ENVIRONMENTAL ASSESSMENT AND SECTION 4(F) EVALUATION

FOR

I-29 Exit 130 (20th Street South) Interchange

EM 0295(45) 130, PCN 020V

Brookings County
Brookings, South Dakota

Submitted Pursuant to 42 U.S.C. 4332(2) and 49 U.S.C. 303
by the
US Department of Transportation
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and
South Dakota Department of Transportation

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ACRONYMS AND ABBREVIATIONS

AAQM	Ambient Air Quality Monitoring
APE	area of potential effect
AST	aboveground storage tank
BCOAC	Brookings County Outdoor Adventure Center
BLE	Base Level Engineering
BMP	best management practice
BUILD	Better Utilizing Investments to Leverage Development
CFR	Code of Federal Regulations
CO	carbon monoxide
dBA	A-weighted decibels
EA	Environmental Assessment
EO	Executive Order
FEMA	Federal Emergency Management Agency
FHWA	Federal Highway Administration
FONSI	Finding of No Significant Impact
GHG	greenhouse gas
I-29	Interstate 29
ICE	Infrastructure Carbon Estimator
LEP	limited English proficiency
Leq(h)	hourly equivalent sound level
LOS	level of service
LWCF	Land and Water Conservation Fund
µg/m^3	micrograms per cubic meter
mmBTU	one million British Thermal Units
MT CO2e	carbon dioxide equivalent
NAAQS	National Ambient Air Quality Standards
NAC	Noise Abatement Criteria
NEPA	National Environmental Policy Act
NO_2	nitrogen dioxide
NPDES	National Pollutant Discharge Elimination System
NRHP	National Register of Historic Places
O_3	ozone
OWUS	other waters of the US
Pb	lead
PM	particulate matter
ppb	parts per billion
ppm	parts per million
ROW	right-of-way
SAAQS	State Ambient Air Quality Standards
SAT	Study Advisory Team
SD 324	South Dakota Highway 324
SDDENR	South Dakota Department of Environment and Natural Resources
SDDOT	South Dakota Department of Transportation
SDGFP	South Dakota Department of Game, Fish, and Parks
SFHA	Special Flood Hazard Area
SHPO	State Historic Preservation Office
SO_2	sulfur dioxide
UA	Uniform Relocation Assistance and Real Property Acquisition Act
US 14	US Highway 14
USACE	US Army Corps of Engineers
U.S.C.	United States Code
USDOT	US Department of Transportation
USEPA	US Environmental Protection Agency
USFWS	US Fish and Wildlife Service
UST	underground storage tank

1.0 PURPOSE AND NEED

1.1 INTRODUCTION

The City of Brookings, South Dakota (the City), in conjunction with the South Dakota Department of Transportation (SDDOT) and the Federal Highway Administration (FHWA), is completing this study to evaluate alternatives for an overpass or interchange on Interstate 29 (I-29) at 20th Street South (the Project). Please refer to *Figure 1-1* for the Project location. A range of options to address the transportation needs in the Project Area was studied previously, and the options were further refined to consider the preferred location of 20th Street South for a new overpass or interchange. These options were previously identified and studied in the following transportation or land use planning documents:

- *Vision 2020 Comprehensive Plan for the City of Brookings* (2000)
- *Brookings Industrial Park Traffic Impact Study* (2008)
- *South Dakota Decennial Interstate Corridor Study* (2010)
- *Brookings Area Master Transportation Plan* (2011)
- *20th Street South Interstate Access Evaluation* (2016)
- *Brookings South Dakota Comprehensive Plan 2040* (2018)
- *Better Utilizing Investments to Leverage Development (BUILD) Grant Application, Bridging the Interstate Divide, 20th Street South Interchange Project* (2019)

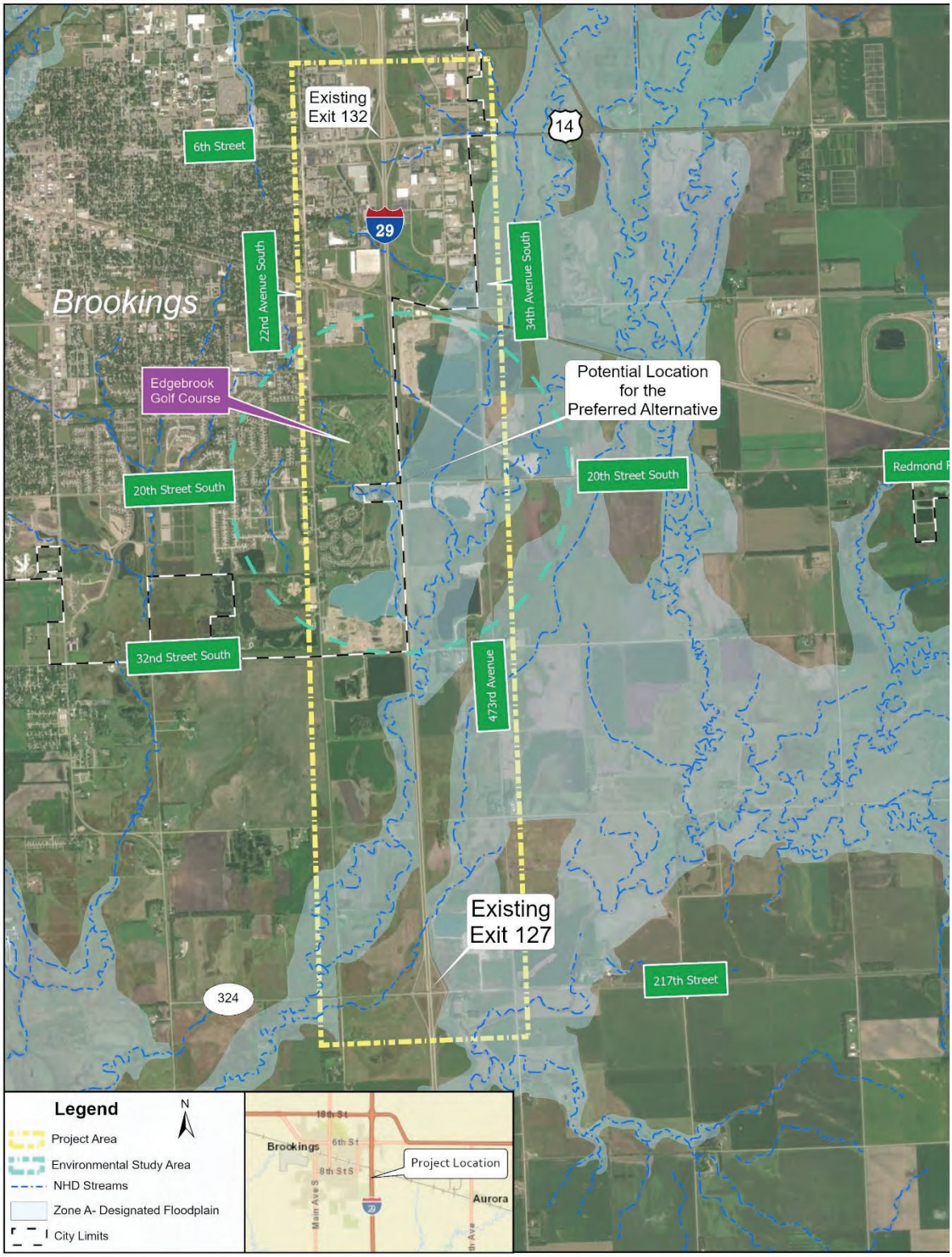
The stakeholders for the Project include the City, Brookings County, SDDOT, FHWA, and the East Brookings Business and Industry Group. The East Brookings Business and Industry Group is a local group that is a proponent of the Project and provides information and financial support. The Project has been coordinated with state and federal agencies, landowners, business owners, commuters, citizens, golf course and trail users, and the City's Parks, Recreation, and Forestry Department.

FHWA BUILD grant funding will be used for this Project; therefore, requirements of the National Environmental Policy Act (NEPA) will apply. FHWA has determined that an Environmental Assessment (EA) is the proper NEPA classification to assist in determining whether the Project is likely to have significant environmental impacts that would require an Environmental Impact Statement under NEPA.

1.2 PROJECT LOCATION AND DESCRIPTION OF PROJECT AREA

The Project is located in Brookings, which is in Brookings County, as shown in *Figure 1-1*. The Project Area is an area used early in this NEPA process to consider the current transportation system. The Environmental Study Area is the area used to evaluate the effects of the reasonable alternatives on the resources present.

Figure 1-1. *Project Location*



Within the Project Area, there are two interchanges on I-29, one at Exit 127 (South Dakota Highway 324 [SD 324] / 217th Street) and one at Exit 132 (US Highway 14 [US 14] / 6th Street). The major north-south arterials are 22nd Avenue South and 34th Avenue South/ 473rd Avenue. 22nd Avenue South is a paved four-lane roadway with turn lanes, and 34th Avenue South was recently improved to a paved two-lane roadway. The major east-west arterial in the Project Area is 6th Street, which is a paved four-lane roadway separated by a median and turn lanes.

The past transportation improvement projects in the Project Area that are relevant to this Project include the following. No known current or future transportation projects were noted in the Project Area. This Project is planned within the SDDOT Statewide Transportation Improvement Program (STIP) noted for construction in 2021.

- **Improvements along the US 14 / 6th Street Corridor from 22nd Avenue South to 34th Avenue South:** In 2017 and 2018, SDDOT and the City completed improvements to the US 14 / 6th Street corridor. The improvements included grading, pavement, curb and gutter, storm sewer, lighting, signing, signals, Americans with Disabilities Act accessibility, and pavement markings. Also included were a span wire traffic signal and a turn-lane addition.

- **Improvements to 34th Avenue South:** Improvements to 34th Avenue South were constructed in two phases. In 2010, phase one was from US 14 / 6th Street to Prince Drive and included improving the rural, gravel-surfaced, two-lane roadway into an urban, asphalt-surfaced, three-lane roadway. Phase one was completed by the City, SDDOT, and FHWA. In 2016, phase two was from Prince Drive to 8th Street South and included improving the rural, gravel, two-lane roadway to a rural, asphalt-surfaced, three-lane roadway. This segment was funded by the City. Phase two also included improvements from 8th Street South to 32nd Street South. The rural, gravel-surfaced, two-lane roadway was reconstructed to a rural, asphalt-surfaced, two-lane roadway. This segment was completed by Brookings County.

- **Improvements to I-29:** In 2020, the I-29 surface was treated (i.e., asphalt overlays, crack sealing).

The City is on a peninsula surrounded by floodplains to the west, south, and east. In addition, growth to the north is restricted by the presence of South Dakota State University, the US 14 bypass, and floodplains. Because of the nature of the City's manufacturing, agricultural-related, and food production industries, most of the community's larger employers flank the I-29 corridor. No industrial development land remains on the west side of I-29, forcing future industrial growth to the east and northeast of I-29. Service, education, and community amenity growth occurs to the south and southwest. Commercial and employment center growth opportunities that could better serve the southern portion of the City and rural areas are limited because of the absence of a southern access to I-29 (City of Brookings 2019).

The Project involves evaluating alternatives for an overpass or interchange at 20th Street South. To consider the extents of the Project, the logical termini were defined. Logical termini for a project are (1) rational end points for a transportation improvement, and (2) rational end points for a review of the environmental impacts. The ground-disturbing activities to improve the transportation system would be

focused near 20th Street South. For this Project, the logical termini west-to-east extents are from 22nd Avenue South to 34th Avenue South, and the south-to-north extents are from 217th Street to 6th Street, including Exits 127 and 132. This Project is a standalone project since the proposed improvements would address the needs. The Project would not force needed improvements outside of the logical termini. This Project is a standalone project separate from current and future roadway projects and conforms to the local and state planning documents.

1.3 PURPOSE AND NEED FOR THE PROJECT

NEPA and other environmental requirements rely on a project decision-making process guided by the purpose and need for the Project. The purpose and need statement clarifies the transportation problem to be solved and provides the justification and expected outcome of the expenditure to improve the transportation system. Other desired outcomes or objectives that are not the main driver of the project can be incorporated as goals. Alternatives are developed, evaluated, and compared based on how well the purpose and need statement is addressed; those alternatives that meet the purpose and need are subsequently evaluated and compared for consideration of engineering criteria and environmental impacts.

The development process for previous transportation plans included public meetings and focus groups to discuss this Project. Over 120 community members participated in the community visioning charrettes, which are held every 5 to 7 years. The charrette process is used to discuss desirable improvements, and an interchange at 20th Street South was highly supported at the visioning charrettes in both 2007 and 2013 (City of Brookings 2018). Specifically for this EA process, coordination with the public occurred through a Project website and a prerecorded presentation. An in-person public meeting was not held because of the COVID-19 pandemic. The presentation on the Project website outlined the proposed purpose and need and asked for comments and input. The purpose and need statement was developed with consideration of public input as well as agency and tribal input. Initial coordination with agencies and tribes occurred through scoping letters. In addition, meetings were held with each potentially affected landowner. Coordination with agencies, tribes, landowners, and the public will continue throughout the Project. Please see *Chapter 5.0* for additional information on the coordination that occurred for the Project.

The purpose and need for this Project were derived using information from all previous studies noted in *Section 1.1*. These local and state planning and study documents accounted for the interchange and 20th Street South improvements.

1.3.1 Purpose of the Project

The purpose of the Project is to relieve congestion on major north-south and east-west arterials and to improve transportation connectivity for community access and to facilitate growth of the local economy.

1.3.2 Project Needs

1.3.2.1 System Linkage

System linkage considers the Project as a “connecting link” and evaluates how the Project fits into the transportation system. As noted in the BUILD grant application, a functional divide is created by I-29 that separates centers of employment and commerce from the existing and future residential areas. Currently,

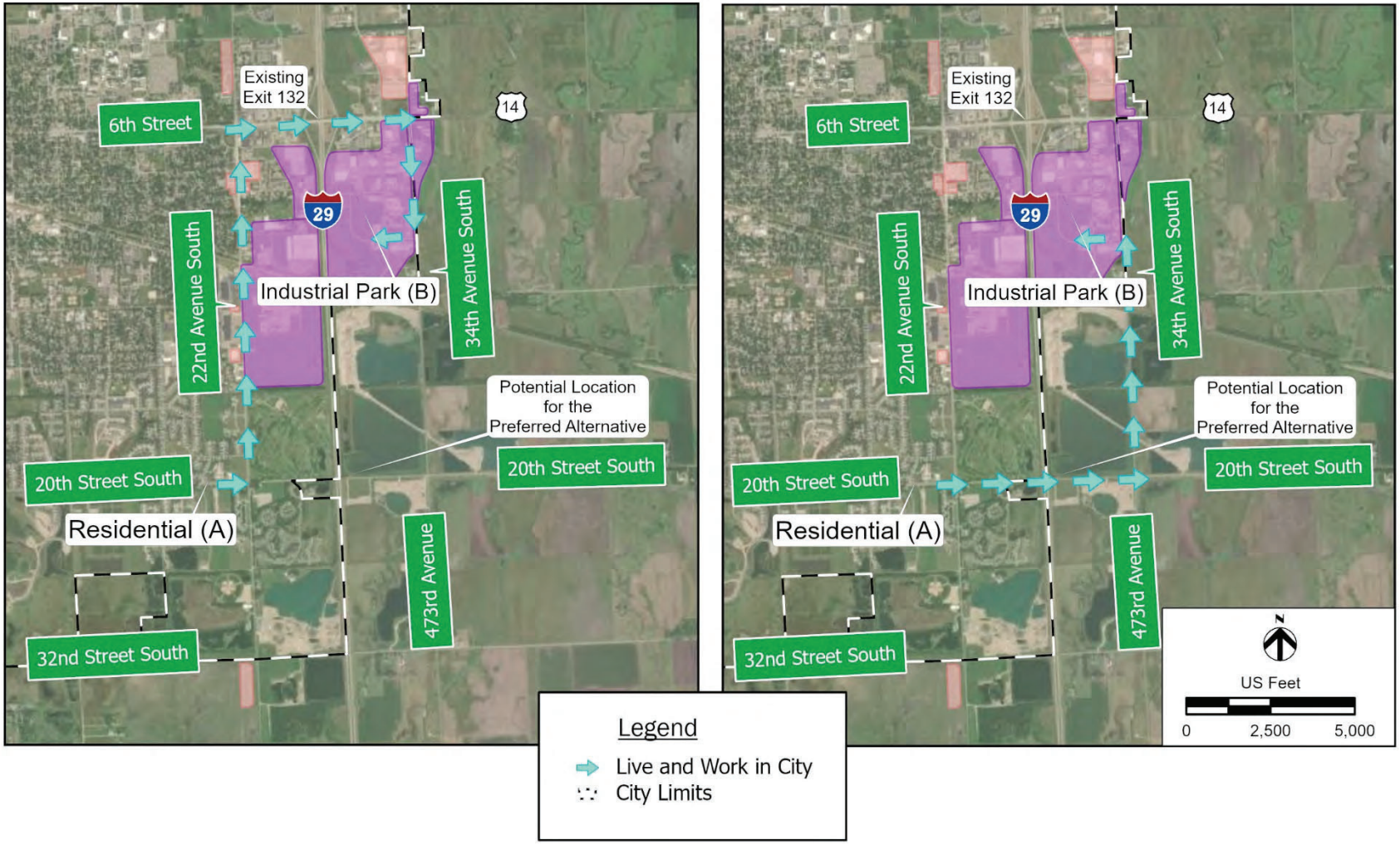
for portions of the City within the Project Area, the east-west connections over I-29 consist of two interchanges, Exit 132 (US 14 / 6th Street) and Exit 127 (SD 324 / 217th Street), and one overpass at 32nd Street South. The US 14 / 6th Street roadway provides connections to the north side of the City, the east I-29 industrial park, and agricultural implement dealers. Total employment on the east side of I-29 within the industrial park is estimated in the BUILD grant application at approximately 4,000 employees. SD 324 / 217th Street provides connections to the main north-south arterials, 22nd Avenue South and 34th Avenue South, but requires residents to travel outside of the city limits to access the other side of I-29. The overpass on 32nd Street South also provides access but lacks amenities and, for many residents, requires additional travel south to access the other side of the interstate. For residents traveling to work, the limited connections across I-29 in the existing roadway system cause longer commuting and travel times, which are expected to increase as future development of residential areas in the southwest portion of Brookings occurs.

To demonstrate the lack of a connecting link in the current roadway system, an example of the travel patterns of residents who live and work in Brookings was considered. This example was selected to show the estimated driving distance and travel time saved for employees of the industrial park if a connecting link were present. The main residential areas in Brookings are south of 6th Street and west of 22nd Avenue South. Naturally, future residential area growth is anticipated to continue in this area, extending south of 20th Street South on the west side of 22nd Avenue South. Drivers coming from existing and future residential areas would converge at the intersection of 22nd Avenue South and 20th Street South. From this intersection, drivers can take either US 14 / 6th Street, SD 324 / 217th Street, or the 32nd Street South overpass to cross I-29 and reach the industrial park. The latter two options lack services; therefore, they are not as commonly used and would add at least an additional 2.5 miles to the drive. For this example, residents were assumed to take US 14 / 6th Street. Please refer to *Figure 1-2*, which shows an existing residential area (Point A) west of I-29 and the industrial park (Point B) east of I-29. Without a connecting link (shown in the left pane of the figure), the driving distance would be 3.3 miles and would take approximately 6.8 minutes. A roadway connection, either an overpass or I-29 interchange, at 20th Street South (shown in the right pane of the figure) would reduce the driver's driving distance by 0.5 mile and drive time by 1.5 minutes. This reduction is assumed to be the amount of driving distance and travel time saved for each individual driver for each trip. If this reduction is calculated for all 4,000 employees on the east side of I-29, a roadway connection in this location would save 2,000 miles and 100 hours for a one-way trip, or 4,000 miles a day and 200 hours for a round-trip travel day. This estimated reduction is for just one group of drivers in the area; additional reductions would occur for the public traveling in the area.

To determine if the proposed alternatives would meet the Project need for system linkage, the following criterion will be used:

- Does the alternative provide a roadway connection over I-29 that reduces driving distance and travel time by at least 2,000 miles and 100 hours for a one-way trip for employees traveling from west of I-29 to the industrial park east of I-29?

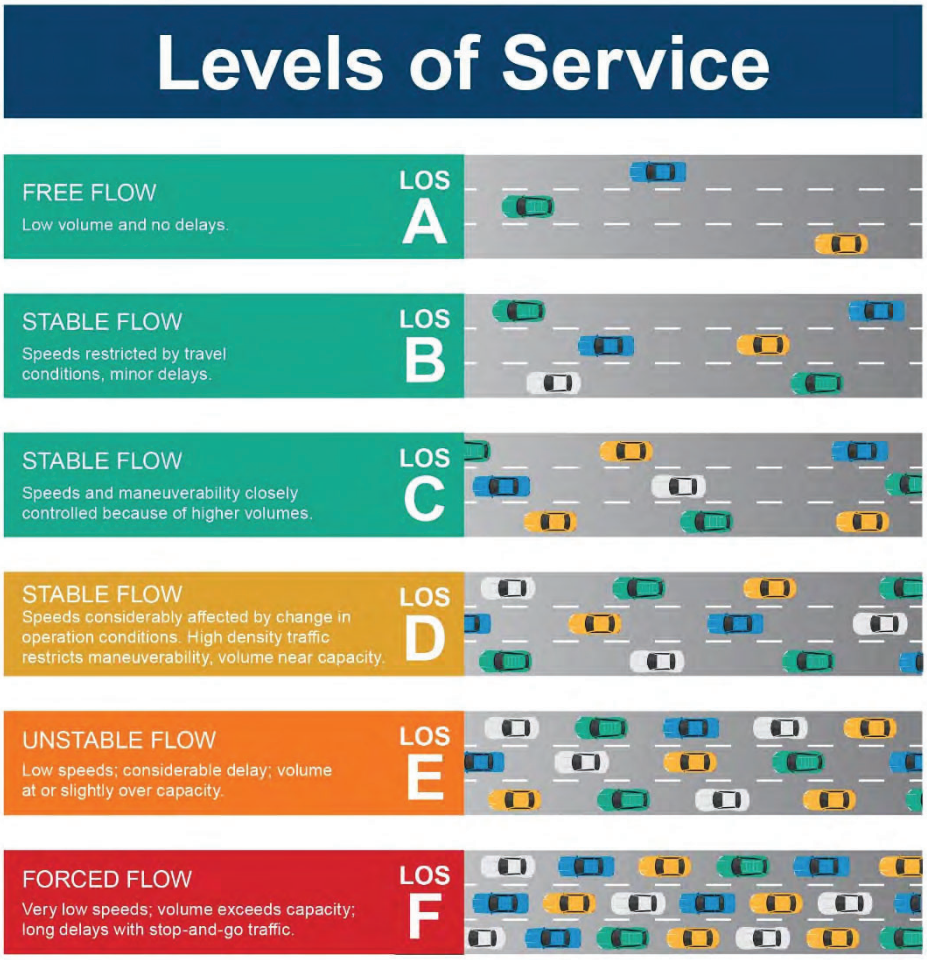
Figure 1-2. *Example Route for System Linkage: Future Development (Destination A) to Industrial Area (Destination B)*



1.3.2.2 Traffic Capacity

Previous traffic studies have been updated to evaluate the traffic operations for current and projected 2045 traffic volumes on the existing roadway systems in the Project Area. The updated traffic study that is part of the Interchange Justification Report analyzed the level of service (LOS), which is a measurement for categorizing traffic flow on roadways and at intersections, generally during peak (work congestion) traffic periods. The LOS scale is similar to classroom grading, with LOS A being the best traffic conditions (i.e., free flow) and LOS F being the worst (i.e., gridlock). Please refer to *Graphic 1-1*.

Graphic 1-1. *Levels of Service*



For this Project, the stakeholders have identified LOS A, B, or C as an acceptable traffic flow at the intersections for the planning period, which is until the year 2045. In the Interchange Justification Report, a LOS was determined for the main intersections for the year 2045 for three scenarios: no-build, overpass at 20th Street South, and interchange at 20th Street South. Please refer to *Table 1-1,* which shows the peak hour LOS at each of the main intersections for the no-build scenario compared to the overpass and interchange scenarios.

Table 1-1. *LOS for No-Build, Overpass, and Interchange Scenarios*

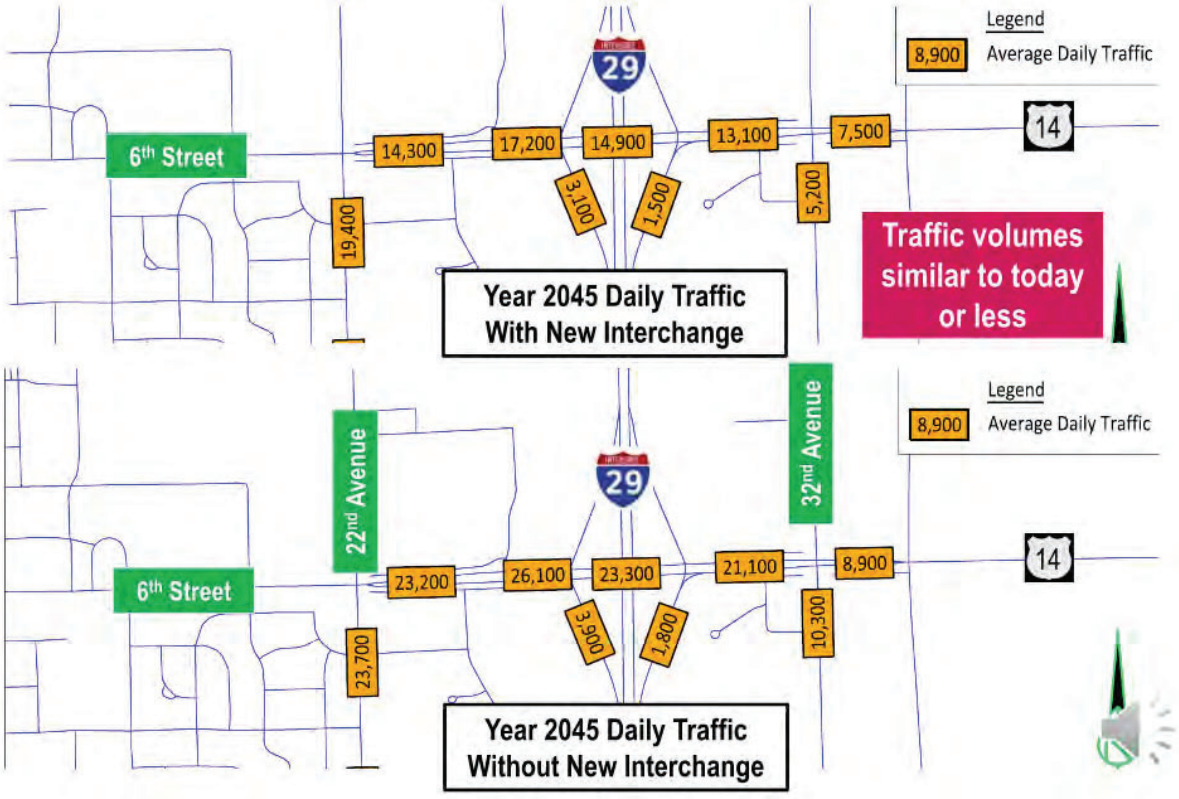
Intersections Considered	No-Build Peak Hour in Year 2045 (AM/PM[1])	Overpass Peak Hour in Year 2045 (AM/PM)	Interchange at 20th Street South Peak Hour in Year 2045 (AM/PM)
34th Avenue and 6th Street	A/C	A/A	A/A
34th Avenue South and 20th Street South	A/A	B/A (Signal)	B/A (Signal)
22nd Avenue and 6th Street	C/C	C/C	C/C
22nd Avenue South and 20th Street South	F/F	B/B	C/C
6th Street and I-29 Southbound	F/F	C/D	A/A

[1] The peak hours in the AM and PM.

Under the no-build scenario, the intersection of 22nd Avenue South and 20th Street South would not have an acceptable LOS in 2045. This intersection would not function well with the future projected traffic in this area, but the traffic flow at this intersection would be improved by an overpass or interchange. The main arterial extending east to west, 6th Street, showed LOS issues for the peak hour at its intersection with I-29 Southbound for the traffic levels in 2045. The intersection at 6th Street and I-29 Southbound would improve to an acceptable LOS level with an interchange at 20th Street South. An overpass would not improve the LOS to an acceptable level.

In addition to the LOS, the traffic congestion was considered at the major arterials by comparing traffic counts with and without an interchange in 2045, as shown in *Figure 1-3*. The future traffic numbers on the major arterials would be reduced on 6th Street, 22nd Avenue South, and 32nd Avenue.

***Figure 1-3**. Year 2045 Daily Traffic with and without an Interchange at 20th Street South.*



To determine if the proposed alternatives would meet the Project need for traffic capacity, the following criterion will be used:

- Does the alternative improve the LOS at the intersection of 22nd Avenue South and 20th Street South and at the intersection of 6th Street and I-29 Southbound to meet an acceptable LOS (A, B, or C) in 2045?

1.3.3 Project Goals

Through the scoping process, goals were considered for this Project. While Project goals are not used for screening alternatives, these goals are incorporated into the alternatives, where possible, to meet the concerns of the public and agencies. The goals identified during the public and agency scoping process—economic development, safety, and multi-modal opportunities—are discussed in the following sections.

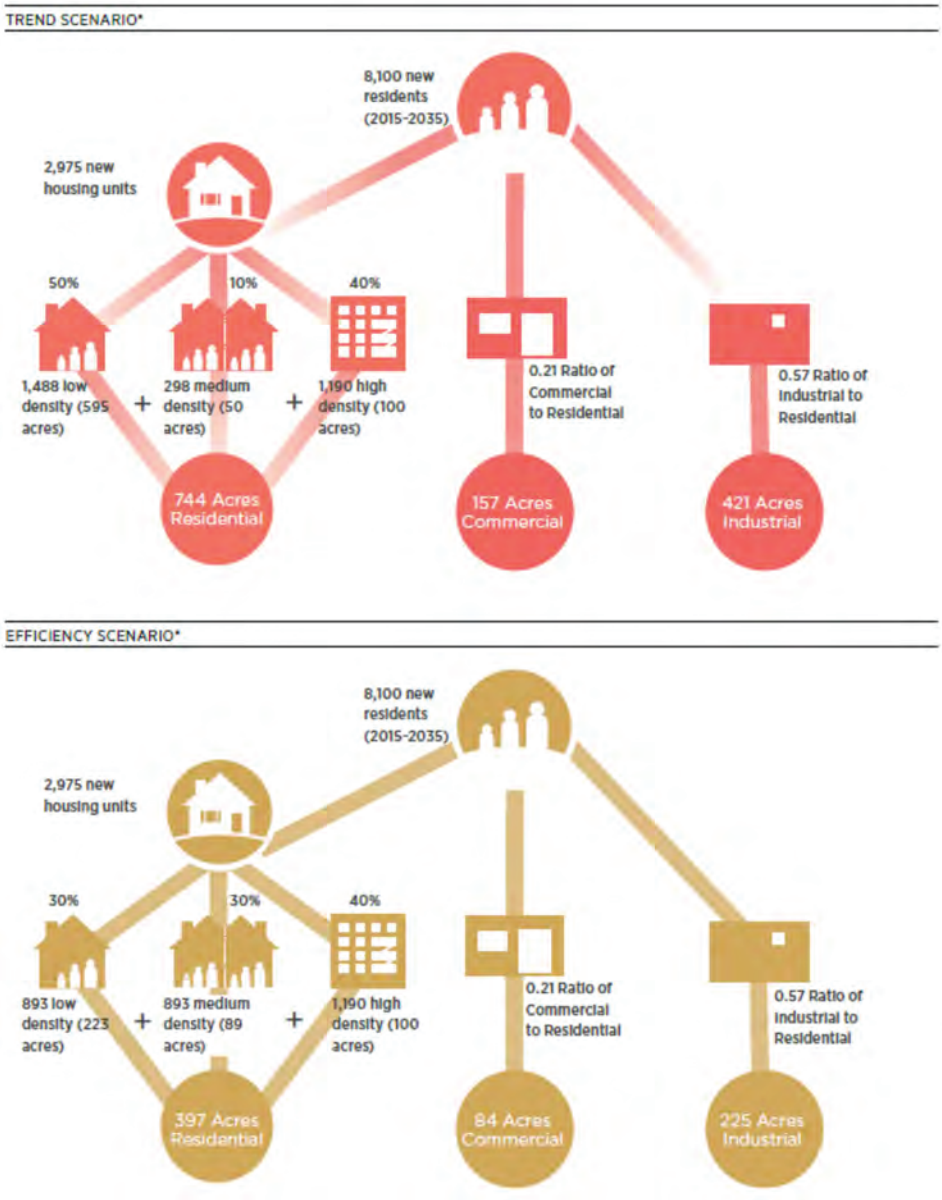
1.3.3.1 Economic Development

This Project would contribute to future growth patterns, land development, and new business development. The current growth rate of Brookings was reviewed, as were the development (residential, commercial, and industrial areas) needed to continue this growth rate and the ability of the Project to facilitate that development in order for Brookings to meet its growth rate.

Brookings is the fourth largest community in South Dakota, with a steady growth rate of 2.5 percent per year in population. In 2018, the City completed an updated *Brookings South Dakota Comprehensive*

Plan 2040 (*2040 Comprehensive Plan*) that included an in-depth evaluation of population and economic growth trends, land use trends and patterns, and transportation systems. To meet the continued steady growth rate, land use growth would need to occur through development of vacant land. The amount of land required to meet the growth rate was presented in two scenarios, trend and efficiency, in the *2040 Comprehensive Plan*. The trend scenario assumed that the City will grow at the same density and patterns that it has in the past, including many single-family detached homes. The efficiency scenario assumed that development will happen in a more compact manner, including a greater variety of housing options on smaller lots, reflecting the national trend in smaller scale retail (City of Brookings 2018). *Graphic 1-2* shows the breakdown of acres of land that would be needed for residential, commercial, and industrial uses to meet the current growth rate under the trend and efficiency scenarios.

Graphic 1-2. *Land Use Scenarios in the 2040 Comprehensive Plan (City of Brookings 2018)*



The *2040 Comprehensive Plan* addressed the future development that will be needed to allow Brookings to continue to grow. In the Project Area, residential, commercial, and industrial development areas have been considered. For the purposes of this EA, any development area that has been made known to the City and Brookings Economic Development Cooperation is referred to as planned development. The timelines on the development of these areas is unknown.

Within the *2040 Comprehensive Plan*, the limited street connectivity, currently and into the future, to large areas of undeveloped land was noted as the need for the proposed interchange at 20th Street South. In addition, prioritization of transportation connectivity to assist in meeting the City's growth rates was noted for support of the proposed interchange (City of Brookings 2018).

In addition to the *2040 Comprehensive Plan*, the following documentation noted the plans to meet the needed growth areas:

- In 2011, the City and Brookings County commissioned the *Brookings Area Master Transportation Plan.* Completed in 2011, this study concluded that a new 20th Street South interchange would allow for additional access to the industrial park, allowing for additional development of the park and the planned development on the east side of I-29 to occur (HDR 2011).

- In 2016, the *Comprehensive Land Use Plan for Brookings County* was completed. This plan noted community growth and the need for future development to accommodate that growth. This plan also noted that the reason planned development areas have not moved forward is because of the lack of existing transportation system infrastructure (Brookings County Planning Commission 2016).

