as described in Appendix C as an acceptable hypothetical model for determining "worst-case" traffic forecasts. Further explanation of model development and agency comments can be found in Appendix C.

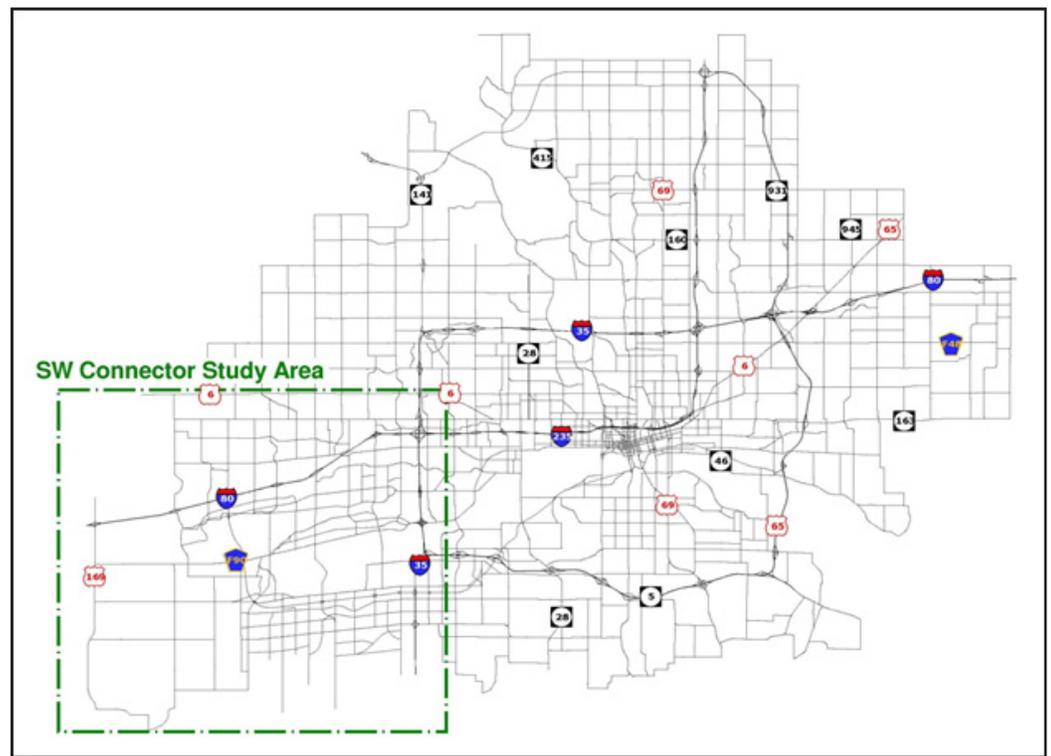


Figure 8 - TDM Focused Model Area

provided by the DMAMPO. The SW Connector terminates at I-80 for this scenario. The network for the Full Build-Out Scenario is shown in Figure 11.

For the development of SED, the following assumptions were used:

- Single Family Residential – 3.6 persons per Dwelling Unit (DU)
- Medium Density Residential – 2.3 persons per DU
- Apartment – 1.7 persons per DU
- Office – 3.3 employees per 1,000 Square Feet (SF) of gross usable space
- Commercial – 1.5 employees per 1,000 SF of gross usable space

Figure 9
Travel Demand
Model: Scenario 1
(Forecast Year 2035)



Legend

-  Study Area
-  Year 2035 Network
-  Existing Network



0 2,000 4,000
 Feet

1 Inch = 3,500 feet

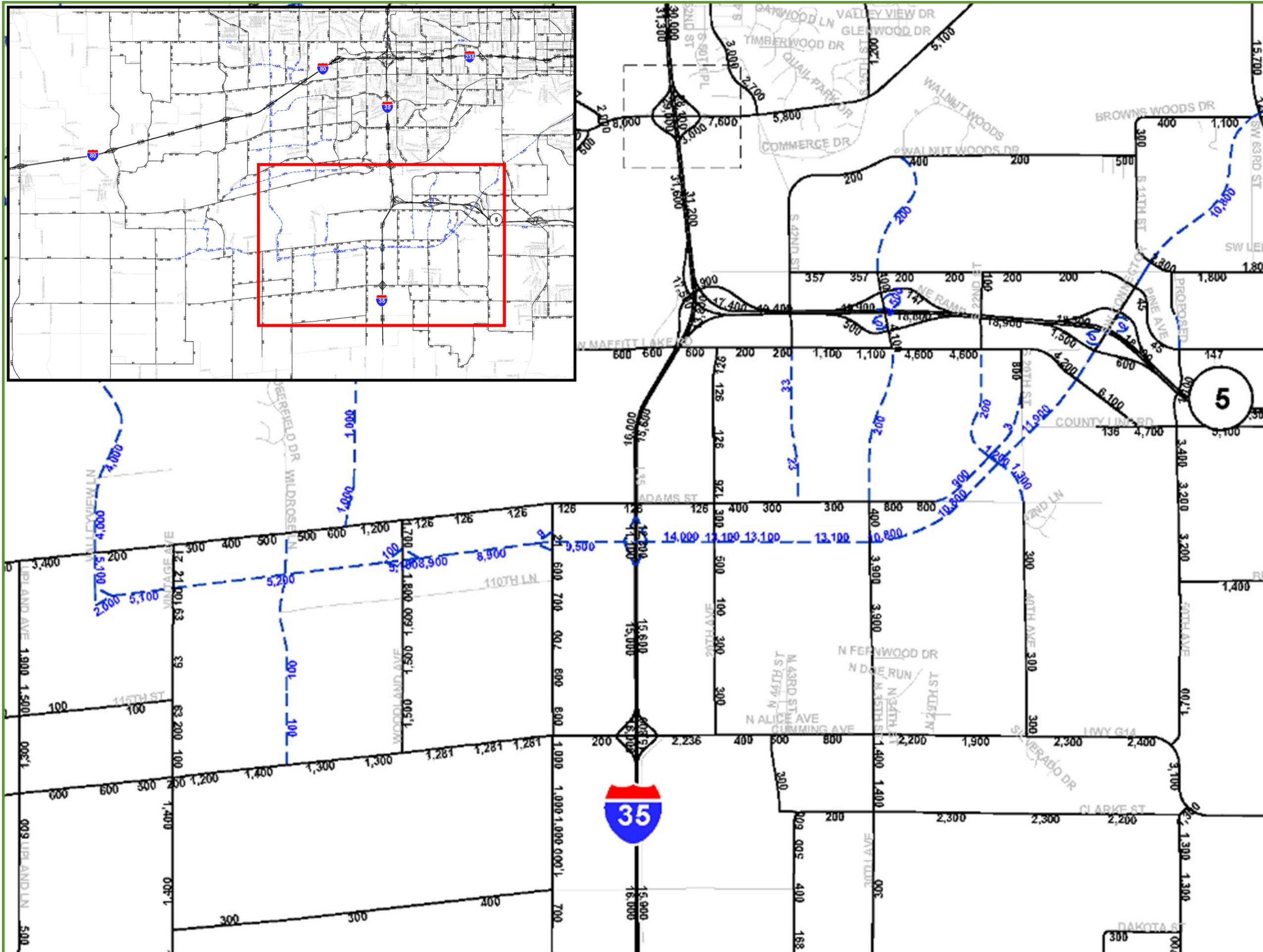
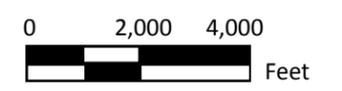


Figure 10
Travel Demand
Model: Scenario 2
(Forecast Year 2035)



Legend

-  Study Area
-  Year 2035 Network
-  Existing Network



1 Inch = 3,500 feet

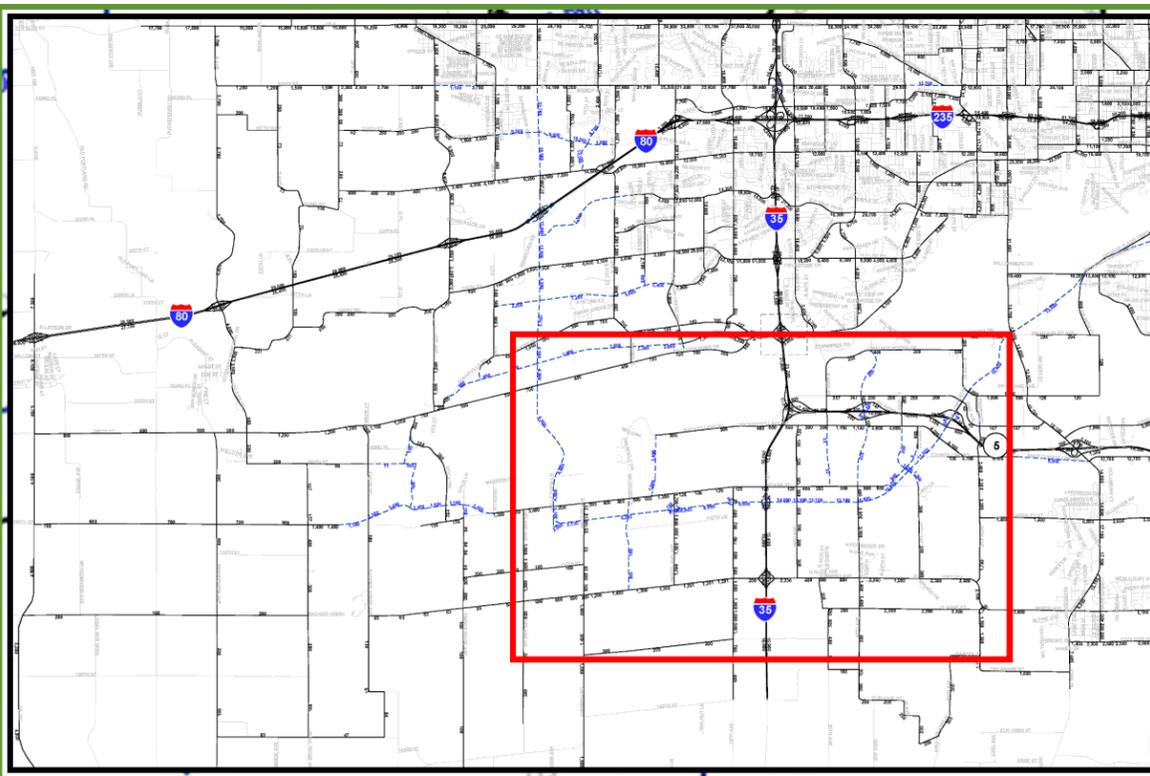
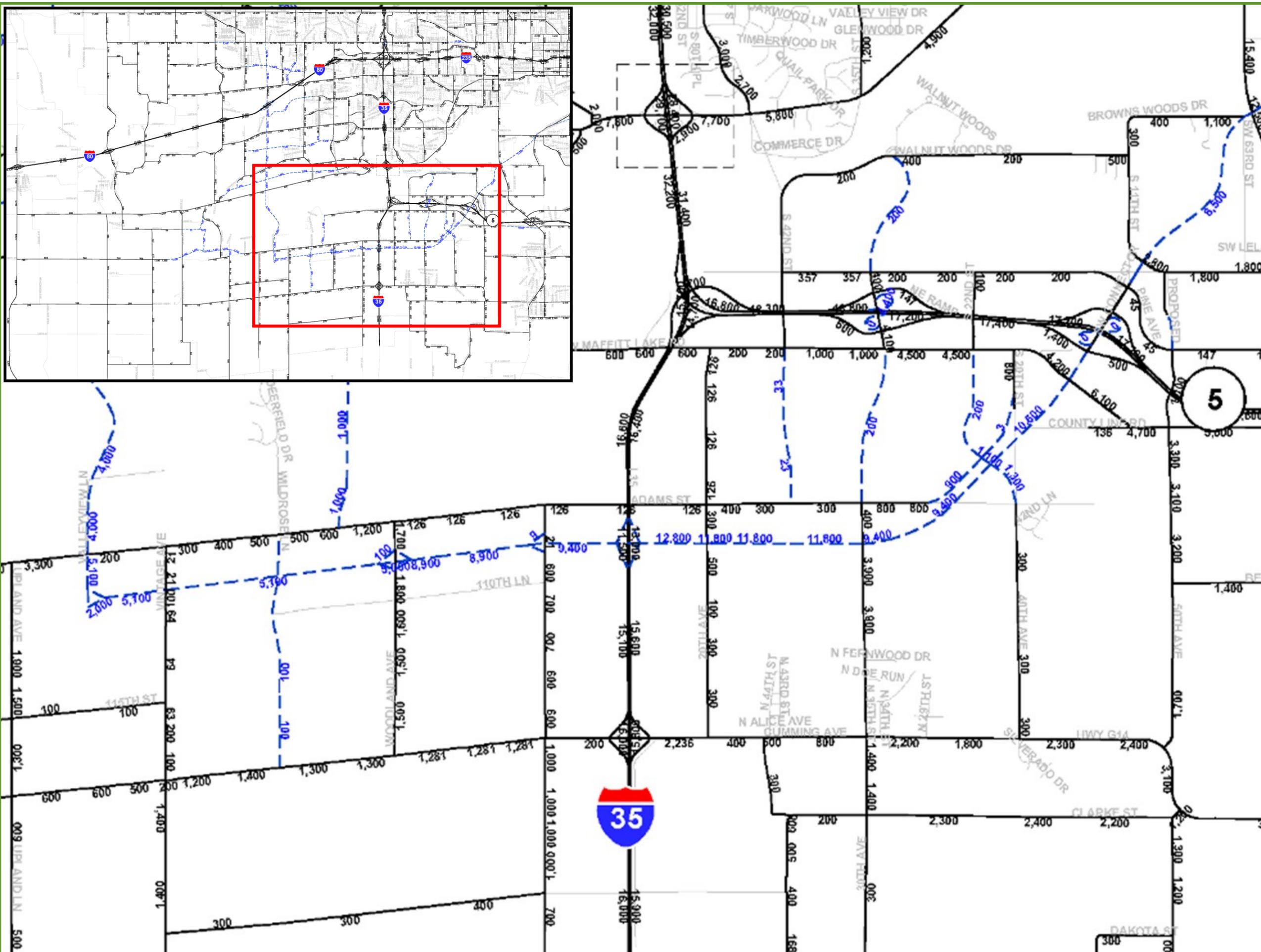
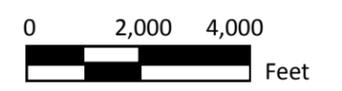


