

South Dakota Department of Transportation
Interchange Modification Justification Report

Interstate 90 Exit 44
(Bethlehem Road - Piedmont)



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EXECUTIVE SUMMARY

The South Dakota Department of Transportation (SDDOT) has initiated an assessment of the existing interchange on Interstate 90 (I-90) at Exit 44 (Bethlehem Road) near Piedmont, South Dakota. Although the interchange is signed as the Bethlehem Road exit, Bethlehem Road is actually north of the interchange. The interchange's crossroad is known locally by many different names, including 218th Street, Deer View Road, Chimney Canyon Road, and Meade County Highway 4A. For the purposes of this document, it will be referred to as 218th Street.

This interchange modification justification report (IMJR) is the culmination of several steps that have been completed to document the benefits and impacts associated with a range of modification alternatives for the existing interchange. This document was completed following the outline provided in the Federal Highway Administration's (FHWA) August 2010 *Interstate System Access Informational Guide* and meets the requirements of the *Access to the Interstate System* policy printed in the Federal Register on August 27, 2009.

FHWA REQUIREMENTS

FHWA policy has developed requirements that need to be addressed when evaluating changes to access points on interstate facilities (Federal Register, Volume 74, Number 165, August 27, 2009). The requirements are part of a policy that was put in place to maintain high levels of safety and mobility on the Interstate System. The policy consists of eight requirements that new access locations should meet. As this modification request is to maintain the existing Exit 44 interchange's diamond interchange configuration, the following is the summarized response to each requirement. The full response to each requirement can be found in Chapter 9: Recommendations.

1. *The need being addressed by the request cannot be adequately satisfied by existing interchanges to the Interstate, and/or local roads and streets in the corridor can neither provide the desired access, nor can they be reasonably improved (such as access control along surface streets, improving traffic control, modifying ramp terminals and intersections, adding turn bays or lengthening storage) to satisfactorily accommodate the design-year traffic demands (23 CFR 625.2(a)).*

This modification request is to reconfigure an existing interchange. No additional access to the Interstate System is being requested. The reconfiguration of the existing interchange will have a negligible effect on the Interstate's traffic operations when compared with the existing interchange's configuration.

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2. *The need being addressed by the request cannot be adequately satisfied by reasonable transportation system management (such as ramp metering, mass transit, and HOV facilities), geometric design, and alternative improvements to the Interstate without the proposed change(s) in access (23 CFR 625.2(a)).*

This modification request is to reconfigure the geometrics of an existing interchange. No additional access to the Interstate System is being requested. Existing characteristics and development in the vicinity of the existing interchange limited the cost feasible options for interchange reconfiguration.

The *Interstate 90 Black Hawk – Sturgis Corridor Preservation Study* initially developed three build alternatives, which were then narrowed down to two feasible alternatives for the corridor's environmental assessment (EA). Both alternatives were a diamond configuration with the eastbound ramp terminal intersection shifted to the west of its current location to provide greater separation between the ramp terminal intersections. The first alternative maintained I-90 over the crossroad whereas the second alternative called for both mainline I-90 and the crossroad being regraded to provide for the crossroad over.

The diamond configuration maintaining I-90 over the crossroad was eventually selected as the preferred option by the EA primarily for costs. The EA's preferred option also involved realigning Sturgis Road to move the intersection of Sturgis Road and the interchange crossroad (218th Street) further west to provide separation between the Sturgis Road intersection and the eastbound ramp terminal intersection, which will be completed with another project that will be completed prior to the interchange reconstruction. This will vastly improve the spacing between the eastbound ramp terminal intersection and the Sturgis Road intersection of 218th Street. The increase in distance between the intersections improves the operation of the crossroad intersections, including the ramp terminal intersections by providing additional queue space for left turns.

There are no areas within the State of South Dakota that will consistently experience congestion levels extreme enough to make ramp metering or HOV facilities economically feasible in the foreseeable future.

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3. *An operational and safety analysis has concluded that the proposed change in access does not have a significant adverse impact on the safety and operation of the Interstate facility (which includes mainline lanes, existing, new, or modified ramps, ramp intersections with crossroad) or on the local street network based on both the current and the planned future traffic projections. The analysis shall, particularly in urbanized areas, include at least the first adjacent existing or proposed interchange on either side of the proposed change in access (23 CFR 625.2(a), 655.603(d) and 771.111(f)). The crossroads and the local street network, to at least the first major intersection on either side of the proposed change in access, shall be included in this analysis to the extent necessary to fully evaluate the safety and operational impacts that the proposed change in access and other transportation improvements may have on the local street network (23 CFR 625.2(a) and 655.603(d)).*

Requests for a proposed change in access must include a description and assessment of the impacts and ability of the proposed changes to safely and efficiently collect, distribute and accommodate traffic on the Interstate facility, ramps, intersection of ramps with crossroad, and local street network (23 CFR 625.2(a) and 655.603(d)). Each request must also include a conceptual plan of the type and location of the signs proposed to support each design alternative (23 U.S.C. 109(d) and 23 CFR 655.603(d)).

A limited analysis of the impact of the proposed interchange modification at Exit 44 on the Interstate's operations was completed as per discussions with FHWA documented on January 7, 2011, June 18, 2012, and June 24, 2013. This analysis indicates no operational issues at the interchange.

4. *The proposed access connects to a public road only and will provide for all traffic movements. Less than "full interchanges" may be considered on a case-by-case basis for applications requiring special access for managed lanes (e.g., transit, HOVs, HOT lanes) or park and ride lots. The proposed access will be designed to meet or exceed current standards (23 CFR 625.2(a), 625.4(a)(2), and 655.603(d)).*

The access improvement will maintain a connection to a public road (218th Street) and will replace the current full access interchange with a reconfigured full access interchange. The reconfigured interchange will continue to provide for all traffic movements. The improvement will meet or exceed current standards for Federal-aid projects on the Interstate system.

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5. *The proposal considers and is consistent with local and regional land use and transportation plans. Prior to receiving final approval, all requests for new or revised access must be included in an adopted Metropolitan Transportation Plan, in the adopted Statewide or Metropolitan Transportation Improvement Program (STIP or TIP), and the Congestion Management Process within transportation management areas, as appropriate, and as specified in 23 CFR part 450, and the transportation conformity requirements of 40 CFR parts 51 and 93.*

The proposed interchange improvement is consistent with local land use plans, the STIP, and the Rapid City MPO transportation plans.