- The BUILD grant application identified previously planned development areas near 20th Street South. These areas would help meet the needed residential, commercial, and industrial opportunities for this growing community.

For this EA process, the City and the Brookings Economic Development Corporation provided the current planned development areas within the Project Area. *Table 1-2* shows the area needed for residential, commercial, and industrial growth for the entire city, not just the Project Area. The current planned areas in the Project Area are also noted to show the progress toward the City's needed growth area due to the Project and to show that clearly defined development areas are identified. As the aforementioned planning studies indicated, by creating better connectivity in the roadway system, planned development would proceed. The planned areas in the Project Area are compared to the acreage needed for residential, commercial, and industrial growth for the entire city to demonstrate that this Project would assist Brookings in facilitating economic growth and striving to meet its growth rate.

As the plans note, the existing transportation infrastructure system would need to be improved to support the growth and economic development of the City. The timeline of the growth on the east side of I-29 is not fully known so improvements of the transportation in that area will occur as traffic warrants. For example, the segment of 20th Street South from 34th Avenue South is currently gravel-surfaced and is a connection from Brookings to Aurora. As traffic warrants, the improvement of the roadway from gravel-surface to paved is recommended. This same recommendation is relevant for the segment of 22nd

Avenue South, south of the intersection with 20th Street South. These improvements as traffic warrants would also allow connectivity to future growth areas, allowing the City to meet its growth rate and economic goals.

Table 1-2. *Acreage of Residential, Commercial, and Industrial Areas Needed to Maintain the City's Current Growth Rate in Comparison to Planned Development Areas*

Land Use	Acreage Needed (Trend Scenario)	Acreage Needed (Efficiency Scenario)	Planned Acreage in Project Area (Estimated)
Residential	744	397	102
Commercial	157	84	62
Industrial	421	225	0

1.3.3.2 Safety

The previous studies analyzed crash records in the Project Area. Recent improvements in the Project Area have improved the roadway concerns for safety. The remaining crashes can mainly be contributed to congestion, which was discussed *Section 1.3.2.3, Traffic Capacity*. As noted, the intersection of 22nd Avenue South and 20th Street South and the intersection of 6th Street and I-29 Southbound would be at an unacceptable LOS with the traffic levels in 2045. The Project's goal is to improve safety by relieving congestion at both intersections.

1.3.3.3 Multi-Modal Transportation

The *2040 Comprehensive Plan* notes that "a transportation system should promote a variety of complementary transportation modes including motorists, bicyclists, pedestrians, and transit riders. At present, Brookings has a strong pedestrian system, an emerging bicycle system, and a well-respected and growing on-demand transit service" (City of Brookings 2018). The Project's goal is to incorporate a shared use path along 20th Street South from the intersection with 22nd Avenue South to 34th Avenue South.

2.0 ALTERNATIVES

2.1 DEVELOPMENT OF ALTERNATIVES

In 2008, the City completed a traffic analysis study to identify solutions to address the existing and future traffic congestion on 6th Street/ US 14. As discussed in Section 1.3.2.2, the LOS at one intersection along 6th Street, 6th Street and I-29 Southbound, will become degraded due to traffic congestion. The traffic analysis study focused on the level of traffic that could be removed from 6th Street from an additional interchange on I-29 in the City and identifying the most ideal location for the interchange. The study noted the closer to 6th Street the interchange was located, the higher traffic usage. The farther south, less traffic usage. The location at 20th Street South was chosen due to being able to have a high enough usage to improve the traffic congestion on 6th Street and to meet the FHWA recommendation of one mile spacing of interchanges. No specific options or concepts for the interchange were considered (HDR 2008).

In 2016, an Interchange Analysis Report was completed with the purpose of considering if an interchange at the 20th Street South location would create any issues on the I-29 mainline. The report also considered potential distance between the proposed ramp of the interchange at this location to the existing ramps for Exit 132 to determine if any issues. Four alternatives were considered, which are noted in *Section 2.2* as Alternatives 1, 2, 3, and 4. This report did not complete any screening of the alternatives.

During the coordination for this EA and the current Interchange Justification Report (IJR), two additional alternatives were identified. Alternatives 5 and 6 were included and are discussed further in *Section 2.2*.

2.2 ALTERNATIVES

The current IJR (SDDOT 2020) analyzed the operations and safety characteristics of the existing roadway system and the future operations (year 2045) for the following alternatives:

- **No-Build Alternative:** The No-Build Alternative would leave the existing roadway system in place.
- **Interchange Alternatives (Alternatives 1–5):** The interchange alternatives would involve building an I-29 interchange at 20th Street South.
- **Overpass Alternative (Alternative 6):** The overpass alternative would involve building an I-29 overpass at 20th Street South.

2.2.1 No-Build Alternative

The No-Build Alternative would not construct an overpass or an interchange at 20th Street South. The main arterials in the Project Area—6th Street, 22nd Avenue South, and 34th Avenue South—would continue to be routinely maintained. Routine maintenance would include any activities that do not change the roadway's typical section, such as resurfacing but with no additional width added to lanes or shoulders. The No-Build Alternative would not meet the needs of the Project Area, causing congestion and a lack of roadway connectivity in Brookings. The No-Build Alternative would also not facilitate

economic growth. The lack of roadway connection and congested main arterials could affect the meeting of the City's planned growth rate. Although the No-Build Alternative does not meet the design criteria or the purpose and need for the Project, it will be carried forward as a baseline for comparing to potential impacts of the build alternatives.

2.2.2 Build Alternative Details

Several details are the same for all of the build alternatives, including the 20th Street South typical section and alignment, 20th Street South intersection improvements, I-29 horizontal and vertical alignment, and utilities. Each of these details are discussed further in the following sections.

2.2.2.1 20th Street South Typical Section and Alignment

Development of the roadway typical section was one of the initial considerations in the alternatives development process. *Figure 2-1* shows the proposed typical section. Features include the following:

- A 36-foot-wide pavement section from 22nd Avenue South to 34th Avenue South (approximately 1 mile). This generally matches existing 20th Street South to the west of 22nd Avenue South.
- Two through-lanes with 8-foot-wide shoulders on each side, or two through-lanes with a center left-turn lane.
- A shared use path on the south side of 20th Street South.

The horizontal alignment of 20th Street South has been shifted up to 180 feet south of the section line. The alignment shift does the following:

- Minimizes impacts on Edgebrook Golf Course, depending on the build alternative. A portion of proposed 20th Street South at the intersection with 22nd Avenue South is anticipated to have temporary construction impacts on the golf course.
- Results in impacts on several mobile homes and a pond along the south side of 20th Street South. All build alternatives would have the same horizontal alignment for 20th Street South.

2.2.2.2 20th Street South Intersection Improvements

The 20th Street South and 22nd Avenue South intersection and the 20th Street South and 34th Avenue South intersection would be improved as part of each build alternative.

To accommodate the traffic at the intersection of 20th Street South and 22nd Avenue South, the following two phases would be completed:

- Phase 1 would include a turn lane for northbound traffic on 22nd Avenue South to turn left onto 20th Street South. During peak hours, traffic becomes backed up at this intersection, and drivers use the Allyn Frerichs Trail on the east side of 22nd Avenue South to go around vehicles turning left onto 20th Street South. The Allyn Frerichs Trail along 22nd Avenue South would be reconstructed to have a 2-foot-wide colored concrete boulevard behind the curb for sign placement and then an 8-foot wide shared use path. This northbound left-turn lane is included in the proposed construction in 2022.

- Phase 2 would include an additional southbound through-lane and right-turn lane on 22nd Avenue South. A sidewalk would be constructed on the west side of 22nd Avenue South between Moriarty Drive and 20th Street South. An eastbound right-turn lane on 20th Street South would also be added. These future improvements are included in the Interchange Justification Report (SDDOT 2020). Please refer to *Figure 2-2*; the teal coloring represents improvements proposed in Phases 1 and 2.

To accommodate traffic at the intersection of 20th Street South and 34th Avenue South, the following two phases would be completed:

- Phase 1 would include a southbound right-turn lane on 34th Avenue South that would be constructed in 2022. Traffic control (i.e., stop signals) would be added at all intersections.

- Phase 2 would include a northbound through lane and right-turn lane on 34th Avenue South. These future improvements would be constructed as traffic warrants. Please refer to *Figure 2-3*.

Figure 2-1. *20th Street South Typical Section*

Figure 2-2. *Proposed Improvements to the Intersection of 20th Street South and 22nd Avenue South*

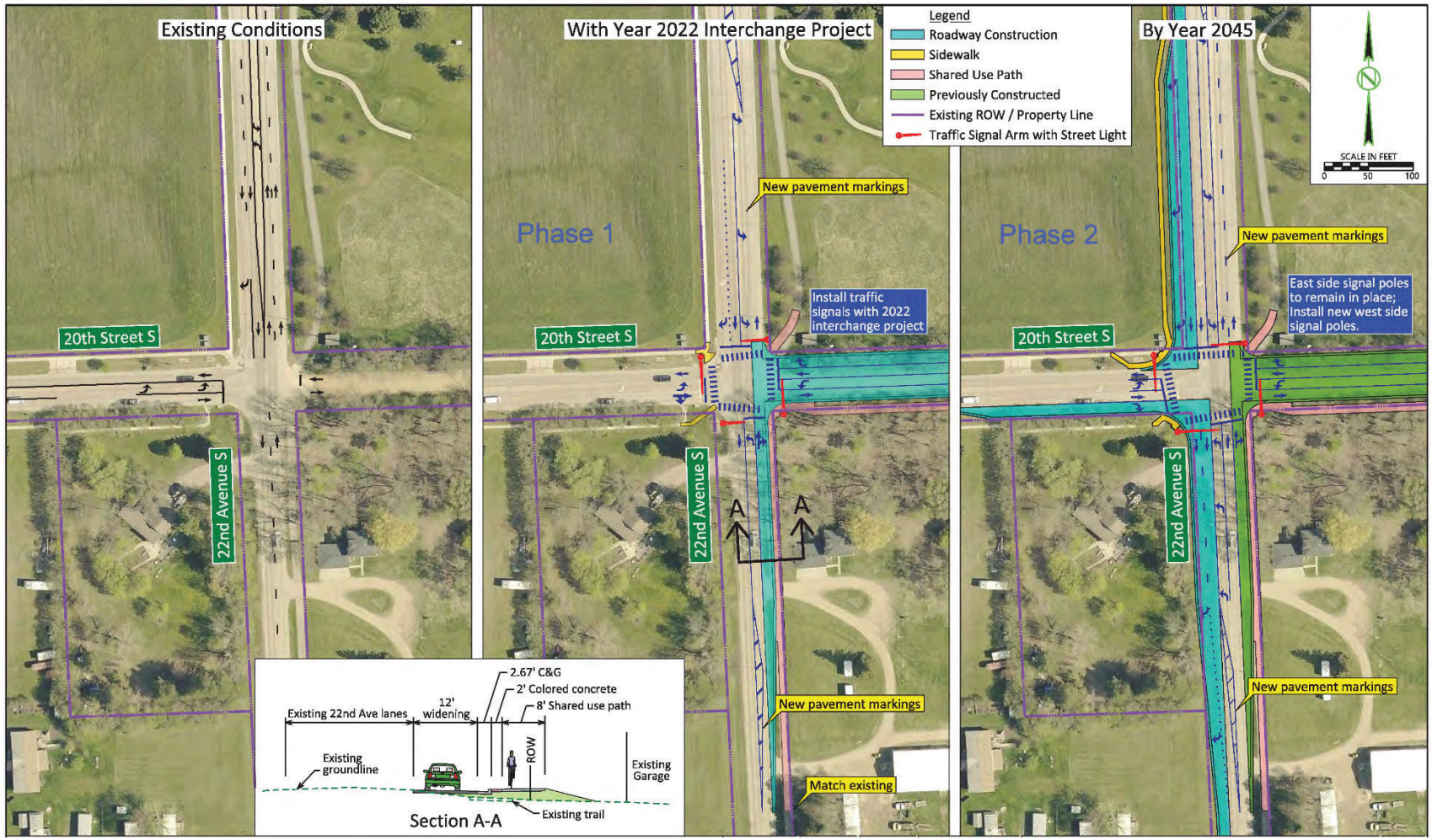
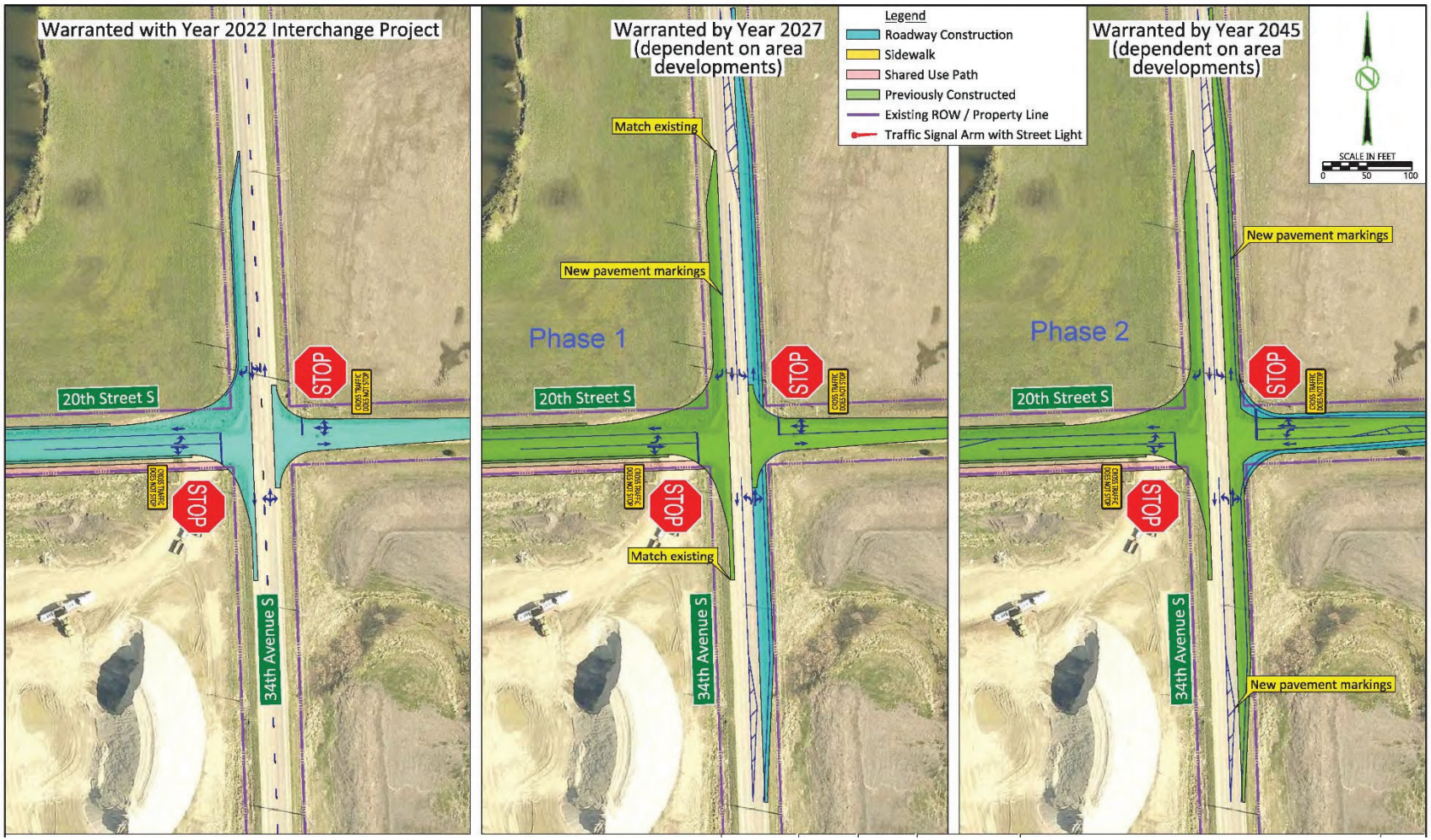


Figure 2-3. *Proposed Improvements to the Intersection of 20th Street South and 34th Avenue South*



2.2.2.3 I-29 Horizontal and Vertical Alignment

The horizontal and vertical alignment of I-29 would remain the same for all build alternatives except Alternative 2, in which I-29 would cross over 20th Street South. No additional lanes or increase in capacity for I-29 is part of this Project.

2.2.2.4 Utilities

A water supply pipeline would be installed within the footprint of the Project under the reconfigured 20th Street South.

2.2.3 Build Alternatives

The following are the proposed build alternatives:

- **Alternative 1: Single Point Interchange (20th Street South over I-29):** This alternative is a single point interchange with 20th Street South going over I-29. This alternative is shown in *Figure 2-4*.

- **Alternative 2: Single Point Interchange (I-29 over 20th Street South):** This alternative is a single point interchange with I-29 going over 20th Street South. This alternative is shown in *Figure 2-5*.

- **Alternative 3: Partial Cloverleaf Interchange:** This alternative is a partial cloverleaf interchange with loops and ramps in the southwest and northeast quadrants of the interchange. This alternative is shown in *Figure 2-6*.

- **Alternative 4: Half Cloverleaf Interchange:** This alternative is a half-cloverleaf interchange with loops and ramps in the southwest and southeast quadrants. This alternative is shown in *Figure 2-7*.

- **Alternative 5: Single Loop Interchange:** This alternative has a loop in the southwest quadrant and a standard diamond interchange layout on the east side. This alternative is shown in *Figure 2-8*.

- **Alternative 6: Overpass Only:** This alternative brings 20th Street South across I-29 as an overpass without any ramp connections to I-29. This alternative is shown in *Figure 2-9*.

Figure 2-4. *Alternative 1*

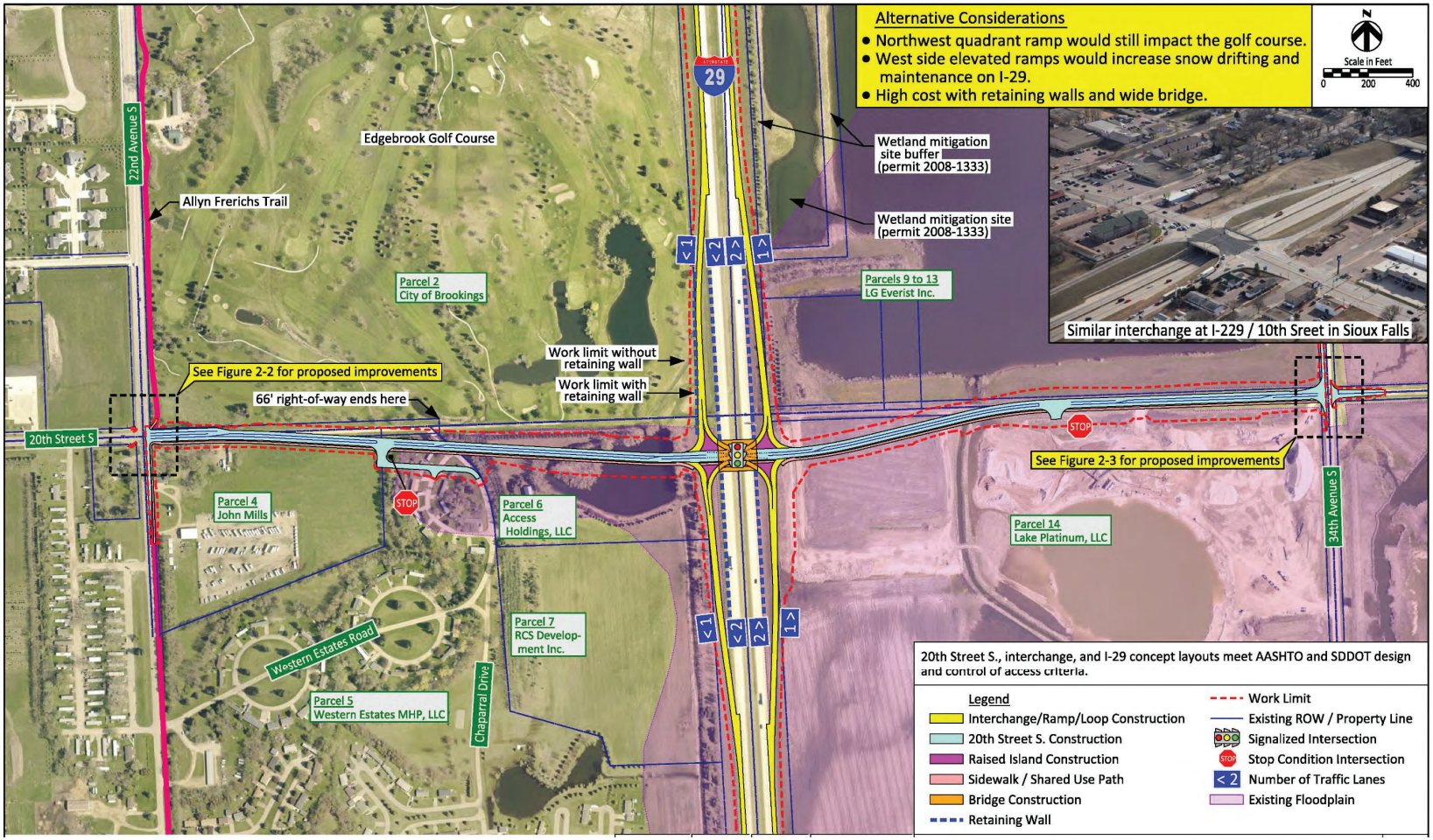


Figure 2-5. *Alternative 2*

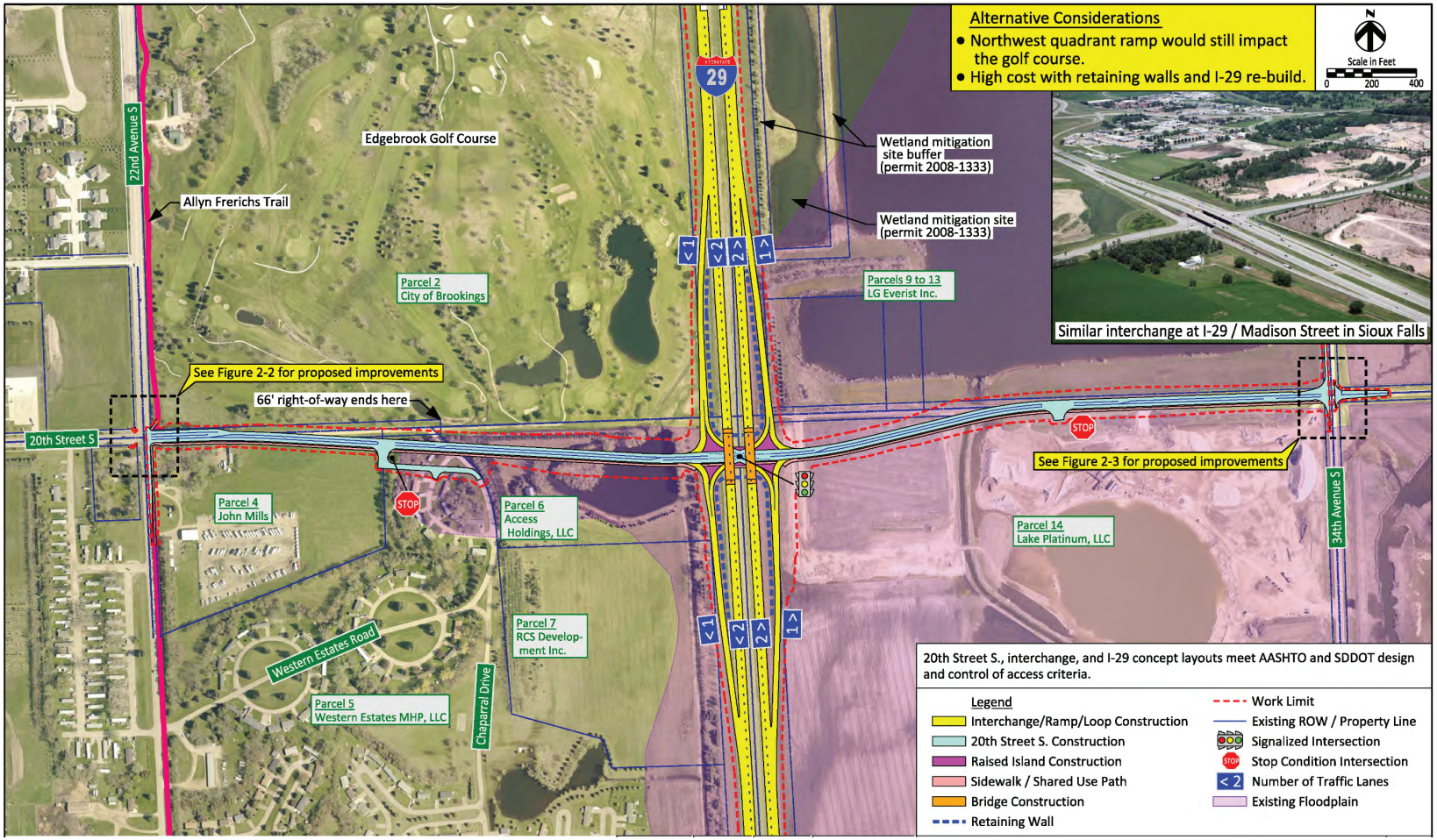


Figure 2-6. *Alternative 3*

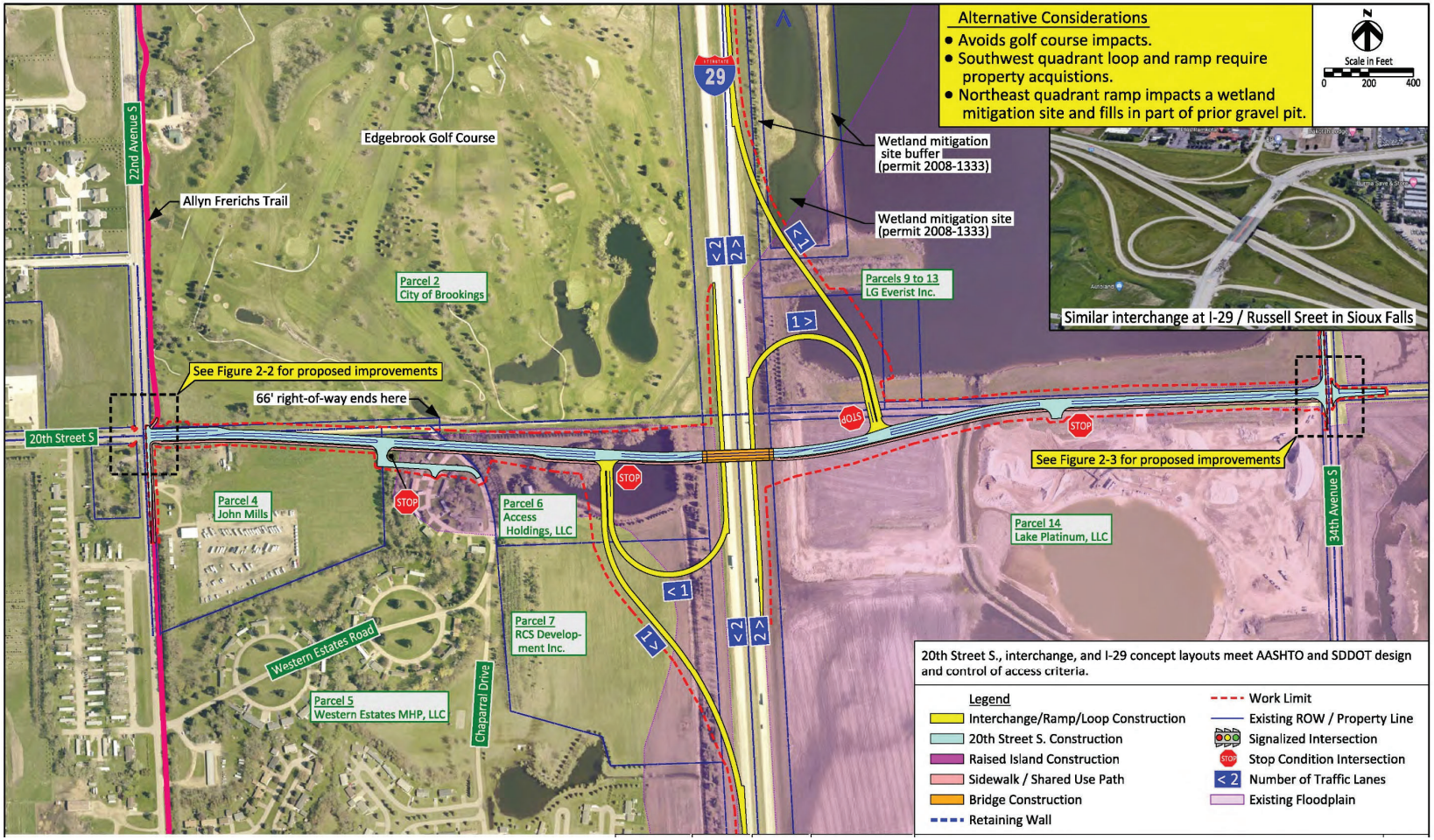


Figure 2-7. *Alternative 4*

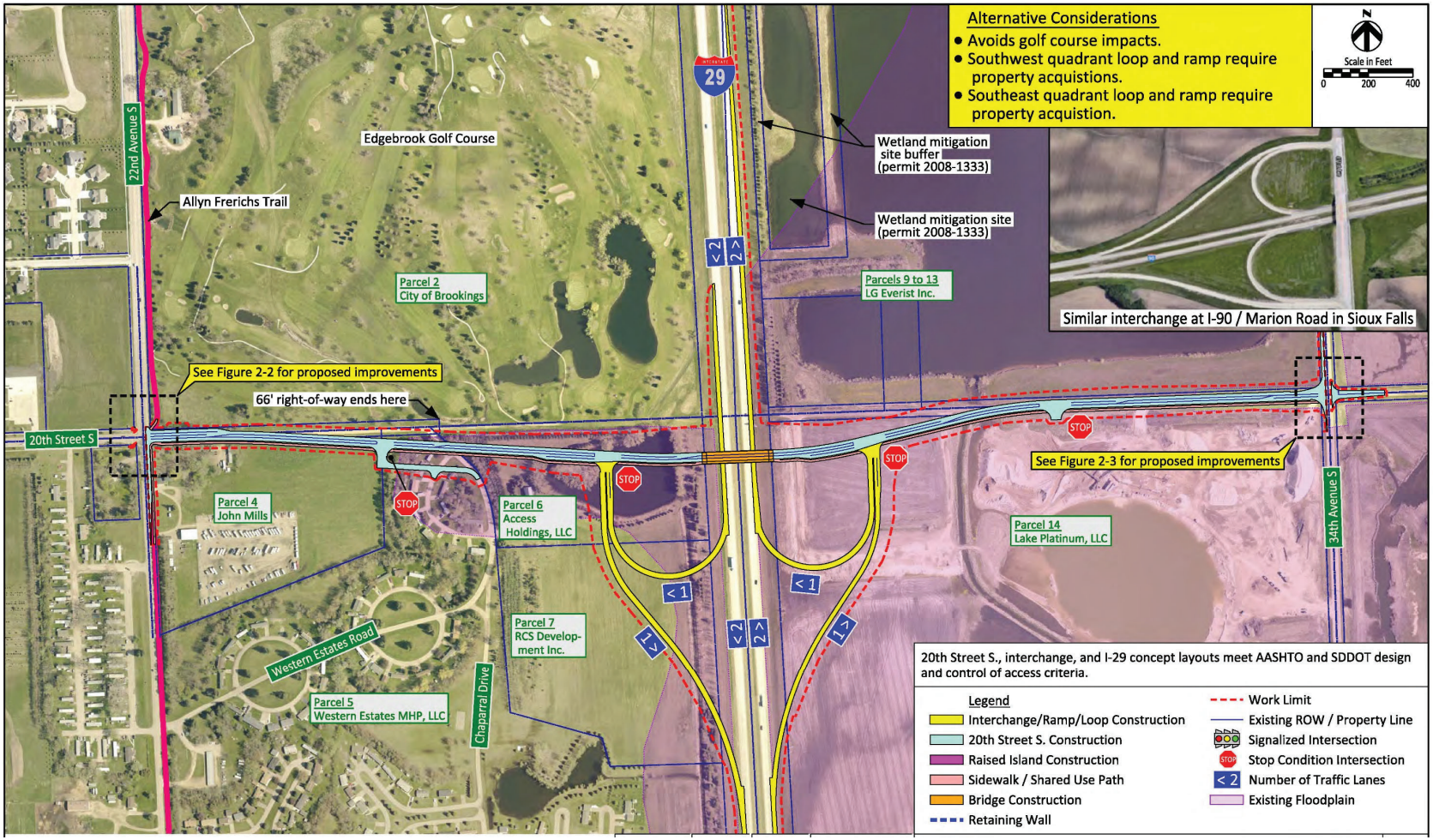


Figure 2-8. *Alternative 5*

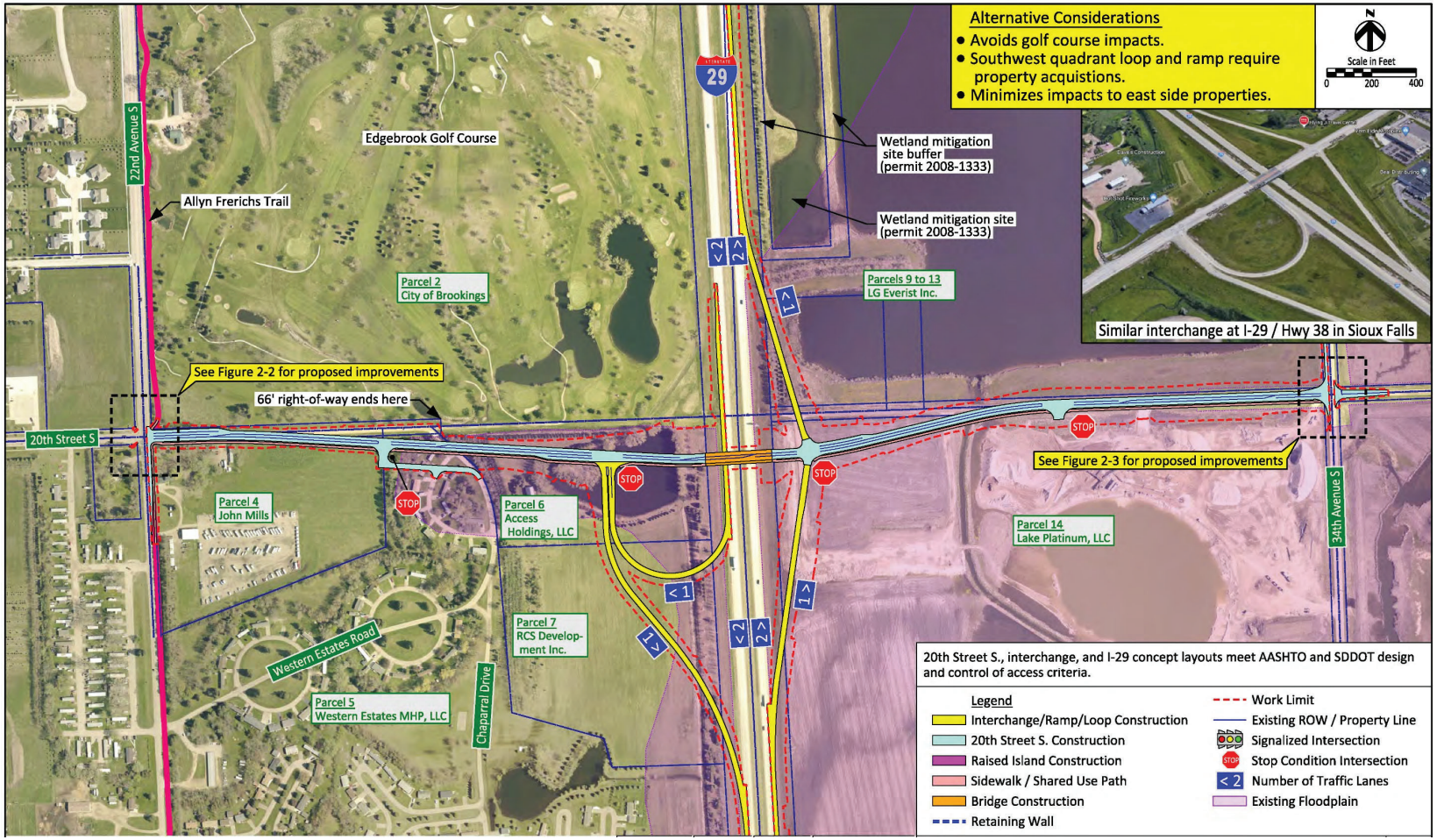
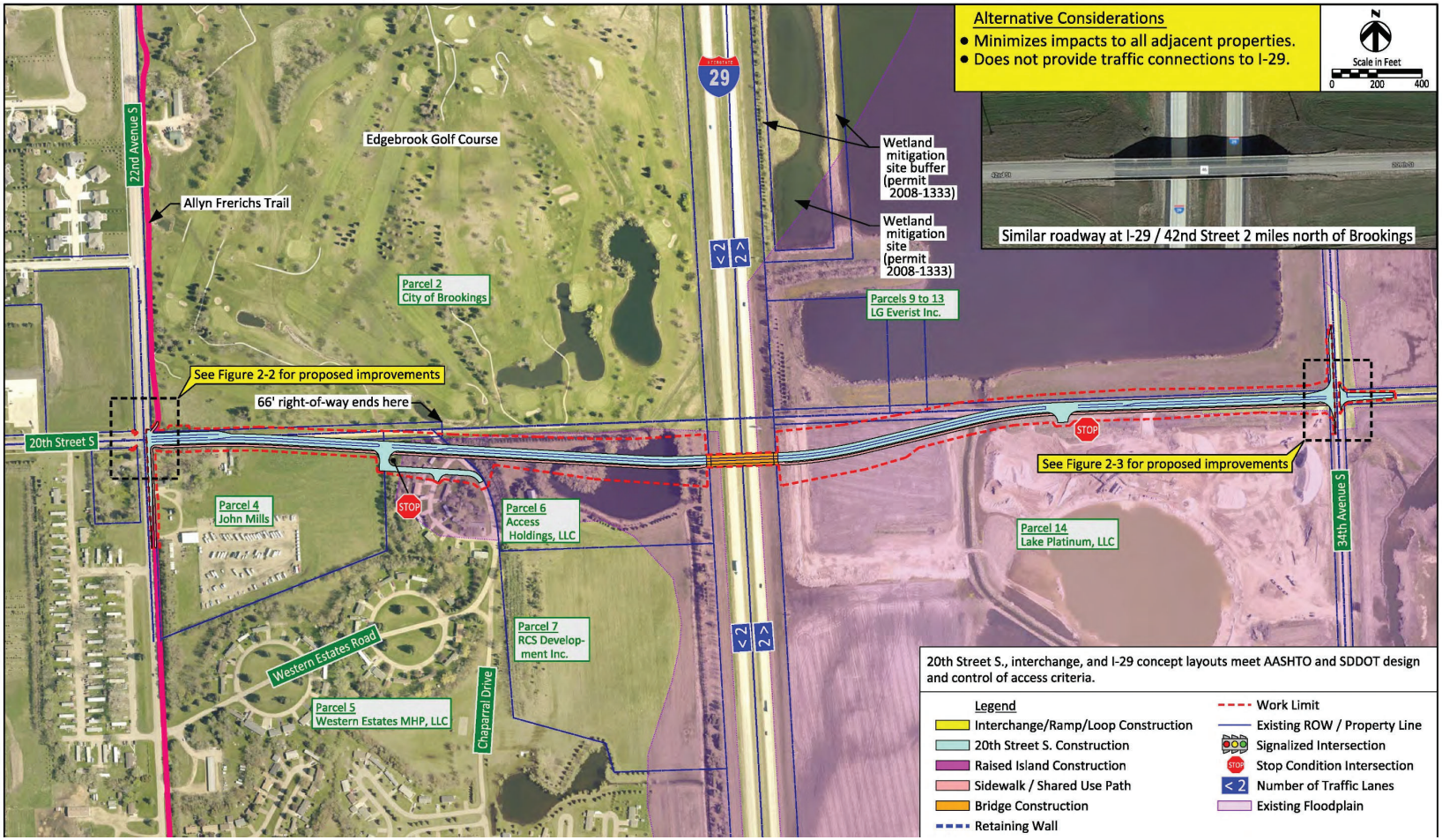