Figure 11
Travel Demand
Model: Full Build-Out
Scenario (Forecast
Year post-2035)

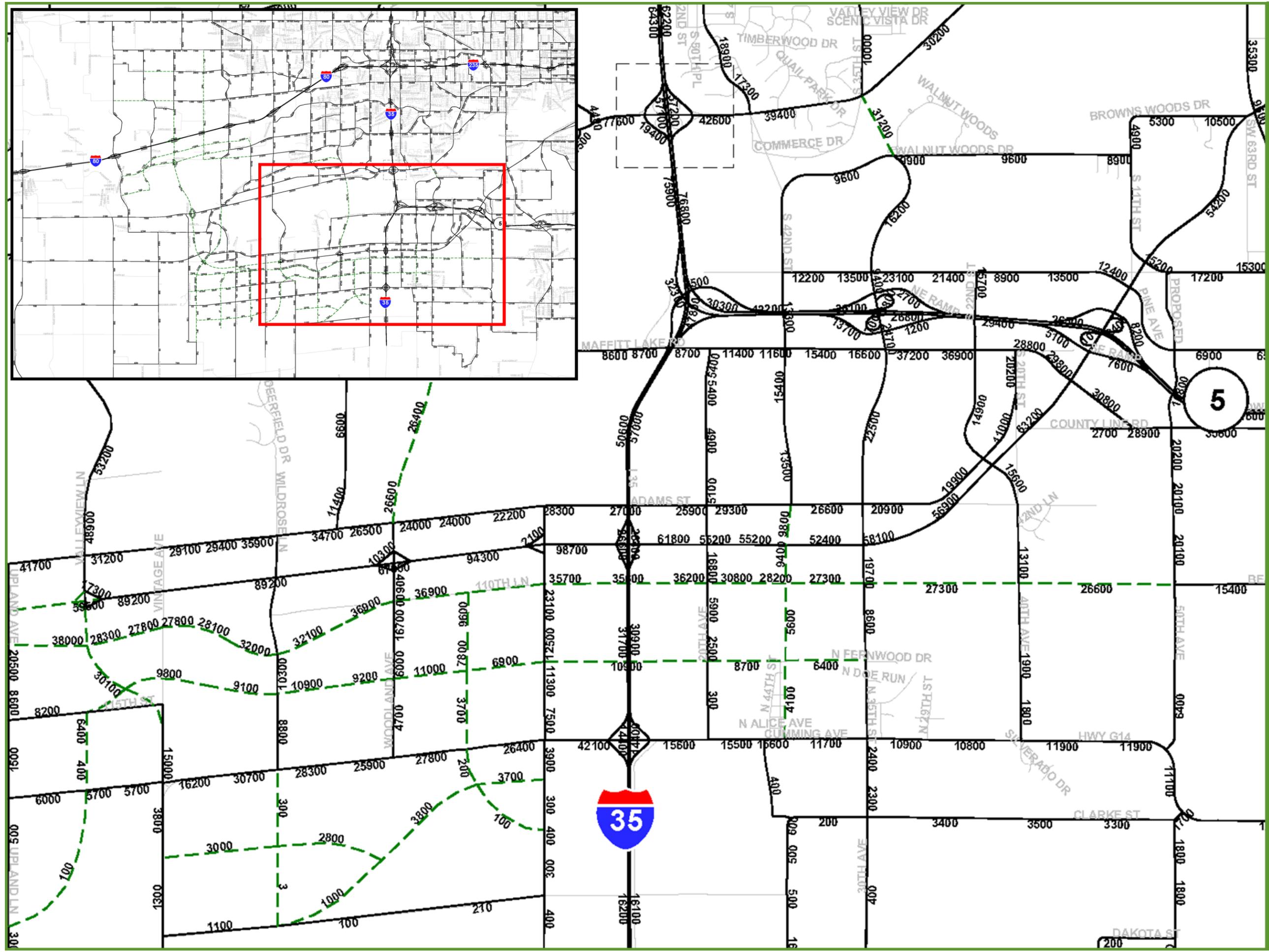


Legend

-  Study Area
-  Full Build-Out Network
-  Existing Network



1 Inch = 3,500 feet



Model Results

Results of the TDM provide similar forecasted Average Daily Traffic (ADT) ranges for Scenarios 1 and 2. Scenario 3, the Full Build-Out Scenario, presents a forecasted ADT increase of nearly ten (10) times the 2035 forecast volumes west of I-35 and nearly five (5) times the 2035 forecast volumes east of I-35. As stated above, the Full Build-Out model was completed as an illustrative forecast to determine right-of-way preservation for the SW Connector and is intended to serve as a reference for a maximum build-out scenario using available long-range SED inputs from the City of West Des Moines and no other communities within the study area.

The Forecast Year 2035 Scenarios are forecasted to have an Average Daily Traffic (ADT) range between 5,100 to 9,500 vehicles west of I-35 (Table 3). In the Forecast Year 2035 Scenarios, the SW Connector is a freeway-type facility with grade separated intersections west of I-35. The SW Connector is forecasted to have an ADT range of 9,400 to 14,000 vehicles on the arterial-type facility to the east of I-35 based on Forecast Year 2035 scenarios.

Table 3 - Forecasted ADT Results from TDM

Scenario	ADT West of I-35	ADT East of I-35
Scenario 1	5,100 - 9,500	10,800 - 14,000
Scenario 2	5,100 - 9,400	9,400 - 12,800
Scenario 3	67,800 - 98,700	52,400 - 63,200

The Full Build-Out Scenario is forecasted to have an increase of nearly ten times the Forecast Year 2035 (67,800 to 98,700 ADT) for the SW Connector portion west of I-35 (Table 3). In the Full Build-Out Scenario the SW Connector portion west of I-35 is extended to the north, reaching I-80. The Full Build-Out Scenario increases by nearly five times the Forecast Year 2035 volumes to a forecasted ADT range of 52,400 to 63,200 vehicles east of I-35.

Capacity Analysis

The results in Table 3 and the vision for the SW Connector as confirmed by the DMAMPO Technical Committee were used to determine the facility configuration that will be needed to meet future travel demand on the SW Connector. Additionally, the alternatives for the SW Connector need to meet a Level of Service (LOS) that is consistent with Iowa DOT criteria for roadway design.

Design Level of Service

The design level of service accepted by the Iowa DOT for a multilane urban arterial is LOS D. At LOS D, facilities function at more stable and free-flow levels of service throughout most of their design life. West of I-35, Iowa DOT criteria states LOS D would be acceptable for a urban freeway. Estimated LOS based on different lane configurations and ADT are shown in Figures 12 and 13. Lane configurations for the freeway-type facility envisioned for west of I-35 is represented in Figure 12, while lane configurations for the arterial-type facility envisioned for east of I-35 is shown in Figure 13.

Level of Service (LOS)

In the United States, traffic flow on highways is described with a Level of Service (LOS) designation. LOS as defined by the Highway Capacity Manual of the Transportation Research Board consists of levels ranging from A (little to no traffic) to F (heavy congestion/gridlock).

The lane configuration needed to meet LOS D in 2035 for the arterial-type facility east of I-35 is one-lane each direction with either right or left turn lanes. West of I-35 one-lane each direction will meet LOS D in 2035 for the freeway-type facility. Additionally, lane configurations for the Full Build-out scenario are identified. To meet LOS D at Full Build-out, the facility east of I-35 is three lanes each direction with right and left turn lanes. West of I-35 three lanes each direction will be needed to meet LOS D based on the Full Build-out scenario. Lane configuration and forecasted ADT for the SW Connector are shown in Table 4.