6. *In corridors where the potential exists for future multiple interchange additions, a comprehensive corridor or network study must accompany all requests for new or revised access with recommendations that address all of the proposed and desired access changes within the context of a longer-range system or network plan (23 U.S.C. 109(d), 23 CFR 625.2(a), 655.603(d), and 771.111).*

Previous studies conducted in the past 12 years (the *South Dakota Interstate Corridor Study* completed in February 2001, the *Interstate 90 Black Hawk – Sturgis Corridor Preservation Study* completed in December 2004, and the 2010 *South Dakota Decennial Interstate Corridor Study* completed in November 2010) indicated no need for any future interchange additions along the segments of Interstate 90 between Exit 44 and the adjacent exits.

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7. *When a new or revised access point is due to a new, expanded, or substantial change in current or planned future development or land use, requests must demonstrate appropriate coordination has occurred between the development and any proposed transportation system improvements (23 CFR 625.2(a) and 655.603(d)). The request must describe the commitments agreed upon to assure adequate collection and dispersion of the traffic resulting from the development with the adjoining local street network and Interstate access point (23 CFR 625.2(a) and 655.603(d)).*

The proposed interchange modification is the result of the *Interstate 90 Black Hawk – Sturgis Corridor Preservation Study* and the corresponding *I-90 Environmental Assessment (Exit 40 to Exit 51)*. The study was jointly coordinated by SDDOT, Meade County, and FHWA staff.

The reconfiguration of the interchange is being proposed to address future traffic growth relative to the anticipated future population growth of the entire Northern Black Hills. After analysis of several alternatives for the corridor, the *Interstate 90 Black Hawk – Sturgis Corridor Preservation Study* recommended the relocation of several service roads, the redesign of several interchanges, and the reconstruction and widening of the I-90 mainline in some areas between Black Hawk and Sturgis when traffic and condition warrants. Unfortunately, both terrain restraints of the Northern Black Hills and the location of nearby federal lands create a geographic bottleneck that limits the amount of parallel corridors to operationally support I-90 that can be feasibly constructed.

8. *The proposal can be expected to be included as an alternative in the required environmental evaluation, review and processing. The proposal should include supporting information and current status of the environmental processing (23 CFR 771.111).*

The proposed revised access is included in the 2014-2017 STIP for 2016 and is the result of the corridor's environmental assessment completed in September 2008.

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Chapter 1: INTRODUCTION

The South Dakota Department of Transportation (SDDOT) initiated in 2004 the *Interstate 90 Black Hawk – Sturgis Corridor Preservation Study* as a result of the 2001 *South Dakota Interstate Corridor Study*. The study provided a more detailed assessment of the Interstate 90 (I-90) corridor from Black Hawk to Sturgis than the statewide study and included all of the interchanges within the corridor. One of the recommendations resulting from that corridor study included the reconstruction of Exit 44 as a high priority project.

This interchange modification justification report (IMJR) is the culmination of several steps that have been completed to document the benefits and impacts associated with a range of modification alternatives for the existing interchange. This document was completed following the outline provided in the Federal Highway Administration's (FHWA) August 2010 *Interstate System Access Informational Guide* and meets the requirements of the *Access to the Interstate System* policy printed in the Federal Register on August 27, 2009.

Background

The existing Exit 44 interchange was first identified as having some minor needs by the 2001 *South Dakota Interstate Corridor Study*. These issues were determined to be minor enough not to require immediate attention given the existing and the projected traffic levels at the time and primarily focused on the location of the service road intersections along the crossroad in relation to the ramp terminal intersections and modifying the geometrics to current design standards.

The 2004 *Interstate 90 Black Hawk –Sturgis Corridor Preservation Study* determined that the reconstruction of the Exit 44 interchange to be a high priority within that corridor, along with relocations of the Interstate frontage roads. The relocation of the Interstate frontage roads would be necessary to accommodate the future needed expansion of the I-90 mainline from 4 lanes to 6 to accommodate future traffic levels between Sturgis and Rapid City.

The *Interstate 90 Black Hawk –Sturgis Corridor Preservation Study* concluded that although some geometric upgrades to current design standards were needed, there was little need to deviate from the existing diamond interchange configuration.

The Exit 44 crossroad is referred to locally by many names. These include:

- 218th Street (Rural 911 Addressing),
- Deer View Road (local street name from the interchange going east),
- Chimney Canyon Road (local street name from the interchange going west),
- Bethlehem Road (per Interstate Exit signing, although the actual Bethlehem Road leading to the ghost town of Bethlehem is north of the interchange), and
- Meade County Highway 4A.

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For purposes of this document, the crossroad will be referred to as 218th Street.

Purpose

The pavement and structures in the vicinity of the interchange are approaching the end of their service lives and are in need of replacement. As such, it is appropriate to evaluate the existing interchange configuration, geometrics, and traffic operations for the anticipated future traffic levels as mainline and service road improvements are accomplished.

Project Location

Exit 44 is an existing connection between I-90 and 218th Street northwest of Piedmont, South Dakota in rural Meade County South Dakota. Exit 44 is located approximately 44 miles east of the Wyoming state line and 13 miles west of the I-90 / I-190 System Interchange. Figure 1 shows the location of Exit 44.

