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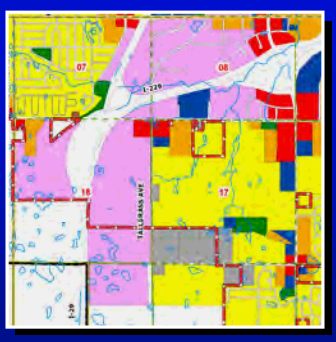
Draft
Environmental Assessment
Solberg Avenue – Tallgrass Avenue Overpass



Connecting South Dakota and the Nation

March 24, 2010

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List of Acronyms and Abbreviations

ASTM	American Society for Testing and Materials
Ave	Avenue
BMPs	Best Management Practices
Census	United States Census Bureau
CFR	Code of Federal Regulations
dB	decibel
dBA	decibels weighted with A-level frequency
EA	Environmental Assessment
EDR	Environmental Data Resources, Inc.
EIS	Environmental Impact Statement
EO	Executive Order
ESA	Endangered Species Act
FEMA	Federal Emergency Management Agency
FPPA	Farmland Protection Policy Act
FHWA	Federal Highway Administration
FIRM	Flood Insurance Rate Map
HCM	Highway Capacity Manual
HCS	Highway Capacity Software
HGM	Hydrogeomorphic
I-29	Interstate 29
I-229	Interstate 229
L_{eq}	equivalent level
$L_{eq}(h)$	equivalent steady state sound level
LOS	Level of service
MBTA	Migratory Bird Treaty Act
mph	miles per hour
MSA	Metropolitan Statistical Area
NA	Not applicable
NAAQS	National Ambient Air Quality Standards
NAC	Noise Abatement Criteria
NEPA	National Environmental Policy Act
NFIP	National Flood Insurance Program
NHPA	National Historic Preservation Act
NPDES	National Pollutant Discharge Elimination System
NRCS	Natural Resources Conservation Service
NRPH	National Register of Historic Places

NWI	National Wetland Inventory
pc/mi/ln	passenger cars per mile per lane
ppm	parts per million
PEMA	palustrine emergent temporarily flooded
PEMAd	palustrine emergent temporarily flooded partially drained/ditched
PEMC	palustrine emergent seasonally flooded
PFOC	palustrine forested seasonally flooded
PL	Public Law
PM_{10}	particulate matter 10 microns or smaller
$PM_{2.5}$	particulate matter 2.5 microns or smaller
Rd	Road
REC	Recognized Environmental Condition
ROW	Right-of-way
SCS	Soil Conservation Service
SECOG	Southeastern Council of Governments
SDDENR	South Dakota Department of Environment and Natural Resources
SDDGFP	South Dakota Department of Game, Fish and Parks
SDDOT	South Dakota Department of Transportation
SHPO	State Historic Preservation Office
St	Street
STIP	Statewide Transportation Improvement Program
SWD	Surface Water Discharge
TAZ	Traffic Analysis Zone
TNM	Traffic Noise Model
TSS	Total suspended solids
UDC	Urbanized Development Commission
Uniform Act	Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970
URS	URS Corporation
USACE	United States Army Corps of Engineers
U.S.C.	United States Code
USEPA	United States Environmental Protection Agency
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Society
UST	Underground storage tank
ug/m^3	micrograms per cubic meter

SECTION ONE INTRODUCTION

1.1 BACKGROUND

The proposed project is located in the southern portion of Sioux Falls, South Dakota along a proposed Solberg Avenue/Tallgrass Avenue alignment between 59th Street and 69th Street (**Figure 1**). The purpose of the project is to improve the connectivity of developing areas in the southwest area of Sioux Falls to the existing arterial street network by providing an extension of Solberg Avenue south of 59th Street to Tallgrass Avenue at 69th Street. The extension of Solberg Avenue includes an overpass of Interstate 229 (I-229), which would be located approximately ¼ mile east of Interstate 29 (I-29) and one mile west of Louise Avenue. The proposed cross section of the Solberg Avenue corridor is a four-lane divided road with:

- Left and right turn lanes provided at 69th Street.
- Left and right turn lanes provided at 59th Street.

At the south end of proposed project, the City of Sioux Falls is currently preparing design plans for the reconstruction and widening of 69th Street from Tallgrass Avenue to Connie Avenue. 69th Street is currently a paved two-lane between Connie Avenue and Medical Court West, approximately 1000 feet east of Tallgrass Avenue. Between Tallgrass Avenue and Medical Court West, 69th Street is a rural, unpaved road. Tallgrass Avenue south of 69th Street is also a rural, unpaved road. The proposed cross section of the 69th Street corridor is a four-lane divided road. This project is included in the 2009 - 2013 City of Sioux Falls Capital Improvement Program. This project is also included as a cumulative impact for this project.

Existing land uses adjacent to the project include a mixture of agricultural, office/light industrial, hospital, and a limited amount of commercial use intermixed. The area adjacent to Tallgrass Avenue and Solberg Avenue fall within the limits of growth/development anticipated to occur prior to 2015. These areas are expected to be developed as residential, light industrial, office and a limited amount of commercial. The area to the southwest of the Tallgrass Avenue / 69th Street intersection is expected to be developed as a medical research campus with commercial retail to the south of that development.

Poor traffic operations in the morning and evening peak periods along arterial routes presently serving study area residential and commercial/industrial developments have led the City of Sioux Falls and the South Dakota Department of Transportation (SDDOT) to evaluate a range of alternatives that incorporate the Interstate and city arterial systems in reducing congestion. As the area continues to develop, current operational concerns will get worse without action and the increased mix of pedestrian and vehicular traffic resulting from the combinations of residential and industrial/office/commercial will likely lead to more conflicts and safety issues.

The level of traffic generated by development in areas adjacent to Solberg Avenue-Tallgrass Avenue and 69th Street in the current and future conditions results in traffic congestion along Louise Avenue. This proposed project provides increased connectivity and capacity for the urban arterial network, which would reduce the burden on the congested Louise Avenue corridor.

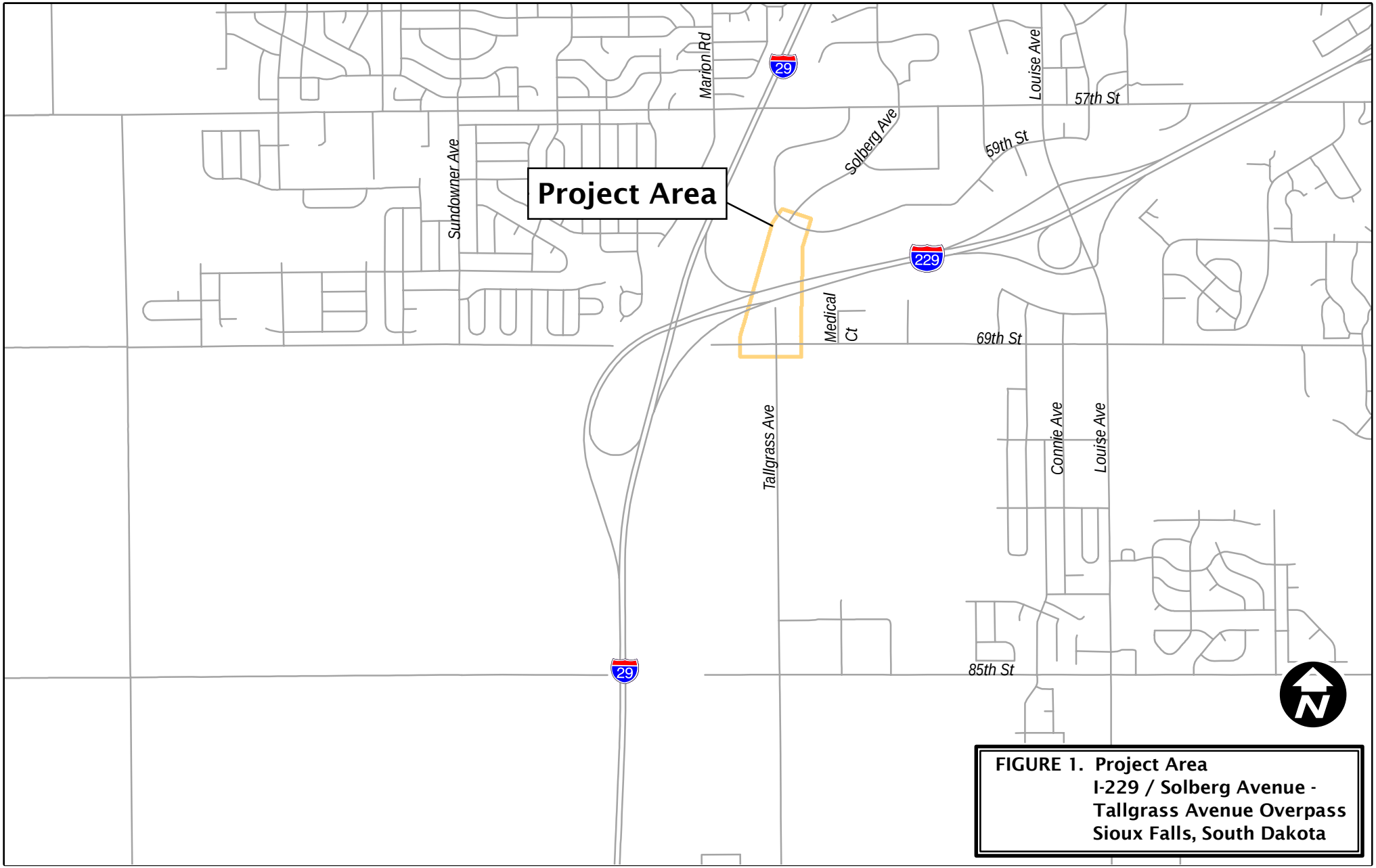


FIGURE 1. Project Area
I-229 / Solberg Avenue - Tallgrass Avenue Overpass
Sioux Falls, South Dakota

1.2 REPORT PURPOSE

The purpose of this environmental assessment (EA) is to document the process, the methods, and assumptions used in quantifying the physical, social and environmental impacts and benefits associated with the transportation system improvement concepts identified to address operational and safety issues in the study area.

SECTION TWO PURPOSE AND NEED FOR THE PROJECT

2.1 PROJECT PURPOSE

The area in the southwestern portion of Sioux Falls will continue to develop, and with the development, traffic on the existing roadway system will continue to increase. Two potential results of the continued development (including residential and industrial/commercial uses) and resulting traffic will be increased levels of congestion on already congested routes and a higher number of crashes involving vehicles and pedestrians/bicyclists. The purpose of implementing the Solberg Avenue-Tallgrass Avenue overpass is to positively influence traffic operations and safety in the area by:

- Providing an additional route across the interstate (I-229) to connect growth areas with the existing city arterial system, which would reduce the burden on the congested Louise Avenue route.
- Providing city arterial connections between growth areas and the existing routes that are complimentary to I-29 and I-229, which could reduce the number of short trips being made on the interstate or through existing interchange areas simply because current network connections to viable city arterials do not exist.
- Extending the pedestrian connectivity between areas north and south of I-229 relative to the current conditions. Presently, sidewalks exist along portions of 57th Street and along Solberg Avenue, but sidewalks are not continuous throughout the study area. In addition, while sidewalks are provided along Louise Avenue as it crosses I-229, the level of vehicular traffic traversing the interchange provides an unfriendly corridor for most pedestrians and bicyclists.

Thus, the project provides increased mobility and accessibility for traffic traveling through southern Sioux Falls.

2.2 PROJECT NEED

2.2.1 Need Associated with Traffic Operations

The Sioux Falls Planning Department has projected that the southwestern portion of the Sioux Falls metropolitan area, which includes the project area, will experience housing and employment development over the next 25 plus years. **Table 1** documents the increment of housing and employment forecasted for the area surrounding the study area. When compared to the forecasted increment of household and employment growth in the entire region, the level of growth in areas adjacent to the I-29/I-229 junction is anticipated to exceed the regional average. As such, the increase of traffic growth in the study area is forecasted to be greater than the regional average and would continue to add volume to the already congested corridors of 57th Street, 49th Street, 41st Street and Louise Avenue. The forecasted change in traffic analysis zone (TAZ) households and employment through the 2033 planning period are shown in **Figures 2 and 3**.

Through examination of the household and employment growth area and increment maps, it can be concluded that a substantial incremental increase of trip generation driven by household development will occur southwest of the I-29/57th Street overpass. As the increment of development in this area is principally residential the vast majority of the new trips being generated will have a destination east of I-29. East side to west side connectivity across I-29 for that subarea is currently provided by the 49th Street and 57th Street overpasses and these routes are presently congested in the

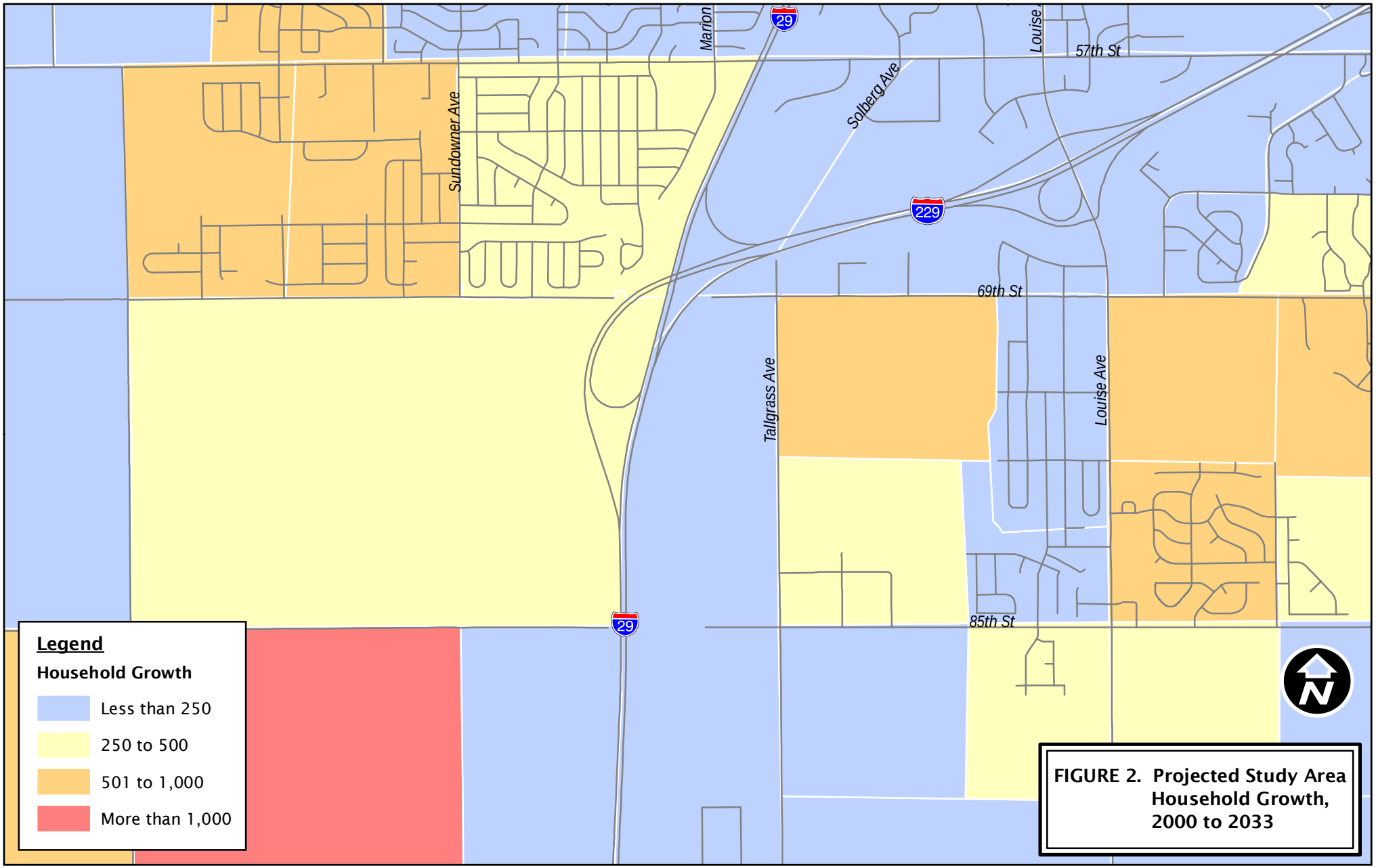


FIGURE 2. Projected Study Area Household Growth, 2000 to 2033

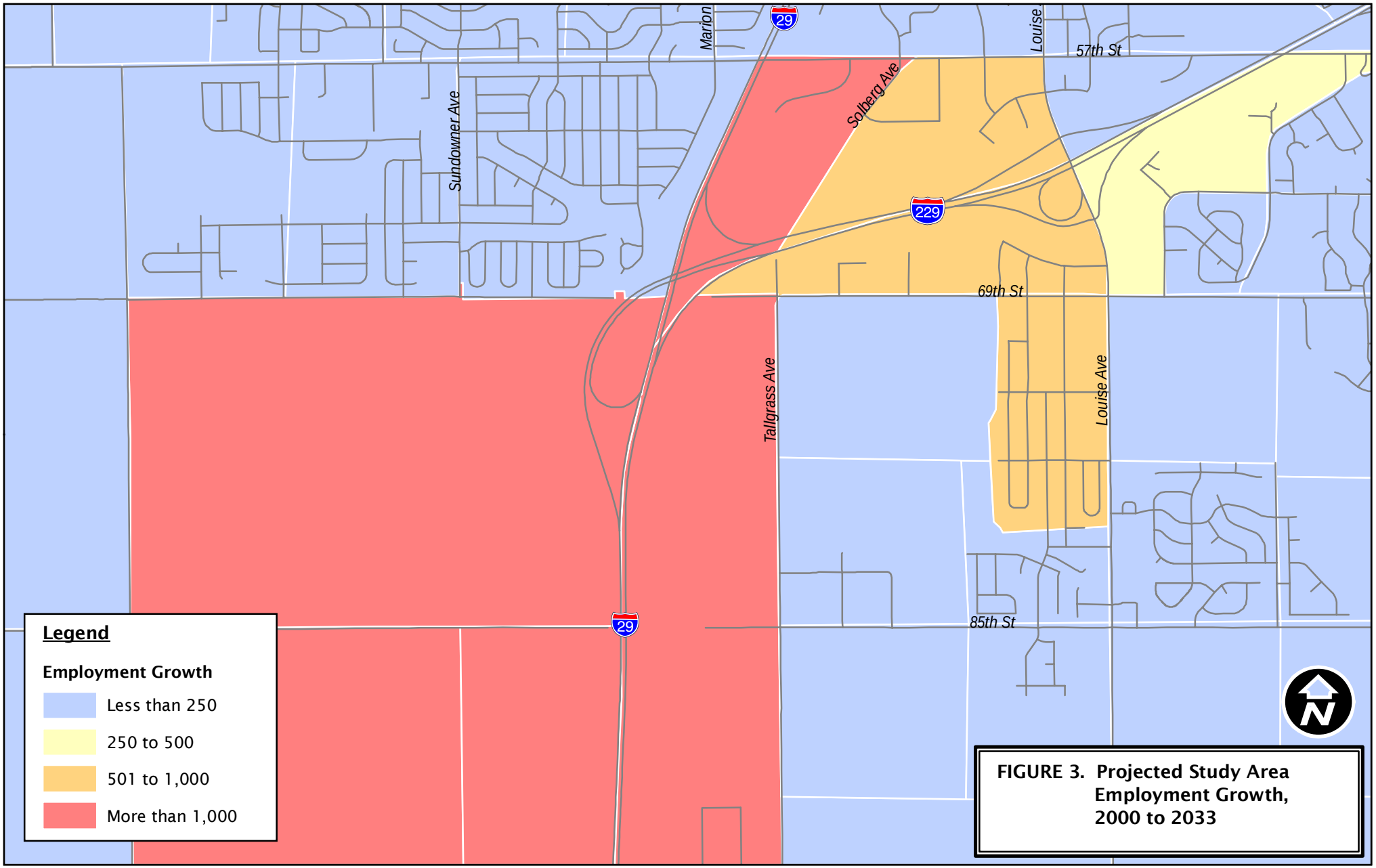


FIGURE 3. Projected Study Area Employment Growth, 2000 to 2033

congested in the peak periods. The increment of traffic will add to the already congested conditions. Significant employment growth is projected for the subareas directly north and south of I-229 in the area east of I-29. As a substantial portion of the anticipated employment growth is forecasted for the area south of 69th Street and as the type of development would draw most of its trips from areas north and east of the development, trips would principally be funneled through the Louise Avenue corridor, which is currently experiencing congestion in both the AM and PM peak hours.