Table 4 - Lane Configuration to Achieve LOS D

Scenario	West of I-35 (Freeway) Required Lane Configuration for Level of Service "D"	East of I-35 (Urban Arterial) Required Lane Configuration for Level of Service "D"
Forecast Year 2035	1 lane each direction	1 lane each direction, plus R & L turn lanes
Full Build-out	3 lanes each direction	3 lanes each direction, plus R & L turn lanes

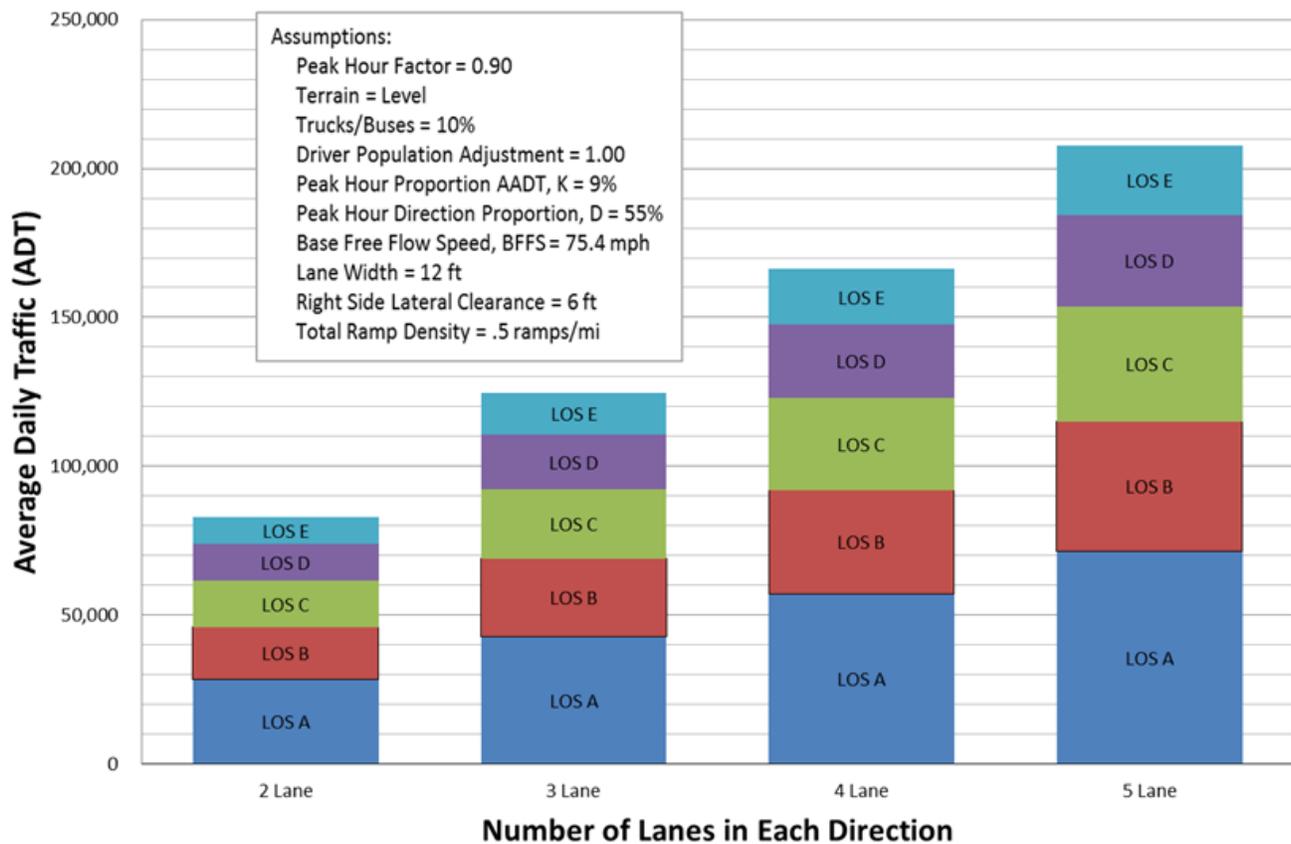


Figure 12 - Estimate LOS based on Lane Configuration and ADT of Freeway-type Facilities

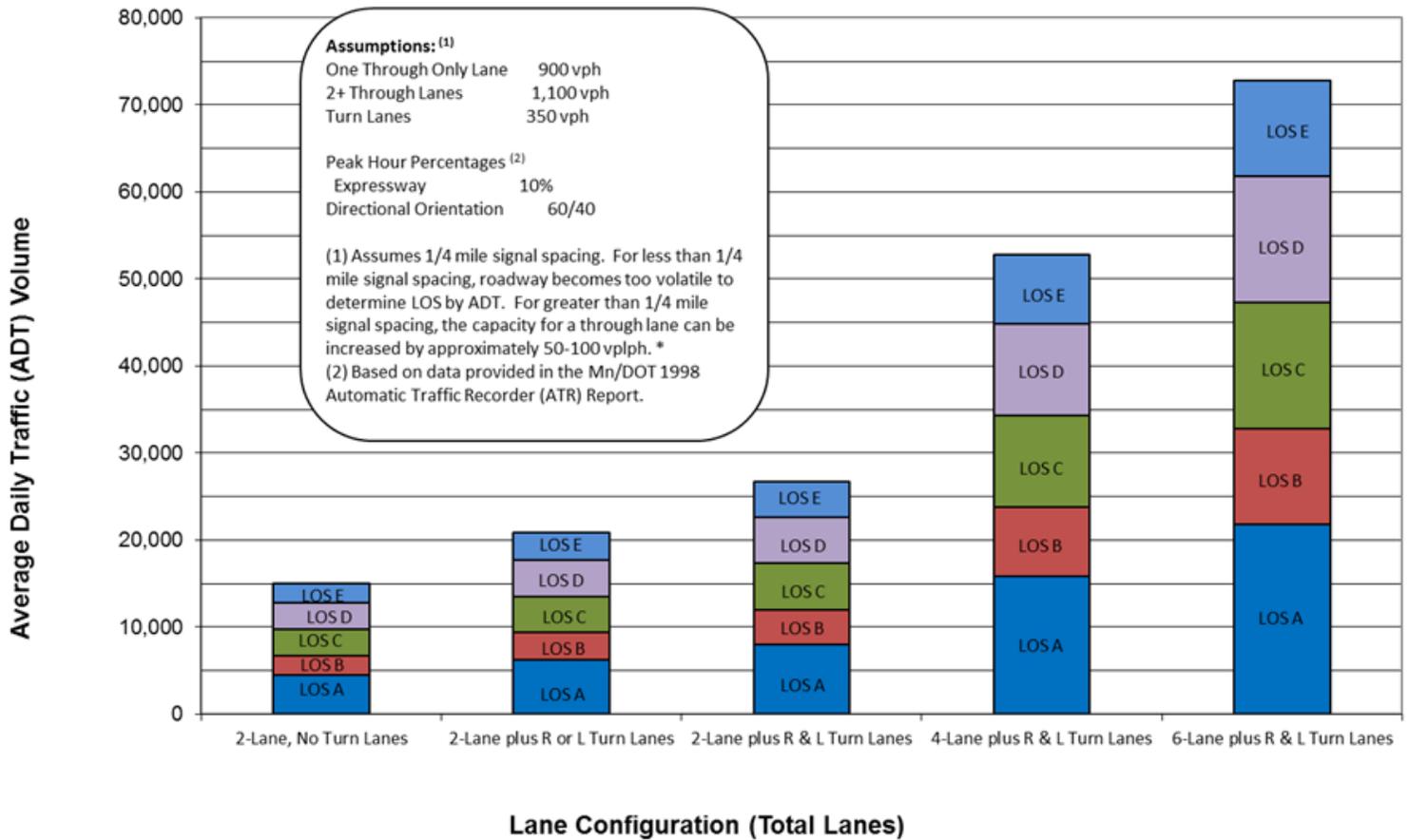


Figure 13 - Estimated LOS based on Lane Configuration and ADT of Arterial-type Facilities

Environmental Screening

Hazardous Material

National Wetland Inventory Review

Threatened and Endangered Species

Geology

Cultural Resources

Drainage Basins

Drainage Areas West of I-35

Drainage Areas East of I-35

Soils

This chapter provides a summary of the preliminary environmental screening completed for the Study. The screening primarily focused on public database information and previous reports documenting environmental concerns, including the Environmental Impact Statement Closure Report (2012). This overview and the attached Appendix D will provide guidance for future work on design and implementation of the project.

Hazardous Material

According to the Iowa Department of Natural Resources (Iowa DNR) and Public Safety State Fire Marshal Office, there are no known contaminated sites, Underground Storage Tanks (UST), or leaking UST within the project corridor. Additionally, the United States Environmental Protection Agency Maps do not indicate any Federal superfund sites within the project study area.

National Wetland Inventory Review

Based on the National Wetland Inventory, there are eighteen (18) mapped wetlands within the project corridor, totaling 34.98 acres. Nine potential Waters of the United States (WOUS) have been identified within the study area.

Threatened and Endangered Species

Based on review of aerial photography and land cover maps, the study area may have potentially suitable habitats for the Indiana bat in Warren County and the Western Prairie Fringed Orchid in Madison County. A habitat assessment for federal and state threatened and endangered species was not conducted for this preliminary review of environmental resources. Further field investigation will be required to determine if appropriate habitat exists for the Northern Long Ear Bat (NLEB). Consideration will also be given to the extended roosting season for the NLEB.

Geology

Data from the Iowa Geological & Water Survey indicates the presence of the abandoned Orilla Coal Mine, located in Warren County. Undermining makes the land surface unstable which can result in subsidence (sinking or collapse) of the land surface over abandoned underground mines in Iowa. In addition, acid drainage seeping from underground mines has adversely affected agricultural land downslope from mined sites, both by its toxic effects and by keeping the land too wet to cultivate.



The SW Connector study area features potentially suitable habitats for several threatened and endangered species, including the Western Prairie Fringed Orchid

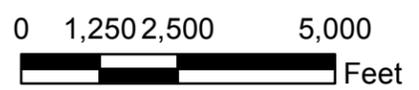
Figure 14

Natural Resources
Near Preliminary
Corridor



Legend

- National Wetland Inventory
- Freshwater Emergent Wetland
 - Freshwater Forested/Shrub Wetland
 - Freshwater Pond
 - Lake
 - Riverine
 - Project Corridor



1 inch = 2,917 feet



Cultural Resources

According to a review completed by Tallgrass Historians L.C., several potentially historic sites were located throughout the study area. The construction of an alignment alternative is recommended to avoid these sites where possible. Additionally, an archaeological assessment was completed to determine the potential for prehistoric site location. According to the results of the assessment, there is a greater potential for sites located west of I-35 within the study area.

Drainage Basins

There are currently two watersheds that are impacted by the study area, the Raccoon River and Lower North River. The SW Connector Corridor generally runs along a ridgeline and would split drainage to the watersheds. The majority of the study area drains to the North River watershed with the following primary basins for drainage:

- Cherry Creek
- Middle Creek
- Raccoon River

Drainage Areas West of I-35

Currently, west of I-35 drainage flows from the northwest to the southeast to Cherry Creek. From Cherry Creek drainage flows to Badger Creek before crossing I-35 near NW 70th Avenue. Drainage then follows the Great Western Trail southeast to the North River. Additionally, a small portion of drainage goes to Maffitt Reservoir and Middle Creek.

Drainage Areas East of I-35

Of the three existing drainage areas east of I-35, one flows into Middle Creek then North River and into Raccoon River. A second area flows south to Middle Creek then Lake Colchester and finally to North River. The last of the three areas east of I-35 drains north to Raccoon River.

Soils

Soils within the study area are generally categorized by the Natural Resources Conservation Service as Hydrologic Soil Group B and C. Soil types include:

- Sharpsburg
- Macksburg
- Ladoga
- Lamoni
- Colo-Ely

For additional information on soils, drainage, and potential mitigation options in the study area, see Appendix D.

Development of Build Alternatives

Project Termini

Alignment Alternative Development

Facility Type

Alternatives Being Considered

Alternative Analysis

Alternatives Being Eliminated

Most Feasible Alignment Alternative

I-35 Interchange Alternatives

SW Connector Crossing/Interchange Location

Interchange Alternative 1 - Diamond Interchange

Interchange Alternative 2 - Cloverleaf Interchange

Interchange Alternative 3 - Semi-Directional Interchange

This chapter summarizes the development of alternatives and the conditions within the study area that dictate the potential alternatives. Additional analysis of the logical termini and independent utility for the proposed SW Connector can be found in Appendix E.

The SW Connector concept has been extensively studied and planned for many years. The most recent Southwest Connector-Warren County EIS/Feasibility Study (I-35 to IA 5) (Feasibility Study), initiated in 2007 and concluded in 2012, established the basic parameters for the Study, including alternatives presented in this chapter. The Feasibility Study was suspended after FHWA determined the project did not meet National Environmental Policy Act (NEPA) requirements for logical termini and independent utility for the proposed segment.

Project Termini

The Feasibility Study did not meet the NEPA requirements to demonstrate logical termini and independent utility largely due to its chosen endpoints:

- Previous Eastern Terminus – Existing Veterans Parkway Interchange on IA 5.
- Previous Western Terminus – I-35 approximately equidistant between the IA 5 and County Road G14 Interchanges.