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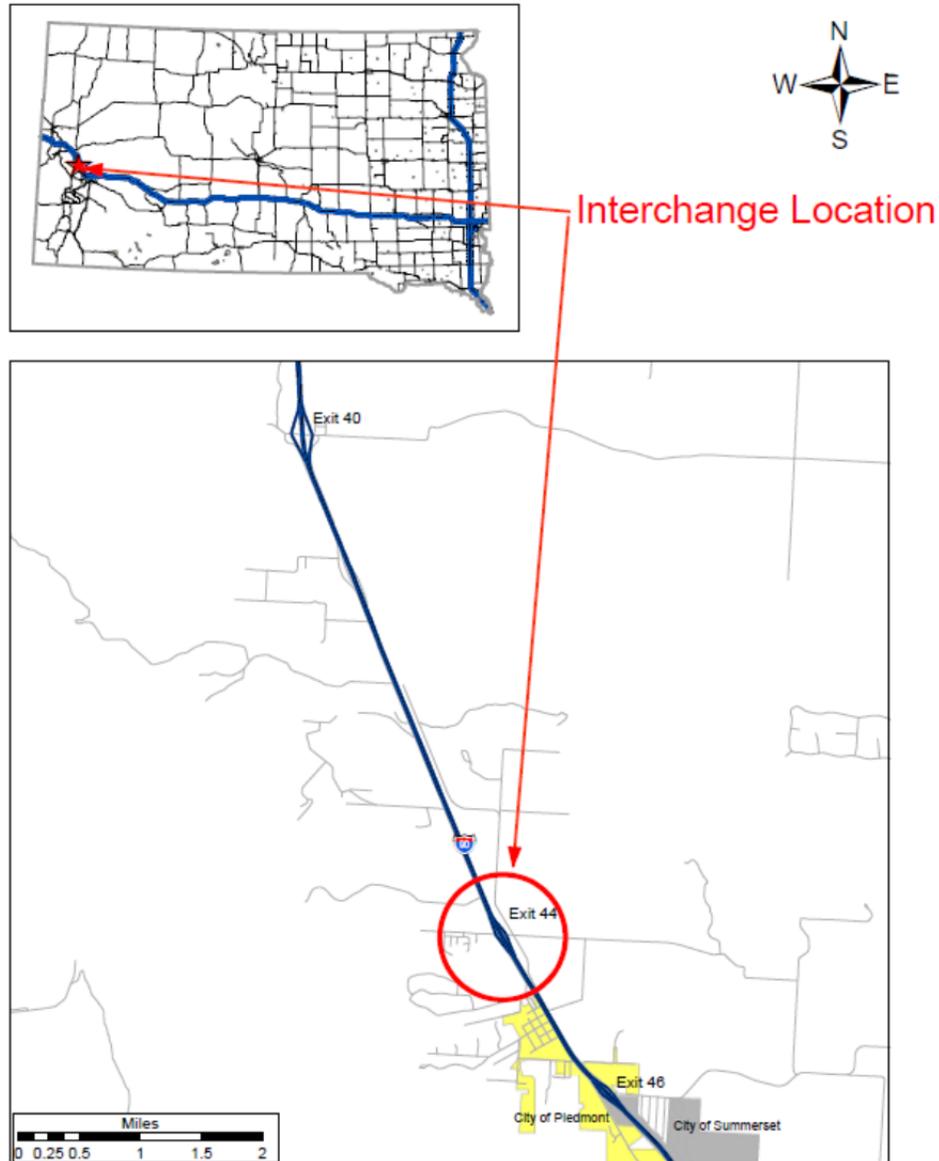


Figure 1: Project Location

The current configuration for Exit 44 is a skewed diamond interchange as shown in Figure 2. The proposed interchange modification would replace the skewed diamond interchange at Exit 44 with a similarly skewed diamond, but with the ramp terminal intersections slightly farther apart. The result would be a more efficient interchange that will improve the operational service of 218th Street while slightly improving the operational service of the Interstate.

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Figure 2: Existing Configuration

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Chapter 2: METHODOLOGY

This interchange modification justification report (IMJR) demonstrates that the action associated with implementing the proposed project does not have any fatal flaws. Demonstrating that no fatal flaws exist does not endorse the action, but rather allows for the conclusion that the identified access alternatives are not flawed from the perspective of traffic operations and safety, as required by the Federal Highway Administration (FHWA). Fatal flaws would include a proposed interchange modification that:

- Does not provide full access to public roads.
- Would negatively impact interstate facility traffic operations and cannot be reasonably mitigated.
- Would negatively impact interstate facility/cross street safety and cannot be reasonably mitigated.
- Conflicts with or is inconsistent with local and regional plans.
- Would create the potential for environmental consequences which could not be mitigated.

Inquiries to FHWA during the initial project development (scoping) phase indicated that no IMJR document would be needed (email dated January 7, 2011), so no traffic data was collected to create such a document. As such, traffic data and analysis needed for adjacent interchanges and mainline Interstate used results from the *South Dakota Decennial Interstate Corridor Study*. Traffic analysis result tables used from the *South Dakota Decennial Interstate Corridor Study* are included in Appendix C.

This IMJR document is organized in accordance with section 3.5.3 of FHWA's *Interstate System Access Information Guide*, August 2010.

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Chapter 3: EXISTING CONDITIONS

Demographics

The existing Exit 44 interchange primarily provides rural areas of Meade County access to the Interstate system. The interchange currently serves an area of ranch land and some rural residential neighborhoods and acreages, primarily west of I-90. The Town of Piedmont, South Dakota is located approximately ¾ of a mile south of the interchange, so the Exit 44 interchange serves Piedmont residents wishing to go west on I-90.

Existing Land Use

Land use surrounding the Exit 44 interchange is classified by Meade County primarily as rural residential (3 or more acres per lot) to the west of the interchange and a mixture of rural residential and agricultural to the east of the interchange. By Meade County ordinance, rural residential subdivisions near the I-90 Corridor are made up of typically three or more acre lots. Special Zoning Areas permit 1 acre lots within those approved Special Zoning Areas. The existing land use is shown in Figure 3.