Without the Action alternative concepts in place, no reasonable alternatives to Louise Avenue exist.

TABLE 1: PROJECTED SOCIO-ECONOMIC GROWTH, SIOUX FALLS MODEL, 2000 TO 2033

Evaluation Area	2000		2033		Percent Change	
	Dwelling Units	Total Employment	Dwelling Units	Total Employment	Dwelling Units	Total Employment
I-29/I-229 Interchange Study Area	5,480	6,890	11,610	29,970	112	335
Entire Sioux Falls Region	66,279	99,415	143,231	197,159	116	98

Source: Southeastern Council of Governments (SECOG)

2.2.1.1 Traffic Forecasting Process and Results

Traffic forecasts for 2033 have been developed along study area city arterial corridor and interstate routes of I-29 and I-229. Included in the forecasts are:

- Daily traffic on segments between key intersections.
- AM and PM peak hour intersection turning movements and segment volumes along city arterial and interstate routes.

The methods and assumptions used in developing the daily and peak hour forecasts are documented in the Traffic Forecasts and Traffic Operations Technical Memorandum, which is attached in Appendix A. The general methodology of the forecasting process is displayed in **Figure 4** and outlined below:

- 2033 No-Action Daily Forecasts: The Southeastern Council of Governments (SECOG) regional demand model was the principal source for estimating the increment of daily traffic associated with the 2033 development plan. The No-Action traffic network includes the extension of 59th Street and the widening/capacity increase for 69th Street. The model generates daily traffic assignments, which were adjusted to correct for the differences observed between the 2000 daily traffic counts and the 2000 daily traffic assignments from the base model. A process of correcting for the absolute and the relative error between counts and assignments was used.

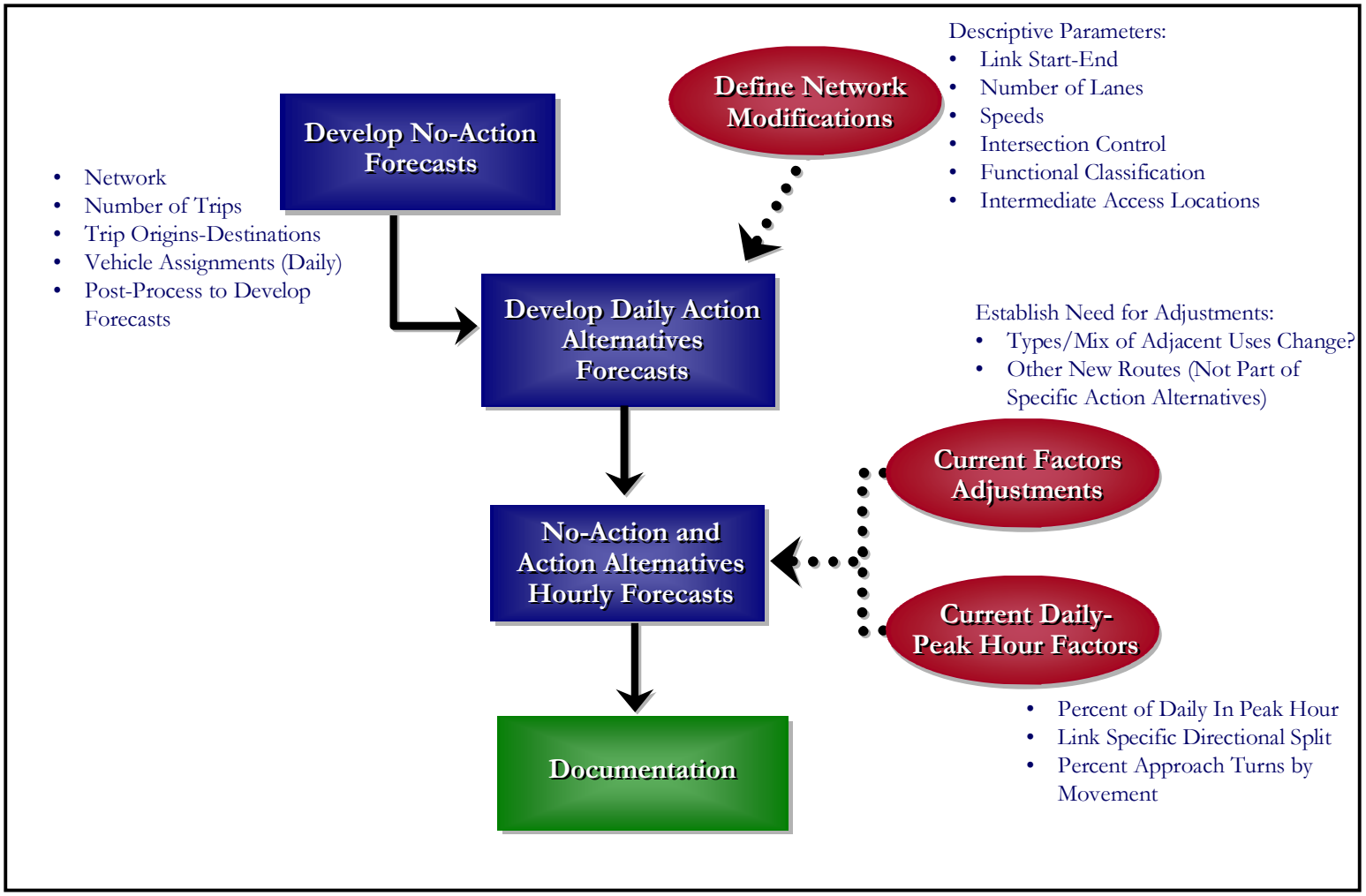


FIGURE 4. Traffic Forecasting Process Methodology

- Update the 2033 No-action Network to include the Solberg Avenue-Tallgrass Avenue overpass of I-229.
- Prepare 2033 Action alternative daily traffic forecasts to reflect the roadway network updates listed above. Assignments obtained from the regional travel model were adjusted using the same methodology and base condition adjustments as were applied in the 2033 No-action condition.
- Factor the 2033 No-Action and Action forecasts to the AM and PM peak hour. From existing condition daily segment counts and peak hour intersection turning movement counts, factors for the following were calculated:
  - Percentage of the daily traffic occurring in the AM or PM peak hour on key routes.
  - North-south or east-west directional splits for each key route segment in the AM and the PM peak hours.
  - Percentage turning distribution by intersection approach for right turns, left turns and through vehicles for each of the key intersections.
  - Adjust the peak hour percentages, directional splits and/or intersection percentage turns to reflect substantial changes in the source type of traffic in the study area. A change in source type is associated with a substantial change in the type of land use generating traffic (not necessarily just the increment) in an area. If an area is generally industrial today with open space that will be developed as residential, a change in a number of the parameters may be warranted.

Current (2007) segment daily traffic counts and 2033 daily No-action alternative forecasts are displayed in **Figure 5**.

2.2.1.2 Traffic Operations

The evaluation of existing and future traffic conditions for key arterial intersections, Interstate mainlines, and junctions employed the theory and methodologies contained in the *2000 Highway Capacity Manual* (HCM) (TRB 2000). The Highway Capacity Software (HCS, Release 4.1e; TRB 2000) was used to apply the HCM procedures.

For the purposes of this project, a deficiency is defined as level of service (LOS) D or worse. LOS is a term used to qualitatively describe roadway and intersection traffic operations. LOS is expressed as letters A to F, with LOS A representing the best operating conditions and LOS F the worst. The measures of effectiveness for the key intersections, basic freeway segments, ramp junctions, and weaving segments are discussed below:

- *Arterial and Collector Intersections:* At signalized intersections, LOS is based on the weighted average of all approach delays. For unsignalized intersections, the LOS is based on the worst minor street movement delay (usually the left turn movements on the cross street). **Table 2** provides the LOS criteria for signalized and unsignalized intersections.

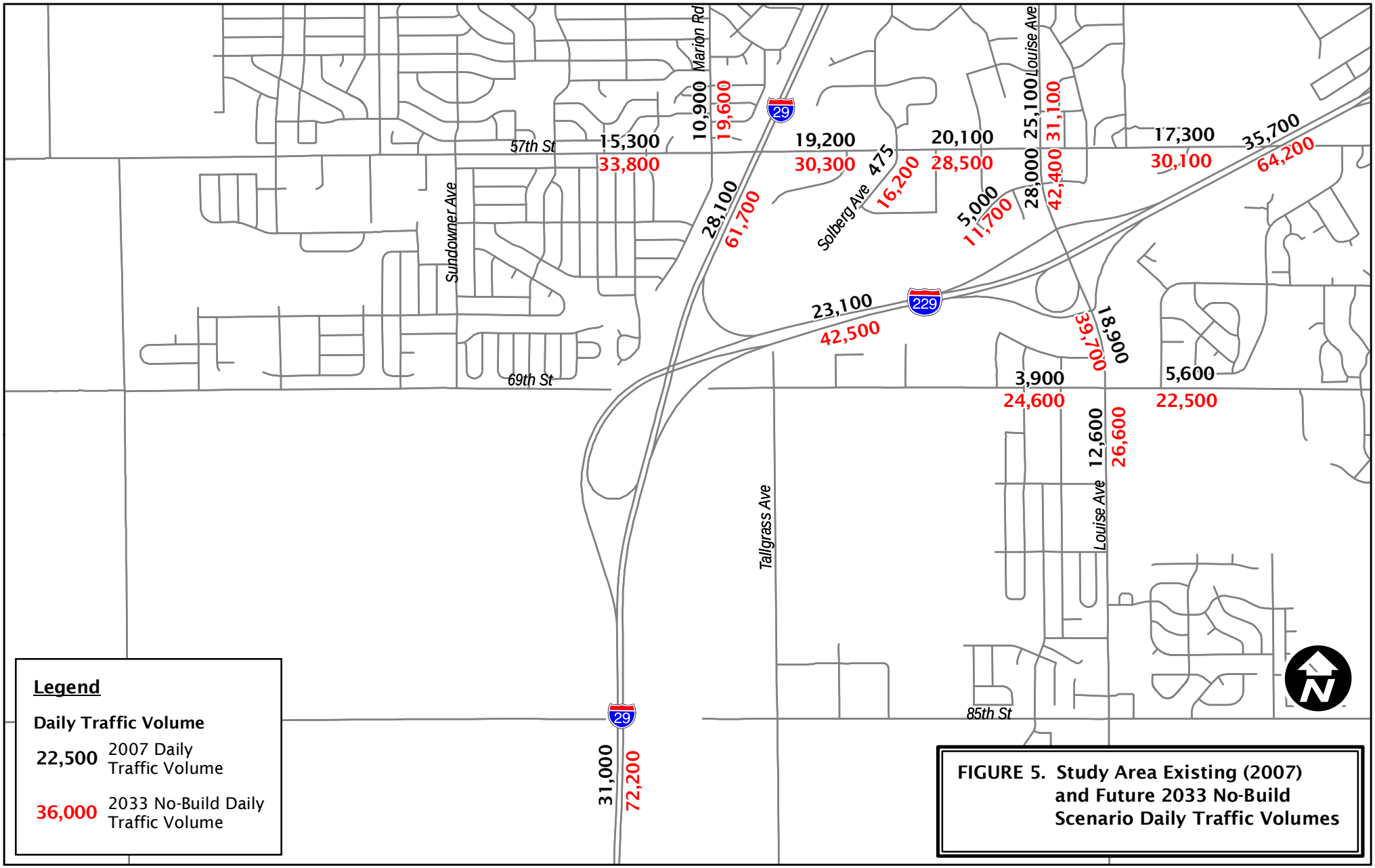


FIGURE 5. Study Area Existing (2007) and Future 2033 No-Build Scenario Daily Traffic Volumes

TABLE 2: LEVEL OF SERVICE CRITERIA FOR INTERSECTIONS

Level of Service	Control Delay per Vehicle (s/veh)	
	Signalized Intersections	Unsignalized Intersections
A	≤ 10	≤ 10
B	> 10 – 20	> 10 – 15
C	> 20 – 35	> 15 – 25
D	> 35 – 55	> 25 – 35
E	> 55 – 80	> 35 – 50
F	> 80	> 50

s/veh = average delay per vehicle in seconds

Source: 2000 Highway Capacity Manual, Exhibit 16-2 and Exhibit 17-2.

- *Basic Freeway Segments* – The LOS of a basic freeway segment is defined by the density of traffic flow in passenger cars per mile per lane (pc/mi/ln). Density is a measure that uses proximity to other vehicles to reflect effects on flow speed and the ability to maneuver. **Table 3** provides the LOS criteria for basic freeways.
- *Ramp Junctions* – The LOS of a ramp junction is also defined by the density of traffic flow in pc/mi/ln within the influence (merge or diverge) area of the ramp junction. **Table 4** provides the LOS criteria for ramp junctions.
- *Weaving Segments* - The LOS of a weaving segment is also defined by the density of traffic flow in pc/mi/ln within the weaving segment. **Table 5** provides the LOS criteria for weaving segments.

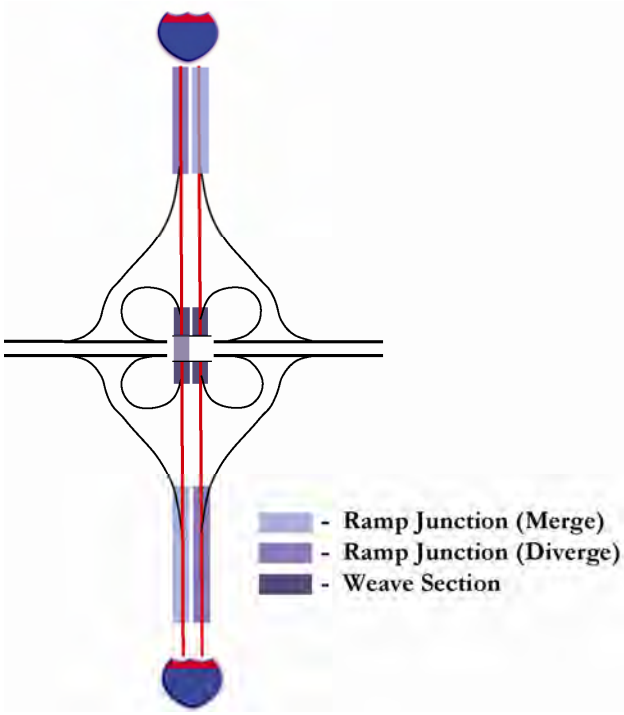


TABLE 3: LEVEL OF SERVICE CRITERIA FOR BASIC FREEWAY SEGMENTS [a]

Level of Service	Maximum [b] Density	Minimum [c] Speed	Max. Service [d] Flow Rate	Max. v/c [e] Ratio
A	11	70	770	0.32
B	18	70	1260	0.53
C	26	68.2	1770	0.74
D	35	61.5	2150	0.90
E	45	53.3	2400	1.00

Notes:

a – Assumed free-flow speed = 70 mph.

b – Density is the primary determinant of LOS. Density is measured as passenger cars per mile per lane (pc/mi/ln).

c – Speed is measured at the maximum density for a given LOS. Speed is measured as miles per hour (mph).

d – Maximum service flow rate is measured as passenger cars per hour per lane (pc/hr/ln).

e – Maximum volume / capacity ratio with volume and capacity both measured in terms of (pc/hr/ln).

Source: 2000 Highway Capacity Manual, Exhibit 23-2.