Figure 2-9. *Alternative 6*



2.3 EVALUATION CRITERIA APPLIED TO THE ALTERNATIVES

NEPA analyses are required to "rigorously explore and objectively evaluate all reasonable alternatives" (40 Code of Federal Regulations [CFR] 1502.14). The first step in exploring alternatives for this Project was to determine whether the alternatives met the purpose and need criteria. Alternatives that did not meet the purpose and need criteria were not considered further. For the alternatives that met the purpose and need criteria, other considerations, such as environmental considerations, property impacts, and costs, were used as part of the initial evaluation. The alternatives that met the purpose and need and that did not have a higher level of impacts on the resources in comparison to the other alternatives were carried forward in the NEPA process for more detailed environmental analysis.

2.3.1 Purpose and Need for the Project

To determine if the alternatives met the purpose and need, the following criteria were used:

- **System linkage:** Does the alternative provide a roadway connection over I-29 that reduces driving distance and travel time by at least 2,000 miles and 100 hours for a one-way trip for employees traveling from west of I-29 to the industrial park east of I-29?

- **Traffic capacity:** Does the alternative improve the LOS at the intersection of 22nd Avenue South and 20th Street South and at the intersection of 6th Street and I-29 Southbound to meet an acceptable LOS (A, B, or C) in 2045?

As stated in *Section 1.3.1*, the purpose of the Project is to relieve congestion on major north-south and east-west arterials and to improve transportation connectivity for community access and to facilitate growth of the local economy.

All build alternatives carried forward in the NEPA process must meet the purpose and need criteria. Alternatives 1 through 6 were evaluated against these criteria as follows:

- Alternatives 1 through 6 meet the system linkage criterion. All of the build alternatives would reduce the driving distance and travel time from the existing residential areas to the industrial park on the east side of I-29. This route was used as an example to demonstrate that an overpass or interchange at 20th Street South would reduce the driving distance by at least 2,000 miles for a one-way trip for employees and would save approximately 100 hours of travel time for those employees. All six build alternatives would provide this roadway connection in the Project Area by providing an overpass or interchange at 20th Street South.

- Alternatives 1 through 5 meet the traffic capacity criterion. Alternative 6 does not meet the criterion for the intersection of 6th Street and I-29 Southbound. This intersection would have a LOS above A, B, and C in 2045.

Alternative 6 does not meeting the traffic capacity criterion; therefore, not meeting the purpose and need for the Project. Alternatives that do not meet the purpose and need are not considered further in the alternative evaluation process; therefore, Alternative 6 will not be considered further.

2.3.2 Project Goals

The goals for the Project include economic development, safety improvement through decreased traffic congestion, and multi-modal transportation. While Project goals are not used for screening alternatives, these goals are incorporated into the alternatives, where possible, to meet the concerns of the public and agencies. To consider whether the alternatives incorporated the Project goals, the following questions were used:

- Does the alternative provide connectivity in the roadway system, thereby facilitating the continued growth of Brookings, which includes the planned development of 102 acres of residential and 62 acres of commercial area in the Project Area?
    - Alternatives 1 through 5 would facilitate planned economic development by providing system linkage in the current transportation system. The planned residential and commercial development would proceed because of 20th Street South becoming an east-west arterial that connects the east and west sides of I-29. This development would provide needed acreage noted in the *2040 Comprehensive Plan,* allowing Brookings to meet its growth rate.
- Does the alternative improve safety by reducing traffic congestion at the intersection of 22nd Avenue South and 20th Street South and at the intersection of 6th Street and I-29 Southbound?
    - Alternatives 1 through 5 would meet the goal of improving safety by reducing traffic congestion at the intersection of 20th Street South and 22nd Avenue South and the intersection of 6th Street and I-29 Southbound, both of which would have degraded LOS by 2045.
- Does the alternative incorporate a shared use path along 20th Street South from the intersection with 22nd Avenue South to 34th Avenue South?
    - Alternatives 1 through 5 would provide a shared use path adjacent to 20th Street South, thereby meeting the goal of multi-modal transportation.

2.3.3 Environmental Considerations

The environmental resources initially considered for screening of Alternatives 1 through 5 include floodplains, environmental justice, noise, private property and residences, Section 4(f) properties, Section 6(f) properties, wetlands and other waters of the US (OWUS), and land use.

To evaluate the alternatives based on environmental considerations, the following questions were used as the criteria:

- Does the alternative have more impact on the 100-year floodplain[1] than the other alternatives?

[1] The designated floodplain within the Project Area is Zone A, 100-year floodplain.

- Does the alternative have disproportionately high and adverse impacts on environmental justice populations in comparison to other populations?
- Does the alternative have additional impacts to noise sensitive areas in comparison to the other alternatives?
- Does the alternative effect any cultural resource sites (i.e. historic structures, archeological sites)?
- Does the alternative require a use from an identified Section 4(f)[2] property?
- Does the alternative require a permanent conversion of Section 6(f)[3] resource land?
- Does the alternative have major impacts on waters of the US?
- Is the alternative consistent with future land use plans? Comparatively, how many acres of developable property would be impacted by the alternative?

Please refer to *Section 2.2.4* for the discussion of private property, residences, and land use. Please refer to *Section 2.3* for further discussion of the other environmental considerations.

2.3.4 Property and Land Use Impacts

To evaluate the alternatives based on property impacts, the following questions were used as the criteria:

- How many residential properties would be acquired?
- Comparatively, how many acres of private property would be acquired?
- Is the alternative consistent with future land use plans? Comparatively, how many acres of developable property would be impacted by the alternative?

The properties in the Project Area include the following:

- In the northeast quadrant is a privately owned mining operation. The *2040 Comprehensive Plan* shows this area remaining open water into the future.
- In the southeast quadrant is a recently permitted, privately owned mining operation that was previously farmland. This area is designated within the *2040 Comprehensive Plan* as medium urban area and open space. As noted previously, planned development is

[2] Section 4(f) of the US Department of Transportation (USDOT) Act of 1966 requires federal agencies under USDOT—FHWA for this Project—to make a special effort to preserve the natural beauty of the countryside and public park and recreation lands, public wildlife and waterfowl refuges, and public and private historic sites.

[3] Section 6(f) of the Land and Water Conservation Fund (LWCF) Act of 1965 was established to protect parks and recreation areas that were acquired, developed, or rehabilitated, even in part, with the use of any federal land and water grant funds.

more up-to-date information of the developable property. For the southwest quadrant, the developer has indicated the area would be commercial and residential development.

- In the southwest quadrant is a privately owned manufactured home community. The property owner leases the lots to each manufactured homeowner. A privately owned pet crematory was previously operated in this quadrant. The crematory appears to be closed. The *2040 Comprehensive P*lan notes this area as remaining a manufactured home area, while the developable areas would become urban, high and medium intensity. The remainder of the developable property is privately owned and is planned for commercial development.

- In the northwest quadrant is Edgebrook Golf Course, a publicly owned property. The *2040 Comprehensive Plan* notes this area as remaining the Edgebrook Golf Course.

The impacts on private property and land use that would occur under Alternatives 1 through 5 are anticipated to be as follows:

- Alternatives 1 through 5 would require the acquisition of five residences.

  Alternatives 1 and 2 would require acquisition of the least number of acres of private property for the Project. Alternatives 1 and 2 would similarly affect the properties in all four quadrants. Alternatives 3 and 5 would require more property acquisition than Alternatives 1 and 2, and less than Alternative 4. Alternative 3 would affect properties in the northeast and southwest quadrants for the loop ramps. Alternative 5 would affect properties in the southwest quadrant for the loop ramp and in the northeast and southeast quadrants for the standard diamond ramps. Alternative 4 would require the most property acquisition.

- As discussed in Section 1.3.3, a certain acreage of developable property is needed for the City to meet its growth rate. Alternatives 1 through 5 do differ in the impact to developable property that is directly adjacent to the interchange. The footprint of the alternatives on the west side of I-29 would be the same within the developable property. Please refer to *Figure 2-4 to Figure 2-9*. The alternatives have differing footprints on the east side of I-29, specifically the impact to planned commercial and residential development in the southeast quadrant. As noted previously, planned development is more up-to-date information of the potential development areas. Alternatives 1, 2 and 3 would require the acquisition of approximately 6 to 7 acres from this planned development area. Alternative 4 would require approximately 15 acres and Alternative 5 would require 8 acres. Alternatives 1, 2, 3, and 5 have similar areas. Alternative 4 would require an additional 7 acres for acquisition.

  As shown on Figure 1-1, the east side of the City has a large area of designated floodplain that presents issues for future growth. The 2040 Comprehensive Plan notes the importance of efficiently utilizing developable land adjacent to the City that would not affect environmentally sensitive areas, particularly floodplain. These developable areas will be absorbed quickly and once developable land adjacent to the City is built out, the new developments will have to “jump” the areas that would have adverse effects to the

floodplain. This will require the roadway system and other infrastructure (i.e. sewer, water) to be extended to reach the new development, which will be costly for residents and the City. The 2020 Comprehensive Plan considered an efficiency scenario to assist in utilizing each developable property effectively due to the concern about the "jump" across the floodplain. Therefore, the impact of additional acres within areas planned for development is a differentiator for the alternatives. Alternative 1, 2, 3, and 5 have similar acres that would need to be acquired from the southwest quadrant. Alternative 4 would require an additional 7 acres of developable land that would have to be identified in a different location for the City to meet its growth rate. Therefore, Alternative 4 would not be consistent with the land use plans in utilizing an efficient design.

2.3.5 Cost Analysis

To evaluate the cost of the alternatives, the following questions were used as the criteria:

- What is the comparative cost of property acquisition?
- What is the comparative cost of construction, and does available funding cover the construction cost?

Property acquisition is a factor in the cost of the overall project and can be considered as part of the initial cost analysis of the alternatives. Alternatives 1 and 2 would require less property acquisition than Alternatives 3, 4, and 5. Of Alternatives 3, 4, and 5, Alternatives 3 and 4 would require more property acquisition than Alternative 5.

The criterion for the overall cost of construction for the build alternatives focused on the available funding. The construction costs for Alternatives 1 and 2 would be higher than the available funding. Alternative 3 would have the next highest construction cost, and its cost would be within the funding constraints. Alternatives 4 and 5 would have the lowest construction costs and would be within the funding constraints.

2.4 ENVIRONMENTAL CONSIDERATIONS

As discussed in *Section 2.2.3*, the environmental resources initially considered for screening of Alternatives 1 through 5 include floodplains, environmental justice, noise, cultural resources, Section 4(f) properties, Section 6(f) properties, and wetlands and OWUS. The potential impacts of Alternatives 1 through 5 on these environmental resources are as follows:

- Alternatives 1 through 5 would have comparable effects on the designated floodplain, Zone A. This is because of the wide extents of the designated floodplain and the embankments of the existing roadway system that are already affecting the drainage in the area. Therefore, floodplain impacts would be similar and cannot be used to differentiate the alternatives.
- Environmental justice populations are located in the Project Area. Please refer to *Section 3.16* for detailed information. Two vulnerable populations, children and elderly, live directly south of the proposed construction area for the build alternatives.

Alternatives 1 through 5 would maintain an access to the residences. Overall, Alternatives 1 through 5 would similarly improve the transportation connectivity in the area. No disproportionately high and adverse effects on environmental justice populations are anticipated from Alternatives 1 through 5. Consequently, this consideration cannot be used to differentiate the alternatives.

- An initial consideration of noise levels was completed. A full noise analysis will be completed for the alternative(s) carried forward for further consideration. The existing noise levels at the Allyn Frerichs Trail, north of Edgebrook Golf Course and adjacent to I-29, were above the recommended noise level for recreation areas. In addition, the noise levels adjacent to I-29 within Edgebrook Golf Course were above the recommended noise level. Within the golf course, noise levels decrease the further away the noise receptor is from I-29. Alternatives 1 through 5 would slightly increase these noise levels. These properties do not have residential areas that would be affected. Therefore, Alternatives 1 through 5 are anticipated to have similar noise impacts, and noise impacts cannot be used to differentiate the alternatives.

- Initial reviews for historic structures and archaeological sites noted no potential sites within the identified area of potential effect. Therefore, impacts on cultural resources cannot be used to differentiate the alternatives.

- Alternatives 1 through 5 include the shifted alignment of 20th Street South, and each build alternative would require the acquisition of five residences. However, the alternatives do differ in the amount of right-of-way (ROW) acquisition required due to the proposed ramps. This consideration is used to differentiate the alternatives in the initial alternative analysis.

- Alternatives 1 through 5 do differ in effects on Section 4(f) properties, Section 6(f) properties, and wetlands and OWUS. These environmental considerations are discussed in *Sections 2.3.1 and 2.3.2*, including background information and the screening evaluation of the alternatives.

2.4.1 Section 4(f) and 6(f)

2.4.1.1 Section 4(f) Background

Section 4(f) of the US Department of Transportation (USDOT) Act of 1966 requires the determination of whether a proposed highway project would adversely affect a Section 4(f) resource. Section 4(f) resources include publicly owned parks and recreation areas, publicly owned wildlife and waterfowl refuges, and publicly or privately owned historic structures. These resources have been officially designated as such by a federal, state, or local agency.

Under Section 4(f), impacts, effects, or encroachment of a project alternative on the identified property is referred to as a *use*. The types of uses include permanent incorporation into a transportation facility; temporary occupancy for project construction-related activities; and constructive use, in which no actual physical use occurs, but indirect effects on the property may occur, such as increased noise levels that substantially interfere with the recreational purpose of property. Section 23 CFR 774.13(d) provides

conditions under which temporary occupancy is so minimal that, if all conditions are met, the occupancy does not constitute a use under Section 4(f).

When a project alternative requires a use of a Section 4(f) property, the following three methods are available for FHWA approval:

- Preparing a *de minimis* impact determination
- Applying a programmatic Section 4(f) evaluation
- Preparing an individual Section 4(f) evaluation

A *de minimis* determination does not require an evaluation of alternatives, and no avoidance or feasible and prudent avoidance alternative analysis is required. Programmatic Section 4(f) evaluations are a time-saving procedural option for preparing individual Section 4(f) evaluations for certain minor uses of Section 4(f) property. An individual evaluation is required when there is no feasible and prudent alternative that completely avoids the use of the Section 4(f) property and when the project includes all possible planning to minimize harm to the Section 4(f) property resulting from the transportation use.

2.4.1.2 Section 6(f) Background

Section 6(f) of the Land and Water Conservation Fund (LWCF) Act of 1965 requires approval from the National Park Service for converting lands that have been paid for in part or in entirety by LWCF grants to non-park or non-recreation uses. This approval will be granted only if the action complies with the state recreation plan and if an area of equal fair market value and usefulness is substituted for the land being removed from park and/or recreation use.

For permanent incorporation of Section 6(f) properties into non-outdoor recreation uses, a Conversion of Use process established by the National Park Service must be followed. Basically, the process involves replacing the resources being removed from Section 6(f) protection. The main prerequisites that must be met before the National Park Service will consider the conversion request, according to the Section 6(f) guidance document (NPS 2008), are summarized as follows:

- All practical alternatives to the conversion have been evaluated and rejected on a sound basis.

- The fair market value of the property to be converted has been established, and the property proposed for substitution is of at least equal fair market value. A critical first step is for the State and National Park Service to agree on the size of the impacted Section 6(f) property prior to any appraisal activity.

- The property proposed for replacement is of reasonably equivalent usefulness and location as that being converted. Replacement property need not necessarily be directly adjacent to or close by the converted site.

- The property proposed for replacement meets the eligibility requirements for LWCF-assisted acquisition (i.e., is a viable recreation area). Small conversions are composed of small portions of Section 6(f) protected areas that amount to no more than 10 percent of the Section 6(f) protected area or 5 acres, whichever is less. Because small

conversion proposals are less complex, National Park Service review and decision can be expedited when minor or no environmental impacts would occur, the proposed conversion is not controversial, and the replacement property is contiguous to the original Section 6(f) area.

Proposals for temporary non-recreation activities of less than a 6-month duration within a Section 6(f) protected area must be reviewed and approved by the National Park Service.

2.4.1.3 Identification of Section 4(f) and 6(f) Properties

Edgebrook Golf Course

Edgebrook Golf Course is a municipal 18-hole golf course with a 9-hole junior/short course located immediately northwest of the proposed interchange location, as shown previously in *Figures 2-4 through 2-9*. Due to the golf course being located directly adjacent to I-29, existing noise levels along the eastern edge are currently higher than recommended levels for a recreation area. Please refer to *Section 3.7* for additional discussion of the noise levels. Edgebrook Golf Course is considered to be both a Section 4(f) and Section 6(f) property. Section 4(f) applies to the golf course because it is owned, operated, and managed by a public agency for the primary purpose of public recreation.

Section 6(f) protection applies to the entire Edgebrook Golf Course. Randy Kittle, the Grants Coordinator with the South Dakota Department of Game, Fish, and Parks (SDGFP), Division of Parks and Recreation, was contacted on January 12, 2016 during the previous studies, regarding the use of LWCF grants for Edgebrook Golf Course. On March 26, 2020, Mr. Kittle responded that three LWCF grants were used to develop Edgebrook Golf Course and that the entire boundary of the golf course is protected under Section 6(f) for public outdoor recreation (R. Kittle, personal communication, March 26, 2020). Section 6(f) applies to the property boundary at the time the LWCF grant funds were used for development of the golf course.

Allyn Frerichs Trail

The Allyn Frerichs Trail, a paved shared-use trail, is considered a Section 4(f) property but not a Section 6(f) resource. The paved trail enters the Project Area north of the golf course then extends on the east side of 22nd Avenue South. The paved trail crosses 20th Street South at the intersection of 20th Street South and 22nd Avenue South. The trail continues south along 22nd Avenue South. The City's Parks, Recreation, and Forestry Department has confirmed that this trail is a Section 4(f) property. Section 4(f) applies to the trail because it is a publicly owned, shared use path designated and functioning primarily for recreation. Section 6(f) does not apply because the SDGFP Grants Coordinator confirmed that LWCF grant funds were not used to create the trail.

2.4.1.4 Alternatives Screening

Section 4(f) regulations at 23 CFR 774 require proof that the alternatives carried forward are feasible and prudent. Under Section 6(f) regulations at 36 CFR 59, all practical alternatives to the conversion must have been evaluated and rejected on a sound basis. Section 4(f) use and Section 6(f) permanent conversion can be used as alternative evaluation criteria. The potential use of, and impact on, the Section 4(f) and 6(f) properties for each alternative are discussed in the following sections.

Edgebrook Golf Course

Alternatives 1 and 2 would require acquisition of a portion of the golf course in the northwest quadrant of the proposed interchange. Within this southeastern portion of the golf course, the tee boxes, fairways, and greenways for Holes 15 and 16 are present. Alternatives 1 and 2 would likely require an individual evaluation to comply with Section 4(f). An individual evaluation is assumed because of the direct effects on Holes 15 and 16 within the golf course and on the recreation area of the property. If possible, feasible minimization, mitigation, or enhancement measures, if implemented, could potentially qualify the Section 4(f) use as a *de miminis* impact. Mitigation measures may involve modifying or relocating paths, structures, or other elements of the golf course, such as tee boxes or greens. Alternatives 1 and 2 would require a Conversion of Use process to comply with Section 6(f).

Alternatives 3, 4, and 5 would avoid needing to acquire golf course property. Temporary construction easements would be required near the intersection of 20th Street South and 22nd Avenue South for minimal contouring in this area. For Section 4(f), the activities proposed under Alternatives 3, 4, and 5, such as regrading slopes, are often considered a temporary occupancy exception. As discussed above, the existing noise levels are currently above the required level for recreational areas. The alternatives would not result in a constructive use since the alternatives would not result in a substantial impairment of the golf course's activities, features, or attributes. Noise levels near the golf course would increase, however, these would not be a substantial increase that would reduce or remove the sub purpose or significance of the 4(f) property. Please refer to *Section 3.17* for additional discussion of Section 4(f).

Allyn Frerichs Trail

Alternatives 1 through 5 would have similar impacts on the Allyn Frerichs Trail. All alternatives are expected to have a *de minimis* impact to the trail due the need to shift the trail south of the intersection of 22nd Avenue South and 20th Street South. Please refer to *Section 3.17* for additional discussion. As noted in Section 2.3.1.3, Section 6(f) does not apply to the Allyn Frerichs Trail.

2.4.2 Wetlands and Other Waters of the US

2.4.2.1 Background

Wetlands and OWUS, including waterways, lakes, natural ponds, and impoundments, are regulated by the US Army Corps of Engineers (USACE) under Section 404 of the Clean Water Act. OWUS include rivers, streams, intermittent streams, lakes, ponds, and impoundments. Wetlands and OWUS are subject to USACE jurisdiction, which is determined by the applicable USACE district regulatory office. Executive Order (EO) 11990, Protection of Wetlands (May 24, 1977), directs agencies, in this case FHWA, to consider avoidance of adverse effects and incompatible development in wetlands.

Typically, USACE issues two types of Section 404 permits, nationwide and individual. Nationwide permits authorize activities that are similar in nature and cause only minimal adverse environmental impacts on aquatic resources, separately or on a cumulative basis. Individual permits require an individual, project-specific evaluation because of the potential to have more than minimal adverse environmental impacts on aquatic resources. For an individual permit, USACE must evaluate alternatives that are practicable and reasonable. In accordance with guidelines at 40 CFR 230.10(a), a permit cannot be issued if a practicable alternative exists that has a less adverse impact on the aquatic ecosystem, provided the alternative does not have other significant adverse environmental consequences on other natural

ecosystem components. The alternative with the least adverse impact on the aquatic ecosystem and no significant environmental adverse consequences is referred to as the Least Environmentally Damaging Practicable Alternative.

2.4.2.2 Identification of Wetlands and Other Waters of the US

A field delineation was completed to identify and document the wetlands and OWUS present in an identified survey area. The wetlands and OWUS identified in each quadrant of the potential interchange location are as follows:

- In the northeast quadrant, the wetlands present include a large pond, wetlands in the ROW, and a wetland created for mitigation for another project. The large pond was part of recent mining activity and is located where a stream once occurred. Hydrologic connection appears to still exist as the pond extends into a stream that continues into the southeast quadrant. This pond is anticipated to be jurisdictional because of that hydrologic connection. Wetlands within the ROW are likely preamble; therefore, they will not be jurisdictional or require mitigation under EO 11990. The smaller wetland is a created wetland that was mitigation for a different project's wetland impacts. A designated buffer surrounding the wetland is part of the mitigation site. Impacting a mitigation site would be difficult to complete because avoidance of a mitigation site is recommended under Section 404 guidelines.

- In the southeast quadrant, a stream, a farmed wetland, and wetlands within the ROW are present. The stream connected to the pond in the northeast quadrant is likely jurisdictional. The farmed wetlands were determined to be likely non-jurisdictional and are now located within an active mining area. The wetlands within the ROW are likely preamble; therefore, they will not be jurisdictional or require mitigation under EO 11990.

- In the southwest quadrant, a pond and wetlands within the ROW are present. A jurisdictional determination has been completed for the pond under a previous permitting action. This pond was determined to be non-jurisdictional and is considered artificial under the Cowardin classification. Because it is classified as artificial, the pond would not qualify for protection under EO 11990. The wetlands in the ROW are likely non-jurisdictional.

- In the northwest quadrant, three wetlands, two small ponds, and a small drainage associated with the golf course are present. These wetlands are likely non-jurisdictional or preamble.

2.4.2.3 Alternatives Screening

The potential impacts on wetlands and OWUS for each alternative are discussed in the following sections:

- Alternatives 1 and 2 would have similar minor impacts, approximately 2.2 to 2.5 acres. These alternatives may impact wetlands in the ROW in the southeast quadrant and would impact the pond and wetlands in the ROW in the southwest quadrant. The pond in the southwest quadrant is an artificial, non-jurisdictional; therefore, mitigation under

EO 11990 and Section 404 would not be required for impacts on this wetland. The impacts on the wetlands in the ROW are anticipated to be minor.

- Alternative 3 would have major impacts on the large pond and wetland mitigation site in the northeast quadrant. Alternative 3 would have approximately 7.8 acres of impact to wetland and OWUS. The impacts on the large pond would be approximately 3 acres, and the impacts on the wetland mitigation site would require a Section 404 permit. Alternative 3 would also impact the pond in the southwest quadrant, which is non-jurisdictional. This alternative would likely require an individual permit and mitigation under EO 11990.

- Alternatives 4 and 5 would impact wetlands in the ROW in the southeast quadrant and would impact the pond and wetlands in the ROW in the southwest quadrant. Alternatives 4 and 5 would have approximately 4.3 acres of impact to wetlands and OWUS. The pond in the southwest quadrant is an artificial, non-jurisdictional; therefore, mitigation under EO 11990 and Section 404 would not be required for impacts on this wetland. The impacts on the wetlands in the ROW are anticipated to be minor.

2.5 ALTERNATIVES SCREENING SUMMARY

Table 2-1 summarizes the results of the initial alternatives screening. To provide the level of impact or effect of each alternative on each resource, the table uses the terms high, medium, or low. These levels were determined based on the information in *Sections 2.2 and 2.3*.

Based on the alternatives screening, the following alternatives have been eliminated from further consideration:

- Alternative 6 does not meet the purpose and need criterion for traffic capacity. Therefore, Alternative 6 was eliminated from further consideration.

- For Section 6(f), Alternatives 1 and 2 would require a Conversion of Use process for incorporation of recreational land into transportation ROW. The process would require the Section 6(f) property converted to non-recreational area to be replaced in-kind. In addition, the process would require proof that all practical alternatives to the conversion have been evaluated and rejected on a sound basis. Based on Section 4(f) and 6(f) process requirements, Alternatives 1 and 2 are eliminated from further consideration.

- Alternative 3 would impact a wetland created for mitigation and have approximately 7.8 acres of impact, over 3 acres more than the other alternatives. Impacting a wetland mitigation site can be difficult to permit if alternatives exist that can avoid the alternative. In addition, the alternative would have over 3 acres of impact on a large jurisdictional pond. Therefore, Alternative 3 is eliminated from further consideration.

- Alternative 4 would require additional acquisition of 7 acres in comparison to Alternative 5 in the planned commercial and residential development in the southeast quadrant. Alternatives 4 and 5 would provide the same level of functionality and improvement to the transportation system and would have similar impacts on all environmental

resources, with the exception in this difference in land use. Therefore, Alternative 4 would impact 7 additional acres of impact for the same roadway system improvement, and 7 acres would still be needed for the acreage necessary to meet the commercial and residential areas noted in the *2040 Comprehensive Plan*. Due to the additional area of impact to planned development, Alternative 4 is eliminated from further consideration.

Alternative 5 is recommended to be carried forward for further consideration. Although the No-Build Alternative does not meet design criteria and does not meet the needs for the Project, it will be carried forward as a baseline for comparison to Alternative 5.

Table 2-1. *Alternatives Screening Summary*

Alternatives	Purpose and Need		Project Goals			Applicable Environmental Impacts							Property and Land Use Impacts			Cost
	System Linkage	*Traffic Capacity*	*Economic Development*	*Safety*	*Multi-Modal Transportation*	*Section 4(f) Impact*	*Section 6(f) Impact*	*Wetlands and Other Waters of US*	*Noise Analysis*	*Cultural Resources*	*Environmental Justice*	*Floodplain*	*Residential Acquisitions*	*Acquisition of Developable Acreage*	*Consistency with Land Use Plans*	*Construction Cost*
1	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Low	Low	Low	None	Low	5	Low	Yes	High
2	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Low	Low	Low	None	Low	5	Low	Yes	High
3	Yes	Yes	Yes	Yes	Yes	No	No	High	Low	Low	None	Low	5	Med	Yes	Med
4	Yes	Yes	Yes	Yes	Yes	No	No	Low	Low	Low	None	Low	5	High	No	Low
5	Yes	Yes	Yes	Yes	Yes	No	No	Low	Low	Low	None	Low	5	Med	Yes	Low
6	Yes	No	---	---	---	---	---	---	---	---	---	---	---	---	---	---

3.0 AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

The existing environment (i.e., baseline conditions) that may be affected by the alternatives are described in this chapter, as are the potential beneficial and adverse, direct and indirect impacts from the alternatives carried forward for further consideration. The permanent and temporary impacts, including consideration of construction, are discussed in each resource section. Construction impacts are short-term, occurring only during the period when construction personnel and equipment are operating.

Avoidance, minimization, and mitigation measures are summarized for each resource area, as applicable. All potentially relevant environmental resource categories were considered for analysis in this EA. Resources not present or did not require further consideration in this chapter include climate change, prime farmland, and wild and scenic rivers.

3.1 LAND USE

Land use and transportation are closely linked. Land use decisions can affect transportation mobility, accessibility, and safety as well as the environment and quality of life. Likewise, transportation decisions can affect land use, the environment, and quality of life as well as mobility, accessibility, and safety (Center for Environmental Excellence by AASHTO 2010). Land use was evaluated by determining the direct and indirect effects of the Project on existing land use (for example, recreation, residential, commercial, and industrial) and by verifying the consistency of the Project with development patterns and land use planning in Brookings.

3.1.1 Land Use Plans

Brookings is a regional commerce and employment center located at the intersection of I-29 and US 14 / 6th Street. As the fourth largest community in South Dakota and the second largest community in the I-29 corridor, Brookings is just 58 miles north of Sioux Falls (South Dakota's largest metropolitan community) and 190 miles south of Fargo, North Dakota. No specific land use planning documents were available for the City of Aurora or Brookings County. Multiple plans have been completed for Brookings, including the following:

- ***Vision 2020 Comprehensive Plan for the City of Brookings* (2000):** This plan was an update of the 1966 Comprehensive Plan and was intended to provide direction and guidance for elected officials in matters regarding the physical development of Brookings over the next 20 years. Two of the conclusions of the plan included the recommendation of an I-29 interchange at Milepost 130 to establishing adequate travel routes between intensive employment areas and existing and planned residential growth areas (City of Brookings 2000).

- ***South Dakota Decennial Interstate Corridor Study* (2010):** This study identified I-29 Exit 130 as an option to provide additional access to the southern portion of Brookings.

Access in this area would relieve traffic on US 14 / 6th Street by providing a more direct connection between the residential development in the southwest portion of Brookings to the commercial and industrial development located on the east side of I-29. It would also provide an alternate access from I-29 to the industrial park (SDDOT 2010).

- ***Brookings Area Master Transportation Plan* (2011):** This plan, completed in 2011, included origin-destination studies, projected future traffic volumes on the collector and arterial street systems, reviewed safety and crash data using the SDDOT Road Safety Inspection Program, conducted traffic counts, and calculated intersection LOS. This study concluded that a new 20th Street South interchange would allow for additional access to the industrial park, allowing for additional development of the park and the planned development on the east side of I-29 to occur (HDR 2011).