Consequently, the Feasibility Study recommended the planned extension of Grand Prairie Parkway into Madison County for consideration as the new western terminus in future SW Connector studies. Based on this recommendation, the following termini were selected for the Study:

- New Eastern Terminus – Existing Veterans Parkway Interchange on IA 5
- New Western Terminus – Planned extension of Grand Prairie Parkway into Madison County.

Alignment Alternatives Development

Before its conclusion in 2012, the Feasibility Study examined three alignment alternatives between the existing Veterans Parkway/IA 5 Interchange and I-35. The three alternatives evaluated in the Feasibility Study were reviewed in conjunction with the Environmental Impact Statement (EIS). The EIS examined the alignments east of I-35 for impacts to environmental resources (wetlands, threatened and endangered species, and air quality), the existing transportation network, and other potential impacts. For additional information on the environmental evaluation completed before the EIS Closure see Appendix E

The alignments evaluated in the Feasibility Study, Figure 15, follow a corridor along the Great Western Trail and crossing I-35 nearly equidistant between the County Road G14 Interchange and the IA 5 Interchange. The alignments were evaluated based on criteria developed during the Feasibility Study and were presented to the public on two occasions for review and comment.

The scoring criteria utilized to evaluate these alignments included environmental, social, and facility measures. The middle alignment (B) attained the highest score and was determined to be the most feasible of the three alignments. Based on the scoring results, public involvement, and its minimal impact on the existing local road network, Alignment B was identified as the recommended alternative

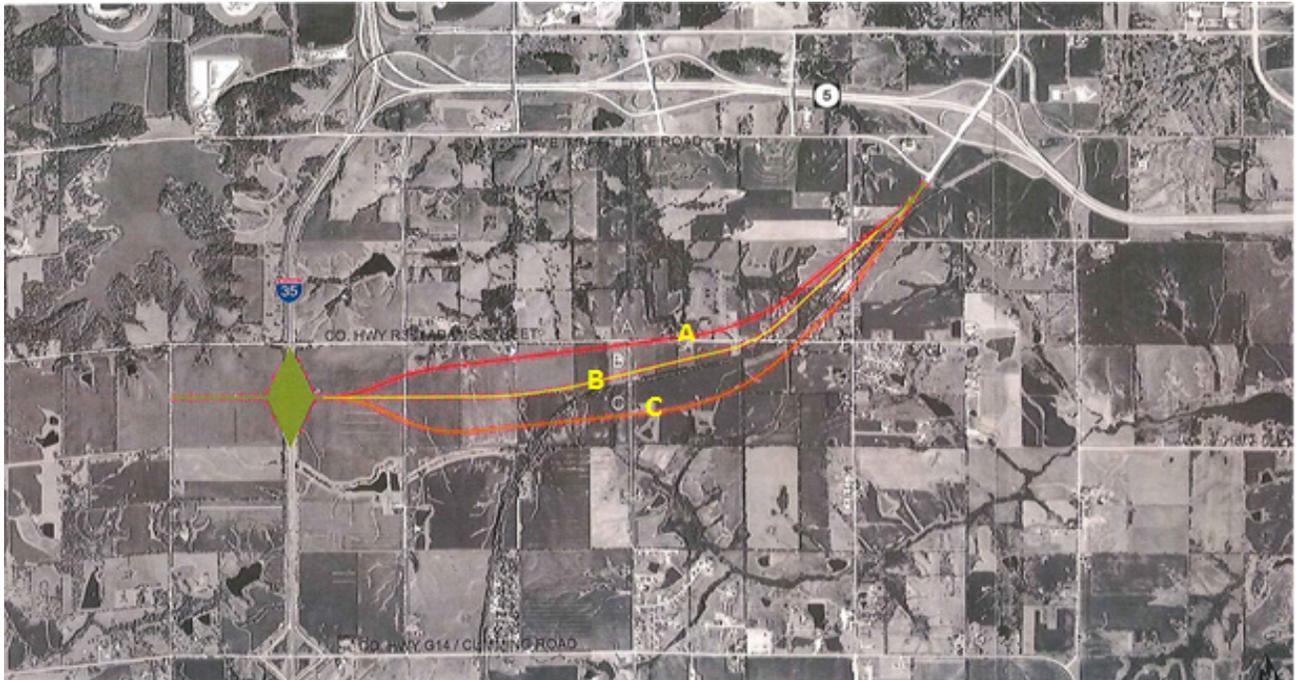


Figure 15 - Feasibility Study Alignment Alternatives

in the Feasibility Study. During the review of previous planning documents, the current study effort recognized the Feasibility Study's recommendation of Alignment B and incorporated the alignment into the eastern portion of alternatives developed in the Study. For additional analysis of the alternatives included in the Feasibility Study see Appendix E.

The Feasibility Study was concluded before analysis of an alignment to County Road G14 could be fully conducted. The study noted input on two alignment alternatives for the SW Connector to County Road G14:

- Follow the existing alignment of County Road G14
- Eliminate the County Road G14 interchange in favor of the new Southwest Connector Interchange

The Feasibility Study determined that an alignment eliminating the interchange at County Road G14 would likely not achieve the goal of maintaining the existing local road support network. Additionally, eliminating the interchange at County Road G14 would remove the primary access to I-35 from the City of Cumming. The other proposed alternative following the existing alignment of County Road G14 received no further discussion in the Feasibility Study.

Facility Type

Planning documents throughout the region have outlined a range of facility types for the proposed SW Connector. Alternatives consistently identified a freeway-type facility with grade separated intersections or an arterial-type facility with at-grade intersections. At the January 2013 DMAMPO Technical Committee Meeting, a vision for the SW Connector was identified.

The vision for the SW Connector includes:

- East of I-35, the SW Connector (Veterans Parkway) will be an expressway-type facility with at-grade intersections. The facility will ultimately become a 6-lane facility with landscaped boulevards, from the current IA 5/SW Connector interchange to I-35. This section would be consistent with the long-range planning and design for the existing SW Connector facility between IA 5 and IA 28 in West Des Moines, and the proposed SW Diagonal, which is planned to extend from IA 28 to Downtown Des Moines. Intersection traffic control methods would be upgraded as traffic volumes dictate. In the DMAMPO's HY 2035 MTP, this facility is identified as a collector roadway.
- West of I-35, the SW Connector (Veterans Parkway) will be designed to accommodate higher travel speeds with limited local property access and has been referred to as "the SW Bypass" due to the higher speed design of the proposed facility. The combined SW Connector/SW Bypass is anticipated to ultimately become a freeway-type facility with grade-separated intersections spaced at intervals typically seen on urban freeways. This facility could possibly be constructed in stages and would likely begin as a two-lane rural section roadway expandable to 4 lanes, beginning with a future I-35 interchange and ending at a temporary terminus with the future Grand Prairie Parkway. It is anticipated this facility will extend west and northward to connect with I-80. The DMAMPO's HY 2035 MTP identifies this facility as an unclassified roadway.

Based on the guidance provided by the vision defined above and travel demand model results, lane configurations were determined for the facility types for the SW Connector.

Alternatives Being Considered

No Build Alternative

The no build alignment alternative for the SW Connector is to take no action to develop a new east-west roadway within the study area. The no build alternative would leave the existing rural network in place and include the extension of Grand Prairie Parkway into Madison County. The alternative also includes the reconstruction of the Adams Street Bridge. As land use intensifies in the Study Area the rural network will likely need to be improved to facilitate additional accessibility needs. Level of Service (LOS) of the roadway system may decrease due to intensified development within the Study Area. The no build alternative provides a base line for the comparison of the alternatives being considered.

Build Alternative 1

As stated above, the Feasibility Study was concluded before alignment alternatives connecting to County Road G14 were evaluated. Alternatives to County Road G14 have the potential to impact a number of residential, commercial, and environmental features within the study area. Initial alignments east of I-35 to County Road G14 were primarily split into two categories, east of the City of Cumming and west of the City of Cumming. Alignments to the east of the City of Cumming were eliminated early in the analysis process due to potential impacts to residential property east of the City and to the City core due to potential right-of-way expansion. Therefore, alignments west of the City of Cumming were considered to County Road G14.

Based on the goal of minimizing impacts to environmental features and residential properties, as well as, a review of public comments provided in the Feasibility Study, the most feasible alignment east of I-35 was determined to follow the Great Western Trail south from IA 5 to County Road G14, as shown in Figure 16. The alignment to County Road G14, Build Alternative 1, crosses I-35 at the recently reconstructed interchange. Build Alternative 1 would likely need to be constructed slightly south of the existing County Road G14 to align with the interchange.

Build Alternative 1 has the increased potential of impacting residential property and environmental features on the western portion of the alignment. Additionally, as traffic demand increases and the redesign of the interchange is warranted, impacts to residential property adjacent to the County Road G14 Interchange would likely see adverse impacts due to potential access changes. The alignment west of I-35 deemed most feasible due to the likelihood of avoiding many environmental features follows County Road G14 then turns northwest between County Road R35 and Woodland Avenue, and connects to the extension of Grand Prairie Parkway, as shown in Figure 16.

Build Alternative 2

Based on the Feasibility Study's recommended alignment alternative, the current Study adapted the alignment to follow the Great Western Trail from the IA 5/Veterans Parkway Interchange. After crossing Adams Street, the alignment turns west and parallels Adams Street to the extension of Grand Prairie Parkway into Madison County. Like the alignment to County Road G14, following the Great Western Trail minimizes the potential impacts to residential properties and environmental resources. The Build Alternative 2 alignment is shown in Figure 17.

The location of the alignment crossing at I-35 required additional attention to ensure adequate spacing and accommodations for a future interchange connecting I-35 and the SW Connector. An initial review of interchange spacing and interchange alternatives can be found in Appendix E. The reconstruction of the Adams Street Bridge is being planned to ensure future interchange improvements do not adversely affect local traffic on Adams Street.

Figure 16
Build Alternative 1



- Legend**
- Build Alternative 1
 - Grand Prairie Parkway (Planned)
 - West Des Moines Ultimate Streets (Planned)
 - Great Western Trail
 - City of Cumming
 - City of Norwalk
 - City of West Des Moines
 - Counties