TABLE 4: LEVEL OF SERVICE CRITERIA FOR RAMP JUNCTIONS

Level of Service	Density (pc/mi/ln)
A	≤ 10.0
B	> 10.0 – 20.0
C	> 20.0 – 28.0
D	> 28.0 – 35.0
E	> 35.0
F	Demand exceeds Capacity

Note: Density is the primary determinant of LOS for ramp junctions. Other factors (e.g., maximum volumes for merge/diverge area) can result in lower LOS.
pc/mi/ln = passenger cars per mile per lane

Source: 2000 Highway Capacity Manual, Exhibit 25-4.

TABLE 5: LEVEL OF SERVICE CRITERIA FOR WEAVING SEGMENTS

Level of Service	Density (pc/mi/ln)
A	≤ 10.0
B	> 10.0 – 20.0
C	> 20.0 – 28.0
D	> 28.0 – 35.0
E	> 35.0 – 43.0
F	> 43.0

Note: Density is the primary determinant of LOS for weaving segments. Other factors (e.g., maximum weaving volumes) can result in lower LOS.
pc/mi/ln = passenger cars per mile per lane

Source: 2000 Highway Capacity Manual, Exhibit 24-2.

The AM and PM peak period traffic operations for the current (2007) conditions and 2033 No-build alternative resulting from application of the documented methodologies are displayed in **Figures 6 and 7**. A summary of the 2033 No-build traffic analyses results is provided below:

- Three basic freeway segments are projected at LOS D or worse during at least one peak period. This analysis assumes no additional improvements (e.g., auxiliary lanes) are provided to increase mainline capacity.
  - Southbound I-29 between 41st Street and I-229 (PM peak)
  - Southbound I-29 between I-229 and Tea [Highway 106] (PM peak)
  - Northbound I-29 between Tea and I-229 (AM peak)
- All of the I-29 / I-229 system interchange ramp junctions and both southbound I-229 ramp junctions at Louise Avenue are projected to operate at LOS D or worse during at least one peak period.
- Each of the signalized intersections along the Louise Avenue and 57th Street corridors are projected to operate at LOS D or worse during at least one peak period.
- The 69th Street / Solberg Avenue (Tallgrass Avenue) intersection only has two legs under the no-build scenario and operations are projected to LOS B or better.

Many of the signalized intersections with poor levels of service (LOS F) for are projected to significantly exceed the 80 second threshold established for LOS F operations.

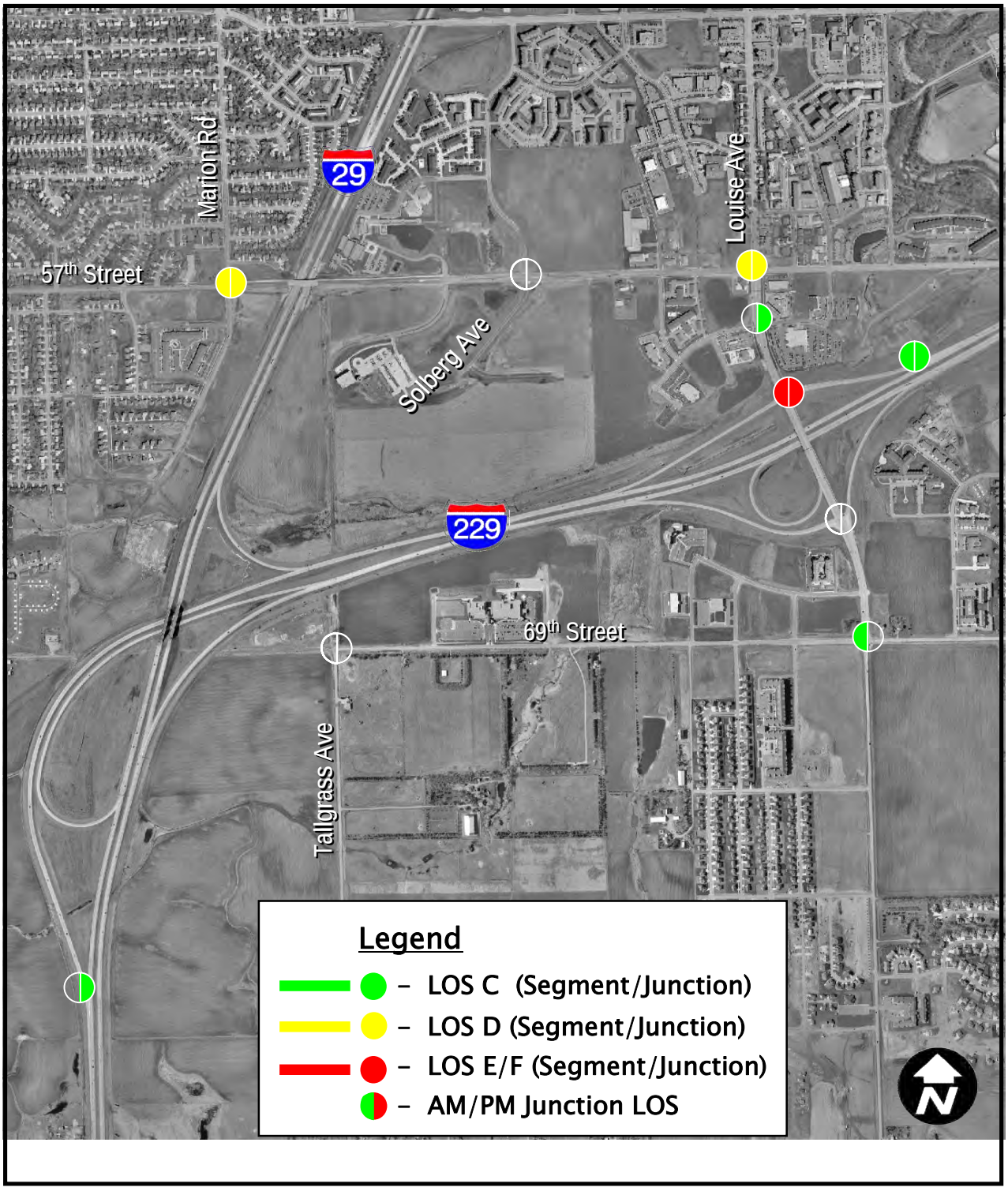


FIGURE 6. I-229 / Solberg-Tallgrass Avenue Overpass
Traffic Operations, Existing Conditions

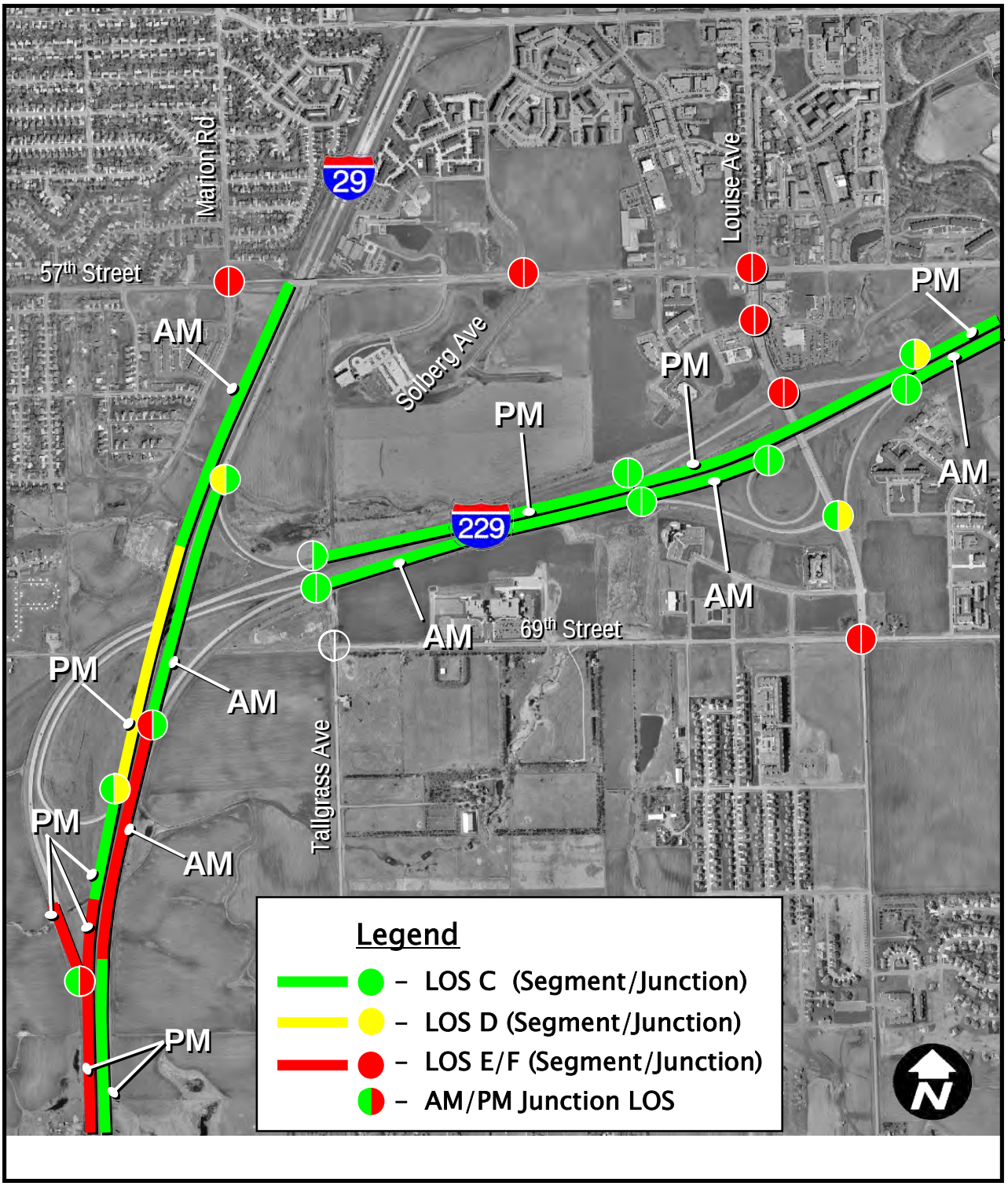


FIGURE 7. I-229 / Solberg-Tallgrass Avenue Overpass Traffic Operations, Future No-Build Conditions

2.3 PROPOSED ACTION

The proposed action is to provide an arterial crossing of I-229 at Solberg Avenue-Tallgrass Avenue, which would augment the existing conditions, connects between development areas north and south of the interstate. The Solberg Avenue-Tallgrass Avenue arterial corridor would comprise the following elements:

- Four-lane divided roadway extension of the Solberg Avenue corridor from the present termini at 59th Street to Tallgrass Avenue at 69th Street.
- Four-lane bridges (overpass) over I-229 for Solberg Avenue-Tallgrass Avenue.
- A traffic signal at the intersection of Solberg Avenue-Tallgrass Avenue/69th Street.
- Sidewalks on both side of the Solberg Avenue-Tallgrass Avenue corridor, including on the bridge over the interstate. One sidewalk will be wider in order to accommodate bicycle travel through this corridor.

SECTION THREE ALTERNATIVES

The area adjacent to the I-29/I-229 system interchange has been the focus of traffic analyses addressing interstate operations and enhanced access and arterial corridor analyses associated with site developments. Through the multi-focus studies a range of system interchange modifications to provide arterial access to 69th Street, additional I-29 accesses at 57th Street and 85th Street, modifications to the I-229/Louise Avenue interchange, development of overpasses intended to supplement city arterial connectivity and reduce the shorter trip burden on the interstate system and various arterial and collector street improvements have been extensively reviewed.

As part of the interstate study work, arterial overpass concepts that reflect the Solberg Avenue-Tallgrass Avenue connection were also evaluated. The focus of the arterial crossing evaluation was on the potential effects on interstate operations and traffic operations at the ramp junctions of I-29/41st Street, I-29/Lincoln County 106 and the I-229/Louise Avenue interchanges. The focus of the current project assessment expands beyond the interstate to include the arterial and collector intersections adjacent to the interstate.

The primary focus of the initial alternatives screening was the potential for the various alternatives to improve connectivity of on-going and future development areas with the remainder of the arterial system, the potential for positive or negative impacts to interstate operations and concept cost relative to the traffic operations benefits. While the alternatives that provide additional access to the interstate system addressed the goal of improving access to adjacent development areas, none of them resulted in substantial improvements at the congested interchanges of I-29/41st Street or I-229/Louise Avenue. In addition, the costs of the alternatives that provided additional interstate access to/from adjacent development areas were judged to be outside the local funding capacity based on current priorities and known commitments.

As the arterial overpass concept reasonably addressed the development property access goals without increasing the shorter trip burden on the interstate system and addressed the access goal at a lower cost than the additional interstate access concepts, the I-229/Solberg Avenue-Tallgrass Avenue concept was retained for consideration.

3.1 ALTERNATIVES RETAINED

As stated previously, one build alternative was retained for further analysis. In addition, the No-build Alternative has been included to satisfy National Environmental Policy Act (NEPA) requirements and Federal Highway Administration (FHWA) guidelines. The following two alternatives have been considered in the EA.

- Alternative 1 – No-build
- Alternative 2 –I-229/Solberg Avenue-Tallgrass Avenue Overpass (Grade Separation).

These alternatives are detailed in the following subsections.

3.1.1 Alternative 1 – No-build

The No-build Alternative assumes that no new access across I-229 would be provided. However, the No-build Alternative would include all other proposed maintenance/improvements to the existing arterial street network or interstate system that are identified in the 2010 - 2014 Statewide

Transportation Improvement Program (STIP, SDDOT 2009) or 2009 – 2013 City of Sioux Falls Capital Improvement Program (CIP, City of Sioux Falls 2008).

3.1.2 Alternative 2 – I-229/Solberg Avenue-Tallgrass Avenue Overpass (Grade Separation)

The proposed action is to provide an arterial crossing of I-229 at Solberg Avenue-Tallgrass Avenue, which would augment the existing conditions, connects between development areas north and south of the interstate. The Solberg Avenue-Tallgrass Avenue arterial corridor would comprise the following elements:

- Four-lane divided roadway extension of the Solberg Avenue corridor from the present termini at 59th Street to Tallgrass Avenue at 69th Street.
- Four-lane bridges (overpass) over I-229 for Solberg Avenue-Tallgrass Avenue.
- A traffic signal at the intersection of Solberg Avenue-Tallgrass Avenue/69th Street.
- Sidewalks on both side of the Solberg Avenue-Tallgrass Avenue corridor, including on the bridge over the interstate. One sidewalk will be wider in order to accommodate bicycle travel through this corridor.

Figure 8 shows the layout of this alternative.

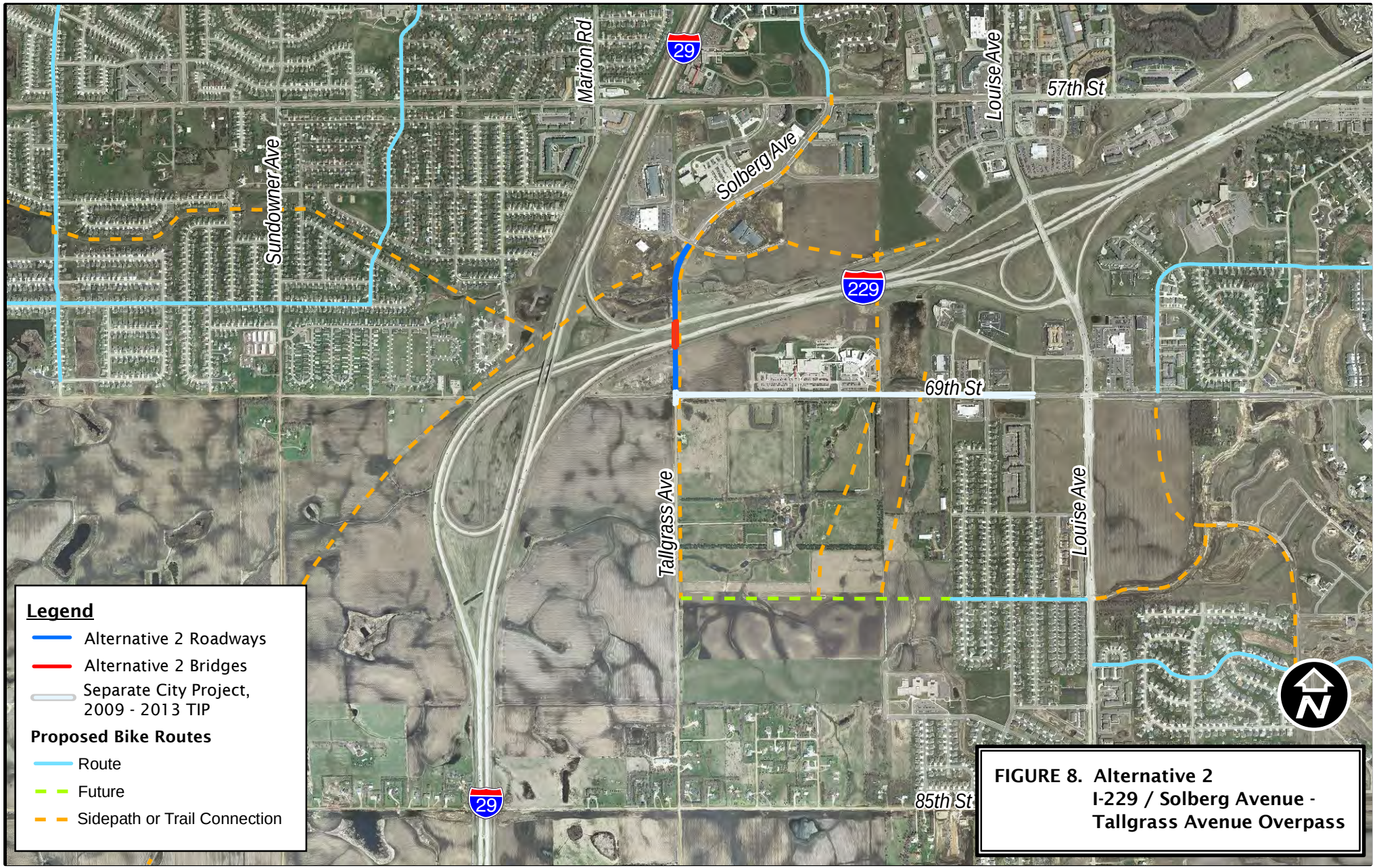


FIGURE 8. Alternative 2 I-229 / Solberg Avenue - Tallgrass Avenue Overpass

SECTION FOUR

AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

4.1 LAND USE AND ZONING

4.1.1 Land Use

4.1.1.1 Affected Environment

North of 85th Street, south of 69th Street and west of Crane Avenue, the existing land use is primarily agriculture with scattered farmsteads and non-farm residential dwellings (**Figure 9**). There are no major commercial or industrial uses located within this area. Between Crane Avenue and Louise Avenue, there is significant housing development between 69th and 85th Streets. North of 69th Street between Tallgrass Avenue and Louise Avenue there is a mixture of office, commercial and medical land uses. North of I-229, commercial and industrial uses become more prominent. The Draft 2035 Comprehensive Development Plan (City of Sioux Falls 2009) designated the areas north and south of I-229 and east and west of the I-29, south of I-229, for business park development. Some additional residential development is slated for the areas south of 69th Street (Map 3A, 2035 Future Land Use Plan, City of Sioux Falls 2009). **Figure 10** shows the future land use within and adjacent to the project area.