- ***20th Street South Interstate Access Evaluation* (2016):** This evaluation determined that the Project would provide better access from I-29 for Brookings County and for Brookings, and would also provide additional access to Aurora. The Project would also allow for commercial, industrial, and residential development to expand south of the industrial park (HDR 2016).

- ***Brookings South Dakota Comprehensive Plan 2040* (2018):** The *2040 Comprehensive Plan* included an in-depth evaluation of population and economic growth trends, land use trends and patterns, and transportation systems. This plan noted the area on the east side of I-29 to have potential for future industrial, commercial, and residential development areas, which would address the growth that will occur in Brookings. The plan noted that one of the issues is the lack of an interchange at 20th Street South for access to the area (City of Brookings 2018).

- **Better Utilizing Investments to Leverage Development (BUILD) Grant Application, Bridging the Interstate Divide, 20th Street South Interchange Project (2019):** The BUILD grant application identified previously planned development areas near 20th Street South. These areas would help meet the needed residential, commercial, and industrial opportunities for this growing community. On the east side of I-29, an additional 20 acres of multi-family housing, 20 acres of commercial space, and 65 single-family lakefront properties could be developed. On the west side of I-29, 240 acres of future residential and 160 acres of commercial land could be developed (City of Brookings 2019).

3.1.2 Existing Land Use, Future Land Use and Planned Development

The existing land use, future land use, and planned development in the Project Area are described in this section. The existing land use in the Project Area includes the following:

- In the northeast quadrant is a privately owned mining operation.

- In the southeast quadrant is a recently permitted, privately owned mining operation that was previously farmland.

- In the southwest quadrant is a privately owned manufactured home community. The property owner leases the lots to each manufactured homeowner. A privately owned pet

crematory was previously operated in this quadrant. The crematory appears to be closed. The remainder of the area is developable property that is privately owned and is planned for residential and commercial development.

- In the northwest quadrant is Edgebrook Golf Course, a publicly owned property.

A future land use analysis was completed as part of the *2040 Comprehensive Plan*. Future land uses in the Project Area include commercial, vacant, public facilities, industry, park, medium-density residential, low-density residential, open space/greenway, and environmentally constrained/floodplain (City of Brookings 2018). These areas are indicated as the types of land uses the property would be best suited for, however, actual development typically differs slightly from these plans. *Figure 3-1* shows the future land use.

To determine future land use growth for residential, commercial, and industrial areas, the *2040 Comprehensive Plan* included an in-depth evaluation of population and economic growth trends, land use trends and patterns, and transportation systems. The land use growth was presented in two scenarios: trend and efficiency. The trend scenario assumed that Brookings would grow at the same density and patterns that it has in the past, including many single-family detached homes. The efficiency scenario assumed that development would happen in a more compact manner, including a greater variety of housing options on smaller lots, reflecting the national trend in smaller scale retail (City of Brookings 2018). *Graphic 1-2* shows the breakdown of acres of land that would be needed for residential, commercial, and industrial uses to meet the current growth rate under the trend and efficiency scenarios.

As the *2040 Comprehensive Plan* notes, the City will grow and expand into areas that are past the current City limits. To plan for this growth, the City and Brookings County have corporately exercised joint zoning authority since 1980 in the joint jurisdictional area. The joint jurisdictional area is the rural area adjacent to the City were urban development is expected to occur. This allows planning for annexation, minimizing future conflicts and efficiently utilized infrastructure investment when land is annexed (City of Brookings 2018). This Project is consistent with the land use plans and the annexation policies in place with the City and Brookings County.

In portions of the Project Area, the land use plans have progressed since the *2040 Comprehensive Plan*. Typically, developers create initial layouts for developable land and make the City aware of those areas. For the purposes of this EA, the developable areas that have been identified by developers to the City and Brookings Economic Development Corporation are referred to as planned development. These areas have general plans for the type of development. Final layouts of the developments are not completed. Coordination occurred with the City and the Brookings Economic Development Corporation to identify current planned development areas, including residential, commercial, and industrial, described as follows and shown in *Figure 3-2*:

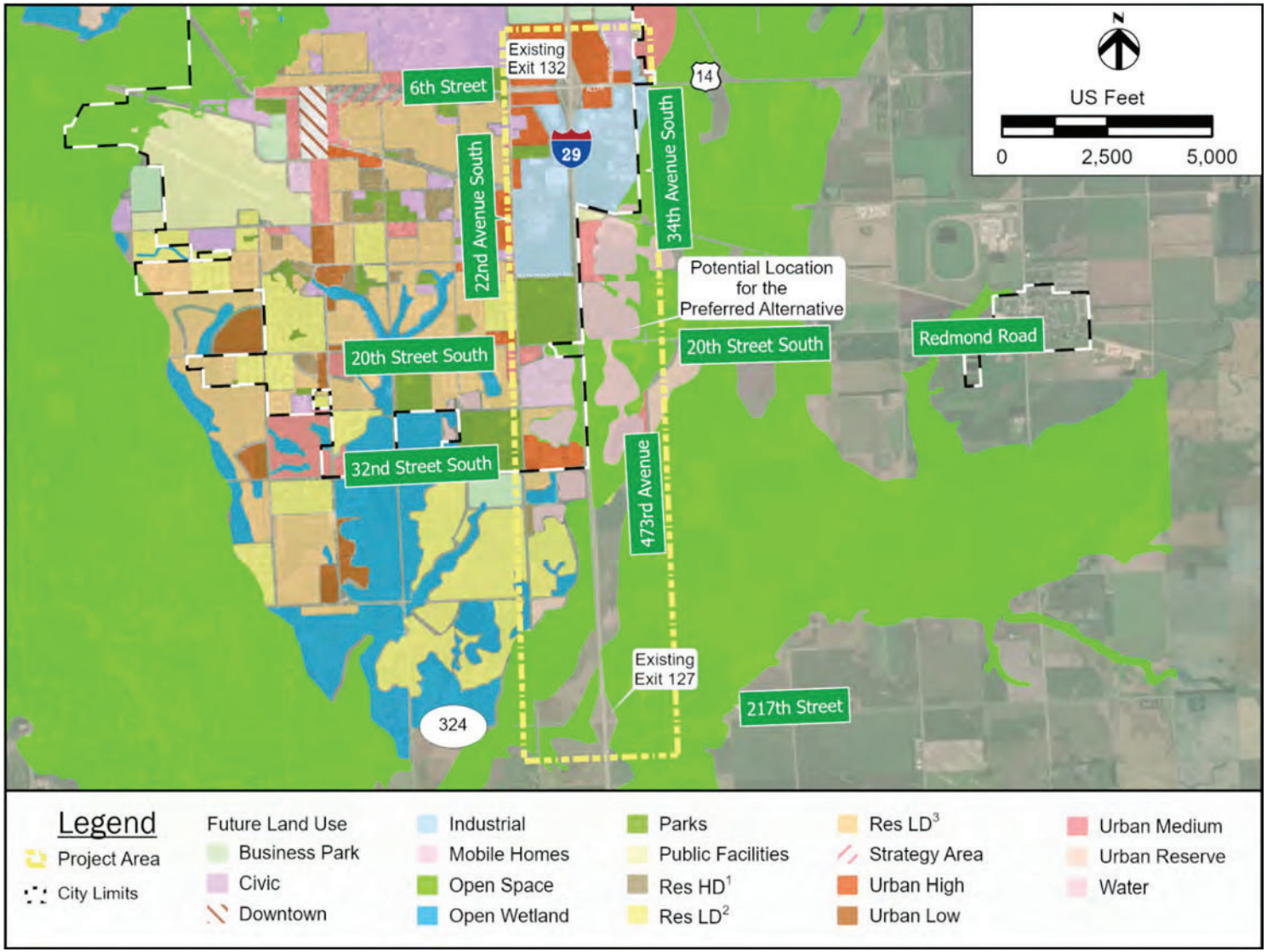
- **Residential:** Existing residential areas are mainly west of 22nd Avenue South, and south of 6th Street to 20th Street South. Within the Project Area, a future residential area is planned on the east side of I-29 south of 20th Street South.

- **Commercial:** Commercial uses have gravitated to major corridors and I-29 to maximize access and visibility, and to reduce impact on residential neighborhoods. In Brookings, these

commercial corridors include 6th Street, 22nd Avenue South, 8th Street South, and the downtown district located on Main Avenue. These areas have been fully developed, and vacant areas are difficult to find. The downtown district has many commercial businesses, including restaurants, bars, shops, and offices (City of Brookings 2019). Additional commercial development is planned on the west side of I-29 along the 20th Street South corridor. In addition, the residential area that is planned on the east side of I-29 south of 20th Street South was also identified as potentially including commercial development.

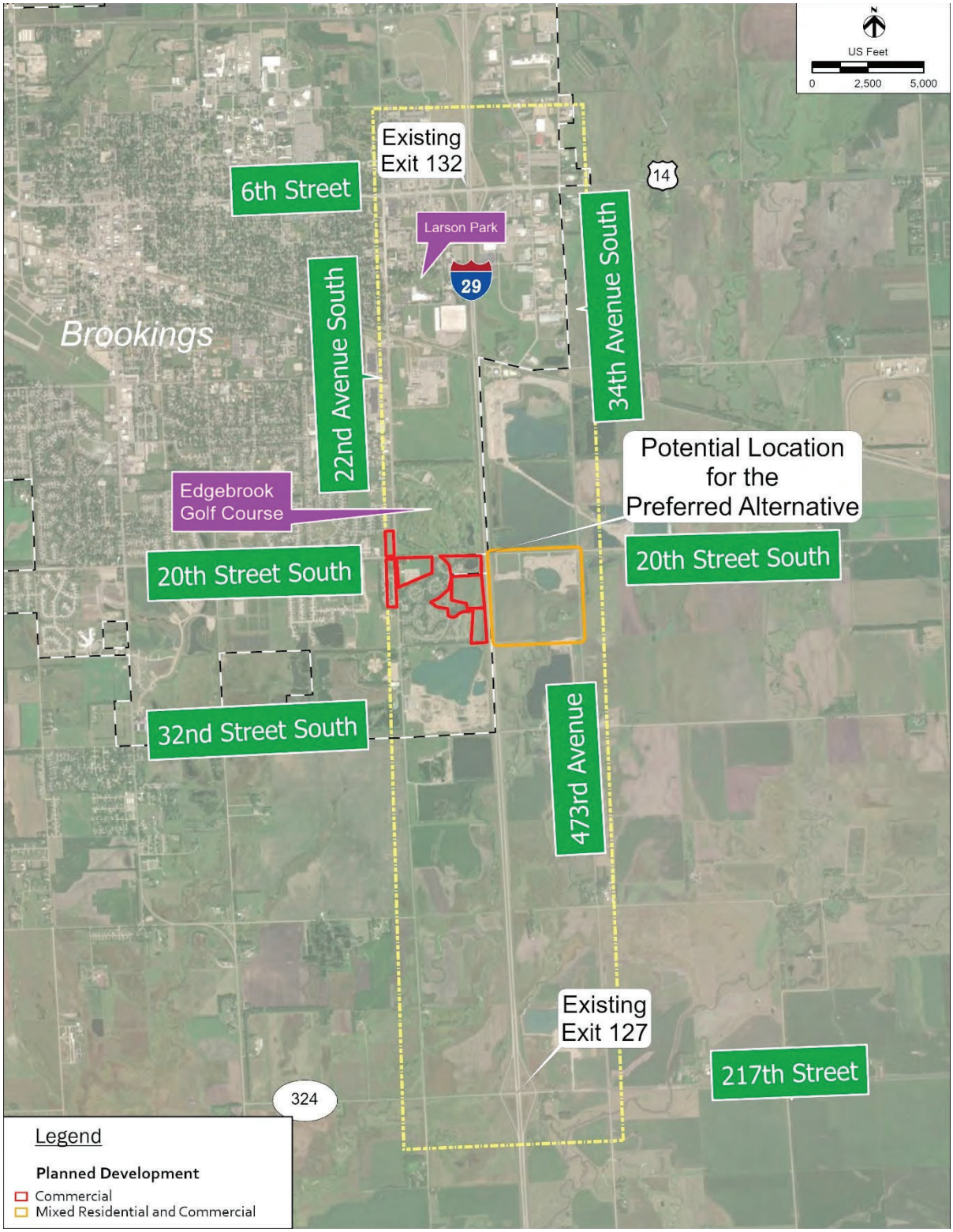
- **Industrial:** The majority of existing industrial land is located adjacent to both sides of I-29, north of 20th Street South. The proximity to I-29 offers access to the interstate, rapid mobility, and accessibility to a larger labor force. No planned industrial areas were identified.

Figure 3-1. *Future Land Use*



Note: 1- Residential High Density 2- Residential Low Density, 3- Residential Low Density

Figure 3-2. *Planned Development*



3.1.3 Environmental Consequences

3.1.3.1 No-Build Alternative

Under the No-Build Alternative, an interchange at 20th Street South would not be constructed. The existing growth rate for Brookings would potentially be affected by the lack of a transportation connection at 20th Street South across I-29. Commercial development typically occurs in higher-traffic corridors, and the No-Build Alternative would not allow 20th Street South to be an additional east-west main arterial. This lack of an additional corridor could inhibit the development in the Project Area, causing increased development pressure in areas where growth was not planned to occur or a reduction in the growth rate in Brookings. Overall, the No-Build Alternative would have a moderate, adverse effect because of the inconsistency with the City's land use plans.

3.1.3.2 Build Alternative

Alternative 5 would create a transportation connection from residential growth areas to employment centers, would facilitate planned commercial development, and would improve commuter routes. Creating this transportation connection would be consistent with the transportation planning completed for Brookings and this area.

Alternative 5 would also create a transportation connection across I-29 and would improve 20th Street South, which would become a main east-west arterial. By creating this corridor, the planned development in the Project Area would occur. As Table 3-1 demonstrates, the planned development in the Project Area would allow Brookings to continue to grow and meet the residential and commercial area needs. For residential areas, the planned 102 acres within the southeast quadrant of the interchange would provide approximately 14 percent of the needed area under the trend scenario and 26 percent under the efficiency scenario. For commercial areas, the planned 62 acres, 20 acres in the southeast quadrant and 42 acres in the southwest quadrant, would provide approximately 39 percent of the needed area under the trend scenario and 74 percent under the efficiency scenario.

The development in the southwest quadrant is mixed providing both residential and commercial, as is encouraged by the *2040 Comprehensive Plan*. The plan notes that if the trend scenario is followed without the efficiency scenario, the amount of developable land adjacent to the City and outside of environmentally sensitive areas, particularly floodplain, will be quickly absorbed. As noted in the *2040 Comprehensive Plan*, once developable land adjacent to the City and services is built out, the new developments will have to "jump" the floodplain. This will require the roadway system and other infrastructure (i.e. sewer, water) to be extended through the floodplain to reach the new development, which will be costly for residents and the City.

Alternative 5 would construct a 20th Street South interchange, a critical transportation infrastructure component, enabling development and future growth in the southern portion of Brookings. The alternative would directly affect adjacent land uses and properties, as land would be converted from its existing use to transportation use. Therefore, Alternative 5 would have the beneficial direct effect of being consistent with the land use plans and anticipated growth rate of Brookings. Alternative 5 would provide the connectivity in the transportation system that would allow planned development to proceed. Without the connectivity in the transportation system, an indirect, adverse effect may occur through induced development occurring in areas where Brookings is not prepared to grow. Overall, Alternative 5 would

have a moderate, beneficial effect on Brookings in providing transportation connectivity that facilitates the planned development, which would allow Brookings to continue to meet the current growth rate.

Table 3-1. *Acreage of Residential, Commercial, and Industrial Areas Needed to Maintain the City's Current Growth Rate in Comparison to Planned Development Areas*

Land Use	Acreage Needed (Trend Scenario)	Acreage Needed (Efficiency Scenario)	Planned Acreage in Project Area (Estimated)
Residential	744	397	102
Commercial	157	84	62
Industrial	421	225	0

3.1.4 Mitigation Measures and Commitments

The City and Brookings County would need to coordinate transportation and land use plans to allow for expansion of the roadway system to accommodate future development.

3.2 SOCIAL

Transportation provides mobility and access for the daily activities of a community. As such, major changes to the transportation system may affect the various aspects of a community. The magnitude of the projected change was evaluated for each of the following social characteristics: population, public services and facilities, community character and cohesion, and traffic circulation. Regarding social impacts, the affected area is the Project Area unless otherwise noted. Statistics used for the analysis were sometimes based on a larger area (such as the City and Brookings County), but the evaluation of impacts was primarily focused on the Project Area.

3.2.1 Population

Table 3-2 shows the population trends in Brookings, indicating a strong growth trend from 2010 to 2019. Brookings has been experiencing growth, primarily on the outer edges of the city. The City's population has grown from 22,056 in 2010 to 24,509 in 2019 (US Census Bureau 2020a).

Table 3-2. *Population Trends for South Dakota, Brookings County, and Brookings*

	2010	2018–2019	Population Increase 2010 to 2018–2019
South Dakota	814,180	882,235	68,055
Brookings County	31,966	35,077	3,111
Brookings	22,056	24,509	2,453

Sources: US Census Bureau 2020a, 2020b.

3.2.2 Public Services and Facilities

Within the Project Area, public services are provided by the following described below and shown on *Figure 3-3*:

- Police departments

  - The Brookings Police Department has jurisdiction within the city limits. The police station is located at 307 3rd Avenue, outside of the Project Area. “The mission of the Brookings Police Department is to prevent crime, enforce the law, and support quality public safety by delivering respectful, professional, and dependable police service” (City of Brookings 2020a).

  - The Brookings County Sheriff’s Office has jurisdiction in the portion of the Project Area that is outside of the city limits. The sheriff’s office is located at 315 7th Avenue, outside of the Project Area. “The purpose of the Brookings County Sheriff’s Office is to provide protection to the citizens of Brookings County. This involves the prevention, detection, apprehension, prosecution, and detention of those persons who violate criminal, civil, state, or local laws.” The office also provides “assistance in emergency situations, medical distress, vehicle accidents, and animal control” (Brookings County 2020a).

- Fire departments

  - The Brookings Fire Department has jurisdiction within the city limits. The Brookings Fire Department is composed of 48 members (3 career members and 45 professional volunteers). A fire station is located at 531 22nd Avenue South within the Project Area (City of Brookings 2020b).

  - The Aurora Fire Department has jurisdiction in the portion of the Project Area outside of the city limits. The fire department is composed of volunteers, with one fire station located in Aurora.

- Transit service

  - Brookings Area Transit Authority provides transit services to all of Brookings County. Rides can be scheduled by calling dispatch, and the transit provides door-to-door service (Brookings Area Transit Authority 2020).

- Ambulance service

  - The Brookings Health System ambulance, located at 300 22nd Avenue South, provides emergency and non-emergency medical transport services for patients in Brookings and the surrounding area. Brookings Ambulance Service transports patients to hospitals, medical centers, and health care facilities in Brookings, including transfers between medical facilities (Brookings Health System 2020).

- Schools

  - Hillcrest Elementary School, located at 304 15th Avenue, is outside of the Project Area. Children within the Project Area north of the railroad alignment attend this school.

  - Medary Elementary School, located at 718 5th Street South, is outside of the Project Area. Children within the Project Area south of the railroad alignment and north of 12th Street attend this school.

  - Dakota Prairie Elementary School is located at 111 26th Street South in the City, outside of the Project Area. Children within the Project Area south of 12th Street attend this school.

  - George S Mickelson Middle School is located at 1802 12th Street South in the City, outside of the Project Area. Children within the Project Area attend this school.

  - Camelot Intermediate School located at 1401 15th Street South in the City, outside of the Project Area. Children within the Project Area attend this school.

  - Brookings High School is located at 530 Elm Avenue in the City, outside of the Project Area. Children within the Project Area attend this school.

- Churches

  - The Church of Jesus Christ of Latter-Day Saints is located in the Project Area at 200 22nd Avenue South.

  - Abundant Life is located in the Project Area at 2120 3rd Street.

Figure 3-3. *Public Services and Facilities*

3.2.3 Community Character and Cohesion

The character of a community is all of the attributes, including social and economic characteristics, that make a community unique and that establish a sense of place for the residents. Community cohesion is the degree to which residents have a sense of belonging to their neighborhood, a level of commitment to the community, or a strong attachment to neighbors, groups, and institutions, usually because of continued association over time. Impacts on community character and cohesion are evaluated based on the Project's potential effects on access to public or community group centers, and changes in neighborhoods or various social groups. These impacts could include isolating or splitting neighborhoods, generating new development, or changing property values.

Approximately half of the Project Area could be considered rural, beginning south of 20th Street South. Several gravel mining operations are scattered among traditional row-cropped agricultural fields. Rural homesteads, presumably single-family farms, are also found in the southern portion of the Project Area. The communities identified in the Project Area include Brookings and the rural community areas.

3.2.4 Traffic Circulation

In the Project Area, I-29 is the main north-south corridor, and it bisects the Project Area. Access to I-29 within the Project Area occurs at Exits 127 and 132. The major north-south arterials in the Project Area include 22nd Avenue South and 34th Avenue South. The major east-west arterials include 20th Street South, US 14 / 6th Street South, 32nd Street South, and SD 324 / 217th Street. Multiple other city streets are located throughout the residential and industrial areas in the Project Area.

As demonstrated in the purpose and need discussion in *Section 1.3*, traffic comes from the City's residential areas and uses Exit 132, Exit 127, or the 32nd Street South overpass to travel to work on the east side of I-29. Traffic also comes from rural communities and uses Exit 132 to travel to work on the west side of I-29.

3.2.5 Environmental Consequences

3.2.5.1 No-Build Alternative

Under the No-Build Alternative, existing levels of traffic would continue to be similar through the area and would likely increase over time. The LOS at the intersection of 22nd Avenue South and 20th Street South and the intersection of 6th Street and I-29 Southbound in the Project Area would be degraded by the planning year of 2045. Increased congestion could harm public service delivery, including emergency services.

Commuters would continue to experience travel delays and extended travel times because of the lack of another major east-west arterial connection from residential neighborhoods and rural communities to major employers. The BUILD grant application estimated travel delays to be over 2 million person-hours in the next 30 years with the current roadway system. Therefore, by bisecting the community, I-29 creates a functional divide that separates the centers of employment and commerce from the current population and future residential growth areas.

Community character and cohesion would remain similar to current conditions. However, over time, increased traffic may necessitate future provisions for traffic and pedestrian facilities in Brookings to

assist in preserving public safety. Overall, the No-Build Alternative would have a moderate, adverse effect on the social environment.

3.2.5.2 Build Alternative

Overall, Alternative 5 would have a moderate, beneficial effect on the social environment. Alternative 5 would provide connectivity of the roadway system that would allow planned development in the area to proceed. This development would contribute to the residential, commercial, and industrial development areas needed to meet the City's growth rate. Allowing the growth rate to continue as anticipated would have an indirect, beneficial effect on Brookings, allowing the continual increase or maintenance of the population.

During construction of Alternative 5, a traffic control plan would be developed during final design. As part of this process, the traffic control plan developed during final design would minimize the amount of disruption to traffic while ensuring the safety of motorists. Due to the roadway being a new alignment, any traffic detours are anticipated to be minimal. Alternative 5 would cause a slight traffic increase on the segment of 20th Street South from the intersection with 34th Avenue South to Aurora. This roadway is currently gravel-surfaced, and some travelers would take this roadway between Aurora and Brookings since the route is shorter. Alternative 5 would relieve traffic congestion and provide connectivity in the roadway system within the City, allowing emergency services to maintain response times. Alternative 5 would have a direct, beneficial effect on these service's response times.

Alternative 5 would provide another main east-west arterial corridor that crosses I-29, connecting rural areas to the city. This connection would have an indirect, beneficial effect by allowing rural residents a more efficient connection to commercial businesses and potential employment. The connection would allow planned development to proceed, which is part of the planned conversion of rural areas to urban directly adjacent to the current city limits. This connection and additional growth may have indirect, minimal adverse effects for the community character and cohesion in the rural areas for rural residents that prefer a more rural setting.

Alternative 5 would have a direct, beneficial effect on traffic circulation by reducing the traffic congestion that exists on 6th Street and 22nd Avenue South. Alternative 5 would provide an additional route for drivers to their residences, businesses, and employment centers. Alternative 5 would specifically improve the intersection of 22nd Avenue South and 20th Street South, where many residents converge from their residences to reach destinations such as work and school. The safety at this intersection would be improved by providing a northbound left-turn lane on 22nd Avenue South, reducing the use of the Allyn Frerichs Trail as a driving lane during peak hour driving times. Residents directly adjacent to Alternative 5 on the south side of 20th Street South in the southwest quadrant would have a minimal, adverse effect due not previously having traffic adjacent to their residences. These residents would also have the same beneficial effects due to an improved roadway system to travel to businesses and employment.

3.2.6 Mitigation Measures and Commitments

To address minor adverse effect for community cohesion for the rural residents, the City and Brookings County will need to coordinate transportation and land use plans to allow for expansion of the City. During these plans, efforts to include the public are encouraged to allow for these residents to have input into these plans.

3.3 ECONOMIC RESOURCES

The population of Brookings has grown steadily since its founding in 1879. Located outside of the Project Area, South Dakota State University is The City's largest employer, with over 2,200 employees. In 2009, it was estimated that South Dakota State University generated "$67.6 million in direct economic impact through day-to-day operations and consumption of goods and services" (City of Brookings 2020c).

The City is continually challenged by a workforce shortage and access to affordable housing. Based on a 2019 survey, Brookings had more than 1,200 jobs open (a long-term trend) and would need to find over 6,000 new employees in the next 10 years to replace retiring workers and support projected business growth. US Census Bureau data indicate that in 2015, nearly 60 percent (9,129 employees) of the workforce commuted into Brookings for employment. In addition, over 3,000 residents commuted out of Brookings for work on a daily basis. Inbound commuter traffic has increased by over 27 percent in the past 10 years. Outbound commuter traffic increased by 36 percent, while the number of individuals both living and working in Brookings increased by just 4 percent (City of Brookings 2019).

The median household income in Brookings from 2014 through 2018 was approximately $50,182. This is below the statewide median household income during the same time frame of $56,499 (US Census Bureau 2020a). Sources of revenue for Brookings County include general property taxes, sales taxes, and revenue shared from the State of South Dakota. The tax base within Brookings County is just over $3 billion (Brookings County Equalization 2020b). The sales tax in the City is 6.5% and retail sales within the City is estimated at $349 million (US Census 2020b).

Economic resources in the Project Area include commercial businesses such as hotels, gas stations, and fast food restaurants. Several businesses are located in the Project Area, including, but not limited to, Daktronics; Walmart; Perkins; Advance Auto Parts; Runnings; Jimmy Johns; Brookings Chevrolet, Buick, and GMC; Culver's; Payless Shoe Source; Fireside Restaurant and Lounge; Lowes; Swiftel Center; Larson Ice Center; Whiskey Creek; Graybar; Hampton Inn and Suites; Applebee's Neighborhood Grill; Fairfield Inn and Suites; Counterpart, Inc.; SGS Midwest Seed Services, LLC; Super 8; Star Circuits, Inc.; Royal Plastics, Inc.; L.G. Everist, Inc.; Hardee's; Choco Latte; 3M; BP Amoco; KFC; Quality Inn; Days Inn; Edgebrook Golf Course; Lowe's Construction Inc.; Avera Brookings Medical Clinic: Amy Nelson-Suarez; Brookings Health System; Yorkshire Eye Clinic; KDBX; Larson Manufacturing; and Twin City Fan and Blower Company.

Several single-family residences, duplexes, multiplex units, apartment buildings, and rural farmsteads are also located in the Project Area. Larson Park is located in the Project Area, situated on the east side of 22nd Avenue South, and provides visitors with multiple recreation options with various activities, including an 18-hole disc golf course, playground equipment, paved trails, a basketball court, and a multi-purpose field. Please refer to *Figure 3-2* for location of Larson Park. Edgebrook Golf Course is located in the Project Area in the northwest corner of the proposed 20th Street South and I-29 interchange. It is open to the public, with memberships available. It offers an 18-hole golf facility, a fleet of golf carts, a full driving range, and a large practice green and chipping green.

3.3.1 Environmental Consequences

3.3.1.1 No-Build Alternative

Under the No-Build Alternative, I-29 would continue to bisect the community within the Project Area, separating centers of employment and commerce from the current population and future residential growth areas, and limiting connectivity to service, retail, and employment establishments. The No-Build Alternative would result in increased congestion for two of the main arterials in the Project Area, 6th Street and 22nd Avenue South. No facilitated crossing of I-29 would exist in the southern two-thirds of Brookings, causing intercity commuters to travel through the congested corridors of 6th Street and 22nd Avenue South or travel up to 2 miles out of the way to cross I-29 via the 32nd Street South overpass.

Over time, these problems may diminish the desirability of the Project Area as commercial, industrial, or residential destinations. Impacts such as additional driving costs (e.g., gas, vehicle maintenance) for drivers and lack of expansion of these businesses may occur. Additional growth for Brookings may be hindered because of the lack of developable land along main arterials in the city. Overall, the No-Build Alternative is anticipated to have a moderate, adverse effect on the economic resources in the Project Area.

3.3.1.2 Build Alternative

Design techniques were used to minimize, to the extent possible, impacts on the existing businesses adjacent to Alternative 5. Within the proposed construction limits of Alternative 5, several businesses are present. The existing businesses are as follows:

- In the northeast quadrant of Alternative 5, L.G. Everist, Inc. has gravel mining operations. Small areas would need to be acquired for improvement of 20th Street South.

- In the southeast quadrant of Alternative 5, a gravel mining operation is owned by Lake Platinum LLC. A portion of the property would need to be acquired for Alternative 5.

- In the southwest quadrant of Alternative 5, Western Estates MHP, LLC is a real estate business that provides rentable lots for modular homes. Alternative 5 would require the acquisition of three mobile home lots and would provide an access drive from the new alignment of 20th Street South. Additional rental property is present south of the intersection of 22nd Avenue South and 20th Street South, and two rental mobile homes would be acquired for Alternative 5. Alternative 5 would also require acquisition of portions of the vacant lots. Please refer to *Figure 3-1*.

- In the northwest quadrant of Alternative 5, Edgebrook Golf Course is owned and operated by the City and offers daily use and membership fee options. Alternative 5 would avoid any acquisition of the area. During construction, temporary easement would be required for a small area near the intersection of 22nd Avenue South and 20th Street South. This easement area would not affect golf activities.

The direct, adverse effects of the acquisition from these businesses would be the tax base that would be lost. As noted in the BUILD grant application, the 20th Street South interchange is a critical transportation infrastructure component that would enable development and future growth in the southern portion of Brookings (City of Brookings 2019). Alternative 5 would provide connectivity to the existing transportation

system by improving traffic along another east-west arterial, 20th Street South. On the east and west sides of I-29 and south of 20th Street South, commercial, mixed use, and residential developments are planned. As noted in *Section 3.1, Land Use*, these areas would contribute to the overall economic growth of Brookings by providing roadway connectivity to the developable land to continue the current growth rate. During the completion of the BUILD grant application, the economic benefit to Brookings from the construction of an interchange at 20th Street South, beyond the travel economic benefits, was considered. Alternative 5 would contribute to creating another east-west connection across I-29 that would create visibility and opportunity for planned development to proceed. To estimate the economic gain from the development, developers provided to the Brookings Economic Development Corporation their planned development areas in the Project Area, which included the following (City of Brookings 2019):

- In the southeast quadrant of Alternative 5, development plans include 20 acres for multi-family housing, 20 acres for commercial space, and 65 single-family properties. This area is estimated to be 130 acres total.

- In the southwest quadrant of Alternative 5, 33 acres are planned for commercial development. This includes a 400,000-square-foot commercial and retail property, 460,000 square feet of residential multi-family above commercial space, and nearly 100,000 square feet of storage space.

- On the west side of the intersection of 22nd Avenue South and 20th Street South, two additional areas, totaling 9 acres, are identified as planned commercial development.

The Brookings Economic Development Corporation compared this planned development area to existing developed retail land in Brookings County to estimate new jobs generated. Approximately 300 jobs were estimated to be generated from this developed commercial area, and each position was estimated to have an average salary of $30,880. An Economic Modeling Systems International (EMSI) program was used to estimate the economic impact of 300 new retail jobs to the area and taxes generated. In the BUILD grant application, a conservative economic increase of nearly $6 million in new earnings and $1 million in new state and local taxes was estimated (City of Brookings 2019). This increase would have a moderate, beneficial effect on the local economy due to Alternative 5.

Alternative 5 would also benefit drivers by reducing their drive time, which in turn would reduce their travel expenses and vehicle maintenance. In the BUILD grant application, savings to drivers was estimated by considering the reduction in travel delay each day for the outbound and inbound commuters. The total travel delay was estimated at 2 million person-hours during the 30-year period of analysis. Estimated savings was determined to be between $10.4 and $21.1 million (City of Brookings 2019).

3.3.2 Mitigation Measures and Commitments

Access would be maintained to businesses from a public street during construction. Access signs indicating individual businesses by name would be included in construction signage. Construction would be phased to minimize traffic congestion impacts and overall time of construction in the Project Area. Alternative 5 would maintain access to all existing businesses from a public street.

All ROW acquisition and relocation impacts would be mitigated in conformance with the Uniform Relocation Assistance and Real Property Acquisition Act (UA) of 1970, as amended by the Surface Transportation Assistance Act of 1987 and as codified in 49 CFR 24, effective April 1989. SDDOT's ROW Program is responsible for acquiring the property necessary for highway purposes and performing services related to acquisition per the UA.

3.4 ACQUISITIONS AND RELOCATIONS

Acquisition would be the temporary or permanent purchase of property for the construction of a roadway. Relocation services would relocate the home or business to another parcel outside of the project area. A field survey and aerial photos were used to identify business and residence locations in the Project Area. Please see *Sections 3.1 and 3.3* for discussions of property in the Project Area.

3.4.1 Environmental Consequences

3.4.1.1 No-Build Alternative

The No-Build Alternative would not directly change or result in relocation of existing businesses, residences, and structures. The planned development in the area could still occur, though likely not to the full extent because of the lack of connectivity in the transportation system.

3.4.1.2 Build Alternative

Alternative 5 would acquire the acquisition of private property within the southwest, southeast, and northeast quadrants. A temporary easement would be required in the Edgebrook Golf Course by the intersection of 20th Street South and 22nd Avenue South for minor grading. Alternative 5 would require acquisition from 11 parcels for a total of approximately 29 acres. Of the total acreage required, approximately 10 acres would be from residential area, approximately 11 acres would be from commercial area (i.e. mining), and approximately 8 acres from a vacant lot. Alternative 5 would require the acquisition of five residences. *Table 3-3* and *Figure 3-4* show the location and details of each acquisition requiring relocation.

At the initiation of this EA process, landowner meetings were held with each landowner to discuss the project. Please also refer to Section 5.4 for a discussion of information available to the public, which would include the landowners and tenants within the impacted area of Alternative 5. The potential alternatives were presented, and after the release of this EA to public comment, further coordination meetings will be held with the landowners.

Table 3-3. *Acquisitions of Residences*

Property ID	Address	Type of Building
1	2224 22nd Avenue South	Single-family residence
2	2228 22nd Avenue South	Single-family residence
3	309 22nd Avenue South	Single-family residence
4	308 22nd Avenue South	Single-family residence
5	310 22nd Avenue South	Single-family residence

Source: Beacon 2020.