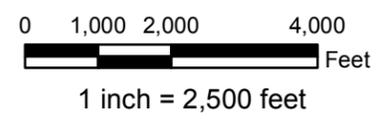
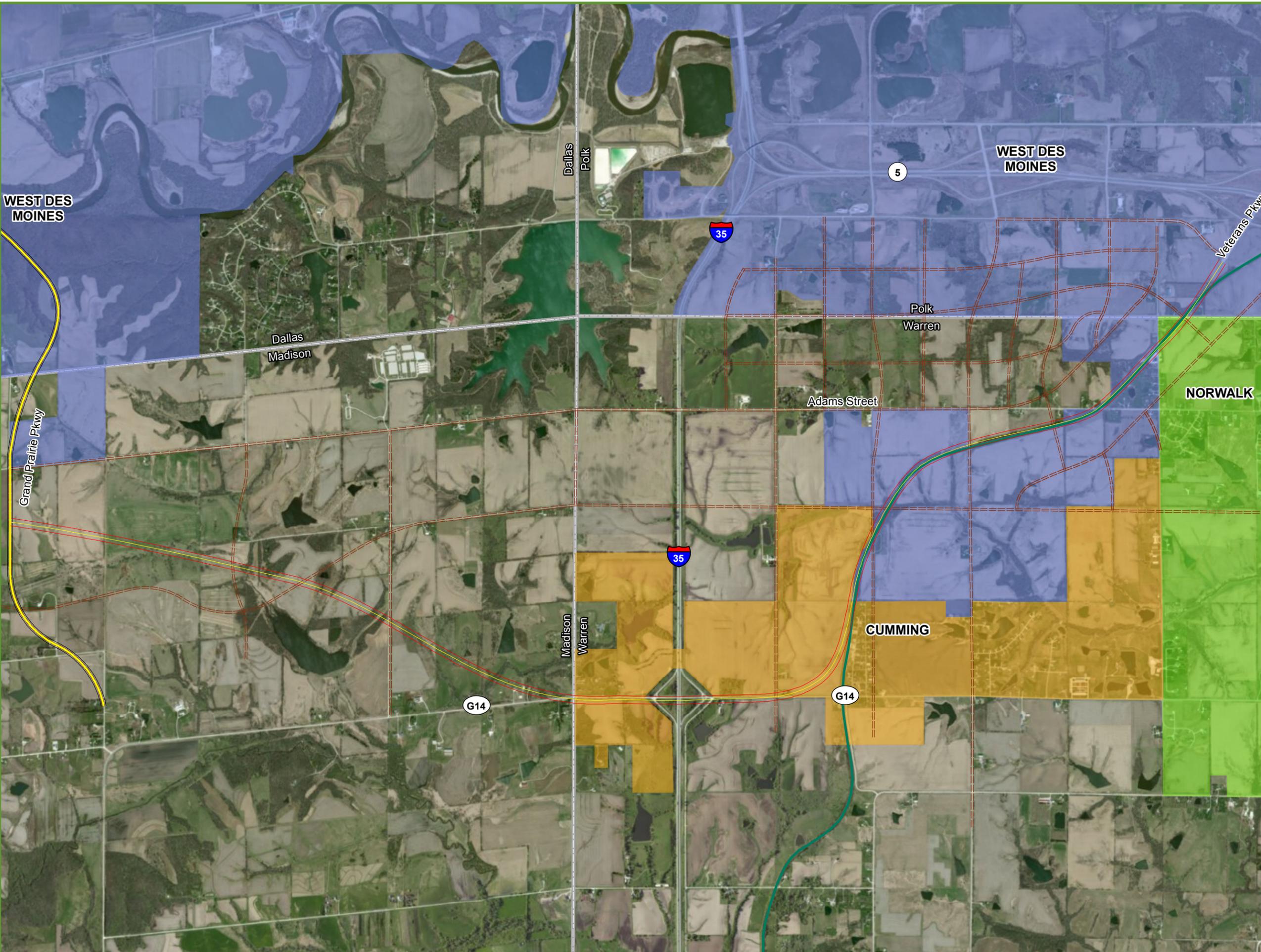


Figure 17
Build Alternative 2

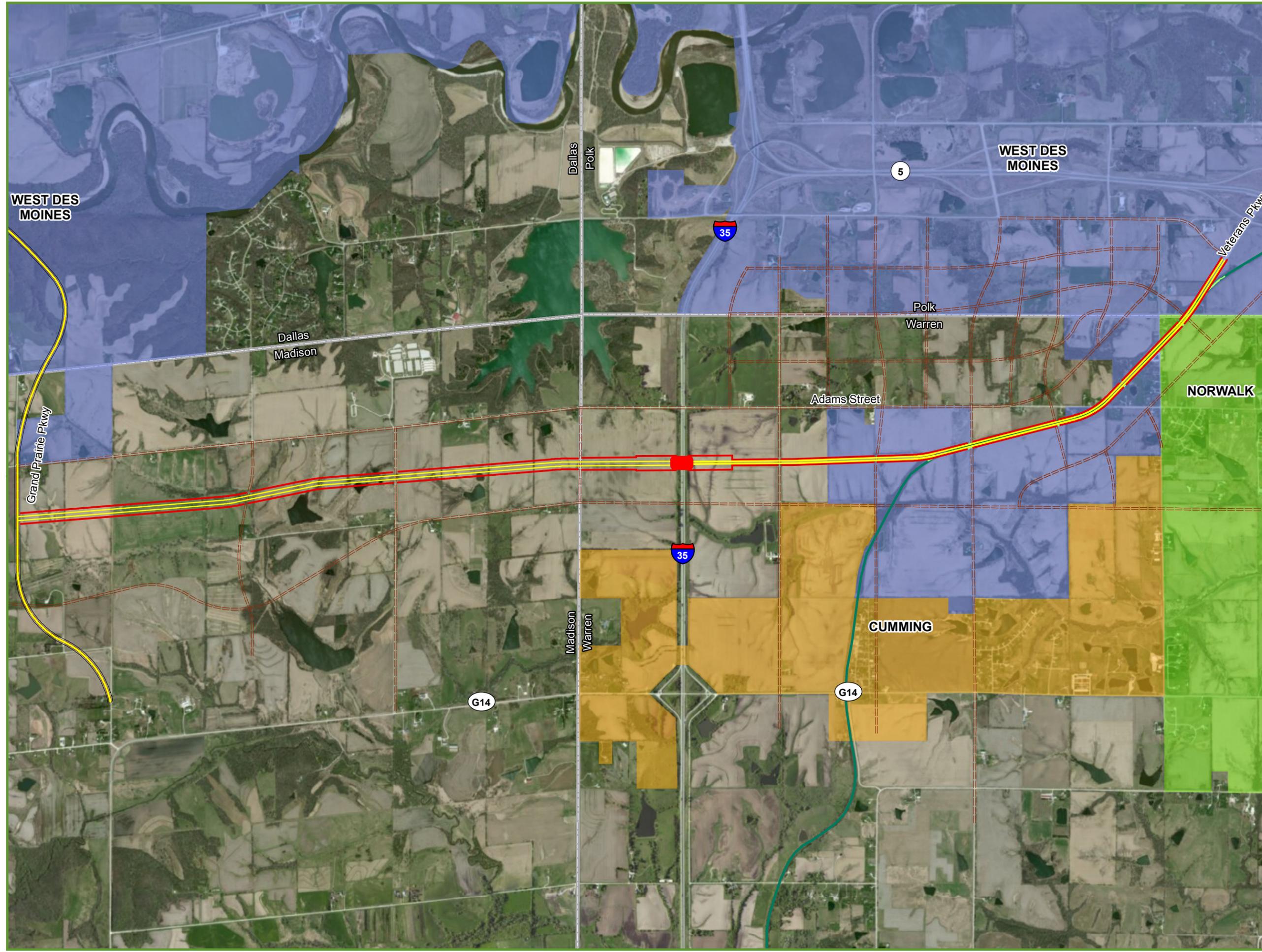


Legend

- Build Alternative 2
- Proposed Bridge Crossing
- Grand Prairie Parkway (Planned)
- West Des Moines Ultimate Streets (Planned)
- Great Western Trail
- City of Cumming
- City of Norwalk
- City of West Des Moines
- Counties



0 1,000 2,000 4,000
Feet
1 inch = 2,500 feet



Alternative Analysis

The alignments being considered were evaluated based on criteria developed in the Guiding Principles Technical Memorandum (Appendix A). Evaluation criteria include measures of effectiveness for regional connectivity and mobility, local access, community and regulatory needs, and cost. Each alternative was analyzed to determine the likelihood of how effective it would be at meeting the needs described, or the quantity of impacts to the designated resource. In addition, the overall score for the alignment provides a quantitative measure for determining the most feasible alternative. The alignment alternative analysis is provided in Table 5.

Alternatives Being Eliminated

The initial alignment alternatives being eliminated are those alignments to County Road G14 considered less feasible than Build Alternative 1, due to the potential impact on residential and commercial property. These alignments also have an increased potential likelihood of environmental impacts to floodplains and wetlands east and west of I-35. The alignments being eliminated are also considered unsupported by regional comprehensive and long range transportation plans as no documentation of an alignment to County Road G14 has been included in planning documents.

Based on the results of the analysis of the alignment alternatives being considered, Build Alternative 1 was eliminated as it received a lower score than Build Alternative 2. Build Alternative 1 has potential residential impacts near the County Road G14 Interchange, as well as potential environmental impacts east and west of I-35. As with the other alignments to County Road G14, Build Alternative 1 is considered to be unsupported by regional comprehensive and long range transportation plans.

Additionally, alignments not recommended in the Feasibility Study were eliminated. The two additional alignments east of I-35 were determined to be less feasible than Alignment B based on analysis completed as part of the Feasibility Study.

Most Feasible Alignment Alternative

Based on the results of the alternative analysis provided in Table 5, the recommended alignment alternative, Build Alternative 2, follows the Great Western Trail, crosses Adams Street, and then turns west to parallel Adams Street. The alignment is unlikely to have impacts on residential properties (involving displacement of residents or tenants), commercial operations, and cultural resources within the study area. Additionally, the alignment includes minimal impacts to floodplains and wetlands as documented in the previous chapter. This alignment is consistent with the alignment recommended in the Feasibility Study, the conceptual alignment in the City of West Des Moines Comprehensive Plan, and the planned corridor in the DMAMPO's HY 2035 MTP. Additionally, the recommended alignment also preserves the planned land uses in and around the City of Cumming.

Table 5 - Alternative Analysis

Needs/Measure of Effectiveness*		Alternatives		
		No Build	Build 1	Build 2
A. Regional Connectivity and Mobility				
1. Does concept create a direct connection between IA 5, I-35, and I-80 planned Grand Prairie Parkway) in terms of:				
Travel time / distance? (I-35 to IA 5)		0	1	3
Convenience from Interstate 35 to SW Connector?		0	3	2
Serves regional traffic?		0	3	3
2. Does concept provide adequate capacity to serve forecast regional travel demand?		0	2	3
3. Does concept provide an interchange in the vicinity of I-35/Adams St?		0	0	2
4. Does the concept improve operations at other interchanges?		0	1	2
5. Does the concept improve operations on local roads?		0	2	2
Sub-total (Sum 1:5)		0	12	17
B. Local Access				
1. Does concept provide needed local capacity?		2	2	2
2. Does concept provide local access?		2	2	2
3. Does concept provide local roadway connections		2	2	2
4. Does concept create developable parcels?		3	2	2
5. Does concept create landlocked, smaller parcels?		0	2	1
6. Will the project be adaptable (sustain itself) over time?		2	2	3
7. Does the concept serve existing land uses?		3	2	2
Sub-Total (1+2+3+4+6+7-5)		14	10	12
C. Community and Regulatory				
Social Environment	1. New Right of Way (Ac.)	0	234	260
	2. Residential Impacts	0	2	1
	3. Business/Employee Impacts	0	1	1
	4. Cultural Resource Impacts	0	1	1
	5. Provides ped./bike facilities?	2	3	3
	6. Provides opportunities for transit?	1	2	2
Natural Environment	7. Structures (number)	0	0	0
	8. Historical Properties (number)	0	0	0
	9. Section 4(f) impacts (Ac.)	0	30	19
	10. 100 yr. Floodplain impacts (Ac.)	0	5-10	0-5
	11. 500 yr. Floodplain impacts (Ac.)	0	5-10	0-5
	12. NWI Wetland Impacts	0	4	5
Sub-total(Sum 1:6)-(Sum 7:12)		3	189-199	234-244
D. Cost				
Cost of roadway improvements? (millions \$)**		0	104	58
TOTAL (A+B+C-D)		17	107-117	205-215

* Values unless otherwise noted (3 = Yes, 2 = Likely, 1 = Unlikely, 0 = No)

** Based on estimated cost per mile of \$8.65 million

I-35 Interchange Alternatives

In addition to the facility alternatives east and west of I-35, alternatives were considered for a potential interchange on I-35. According to *A Policy on Design Standards Interstate System*, January 2005, published by the American Association of State Highway Transportation Officials (AASHTO), “Spacing of interchanges has a significant effect on the operation of interstate highways. As a rule, minimum spacing should be 1.5 km (1 mile) in urban areas and 5 km (3 miles) in rural areas.” The study area of the SW Connector is currently made up of rural land uses; however, the City of West Des Moines’s adopted land use plan identifies the study area as generally urban land uses. Additionally, the study area is within the urban planning area for DMAMPO.

Based on the assumption that the study area will develop as the City of West Des Moines Comprehensive Plan, the spacing for the potential crossing and interchange alternatives will adopt the urban distance (1 mile), which is consistent with interchange spacing within the DMAMPO planning boundary.