4.1.1.2 Environmental Consequences

According to the Draft Comprehensive Development Plan (City of Sioux Falls 2009), the major focus of growth within the project area would be the area along the Solberg Avenue – Tallgrass Avenue corridor.

Alternative 1 – No-build

With the No-build Alternative, Solberg Avenue would not be extended to complete the arterial system within the project area. Therefore, land use adjacent to the project area would not be affected, as no land would be converted from present uses to transportation Right-of-Way (ROW).

Alternative 2 – I-229/Solberg Avenue-Tallgrass Avenue Overpass (Grade Separation)

This alternative would result in approximately 5 acres of land being converted to a transportation corridor. The majority of the conversion would occur on the edge of vacant parcels along Solberg Avenue on both sides of I-229. Therefore, segmentation of parcels would be minimized. The conversion of 5 acres of land to transportation corridor use would be within the land use plan for the Sioux Falls and Lincoln County Planning Districts.

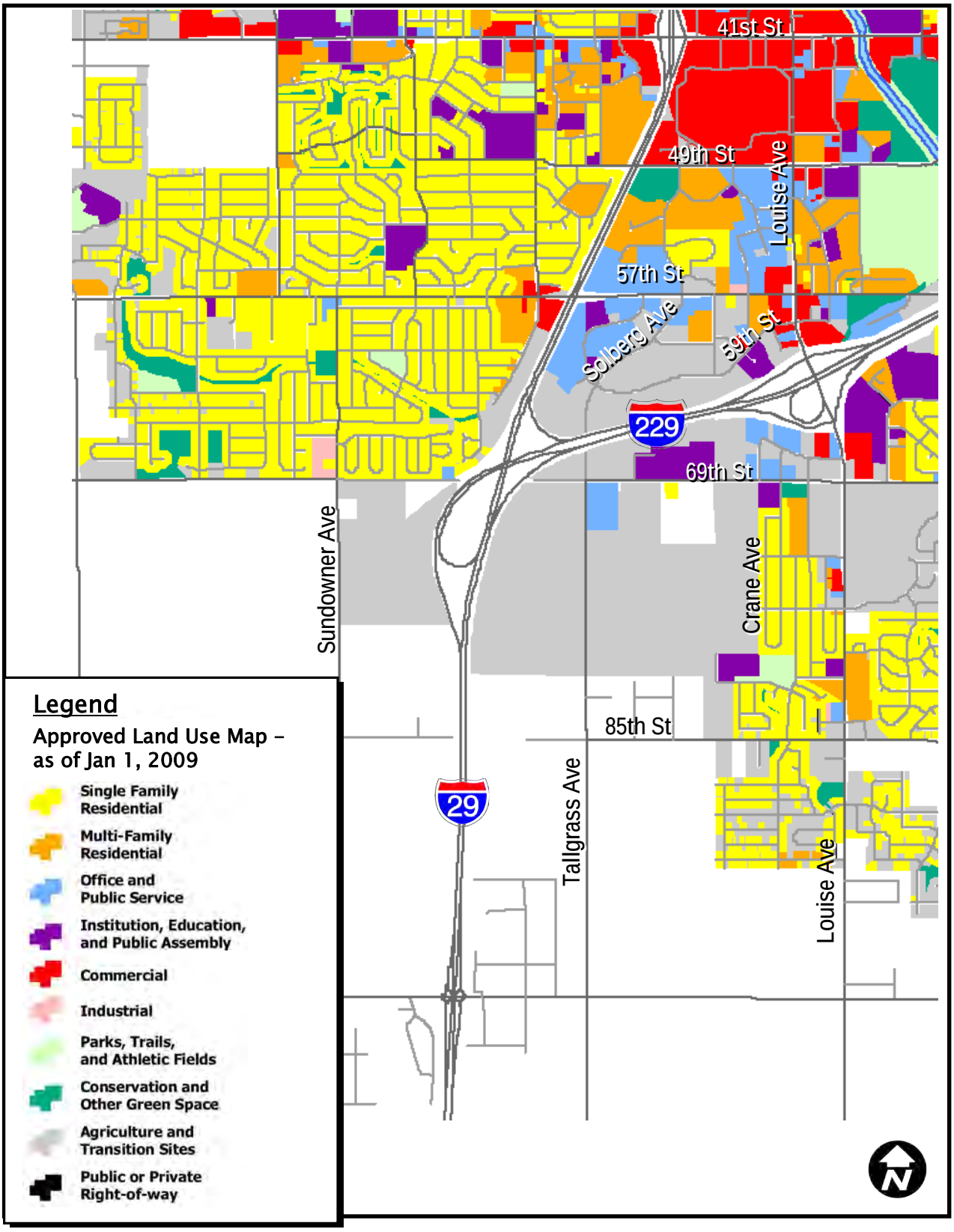


FIGURE 9. Existing Land Use Map

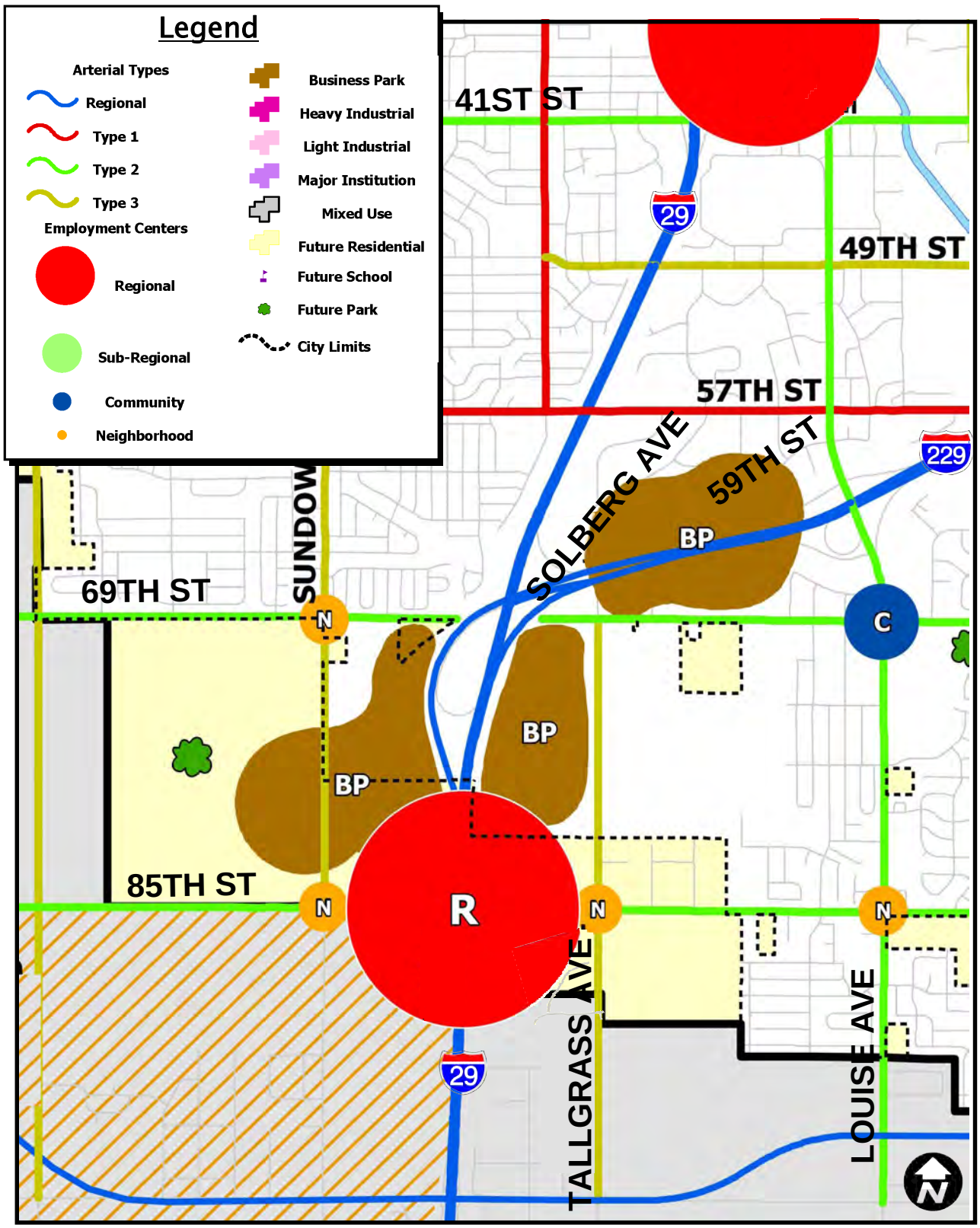


FIGURE 10. Draft Future (2035) Land Use Plan

4.1.2 Prime Farmland

The federal Farmland Protection Policy Act (FPPA) was enacted in 1981 (Public Law [PL] 98-98) to minimize the unnecessary conversion of farmland to nonagricultural uses as a result of federal actions. In addition, FFPA seeks to assure federal programs are administered in a manner compatible with state and local policies and programs that have been developed to protect farmland. The policy of the Natural Resources Conservation Service (NRCS) is to protect significant agricultural lands from conversions that are irreversible and result in the loss of an essential food and environmental resource.

The NRCS has developed criteria for assessing the effects of federal actions on converting farmland to other uses, including Farmland Conversion Impact Rating Forms (CPA-106 and AD-1006) that document a site-scoring evaluation process to assess its potential agriculture value. Prime farmland has been identified by NRCS as a significant agricultural resource that warrants protection. The FPPA defines prime farmland as land that has the physical and chemical characteristics for producing food, feed, fiber, forage, and oilseed crops and is available for these uses. Prime farmland has the soil quality, growing season, and moisture supply needed to economically produce sustained high yields of crops when treated and managed, including water management, according to acceptable farming methods.

4.1.2.1 Affected Environment

The NRCS's on-line databases were used to obtain a list of soils within Lincoln County, which are considered prime farmland (NRCS 2007a, 2007b). Appendix B provides the soil map for the project area and supporting information for the area of interest identified via a Web Soil Survey. Soils considered to be prime farmland are listed below.

- Egan silty clay loam with 3 to 6 percent slopes
- Egan-Chancellor silty clay loams with 0 to 4 percent slopes
- Egan-Shindler complex with 2 to 6 percent slopes
- Huntimer silty clay loam with 0 to 2 percent slopes
- Chancellor-Tetonka silty clay loam (if drained)
- Chancellor-Viborg silty clay loam (if drained)
- Tetonka silty clay loam (if drained)
- Wentworth-Chancellor silty clay loam with 0 to 2 percent slope (if drained)

These soil-mapping units comprise the majority of the soils within the proposed project area.

4.1.2.2 Environmental Consequences

Alternative 1 – No-build

The No-build Alternative involves no construction activities; therefore, no prime farmland would be affected by this alternative.

Alternative 2 – I-229/Solberg Avenue-Tallgrass Avenue Overpass (Grade Separation)

The Solberg Avenue project primarily resides in current public right-of-way and adjacent properties are not used for farming purposes. Therefore, the Solberg Avenue project will not disturb any farmland and no further coordination with the NRCS regarding prime farmland would be required.

4.1.3 Floodplain Zoning

Potential encroachments on floodplains are coordinated under Executive Order (EO) 11988 on Floodplain Management. The EO requires floodplain impact assessment and coordination for all federally funded projects. The floodplain is defined as the area adjoining a watercourse that is within the 100-year flood, or regional flood zone, as mapped by the Federal Emergency Management Agency (FEMA).

4.1.3.1 Affected Environment

The City of Sioux Falls and Lincoln County both participate in the National Flood Insurance Program (NFIP). By participating in the NFIP, Sioux Falls and Lincoln County have implemented controls, zoning, and development regulations, along with effective land use planning to reduce and control development that occurs within the 100-year floodplain. The project area is not located in a floodplain as designated on Flood Insurance Rate Map (FIRM) Panels 4602770001B, 46099C0607D, and 46099C0606D.

4.1.3.2 Environmental Consequences

Alternative 1 - No-build

Alternative 1 involves no construction within a floodplain; therefore, it would have no effect on identified floodplains within the project area.

Alternative 2 - I-229/Solberg Avenue-Tallgrass Avenue Overpass (Grade Separation)

As stated above, the project area is not located within a designated floodplain; therefore, the project would have no impact on floodplains.

4.1.4 Bicyclists and Pedestrians

4.1.4.1 Affected Environment

Section 4(f) of the Department of Transportation Act of 1966, codified in Federal law at 49 United States Code (U.S.C.) 303, declares that it is the policy of the United States Government that special effort should be made to preserve the natural beauty of the countryside and public park and recreation lands, wildlife and waterfowl refuges, and historic sites.

The city of Sioux Falls has 12 city parks scattered throughout the city and approximately 19 miles of existing bicycle trails primarily located in the central part of the city (City of Sioux Falls 2005). A wide sidewalk/trail is currently provided on the east side of Solberg Avenue between 57th and 59th Street.

4.1.4.2 Environmental Consequences

Alternative 1 - No-build

The No-build Alternative assumes no construction activities would occur related to the extension of Solberg Avenue. Therefore, no new bicycle trails would be constructed along these roadways. However, the 2025 Comprehensive Development Plan (City of Sioux Falls 2002) indicated that as the 2015 and 2025 growth areas develop, trails would be incorporated along existing roadways, connecting to the Big Sioux River Greenway and the City of Sioux Falls park network.

Alternative 2 - I-229/Solberg Avenue-Tallgrass Avenue Overpass (Grade Separation)

Construction of the Solberg Avenue extension would not impact the existing bicycle trails and park system within Sioux Falls. Therefore, the Solberg Avenue extension project would not have any impact on existing bicycle trails or other Section 4(f) properties within Sioux Falls. The proposed design for Solberg Avenue includes a sidewalk on one side and a wider sidewalk/trail on the other side to accommodate bicycles. Those facilities will provide additional connectivity for pedestrians and bicyclists within the study area and beyond.

4.2 SOCIOECONOMICS

4.2.1 Demographics

4.2.1.1 Affected Environment

The city of Sioux Falls has grown from 74,488 in 1970 to an estimated 141,074 in 2006 (Census 2007). The population increased 12 percent between 1970 and 1980, increased 24 percent from 1980 to 1990, and increased 23 percent between 1990 and 2000. It is estimated that 70 percent of the people moving to Sioux Falls came from more than 50 miles away. Nearly half of the people moving to the city during the 1980s were between the ages of 20 and 29, which is attributed to employment and educational opportunities. Females age 60 and over accounted for another 13 percent of the total in-migration, and is attributed to Sioux Falls' expanding reputation as a regional medical center (City of Sioux Falls 2002). Based on the population growth trends, the primary social issues would be associated with travel patterns and urban-rural interface.

The median age in Sioux Falls increased from 25.9 in 1970 to an estimated 34.9 in 2006. Between 1990 and 2000, the 40 to 46 age group grew by 96 percent; the 5 to 19 age group grew by 13 percent, and the 20 to 39 age group grew by 121 percent. These increases reflect job growth and the net in-migration of new employees (City of Sioux Falls 2002). Of the Sioux Falls population over 25 years of age, 90.5 percent are high school graduates and 30.2 are college graduates. The percent of high school graduates is substantially higher than the national average of 84.1 percent (Census 2007).
The annual per capita and annual median family income for Sioux Falls residents is $25,661 and $59,222, respectively, in 2006 inflation-adjusted dollars (Census 2007).

4.2.1.2 Environmental Consequences

Recent development, especially west of the I-29/I-229 Interchange, has resulted in increased usage of the interchange. Additional development of undeveloped land located west, south, and southeast of the I-29/I-229 Interchange would result in an increase in local traffic and a decrease in the LOS of this interchange as well as adjacent interchanges (I-29/41st Street and I-229/Louise Avenue Interchanges) and major arterials in the project area.

Alternative 1 - No-build

The No-build Alternative involves no changes to the exiting arterial system around the I-29/I-229 Interchange. Therefore, the alternative would have no effect on the population or growth pattern of Sioux Falls.

Alternative 2 - I-229/Solberg Avenue-Tallgrass Avenue Overpass (Grade Separation)

Construction of the Solberg Avenue extension would occur in response to the need to provide the desired LOS on the Interstate, interchanges, and arterials within the project area. Once the upgrades

associated with a build alternative have been completed, it would have a positive effect on residential and commercial growth in western and southern sectors of Sioux Falls.

4.2.2 Environmental Justice

4.2.2.1 Affected Environment

EO 12898 (Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations), dated February 1, 1994, directs Federal agencies to "make environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations." Since the proposed project would receive federal funding and obtain federal permit(s), the project would need to comply with EO 12898.