Figure 3-4. *Alternative 5 Relocations*

3.4.2 Mitigation Measures and Commitments

Acquisitions and relocations would be conducted in conformance with the Uniform Relocation Assistance and Real Property Acquisition Act of 1970, as amended by the Surface Transportation Assistance Act of 1987 and 49 CFR, Part 24, effective April 1989. Relocation assistance would be made available to all affected persons without discrimination.

3.5 PEDESTRIANS AND BICYCLISTS

Brookings has a well-developed system of pedestrian and bicycle trails. The *Brookings Bicycle Master Plan* was developed to make the community more bicycle friendly and includes future routes and facilities (on-street and off-street) to supplement existing bicycle and trail infrastructure (City of Brookings 2017). By 2040, the vision of the plan is to make Brookings a Platinum Bicycle Friendly Community, where safe and comfortable bicycling trips throughout Brookings are made by residents, students, and visitors. Please refer to *Figure 3-5* for future and existing trails in a portion of the Project Area.

Figure 3-5. *Pedestrian and Bicyclist Facilities*

The *2040 Comprehensive Plan* notes that "a transportation system should promote a variety of complementary transportation modes, including motorists, bicyclists, pedestrians, and transit riders. At present, Brookings has a strong pedestrian system, an emerging bicycle system, and a well-respected and growing on-demand transit service. The use of these modes is expected to grow and should be incorporated into development standards and city budgets" (City of Brookings 2018). The Project's goal is to be consistent with the *2040 Comprehensive Plan* and incorporate multi-modal transportation opportunities. The goal is to incorporate a shared use path as part of the 20th Street South realignment and improvement.

Named after a former City Parks, Recreation, and Forestry Department director, the Allyn Frerichs Trail is an existing paved, shared use trail within the Project Area. The trail begins north of Exit 132 and continues south on the east side of I-29. The trail crosses under I-29 at the railroad tracks and then continues south until it reaches Edgebrook Golf Course. The trail turns west and goes along the north side of the golf course and then turns south and goes along the west side of the golf course, on the east side of 22nd Avenue South in the Project Area. The trail continues west through portions of the City's residential areas. The City's Parks, Recreation, and Forestry Department maintains and manages the Allyn Frerichs Trail.

The *Brookings Bicycle Master Plan* noted potential future shared use trails. The future shared use trails shown in the plan include a conversion of the existing railroad line to a trail and the Allyn Frerichs Trail becoming part of a potential US Bicycle Route 55 alignment through Brookings. In addition, a few of the main arterials, US 14 / 6th Street and 22nd Avenue South, were noted as accommodating either shared use paths or separated bike lanes in the future (City of Brookings 2017).

Currently, traffic congestion exists at the intersection of 20th Street South and 22nd Avenue South. This congestion is caused by northbound traffic on 22nd Avenue South making a left-hand turn onto 20th Street South, backing up northbound traffic on 22nd Avenue South. Drivers have resorted to driving on the Allyn Frerichs Trail on the east side of 22nd Avenue South to bypass waiting traffic, causing safety issues not only for trail users, but also for vehicles illegally using the trail as a bypass lane.

3.5.1 Environmental Consequences

3.5.1.1 No-Build Alternative

No improvements to the existing identified pedestrian or bicycle facilities would be made as part of the No-Build Alternative. Identified safety concerns would remain. Therefore, the No-Build Alternative would have a minor, adverse effect on pedestrians and bicyclists.

3.5.1.2 Build Alternative

Pedestrian and bicycle facilities would be improved with the construction of Alternative 5. A shared use trail would be provided on the south side of the 20th Street South alignment. This trail would connect to the Allyn Frerichs Trail. In addition, another lane would be incorporated on 22nd Avenue South, and the Allyn Frerichs Trail would be realigned adjacent to the lane on the east side. The realignment would allow for the existing driving lane to become a left-turning lane and the additional driving lane would become a through / right-turn lane. This would encourage drivers to not use the trail as a driving lane, improving safety. Therefore, Alternative 5 would have a moderate, beneficial effect on pedestrians and bicyclists. The Allyn Frerichs Trail is considered a Section 4(f) property and Alternative 5 would require a use under Section 4(f). Please refer to *Section 3.17* for further discussion of Section 4(f).

3.5.2 Mitigation Measures and Commitments

A temporary detour of the Allyn Frerichs Trail would be necessary under Alternative 5. The trail segment north of 20th Street South would be detoured to a sidewalk on the west side of 22nd Avenue South. The trail segment south of 20th Street South would be closed during construction of the new trail along 22nd Avenue South. The closure is anticipated to be approximately 1 month. Signage would be provided to direct users around the construction.

3.6 AIR QUALITY

Criteria pollutants tracked under the US Environmental Protection Agency (USEPA) National Ambient Air Quality Standards (NAAQS) include sulfur dioxide (SO_2), particulate matter (PM), nitrogen dioxide (NO_2), ozone (O_3), lead (Pb), and carbon monoxide (CO). South Dakota has adopted the NAAQS and does not have any State Ambient Air Quality Standards (SAAQS) with thresholds that go beyond the federal threshold levels (South Dakota Department of Environment and Natural Resources [SDDENR] 2019a).

SDDENR operates and maintains a network of Ambient Air Quality Monitoring (AAQM) sites throughout the state; the three closest AAQM sites are the Brookings Research Farm site, Watertown site, and Sioux Falls site. The distances from the three sites to the proposed Project location are 7 miles north, 62 miles northeast, and 60 miles south, respectively. Monitoring data indicate that NAAQS and SAAQS were met at all three AAQM sites in 2019, as shown in *Table 3-4*.

Table 3-4. *2019 Monitoring Results for Brookings, Watertown, and Sioux Falls AAQM Sites*

Criteria Pollutant Monitored	Brookings Research Farm AAQM Site [a,b]	Watertown AAQM Site [b]	Sioux Falls AAQM Site [b]	NAAQS	SAAQS
CO (1-hour)	–	–	–	35 ppm	35 ppm
CO (8-hour)	–	–	–	9 ppm	9 ppm
Pb (3-month Average) [c]	–	–	–	0.15 µg/m^3	0.15 µg/m^3
SO_2 (1-hour)	–	_	4.0 ppb	75 ppb	75 ppb
NO_2 (1-hour)	–	_	33.0 ppb	100 ppb	100 ppb
NO_2 (Annual Average)	–	_	4.69 ppb	53 ppb	53 ppb
O_3 (8-hour)	0.063 ppm	–	0.067 ppm	0.070 ppm	0.070 ppm
$PM_{2.5}$ (24-hour)	13 µg/m^3	16 µg/m^3	15 µg/m^3	35 µg/m^3	35 µg/m^3
$PM_{2.5}$ (3-year Average)	4.6 µg/m^3	6.8 µg/m^3	5.9 µg/m^3	12 µg/m^3 [d]	12 µg/m^3 [d]
PM_{10} (24-hour)	–	–	–	150 µg/m^3	150 µg/m^3

Source: SDDENR 2019a.
Key: ppb = parts per billion; ppm = parts per million; µg/m^3 = micrograms per cubic meter
Notes:
a SO_2, and NO_2 are not monitored at the Brookings Research Farm and Watertown AAQM sites.
b CO, Pb, and PM_{10} are not monitored at the Brookings Research Farm, Watertown, and Sioux Falls AAQM sites.
c Pb sampling in the past and current emissions levels indicates that South Dakota is attaining the Pb standard.
d To attain this standard, the 3-year average of the weighted annual mean $PM_{2.5}$ concentrations from single or multiple community-oriented monitors must not exceed 12 µg/m^3.

USEPA uses the following classifications for each of the six criteria pollutants: attainment, nonattainment, maintenance, and unclassifiable. As of August 31, 2019, USEPA has determined the entire state of South Dakota is in attainment for NAAQS (USEPA 2019a). SDDENR has also determined that the entire state of South Dakota is in attainment for all SAAQS (SDDENR 2019a).

3.6.1 Environmental Consequences

3.6.1.1 No-Build Alternative

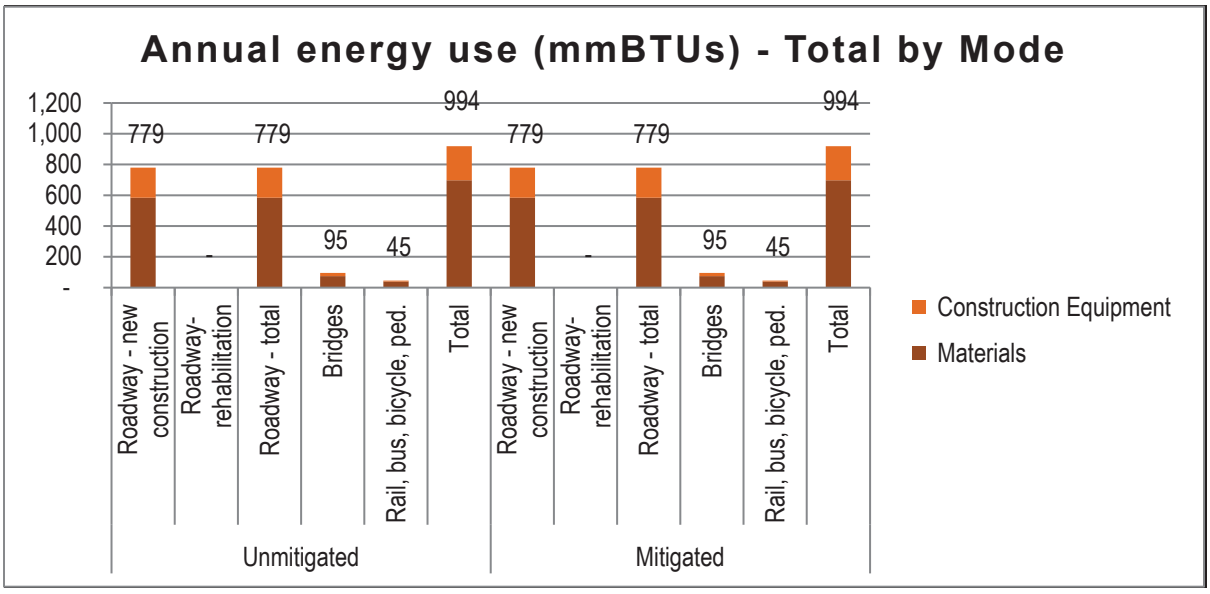
Air quality would decline over time under the No-Build Alternative as traffic congestion worsens. However, it is not likely that air quality standards would be violated in the foreseeable future. Therefore, the No-Build Alternative would have a negligible effect on air quality.

3.6.1.2 Build Alternative

During construction, potential temporary air quality impacts would include fugitive dust associated with site work and haul routes, exhaust and machinery-related emissions from construction equipment and haul vehicles and potential congestion in the vicinity of construction sites and haul routes.

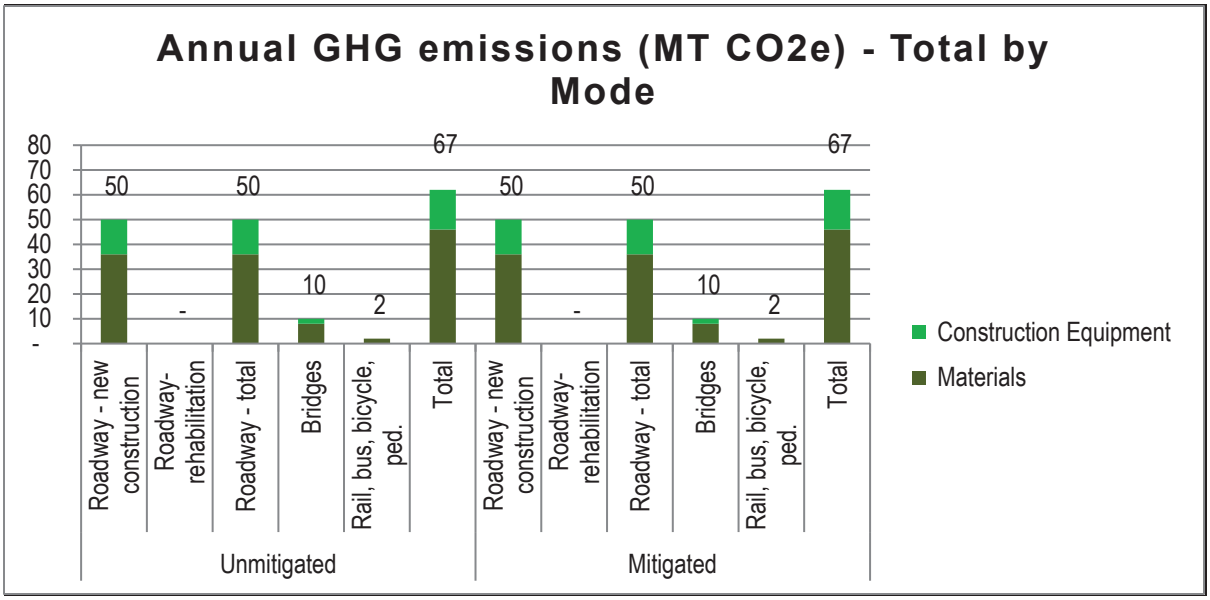
FHWA developed an Infrastructure Carbon Estimator (ICE) tool that estimates the life cycle energy and greenhouse gas (GHG) emissions from the construction and maintenance of transportation facilities. The tool is based on a nationwide database of construction bid documents, data collected from the Departments of Transportation in each state, and consultation with transportation engineers and life cycle analysis experts. ICE measures the annual energy use in one million British Thermal Units (mmBTU) annualized over 30 years, as well as the annual GHG emissions annualized over 30 years. Please refer to *Graph 3-1* and *Graph 3-2*.

Graph 3-1. *FHWA Infrastructure Carbon Estimator Annual Energy Use*



Source: USDOT. 2017.
Key: mmBTUs = one million British Thermal Units; MT CO2e = carbon dioxide equivalent

Graph 3-2. *FHWA Infrastructure Carbon Estimator Annual GHG Emissions*



Source: USDOT 2017.
Key: mmBTUs = one million British Thermal Units; MT CO2e = carbon dioxide equivalent

For both annual energy use and annual GHG emissions, the ICE tool estimates show that annual energy use is proportional to annual GHG emissions; as annual energy use goes up, so do GHG emissions. The results from the ICE tool take into consideration the portion of annual energy use from upstream energy and emissions, and direct energy and emissions occurring from construction. The ICE tool prompted three sources (roadway, bridges, and pedestrians) for energy use and GHG generators as a consequence of Alternative 5. For annual energy use, the individual energy sources show 779 mmBTUs for roadway, 95 mmBTUs for bridges, and 45 mmBTUs for pedestrians. Total annual energy use, annualized over 30 years, shows 994 mmBTUs. For annual GHG emissions, the individual sources show 50 carbon dioxide equivalent (MT CO2e) for roadway, 10 MT CO2e for bridges, and 2 MT CO2e for pedestrians. Total annual energy use, annualized over 30 years, shows 67 MT CO2e.

On September 16, 2019, SDDOT sent a letter to SDDENR that described the project and requested comments pertaining to air quality. Please refer to *Appendix A* for the SDDENR response letter. The SDDENR Air Quality Program noted that this project would have only a minor impact on air quality in South Dakota. This impact would be through point source and fugitive emissions. Fugitive emissions are not covered by State air quality regulations but can be a common source of public concern and may be subject to local or county ordinances. All emissions from construction activities would be temporary in nature. Construction activities are not anticipated to result in visual impairment of any Class I areas, cause or contribute to a violation of any NAAQS or SAAQS, or expose sensitive receptors to substantially increased pollutant concentrations.

As noted in the modeling, Alternative 5 would have minimal increase in emissions and energy uses. Alternative 5 would in the City's transportation system reduce traffic congestion; therefore, emissions from vehicles. For the segment of 20th Street South from Brookings to Aurora that is gravel-surfaced,

minor increases in dust would occur from the slight increase in traffic. Therefore, Alternative 5 has a negligible effect on air quality.

3.6.2 Mitigation Measures and Commitments

Construction equipment with point source emissions in many cases is required to have an air quality permit to operate. As applicable, permit applications would be obtained from the SDDENR Air Quality Program or Minerals and Mining Program.

During construction, fugitive emissions would be monitored, and would be mitigated (such as watering to suppress dust) as needed.

3.7 NOISE

Traffic noise consists of vehicular engine noise and tire noise from contact with the roadway surface. In general, noise can be defined as unwanted sound. Noise levels from highway traffic are affected primarily by three factors: (1) the volume of the traffic, (2) the speed of the traffic, and (3) the number of trucks in the flow of traffic. Sound is composed of various frequencies. The human ear is efficient at blocking out very low- and high-frequency sound. Frequencies to which the human ear does not respond must be filtered out or scaled when evaluating traffic noise levels. Noise is measured in decibels, a logarithmic scale. The type of scale that best approximates the frequency response of the human ear is called the A-scale. Therefore, noise levels are measured and reported in A-weighted decibels (dBA). *Table 3-5* provides noise levels (in dBA) common to everyday activities.

The Federal-Aid Highway Act of 1970 mandated that the FHWA develop noise standards for the mitigation of highway traffic noise. FHWA prepared standards for the mitigation of highway traffic noise in the planning and design of federally funded projects. These standards comprise Title 23 of the United States Code of Federal Regulations Part 772- Procedures for Abatement of Highway Traffic Noise and Construction Noise (23 CFR 772). These criteria and procedures are set forth in 23 CFR 772. On July 13, 2010, The FHWA published a final rule which revised 23 CFR 772. The rule requires State highway agencies prepare state-specific noise policies/guidance and procedures for applying the revised rule in their state. In accordance, SDDOT developed the *Noise Analysis and Abatement Guidance* (SDDOT 2011). The FHWA has also developed Noise Abatement Criteria (NAC) and procedures for use in the planning and design of highways. The NAC noise level is 67 dBA for residential and park area receptors and 72 dBA for commercial receptors. Please refer to *Table 3-6*. Impacts occur when the predicted noise levels approach or exceed the NAC noise levels or when they substantially exceed the existing noise levels. Within the SDDOT's *Noise Analysis and Abatement Guidance* (SDDOT 2011), the term 'approach' was defined as reaching 1 dBA less than the NAC and the term 'substantially exceed' as being at least 15 dBA above existing noise levels. This document, approved by FHWA and consistent with FHWA's procedures, was followed for this analysis. Consequently, a predicted exterior noise level of 66 dBA for residential and park area receptors and 71 dBA for commercial receptors would represent a noise impact.

Within the SDDOT's *Noise Analysis and Abatement Guidance* (SDDOT 2011), projects are categorized into types to identify the level of noise analysis needed. Type 1 includes the following types of projects:

- The construction of a highway on new location; or

- The physical alternation of an existing highway where there is either:
    - Substantial Horizontal Alternation: A project that halves the distance between the edge of the outermost through-traffic lane and the closest receptor between the existing condition and the future build condition; or
    - Substantial Vertical Alternation: A project that removes shielding thereby exposing the line-of-site between the receptor and the traffic noise source. This is done by either altering the vertical alignment of the highway or by altering the topography between the highway traffic noise source and the receptor; or,
- The addition of a through traffic lane;
- The addition of an auxiliary lane except for when the auxiliary is a turn lane;
- The addition of a new interchange or the relocation of interchange lanes, or when ramps are added to a quadrant to complete an existing partial interchange;
- Restriping existing pavement for the purpose of adding a through-traffic lane or an auxiliary lane; or
- The addition of a new or substantial alteration of a weigh station, rest stop, ride-share lot or toll plaza.

Type 1 requires noise analysis modeling and consideration of abatement options if noise impacts are documented. Because this Project involves the construction of a new interchange, it is considered a Type I project per SDDOT guidance. For a Type I project, a noise analysis is required to identify noise impacts and to evaluate the feasibility and reasonableness of noise mitigation measures if there would be noise impacts associated with the project.

For Alternative 5, the study area for noise analysis (noise study area) was defined as the area within 500 feet of the edge of pavement along the Project corridor, including the proposed 20th Street South alignment and a section of I-29. Within the noise study area, land use includes residential properties, Edgebrook Golf Course, and trail systems. As noted in the SDDOT's *Noise Analysis and Abatement Guidance* (SDDOT 2011), undeveloped lands that have been permitted for development would need to be analyzed for that permitted land use. Although the non-developed properties have been planned for residential and commercial land use and the City is aware of these plans, the areas have not been permitted. For the golf course, only areas that have frequent human activity, such as tee boxes and the greens, are sensitive to noise levels. A noise study (HDR 2020a) completed in July 2020 was performed with the FHWA Traffic Noise Model, Version 2.5, to evaluate projected traffic noise levels and was completed in accordance with SDDOT *Noise Analysis and Abatement Guidance* (SDDOT 2011). The noise study was updated to analyze the noise levels using the 2045 traffic volumes (HDR 2020a). Please refer to *Figure 3-6* and *Appendix B* for the noise analysis report. *Table 3-7* describes the location of the noise measurement, validation sites, and validation results that were used for the noise study.

Table 3-5. *Common Noise Levels*

Common Outdoor Activities	Noise Level DBA	Common Indoor Activities
	110	Rock band
Jet flyover at 1,000 feet		
	100	
Gas lawnmower at 3 feet		
	90	
Diesel truck at 50 feet at 50 mph		Food blender at 3 feet
	80	Garbage disposal at 3 feet
Noisy urban area (daytime)		
Gas lawnmower at 100 feet	**70**	Vacuum cleaner at 10 feet
Commercial area		Normal speech at 3 feet
Heavy traffic at 300 feet	**60**	
		Large business office
Quiet urban area (daytime)	**50**	Dishwasher in next room
Quiet urban area (nighttime)	**40**	Theater, large conference room (background)
Quiet suburban area (nighttime)		
	30	Library
Quiet rural area (nighttime)		Bedroom at night, concert hall (background)
	20	
		Broadcast or recording studio
	10	
Lowest threshold of human hearing	**0**	Lowest threshold of human hearing

Source: California Department of Transportation 2013.

Table 3-6. *Noise Abatement Criteria*

[Hourly A-Weighted Sound Level – decibels (dBA)]				
Activity Category	**Activity Leq(h)[a]**		**Evaluation Location**	**Description of Activity Category**
	FHWA	**SDDOT**		
A	57	56	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[b]	67 52	66 51	Exterior Interior	Residential.
C[b]	67	66	Exterior	Active sports areas, amphitheaters, auditoriums, campgrounds, cemeteries, daycare centers, hospitals, libraries, medical facilities, parks, picnic areas, places of worship, playgrounds, public meeting rooms, public or nonprofit institutional structures, radio studios, recording studios, recreational areas, Section 4(f) sites, schools, television studios, trails, and trail crossings.
D	52	51	Interior	Auditoriums, daycare centers, hospitals, libraries, medical facilities, places of worship, public meeting rooms, public or nonprofit institutional structures, radio studios, recording studios, schools, and television studios.
E[b]	72	71	Exterior	Hotels, motels, offices, restaurants/bars, and other developed lands, properties, or activities not included in A–D or F.
F	--	--	--	Agriculture, airports, bus yards, emergency services, industrial, logging, maintenance facilities, manufacturing, mining, rail yards, retail facilities, shipyards, utilities (water resources, water treatment, electrical), and warehousing.
G	--	--	--	Undeveloped lands that are not permitted.

Source: Based on 23 CFR Part 772, Table 1.

a Leq(h) is the hourly equivalent sound level. The Leq(h) activity criteria values are for impact determination only and are not design standards for noise abatement measures.

b Includes undeveloped lands permitted for this activity category.

Figure 3-6. *Noise Measurement Locations and Noise Analysis Results*

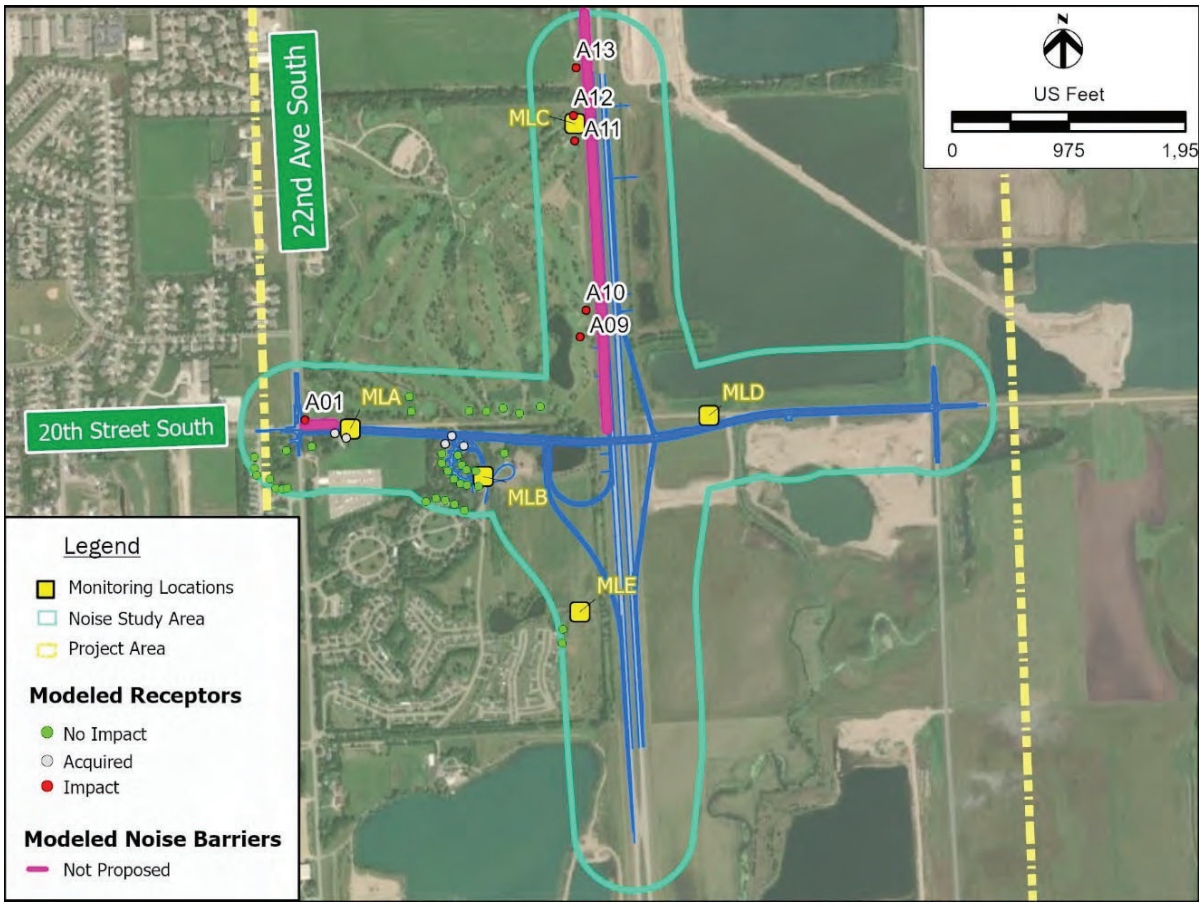


Table 3-7. *Noise Measurement Locations*

Measurement Location	Description	Leq(h), dBA		
		Measured	Modeled	Difference
MLA	Near 2228 and 2230 20th Street South	50.6	48.4	-2.2
MLB	Near 314 Horseshoe Bend	48.1	49.9	+1.8
MLC	Edgebrook Golf Course	66.3	66.8	+0.5
MLD	Along 20th Street South	52.7	53.8	+1.1
MLE	Near 907 Tumbleweed Road	58.7	60.3	+1.6

3.7.1 Environmental Consequences

3.7.1.1 No-Build Alternative

The No-Build Alternative would have no effects on existing noise in the Project Area. Under existing conditions, the noise levels at four receptors are exceeded. Please refer to *Table 3-8* and the following describes each receptor that exceeds the NAC:

- Three of the receptors are located in the Edgebrook Golf Course:

- A10 is located within the fairway of Hole 15.
- A11 is located within the tee box of Hole 17
- A12 is located within the fairway of Hole 18.

- One receptor, A13 is located at the segment of the Allyn Frerichs Trail that is north of the Edgebrook Golf Course and adjacent to I-29.

3.7.1.2 Build Alternative

Construction noise is transient in nature and dependent on the type of work. The equipment that produces noise is limited to the construction area or to the haul routes. This noise is mitigated by the fact that construction is predominantly performed during daylight hours when people are much less sensitive to noise. Since 20th Street South and I-29 are both adjacent to Alternative 5, the noise of construction equipment would be similar to existing traffic noises.

The FHWA Traffic Noise Model, Version 2.5, was used to evaluate the noise levels at noise-sensitive receptors within the noise study area for existing conditions and future conditions under Alternative 5. The Traffic Noise Model accounts for the elevation differences and the proposed roadway alignment in relation to noise-sensitive sites. *Table 3-8* lists the NAC, the existing modeled hourly equivalent sound level (Leq(h)), and the modeled Leq(h) under Alternative 5.

Table 3-8. *Predicted Noise Levels at Receptors*

Noise Receptor ID	Noise Receptor (Number of Receptors Represented)	Activity Category	NAC, dBA	Leq(h), dBA			
				Existing	Alternative 5	Difference between Existing/Build	Impact
A01	Trail (1)- North of Golf Course	C	66	63.8	67.7	+3.9	Yes
A02	Edgebrook Golf Course (1), Hole 4 Bunker	C	66	48.6	58.4	+9.8	No
A03	Edgebrook Golf Course (1), Hole 4 Tee Box	C	66	48.6	54.9	+6.3	No
A04	Edgebrook Golf Course (1), Hole 8 Fairway	C	66	50.9	57.9	+7.0	No
A05	Edgebrook Golf Course (1), Hole 8 Tee Box	C	66	52.2	58.4	+6.2	No
A06	Edgebrook Golf Course (1), Hole 11 Tee Box	C	66	53.5	58.3	+4.8	No
A07	Edgebrook Golf Course (1), Hole 12	C	66	55.1	59.8	+4.7	No
A08	Edgebrook Golf Course (1), Hole 14 Tee Box	C	66	57.1	59.8	+2.7	No
A09	Edgebrook Golf Course (1), Hole 15 Fairway	C	66	65.7	67.2	+1.5	Yes

Noise Receptor ID	Noise Receptor (Number of Receptors Represented)	Activity Category	NAC, dBA	Leq(h), dBA			
				Existing	Alternative 5	Difference between Existing/Build	Impact
A10	Edgebrook Golf Course (1), Hole 15 Tee Box	C	66	68.8	70.3	+1.5	Yes
A11	Edgebrook Golf Course (1). Hole 17 Tee Box	C	66	67.4	68.9	+1.5	Yes
A12	Edgebrook Golf Course (1), Hole 18 Fairway	C	66	68.0	69.5	+1.5	Yes
A13	Trail (1)- At Intersection of 20th St S and 22nd Ave S	C	66	70.2	71.6	+1.4	Yes
B01	Single-Family Residence (1)	B	66	50.3	53.5	+3.2	No
B02	Single-Family Residence (1)	B	66	50.2	53.1	+2.9	No
B03	Single-Family Residence (1)	B	66	50.3	53.0	+2.8	No
B04	Single-Family Residence (1)	B	66	52.5	55.2	+2.7	No
B05	Single-Family Residence (1)	B	66	53.6	56.2	+2.6	No
B06	Single-Family Residence (1)	B	66	55.7	58.2	+2.5	No
B07	Single-Family Residence (1)	B	66	57.8	60.4	+2.6	No
B08	Single-Family Residence (1)	B	66	58.6	61.5	+2.9	No
C01	Single-Family Residence (1)	B	66	58.7	62.6	+3.9	No
C02*	Single-Family Residence (1)	B	66	51.6	*	-	-
C03*	Single-Family Residence (1)	B	66	50.3	*	-	-
C04*	Single-Family Residence (1)	B	66	49.9	*	-	-
C05*	Single-Family Residence (1)	B	66	49.6	*	-	-
C06	Single-Family Residence (1)	B	66	49.4	58.6	+9.2	No
C07	Single-Family Residence (1)	B	66	49.4	56.3	+6.9	No
C08	Single-Family Residence (1)	B	66	49.6	55.5	+5.9	No
C09	Single-Family Residence (1)	B	66	49.9	55.2	+5.3	No
C10	Single-Family Residence (1)	B	66	50.2	55.3	+5.1	No
C11	Single-Family Residence (1)	B	66	50.5	55.6	+5.1	No
C12	Single-Family Residence (1)	B	66	51.2	56.2	+5.0	No
C13*	Single-Family Residence (1)	B	66	50.5	*	-	-
C14	Single-Family Residence (1)	B	66	50.1	58.6	+8.5	No
C15	Single-Family Residence (1)	B	66	50.3	56.7	+6.4	No
C16	Single-Family Residence (1)	B	66	50.5	56.6	+6.1	No
C17	Single-Family Residence (1)	B	66	51.1	57.0	+5.9	No
C18	Single-Family Residence (1)	B	66	48.8	53.4	+4.6	No
C19	Single-Family Residence (1)	B	66	49.1	53.8	+4.7	No
C20	Single-Family Residence (1)	B	66	49.4	54.0	+4.6	No

Noise Receptor ID	Noise Receptor (Number of Receptors Represented)	Activity Category	NAC, dBA	Leq(h), dBA			
				Existing	Alternative 5	Difference between Existing/Build	Impact
C21	Single-Family Residence (1)	B	66	49.8	54.4	+4.6	No
C22	Single-Family Residence (1)	B	66	50.3	54.6	+4.3	No
C23	Single-Family Residence (1)	B	66	53.5	61.6	+8.1	No
C24	Single-Family Residence (1)	B	66	58.3	60.6	+2.3	No
C25	Single-Family Residence (1)	B	66	58.1	60.3	+2.2	No

*Residence would be acquired or relocated as part of Alternative 5.

Under Alternative 5, impacts are predicted at six receptors, and five additional receptors are anticipated to be acquired or relocated as part of the build alternative. All six impacted receptors are in Activity Category C and include the four receptors impacted under the existing condition. Four of the exceeded receptors are located at Edgebrook Golf Course, and two are located on segments of the Allyn Frerichs Trail. All impacts are the result of approaching or exceeding the NAC. Predicted noise levels would increase 1.4 to 9.8 dBA over the existing condition, which is below the threshold for a substantial increase (15 dBA or more). *Figure 3-6* shows the noise receptors and locations with predicted impacts.

For the six noise-related impacts that are predicted as a result of Alternative 5, potential traffic noise abatement measures were considered. These measures included modification of the proposed horizontal and/or vertical alignments of the roadway, traffic management measures (modification of speed limits and restriction of truck traffic), construction of noise barriers along or within the ROW, and acquisition of property to serve as a buffer zone. Only one of these abatement measures was determined to be feasible for further discussion: construction of noise barriers along or within the ROW.

When a traffic noise impact is identified, noise abatement measures must be considered and evaluated for feasibility and reasonableness by comparing the cost and effect of the abatement measure against the amount of benefit. Feasibility and reasonableness conditions must be met for noise abatement to be justified and incorporated into project design. A noise abatement measure is considered feasilble when a minimum of 60% of front row receptors directly behind the abatement measure achieve a 5 dBA noise reduction. Reasonableness is a more subjective criterion than feasibility. Common sense and good judgement are applied in arriving at a decision when noise abatement measures are considered. Three reasonableness criteria must be collectively achieved. The three criteria are (1) viewpoints of the property owners and residents of all benefited receptors, (2) cost effectiveness, and (3) noise reduction goal. Failure to achieve any single element of feasibility or reasonableness results in the noise abatement measure being deemed not feasible or not reasonable, whichever applies.