SW Connector Crossing/Interchange Location

The SW Connector will generally be located south of and parallel to Adams Street based on Build Alternative 2 described above. In order to achieve the correct spacing for urban interchanges and maximize separation from the existing system interchange at IA 5, the SW Connector will be located roughly 1.2 miles north of County Road G14 and 1.6 miles south of IA 5.

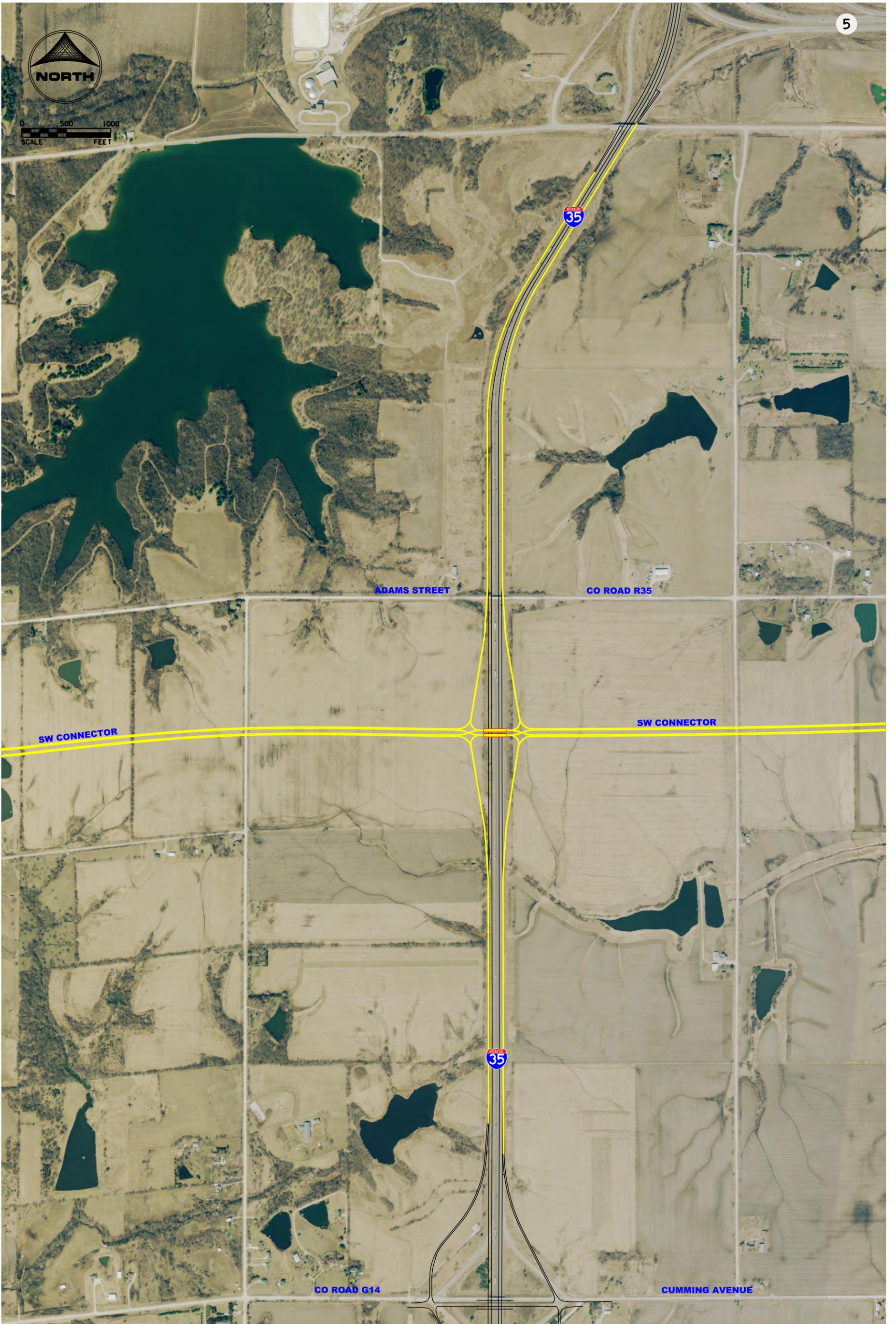
Although this alignment would meet the minimum interchange spacing criteria provided by AASHTO, additional consideration of adequate space between interchanges for traffic operations and signing is needed. Based on AASHTO’s *A Policy on Geometric Design of Highways and Streets*, 2011, Chapter 10, minimum distances between the interchange ramps on I-35 should be 2,000 feet to provide sufficient weaving length. The interchange alternatives identified will likely need additional widening of I-35 at Adams Street to accommodate either a ramp or auxiliary lanes.

Interchange Alternative 1 – Diamond Interchange

The first interchange alternative assumes the SW Connector is developed as an arterial street with at-grade intersections both east and west of I-35. This alternative presents a diamond interchange layout developed with diagonal ramps that merge with I-35 in a manner that would require at most an additional 24-feet of width on each side of I-35 at the Adams Street crossing. Interchange Alternative 1 provides added traffic carrying capacity for potential high-volume left turning movements between the SW Connector and I-35, shown in Figure 18.

The resulting weaving distances along I-35 exceed the minimum 2,000 feet and are:

- County Road G14: 2,800 feet
- IA 5: 5,200 feet



Interchange Alternative 2 – Cloverleaf Interchange

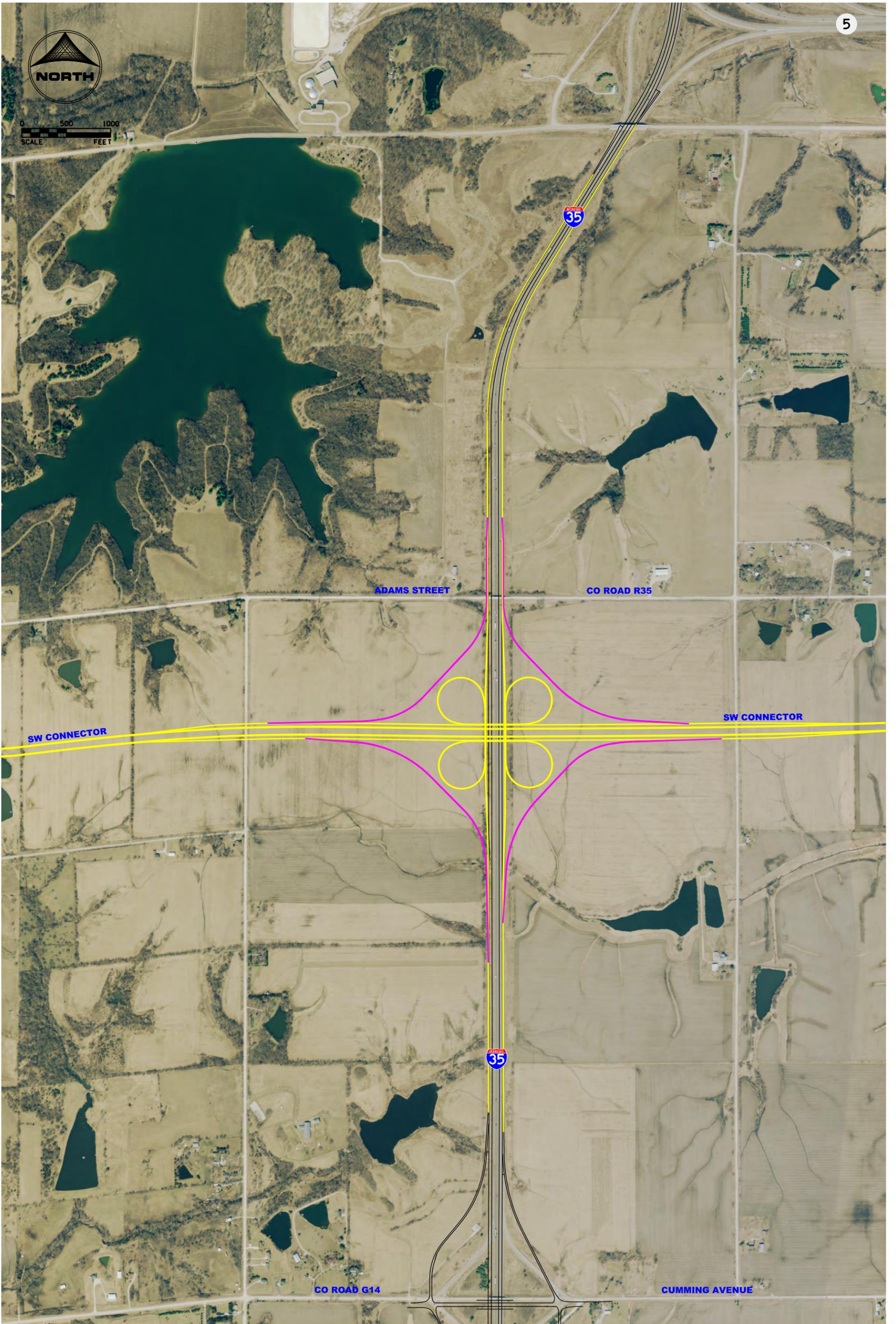
The second interchange alternative assumes the SW Connector is developed as a freeway with grade-separated interchanges both east and west of I-35. This alternative presents a directional interchange that would provide free-flow movements for all directions. The Cloverleaf Interchange would be constructed to current standards featuring a parallel collector-distributor roadway adjacent to the mainline of travel. The development of the parallel roadways would require two lanes at the Adams Street crossing or an additional 24-feet of width on each side of I-35.

The resulting weaving distances along I-35 exceed the minimum 2,000 feet and are:

- County Road G14: 2,500 feet
- IA 5: 4,300

This interchange alternative could be constructed in phases as the SW Connector develops by constructing the diagonal ramps as an initial phase with at-grade access control on the SW Connector. Then the loops could be added as needed.

Alternative 2, the Cloverleaf Interchange, is shown in Figure 19.



Interchange Alternative 3 – Semi-Directional Interchange

The third interchange alternative assumes the SW Connector is developed as a freeway with grade-separated interchanges west of I-35 and an arterial with at-grade intersections east of I-35. This alternative presents a semi-directional interchange that provides free-flow movements for interstate type travel to/from I-35 and the SW Connector west of I-35.

This alternative also provides potential phasing options to allow for expansion of the interchange as demand warrants.

- Phase 1: Construct a basic diamond interchange while the SW Connector functions as a local arterial street, with stop sign or traffic signal control at the ramp intersections with the SW Connector.
- Phase 2: Construct a free-flow diagonal ramp from southbound I-35 to westbound SW Connector and a flyover structure from eastbound SW Connector to northbound I-35. The diamond interchange ramps from Phase 1 would remain in place.
- Phase 3: As travel demand increases to the point where free-flow travel to/from the south and west is needed, an additional flyover ramp for northbound I-35 to westbound SW Connector. The complimentary free-flow diagonal ramp for eastbound SW Connector to southbound I-35 would be constructed.