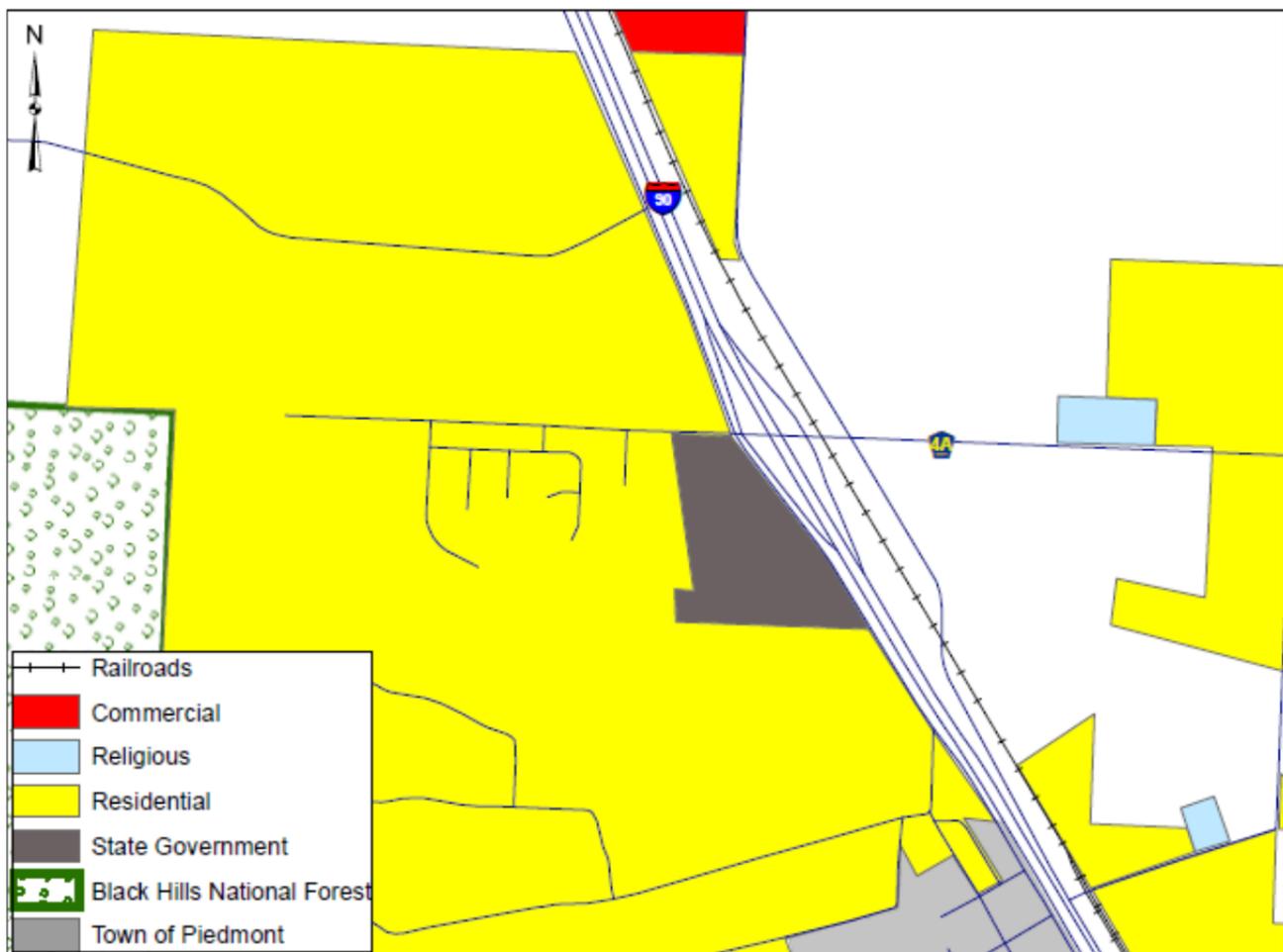


Figure 3 Current Meade County Approved Land Use

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Existing Roadway Network

I-90 is the primary north-south route through the study area. Sturgis Road (the I-90 frontage road just west of I-90) provides additional north-south support to I-90 for local travel. The Exit 44 crossroad (218th Street / Meade County 4A) is the primary route to the east from Exit 44, eventually connecting with Meade County Highway 4. The Bethlehem Road is currently the only through route towards the west in the entire study area, as most routes terminate prior to entering the Black Hills National Forest. The existing roadway network is shown along with the federal functional classification map in Figure 4.

I-90 currently has 2 lanes in each direction through the study area. All other roadways in the study area are currently one lane in each direction.

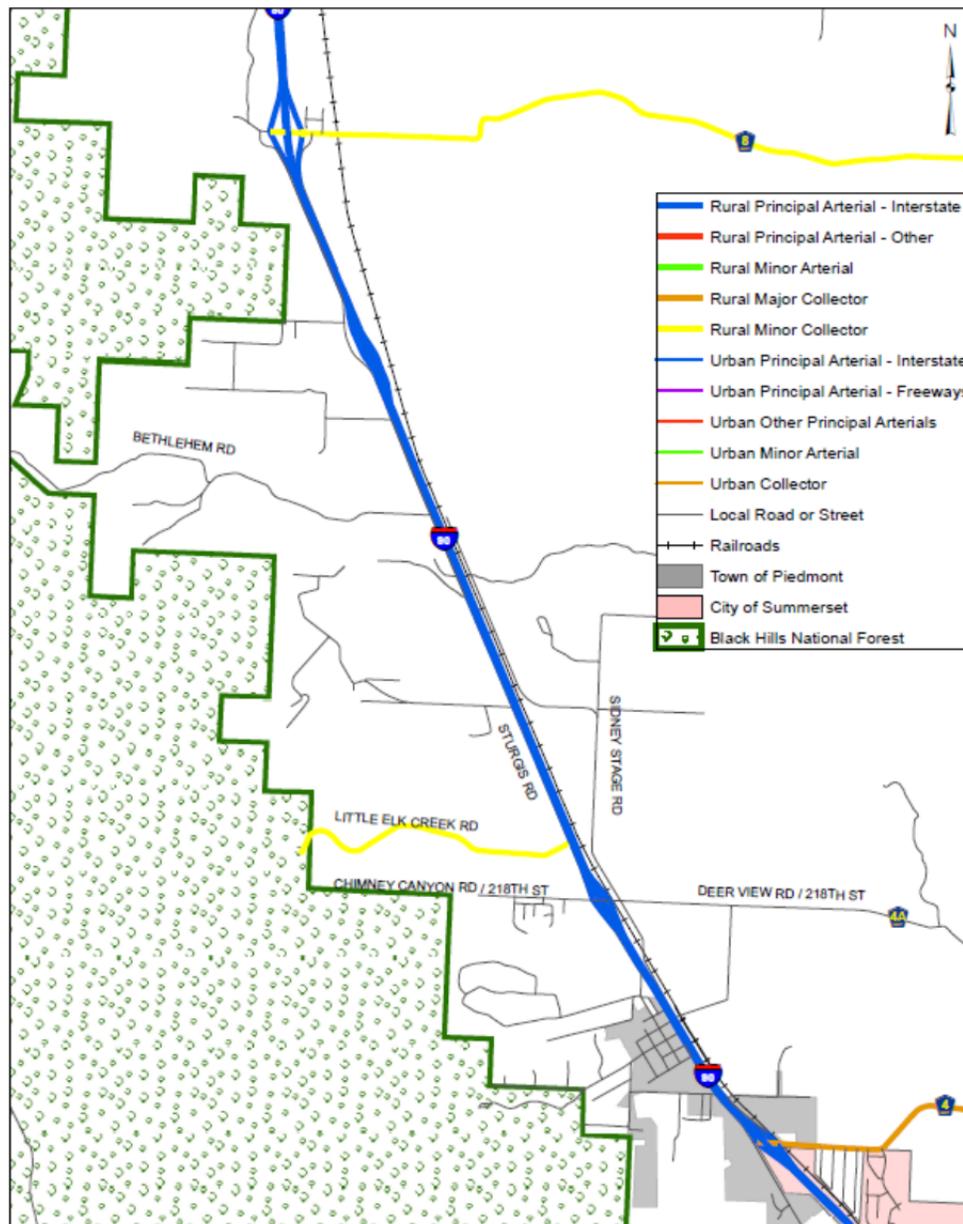


Figure 4

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Alternative Travel Modes

Given the rural nature of the area surrounding Exit 44, there is currently no routine transit stops to the interchange area. Jefferson Bus Lines runs daily service between Rapid City, SD and Billings, MT along I-90 through the interchange, but does not routinely stop at the interchange. Prairie Hills Transit also provides a daily commuter shuttle service from Spearfish to Rapid City with designated loading areas along the route, but none are located within the Exit 44 interchange's influence area.