For Alternative 5, two noise barriers were modeled. Noise Barrier A1 was modeled north of 20th Street South and east of 22nd Avenue South to shield impacted Receptor A01. The modeled wall was approximately 225 feet long. The trail represented by Receptor A01 crosses 20th Street South. As summarized in *Table 3-9*, a 20-foot-high wall was evaluated. The noise barrier did not provide any receptors a reduction in 5 dBA because Receptor A01 cannot be fully shielded from the roadway due to of the trail crossing. Noise Barrier A1 was not found to be reasonable or feasible; therefore, a wall in this location is not proposed.

Noise Barrier A2 was modeled west of I-29 to shield Receptors A09, A10, A11, A12, and A13. The modeled wall was approximately 3,383 feet long and would extend across the entire property. As summarized in *Table 3-9*, walls with heights from 10 to 20 feet were evaluated. Noise Barrier A2 was not found to be feasible and reasonable; therefore, a wall at this location is not proposed.

Alternative 5 is anticipated to have a minor, adverse effect on noise levels at six receptors along the eastern boundary of Edgebrook Golf Course and on portions of the Allyn Frerichs Trail.

Table 3-9. *Noise Abatement Analysis for Noise Barriers*

Barrier Height (feet)	Feasibility		Reasonableness					Is Barrier Feasible and Reasonable?
	% Front-row with 5-dBA Reduction	Acoustically Feasible?[a]	% Benefited with 7-dBA Reduction	Noise Abatement Design Goal?[b]	Anticipated Cost	Allowable Cost[c]	Cost-Effective?[d]	
Noise Barrier A1								
20	0	No	0	No	N/A	N/A	N/A	No
Noise Barrier A2								
10	60	Yes	0	No	N/A	N/A	N/A	No
12	100	Yes	80	Yes	$1,786,224	$105,000	No	No
14	100	Yes	100	Yes	$2,083,928	$105,000	No	No
16	100	Yes	100	Yes	$2,381,632	$105,000	No	No
18	100	Yes	100	Yes	$2,679,336	$105,000	No	No
20	100	Yes	100	Yes	$2,977,040	$105,000	No	No

a 5-dBA reduction for at least 60% of front-row receptors.
b 7-dBA reduction for at least 40% of benefited receptors.
c Allowable cost is $21,000 per benefited receptor.
d Anticipated cost is less than allowable cost.

3.7.2 Mitigation Measures and Commitments

SDDOT will not be responsible for providing highway traffic noise abatement for undeveloped lands permitted after the Date of Public Knowledge.

During construction, contractors would be required to comply with sound control requirements identified in the *SDDOT Standard Specifications for Roads and Bridges* (SDDOT 2015). Construction noise abatement would be reviewed and specifically applied for this Project.

3.8 WETLANDS AND OTHER WATERS OF THE US

Wetlands and Other Waters of the US (OWUS) are regulated by USACE under Section 404 of the Clean Water Act. OWUS include rivers, streams, intermittent streams, lakes, ponds, and impoundments. Wetlands and OWUS are subject to USACE jurisdiction, which is determined by the applicable USACE district regulatory office. EO 11990, Protection of Wetlands (May 24, 1977), directs agencies, in this case

FHWA, to implement “no net loss” measures for wetlands which entails a phased approach to wetland impacts, requiring avoidance, then minimization, and then mitigation for the wetland impacts.

A field delineation was conducted on May 12, 2020, to identify and document wetland boundaries and OWUS in the defined wetland delineation survey area. Please refer to *Appendix C* for the wetland delineation report. The survey area was determined by considering indirect and direct effects on wetlands that would occur under Alternative 5. The survey area encompassed 20th Street South from 22nd Avenue South to 34th Avenue South, and along I-29, 0.5 mile north and 0.5 mile south of the proposed interchange with 20th Street South. Within the approximate 196-acre wetland delineation survey area, 12 wetlands were identified, totaling 18.81 acres; one stream was identified, totaling 322 linear feet (0.16 acre); and one lake was identified, totaling 11.60 acres.

Please refer to *Table 3-10* for the wetlands and *Table 3-11* for the OWUSs in the wetland delineation survey area which includes an estimate of impacted wetland acreage by wetland type and impacted OWUS. Wetlands 2 and 5 have previous USACE jurisdictional determinations. The rest of the features note the delineator’s recommended jurisdictional status. A jurisdictional determination was requested on July 15, 2020, from USACE. The jurisdiction of the impacted features will be verified during final design of the preferred alternative.

Table 3-10. Delineated Wetlands in the Wetland Delineation Survey Area

Feature	Area (acres) [a]	Cowardin Classification[b]	Wetland Type[c]	Jurisdictional Status or Identification of Preamble Status[d]	Permanent Impacts (Acres)	Temporary Impacts (Acres)
WL-01a	0.09	R4SBC	Slope	Likely Non-Jurisdictional	0.0	0.0
WL-01b	0.35	R4SBCx	Slope	Likely Non-Jurisdictional	0.0	0.02
WL-01c	0.27	PEMAx	Slope	Likely Non-Jurisdictional	0.0	0.05
WL-02	3.29	PUB1x	Depressional	Non-Jurisdictional (Artificial)	3.29	0.01
WL-03	1.63	PEMAd	Slope	Likely Non-Jurisdictional	0.28	0.1
WL-04	0.71	PEMAd	Slope	Likely Non-Jurisdictional	0.01	0.04
WL-05	0.14	PEMAd	Depressional	Non-Jurisdictional	0.0	0.0
WL-06a	0.17	RP1EM	Riverine	Likely Preamble	0.09	0.01
WL-06b	0.12	RP1EM	Riverine	Likely Preamble	0.03	0.01
WL-07a	0.30	PEMAx	Slope	Likely Jurisdictional	0.28	0.06
WL-07b	0.01	PEMAx	Slope	Likely Jurisdictional	0.0	0.0
WL-08a	0.03	PEMAx	N/A (Ditch)	Likely Preamble	0.03	0.0
WL-08b	0.04	PEMAx	N/A (Ditch)	Likely Preamble	0.04	0.0
WL-08c	0.02	PEMAx	N/A (Ditch)	Likely Preamble	0.02	0.0
WL-08d	0.16	PEMAx	N/A (Ditch)	Likely Preamble	0.16	0.0
WL-08e	0.06	PEMAx	N/A (Ditch)	Likely Preamble	0.06	0.0
WL-08f	0.02	PEMAx	N/A (Ditch)	Likely Preamble	0.02	0.0
WL-09a	0.02	PEMAx	N/A (Ditch)	Likely Preamble	0.01	0.01
WL-09b	0.01	PEMAx	N/A (Ditch)	Likely Preamble	0.0	0.0
WL-09c	0.04	PEMAx	N/A (Ditch)	Likely Preamble	0.0	0.0
WL-09d	0.13	PEMAx	N/A (Ditch)	Likely Preamble	0.03	0.05
WL-10	8.65	PUBHx	Depressional	Likely Non-Jurisdictional	0.0	0.0
WL-11	1.51	PUBHx	Depressional	Likely Preamble	0.0	0.0
WL-12	1.04	PUBHx	Depressional	Likely Preamble	0.0	0.0
Wetland Acres	**18.81**				**4.35**	**0.36**

a Area delineated within the defined wetland delineation survey area for the Project.
b R4SBC- Riverine, Intermittent, Streambed, Seasonally Flooded; R4SBCx- Riverine, Streambed, Seasonally Flooded, Excavated; PEMAx- Palustrine, Emergent, Temporarily Flooded, Excavated; PUB1x- Palustrine, Unconsolidated Bottom, Cobble-Gravel, Excavated; PEMAd- Palustrine, Emergent, Temporarily Flooded, Partly Drained/Ditched; RP1EM- Riverine, Emergent; PUBHx- Palustrine, Unconsolidated Bottom, Permanently Flooded, Excavated
c Wetland type refers to the HGM classification: depressional, riverine, or slope wetlands.
d Jurisdictional status assists SDDOT with determining whether or not the feature is under the authority of USACE.

Table 3-11. *Delineated Potential Other Waters of the US in the Wetland Delineation Survey Area*

Feature	Length (feet)	Area (acres)[a]	Cowardin Classification	Jurisdictional Status	Permanent Impacts (Acres)	Temporary Impacts (Acres)
Stream 01	332	0.16	R4SB5d	Likely Jurisdictional	0.01	0.07
L-01	N/A	11.60	L1UBx	Likely Jurisdictional	0.02	0.0
Total	**332**	**11.76**			**0.03**	**0.07**

a Area delineated within the defined wetland delineation survey area for the Project.

3.8.1 Environmental Consequences

3.8.1.1 No-Build Alternative

Wetlands and OWUS would not be impacted by the No-Build Alternative.

3.8.1.2 Build Alternative

During the preliminary design of the build alternatives, preliminary wetland and OWUS impacts were identified, as discussed in *Section 2.3.2*. The alignment of Alternative 5 was shifted to avoid or minimize impacts on natural wetland areas and OWUS to the extent possible. The northeast ramp of the interchange was shifted to avoid the mitigation site, WL-10. WL-10 is a mitigation site with a wetland and buffer area that was used to mitigate for the impact of another project. Mitigation sites, typically, have protection measures identified that protect the site from disturbance or development. Therefore, permitting a site previously utilized to mitigate wetland impacts for another project can be difficult. The area of impact for the wetlands and OWUS for Alternative 5 was calculated using the preliminary construction limits. Alternative 5 would have a total area of impact of 4.38 acres to wetlands and OWUS. Please refer to *Figure 3-7* and *Table 3-12* for a summary of wetland and OWUS impacts.

Typically, USACE issues two types of Section 404 permits, nationwide and individual. Nationwide permits authorize activities that are similar in nature and cause only minimal adverse environmental impacts on aquatic resources, separately or on a cumulative basis. Individual permits require an individual, project-specific evaluation because of the potential to have more than minimal adverse environmental impacts on aquatic resources. For an individual permit, USACE must evaluate alternatives that are practicable and reasonable. In accordance with guidelines at 40 CFR 230.10(a), a permit cannot be issued if a practicable alternative exists that has a less adverse impact on the aquatic ecosystem, provided the alternative does not have other significant adverse environmental consequences on other natural ecosystem components. The alternative with the least adverse impact on the aquatic ecosystem and no significant environmental adverse consequences is referred to as the Least Environmentally Damaging Practicable Alternative. Of the total 4.38 acres of impact to wetlands and OWUS, Alternative 5 would have approximately 0.28 acre of impact on jurisdictional wetlands and 0.03 acre of impact on OWUS. Alternative 5 would likely be permitted under a nationwide Section 404 permit. Impacts above 0.1 acre need to be mitigated, so approximately 0.31 acre of impact would be mitigated for Section 404 requirements.

A Section 10 permit is occasionally required in addition to a Section 404 permit and Section 401 water quality certification (discussed in *Section 3.14*) when work is being done in, over, or under a navigable

water of the US. No waterways in the Project Area are designated as navigable; therefore, a Section 10 permit would not be required.

Under EO 11990, 0.57 acre of impact on wetlands would need to be mitigated. A total of 0.60 acre would be mitigated to meet the requirements for Section 404 and EO 11990. Mitigation would occur through a local mitigation bank, North Central Mitigation, at the Upper Big Sioux site. On August 25, 2020, the availability of credits for the 0.60 acre of impacted wetland and OWUS was confirmed. All mitigation needed for EO 11990 and Section 404 would be purchased at the same time. Please see *Appendix A* for confirmation of the mitigation.

3.8.2 Mitigation Measures and Commitments

The SDDOT and City would acquire credits to mitigate for the 0.60 acre from the North Central Wetland Mitigation Bank site to mitigate permanent impacts. For wetlands found not to be under USACE jurisdiction, FHWA regulations (23 CFR 777.9) would apply, and mitigation for permanent impacts on these wetlands would be required.

Table 3-12. *Summary of Wetland and Other Waters of the US Impacts for Alternative 5*

	Total Temporary Impacts (acres)	Total Permanent Impacts (acres)	USACE Jurisdiction Impacts (acres)	EO 11990 Impacts (acres)	Preamble Wetland Impacts (acres)	Mitigation Needed (acres)
Wetlands	0.36	4.35	0.28	0.57	0.01	0.57
OWUS	0.07	0.03	0.03	0.03	0.0	0.03
Total	**0.43**	**4.38**				**0.60**

Figure 3-7. *Wetlands and Other Waters of the US Impacts for Alternative 5*

3.9 WATER QUALITY

The Federal Water Pollution Control Act, commonly referred to as the Clean Water Act, provides for the establishment of water quality standards, control of discharges, development of wastewater treatment management plans and practices, prevention or minimization of the loss or degradation of surface waterbodies and groundwater, the location with regard to an aquifer or sensitive ecological area, and the regulation of other issues concerning water quality. The purpose of this section is to determine if the Project has the potential to exceed water quality standards from the discharge of surface water runoff, cause impact on the groundwater and water supply/drinking water sources, or affect wastewater treatment management plans and practices.

The Project Area is located in the Upper Big Sioux Watershed. The surface water resources in the Project Area were identified through a desktop review and include wetlands, human-made ponds, Medary Creek, unnamed tributaries to the Big Sioux River, and wetlands adjacent to the unnamed tributaries of Medary Creek and the Big Sioux River. Medary Creek is a large perennial stream that flows through the southeastern corner of the Project Area. Please refer to *Section 3.11, Figure 3-8* to see the location of Medary Creek.

The residences and businesses within the Project Area receive their drinking water through Brookings Municipal Utilities. The City receives its water supply from the Big Sioux Aquifer and the wells are located outside of the Project Area. The Big Sioux Aquifer covers an area of approximately 20 square miles, with a drainage area of approximately 100 square miles. The drainage area provides an average recharge of water into the aquifer of 9 billion gallons annually (Brookings Municipal Utilities 2020). The East Water Plant is located in the Project Area and provides up to four million gallons of treated water a day (Brookings Municipal Utilities 2020).

3.9.1 Environmental Consequences

3.9.1.1 No-Build Alternative

Under the No-Build Alternative, increased disturbance from site clearing, excavation, and construction activities for the Project would not occur, resulting in less opportunity for surface water or groundwater impacts in the Project Area.

3.9.1.2 Build Alternative

For Alternative 5, the surface water runoff would increase after construction is completed, due to the additional surface area of 20th Street South and the interchange in comparison to the existing roadway system. Pollutant load would increase in the Project Area as a result of increased traffic volumes from a new roadway and interchange. Requirements of the National Pollutant Discharge Elimination System (NPDES) General Permit for Stormwater Discharges Associated with Construction Activities would limit erosion during construction, and limit post-construction erosion (typically achieved through re-establishment of vegetation and use of structural devices such as berms and energy dissipation structures). One or more NPDES permits, as required, would be acquired and abided by for the Project. Best management practices (BMPs) would be implemented through the General Permit to minimize impacts on wetlands and identified OWUS in the Project Area, as well as streams further downstream such as Medary Creek, unnamed tributaries of the Big Sioux River, and the Big Sioux River.

Coordination occurred with the SDDENR Surface Water Quality Division, and the office responded on April 7, 2020, with no objection to the Project. Specific requirements were noted for the Project regarding surface waters and are included in *Section 3.9.1*. Alternative 5 is anticipated to have minor, adverse effects on water quality because of the slight increase in impervious areas in the Project Area.

3.9.2 Mitigation Measures and Commitments

All fill material shall be free of substances in quantities, concentrations, or combinations that are toxic to aquatic life.

A project specific sediment, erosion control, and spill prevention measures would need to be developed during final design and included within the plans and specifications. The Stormwater Pollution Prevention Plan (SWPPP) would incorporate SDDOT and the City's standard BMPs for velocity dissipation, revegetation, stabilization, etc. that the contractor would comply with.

Removal of vegetation shall be confined to those areas necessary for construction.

At a minimum, and regardless of project size, appropriate erosion and sediment control measures must be installed to control the discharge of the pollutants from the construction site. Any construction activity that disturbs an area of 1 or more acres of land must have authorization under the NPDES General Permit for Stormwater Discharges Associated with Construction Activities. The permit can be obtained through coordination with SDDENR.

All material identified in the permit application as removed waste material, material stockpiles, and dredged or excavated material shall be placed for either temporary or permanent disposal in an upland site that is not a wetland, and measures shall be taken to ensure that the material cannot enter the watercourse through erosion or any other means.

Methods shall be implemented to minimize the spillage of petroleum, oils, and lubricants used in vehicles during construction activities. If a discharge does occur, suitable containment procedures such as banking or diking shall be used to prevent entry of these materials into a waterway.

All newly created and disturbed areas above the ordinary high-water mark that are not riprapped shall be seeded or otherwise revegetated to protect against erosion.

Waters of the state are located in the Project Area and are protected under Administrative Rules of South Dakota Chapter 74:51 (SDDENR 2020). Special construction measures may have to be taken to ensure that water quality is not impacted.

If construction dewatering is required, the Contractor shall obtain the General Permit for Temporary Discharge Activities from the SDDENR Surface Water Program. The Contractor shall provide a copy of the approved permit to the Project Engineer.

Any groundwater wells would be confirmed during physical survey and, if impacted, would be properly capped and sealed. Any impacted wells and connections would be replaced for properties that were not

fully acquired. It is anticipated that Alternative 5 would not impact the water resources in the area due to the incorporation of BMPs into final design and construction.

3.10 VEGETATION, FISH, AND WILDLIFE

Although wildlife habitat is limited in the Project Area because of the presence of existing roads, development, and mining operations, several species may use the close-cropped lawn and ditch areas to fulfill all or a portion of their life requirements, such as home territory, nesting habitat, or foraging habitat. Bird species such as western meadowlark, horned larks, eastern kingbird, barn swallows, song sparrows, American robin, mourning doves, and killdeer commonly use open grassland communities for home territories, nesting, or foraging. Although species such as meadowlarks, horned larks, and kingbirds are considered grassland species, they are also considered habitat generalists and can use grassland, brushy habitats, semi-forested habitats, or rural and urban habitats. In addition to the bird species listed above, several common small rodents, such as meadow voles, grasshopper mice, prairie deer mouse, thirteen lined ground squirrels, and jackrabbits, could also use the grassy portions of the Project Area. With the presence of the species listed above, several predatory species would be expected to also use the Project Area, including red-tailed hawks, red fox, coyote, striped skunk, and raccoons.

The Project Area is largely within maintained interstate and urbanized ROW in areas of previous development and disturbance. The Project would not impact fish habitat or Medary Creek. During a habitat review conducted during the wetland delineation, suitable habitat areas for the northern long-eared bat and raptor species were noted. Suitable trees that may provide habitat for the northern long-eared bat were observed in the Project Area and will be discussed further in *Section 3.12*. No raptor nests were observed in the Project Area.

During the development of this EA, coordination occurred with SDGFP and the US Fish and Wildlife Service (USFWS). This coordination was in effort to characterize the habitats for the vegetation, fish, and wildlife located in the Project Area, and to understand resource agency issues concerning the Project. SDGFP did not identify any occurrences of state-listed threatened, endangered, or rare species in the Project Area (SDGFP 2020). Further consideration of state- and Federal listed threatened and endangered species is discussed in *Section 3.12*.

3.10.1 Environmental Consequences

3.10.1.1 No-Build Alternative

No temporary or permanent impacts on vegetation, fish, and wildlife would occur under the No-Build Alternative.

3.10.1.2 Build Alternative

Alternative 5 would have a negligible effect on the vegetation, fish, and wildlife populations in the Project Area. Habitat in the area is currently disturbed, and similar areas are available throughout the Project Area. *Table 3-13* identifies the habitat types found in the Project Area and lists the potential impacts on these areas under Alternative 5. SDGFP recommended minimum disturbance of wetland and riparian areas, and implementation of a site-specific sediment and erosion control plan (SDGFP 2020). Specific commitments are included in *Section 3.10.2*.

Table 3-13. *Habitat Types*

Habitat Type	Description	Impact Type under Alternative 5
Agricultural lands	Agricultural lands include cropland and pastureland.	Agricultural lands would be directly impacted from the acquisition of ROW. Minimal impacts outside of the acquired ROW would occur.
Wetlands	Wetlands occur in the Project Area as drainageways, intermittent streams, human-made basins, and prairie potholes.	Direct impacts on wetlands would be mitigated. The types of wetlands in the Project Area vary. Before construction, a USACE Section 404 permit would be obtained for any required fill areas within wetland areas.
Medary Creek	Medary Creek is a tributary of the Big Sioux River and provides habitat for fish and other aquatic species.	Because of the location of Medary Creek in the southeastern corner of the Project Area, impacts are not anticipated.
Roadside ditches	Roadside ditches provide grassland and, in some cases, wetland habitat.	Roadside ditches and new median/off-ramp/on-ramp areas would be maintained in the interchange and within the 20th Street South alignment.
Human-made open water features	Several human-made open water features exist in the Project Area and are associated with various sand, gravel, or construction businesses.	The pond in the southwest quadrant of the interchange would be impacted. Minor effects on the large pond on the northeast quadrant would occur.

3.10.2 Mitigation Measures and Commitments

Disturbance of riparian and wetland areas should be kept to an absolute minimum.

If riparian vegetation is lost, it should be quantified and replaced on site. Seeding of indigenous species should occur immediately after construction to reduce sediment and erosion.

A site-specific sediment erosion control plan should be implemented to provide interim control prior to re-establishing permanent vegetation cover on the disturbed site.

3.11 FLOODPLAIN

EO 11988, Floodplain Management (May 24, 1977), directs federal agencies to reduce the risk of flood loss; minimize the impact of floods on human safety, health, and welfare; and restore and preserve the natural and beneficial values served by floodplains. Order DOT 5650.2 contains USDOT policies and procedures for implementing EO 11988 (USDOT 1979). Agencies are required to show there is no practical alternative before taking action that would have a significant encroachment on a 100-year floodplain. In terms of NEPA, a significant encroachment would occur when the proposed action would have notable adverse impacts on the natural and beneficial values of the floodplain.

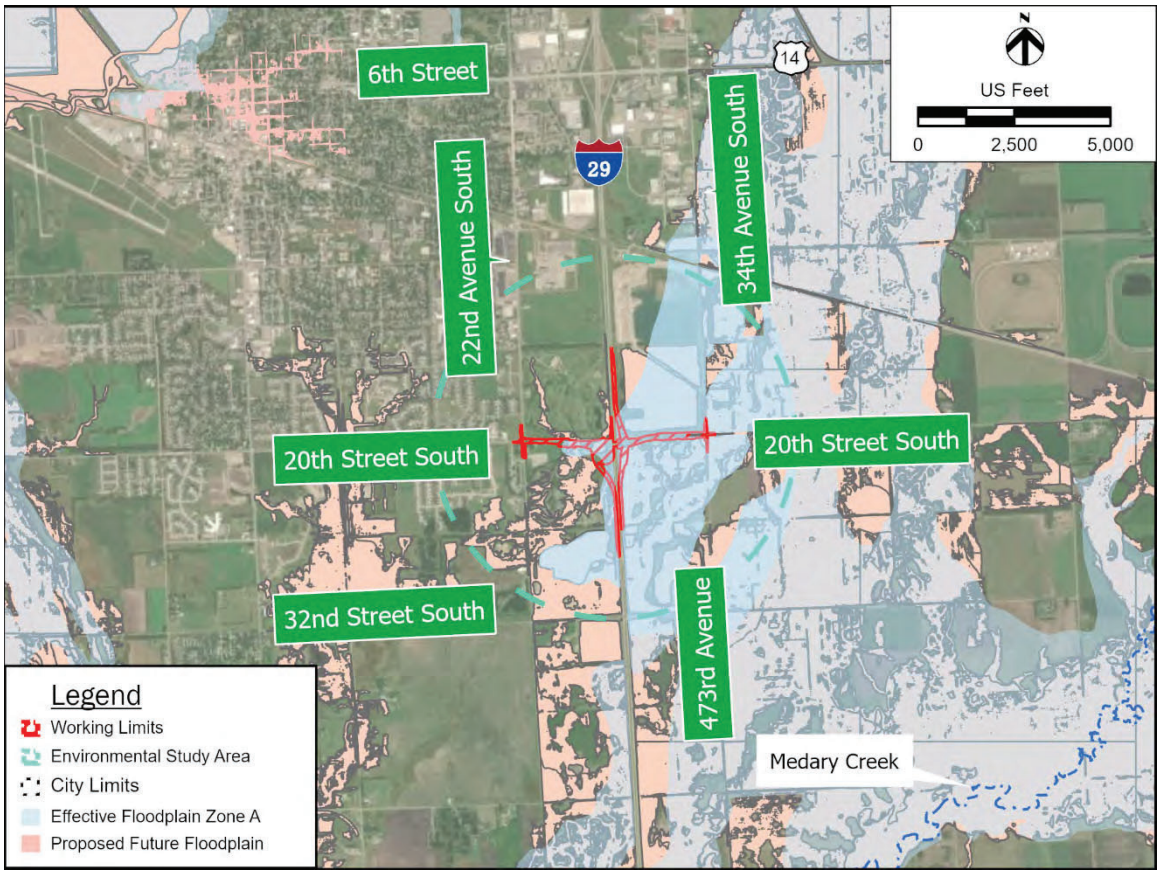
Floodplains are defined as that portion of lowland and flat area adjoining waters subject to a 1 percent or greater chance of flooding in any given year (i.e., a 100-year flood event). Floodplains are regulated by the Federal Emergency Management Agency (FEMA), which has designated Community Floodplain Administrators who fundamentally work to effectively manage the floodplain resources, manage floodplain risk, and mitigate flood risk for their communities. In general, the administrator is responsible

for ensuring that development activities comply with the floodplain management regulations and other applicable codes and ordinances.

FEMA floodplain data were reviewed for the Project Area to determine potential impacts. The current Flood Insurance Rate Map shows the 100-year floodplain under the designation of Zone A Special Flood Hazard Area (SFHA). Because detailed hydraulic analyses have not been performed for Zone A SFHA, no base flood elevations or flood depths are known. Recently, Base Level Engineering (BLE) data have been completed for this area. The BLE produces more detailed boundaries by using high-resolution ground elevation data and improved engineering models and flood hazard data. This BLE is anticipated to be incorporated as an updated Flood Insurance Rate Map (FIRM) in the future, anticipated to be adopted in 2025. Please refer to *Figure 3-8* for both the effective Zone A SFHA floodplain and the proposed future floodplain, which is the BLE.

This Project is within a joint jurisdictional area due to the location within the City limits and in Brookings County. Therefore, coordination occurred with the City and County Community Floodplain Administrators. Meetings were held with the Floodplain Administrators on June 10, 2020 and June 23, 2020. Please refer to *Appendix D* for the meeting minutes. During these meetings, the use of the BLE data was confirmed, as well as the intention of this information to later be utilized to develop the FIRM.

Figure 3-8. *Floodplain*



3.11.1 Environmental Consequences

3.11.1.1 No-Build Alternative

The No-Build Alternative would not change the relationship between the existing roads and the floodplain. Therefore, there would be no floodplain impacts associated with the No-Build Alternative as compared to the existing conditions.

3.11.1.2 Build Alternative

Alternative 5 would cross of the FEMA effective Zone A SFHA floodplain, approximately 855.48 acres within the Environmental Study Area and 36.57 acres within the proposed working limits. To determine the effects of Alternative 5 on the floodplain, the BLE data and mapping were used. The proposed 20th Street South alignment would cross the BLE mapped areas at a few crossings, and in these crossings, fill would occur. The opening of the existing culvert on the east side of I-29 would remain a similar size. The modeling completed showed that the rise would be less than 1 foot; therefore, it is anticipated that Alternative 5 would have a minor, adverse impact on the floodplain.

Coordination occurred with the City and Brookings County Community Floodplain Administrators, and the administrators concurred that Alternative 5 would have minimal impacts on the floodplain. The BLE information utilized for modeling will be refined in the future and utilized to revise the FIRMs. The timeline on this is approximately two to four years. The City and Brookings County Community Floodplain

Administrators indicated a Conditional Letter of Map Revision (CLOMR) is not requested due to the minimal impacts, based on modeling utilizing the BLE information that will be utilized to create the updated FIRM. As design advances, efforts would be made to reduce the impact on the floodplain.

3.11.2 Mitigation Measures and Commitments

During final design, a Floodplain Development Permit would be acquired and coordinated through the City and Brookings County. The City and Brookings County Floodplain Administrators do have the authority to require a Letter of Map Revision (LOMR) within six months of Project completion.

3.12 THREATENED AND ENDANGERED SPECIES

Section 7 of the Endangered Species Act, as amended, applies to federal actions and sets forth requirements for consultation to determine if the proposed action may affect a threatened or endangered species. If a threatened or endangered species or its critical habitat may be affected, Section 7(a)(2) of the Endangered Species Act requires the federal lead agency to consult with USFWS or the National Marine Fisheries Service, as appropriate, to ensure that the project does not jeopardize the continued existence of the affected species. Threatened, endangered, candidate, and proposed state-listed animal and plant species and their habitats that exist in the affected environment must also be considered. Plant or animal species with special status are also included.

A search of the USFWS Information for Planning and Consultation (IPaC) database (Consultation Code 06E14000-2020-SLI-0642) indicated that four threatened and one endangered listed species may be present (USFWS 2020a). During the wetland delineation, a habitat review was also completed to identify potential habitat for listed species. The habitat assessment occurred in the wetland delineation survey area for a description of that survey is in *Section 3.8*. The threatened and endangered species that may be present in the Project Area are the following:

- **Northern long-eared bat (*Myotis septentrionalis*) – threatened status:** The northern long-eared bat is a medium-sized bat that occurs across the central, eastern, and northern portions of the United States and across Canada. It is one of the species of bats most impacted by white-nose syndrome. The western population of the northern long-eared bat occurs in several states, including South Dakota. The species commonly roosts singly or in colonies in the trees of forested areas and, to a lesser extent, in caves, mines, and structures (USFWS 2020b). Potential habitat for the northern long-eared bat was identified based on the presence of trees within the survey area.

- **Rufa red knot (*Calidris canutus rufa*) – threatened status:** The rufa red knot is a medium-sized shorebird and makes one of the longest-distance migrations known, migrating up to 19,000 miles annually (USFWS 2013). The red knot's "unique and impressive life history depends on suitable habitat, food, and weather conditions…[at] sites across the Western Hemisphere, from the extreme south of [Brazil] to the far north of the central Canadian Arctic" (USFWS 2019a). While most red knots follow migration routes along the east or west coasts of North America, small numbers of this species follow an inland migration route, which may include stopovers in the Great Plains (USFWS 2013), including South Dakota. Preferred stopover habitat includes gravely or sandy beaches, tidal mudflats, salt marshes, shallow coastal impoundments, and peat

banks. Stopovers are defined as places where migrant birds stop to rest, drink, and eat during migration or after long flights (USFWS 2014a). There are no suitable sand or gravel bars, tidal mud flats, salt marshes, or peat banks in the survey area.

- **Dakota skipper (*Hesperia dacotae*) – threatened status:** The Dakota skipper is a small butterfly that relies on healthy native prairie within its current range of North Dakota, South Dakota, Minnesota, Manitoba, and Saskatchewan to complete its life cycle (USFWS 2014b). The Dakota skipper overwinters as larvae in shelters at ground level, relying on medium-stature native grasses, such as prairie dropseed (*Sporobolus heterolepis*), little bluestem (*Schizachyrium scoparium*), and sideoats grama (*Bouteloua curtipendula*) for growth and survival to complete one generation per year. The adult Dakota skipper requires a diversity of flowering forbs as a nectar source during its flight period from late June to early or mid-July. Two preferred adult habitat types have been identified throughout the range of the Dakota skipper, consisting of moist bluestem prairie (Type A) and upland mixed-grass prairie (Type B; USFWS 2018). Critical habitat for the Dakota skipper was designated by USFWS in 2015. Because the Project would occur in a highly disturbed road corridor, there is no suitable habitat or designated critical habitat in the survey area.

- **Poweshiek skipperling (*Oarisma poweshiek*) – endangered status:** Poweshiek skipperlings are small butterflies historically found in remnants of high-quality tallgrass and mixed grass native prairie in Iowa, Minnesota, North Dakota, South Dakota, and Wisconsin, and in fens in Michigan. Within the last 10 years, the species may have been extirpated from the Dakotas, Minnesota, and Iowa. Long-term survival of the species may now be dependent on the smaller, more isolated populations at the periphery of its range in Michigan and Wisconsin (USFWS 2019b). Because the Project would occur in a highly disturbed road corridor, there is no suitable habitat or designated critical habitat in the survey area.

- **Western prairie fringed orchid (*Platanthera praeclara*) – threatened status:** Western prairie fringed orchids occur west of the Mississippi River and currently occur in Iowa, Kansas, Minnesota, Nebraska, North Dakota, and Manitoba, Canada. Preferential habitat includes wet, unplowed tallgrass prairies and meadows; however, western prairie fringed orchids have been found in fields and roadside ditches. Habitat loss and degradation, primarily through conversion to cropland, is the greatest threat to the orchid (USFWS 2019c). Because the Project would occur in a highly disturbed area, it is unlikely that native tallgrass prairie habitats or wet meadows suitable for populations of western prairie fringed orchid exist in the survey area.

State threatened or endangered species and species of management concern (designated species that require both control and protection) are regulated under South Dakota Statutes 34A-8 and 34A-8A, respectively. SDGFP maintains a list of species determined to be threatened or endangered in South Dakota. During coordination with SDGFP, the agency noted that no occurrences of threatened, endangered, or rare species were documented in the Project Area.

3.12.1 Environmental Consequences

3.12.1.1 No-Build Alternatives

The No-Build Alternative maintains the Project Area as is, with no construction of an interchange occurring. The No-Build Alternative would not change the relationship between the existing roads and threatened or endangered species. Therefore, there would be no effects on threatened or endangered species associated with the No-Build Alternative as compared to the existing conditions.

3.12.1.2 Build Alternative

As discussed in *Section 3.12*, no suitable habitat for the following listed species was identified in the survey area: Rufa red knot, Dakota skipper, poweshiek skipperling, and western prairie fringed orchid. Therefore, based on lack of suitable habitat, Alternative 5 is anticipated to have no effect on these species. Potential habitat areas were identified and are shown in *Appendix A*. On September 17, 2020, USFWS concurred that the Alternative 5 would not adversely affect listed species.

3.12.2 Mitigation Measures and Commitments

Project activities that include tree removal, structure work, and/or work within 150 feet of a potential maternity roost tree should not occur between November 1st and March 31st. Potential roosting tree areas are shown in *Appendix A*.

3.13 CULTURAL RESOURCES

Historical, architectural, archaeological, and cultural resources that would be affected by federally funded/licensed undertakings come under the protection of the National Historic Preservation Act of 1966 (16 United States Code 470), as amended. Section 106 of this act requires federal agencies to consider the effects of such undertakings on properties listed, or eligible for listing, in the National Register of Historic Places (NRHP). Regulations related to this process are described in 36 CFR Part 800, Protection of Historic Properties. A broader range of cultural resources comes under the protection of Section 4(f) of the USDOT Act of 1966, which requires projects funded by USDOT to avoid significant historic sites unless there is no "feasible and prudent" alternative. In general, this provision applies to resources that are listed, or eligible for listing, in the NRHP. However, at the discretion of USDOT, Section 4(f) protection may also be extended to properties that do not meet NRHP criteria as long as the responsible jurisdiction advocates Section 4(f) status.