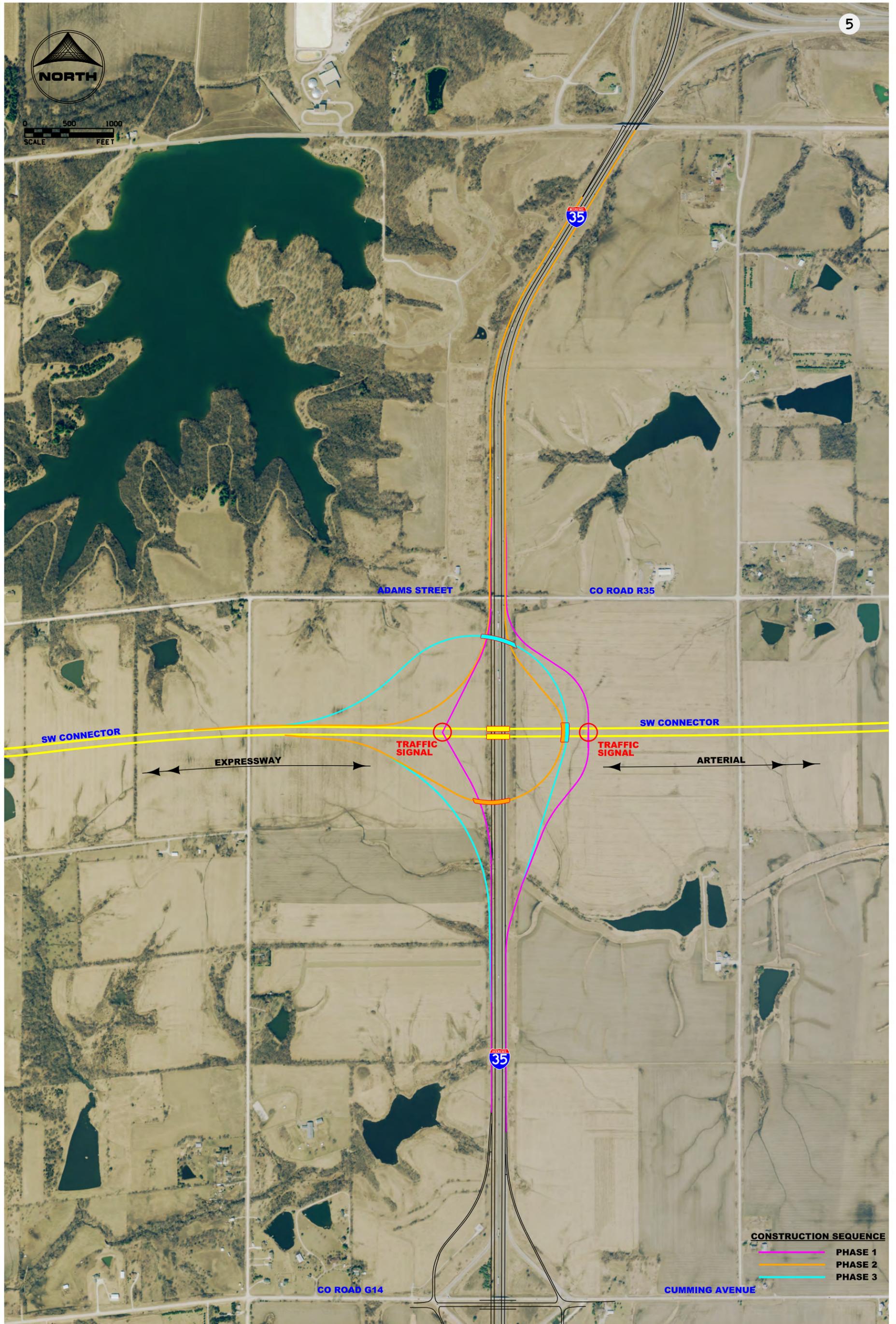
This alternative requires two auxiliary lanes adjacent to I-35 at the Adams Street crossing in both the northbound and southbound directions to accommodate the new ramps. The resulting weaving distances along I-35 exceed the minimum 2,000 feet and are:

- County Road G14: 2,300 feet
- IA 5: 5,200 feet

Alternative 3, the Semi-Directional Interchange, is shown in Figure 20 with the phased construction options highlighted.



0 500 1000
SCALE FEET



CONSTRUCTION SEQUENCE

- PHASE 1
- PHASE 2
- PHASE 3

Public Involvement

Technical Advisory Committee

Project Advisory Committee

Public Meeting

Project Website

This chapter summarizes the public involvement activities undertaken during the course of the study process. Additional information related to comments provided at the public meeting can be found in Appendix F.

Technical Advisory Committee

At the beginning of the location study process, a Technical Advisory Committee (TAC) was established to review technical memorandum and provide guidance for the Study. The TAC is made up of representatives from the following agencies:

- Warren County
- Madison County
- City of Cumming
- City of West Des Moines
- Des Moines Area Metropolitan Planning Organization
- Iowa DOT Districts 1, 4, and 5
- Iowa DOT Office of Location and Environment
- Federal Highway Administration

The committee met on several occasions to discuss progress on tasks outlined as components of the Study. The first meeting held in October 2012 featured a presentation by consultant staff on the project and the schedule for work to be completed. Additionally, the first technical memorandums were distributed for TAC member review. The second meeting, May 2013, featured consultant staff presenting findings from additional technical memorandum, as well as, the preliminary results of the TDM. Discussion at the May 2013 meeting also covered alternative development and the preliminary alternatives. The most recent meeting was held January 28, 2014 to review technical memorandum and receive project updates in preparation of the draft study report. Committee members were interested in the results of the travel demand model and the development of model scenarios.

Project Advisory Committee

A Project Advisory Committee (PAC) was also established for the Study with the Southwest Economic Development Cooperative. The Cooperative is a partnership that is focused on “strategic economic, land use, and transportation planning.” Representatives of the Cooperative are from the following agencies:

- Dallas County
- Madison County
- Warren County
- City of Cumming
- City of Norwalk
- City of Waukee
- City of West Des Moines
- City of Van Meter
- Warren County Economic Development Corp.
- Madison County Development Group

The first PAC meeting pertaining to the Study was held on April 4, 2013. The meeting featured a presentation by consultant staff on the status of the Study. The PAC was interested in how the SW Connector project fit with other projects in the Cooperatives area of interest and what alternatives were developed and evaluated for the interchange at I-35.

A second PAC meeting was held March 27, 2014 with 19 members of the committee and project staff attending. The meeting featured a presentation by consultant staff on the status of the Study, including a summary of the public meeting and alternatives being considered. The PAC was interested in how the alignment alternative was spaced to accommodate interchange alternatives, and the results of the TDM.

Public Meeting

A public meeting was held on February 27, 2014 at the Happy Apple Orchard Banquet facility in Norwalk, Iowa. The meeting was publicized in two newspapers in Warren County, TAC member websites, and the Study website. Additionally, a mailing was sent to property owners in the vicinity of the project corridor. Approximately 100 persons, including members of the TAC, attended the public meeting with 65 persons signing the register upon entering the meeting.

During the meeting attendees were able to view displays and discuss alternatives being considered with consultant staff and members of the TAC. A presentation given by consultant staff provided a summary of the work completed, the alternatives being considered, and the next steps in the Study.

Attendees were encouraged to discuss the project with staff and oral comments covered many of the important issues for residents of the study area. Main topics of discussion include: the recommended alignment in relation to the attendee's property, the projects time frame for construction, and how the construction of the SW Connector will be funded.

Attendees were encouraged to provide written comments on the alternatives. During the open comment period no written comments were received; however, individuals unable to attend the public meeting contacted project staff to receive materials presented at the public meeting. A summary of the public meeting can be found in Appendix F.

Study Website

A website was created to provide information on the Study to the public. The website provides an overview of the project with the history of the previous studies completed within the corridor. The Study schedule with significant tasks is also available for public review. Memorandums presented to the Technical Advisory Committee are posted on the website. Documents presented at the public meeting were also added for individuals who may have been unable to attend. Additionally, the website allows individuals to sign-up for a mailing list to received updates on the Study.



Property owners and interested individuals discuss the SW Connector with the TAC members and project staff in February 2014

Recommendations & Implementation

Recommended Alternative

Right-of-Way Needs

Implementation

Construction Phasing

Stormwater Management

Additional Environmental Analysis

Applicable Regulatory Permitting Considerations

Planning Level Cost Estimation

This chapter documents the findings of the Study, makes recommendations, and provides implementation guidance to proceed with the development of the corridor.

Recommended Alternative

The recommended facility is an arterial-type facility east of I-35 and a freeway-type facility west of I-35 with the ability to expand as land use intensifies along the corridor. The portion of the SW Connector east of I-35 will feature one lane each direction with turn lanes at at-grade intersections and will include multimodal facilities where appropriate. The portion of the SW Connector west of I-35 will feature two or four lanes each direction (depending on traffic volumes at time of construction) and the ability to expand as traffic volumes increase. The SW Connector west of I-35 may also have grade-separated interchanges as development along the corridor warrants interchange access.

Conceptual designs for the SW Connector are presented in Figures 21 and 22. These figures illustrate what the SW Connector may look like and are in no way the final design for the SW Connector. Final right-of-way and roadway dimensions may vary.

An Interchange Justification Report (IJR) will be required before an interchange alternative can be approved, but at this time, the recommended interchange alternative is the semi-directional interchange. The alternative provides the most flexibility to accommodate future demand along the corridor. During the IJR process additional analysis will be conducted for the interchange alternatives to refine traffic operations of the interchange spacing and demonstrate that adequate weaving distance exists. Additionally, the recommended interchange alternative provides the best fit with the types of facility recommended for the SW Connector both east and west of I-35.

In order to meet the needs outlined in the Guiding Principles chapter, the recommended alternative for the SW Connector needs to:

- Improve regional roadway system linkages to enhance local and regional mobility.
- Create new property access in conformance with future land use plans of the City of West Des Moines, Warren County, and Madison County.
- Minimize social and natural environmental impacts.
- Maximize cost effectiveness of improvements to be implemented over time.

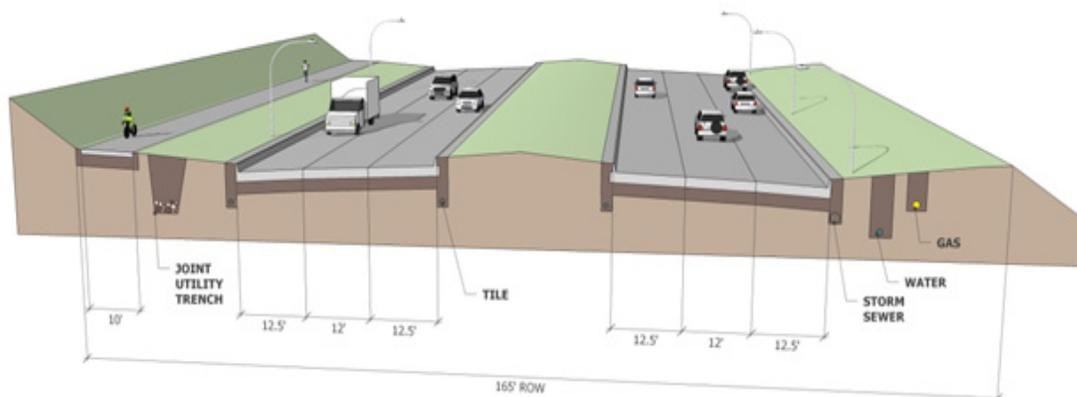


Figure 21 - Conceptual Design of Ultimate Vision for SW Connector East of I-35

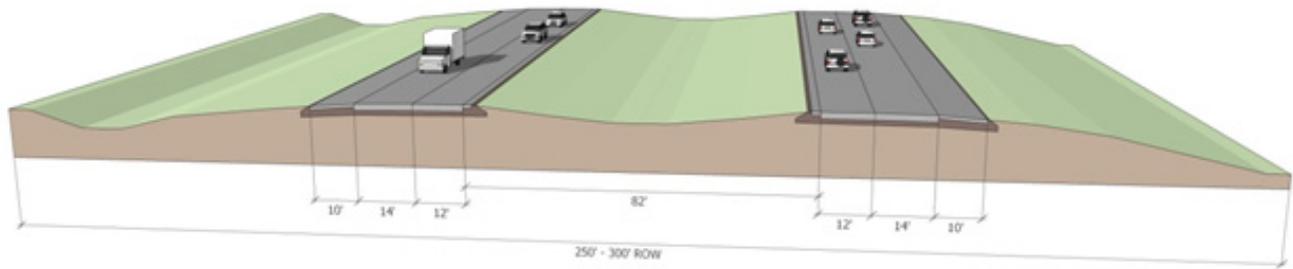


Figure 22 - Conceptual Design of Ultimate Vision for SW Connector West of I-35

The recommended alignment follows the Great Western Trail south from the existing portion of the Veterans Parkway, then parallels Adams Street. West of I-35, the recommended alignment follows a ridgeline south of Adams Street to the planned extension of Grand Prairie Parkway into Madison County. The alignment will need further evaluation during the design phase to determine the alignment as the facility nears Cherry Creek to minimize environmental impacts. The recommended alignment is shown in Figure 23.