The Sturgis Municipal Airport is located about 12 miles north of the interchange, although to drive there takes approximately 19 miles, as there is no direct connection between the interchange and the airport. The airport provides general aviation services to Meade County South Dakota. The nearest airport providing commercial passenger and freight services is the Rapid City Regional Airport, located approximately 22 miles southeast of the interchange.

The Canadian Pacific / Dakota, Minnesota & Eastern (CP / DM&E) Railroad is a Class I freight railroad that has a track that parallels I-90 to the east of the interchange.

As Exit 44 is primarily a rural access interchange, bicycle and pedestrian activity in the interchange's influence area is rare, and there are no trails or sidewalks in the area.

Interchanges

I-90 Exit 44: 218th Street

The existing interchange for I-90 and 218th Street is a skewed diamond configuration, with a spacing of approximately 450' between the interchange ramp intersections along 218th Street. Both intersections are presently stop controlled from the off ramp terminal, with nonstop conditions along the crossroad. All ramps were originally designed and striped as single lane ramps. The cross section of 218th Street is primarily a two lane section. The aerial photo in Figure 5 shows the configuration of the existing Exit 44 interchange.

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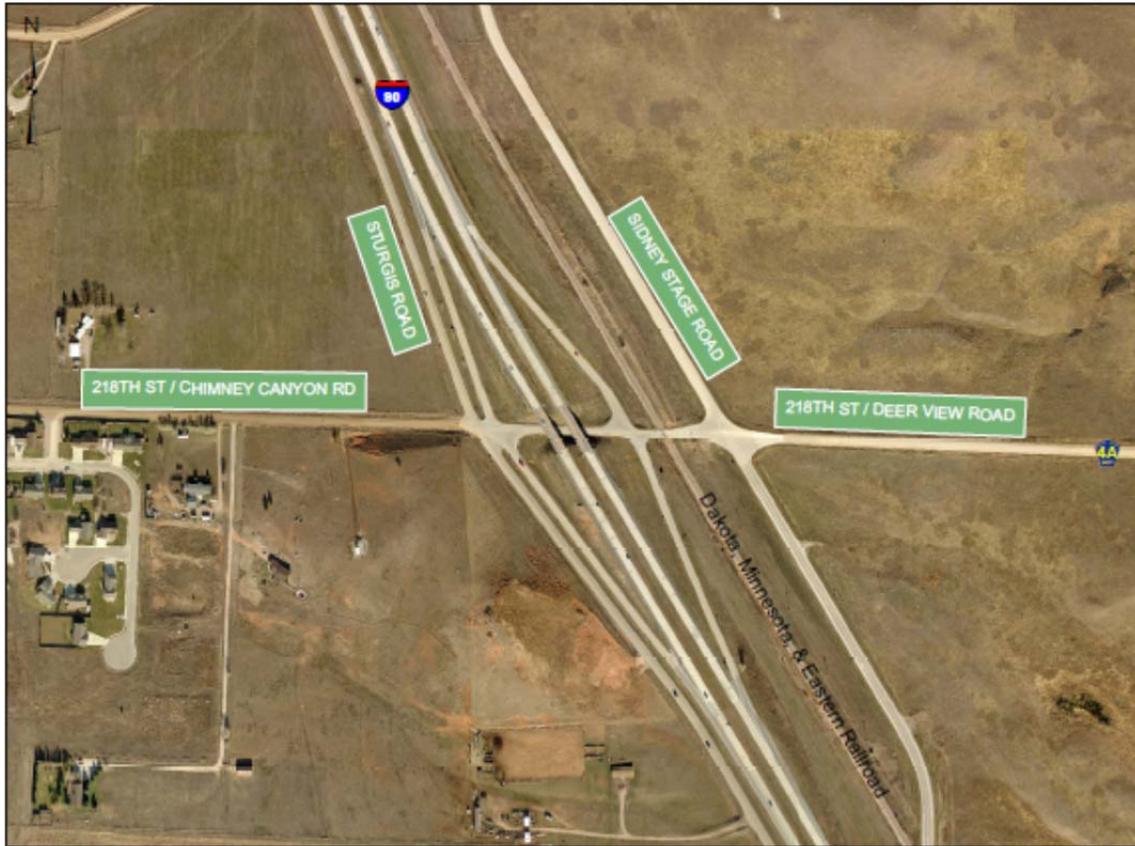


Figure 5: Existing I-90 / Exit 44 Interchange Configuration

On the east side of the interchange, the CP / DM&E railroad has an at-grade railroad crossing approximately 100 feet east of the westbound ramp terminal intersection. The unsignalized intersection of Sidney Stage Road and 218th Street is located on the other side of the railroad crossing, approximately 300' east of the westbound ramp intersection.

West of the interchange, the unsignalized intersection of Sturgis Road and 218th Street is located about 60' west of the eastbound ramp terminal intersection.

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I-90 Exit 40: 214th Street / Tilford Road

The adjacent interchange northwest of the Exit 44 interchange is Exit 40: Tilford Road. The interchange is a typical diamond configuration. The interchange is shown in Figure 6 below.



Figure 6: Existing I-90 Exit 40 Interchange Configuration

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I-90 Exit 46: Piedmont

The adjacent interchange southeast of the I-90 Exit 44 interchange is the Exit 46 interchange. The interchange is a skewed diamond configuration. The aerial photo in Figure 7 shows the configuration of the existing I-90 Exit 46 interchange.



Figure 7: Existing I-90 Exit 46 Interchange Configuration

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Potential Adjacent Interchanges

The SDDOT has no expectation for any new interchanges that would affect the traffic operations at Exit 44 within the planning horizon.

Existing Data

The data used to create this document came from a combination of data sources belonging to the South Dakota Department of Transportation or the South Dakota Department of Public Safety. Much of the data came through the *Interstate 90 Black Hawk – Sturgis Corridor Preservation Study*. The most recent data available was used.