Based on the 2006 American Community Survey, the population of Sioux Falls is approximately 141,074 (Census 2007). Whites comprise approximately 88.9 percent of the population. The three largest minority populations are Hispanic or Latino Race (4.1 percent), Black or African American (2.6 percent), and American Indian/Alaska Native (2.2 percent) (Census 2007). Approximately 5.6 percent of the families and 9.7 percent of the individuals in Sioux Falls have incomes that are below established poverty levels. Both percentages are well below the national averages (Census 2007).

Although whites comprise approximately 94 percent of the population within and immediately surrounding the project area, within specific areas Hispanic/Latinos comprise up to 50 percent of the population. The highest abundance of Hispanic/Latinos is located southeast of the project area. Native American/Alaska Native comprise approximately 2.2 percent (higher than the national average) of the local population, and African American/Asian represent approximately 2 percent of the local population. Low-income families and individuals comprise up to 15 percent of the population within and surrounding the project area. The higher concentration of the low-income population is located northeast of the project area.

4.2.2.2 Environmental Consequences

Alternative 1 - No-build

There would be no potential impacts to low-income and/or minority populations with the No-build Alternative because no construction activities would occur.

Alternative 2 - I-229/Solberg Avenue-Tallgrass Avenue Overpass (Grade Separation)

As stated above, up to 15 percent of the population living northeast of the project area is considered to be low income and minorities are spread throughout the project area with a concentration located southeast of the project area. Although, there are concentrations of low income and minorities within and surrounding the project, none of the build alternatives would have a disproportionate adverse impact on these populations. Upgrading the operation of the arterial system and expanding the sidewalk/ trail system within the project area would improve travel throughout Sioux Falls, including those areas with concentrations of low-income and minority populations.

4.2.3 Economics

4.2.3.1 Affected Environment

The City of Sioux Falls has experienced a steady growth of population, combined with an increase in land acquisition and development. As growth continues, commuter demands on existing and new roadway systems would continue to increase in the future. The City's growth can be attributed to a

number of reasons. The Sioux Falls Metropolitan Statistical Area (MSA) is the largest and fastest-growing labor market area in the state of South Dakota. Between 1996 and 2000, approximately 15,000 new jobs were created in Sioux Falls. New employment opportunities continue to be created in many industries, including the following growth areas:

- Finance/insurance (including the credit card industry)
- Health care and other services
- Retail/wholesale trade
- Manufacturing

Non-farm employment in the Sioux Falls MSA grew 38.6 percent during the 1980s, and by 47 percent from 1990 to 2001. Employment in the finance, insurance, and real estate sector grew 346 percent from 1980 to 2000, making it the fastest growing area of employment. The services sector and the construction and mining sector also grew more rapidly than the rate for total employment during the same period, increasing 165 and 113 percent, respectively. The wholesale and retail trade sector accounted for 25.3 percent of the 2000 employment (City of Sioux Falls 2002).

Continued expansion of employment opportunities in Sioux Falls is expected to sustain the level of in-migration seen during the last two decades. Projections assume the national trend of large employers relocating or expanding into medium-sized midwestern cities recognized as safe, clean communities with a high quality of life will continue. Additionally, South Dakota's favorable tax climate is anticipated to remain a primary competitive advantage supporting further employment opportunities (City of Sioux Falls 2002).

4.2.3.2 Environmental Consequences

Alternative 1 - No-build

With the No-build Alternative, the existing arterial system would not be upgraded and as traffic volume increases, the LOS on the interstate and arterial routes would decrease. A decrease in LOS would result in a negative economic impact on the City of Sioux Falls if companies decide to build elsewhere due to an inadequate transportation system.

Alternative 2 - I-229/Solberg Avenue-Tallgrass Avenue Overpass (Grade Separation)

Sioux Falls, Minnehaha County, and Lincoln County would experience a short-term beneficial economic impact due to the purchase of goods and services during the construction of the project components. Post-construction, the completed arterial system would improve the LOS at the I-29/I-229 interchange by allowing local traffic to use the alternative routes instead of accessing the interstate system. Additionally, the arterial system would be able to handle the increased traffic generated by development within the project area. There is a potential for long-term economic benefit if the upgraded transportation system aides in the recruitment of businesses to the area.

4.2.4 Acquisition and Relocation

Relocation of residences and businesses to accommodate purchase of highway ROW and subsequent construction of the highway is an unavoidable consequence of upgrading transportation systems. In some instances, displacement would involve only a portion of an existing property while in other instances, it would involve the entire property. Temporary construction easements are also needed. Impacts, whether positive or negative for a particular piece of property, could include influences on

free market prices that might be paid for certain properties and could make renting or leasing certain properties easier or more difficult. These impacts are unavoidable.

Federal law requires that relocation assistance be provided to any person, business, or farm operation displaced because of the acquisition of real property by a public entity for public use (Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, PL-91-646 and amendments) (Uniform Act). In recognizing the rights of citizens displaced by transportation improvement projects, SDDOT has adopted policies that assure fair treatment and just compensation for tenants and owners of businesses and residential property. This compensation includes all types of housing. All ROW acquisition and relocation would be in accordance with the Uniform Act, which requires that just compensation be paid to the owner of private property taken for public use. The appraisal of fair market value is the basis of determining just compensation to be offered the owner for the property to be acquired. An appraisal is defined in the Uniform Act as a written statement independently and impartially prepared by a qualified appraiser setting forth an opinion of defined value of an adequately described property as of a specific date, supported by the presentation and analysis of relevant market information.

The Relocation Assistance Program requires that before a project can be constructed, a Replacement Housing Study must be completed to determine the needs of the people being relocated and the availability of replacement housing. In general, these requirements would ensure that displaced persons and families would be provided decent, safe, and sanitary housing that is comparable to the property being acquired and is within their financial means. Relocation payments may also be included to cover expenses involved with finding, purchasing or renting, and moving to a new location. As identified below the potential relocation payments are available to both private residences and businesses.

No person shall be displaced from his or her residence unless a comparable replacement dwelling is available or provided for the displaced occupant. A displaced business would be offered a Relocation Assistance Program that meets all the criteria under federal and state laws governing displacements on publicly financed projects. This program is designed to offer advisory services and under many circumstances, to make payments to help offset some of the expenses and costs experienced by those who are displaced.

4.2.4.1 Affected Environment

The project area includes office, commercial, and industrial developments.

4.2.4.2 Environmental Consequences

Alternative 1 – No-build

The No-build Alternative requires no additional ROW and no structures or land would need to be acquired or relocated.

Alternative 2 - I-229/Solberg Avenue-Tallgrass Avenue Overpass (Grade Separation)

Property acquisition would be required for construction of the Solberg Avenue extension. However, no structures would be acquired and no persons or businesses would be displaced. All properties would be acquired in accordance with the Uniform Act. Land acquisition requirements for the ROW were discussed under land use and prime farmland.

4.3 VISUAL QUALITY/AESTHETICS

4.3.1 Affected Environment

The viewshed surrounding the project area includes some commercial buildings to the north of the 59th Street / Solberg Avenue intersection. South of the project area, the view is mainly undeveloped land or agricultural fields with a few scattered residences.

4.3.2 Environmental Consequences

Much of the area located south of the project area is predicted to develop in the future. As this development occurs, the viewshed would be changed from a rural setting to an urban setting. This development and resulting change in the viewshed would happen regardless of the alternative selected.

4.3.2.1 Alternative 1 - No-build

With the No-build Alternative, no new structures would be constructed and the local viewshed would not be affected other than the development discussed above.

4.3.2.2 Alternative 2 - I-229/Solberg Avenue-Tallgrass Avenue Overpass (Grade Separation)

During the construction of any of the project components, the viewshed would be temporarily altered by construction activities and construction equipment. However, the overall viewshed would not be significantly impacted because the arterial system modifications associated with the project would occur adjacent to an existing transportation corridor (I-29/I-229). The residential and commercial development projected to occur in the surrounding areas would present a greater change in the viewshed than the proposed roadway changes.

4.4 AIR QUALITY

The Federal Clean Air Act of 1970 required the adoption of National Ambient Air Quality Standards (NAAQS). These standards were established in order to protect public health and welfare from known effects of sulfur dioxide, particulates (PM_{10}, 10-micron to 2.5 microns, $PM_{2.5}$, 2.5 microns and smaller), carbon monoxide, nitrogen dioxide, ozone, and lead. The NAAQS define the allowable concentrations of pollutants that may be reached but not exceeded in a given time period to protect human health (primary standard) and welfare (secondary standard) with a reasonable margin of safety.

4.4.1 Affected Environment

The U.S. Environmental Protection Agency (USEPA) delegated the protection of the ambient air quality in South Dakota to the South Dakota Department of Environment and Natural Resources (SDDENR) in 1972. The SDDENR adopted the federal air pollution control regulations by reference and these are shown in **Table 6**. As part of the state's program, the SDDENR operates a network of air monitoring samplers. The samplers determine the existing concentrations of regulated pollutants for different areas in the state. Currently, the city of Sioux Falls is considered an attainment area (SDDENR 2007a), meaning Sioux Falls is in compliance with all of the NAASQ.

TABLE 6: NATIONAL AMBIENT AIR QUALITY STANDARDS

Pollutant	Averaging Time	Concentration
Sulfur Dioxide	Annual Arithmetic Mean 24-Hour [(a)] Three Hour [(a)]	0.03 ppm 0.14 ppm 0.50 ppm
Particulates (PM_{10})	24-Hour	150 $\mu g/m^3$
Particulates ($PM_{2.5}$)	Annual Arithmetic Mean 24-Hour	15 $\mu g/m^3$ 35 $\mu g/m^3$
CARBON MONOXIDE	One Hour [(a)] Eight Hour [(a)]	35 ppm 9 ppm
Ozone	Eight Hour	0.08 ppm
Nitrogen Dioxide	Annual Arithmetic Mean	0.053 ppm
Lead	Three Month Arithmetic Mean	1.5 $\mu g/m^3$

[(a)] Not to be exceeded more than once per year.
ppm = Parts of pollutant per million parts of air (by volume) at 25° Celsius.
$\mu g/m^3$ = Micrograms of pollutant per cubic meter of air.
Source: SDDENR 2007a

4.4.2 Environmental Consequences

4.4.2.1 Alternative 1 - No-build

No activities would occur with the No-build Alternative. The area surrounding the project area would develop and traffic volumes in the area would increase. The traffic delays would have the potential to result in localized air quality impacts related to vehicle exhaust, especially during AM and PM peak hours. However, no long-term significant impacts are anticipated with the No-build Alternative and no air quality standards would be violated.

4.4.2.2 Alternative 2 - I-229/Solberg Avenue-Tallgrass Avenue Overpass (Grade Separation)

During construction, the proposed action would have temporary, minor impacts on air quality relating to increased dust levels and vehicle exhaust. Any adverse impacts would be short-term and localized, and no permit would be required. However, if dust were to become a problem, the contractor would be required to implement dust control procedures (i.e., water down the work area). Even with higher traffic volumes in the future, no long-term significant impacts are anticipated with any of the build alternatives and no air quality standards would be violated.

4.5 NOISE

Sound is the sensation produced in the ears when the movement of an object creates waves of air. The relative impact of sound waves depends on the amount of pressure they generate. The unit of measure for sound pressure is the decibel (dB). Decibels are based on a logarithmic scale because the range of sound pressures is too great to be accommodated on a linear scale.

The measured noise level from a given source does not necessarily correspond to our perception of "loudness". For instance, a three decibel increase from a noise source represents a doubling of the noise level (as measured in sound pressure) on the logarithmic scale. However, this change is barely perceptible for human beings. Furthermore, an increase in 10 decibels from a noise source is a

tenfold increase in noise pressure, but is only perceived as a doubling in the loudness by the human ear.

4.5.1 Affected Environment

For highway traffic noise analysis, the FHWA has specified that noise be predicted and evaluated in decibels weighted with the A-level frequency response; this unit of measure is referred to as dBA. Measurements in dBA incorporate a human's reduced sensitivity to both low frequency and very-high frequency noises to better correlate with our subjective impression of loudness. **Table 7** displays noise levels common to our everyday activities.

The amount of traffic noise exposure will vary from location-to-location adjacent to a roadway corridor. Holding meteorological conditions constant, there are four general concepts that affect the level of traffic noise exposure along a roadway corridor:

- *Traffic characteristics*: Noise levels increase as traffic volumes and/or travel speeds increase. For example, a doubling of the traffic volumes on a roadway (holding the relative composition of traffic constant) will double the traffic sound level and create a noise level increase of three decibels. The mix/composition of the vehicles (portion of trucks, cars, buses and motorcycles) also affects noise levels; heavy trucks emit more noise than automobiles and emit at different noise source heights.
- *Distance to the noise source*: Noise levels decrease as the distance between the noise receptor and the highway traffic increases. For instance, someone standing 200 feet from a noise source would be exposed to twice the level of noise, or three more decibels, than someone standing 400 feet away from the same noise source. See Type of Ground Cover below for more information.
- *Line of sight between the noise source and the noise receptor*: Noise levels are highest when there is a direct line of sight, without solid obstructions, between the source of the noise and the noise receptor. Objects that block the line of sight between the noise source and receptor, whether due to differences in elevation or to natural or man-made obstructions, will reduce noise levels to some extent. Solid, continuous obstructions can significantly reduce noise levels, often between 5 and 10 decibels.
- *Type of ground cover*. Vegetation, such as grass or shrubbery, absorbs more of the noise level energy than "hard' surfaces such as pavement or water. Thus, the distance attenuation rates are different over "soft" cover areas (grass and shrubbery) than over hard surfaces. The attenuation rate over hard surfaces is -3 dBA per doubling of distance and for soft surfaces the rate is -4.5 dBA per doubling of distance.

TABLE 7: COMMON EXTERIOR NOISE LEVELS (dBA)

Noise Activity and Distance	Noise Level(dBA)
Rock Band	110
Jet Flyover at 985 feet	105
Heavy Truck at 49 feet	90
Noisy Restaurant	80
Gas Lawn Mower at 98 feet	70
Normal Speech at 3.3 feet	65
Leaves Rustling / Quiet Office	40
Threshold of Hearing	0

23 Code of Federal Regulations (CFR) Part 772 was written by the FHWA to provide procedures for noise studies and noise abatement measures. 23 CFR 772 contains noise abatement criteria (NAC), which are based on the equivalent level (L_{eq}) noise descriptor. The noise levels experienced by most persons adjacent to a highway corridor are not steady over time, since noise levels vary as adjacent traffic conditions vary. The $L_{eq}(h)$ is a descriptor that summarizes a "snapshot" sound level that is equivalent (in terms of acoustic energy) to the varying noise levels experienced over the peak traffic noise hour.

Table 8 documents the desired upper limits of $L_{eq}(h)$ by activity category, as established by the NAC. At a sensitive noise receiver, any noise levels that approach or exceed these criteria would not be desirable and would be categorized a noise impact.

To determine which abatement criteria should be applied at the various receivers in the corridor, land uses were verified during field visits in March 2007. For the entire Solberg Avenue-Tallgrass Avenue overpass project limits adjacent land use, current and anticipated for the future, is commercial as the area is currently, or anticipated to be, developed as offices and retail uses. Thus, the entire study limits would fall into the NAC C activity category, which reflects noise abatement threshold of 72 dBA.

TABLE 8: NOISE ABATEMENT CRITERIA, HOURLY A-WEIGHTED SOUND LEVEL

Activity Category	Hourly Noise Levels Leq(h) dBA	Description of Activity Category
A	57 (Exterior)	Lands on which serenity and quiet are of extraordinary significance and serve an important public need and where the preservation of those qualities is essential if the area is to continue to serve its intended purpose.
B	67 (Exterior)	Picnic areas, recreation areas, play grounds, active sports areas, parks, residences, motels, hotels, schools, churches, libraries, and hospitals.
C	72 (Exterior)	Developed lands, properties, or activities not included in Categories A or B above.
D	---	Undeveloped lands.
E	52 (Interior)	Residences, motels, hotels, public meeting rooms, schools, churches, libraries, hospitals, and auditoriums.

4.5.2 Environmental Consequences

Noise levels were predicted by using the FHWA's Traffic Noise Model (TNM) version 2.5 noise model for existing, future no-build and future build scenarios for sensitive noise receivers adjacent to the project area. Traffic noise levels evaluated reflect "peak traffic hour" noise levels and are predicted in hourly Leq dBA. In addition to the studied roadway segments, Solberg Avenue, the traffic noise contributions of 69th Street, I-29 and I-229 were included in the analysis. I-29 and I-229 were predicted to contribute significantly higher traffic noise levels to much of the surrounding area relative to Solberg Avenue or 69th Street. Higher contributions from I-29 and I-229 are connected with the higher traffic volumes, travel speeds and higher heavy truck volume than on the arterial routes.

Setback distance between the roadway and a noise level approaching the NAC noise levels of Leq 67 dBA and 72 dBA were predicted for existing and future traffic conditions. Approaching a threshold is defined by the SDDOT policy as a noise level within one decibel of the applicable NAC. **Table 9** documents the noise impact setback for Solberg Avenue/Tallgrass Avenue. For the build scenario (Alternatives 2), the distance relative to the NAC is documented in the same column.

TABLE 9: DISTANCE TO NOISE IMPACT SETBACK BY ACTIVITY CATEGORY ADJACENT TO SOLBERG AVENUE/TALLGRASS AVENUE

Activity Category	Existing Conditions	2033 No-build Scenario (Alternative 1)	2033 Build Scenario (Alternative 2)
Activity Category B	<5' from Roadway Edge	Not Applicable	Not Applicable
Activity Category C	Within Travelway	<5' from Roadway Edge	15' from Roadway Edge

Current land use activities adjacent to the project are commercial (north of I-229), interstate right-of-way for I-229, and south of I-229 the area is either SDDOT right-of-way or undeveloped. Those undeveloped areas are anticipated to be developed as commercial properties as is consistent with the land use plan. There are no residential uses (current or planned) along Solberg Avenue/Tallgrass Avenue within or immediately adjacent to the study area. Thus, the NAC "C" criteria are appropriate for the entire corridor.