The area of potential effect (APE) is the geographic area or areas within which an undertaking may cause changes in the character or use of historic properties or archaeological sites. A potential effect is found when an undertaking may alter, directly or indirectly, any of the characteristics of a historic property that qualify the property for listing in the NRHP in a manner that would diminish the integrity of the property's location, design, setting, materials, workmanship, feeling, or association. Examples of adverse effects include physical damage or alteration of the property, change of the character of the property's use or of physical features within its setting that contribute to its historical significance, and introduction of visual, atmospheric or audible elements that diminish the integrity of the property's significant historic features.

Therefore, the APE for historic properties is the area that contains a property that would be acquired or physically disturbed to the extent that its current use may be affected, or that would be significantly

visually affected by the alternatives under consideration. For archaeological sites, the APE is the area where the ground could be disturbed as a direct or indirect consequence of the alternatives under consideration.

A Level I records search was completed for the Environmental Study Area. No historic structures listed in the NRHP were noted in the records search. Five potential historic structures were noted during the records search that were further investigated:

- The first structure is located at 2008 22nd Street South and met the minimum age requirements (50 years old) for the NRHP, but the structure is altered from its original condition and is recommended not eligible for listing in the NRHP.

- The second structure is located at 2015 22nd Street South and was built in 1916 but has been altered from its original condition. Therefore, the structure is recommended not eligible for listing in the NRHP.

- No evidence of the three remaining structures in the southeast quarter of Section 31, Township 110N, and Range 49W were observed. A gravel quarry is now at this location.

Seven mobile homes are located within the APE. These structures do not meet the minimum age requirements for listing in the NRHP; therefore, none of these structures are eligible for listing in the NRHP.

One considered structure, which appeared to previously have been a former church, was moved to 2319 22nd Avenue South. This building was moved to this location between 1981 and 1991. Because of the structure's relocation and significant alterations, this building is recommended not eligible for listing in the NRHP (Kogel 2020a).

A Level III cultural resources survey was completed in the APE in June through August, 2020. A series of shovel tests were excavated in portions of the APE that appeared to be undisturbed from previous development. No archeological sites were identified within the APE (Kogel 2020b).

3.13.1 Environmental Consequences

3.13.1.1 No-Build Alternative

The No-Build Alternative would not impact historic structures or archaeological sites in the Project Area. However, other anticipated development in this area would have the potential to affect cultural resources.

3.13.1.2 Build Alternative

No historic properties or archeological sites were identified within the APE. Therefore, a determination of no historic properties affected was recommended in the Level III cultural resources report (Kogel 2020b). A letter from SDDOT was sent to the State Historical Preservation Office (SHPO) on September 8, 2020, recommending an effect determination of no historic properties affected. On September 9, 2020, SHPO responded by concurring with the effect determination of no historic properties effected.

3.13.2 Mitigation Measures and Commitments

No mitigation measures or commitments are required for cultural resources.

3.14 REGULATED MATERIALS

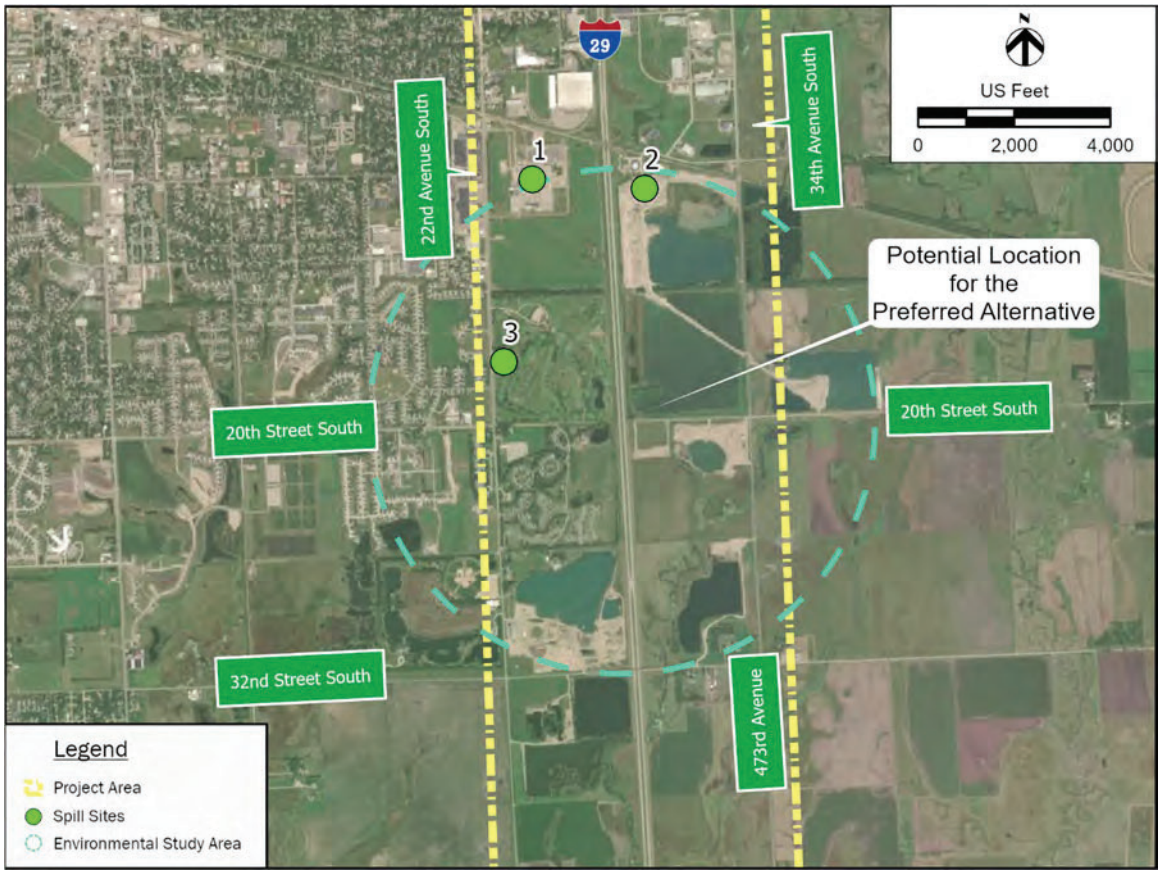
Facilities and properties that have had documented releases of hazardous substances or wastes to the environment, or that manage hazardous substances or wastes in substantial quantities and have the potential to release hazardous substances or wastes in substantial quantities to the environment, are required to report these activities to federal and state regulatory agencies. USEPA and SDDENR maintain databases to track and monitor these facilities and properties. Contaminated, or potentially contaminated, properties are a concern for transportation projects because of the associated liability of the safety concerns related to exposure to contaminated soil, surface water, or groundwater. A review of the SDDENR database that contains information on aboveground storage tanks (AST), underground storage tanks (UST), spill sites, and superfund sites was completed for the Environmental Study Area (SDDENR n.d.). In addition, a windshield survey was completed on June 8, 2020, to visit the site locations from the database review and to review the area that would potentially be disturbed by Project construction to determine if other sites of concern were present. Please refer to *Table 3-14* for a list of the sites identified in the Environmental Study Area, and *Figure 3-9* for the locations of the sites.

Table 3-14. *Regulated Materials in Environmental Study Area*

Map ID	Facility Name	Reason for Listing[a]	Location
1	3M Manufacturing	UST, AST, Spill Sites	601 22nd Avenue South, Brookings, SD 57006
2	L.G. Everist, Inc.	UST	912 34th Avenue South, Brookings, SD 57006
3	Edgebrook Golf Course	UST	1415 22nd Avenue South, Brookings, SD 57006

a UST = underground storage tank; AST = aboveground storage tank

Figure 3-9. *Regulated Materials*



3.14.1 Environmental Consequences

3.14.1.1 No-Build Alternative

The No-Build Alternative would not impact regulated materials in the Environmental Study Area.

3.14.1.2 Build Alternative

Sites listed in *Table 3-14* are not anticipated to be affected by, or to affect, the Project because either the site is listed as closed or the hazardous release has been remediated and approved of by SDDENR. A closed site means that an AST or UST was removed or decommissioned. The following list describes each site, identifies the potential for impact, and if applicable, provides recommendations for further investigation. Known ASTs, USTs, and spill sites within the Environmental Study Area include the following (SDDENR n.d.):

- **Site 1 – 3M Manufacturing – UST leak (fuel oil):** 3M is one of the industrial areas nearest to the Environmental Study Area. SDDENR (formerly South Dakota Department of Water and Natural Resources), reported discovery of discolored soil near the UST. SDDENR advised 3M to remediate the contaminated soil and repair the existing UST. 3M mitigated further contamination release, repaired the UST, and installed a cathodic protection system to monitor

corrosion. SDDENR approved the site to continue operation in 1991 with no further action required. Therefore, the Project would not affect or be affected by the UST on Site 1.

- **Site 1 – 3M Manufacturing – AST leak (petroleum):** SDDENR reported that laboratory results of samples taken beneath the AST revealed low concentrations of petroleum contamination. SDDENR requested that the contaminated soil be disposed of at a permitted landfill. 3M remediated the contaminated soil, and the AST was removed from the site. SDDENR closed the site in 2017 with no further action required. Therefore, the Project would not affect or be affected by the AST on Site 1.

- **Site 1 – 3M Manufacturing – Spill sites:** SDDENR reported 12 hazardous spill instances at the 3M facility: fuel oil (multiple releases), Roplex (pesticide), heating fuel, toluene-based adhesive, rubber adhesive, heptane, and latex adhesive. The risk for contamination is likely minimal because of the approved remediation of the spill sites. Therefore, no further action is required, and the Project would not affect or be affected by the spill sites on Site 1.

- **Site 2 – L.G. Everist, Inc. – UST leak (diesel fuel):** L.G. Everist excavated and removed the UST from the site in 1988. Twin City Testing Corporation tested the soil, revealing petroleum contaminates from the UST, and SDDENR requested 1 year of quarterly reports for proper soil remediation standards and groundwater impact. In 1991, SDDENR noted that the remaining contamination has not exceeded state soil remediation standards, and groundwater impact did appear to occur. SDDENR closed the site in 1991 with no further action required. Therefore, the Project would not affect or be affected by Site 2.

- **Site 3 – Edgebrook Golf Course – UST removal (petroleum):** In 1990, Geotek Engineering conducted site observation, testing of the UST removal, and remediation through proper soil disposal and soil testing. The UST removed from the site was observed to be in good condition, and all field testing of the excavation showed no detectable petroleum contamination. Therefore, no further action is required, and the Project would not affect or be affected by Site 3.

3.14.2 Mitigation Measures and Commitments

To avoid and/or minimize impacts on regulated materials sites in the Environmental Study Area, a construction BMP would be implemented. The Contractor should be alert for large areas of soil staining, buried drums, ASTs, and USTs, and should coordinate with SDDOT and SDDENR if any obvious contamination is found prior to continuing work in those areas.

3.15 VISUAL IMPACTS AND AESTHETICS

The visual landscape of the Project Area is composed primarily of residential housing, Edgebrook Golf Course, an industrial park on the east side of I-29, commercial businesses along 6th Street, a railroad, the existing transportation system, water resources, and agricultural fields. In addition, the visual landscape in the Project Area includes the 3M manufacturing plant, Mickelson Middle School, and the Boys and Girls Club.

I-29 runs north-south through the center of the Project Area. East of I-29, 20th Street South dead-ends at the eastern boundary of I-29, and west of I-29, 20th Street South ends 0.25 mile west of I-29. The area

bordering the east side of I-29 along 20th Street South consists of agricultural land, an active gravel mining operation, open water areas, and shelterbelts. West of I-29 along 20th Street, Edgebrook Golf course lies north of the road and the Western Estates mobile home court lies south of the road. Open water features are located in the northeast and southwest quadrants of the proposed interchange, as well as within Edgebrook Golf Course in the northwest quadrant of the proposed interchange.

3.15.1 Environmental Consequences

3.15.1.1 No-Build Alternative

The No-Build Alternative would not involve construction of the Project; therefore, it would not directly alter visual impacts or aesthetics. Traffic congestion currently presents a visual intrusion in the area and would continue to increase without the Project.

3.15.1.2 Build Alternative

Alternative 5 would involve constructing a new interchange in an area that has been previously disturbed by mining, development, and the existing transportation system. Therefore, the visual direct impact would be negligible for the area. Alternative 5 would reconstruct 20th Street South adjacent to the golf course and across I-29. A row of trees would be left in place and would block the view of the roadway from the eastern portion of Edgebrook Golf Course when facing the roadway. Overall, Alternative 5 would have a minor, adverse effect on the viewshed from the golf course.

3.15.2 Mitigation Measures and Commitments

No mitigation measures or commitments are required for visual impacts and aesthetics.

3.16 ENVIRONMENTAL JUSTICE

EO 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations (February 11, 1994), requires each federal agency to "make achieving 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." Also, USDOT and FHWA issued the following guidance addressing minority, low-income, and vulnerable age populations and how they should be considered during planning for transportation projects:

- USDOT Updated Environmental Justice Order 5610.2(a), Final DOT Environmental Justice Order, issued May 2, 2012

- FHWA Order 6640.23A, FHWA Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, issued June 14, 2012

There is also federal guidance regarding coordination with populations that have difficulty understanding English. EO 13166, Improving Access to Services for Persons with Limited English Proficiency (August 11, 2000) requires federal agencies to examine the services they provide, identify any need for services to those with limited English proficiency (LEP), and develop and implement a system to provide those services so persons with LEP can have meaningful access.

Data on minorities, languages spoken, and age groups from the 2010 US Census, and data on income from the 2011 5-year average American Community Survey (part of the US Census) were analyzed to determine the characteristics (that is, minority, age, and income) of the population in and near the Project Area. Data were analyzed to the smallest geographic unit available (i.e., census block for minority and age, and census block group for income and languages spoken) were analyzed to determine the percentage of individuals for whom English is not their primary language. The geographic area of census block groups extend beyond the boundaries of the Project Area; therefore, the total population of the census blocks analyzed for the Project Area is somewhat larger than the actual population in the Project Area. A technical memorandum regarding environmental justice was developed that discusses the methodology of the analysis, presents tables of population characteristics, and discusses environmental justice findings (HDR 2020b). Please refer to *Appendix E* for the technical memorandum.

Estimated demographic, housing, employment, race, and poverty data for Brookings County and the Project Area were derived from the US Census data and are summarized in *Tables 3-15 and 3-16.* Statistics from the Project Area were compared to Brookings County to identify environmental justice populations, as follows:

- **Minority Populations:** The total number of minorities in the Project Area was determined to be 253, of which 43 identified as Hispanic origin. The percentage of minority populations within the Project Area (9.0 percent) is substantially greater (greater than 40 percent more) than that of the percentage within Brookings County (6.3 percent). Of the 95 census blocks in the City, 46 were populated and 20 had at least one minority individual. Only two census blocks met the threshold of having substantial populations with more than 10 minority individuals and include 169 of the total 253 minority individuals within the Project Area. Of the 169 minorities in those two census blocks, 155 were in one census block. The two census blocks with substantial minority populations are the following and are shown in *Figure 3-10*:
    - Census Block 2060, Census Tract 9590 (14 minorities, all of whom are Hispanic)
    - Census Block 5014, Census Tract 9589 (155 minorities, of whom 42 are Black, 7 are American Indian, 94 are Asian, and 12 are Hispanic)
- **Vulnerable Age Populations:** The percentage of elderly persons in the Project Area is greater, but not substantially greater, than the percentage in Brookings County. The proportion of children in the Project Area is less than in Brookings County. However, readily identifiable groups and substantial clusters of elderly populations and children were identified. Please refer to *Figure 3-10* for the locations of the vulnerable populations.
- **Low-Income Populations:** Overall, the percentage of low-income populations is lower in the Project Area than in Brookings County. However, Block Group 5, Census Tract 9589 contains a substantial low-income population. This population lives in high-density, multi-family residential units north of 6th Street and west of I-29, including university campus housing. Please refer to *Figure 3-10* for the location of this low-income population.

Table 3-15. *Demographics in the Project Area*

Demographic	Brookings County	Project Area
Total Population	31,965	2,824
White	29,513	2,530
Black	246	55
American Indian and Alaska Native, Not Hispanic	272	16
Asian, Not Hispanic	866	139
Native Hawaiian and Other Pacific Islander, Not Hispanic	9	0
Hispanic	636	43
Total Minority	2,029	253
Percent Minority	6.3	9.0
Children	6,038	415
Percent Children	18.9	14.7
Elderly	3,170	371
Percent Elderly	9.9	13.1

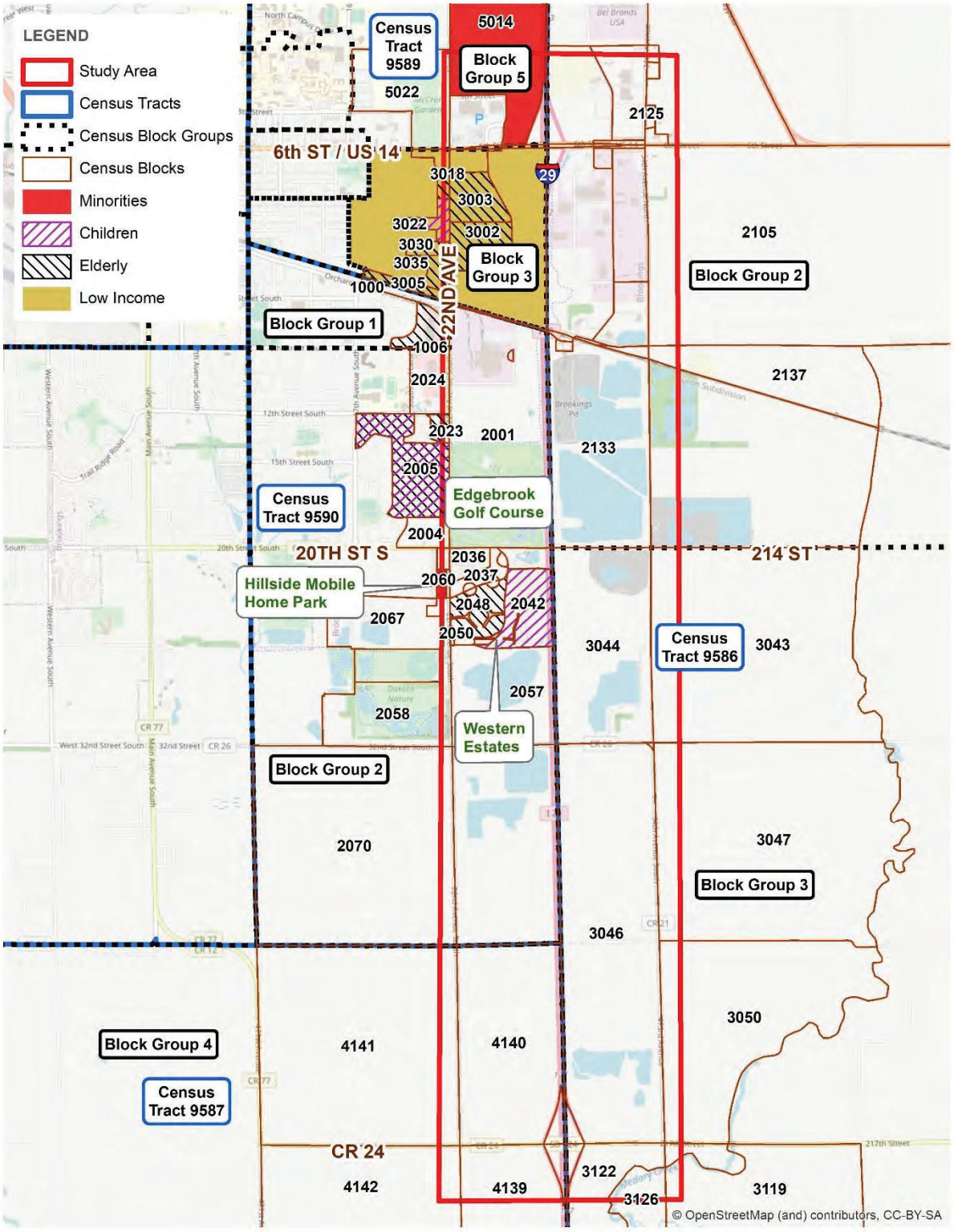
Source: US Census Bureau 2020c.

Table 3-16. *Low-Income Populations in the Project Area*

Area	Total Population	Income Below Poverty Level	Percent
Brookings County	30,791	4,735	15.4
Block Group 2, Census Tract 9586	595	105	17.6
Block Group 3, Census Tract 9586	1,103	126	11.4
Block Group 2, Census Tract 9590	4,575	459	10.0
Block Group 3, Census Tract 9589	1,497	119	7.9
Block Group 5, Census Tract 9589	1,478	555	37.6
Total Project Area	**9,428**	**390**	**14.7**

Source: US Census Bureau 2020d.

Figure 3-10. *Environmental Justice Populations in the Project Area*



3.16.1 Environmental Consequences

3.16.1.1 No-Build Alternative

For the No-Build Alternative, the environmental justice populations would not experience a disproportionately high or adverse effect and would be similarly affected as other populations.

3.16.1.2 Build Alternative

Vulnerable populations—elderly and children—were identified in the Western Estates mobile home park south of the proposed construction limits of Alternative 5. Within the proposed construction limits, five modular homes would be acquired or relocated under Alternative 5, which would be a direct, adverse impact. Alternative 5 would have an indirect, beneficial effect by improving the roadway system and access to this residential area.

One low-income population is present in high-density, multi-family housing south of 6th Street and west of I-29. No direct, adverse impacts would occur in this area. The low-income population in this area would receive an indirect, beneficial effect from the Project reducing the traffic congestion on 6th Street.

As discussed above, potential direct impacts that would have a disproportionately high and adverse effect on minority, vulnerable age, and low-income populations in the Project Area are not apparent. The population of LEP individuals does not exceed the FHWA criteria of 5 percent for LEP outreach. Mitigation efforts do not appear to be warranted. All identified adverse impacts would be temporary, occurring only during construction. Such impacts would affect both non-protected and protected populations. The Project, upon completion, would benefit all populations.

3.16.2 Mitigation Measures and Commitments

No mitigation measures or commitments are required for environmental justice.

3.17 SECTION 4(F) AND 6(F) RESOURCES

Section 4(f) of the USDOT Act of 1966 requires the determination of whether a US Department of Transportation (USDOT) proposed project would adversely affect or occupy a Section 4(f) resource. Please refer to *Section 2.4.1.1* for background information on Section 4(f). Section 6(f) of the LWCF Act of 1965 requires approval from the National Park Service for converting lands that have been paid for in part or in entirety by LWCF grants to non-park or non-recreation uses. Please refer to *Section 2.4.1.2* for background information on Section 6(f).

In the Environmental Study Area, there are no historic properties listed, or eligible for listing, in the NRHP. Please refer to *Section 3.13*. There are several publicly owned parks and recreation areas that are open to the public, and one game production area that is open for recreational fishing, as follows and as shown in *Figure 3-11*:

- **Moriarty Park:** Moriarty Park is a 10-acre park designated as a neighborhood park in the *2030 Park Master Plan* (City of Brookings 2010). It offers a multi-purpose field, playground equipment, basketball court, picnic shelter, and restrooms. A shared use trail connects the park with the nearby neighborhoods. It is located at 17th Avenue South and Pebble Beach Drive. This area is

considered a Section 4(f) property and due to not receiving LCWF grants would not be considered a Section 6(f) property.

- **Edgebrook Golf Course:** Edgebrook Golf Course is a municipal 18-hole facility with a 9-hole junior/short course located at 1415 22nd Avenue South. It is owned and operated by the City. Fees are reviewed and set annually by the City's Park and Recreation Board and include single rounds of golf and seasonal passes. The clubhouse offers golf carts and equipment for rent as well as a pro shop. The golf course also provides professional golf lessons to youth 14 years and younger by appointment. Section 4(f) applies to the golf course because it is owned, operated, and managed by a public agency for the primary purpose of public recreation. Randy Kittle, the Grants Coordinator with the SDGFP, Division of Parks and Recreation, confirmed that three LWCF grants (46-00166, 46-00304, and 46-01035) were used to develop Edgebrook Golf Course and that the entire boundary of the golf course is protected under Section 6(f) for public outdoor recreation (R. Kittle, personal communication, March 26, 2020). Section 6(f) applies to the property boundary at the time the LWCF grant funds were used for development of the golf course.

- **Dakota Nature Park:** Dakota Nature Park, previously known as Southbrook Nature Park, is a 135-acre park and is open year-round for activities such as fishing, canoeing, paddle boarding, kayaking, bird watching, hiking, biking, picnicking, snowshoeing, cross-country skiing along groomed trails, and many other outdoor activities. Dakota Nature Park is designated as a special use park in the *2030 Park Master Plan* (City of Brookings 2010). The Larson Nature Center is in the southwest corner of the park and is used for nature education, programming, and socializing at Dakota Nature Park. Paved and primitive trails connect the chain of ponds and wetlands in the park; benches are scattered along the trails, providing opportunities for enjoying the wildlife and nature viewing. This area is considered a Section 4(f) property and, due to not receiving LCWF grants, would not be considered a Section 6(f) property.

- **Brookings County Outdoor Adventure Center:** The Brookings County Outdoor Adventure Center (BCOAC) is located off of 22nd Avenue South between the Dakota Nature Park and the SouthBrook Softball Complex. The facility is on land owned by Brookings County and houses indoor firearms and archery ranges, offering both adult and youth classes and leagues. The ranges are open to the public, but there is a fee to use the ranges. The BCOAC is also home to the South Dakota State University Extension, 4-H offices, and the SDGFP office (BCOAC 2019). This is a multi-use property and the portions of the property used for recreation would be protected under Section 4(f) but, due to not receiving LCWF grants, BCOAC would not be considered a Section 6(f) property.

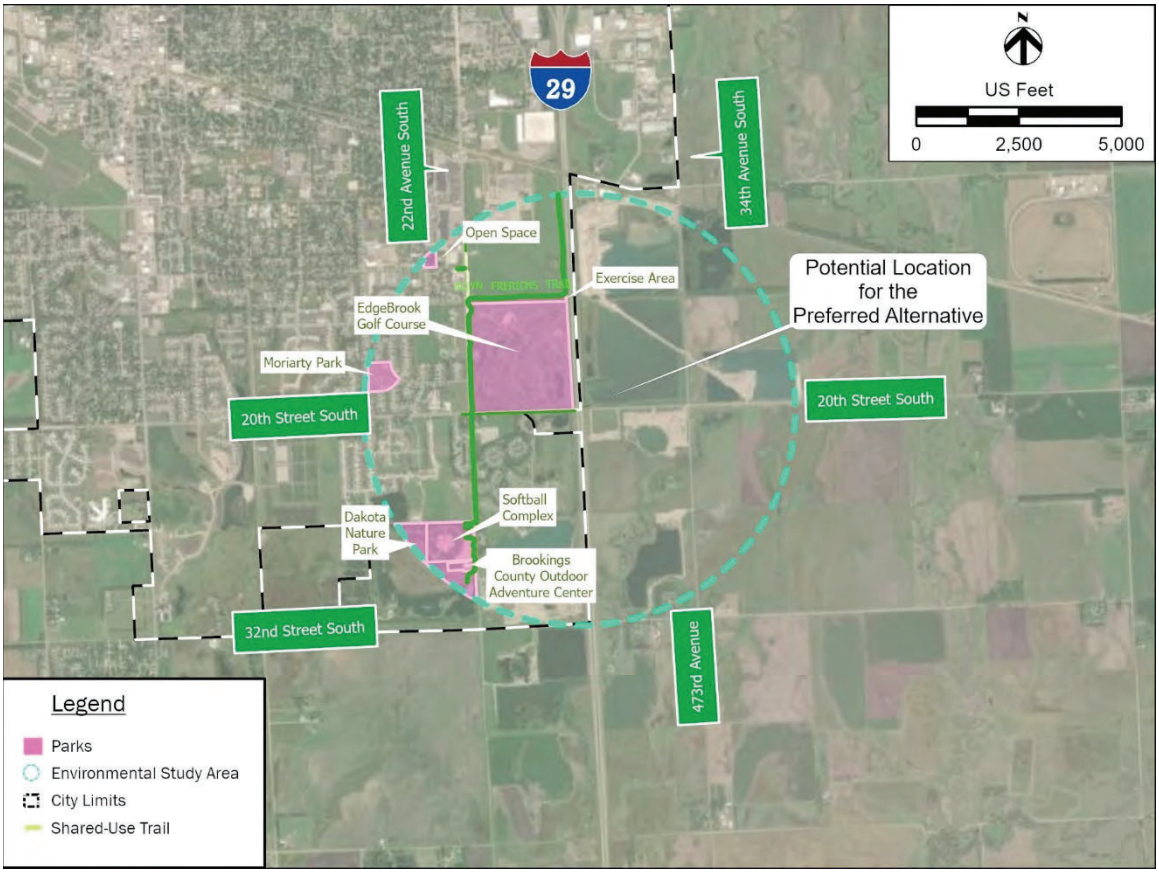
- **SouthBrook Softball Complex:** Located west of 22nd Avenue South, the SouthBrook Softball Complex consists of five lighted softball diamonds for youth, adult, and tournament play. The *2030 Park Master Plan* designated the property as a special use park (City of Brookings 2010). The SouthBrook Softball Complex includes restroom and concession facilities, a picnic shelter, aluminum bleacher seating, and an off-street gravel parking lot. The 25-acre softball complex borders Dakota Nature Park. Proposed improvements include two additional softball fields, a paved parking lot, and spectator shade canopies. The ball diamonds and the lighting were improved with LWCF grants (46-00879 and 46-00992, respectively), and provisions of

Section 6(f) apply to those improvements (R. Kittle, personal communication, March 26, 2020). This area is considered a Section 4(f) property and, due to receiving LCWF grants, would also be considered a Section 6(f) property.

- **Exercise Course**: The exercise course is located north of the Edgebrook Golf Course within the shelterbelt, south of the Allyn Frerichs Trail. The exercise course provides outdoor exercise activities along a trail. This area is considered a Section 4(f) property and, due to receiving LCWF grants, would also be considered a Section 6(f) property.

- **Allyn Frerichs Trail:** The Allyn Frerichs Trail is an existing paved, shared use trail designated and functioning primarily for recreation. The City's Parks, Recreation, and Forestry Department maintains and manages the trail and has confirmed the significance of this trail as part of its recreation system. The trail begins north of Exit 132 and continues south on the east side of I-29. The trail crosses under I-29 at the railroad tracks and then continues south until it reaches Edgebrook Golf Course. The trail turns west and goes along the north side of the golf course and then turns south and goes along the west side of the golf course, on the east side of 22nd Avenue South in the Environmental Study Area. The trail continues west through portions of the City's residential areas. It connects to several park trail systems (City of Brookings 2010). The Allyn Frerichs Trail is part of a planned 2025 Trail Loop. The loop, when complete, would provide connections to a larger system of existing and planned shared use paths that have been identified in the *City of Brookings Master Drainage Plan and Master Park Plan* (City of Brookings 2017). The trail is also under consideration as part of a potential US Bicycle Route 55 alignment (City of Brookings 2017). For more information on pedestrian and bicyclist accommodations, please refer to *Section 3.5.* The City's Parks, Recreation, and Forestry Department has confirmed that this trail is a Section 4(f) property. Section 4(f) applies to the trail because it is a publicly owned, shared use path designated and functioning primarily for recreation. Section 6(f) does not apply because the SDGFP Grants Coordinator confirmed that LWCF grant funds were not used to create the trail.

Figure 3-11. *Park and Recreational Areas and Trails*



A portion of the Environmental Study Area is outside of the City limits. Brookings County does not have any publicly owned recreation facilities. The recreation uses in Brookings County include private golf courses, racetracks, and shooting sport facilities (Brookings County Planning Commission 2016). These recreation facilities are not subject to the provisions of Section 4(f) and 6(f).

Edgebrook Golf Course and SouthBrook Softball Complex were developed and improved using LWCF grants, and the provisions of Section 6(f) apply to these properties in addition to the provisions of Section 4(f).

3.17.1 Environmental Consequences

3.17.1.1 No-Build Alternative

Under the No-Build Alternative, a new interchange on I-29 at 20th Street South would not be constructed. Identified safety concerns would remain in place. There would be no direct impacts on any of the identified Section 4(f) and 6(f) properties.

3.17.1.2 Build Alternative

Under Alternative 5, a loop ramp would be constructed in the southwest quadrant of I-29 and 20th Street South, and a standard diamond interchange would be constructed east of I-29, as shown in *Figure 2-8*. Alterative 5 would not impact Moriarty Park, Dakota Nature Park, BCOAC, and SouthBrook Softball Complex because of their distance from the construction area.

Alternative 5 would not require permanent ROW and no operations of the Edgebrook Golf Course would be impacted. A temporary easement would be needed to complete the construction of Alternative 5 along the south edge of the golf course near 20th Street. A total of 0.12 acre within the golf course property would be temporarily impacted and 0.28 acre of temporary easement would be required for construction. The area will be re-graded and reseeded to a similar or better condition once the construction of the area is complete. The minimal grading would be needed along the south edge of the golf course for the 20th Street alignment. The alignment of the proposed 20th Street has been shifted to the south, specifically to avoid impacts to the golf course. The fill slope of 20th Street alignment extends slightly into the golf course to allow the roadway to align with 22nd Avenue South. Construction within this area would be less than 6 months in duration. Predicted noise levels would increase 1.4 to 9.8 dBA over the existing condition within the Edgebrook Golf Course, which is below the threshold for a substantial increase (15 dBA or more). These increases would not be a substantial and would not reduce or remove the purpose or significance of the 4(f) property. Please see *Section 3.7* for further discussion of noise levels. In accordance with 23 CFR 774.13(d), the temporary occupancy of land associated with Edgebrook Golf Course would not constitute a use, based on the following assessment:

1. Duration must be temporary, i.e., less than the time needed for construction of the project, and there should be no change in ownership of the land;

2. Scope of the work must be minor, i.e., both the nature and the magnitude of the changes to the Section 4(f) property are minimal;

3. There are no anticipated permanent adverse physical impacts, nor will there be interference with the protected activities, features, or attributes of the property, on either a temporary or permanent basis;

4. The land being used must be fully restored, i.e., the property must be returned to a condition which is at least as good as that which existed prior to the project; and

5. There must be documented agreement of the official(s) with jurisdiction over the Section 4(f) resource regarding the above conditions.

The grading in the northeast corner of the intersection of 20th Street South and 22nd Avenue South would require reconstruction of a small segment of the Allyn Frerichs Trail. The proposed improvements would be minor and shorter in duration than the construction for the interchange of 20th Street South with I-29, and trail would be restored. At this location, noise levels would increase 3.9 dBA, which is not substantial increase. Please refer to *Section 3.7* for further discussion of noise levels. In addition, in the southeast corner of the intersection of 20th Street South and 22nd Avenue South, Alternative 5 would require the Allyn Frerichs Trail to be shifted to the east. The shift is required to construct a northbound left-turn lane on 22nd Avenue South. Please refer to *Figure 2-3*. Permanent ROW would be purchased from the adjacent private landowner to shift the trail. The shift of the trail prohibits drivers to use the trail as a through lane during peak driving times.

During construction, the trail segment north of 20th Street South would be detoured to the 22nd Avenue South west side sidewalk. The trail segment south of 20th Street South would be closed during

construction of the new trail along 22nd Avenue South. The estimated timeframe for trail closure would be one month. Once construction is complete, the overall condition of the trail in these locations will be the same or better than the current condition. Signage would be provided to direct users around the construction.