Operational Performance

A limited traffic operations study was conducted as part of the *Interstate 90 Black Hawk – Sturgis Corridor Preservation Study*, and showed no existing operational issues at the interchange. Given that the data used by that study is over 10 years old, a reevaluation of the interchange's operations is prudent. As congestion is more often dictated by actions at intersections and ramp junctions, analysis on those movements were done independently.

Since the HCM2010 methodology for interchanges only pertains to signalized ramp terminals, the Level of Service (LOS) for unsignalized intersections according to the Highway Capacity Manual 2010 was used to measure traffic operation at each of the ramp terminal intersections. Each lane of traffic has delay associated with it and therefore a correlating LOS. The weighted average delay for each of these lanes of traffic for an intersection is the intersection LOS. LOS categories range from LOS "A" (best) to "F" (worst) as shown in the Table 1.

Table 1: Level of Service Criteria

Control Delay (s / vehicle)	LOS by Volume to Capacity Ratio		LOS Description
	v/c ≤ 1	v/c > 1	
0 – 10	A	F	Free flow, insignificant delays
>10 – 15	B	F	Stable operation, minimal delays
>15 – 25	C	F	Stable operation, acceptable delays
>25 – 35	D	F	Restricted flow, noticeable delays
>35 – 50	E	F	Maximum capacity, extended delays, long queues form upstream from intersection
>50	F	F	Forced flow, excessive delays, queues may block upstream intersections

Source: HCM2010, Exhibit 19-1 and 20-2

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The SDDOT typically triggers capacity improvements when the LOS is below a C on mainline highway corridors and below a LOS of D at intersections and ramp junctions.

As the previous studies showed that capacity was not the driving force behind the interchange modification for Exit 44, only a limited traffic operations study was conducted again for Exit 44, with ramp volume counts collected in May, 2013, strictly for the purposes of this document. The east limit of the study was the westbound ramp terminal and the western limit was the eastbound ramp terminal intersection. Intersections analyzed were the I-90 eastbound ramp terminal and the I-90 westbound ramp terminal. An evaluation was also done to study the ramp merge/diverge areas along I-90 associated with the Exit 44 interchange.

Table 2 summarizes the results of the existing traffic analysis of the crossroad / ramp terminal intersections and Table 3 summarizes the existing operations at the ramp junctions at the I-90 Exit 44 interchange.

Table 2: Exit 44 Intersections Existing Level of Service

Intersection / Movement	AM Peak LOS*	PM Peak LOS*
218th Street / I-90 Westbound Ramp	A	A
218th Street / I-90 Eastbound Ramp	A	A

Note: *Average Intersection LOS shown, individual movements may be different.

Table 3: Exit 44 Ramp Junction Existing Level of Service

Interchange	Ramp	Movement	AM Peak LOS	PM Peak LOS
Exit 44	90EB to Off-ramp	Diverge	A	A
Exit 44	90 WB to Off-ramp	Diverge	A	B
Exit 44	On-ramp to 90 EB	Merge	A	A
Exit 44	On-ramp to 90 WB	Merge	B	B

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Existing Safety Conditions

Twenty-two (22) reported crashes were determined to be within the Exit 44 interchange influence area over the past five years (calendar years 2008, 2009, 2010, 2011, and 2012). Zero (0) crashes were classified as a fatality during the reporting period and five (5) crashes were classified as an Injury accident. Twenty of the 22 crashes involved a single moving vehicle; including all 5 Injury classified accidents. Twelve were determined to be weather related and six resulted in a citation for overdriving conditions. This data is shown in Table 4.

Table 4: Crash Classification* for Reported Crashes 2008-2012

Classification	Mainline	Ramps	Ramp Terminal Intersections	Crossroad	Total
Fixed Object	11 (2 I/F)	3 (1 I/F)	1	0	15 (3 I/F)
Animal	2 (1 I/F)	1	0	0	3 (1 I/F)
Pedestrian	0	0	0	0	0
Bicycle	0	0	0	0	0
Parked Car	1 (1 I/F)	0	0	0	1 (1 I/F)
Over Turn	0	1	0	0	1
Other Single Vehicle	0	0	0	0	0
Rear End	0	0	0	0	0
Head ON	0	0	0	0	0
Angle	1	0	1	0	2
Sideswipe, same direction	0	0	0	0	0
Sideswipe, opposite direction	0	0	0	0	0
Other Multiple Vehicle	0	0	0	0	0
Total	15 (4 I/F)	5 (1 I/F)	2	0	22 (5 I/F)

(I/F) = Number Classified as an Injury/Fatality Accident

* Classification based upon Interchange Safety Analysis Tool (ISAT) methodology.

Figure 8 shows the location of all reported crashes for calendar years 2008, 2009, 2010, 2011 & 2012, including those outside of the Exit 44 interchange's influence area.

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Crash Location and Severity

2008, 2009, 2010, 2011, & 2012



Figure 8

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Existing Environmental Constraints

An environmental assessment (EA) was conducted for the entire I-90 corridor from MRM 40 to MRM 51, which included Exit 44, following *the Interstate 90 Black Hawk – Sturgis Corridor Preservation Study*. The EA determined no environmental constraints within the Exit 44 interchange's area of influence that would affect potential improvements. Figure 9 shows the location of the known environmental constraints within ½ mile of the Exit 44 interchange. The EA concluded in 2008 with a Finding of No Significant Impact (FONSI).

Known Potential Environmental Constraints



Figure 9

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Chapter 4: NEED

While the need to reconfigure an existing interchange is primarily for geometric, safety and traffic capacity reasons, the timing of such projects in South Dakota typically is controlled by the need to replace the existing pavement and/or structure(s). A combination of these five base need types defines the overall need for an interchange reconfiguration.

Geometric

Since the interchange's construction in 1958, geometric design standards have changed. As a result, though built to meet or exceed standards of the day, some geometric characteristics of the existing interchange no longer meet today's standards. The *2000 Interstate Corridor Study* found some minor geometric issues with the interchange. Those geometric issues found during the 2000 Interstate Corridor Study include:

- The inslopes for all of the ramps are 4:1.
- The total width for all of the ramps is 24'.
- The right shoulder width for all of the ramps is 3'.
- Proximity of an adjacent railroad crossing is much less than desirable.
- Proximity of adjacent intersections to the ramp intersections are much less than desirable.