4.5.2.1 Alternative 1 - No-build

The No-build alternative assumes a roadway network that is essentially the same as the current. Without the Solberg Avenue-Tallgrass Avenue crossing, there would not be a "new' traffic noise source (a new route) in the study area. While traffic volumes on existing routes are predicted to increase, the estimated distances to the applicable abatement criteria thresholds would not change substantially from the current conditions. Limited changes are forecasted due to the reduced level of traffic operations that would result in a lower peak hour traffic speed, relative to current conditions.

4.5.2.2 Alternative 2 - I-229/Solberg Avenue-Tallgrass Avenue Overpass (Grade Separation)

Adding the Solberg Avenue-Tallgrass Avenue overpass introduces a new noise source into the study area. To quantify the potential for impacts a noise contour associated with the NAC "C" criteria was determined through modeling. The traffic noise contour for the new noise source is displayed in Figure 11. As can be observed, the distance to the abatement criteria noise level is within the assumed 110 foot right-of-way or the proposed Solberg-Tallgrass overpass and approach roadway or is within the right-of-way limits of the I-229 corridor. The result is that no developed or developable properties are anticipated to be located within areas that would experience traffic noise levels in excess of the federal noise abatement criteria.

4.5.3 Noise Mitigation Evaluation

There were no properties along the proposed Solberg Avenue–Tallgrass Avenue corridor predicted to approach or exceed the applicable NAC. As no developed or developable properties are, or would be within a potential abatement area, mitigation measures such as noise barriers or establishing setback buffers are not warranted.

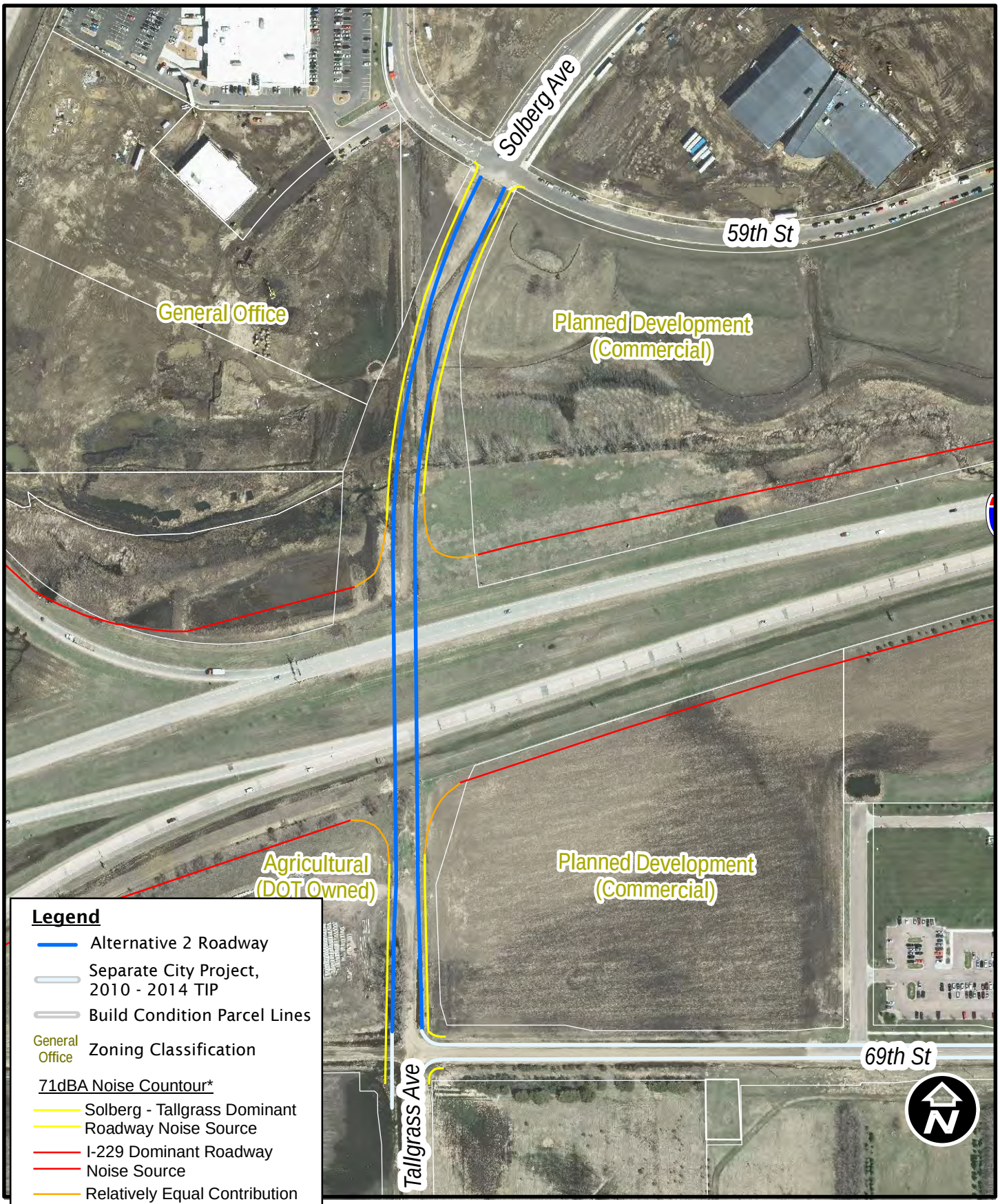


FIGURE 11. Solberg Avenue - Tallgrass Avenue Preferred Alternative, 71 dBA Noise Contour

4.6 GEOLOGY, TOPOGRAPHY, AND SOILS

4.6.1 Affected Environment

The structurally high Pre-Cambrian Sioux Quartzite Ridge underlies the entire local area. This west tending structural arch is composed of Pre-Cambrian granites and Sioux Quartzite. The overall project area is located at the extreme southern edge of the Coteau des Prairie Section of the Central Lowland Providence that is located in the western United States. Four glaciers (the Nebraskan, the Kansan, the Illinoisan, and the Wisconsin) have crossed the project area. The advance and receding of these glaciers had a large impact on the surficial geology and topography of the local area. Glacial action ground up and eroded bedrock and mixed it with material that was carried down from the north. When the glaciers receded, silt, clay, sand, and gravel were left as unconsolidated deposits. Following these depositions, wind (loess soils) and water (alluvial soils) have transported and redistributed portions of the glacial materials (SCS 1964).

Local topography consists of moderately undulating glacial uplands that occur within the Big Sioux River Basin. The valleys of the watershed are flat and wide with local relief usually 20 to 50 feet. Within Minnehaha County, total relief from northwest to southeast is approximately 570 feet (SCS 1964). Within Lincoln County, elevation ranges from less than 1,300 feet along the Big Sioux River to about 1,500 feet on uplands (SCS 1976).

Soils within the project area are comprised predominantly of clay loams and silty clay loams (NRCS 2007a). The soils north and west of the I-29/I-229 Interchange have been previously disturbed during development activities. Some soils, especially south and east or the interchange, have not been markedly changed by development and are still used for agricultural purposes.

4.6.2 Environmental Consequences

Neither the No-build Alternative nor the build alternative have the potential to effect geology or topography. Potential impacts to soils with each of the alternatives being evaluated are provided in the following subsections. Issues associated with impacts on prime farmland including soils that support the prime farmland classification are discussed in Section 4.1.2.

4.6.2.1 Alternative 1 – No-build

No construction or upgrading activities would occur with the No-build Alternative. Therefore, this alternative would have no potential to adversely impact soils within the project area.

4.6.2.2 Alternative 2 - I-229/Solberg Avenue-Tallgrass Avenue Overpass (Grade Separation)

This alternative would disturb approximately seven acres of soil, with the roadway and adjacent multi-use trail accounting for approximately 3.8 acres. Soils located beneath components of the new roadway and trail would be permanently impacted. Soils located along the edge of the new roadways, comprising approximately 3.2 acres) would be temporarily impacted during the construction phase. These soils would be re-vegetated following construction.

Best Management Practices (BMPs) would be utilized during the construction of the alternative's components to prevent or reduce soil erosion within disturbed areas and the movement of sediment into local streams including the Big Sioux River (located down gradient of the project area). An additional, important feature in the control of soil erosion would be an aggressive re-vegetation program of disturbed areas once construction has been completed.

Due to a relatively small amount of new soil disturbance and the use of the identified BMPs these impacts would not be considered significant.

4.7 HYDROLOGY AND WATER QUALITY

4.7.1 Hydrology

The largest hydrological feature in the general project area is the Big Sioux River, which lies east of the project area. Neither the No-build Alternative nor the Build Alternative have the potential to affect hydrology (flow) of any stream within or in the vicinity of the project area. Therefore, no additional discussion regarding hydrology is provided in this document.

4.7.2 Water Quality

The USEPA's National Pollutant Discharge Elimination System (NPDES) Program requires all construction activities that disturb more than 1 acre to receive a construction NPDES permit. The SDDENR issues the NPDES permits under its Surface Water Discharge (SWD) Program.

4.7.2.1 Affected Environment

No streams or rivers are located within the project area. However, portions of the Big Sioux River and Skunk Creek are located within 1 mile to the east of the project area. Various pollutants are commonly encountered in roadway runoff generated during storm events. These include eroded soil, nutrients, metals, and petroleum compounds.

The SDDENR has identified the following beneficial uses of the Big Sioux River from its confluence with the Missouri River upstream to the Sioux Falls Diversion (SDDENR 2007b):

- Warm water semi-permanent fish life propagation waters
- Immersion recreation waters
- Limited recreation waters

Based on information compiled in 2003, it was reported that the portion of the Big Sioux River from the confluence of Skunk Creek downstream to the Missouri River was non-supportive of its designated uses due to elevated levels of fecal coliform bacteria and total suspended solids (TSS) (SDDENR 2007b).

4.7.2.2 Environmental Consequences

Alternative 1 – No-build

Since the No-build Alternative involves no construction of new roadways, there would be no construction-related water quality impacts with this alternative. As discussed in Section 2.2, traffic using the existing roadways in the area would be expected to increase several fold during the planning period, which extends through year 2033. As traffic volume increases, pollutants associated with vehicular emissions (petroleum compounds and metals) would correspondently increase and their concentrations in runoff from the roadway would increase. These pollutants would eventually be carried into the Big Sioux River. Presently neither of these pollutants has been recorded at levels that would restrict the designated uses of the Big Sioux River. The level of these pollutants that would be contributed by the increased vehicle emissions would not increase levels of either to levels that would impede the designated uses from occurring.

Alternative 2 –I-229/Solberg Avenue-Tallgrass Avenue Overpass (Grade Separation)

With the construction of the arterial grade separation and associated structures, approximately seven acres of soil would be disturbed. Therefore, the contractor would be required to obtain a general permit for stormwater discharges associated with construction activities from the SDDENR. The permit application would require the identification of appropriate BMPs to control soil erosion. This is normally achieved through the development of an Erosion Control Plan that outlines BMPs to be installed, staging, temporary storage of excess material, inspection, and maintenance schedule of BMPs, and temporary seeding measures. As discussed earlier, the reach of the Big Sioux River east of the project area is presently being impaired by elevated levels of fecal coliform bacteria and TSS. Therefore, it is extremely important that approved BMPs be properly designed, constructed, and maintained to assure that TSS levels in the river are not elevated by project related activities.

With the construction of this arterial grade separation, the predicted increase in traffic can be accommodated by an acceptable LOS and as such traffic congestion within the project area would not be an issue. Therefore, the level of emissions within the project area would be less than the emissions that would occur with the No-build Alternative. This would be a favorable attribute of this alternative.

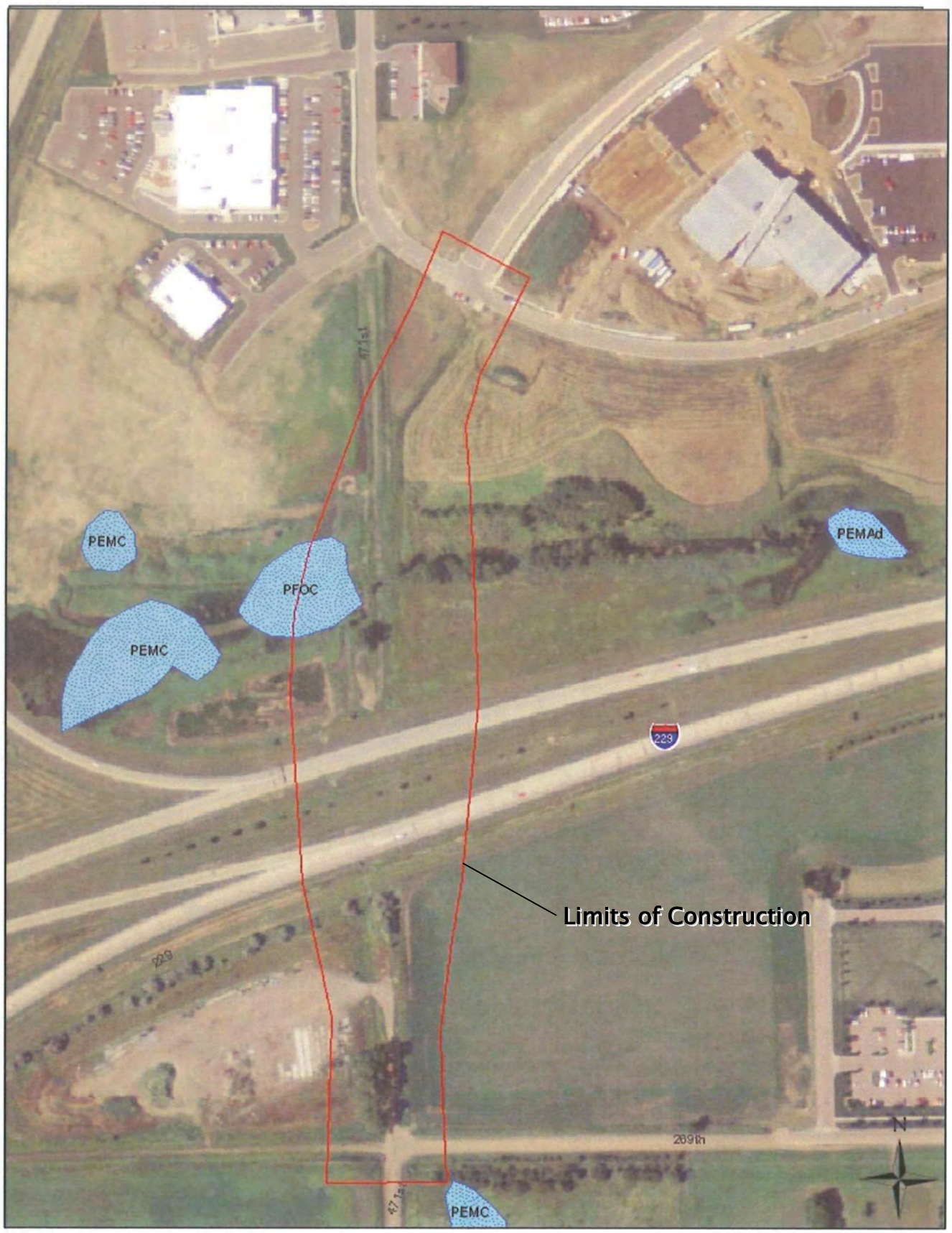
4.8 WETLANDS

Wetlands are a distinct subset of all jurisdictional waters and are legally defined as: "those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and under normal circumstances do support a prevalence of vegetation typically adapted for life in saturated soil conditions" (USEPA, 40 CFR 230.2 and USACE, 33 CFR 328.3). This definition emphasizes that under normal circumstances wetlands must possess three characteristics: a prevalence of hydrophytic vegetation, hydric soils and wetlands hydrology.

EO 11990, entitled Protection of Wetlands, requires federal agencies to take action to minimize the loss of wetlands. Activities disturbing jurisdictional wetlands require a permit from the United States Army Corps of Engineers (USACE). Two types of authorization are available from the USACE for activities regulated under Section 404 of the Clean Water Act. Depending on the type of project and potential impacts, either an individual 404 Permit or a Nationwide General permit would be issued by the USACE.