In accordance with 23 CFR 774, Alternative 5 would have a *de minimis* impact upon the Allyn Frerichs Trail based upon the following assessment:

- All possible planning to minimize harm has been incorporated into project development.
- The nature and magnitude of changes will not adversely affect the recreational activities, features, or attributes that qualified the property for 4(f) protection.
- Proposed measures to minimize harm and resulting mitigation, in regard to protecting the 4(f) property and maintaining access and safety, are considered to be reasonable and acceptable.

The City is considered the official with jurisdiction under Section 4(f) for both Edgebrook Golf Course and the Allyn Frerichs Trail. The proposed alternatives were shown to the City's Parks, Recreation, and Forestry Department on May 13, 2020. Edgebrook Golf Course was noted as a Section 4(f) and 6(f) resource, and the Allyn Frerichs Trail was noted as a Section 4(f) resource. After public review of this EA, a concurrence from the City would be requested of the proposed temporary occupancy exemption for the Edgebrook Golf Course and the *de minimis* use of the Allyn Frerichs Trail.

SDGFP, as the state agency responsible for overseeing LWCF compliance, was sent a letter from SDDOT on September 10, 2020. The letter requested concurrence that the proposed work within the golf course as part of Alternative 5 be considered a temporary non-conforming use under Section 6(f). The SDGFP concurred on September 11, 2020.

3.17.2 Mitigation Measures and Commitments

Access to the Allyn Frerichs Trail would be restricted for a period of time that is anticipated to be less than the time needed for construction. Detours would be provided where feasible and safe. Access or use of the Edgebrook Golf course would not be impacted.

Temporary construction fencing shall be installed along proposed construction limits near the Allyn Frerichs Trail and Edgebrook Golf Course prior to the start of construction activities to protect the existing 4(f) property and the public.

Appropriate signage shall be installed to alert users of the Allyn Frerichs Trail of construction activities, access restrictions or closures, and to direct users to secondary access points.

The staging and/or storage of construction equipment or materials shall not take place outside proposed construction limits that are within the defined boundaries of the 4(f) property.

The Contractor shall be required to closely coordinate the construction schedule with SDDOT and City of Brookings prior to the start of construction activities.

A temporary detour of the Allyn Frerichs Trail would be necessary for the construction of the 20th Street South and 22nd Avenue South intersection. Signage would be provided to direct users around the construction.

Revegetation and landscaping within the temporary grading area within the Edgebrook Golf Course would occur.

3.18 UTILITIES

The following utilities are located in the working limits of Alternative 5:

- **Electrical:** Brookings Municipal Utilities owns an overhead electrical line above head along 34th Avenue South. In addition, an underground electric line under 22nd Avenue South.
- **Water:** The Brookings Municipal Utilities Water Department provides Brookings with potable water. Brookings receives its water supply from underground aquifers. A well within the Big Sioux Aquifer, located 2 miles northeast of Brookings, supplies water to the Brookings Municipal Utilities Water Department; the water treatment plant is in the Project Area. A water main runs along the west side of 22nd Avenue South, crossing 20th Street South.
- **Sewer:** Wastewater is diverted to the Brookings Wastewater Treatment Plant and flows south along 22nd Avenue South and 34th Avenue South, crossing 20th Street South.
- **Fiber:** Fiber lines for internet are provided through Swiftel Communications, and several lines are located in the Project Area.

3.18.1 Environmental Consequences

3.18.1.1 No-Build Alternative

The No-Build Alternative would not involve Project construction and, therefore, would not result in temporary or permanent impacts on utilities.

3.18.1.2 Build Alternative

Alternative 5 would have temporary impacts due to the relocation of private and public utilities in the Project Area before or during construction. A utility corridor was considered. Due to the potential to expand the footprint of Alternative 5 and increase impacts to adjacent properties, was not included. To minimize the potential for impacts from the proposed Project, close coordination occurred with utility companies and the City. This coordination would continue throughout final design and into construction of the preferred alternative.

3.18.2 Mitigation Measures and Commitments

Coordination would continue to occur with the utility companies and the City during final design, and any needed commitments would be developed during the design process.

3.19 CUMULATIVE IMPACTS

This section addresses potential cumulative impacts associated with the Project. Cumulative impacts are beneficial and adverse effects that would result when impacts from the Project are considered with impacts from other local or regional projects. The Council on Environmental Quality's Regulations for Implementing the Procedural Provisions of NEPA define a cumulative impact as "the impact on the

environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions" (40 CFR 1508.7).

"Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time" (40 CFR 1508.7). They may arise from single or multiple actions and result in additive or interactive effects. Before cumulative impacts can be evaluated, a proposed action must have advanced far enough in the planning process that its implementation is reasonably foreseeable. Reasonably foreseeable actions are not speculative, are likely to occur based on reliable sources, and are typically characterized in planning documents.

3.19.1 Past, Present, and Reasonably Foreseeable Future Actions

3.19.1.1 Past Actions

Past actions that have affected resources in the Project Area include the following:

- Agricultural activity, especially the conversion of native prairie to cropland
- Commercial and industrial development occurring north of 20th Street South on both sides of I-29 and along the main arterials, 6th Street and 22nd Avenue South
- Other development occurring in the area, including roads, I-29, utilities, and residential areas
- Railroad line extending through the Project Area
- Mining activities on the east side of I-29 near 20th Street South

Past transportation improvement projects in Project Area include the following:

- **Improvements along the US 14 / 6th Street corridor from 22nd Avenue South to 34th Avenue South:** In 2017 and 2018, SDDOT and the City completed improvements to the US 14 / 6th Street corridor. The improvements included grading, pavement, curb and gutter, storm sewer, lighting, signing, signals, Americans with Disabilities Act accessibility, and pavement markings. Also included were a span wire traffic signal and a turn lane addition.
- **Improvements to 34th Avenue South:** Improvements to 34th Avenue South were constructed in two phases. In 2010, phase one was from US 14 / 6th Street to Prince Drive and included improving the rural, gravel-surfaced, two-lane roadway into an urban, asphalt-surfaced, three-lane roadway. Phase one was completed by the City, SDDOT, and FHWA. In 2016, phase two was from Prince Drive to 8th Street South and included improving the rural, gravel, two-lane roadway to a rural, asphalt-surfaced, three-lane roadway. This segment was funded by the City. Phase two also included improvements from 8th Street South to 32nd Street South. The rural, gravel-surfaced, two-lane roadway was reconstructed to a rural, asphalt-surfaced, two-lane roadway. This segment was completed by Brookings County.
- **Improvements to I-29:** In 2020, the I-29 surface was treated (i.e., asphalt overlays, crack sealing).

3.19.1.2 Present Actions

Present actions that have affected resources in the Project Area include the following:

- Recently initiated mining activities on the east side of I-29, south of 20th Street South
- Mining activities in previously mined areas on both sides of I-29, one area north of 20th Street South on the east side of I-29 and one area south of 20th Street South on the west side of I-29
- Farming in rural areas
- Industrial and commercial areas in the Project Area

3.19.1.3 Reasonably Foreseeable Future Actions

Reasonably foreseeable future actions that would affect resources in the Project Area include the following:

- Exit 127 will be improved in 2022. The improvements include overlay, end blocks, joints, guardrail, and surfacing (SDDOT 2020).
- SD 324 / 217th Street will be grouted and sealed in 2021 (SDDOT 2020).
- Roadway improvements in the area as the City grows, including 20th Street South corridor and 22nd Avenue South corridor.
- Planned commercial and residential development will occur in the Project Area. Please refer to *Figure 3-1*.
- Future commercial, industrial, and residential development that is not currently planned will occur in current rural areas as part of city expansion as Brookings continues to grow.

3.19.2 Cumulative Impact Assessment

The resources considered in this cumulative impact assessment were determined by analyzing the types of environmental resources near the Project Area; the most prevalent, sensitive, and/or threatened resources; and the resources most substantially impacted by the build alternative (taking into account both direct and indirect impacts). Resources that would not be adversely or permanently affected by the Project are not considered in this cumulative impact assessment.

3.19.2.1 Social and Economic Resources

The Project and other present and reasonably foreseeable transportation projects would maintain or improve connectivity in and near the Project Area and would decrease the travel time to work and businesses. This improvement or maintenance of the transportation system would allow emergency services to maintain response times as Brookings grows. The Project and other transportation improvements would also have moderate, beneficial effects on the traffic circulation in Brookings, allowing the LOS at intersections to be acceptable and reducing traffic congestion on main arterials. The Project Area would experience urban growth in rural areas as part of the reasonably foreseeable

development; this would have a minor effect on community character and cohesion because of the expansion of the city into rural areas. This expansion is planned, which would minimize the effects.

The Project and other present and reasonably foreseeable projects would have a moderate, beneficial effect on Brookings by improving connectivity to the transportation system, which would facilitate planned growth in the proposed development areas. The planned development would contribute to the tax base and allow The City's population to continue to grow.

3.19.2.2 Acquisitions and Relocations

As part of the planned development and transportation projects, some residences would be acquired as part of the rural-to-urban conversion in the area. The Project would require the acquisition of five single-family residences. Planned development could potentially acquire residences, although no specific acquisitions are known, and could establish replacement residential properties or other land uses. Overall, this is expected to have a moderate, adverse effect in the Project Area. The development of new residential areas would provide additional residential opportunities for residents of Brookings.

3.19.2.3 Noise

Temporary, minor impacts would be expected from noise associated with construction activities for the Project and other present and reasonably foreseeable projects. Impacts from each activity would be temporary in nature and would vary depending on the type of equipment used (e.g., tractors, bulldozers, front-end loaders, excavators, dump trucks, scrapers, and compactors), the area that the action would occur in, and the distance from the noise source. Therefore, a negligible, cumulative effect would be expected during construction of the Project.

The existing noise levels in Edgebrook Golf Course and on some segments of the Allyn Frerichs Trail are above the recommended noise levels. The Project would cause increased traffic, and thus noise, in the area of 20th Street South. Additional development, including residential and recreation areas, would occur in consideration of the interchange location. The *2040 Comprehensive Plan* suggested land use areas surrounding the interchange (City of Brookings 2018). Therefore, the cumulative effect on noise in the area would be expected to be minor with the utilization of noise compatible planning techniques by local officials to prevent future highway traffic noise impacts.

3.19.2.4 Wetlands and Other Waters of the US

Construction of the Project would result in an overall increase in impervious surfaces in the surrounding areas. Impervious surfaces have the potential to increase the volume and velocity of stormwater runoff, which can indirectly result in soil erosion and sedimentation. Cumulative impacts are anticipated to be minor and adverse as a result of the Project and in consideration of other present and reasonably foreseeable projects. The majority of the land use west of I-29 along the 20th Street South corridor is already impervious surface, consisting mainly of paved roadways, streets, parking lots, houses, or buildings. East of I-29, the majority of the 20th Street South corridor is comprised of agricultural fields, gravel mining operations, and artificial ponds. Additional development would add further impervious surfaces and fill additional wetlands.

The Project would result in unavoidable impacts on wetlands and OWUS. The Project would have a total of 0.60 acre of impact on aquatic resources that are regulated under Section 404 and EO 11990. Under

Section 404, the Project would impact 0.28 acre of jurisdictional wetlands and 0.03 acre of jurisdictional OWUS; therefore, the Project would likely be permitted under a nationwide Section 404 permit. Present and reasonably foreseeable projects in the area would be required to comply with the Section 404 process if any impacts on a jurisdictional water of the US are proposed. The basic requirements of the Section 404 program is that no discharge of dredged or fill material can be permitted if a practicable alternative exists that is less damaging to the aquatic environment or if the jurisdictional water would be degraded. The permitting process requires consideration of avoiding the water of the US first and, if avoidance is not obtainable, minimization and mitigation. Therefore, the cumulative effect on waters of the US in the Project Area is anticipated to be an overall minor, adverse effect to wetlands and OWUS due to actions within the Project Area.

3.19.2.5 Water Quality

The Project and other present and reasonably foreseeable projects would be required to obtain a General Permit for Temporary Discharge Activities from the SDDENR Surface Water Program if construction of an area over 1 acre is required. This permit requires BMPs that reduce runoff from construction areas, including any point source discharge from dewatering activities, entering waters of the state. Waters of the state are located in the Project Area and are protected under Administrative Rules of South Dakota Chapter 74:51 (SDDENR 2020). Special construction measures would be taken to ensure that water quality standards are not violated. In accordance with the SDDENR General Permit for Stormwater Discharges, a Storm Water Pollution Prevention Plan would be included in the construction contract and implemented during construction to reduce or eliminate impacts due to erosion and sedimentation.

In addition, each development would need to take into consideration drainage and water quality BMPs that would reduce long-term effects on water quality. Because of the permit and drainage requirements, a minor, adverse effect on water quality in the Project Area would be anticipated.

3.19.2.6 Floodplain

Alternative 5 is located within a designated floodplain area. For the Project and other present and reasonably foreseeable projects, a Floodplain Development Permit would be required. The permit is coordinated by the City and Brookings County Community Floodplain Administrators and is required if any project could potentially impact the floodplain. Because of these requirements, a minor, adverse effect on floodplain in the Project Area would be anticipated.

3.19.2.7 Visual Impacts and Aesthetics

Temporary and permanent impacts on visual and aesthetic components of the Project Area would occur. Currently, no interchange at I-29 and 20th Street South exists. With the construction of Alternative 5, 20th Street South would become an east-west arterial roadway in Brookings. Traffic would be present in an area previously devoid of through traffic. Development of this area would result in vacant lots. The cumulative effects on visual and aesthetics are anticipated to be overall a minor, adverse effect because the current area is already partially developed.

3.19.2.8 Section 4(f) and 6(f) Resources

Section 4(f) is a requirement of USDOT agencies and, therefore, would not apply to private development. The Section 4(f) properties in the Project Area are under the jurisdiction of the City's Parks, Recreation, and Forestry Department. Because these areas are public property, the City would have jurisdiction and

likely would not convert these areas to development. Under Section 6(f), the Project would have a non-conforming effect on Edgebrook Golf Course for temporary easement for minor grading. Therefore, the cumulative effects are anticipated to be negligible.

3.19.3 Cumulative Impact Conclusion

The cumulative impacts of past activities have not led to significant adverse impacts in the Project Area. Considering the present and reasonably foreseeable future activities and their limited impact in consideration of impact avoidance, minimization, and mitigation, and considering the plans governing the activities and the regulatory environment, adverse cumulative impacts are not anticipated to be significant.

Cumulatively, the Project and other present and reasonably foreseeable projects would result in stormwater runoff, conversion of agricultural land, and loss of groundwater recharge area; however, these are not considered significant given the effort to avoid, minimize, and mitigate for environmental impacts. Overall, the cumulative impacts projected to occur are anticipated to be minor, adverse effects to the resources within the Project Area due to the Project in conjunction with other projects.

The Project would have some beneficial cumulative impacts regarding the alleviation of traffic and congestion. The planning efforts for future development and the roadway network would allow for a more orderly growth pattern for this area, therefore minimizing the impacts on aesthetics. The Project would also mitigate traffic congestion on the existing roadways and provide a side path that would connect pedestrians in the planned residential areas to the City's bike trail system.

4.0 PREFERRED ALTERNATIVE

4.1 SUMMARY OF IMPACTS

Table 4-1 summarizes the environmental impacts associated with the alternatives carried forward in this EA. Impacts associated with Alternative 5 were calculated using construction limits based on preliminary design. *Chapter 3.0 Affected Environment and Environmental Consequences* summarizes potential impacts on environmental resources for Alternative 5 in comparison to the No-Build Alternative.

Table 4-1. *Impact Summary of the No-Build Alternative and Alternative 5*

No-Build Alternative	Alternative 5
Land Use	
The No-Build Alternative is inconsistent with land use plans. The lack of connectivity in the roadway system in Brookings could inhibit the planned development in the Project Area. This could cause induced growth in unplanned areas or a reduction in the growth rate in Brookings, resulting in a **moderate, adverse effect** on land use.	Alternative 5 is consistent with land use plans. Improved connectivity in the roadway system would facilitate the planned development in the Project Area, allowing Brookings to continue to grow, resulting in a **moderate, beneficial effect** on land use.
Social	
The No-Build Alternative would lead to increased traffic congestion and reduced response times from emergency services. Travel delays would continue to be approximately 2 million person-hours in the next 30 years with the current roadway system. The No-Build Alternative would have a **moderate, adverse effect** on the social environment.	Under Alternative 5, traffic congestion would be reduced, and emergency service response times would be maintained or improve. Rural areas would experience a minor, adverse effect due to conversion of property to urban areas. Traffic delays for residents to their places of employment would be reduced by at least approximately 2,000 miles and 100 hours for a one-way trip to work, resulting in an overall **moderate, beneficial effect** on the social environment.
Economic Resources	
The No-Build Alternative would result in increased costs to drivers due to traffic congestion. The growth of Brookings may be hindered, which would reduce the tax base. The No-Build Alternative would have a **moderate, adverse effect** on economic resources.	Alternative 5 would provide connectivity in the transportation system, allowing planned development to proceed. The development is anticipated to create 300 new jobs, nearly $6 million in new earnings, and $1 million in new state and local taxes. Alternative 5 would have a **moderate, beneficial effect** on the local economy.
Acquisitions and Relocations	
No acquisitions or relocations are required under the No-Build Alternative.	Alternative 5 would require the **acquisition of five single-family residences**.
Pedestrians and Bicyclists	
Currently during peak hours, drivers illegally use the Allyn Frerichs Trail to go around vehicles turning left onto 20th Street South. Under the No-Build Alternative, vehicles would continue to use the trail, and safety for trail users would continue to be a concern. Therefore, the No-	A segment of the Allyn Frerichs Trail from the intersection of 20th Street South and 22nd Avenue South would be shifted to the east. This would provide a northbound left turn-lane on 22nd Avenue South. Currently during peak hours, drivers illegally use the trail to go around vehicles turning left onto

No-Build Alternative	Alternative 5
Build Alternative would have a **minor, adverse effect** on pedestrians and bicyclists.	20th Street South. The safety for trail users would be improved. Therefore, Alternative 5 would have a **moderate, beneficial effect** on pedestrians and bicyclists.
Air Quality	
The No-Build Alternative would result in deterioration of air quality due to increased traffic congestion. However, it is not likely that air quality standards would be violated in the foreseeable future. Therefore, the No-Build Alternative would have a **negligible effect** on air quality.	Alternative 5 would result in a temporary increase in air emissions during construction. Following construction, a decrease in traffic congestion would lead to a decrease in emissions. Therefore, Alternative 5 would have a **negligible effect** on air quality.
Noise	
Currently, four receptors are over the acceptable noise levels. These receptors are located near the eastern boundary of Edgebrook Golf Course and on portions of the Allyn Frerichs Trail. The No-Build Alternative would have **no effects** on existing noise in the Project Area.	Six noise-related impacts are predicted because of Alternative 5. Potential traffic noise abatement measures were determined to be not feasible. Alternative 5 is anticipated to have a **minor, adverse effect** on noise levels at six receptors along the eastern boundary of Edgebrook Golf Course and on portions of the Allyn Frerichs Trail.
Wetlands and Other Waters of the US	
The No-Build Alternative would have **no effects** on existing wetlands or OWUS.	Approximately 0.28 acre of USACE jurisdictional wetlands and 0.03 acre of OWUS would be impacted. Alternative 5 is anticipated to be permitted under a Section 404 nationwide permit. Approximately 0.28 acre of impact would be mitigated for Section 404 requirements, and approximately 0.57 acre of wetlands protected under EO 11990 would require mitigation. Overall, Alternative 5 would have a **minor, adverse effect** to wetlands and OWUS.
Water Quality	
The No-Build Alternative would have **no effects** on water quality.	Alternative 5 would result in a minor increase in runoff from impervious surfaces due to the additional roadway. Therefore, Alternative 5 would have a **minor, adverse effect** on water quality.
Vegetation, Fish, and Wildlife	
The No-Build Alternative would have **no effects** on vegetation, fish, and wildlife.	Alternative 5 would have a **negligible effect** on the vegetation, fish, and wildlife populations in the Project Area. Habitat in the area is disturbed, and similar areas are available throughout the Project Area.
Floodplain	
The No-Build Alternative would have **no effects** on the floodplain.	The rise of the floodplain caused by Alternative 5 would be less than 1 foot. Therefore, it is anticipated that Alternative 5 would have a **minor, direct, adverse impact** on the floodplain.
Threatened and Endangered Species	
The No-Build Alternative would have **no effects** on threatened or endangered species.	Alternative 5 would have **no effect** to threatened and endangered species.
Cultural Resources	
The No-Build Alternative would have **no effects** on cultural resources.	Alternative 5 would have **no effect** to cultural resources.

No-Build Alternative	Alternative 5
Regulated Materials	
The No-Build Alternative would have **no effects** on regulated materials.	Regulated material sites **would not be affected by, nor would they affect**, Alternative 5.
Visual Impacts and Aesthetics	
The No-Build Alternative would have **no effects** on the visual landscape or aesthetics.	Alternative 5 would have a **minor, adverse effect** on the viewshed from Edgebrook Golf Course.
Environmental Justice	
The No-Build Alternative would have a **minor, adverse effect** on environmental justice populations because of traffic delays and additional drive time due to connectivity in the transportation system.	Alternative 5 would benefit all populations in the Project Area by reducing travel times and distances. The effect would be **minor, beneficial effect** on environmental justice populations due to improvement of traffic delays and decreased drive time due to connectivity in the transportation system.
Section 4(f) and Section 6(f) Resources	
The No-Build Alternative would have **no effects** on Section 4(f) and Section 6(f) resources.	SDGFP concurred with the proposed work within the golf course as part of Alternative 5 be considered a **temporary non-conforming use** under Section 6(f). A concurrence from the City would be requested of the proposed **temporary occupancy exemption** for the Edgebrook Golf Course and the ***de minimis*** use of the Allyn Frerichs Trail.
Utilities	
The No-Build Alternative would have **no effects** on utilities.	Alternative 5 would require relocation of utilities, but impacts would be **minor temporary adverse** impacts. To minimize impacts, coordination has occurred with utility companies and the City. This coordination would continue prior to construction.

4.2 SELECTION OF PREFERRED ALTERNATIVE

Based on the evaluation of potential impacts, Alternative 5 is recommended as the preferred alternative. The benefits of Alternative 5 include the following:

- Alternative 5 would meet the needs for the Project, providing connectivity in the roadway system and maintaining an acceptable LOS in the Project Area.
- Alternative 5's estimated construction cost of approximately $18,600,000 is within the available funding.
- Alternative 5 would avoid a use of the Edgebrook Golf Course, a Section 4(f) and 6(f) property.
- Alternative 5 would avoid the wetland mitigation site present in the northeast quadrant of the proposed interchange.

Although the drawbacks of Alternative 5 include the acquisition of five residences and other private property, these impacts would also occur under the other build alternatives that were considered and screened out from further evaluation.

The No-Build Alternative is not recommended as the preferred alternative because the needs for the Project would not be met.

4.3 ENVIRONMENTAL COMMITMENTS AND PERMITTING FOR THE PREFERRED ALTERNATIVE

Mitigation measures and future commitments were addressed by resource in *Chapter 3.0* and are summarized as follows; if a specific SDDOT standard environmental commitment is required, then the specific reference to the commitment is included. This section is a post-environmental document tool to track the requirements that would be included in final design, construction, and after construction. Please see *Appendix G* for the SDDOT Section A of the plan sheets that would be included for the plan set for the preferred alternative.

- The City and Brookings County would need to coordinate transportation and land use plans to allow for expansion of the roadway system to accommodate future development. During these plans, efforts to include the public are encouraged to allow for rural area residents to have input into these plans.

- Access would be maintained to businesses during construction. Access signs indicating individual businesses by name would be included in construction signage. Construction would be phased to minimize traffic congestion impacts and overall time of construction in the Project Area. Alternative 5 would maintain access to all existing businesses from a public street during and after construction.

- All ROW acquisition and relocation impacts would be mitigated in conformance with the UA of 1970, as amended by the Surface Transportation Assistance Act of 1987 and as codified in 49 CFR 24, effective April 1989. SDDOT's ROW Program is responsible for acquiring the property necessary for highway purposes and performing services related to acquisition per the UA.

- A temporary detour of the Allyn Frerichs Trail would be necessary under Alternative 5. The trail segment north of 20th Street South would be detoured to a sidewalk on the west side of 22nd Avenue South. The trail segment south of 20th Street South would be closed during construction of the new trail along 22nd Avenue South. The closure is anticipated to be approximately 1 month. Signage would be provided to direct users around the construction.

- Construction equipment with point source emissions in many cases is required to have an air quality permit to operate. As applicable, permit applications would be obtained from the SDDENR Air Quality Program or Minerals and Mining Program.

- During construction, fugitive emissions would be monitored, and would be mitigated (such as watering to suppress dust) as needed.

- SDDOT will not be responsible for providing highway traffic noise abatement for undeveloped lands permitted after the Date of Public Knowledge.

- During construction, contractors would be required to comply with sound control requirements identified in the *SDDOT Standard Specifications for Roads and Bridges* (SDDOT 2015). Construction noise abatement would be reviewed and specifically applied for this Project.

- The final plan sheets for the Project would include SDDOT Standard Commitment A (Wetlands), Commitment N (404 Permit), and Commitment O (401 Certification. The SDDOT and City would acquire credits to mitigate for the 0.60 acre from the North Central Wetland Mitigation Bank site to mitigate permanent impacts. For natural wetlands found not to be under USACE jurisdiction, FHWA regulations (23 CFR 777.9) would apply, and mitigation for permanent impacts on these wetlands would be required.

- All fill material shall be free of substances in quantities, concentrations, or combinations that are toxic to aquatic life.

- A project specific sediment, erosion control, and spill prevention measures would need to be developed during final design and included within the plans and specifications. The Stormwater Pollution Prevention Plan (SWPPP) would incorporate SDDOT and the City's standard BMPs for velocity dissipation, revegetation, stabilization, etc. that the contractor would comply with.

- SDDOT Standard Commitment E (Stormwater) would be incorporated into the plans. This requires a stormwater permit, which requires revegetation of disturbed areas. Removal of vegetation shall be confined to those areas necessary for construction. A site-specific sediment erosion control plan would be implemented to provide interim control prior to re-establishing permanent vegetation cover on the disturbed site. If riparian vegetation is lost, it should be quantified and replaced on site. Seeding of indigenous species should occur immediately after construction to reduce sediment and erosion.

- All material identified in the stormwater permit application as removed waste material, material stockpiles, and dredged or excavated material shall be placed for either temporary or permanent disposal in an upland site that is not a wetland, and measures shall be taken to ensure that the material cannot enter the watercourse through erosion or any other means.

- Methods shall be implemented to minimize the spillage of petroleum, oils, and lubricants used in vehicles during construction activities. If a discharge does occur, suitable containment procedures such as banking or diking shall be used to prevent entry of these materials into a waterway.

- All newly created and disturbed areas above the ordinary high-water mark that are not riprapped shall be seeded or otherwise revegetated to protect against erosion.

- Waters of the state are located in the Project Area and are protected under Administrative Rules of South Dakota Chapter 74:51 (SDDENR 2020). Special construction measures may have to be taken to ensure that water quality is not impacted.

- If construction dewatering is required, the Contractor shall obtain the General Permit for Temporary Discharge Activities from the SDDENR Surface Water Program. The Contractor shall provide a copy of the approved permit to the Project Engineer.

- Any groundwater wells would be confirmed during physical survey and, if impacted, would be properly capped and sealed. Any impacted wells and connections would be replaced for properties that were not fully acquired. It is anticipated that Alternative 5 would not impact the water resources in the area due to the incorporation of BMPs into final design and construction.

- For surface water protection, the SDDOT Standard Commitment D1 (Surface Water Quality), D2 (Surface Water Discharge), G (Dewatering and Sediment Collection), and J (Construction Practices for Temporary Works in Waterways of the US) would be incorporated into the final plans. Disturbance of riparian and wetland areas should be kept to an absolute minimum.

- During final design, a Floodplain Development Permit would be acquired and coordinated through the City and Brookings County.

- To avoid and/or minimize impacts on regulated materials sites in the Environmental Study Area, a construction BMP would be implemented. The Contractor should be alert for large areas of soil staining, buried drums, ASTs, and USTs, and should coordinate with SDDOT and SDDENR if any obvious contamination is found prior to continuing work in those areas.

- Seeding of disturbed areas to re-established vegetation would be completed to minimize impacts after the construction of Alternative 5.

- SDDOT Commitment B5, project activities that include tree removal, structure work, and/or work within 150 feet of a potential maternity roost tree should not occur between November 1st and March 31st. Potential roosting tree areas are shown in *Appendix A*.

- For Section 4(f) and 6(f), SDDOT Standard Commitments M1 and M2 would be incorporated. A temporary detour of the Allyn Frerichs Trail would be necessary for the construction of the 20th Street South and 22nd Avenue South intersection. Signage would be provided to direct users around the construction.

- Coordination would continue to occur with the utility companies and the City during final design, and any needed commitments would be developed during the design process.

- Access to the Allyn Frerichs Trail would be restricted for a period of time that is anticipated to be less than the time needed for construction. Detours would be provided where feasible and safe. Access or use of Edgebrook Golf course would not be impacted.

- Temporary construction fencing shall be installed along proposed construction limits near the Allyn Frerichs Trail and Edgebrook Golf Course prior to the start of construction activities to protect the existing 4(f) property and the public.

- Appropriate signage shall be installed to alert users of the Allyn Frerichs Trail of construction activities, access restrictions or closures, and to direct users to secondary access points.

- The staging and/or storage of construction equipment or materials shall not take place outside proposed construction limits that are within the defined boundaries of the 4(f) property.
- The Contractor shall be required to closely coordinate the construction schedule with SDDOT and City of Brookings prior to the start of construction activities.
- A temporary detour of the Allyn Frerichs Trail would be necessary for the construction of the 20th Street South and 22nd Avenue South intersection. Signage would be provided to direct users around the construction.
- Revegetation and landscaping within the temporary grading area within the Edgebrook Golf Course would occur.

5.0 COMMENTS AND COORDINATION

During the development of this EA, coordination with the public, agencies, and tribes has occurred. The following sections describe the coordination with, and involvement of, the Study Advisory Team, agencies, tribes, and the public, as well as the future involvement of these groups during the NEPA process.

5.1 STUDY ADVISORY TEAM

To ensure that coordination occurred throughout this EA, a Study Advisory Team (SAT) was formed. The SAT members included representatives from the City, Brookings County, the East Brookings Business and Industry Group, SDDOT, and FWHA. Meetings were held at the following Project milestones:

- March 12, 2020, Kick-off Meeting
- May 13, 2020, Initial Range of Alternatives
- June 23, 2020, Purpose and Need for the Project

5.2 AGENCY COORDINATION

Throughout the NEPA process, coordination occurred with resource agencies. Please refer to *Appendix A, Agency Coordination*. The coordination is summarized as follows:

- Coordination letters were sent to SDDENR and SDGFP. A project location map and request for information that pertained to their jurisdiction was requested. Both agencies responded, and their responses were incorporated in *Sections 3.6, 3.8, 3.9, 3.10, 3.12, and 3.14*.

- A coordination meeting was held with FEMA and Community Floodplain Administrators from the City and Brookings County on June 10, 2020. Follow-up coordination occurred with the City and Brooking County Floodplain Administrators on June 23, 2020. Please refer to *Section 3.11* for additional information regarding the floodplain analysis.

- A coordination meeting was held with USACE on April 30, 2020. A jurisdictional determination request was submitted on July 15, 2020. Please refer to *Section 3.8*, which incorporates the USACE jurisdictional determination response.

- After the completion of the wetland delineation and habitat assessment, a coordination letter was sent to USFWS. Please refer to *Section 3.12*, which incorporates the agency's response.

- After the completion of the Level I and Level III cultural resources reports, a coordination letter was sent to the SHPO. Please refer to *Section 3.13*, which incorporates the agency's response.

- Coordination occurred with the City's Parks, Recreation, and Forestry Department regarding Edgebrook Golf Course and the Allyn Frerichs Trail. The Parks, Recreation, and Forestry Department was shown the proposed purpose and need and alternatives on May 13, 2020.

- For Section 6(f), a request for concurrence with the determination that Alternative 5 would have a temporary, non-conforming use was sent from SDDOT to SDGFP on September 10, 2020. SDGFP concurred on September 11, 2020.

5.3 TRIBAL COORDINATION

Section 106 of the National Historic Preservation Act of 1966 guides federal agencies to consult tribes that are federally recognized and may have a cultural or religious association to historic resources affected by federal actions.

For this Project, SDDOT sent coordination letters on March 25, 2020, to the following seven tribes that may have an interest in the highway projects in Brookings County, SD:

- Chippewa Cree
- Flandreau Santee Sioux Tribe
- Lower Brule Sioux Tribe
- Sisseton Wahpeton Oyate
- Standing Rock Sioux Tribe
- Three Affiliated
- Yankton Sioux

One response was received on March 26, 2020; the Lower Brule Sioux Tribe noted that it has no comment on the Project. This written response from Lower Brule Sioux Tribe is provided in *Appendix A*.

5.4 PUBLIC INVOLVEMENT

Public involvement has been carried out throughout the Project. Public involvement occurred primarily online due to COVID-19 limiting the ability for in-person meetings. Materials were posted online and made available to the public to relay the key milestones of the Project. Public input was requested at each milestone.

A postcard notification was mailed to landowners, advising them of the proposed construction of a new interchange. The postcard directed interested individuals to the project website. On April 20, 2020, the Project's website (https://www.20thstinterchange.com/) released an online presentation and opportunity for comment to the purpose and need and the alternatives. Comments submitted on the website were made available for public review, however, commenter's names, addresses, email address, or specific property information has been omitted. To date, 38 comments regarding the Project have been posted to the website and can be found in *Appendix G* of this EA.

Many of the comments submitted via the website were in support of the project, citing increased safety and travel improvements (distance, time, and efficiency) for commuters, and future development opportunities as positive outcomes. The main concern raised in many of the comments was the impact to the golf course, with the suggestion of total avoidance of impacts to the golf course being a common statement. Additional noise due to traffic was also a concern, as well as the quality of the noise projections of the future. Two comments stated that the interchange was in the wrong location and should be located

at 32nd Avenue to accommodate the future growth of the City. One commenter stated that the City and Brookings County funds should go to existing roadways instead of the 20th Street South interchange.

Throughout the course of the Project, all correspondence received from the public was logged and, if requested, was responded to accordingly.

5.5 FUTURE INVOLVEMENT

Public coordination will occur following the release of this EA and Section 4(f) evaluation for public comment. Following the 30-day comment period, SDDOT and FHWA would make the determination as to the adequacy of the environmental documentation. If further documentation is necessary, it would be accomplished by revising the EA or preparing an Environmental Impact Statement, whichever is appropriate.

If the environmental review process finds that the Project will not result in any significant environmental impacts, SDDOT will prepare a request for a Finding of No Significant Impact (FONSI) and will submit the request to FHWA. SDDOT will also seek concurrence from the City's Parks, Recreation, and Forestry Department for the proposed Section 4(f) determination. If FHWA agrees that a FONSI and the Section 4(f) determination is appropriate, it will issue a FONSI to conclude the environmental review process and document the decision. If FHWA determines that the Project would result in significant environmental impacts, SDDOT may prepare an Environmental Impact Statement or select the No-Build Alternative as its preferred alternative.

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