Pavement

The need to replace or rehabilitate the pavement is often the driving force behind the timing of when the majority of construction projects on the state highway system occur. The pavement of the existing I-90 mainline through Exit 44 is Portland Cement Concrete (PCCP) with steel mesh reinforcement built in 1958 and has been showing signs of reactive cracking throughout the surface. The crossroad and ramps are asphalt surfaced, initially constructed in 1958 and last surfaced in 1991. The crossroad was last resurfaced with asphalt in 1991. As the I-90 mainline pavement structure is now in need of replacement, it is appropriate to evaluate existing and future traffic operations of the existing interchange configuration before placing a new pavement surface with the expectations for a 40 to 50 year pavement service life.

Safety

The Exit 44 interchange ranked 60th out of the 62 interchanges evaluated in Phase 1 of the *2000 Interstate Corridor Study*, so was not seen as an immediate safety need at the time. The *2010 Decennial Update to the Interstate Corridor Study* found that the interchange has jumped up the list significantly, having the 16th highest crash rate of the 126 interchanges evaluated. Since the vast

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majority of crashes are single vehicle and weather related, pavement condition could be a likely contributing factor and a reduction of crashes could occur with new pavement.

Structural

The need to replace or rehabilitate a structure is the second most critical consideration behind the timing of construction projects on South Dakota's state highway system. The two structures at the existing Exit 44 interchange both currently have a Federal Sufficiency Rating of 48.0 and are classified as structurally deficient. This is primarily due to a poor deck condition rating.

Structurally, the bridges are currently in fair condition. The steel stringer/girder bridges were built in 1957. A deck overlay for the eastbound lane structure was completed in 2013, as there was a worry that the existing bridge deck wouldn't be able to accommodate head to head traffic during the reconstruction process without it. It is appropriate to evaluate the existing and future traffic operations of the existing interchange configuration before placing a new structure with the expectations for a 75 year structure service life.

Traffic

The *Interstate 90 Black Hawk – Sturgis Corridor Preservation Study* concluded that traffic operations are not currently an issue at the interchange. When the existing (No Build) configuration was evaluated for 2025, the interchange ramp terminal intersections with the crossroad indicated an anticipated deterioration to a LOS of B in the average AM and PM peak hours. The *2000 Interstate Corridor Study* evaluated the 1999 merge and diverge movements at the interchange and found them all to be operating at LOS B at that time. These operational characteristics were verified by analyzing the ramp counts taken in May 2013. As volumes have not significantly increased along this segment of I-90, this seems to indicate that traffic operations of the interchange do not appear to be a significant factor.

However, the *Interstate 90 Black Hawk – Sturgis Corridor Preservation Study* did indicate that mainline capacity may require an expansion of mainline from 2 through lanes to 3 through lanes in each direction sometime beyond the planning horizon. This expansion of mainline capacity leads to a need to slightly relocate the merge and diverge points of the Exit 44 ramps in order to bring ramp tapers up to current standards.

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Chapter 5: ALTERNATIVES

Alternatives for the Exit 44 interchange were initially developed and evaluated as part *Interstate 90 Black Hawk – Sturgis Corridor Preservation Study*. The *Interstate 90 Black Hawk – Sturgis Corridor Preservation Study* initially developed 3 configuration options for the interchange area. A brief description of the No Build and all 3 build options follows.

Alternative 0: No Build

This alternative does not alter the current configuration of the existing Exit 44 interchange or apply any improvements along Exit 44 or mainline I-90 and results in strictly removing and replacing the pavement and structure repairs.

Alternative 1: Diamond Interchange with Realigned South Frontage Road.

This alternative maintains the existing diamond configuration but does modify the existing interchange by spreading out the distance between the ramp terminal intersections. This alternative also calls for the realignment of the south frontage road (Sturgis Road) so to increase the distance between the eastbound ramp terminal intersection and the frontage road intersection. The ramps will also need to be completely regraded to accommodate the adjustments to the mainline as well as increasing the ramp width to today's standard.



Figure 10: Alternative 1 as depicted by the *Interstate 90 Black Hawk – Sturgis Corridor Preservation Study*

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Note: As project design progressed, the crossroad intersection has been moved to the east, moving it closer to the eastbound ramp terminal intersection than as depicted in the figure shown from the *Interstate 90 Black Hawk – Sturgis Corridor Preservation Study's* Final Report above. The actual realignment of Sturgis Road is being completed as part of a separate project and not part of the construction project to reconfigure the Exit 44 interchange. The realignment of Sturgis Road is anticipated to be completed prior to reconstruction of the Exit 44 interchange.

The section of Sidney Stage Road to the south of 218th Street will be obliterated rather than realigned as depicted in the figure shown from the Interstate 90 Black Hawk – Sturgis Corridor Preservation Study's Final Report above. This will also be completed as part of a separate project that will improve and extend the existing Spring Valley Road to Elk Creek Road, located further east (off of the picture).

Alternative 2: Diamond Interchange with Realigned South Frontage Road with Mainline I-90 Under Crossroad.

This alternative is similar to Alternative 1 with one major difference. This configuration will also invert the crossroad and I-90 to have the crossroad go over I-90. As with Alternative 1, this alternative calls for the realignment of the south frontage road (Sturgis Road) so to increase the distance between the eastbound ramp terminal intersection and the frontage road intersection. This alternative also opens the possibility for a grade separated rail crossing of the Canadian Pacific – Dakota, Minnesota & Eastern rail line. The ramps will also need to be completely regraded to accommodate the adjustments to the mainline as well as increasing the ramp width to today's standard.

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Figure 11: Alternative 2

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Alternative 3: Diamond Interchange with Realigned South Frontage Road and Roundabout Eastbound Ramp Terminal Intersection.

This alternative is similar to Alternative 1 with one major difference. As with Alternative 1, this alternative also calls for the realignment of the south frontage road (Sturgis Road) but only west enough to allow for a single roundabout intersection of the crossroad with both the eastbound ramp terminal and Sturgis Road. The ramps will also need to be completely regraded to accommodate the adjustments to the mainline as well as increasing the ramp width to today's standard.



Figure 12: Alternative 3

Further details on the above alternatives can be found in Chapter 7: Alternatives Analysis.

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Chapter 6: FUTURE YEAR TRAFFIC

As congestion is more often dictated by actions at intersections and ramp junctions, analysis on those movements were done independently. Future traffic was estimated for the year 2036 using the May 2013 collected ramp volume data and traffic growth rates for rural Meade County for each road facility type. Meade County's future land use map shows no changes are foreseen within the planning horizon for the interchange's influence area. Per discussions with FHWA on June 18, 2012, only the No Build and the recommended build alternative, Alternative 1, were analyzed.