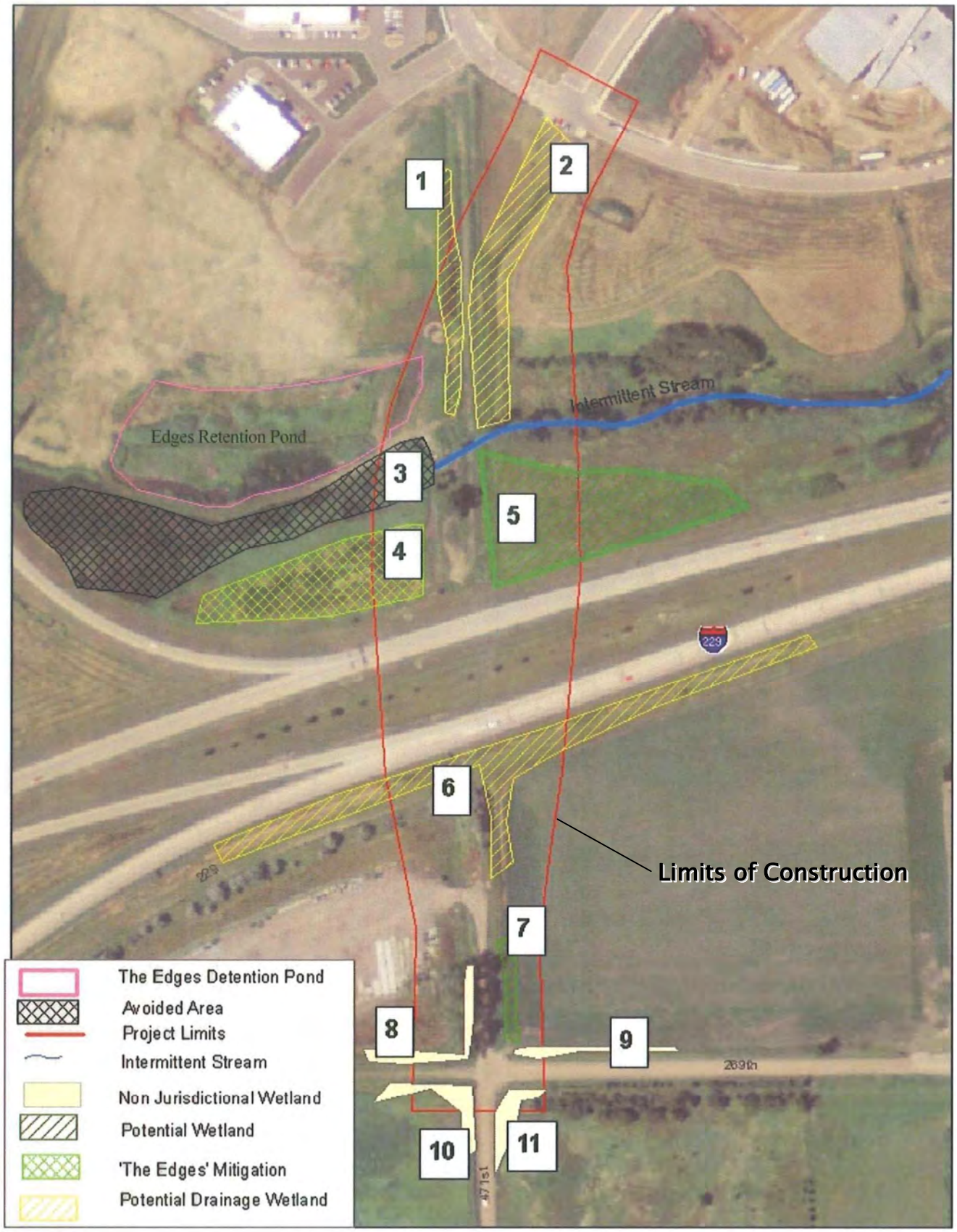
4.8.1 Affected Environment

United States Geological Society (USGS) National Map, which includes the United States Fish and Wildlife Service (USFWS) National Wetlands Inventory (NWI) map, and several site visits between March 2005 and June 2007 and a wetland assessment (February 2010) were used to determine the location of wetland areas within and in the immediate vicinity of the project area. Numerous small wetlands were identified within the project area. These wetlands are located in an area along or near the Solberg Avenue/Tallgrass Avenue alignment between 59th and 69th Street. Types of wetlands identified from the NWI map include several classifications: PEMAd (palustrine emergent temporarily flooded partially drained/ditched), PEMC (palustrine emergent seasonally flooded), PFOC (palustrine forested seasonally flooded) (**Figure 12**). The wetland assessment (Appendix C) report also identified some additional potential wetland areas. The potential wetlands have not been determined jurisdictional by the USACE. Those potential wetlands and jurisdictional wetlands are shown on **Figure 13**. Within the project limits there are approximately 4.9 acres of wetlands and that includes 1.3 acres of jurisdictional wetlands and 3.6 acres of potential wetlands. That figure also includes non-jurisdictional wetlands that are discussed further in the wetland assessment report.



Source: Solberg Avenue and I-229 Wetland Assessment Report, Map 2

FIGURE 12. National Wetland Inventory for Project Area



Source: Solberg Avenue and I-229 Wetland Assessment Report, Map 5

FIGURE 13. Location of Wetlands within Project Area

The USACE was contacted regarding jurisdictional wetlands for the I-29/I-229 Interchange in 2005. In a letter dated October 10, 2005 (Appendix B), the USACE indicated that some jurisdictional wetlands were located within the Interchange project area. The project area for the Solberg/Tallgrass Avenue extension is included within the project area that was evaluated for the I-29/ I-229 Interchange. Based on this previous information and subsequent discussions with the USACE, jurisdictional wetlands identified as part of the I-29/I-229 environmental analysis would be included in the project area for the proposed action. The USACE was sent a letter (dated November 27, 2007) informing them of the proposed action and discussing that the project area was previously evaluated by them as part of the I-29/I-229 Interchange project. No response was received from the USACE. The USACE was contacted via telephone on October 22, 2009 regarding the Solberg project (Appendix B). The USACE reviewed maps of the project area while on the phone with URS Corporation. The USACE indicated there was nothing on the map to cause a change in the jurisdictional determination made originally in 2005.

4.8.2 Environmental Consequences

4.8.2.1 Alternative 1 - No-build

Since the No-build Alternative would involve no construction activities, it would not have the potential to affect the wetland located within the project area.

4.8.2.2 Alternative 2 –I-229/Solberg Avenue-Tallgrass Avenue Overpass (Grade Separation)

Construction of Solberg Avenue would impact wetlands located within the project area. Due to the number of wetlands present within the general project area and the limited ability to modify the designs because of engineering constraints, it would be impossible to avoid all of the wetlands. Based on the wetland assessment report, 4.9 acres of wetlands could be impacted by the proposed action.

4.8.3 Wetland Mitigation

The mitigation plan for the proposed action will recommend off-site mitigation. The Executive Order 11990 Wetland Findings are documented in Appendix D. Off-site mitigation is being recommended because it is difficult to maintain quality mitigation sites near the proposed action site due to roadway runoff. Wetland mitigation for unavoidable impacts related to this project will be accomplished through the purchase of mitigation bank credits at the Tetonka Wetland Mitigation Bank, located in Minnehaha County, South Dakota. The Tetonka Wetland Mitigation Bank is a wetland complex with riverine and pothole wetlands.

A Hydrogeomorphic (HGM) Assessment will be completed on the jurisdictional and non-jurisdictional wetlands that will be impacted by the proposed action. The unique conditions of the Tetonka Wetland Mitigation Bank make it possible to use HGM as the common dominator for the different types of wetlands found within the project area. The HGM assessment will determine the number of HGM credits that will be purchased from the wetland bank. Based on past experience in this area the HGM values for impacted wetland areas should fall within the range of two to six HGM per acre. The available wetland bank HGM credits found in the Tetonka Wetland Mitigation Bank are adequate to replace those impacted by the proposed action.

Coordination with the USACE was initiated in 2005 and has continued through the various phases of the environmental review process. A wetland delineation study will be completed for the proposed action prior to the Final EA. The delineation of the wetlands will be completed using the USACE

Wetland Manual and Regional Supplement. The delineation and request for jurisdictional determination will be submitted in a single document to the South Dakota Regulatory Office of USACE. A USACE Section 404 permit documenting the wetland delineation, alternative analysis, and mitigation requirements will then be completed.

Non-jurisdictional wetlands will be mitigated in accordance with FHWA regulation 23 CFR 777. With the implementation of mitigation measures there would be no net impact on wetlands.

4.9 WATER BODY MODIFICATION AND WILDLIFE IMPACTS

Several state and federal regulations on fish and wildlife coordination for environmental review have implications for this project. In addition, designated state or federally managed fish or wildlife lands/facilities were reviewed in the project area for potential impacts. At the federal level, NEPA provides transportation project guidance and direction for coordination under the policies of the Fish and Wildlife Coordination Act (1958) and the Migratory Bird Treaty Act (MBTA) for projects involving federal funding. Federal actions under both acts require USFWS review. Furthermore, NEPA provides guidance for addressing fish and wildlife habitat impacts, including fish and wildlife impacts in cumulative impact studies. At the state level, the South Dakota Department of Game, Fish and Parks (SDDGFP) regulates and manages certain fish and wildlife species including game, non-game, and state threatened or endangered species.

4.9.1 Affected Environment

No water bodies are located within the project area; however, the Big Sioux River is located east of the project area.

Vegetation and associated terrestrial wildlife habitat within the project area is limited to grassed areas within the roadway right of way and a limited amount of idle land. Vegetation in the vicinity of the project area also includes pastures, native and non-native grasses in idle areas, and row crops. These types of vegetation provide fair to poor habitat for most wildlife species. **Figure 14** shows the vegetation within the project area.

4.9.2 Environmental Consequences

4.9.2.1 Water Bodies

Alternative 1 - No-build

With the No-build Alternative, there would be no construction activities and, therefore, no impact on any water bodies in the general vicinity of the project.

Alternative 2 – I-229/Solberg Avenue-Tallgrass Avenue Overpass (Grade Separation)

Although the Big Sioux River is located east (down gradient) from the project areas, the proposed action would not directly impact the river. With the planned BMPs and other stipulations that occur in the NPDES construction permit that would be issued for the project, the proposed action would not have any indirect adverse effects on the Big Sioux River.

FIGURE 14. Vegetation within Project Area

4.9.2.2 Vegetation and Terrestrial Wildlife

Alternative 1 - No-build

With the No-build Alternative, there would be no construction activities and, therefore, no impact on existing vegetation or local terrestrial wildlife populations.

Alternative 2 – I-229/Solberg Avenue-Tallgrass Avenue Overpass (Grade Separation)

With the build alternative, approximately seven acres of vegetation would be disturbed. Impacts to 3.8 acres of vegetation would be permanent within the footprint of the new roadway components. All other disturbed area (3.2 acres) would be re-vegetated with an approved grass mixture after construction has been completed. The impact of seven acres, whether temporary or permanent, does not represent a substantial impact on local vegetation.

As discussed above, the vegetation present within the project area provides poor quality habitat for terrestrial wildlife species. Therefore, this build alternative would only have minimal impact on the terrestrial wildlife species within the project area.

4.10 THREATENED AND ENDANGERED SPECIES

Protection of federally-listed threatened and endangered species occurs under the provision of the Federal Endangered Species Act (ESA) of 1973 as amended (16 USC 1531, 1544). The USFWS is responsible for review and authorization of actions related to federal listed threatened and endangered species. The FHWA, through the NEPA process, requires USFWS federal threatened and endangered species review and concurrence on all federally-funded transportation projects. In addition, federal ESA Section 7 consultation guidance has been established and is utilized when potential federal threatened and endangered species impacts may occur on a federally-funded transportation project. The USFWS may require preparation of a Biological Assessment to determine the project's scope of effect on the subject threatened and endangered species, and the subsequent avoidance or mitigations solutions. Lastly, the USFWS issues guidance and thresholds for determining avoidance or mitigation strategies for particular federal threatened and endangered species.

State threatened and/or endangered species and Species of Management Concern are codified under South Dakota Statues 34A-8 and 34A-8A, respectively. For state threatened and endangered species, the SDDGFP is authorized to prepare a list of wildlife species that are determined to be endangered or threatened within the state. South Dakota Statute 34A-8-6 designates the SDDGFP and South Dakota Department of Agriculture to perform conservation, management, protection, and restoration of the state's threatened and endangered species and non-game species of wildlife. The South Dakota Secretary of Agriculture and the Secretary of the SDDGFP are responsible for the enforcement of the provisions of the threatened and endangered species statutes.

4.10.1 Affected Environment

According to information available from the USFWS (from the online database and confirmed via telephone on November 27, 2007, Appendix B), two federally listed species have the potential to occur in Lincoln County, South Dakota. These species and their designated status are:

- Topeka shiner (*Notropis topeka*) Endangered
- Western prairie fringed orchid (*Platanthera praeclara*) Threatened

In addition, the SDDGFP was contacted regarding this project. In a letter dated December 5, 2007 (Appendix B), SDDGFP indicated that the project area does not involve any state threatened or endangered species.

Topeka Shiner

The Topeka shiner is a small, stout minnow that does not exceed 3 inches in length. They most often occur in pool and run areas of streams and are seldom found in riffle areas. Recent surveys in Iowa have also documented their use of cut-off channels and oxbows. Generally, the streams they occur in are small to mid-sized prairie streams with relatively high water quality; cool to moderate temperatures; and permanent flows. Topeka shiners can tolerate limited intermittent flows during summer and prolong drought periods (USEPA 2005). The Topeka shiner is known to occur in Slip-Up Creek (tributary to Big Sioux River north of Sioux Falls) and is occasionally found in the Big Sioux River near Sioux Falls. In a letter dated February 7, 2006, the USFWS indicated that no critical habitat, as defined by the ESA, currently exists in South Dakota.

Western Prairie Fringed Orchid

The western prairie fringed orchid, federally listed as threatened, inhabits wet tall-grass meadows with calcareous silt loam, wet-mesic tall-grass prairies, and sub-irrigated sand prairies. Declines in the western prairie fringed orchid populations have been caused by the drainage and conversion of its habitats (native prairies) to agricultural production, channelization, siltation, road and bridge construction, grazing, haying, and the application of herbicides. The western prairie fringed orchid has not been documented in South Dakota since 1916. Potential habitat for the species occurs in the native prairie found in and around Cactus Hills located several miles east and north of the I-29/I-229 Interchange in northeast Sioux Falls.

4.10.2 Environmental Consequences

4.10.2.1 Alternative 1 - No-build

With the No-build Alternative, no construction or other ground disturbance activities would occur. Therefore, this alternative would not have the potential to adversely affect the bald eagle, the western prairie fringed orchid, or the Topeka shiner.

4.10.2.2 Alternative 2 –I-229/Solberg Avenue-Tallgrass Avenue Overpass (Grade Separation)

Construction activities associated with proposed action would not directly affect any habitat important to the western prairie fringed orchid. Therefore, it has been determined that the proposed action would have "No Effect" on this species.

No construction-related activities would occur in the Slip-Up Creek drainage; therefore, Topeka shiners present in the creek would not be affected by the proposed action.

In a letter dated December 20, 2007 (Appendix B), the USFWS concurred that the proposed action would not adversely affect any listed species. Both the USFWS and the SDDGFP were contacted via telephone on October 21, 2009 regarding the Solberg project (Appendix B). USFWS indicated that the species list had not changed and that their initial determination would still apply for the Solberg project. SDDGFP also indicated that their initial statement of no significant impact to fish and wildlife would still apply to this project.

The identified BMPs would be used to control soil erosion and to control the movement of sediment off-site; therefore, the water quality of the Big Sioux River would not be adversely affected by any of the build alternatives. Since the water quality of the Big Sioux River would not be adversely affected,

the proposed action would not adversely impact the occasional Topeka shiner that may occur in the Big Sioux River.

4.11 INVASIVE SPECIES

Invasive species coordination occurs under the FHWA guidance that followed the implementation of EO 13112. This guidance calls on Executive Branch agencies to work to prevent and control the introduction and spread of invasive species. FHWA guidance for NEPA analysis states that the study should address the likelihood of introducing or spreading invasive species and a description of measures being taken to minimize potential harm.

Currently, noxious weeds, which would include invasive species, are controlled through the management efforts of the South Dakota Weed and Pest Board. The SDDOT works with the Weed and Pest Board regarding roadside management actions that are appropriate for control of noxious weeds within highway ROWs.

4.11.1 Affected Environment

No invasive species presently exist within the I-29/I-229 project area.

4.11.2 Environmental Consequences

4.11.2.1 Alternative 1 - No-build Alternative

Since the No-build Alternative involves no ground disturbance or fill requirements, it would not contribute to the spread of an invasion species.

4.11.2.2 Alternative 2 – I-229/Solberg Avenue-Tallgrass Avenue Overpass (Grade Separation)

Areas disturbed during construction provide areas where an invasive species could become established via wind borne seeds or in the grass seed mixture used to re-vegetate the disturbed area. All seed mixtures used by SDDOT for re-vegetation of disturbed areas are certified to be free of noxious weeds. In addition, SDDOT's standard roadside vegetation management actions includes chemical and biological control of weeds where warranted. Special attention is given to disturbed areas until the desired level of vegetation density has been achieved. Therefore, it is expected that none of the build alternatives would result in an increase in the spread of any invasive species.

4.12 HISTORIC AND ARCHAEOLOGICAL PRESERVATION

Assessment of the potential for impacts to historic properties that may result from an action by a federal agency is mandated in the National Environmental Policy Act (NEPA) and the National Historic Preservation Act (NHPA). Section 106 of NHPA requires federal agencies, or their designees, i.e., the recipients of federal funds or applicants for federal permits or licenses, to consider the effects of their actions on historic properties before undertaking a project. A historic property is defined as any prehistoric or historic district, site, building, structure, or object included in, or eligible for inclusion in, the (National Register of Historic Places) NRHP. The Section 106 process consists of steps for 1) identifying and evaluating historic properties; 2) assessing the effects of an undertaking on historic properties; and 3) consultation for methods to avoid, minimize, or mitigate any adverse effects.

Criteria for determining whether a site, building, structure, or object is eligible for listing in the NRHP, as set forth in federal regulation 36 CFR 60, are used to evaluate the significance of historic properties. To qualify for listing in the NRHP, a property must possess integrity of location, design, setting, materials, workmanship, feeling, association, and significance in American history, architecture, archaeology, engineering, and culture due to:

- Criterion A: association with events that have made a significant contribution to the broad patterns of history; or
- Criterion B: association with the lives of persons significant in our past; or
- Criterion C: embodiment of the distinctive characteristics of a type, period, or method of construction, or representation of the work of a master, possession of high artistic values, or representation of a significant and distinguishable entity whose components may lack individual distinction; or
- Criterion D: the ability to yield information important in prehistory or history (U.S. Department of the Interior 1997:2).

Most archaeological sites are eligible under Criterion D while historical and architectural properties are most often eligible under the first three criteria.

The historic property impacts assessment must be coordinated with the State Historic Preservation Office (SHPO) and with the representative from Indian tribes within the area. 36 CFR Section 800.2(c)(3)(iv) states, "When Indian Tribes and Native Hawaiian organizations attach religious and cultural significance to historic properties off tribal land, Section 101(d)(6)(B) of the Act requires Federal agencies to consult with such tribes and native Hawaiian organizations in the Section 106 process. Consultation with Indian tribes was completed for this project as documented in section 4.14.

4.12.1 Affected Environment

The South Dakota State Historic Society's Archaeological Research Center was contacted on November 27, 2007 to conduct a search of an extended area adjacent to the Solberg Avenue overpass project area for known/documented archaeological or historic resources. The search indicated the following:

- Within the data collection area, five properties have been surveyed.
- The SHPO has determined that four of the five properties are not eligible for listing in the NRHP.
- No determination has been made on one of the surveyed properties. The farmstead, located west of Tallgrass Avenue approximately 3/8 miles north of State Highway 106, consists of two houses, two barns, a silo, a granary, and several other buildings (13 structures in all).
- Several archaeological surveys have been completed in the area and no archaeological sites were identified during those surveys.