Right-of-Way Needs

The results of the Full Build-Out model were used to determine the right-of-way needs of the SW Connector Corridor (Table 6). The lane configuration required to provide LOS D at Full Build-Out was determined to be three lanes each direction west of I-35 and three lanes each direction, plus right and left turn lanes east of I-35.

Table 6 - Lane Configuration to Achieve LOS D

Scenario	West of I-35 (Freeway) Required Lane Configuration for Level of Service "D"	East of I-35 (Urban Arterial) Required Lane Configuration for Level of Service "D"
Forecast Year 2035	1 lane each direction	1 lane each direction, plus R & L turn lanes
Full Build-out	3 lanes each direction	3 lanes each direction, plus R & L turn lanes

Based on the Full Build-Out scenario in the table above, the right-of-way needs for each section were determined based on the following lane configurations:

- **East of I-35:** 6-lane section, plus right and left turn lanes at all intersections.
- **West of I-35:** 6-lane section

East of I-35 a right-of-way of 165-feet should be reserved for the arterial-type facility, while west of I-35 between 250 to 300 feet should be reserved depending on topography. East of I-35, the use of the right-of-way adjacent to the Great Western Trail will be considered as it is located along the recommended alignment in both the previous feasibility study and this Study. Use of the existing right-of-way will help meet the goal of maximizing the cost effectiveness of improvements over time.

Figure 23

Recommended Alignment for SW Connector



Legend

- SW Connector Roadway Extent
- Proposed Right-of-Way
- Proposed Bridge Crossing
- Great Western Trail
- Grand Prairie Parkway (Planned)
- West Des Moines Ultimate Streets (Planned)
- Counties



0 1,000 2,000 4,000 Feet

1 inch = 2,500 feet



Implementation

Construction Phasing

Although the Full Build-Out Scenario determined the reservation of right-of-way, the TDM results indicate that the Forecast Year (2035) capacity needs are far less. Initial traffic volumes will likely be well below Forecast Year estimates as the current land use is rural and agricultural. However, the need for capacity increases in the study area is documented and the recommended facility alternative provides a flexible design that can be expanded with minimal disruption to access and mobility as development occurs. The recommended phasing of construction for the recommended facility alternative is as follows:

Initial Construction

- East of I-35: A 37-foot wide (three lanes back-to-back) section consisting of one lane in each direction with left-turn lanes at intersections. Grading and utility construction may also be completed to facilitate future expansion.
- West of I-35: Either a two-lane road or a four-lane divided facility depending on traffic volumes at time of construction.

Future Construction

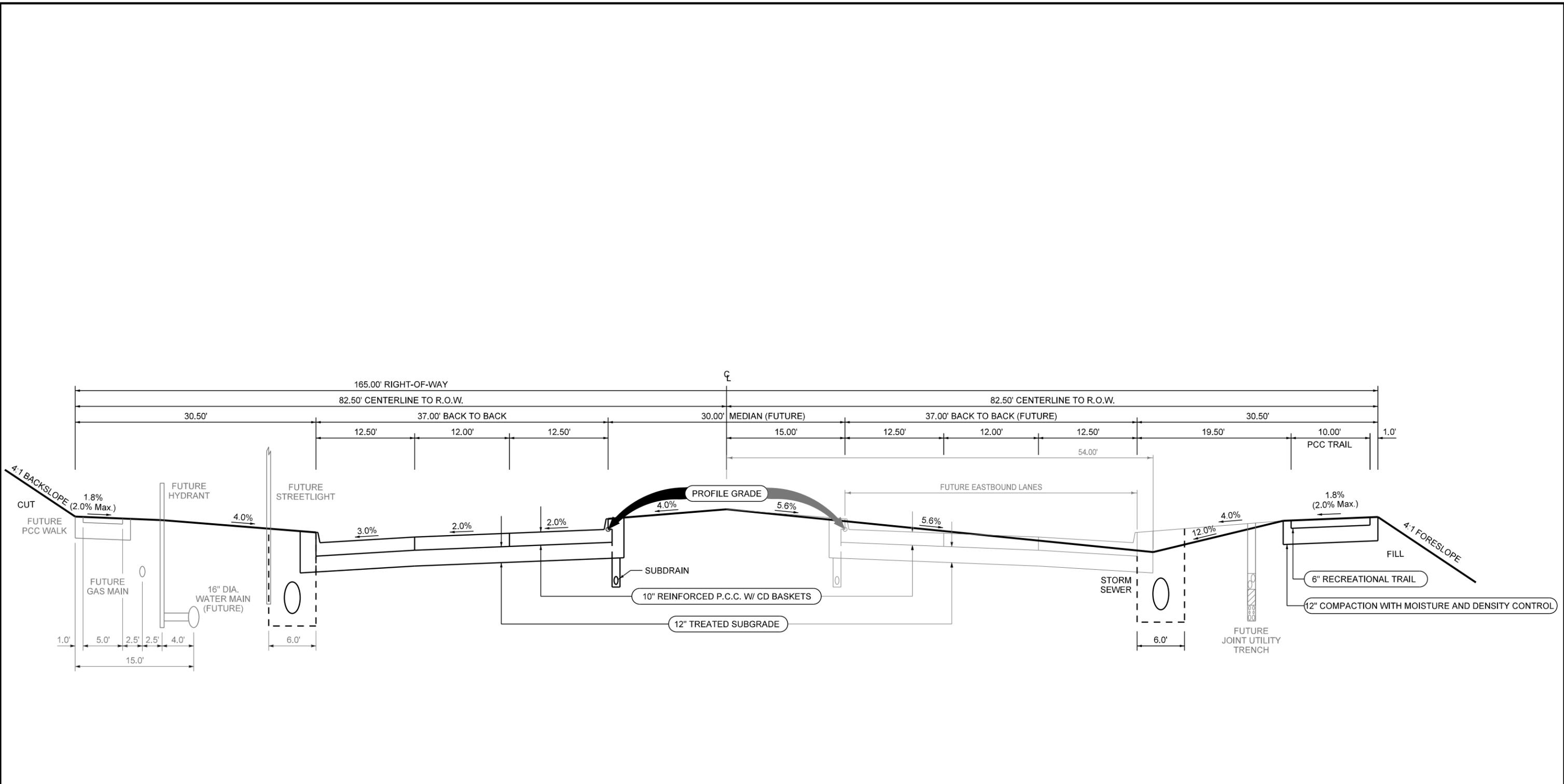
- East of I-35: Add traffic signals at intersections as they become warranted. Build an additional three-lane section (eastbound) parallel to the initial construction. Re-stripe initial construction for westbound usage.
- West of I-35: Convert the four-lane facility to six-lanes by paving the median and installing concrete barriers.

A typical section of the portion of the SW Connector east of I-35 is shown in Figure 24. The typical section displays future expansion relative to the initial construction.

While the initial construction of the recommended facility includes a bridge crossing over I-35, the recommended interchange alternative also features phased construction. The phasing of construction for the recommended interchange alternative allows for expansion of the interchange as travel demand warrants. The future IJR process will determine the final construction phasing for an interchange at I-35 utilizing the most current DMAMPO travel demand model.

Interchange Construction

- **Phase 1:** Construct a basic diamond interchange while the SW Connector functions as a local arterial street, with stop sign or traffic signal control at the ramp intersections with the SW Connector.
- **Phase 2:** Construct a free-flow diagonal ramp from southbound I-35 to westbound SW Connector and a flyover structure from eastbound SW Connector to northbound I-35. The diamond interchange ramps from Phase 1 would remain in place.



SOUTHWEST CONNECTOR
 INTERMEDIATE SECTION - THREE LANE ROADWAY
 37' B-B WITH 8" STANDARD CURB

- **Phase 3:** As travel demand increases to the point where free-flow travel to/from the south and west is needed, an additional flyover ramp for northbound I-35 to westbound SW Connector. The complimentary free-flow diagonal ramp for eastbound SW Connector to southbound I-35 could be constructed.

Stormwater Management

With the construction of the SW Connector, impacts on stormwater management will be considered. West of I-35 the SW Connector right-of-way will be developed so that water runoff can drain to ditches, median drains, and culverts. The SW Connector east of I-35 will be developed to handle stormwater with intakes, storm sewers, and culverts. In the design of the stormwater management system the potential for future developments to drain to the SW Connector will be evaluated.

Additional Environmental Analysis

As the design and implementation process moves forward for the SW Connector it is recommended that coordination with the following agencies be initiated to address potential environmental concerns mentioned in the Study.

- U.S. Army Corps of Engineers (USACE)
- Iowa DNR
- Iowa Geological & Water Survey
- Iowa Department of Agriculture and Land Stewardship: Mines and Minerals Bureau

Agency coordination will provide insight into concerns that will need further analysis and the potential need for National Environmental Policy Act (NEPA) compliance and permitting.

Applicable Regulatory Permitting Considerations

The following permits will be considered during the development of the SW Connector Corridor dependent upon the requirements of funding opportunities. If the project is constructed in multiple phases permits will need to be evaluated for each project phase. Permits include:

- National Pollution Discharge Elimination System (NPDES) Permit
- Flood Plain Development Permits
- Federal Emergency Management Agency (FEMA) Conditional Letter of Map Revision (CLOMR)
- FEMA Letter of Map Revision
- USACE 404 Permit

Planning Level Cost Estimation

Planning level cost estimations were evaluated for the initial construction of the recommended facility following the recommended alignment. The alignment for the SW Connector was divided into four sections while determining cost to more accurately estimate the cost for the initial construction of the recommended facility alternative. The estimated cost for each section is provided in Table 7. More detail on estimated costs of construction can be found in Appendix G.

Table 7 - Planning Level Cost Estimation for SW Connector Segments

Segment	Length (Miles)	Initial Construction Estimate* (millions \$)	Future Construction Estimate* (millions \$)
IA 5 to S. 35th St.	1.7	9.9	3.4
S. 35th St. to S. 50th St.	1.0	6.7	2.5
S. 50th St. to S. 60th St.	1.0	7.9	5.4
S. 60th St. to Grand Prairie Parkway	3.0	20.3	5.7
Total	6.7	43.8	17.0

* Estimates in 2014 Dollars

Interchange Planning Level Cost Estimate

The initial construction cost estimate for the South 50th Street to South 60th Street segment includes the construction of a bridge crossing I-35 without Interstate System access. At this time, an engineer's opinion of probable construction cost for a future I-35/SW Connector Interchange has been prepared, but final construction phasing and cost estimation will be completed in a future Interchange Justification Report (IJR). The cost estimate for the recommended interchange alternative is shown in Table 8.

Table 8 - Planning Level Cost Estimate for Recommended Interchange Alternative

	Construction Estimate* (millions \$)
Phase 1	13.1
Phase 2	17.9
Phase 3	15.3
Total	46.3

*Estimates in 2014 Dollars

Appendix A

Guiding Principles Technical Memorandum

Appendix B

Multimodal Analysis Technical Memorandum

Appendix C

Travel Demand & Capacity Needs Analysis Technical Memorandum

Appendix D

Environmental Screening Overview Technical Memorandum

Water Resource Technical Memorandum

Appendix E

Build Alternative Analysis Technical Memorandum

**Future SW Connector/I-35 Interchange and Interstate Crossing
Continuity Technical Memorandum**

Appendix F

Public Involvement

Appendix G

Cost Estimations