The correspondence letter from the South Dakota State Historic Society's Archeological Research Center is included in Appendix B.

4.12.2 Environmental Consequences

4.12.2.1 Alternative 1 - No-build Alternative

Since there would be no construction activities associated with this alternative, the No-build Alternative would not adversely affect any known cultural resources.

4.12.2.2 Alternative 2 – I-229/Solberg Avenue-Tallgrass Avenue Overpass (Grade Separation)

The one property in the area that has been surveyed, but no determination of eligibility reported, is located approximately 1-5/8 miles south of the Solberg Avenue overpass project area and would not be directly impacted by any of the proposed modifications to the arterial system. No other cultural resource site(s) are known to be located in the vicinity of the project area. Therefore, based on this information, it was determined that there would be no impact on known cultural resources regardless of the alternative selected. The State Historic Preservation Officer (SHPO) was contacted regarding the project and indicated in an email dated January 7, 2008 (Appendix B) that the project currently does not meet the definition of a federal undertaking, and therefore, does not fall under their jurisdiction. The proposed action will be a federal funded project; therefore, coordination with the SHPO will be required to obtain a Section 106 concurrence. An archeological survey of the proposed action will be completed prior to the Final EA.

In the event that cultural resources are encountered during construction activities, construction would be stopped and the SHPO would be contacted. Construction would not be resumed until appropriate coordination has occurred and SHPO approval has been received.

4.13 RECOGNIZED ENVIRONMENTAL CONDITIONS

The American Society for Testing and Materials (ASTM) (2000) Standard E 1527-94 defines a recognized environmental condition (REC) as "the presence or likely presence of any hazardous substances or petroleum products on a property under conditions that indicate an existing release, a past release, or a material threat of a release of any hazardous substances or petroleum products into structures on the property or into the ground, groundwater, or surface water of the property."

4.13.1 Affected Environment

An Environmental Data Resources, Inc. (EDR) database search was completed on December 4, 2007, for one-mile radius around the 69th Street / Tallgrass Avenue intersection (EDR 2007). The EDR search did not identify any known REC sites within the project area.

Sixteen orphan sites (inadequate address to map the location) were listed in the EDR report. No information about any of these sites was included with the EDR report. However, further research into the location of streets within the city indicated that none of the orphan sites are located within the 1-mile radius of the project area. Visual observations did not identify any hazardous materials within the project area.

4.13.2 Environmental Consequences

4.13.2.1 Alternative 1 – No-build

The No-build Alternative would not involve any construction activities; therefore, no RECs would be impacted.

4.13.2.2 Alternative 2 – I-229/Solberg Avenue-Tallgrass Avenue Overpass (Grade Separation)

No known RECs are located within the project area; therefore, construction of the build alternative would not impact any REC sites. If any contamination is encountered during construction activities, the contractor must report the contamination to the SDDENR for action.

4.14 PERMITS AND ADDITIONAL COORDINATION

Table 10 lists agency approvals/permits needed before the proposed project can be constructed. Additional agencies consulted for this project, included:

- US Fish and Wildlife Services
- South Dakota Department of Game, Fish and Parks
- Natural Resources Conservation Service
- In accordance with Section 106 of the National Historic Preservation Act (36 CFR Part 800), the SDDOT solicited comments on this project from the following tribes: Flandreau Sioux Tribe, Lower Brule Sioux Tribe, Sisseton-Wahpeton Oyate Tribe, Standing Rock Sioux Tribe, Yankton Sioux Tribe and the Three Affiliated Tribes of North Dakota. Consultation letters were sent to each tribe on January 6, 2010 (Appendix B). One comment was received from Perry Brady, THPO for the Mandan, Hidatsa, and Arikara Nation (Three Affiliated Tribes of North Dakota). Mr. Brady called the FHWA Division Office on January 22, 2010 and stated that the THPO office does not have any comments on this project. No other comments were received.

4.15 CUMULATIVE IMPACTS

The Solberg Avenue-Tallgrass Avenue Overpass of I-229 is one of several transportation projects / studies under consideration within the southwest portion of the Sioux Falls metropolitan area. These other studies include the following:

- I-29/I-229 system interchange
- I-29 and I-229 mainline
- I-29/69th Street overpass
- 69th Street widening/reconstruction between Tallgrass Avenue and Connie Avenue
- 59th Street between Louise Avenue and Solberg Avenue
- Tallgrass Avenue between 69th Street and 85th Street
- I-29/85th Street and 85th Street between Sundowner Avenue and Louise Avenue

As previously discussed in Chapter 2 the amount of housing and employment in this area of Sioux Falls are projected to increase significantly. The cumulative effect of these roadway improvements is to improve traffic operations and access for this growing area. Many of the above transportation facilities are being studied as part of the I-29 Corridor Study. An environmental document will be prepared for these proposed roadway improvements. At this time many of the above transportation facilities are not currently included in the SDDOT Statewide Transportation Improvement Program.

TABLE 10: AGENCY APPROVALS AND PERMITS

Government Agency	Type of Approval or Permit	Status
Federal		
Federal Highway Administration	EA Approval	Pending
	Environmental Impact Statement (EIS) Need Decision	Pending
US Army Corps of Engineer	Section 404 Permit	On-going
State		
SD Department of Transportation	EA Approval	Pending
	EIS Need Decision	Pending
	Layout Approval	Pending
State Historic Preservation Office	Section 106 Concurrence	On-going, to be completed prior to Final EA
SD Department of Environment and Natural Resources	National Pollutant Discharge Elimination System Permit	Pending
Local		
Urbanized Development Commission (UDC) (Sioux Falls, Minnehaha, and Lincoln Counties)	Layout Approval and Continued Review of Plans	Ongoing

Many of these transportation facilities currently exist and the capacity improvements would enhance traffic operations throughout this area of Sioux Falls. These potential roadway improvement projects are projected to result in similar impacts as the Solberg Avenue overpass. Projected impacts for environmental elements from these projects include farmland conversion, noise impacts to existing residential uses and impacts to wetlands. As those studies progress into the environmental stage, steps will be taken to minimize impacts on these environmental resources and throughout the on-going project development process the SDDOT would continue to evaluate mitigation measures that could be employed to minimize project related impacts. Likewise, as the proposed action progresses into final design, the SDDOT will continue to look for ways to minimize project related impacts.

4.15.1 Indirect Development Impacts

Establishing the Solberg Avenue-Tallgrass Avenue connection across I-229 will create a new arterial corridor between employment opportunities on the north side of I-229 and south of 57th Street and future residential areas outside the current Sioux Falls city limits. The new arterial connection will not result in changes for the future development concepts in undeveloped areas to the south, but it could result in moving the timing of residential developments to an earlier period. In all likelihood, the arterial cross would not, however, result in accelerating implementation of commercial or industrial development concepts in the area as they will rely more on improved connections with regional facilities, such as I-29 and I-229. The proposed arterial crossing does not result in enhanced access to the interstate system. Thus, would not likely accelerate commercial or industrial development ideas.

Within the reasonable travelshed of the Solberg Avenue-Tallgrass Avenue crossing of I-229, there are approximately 150 acres of presently undeveloped area that could develop in an earlier period than if the crossing were not constructed. The future residential development area, displayed in **Figure 15**, located south of 85th Street and east of Tallgrass Avenue (i.e., northwest quarter section of Delapre Township Section 20). Areas outside of this quarter section would most likely obtain access through the Louise Avenue corridor or the Highway 106 interchange at I-29 rather than the Solberg - Tallgrass Avenue corridor. Of the acreage in the quarter section, approximately 99 acres are classified in categories that are either Prime farmland or farmland of statewide importance. The 99 acres, which also includes the undevelopable areas along waterways, represents less than 0.03 percent of the prime, unique or local important farmland in Lincoln and Minnehaha Counties.

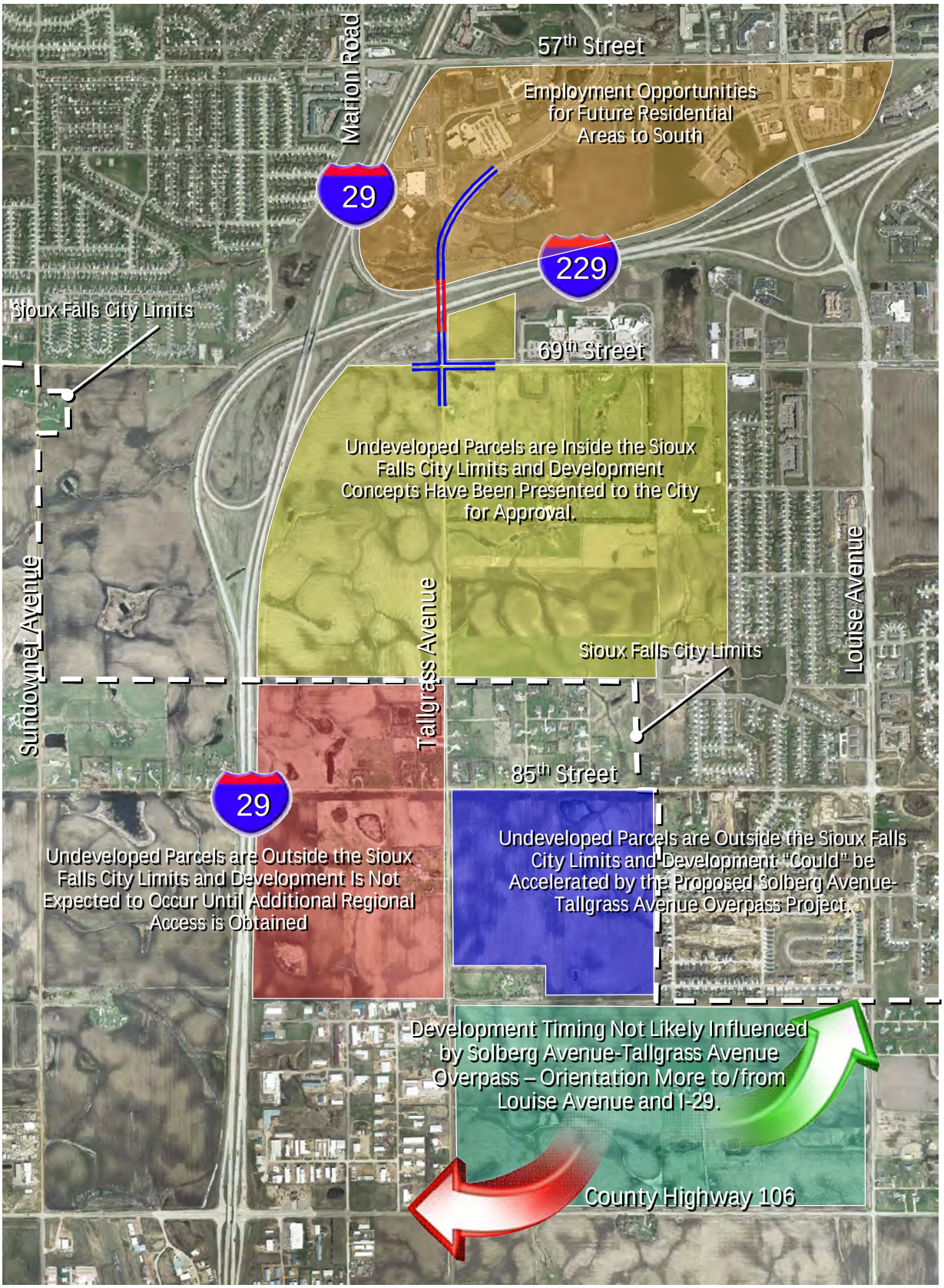


FIGURE 15. Parcels Whose Development Timing Potentially Impacted by Project

4.16 MITIGATION SUMMARY

Table 11 provides a summary of the environmental impacts related to the proposed action and the proposed mitigation measures.

TABLE 11: PROPOSED ACTION IMPACTS AND MITIGATION

Category	Identified Impacts	Identified Mitigation
Land Use	Approximately 5.3 acres of additional right-of-way is needed. No prime farmland conversion from immediate project impacts. Future development of approximately 99 acres of prime farmland/farmland of state importance could be accelerated due to additional area accessibility provided. No impacts to 4f (parks) property.	None Required/Warranted.
Socioeconomic	Positive impact for development as current accessibility barriers are reduced. No environmental justice impacts.	None Required/Warranted.
Visual	Bridge will add a built feature to the current viewshed, creating a potential minor/ minimal impact.	None Required/Warranted.
Air Quality	Air quality would be similar to No-build or slightly better.	None Required/Warranted.
Noise	No impacts outside the proposed right-of-way.	None Required/Warranted.
Geology, Soil	Project will impact approximately 7 acres.	Re-vegetation of 3.2 acres following construction
Hydrology	No water bodies nearby the project – No adverse impacts.	Erosion control plan during construction to control runoff
Wetlands	Approximately 4.9 acres of wetlands would be impacted (wetland impacts include areas within the current Solberg Avenue right-of-way – These areas are included in the wetland impact total, but not in the new right-of-way total).	Wetland areas will be delineated and a final mitigation plan developed for a 404 Permit. City anticipates mitigating impacts through use of the Tetonka wetland Mitigation Bank property.
Wildlife, Threatened and Endangered Species	None.	None Required/Warranted
Cultural/Historical Resources	No known/documented cultural, historical properties/resource areas identified within the project area. SDDOT will be completing a survey prior to final EA.	SHPO will make a final determination for this project based on input from SDDOT (initial contact has been made with SHPO).
Environmental Conditions	None - No hazardous material sites were identified within the project area.	None

SECTION FIVE PREFERRED ALTERNATIVE

5.1 SELECTION OF PREFERRED ALTERNATIVE

The information presented in Section 4 documents the potential positive and negative environmental criteria impacts associated with the identified alternatives, including:

- Alternative 1 - No-build
- Alternative 2 – I-229/Solberg Avenue-Tallgrass Avenue Overpass (Grade Separation)

The environmental analysis is a critical determinant in selection of the locally preferred alternative, but it is not the only determinant and is not necessarily the controlling determinant. The Preferred Alternative should be the concept that best meets the local, regional, and state transportation system goals. Environmental stewardship is one of the transportation goals, but not the only goal. Determining which of the alternatives is the locally preferred takes into account balancing:

- Environmental review results.
- Local and regional transportation system connectivity and continuity beyond the limits, but influenced by current concept under consideration.
- Potential for positive and/or negative impacts to current and/or anticipated development in the adjacent area.
- Cost of one alternative relative to the others.
- How each of the alternatives addressed transportation goals for the community and the region.
- Support from the public.

The process employed in selection of the Preferred Alternative is outlined below:

- Complete the environmental assessment. The results are documented in Section 4.
- Present a summary of the findings associated with the No-build and Build alternative to a broad range of planning and design personnel from the SDDOT, the City of Sioux Falls and the South Eastern Council of Governments.
- With personnel from each of the departments listed, determine which of the alternatives best meets the regional and local transportation system goals.
- Document the preliminary recommendation of the Preferred Alternative to the public and agencies for comment.

5.2 DESCRIPTION OF PREFERRED ALTERNATIVE

Through a workshop meeting the positive and negative aspects of each of the alternatives were reviewed relative to the environmental, transportation, engineering, and cost criteria. The following bullet points provide a description of ideas expressed during the Preferred Alternative selection workshop:

- The need to improve the access to developing areas adjacent to both I-29 and I-229 has been supported through the current and future traffic operations analyses.

- The model-generated traffic forecasts for 2033 reflect substantial increases in volume through the system interchange, using the adjacent interchanges at Louise Avenue, 41st Street and County Road 106 (Tea) and along 57th Street.

The plan view of the Preferred Alternative is displayed in **Figure 16**.

5.3 SUMMARY

Overall, implementation of the Preferred Alternative would not result in major impacts on any of the environmental resources. Farmland conversion, noise impacts to existing residential uses and impacts to wetlands are considered to be the environmental elements that are affected the most by the proposed action. As stated previously, steps have already been taken to minimize impacts on these environmental resources and throughout the on-going project development process the SDDOT would continue to evaluate mitigation measures that could be employed to further reduce project related impacts.

FIGURE 16. Preferred Alternative I-229 / Solberg Avenue - Tallgrass Avenue Overpass

SECTION SIX PUBLIC INVOLVEMENT

6.1 PUBLIC MEETINGS

During the course of this study, "open house" style meetings were held on March 30, 2006, July 17, 2008, and February 26, 2009 to gather input and provide project information to the public regarding the I-29 Corridor Study. The Solberg Avenue project was included as an alternative in the I-29 Corridor study.

Those meetings provided an informal forum for the public to learn about the study and offer comment. The meetings were publicized through paid advertisements in the Sioux Falls Argus Leader, a large local newspaper.

During each meeting, a brief slide presentation explaining the EA process, the status of the study, and the purpose for the meeting was provided to the public. Additionally, aerial photographs with overlays of the potential design alternatives for the overall study corridor (including the Solberg Avenue Overpass) were displayed for public review. People were encouraged to review the information provided on the aerial displays and ask questions and/or discuss the project with SDDOT and URS team representatives. To provide adequate personal attention necessary to the success of the meeting, SDDOT and URS staffs were available to clarify project objectives, describe the process, answer questions, and record comments.

Comments received from the approximately 90 people who attended the meetings were mostly general and were in regards to the meeting, study process, and prioritization of projects. Each comment was read and considered after the meeting. Some comments were used in the alternative selection process. The sign-in forms and written public comments are included in Appendix E. Video recordings of the July 17, 2008 and February 26, 2009 meetings are available for viewing on the SDDOT website.

6.2 DRAFT EA

Prior to publishing the Final EA for the I-229/Solberg Avenue-Tallgrass Avenue Overpass (Grade Separation), the Draft EA will be made available to public agencies and the general public for review and comments. A public meeting specific to this project will be scheduled during the public review period.

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