Alternative 0: No Build

The summation of the traffic operations analyses show that in the future analysis year of 2036, the majority of movements at the Exit 44 interchange will continue to operate within the SDDOT level of service thresholds. Table 5 summarizes the future traffic operations at the ramp terminal intersections whereas Table 6 summarizes the future traffic operations at the ramp junctions with mainline I-90 for the No Build option.

Table 5: 2036 Ramp Terminal Future No Build Level of Service

Intersection / Movement	AM Peak LOS*	PM Peak LOS*
218th Street / I-90 Westbound Ramp	A	A
218th Street / I-90 Eastbound Ramp	A	A

Note: *Average Intersection LOS shown, individual movements may be different.

Table 6: 2036 Exit 44 Ramp Junction Future No Build Level of Service

Interchange	Ramp	Movement	AM Peak LOS	PM Peak LOS
Exit 44	90EB to Off-ramp	Diverge	B	B
Exit 44	90 WB to Off-ramp	Diverge	A	B
Exit 44	On-ramp to 90 EB	Merge	A	A
Exit 44	On-ramp to 90 WB	Merge	B	B

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Alternative 1: Diamond Interchange with Realigned South Frontage Road.

The summation of the traffic operations analyses show that for the proposed improvements of Alternative 1, in the future analysis year of 2036, the majority of the movements at the Exit 44 interchange that showed an anticipated level of service of B in the No Build scenario improved to an anticipated level of service of A due to the increase in ramp taper rates. Table 7 summarizes the future traffic operations at the ramp terminal intersections whereas Table 8 summarizes the future traffic operations at the ramp junctions with mainline I-90 for Alternative 1.

Table 7: 2036 Ramp Terminal Future Alternative 1 Level of Service

Intersection / Movement	AM Peak LOS*	PM Peak LOS*
218th Street / I-90 Westbound Ramp	A	A
218th Street / I-90 Eastbound Ramp	A	A

Note: *Average Intersection LOS shown, individual movements may be different.

Table 8: 2036 Exit 44 Ramp Junction Future Alternative 1 Level of Service

Interchange	Ramp	Movement	AM Peak LOS	PM Peak LOS
Exit 44	90EB to Off-ramp	Diverge	A	A
Exit 44	90 WB to Off-ramp	Diverge	A	B
Exit 44	On-ramp to 90 EB	Merge	A	A
Exit 44	On-ramp to 90 WB	Merge	A	A

Alternative 2: Diamond Interchange with Realigned South Frontage Road with Mainline I-90 Under Crossroad.

Although not analyzed, it can be assumed that the future traffic operations for Alternative 2 would be the same as Alternative 1 since ramp and ramp terminal intersection geometrics would be the same except for the vertical gradeline. With the low ramp volumes projected, vertical grade should not have much affect on traffic operations of the interchange.

Alternative 3: Diamond Interchange with Realigned South Frontage Road and Roundabout Eastbound Ramp Terminal Intersection.

Although not analyzed, it is believed that the future traffic operations for Alternative 3 would be the similar to Alternative 1 in all aspects except for the east bound ramp terminal intersection. With the eastbound ramp terminal intersection being a 6-leg roundabout for this alternative, conducting a basic traffic analysis is problematic and to conduct an appropriate analysis was not deemed feasible since Alternative 3 is not the recommended build alternative for reasons beyond traffic operations.

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Chapter 7: ALTERNATIVES ANALYSIS

Conformance with Transportation Plans

All three build alternatives evaluated conform with current local and state transportation plans.

The existing Exit 44 interchange was first identified as having some minor geometric needs by the 2000 Statewide Interstate Corridor Study. An interchange improvement project for the Exit 44 interchange has been in the Statewide Transportation Improvement Program (STIP) in some form since 2006, and is in the current 2014-2017 STIP for Federal fiscal year 2016.

Compliance with Policies and Engineering Standards

Alternative 0 (No Build) by its definition will not address the known geometric needs of the existing interchange. As such, if Alternative 0 (No Build) is followed, the interchange will not comply with the current South Dakota design standards for inslopes (3:1 versus 6:1 standard), total ramp width (24' versus 25' standard), the right shoulder width (3' versus 8' standard), minimum off-ramp taper (17:1 versus 20:1 standard), minimum on-ramp taper (21:1 versus 50:1), minimum ramp K values (40 versus 84/96 standard), minimum ramp stopping sight distance (318' versus 425' standard), minimum crossroad K values (27 versus 84/96 standard), minimum crossroad stopping sight distance (165' versus 425' standard), maximum crossroad grade (7.9% versus 7% standard) and a clear zone of less than 30'. All three build alternatives will correct these existing geometric issues.

Without major modification to the Canadian Pacific – Dakota, Minnesota & Eastern rail network, the desirable 300' distance between the westbound ramp terminal intersection and the at grade railroad crossing cannot be feasibly achieved. Alternatives 0, 1 & 3 will maintain the approximately 150' distance between the westbound ramp terminal intersection and the at grade railroad crossing. Alternative 2 will allow for a grade separated rail crossing, making the Sidney Stage Road intersection the nearest crossroad access location to the westbound ramp terminal, increasing the distance to approximately 300' from centerline to centerline, with approximately 200' from ramp radius to intersection radius. The Sidney Stage Road intersection will be modified to a T-intersection by the obliteration of Sidney Stage Road south of 218th Street by a separate project to be completed prior to the interchange reconstruction.

Sturgis Road will be realigned to increase the distance between the eastbound ramp terminal intersection and the Sturgis Road intersection to approximately

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500' by a separate project to be completed prior to the interchange reconstruction.

Environmental Impacts

As part of the *Interstate 90 Black Hawk – Sturgis Corridor Preservation Study*, an environmental assessment for the entire corridor was completed and determined no significant impact for the recommended option. The approved environmental assessment is available at

<http://www.sddot.com/transportation/highways/environmental/assessments/docs/MasterFinalEAandFONSISeptember292008.pdf>

Safety

Upon reviewing the reported crash data shown in Table 4 of Chapter 3, one can easily ascertain that the majority of the crashes are single vehicle crashes, including over 90% of all the crashes within the interchange's influence area and 100% of the injury/fatality classified crashes during the reporting period (2008 thru 2012). Most of those crashes resulted in citations for over driving weather conditions, which would suggest that they are more driver caused than geometric issues. This would, however, suggest that new pavement with a higher friction factor could aid in the prevention of future crashes.

In addition, although only two (9%) of the crashes were ramp terminal related, moving the intersection of Sturgis Road west along the crossroad to create a greater separation between the Sturgis Road and I-90 eastbound ramp terminal intersections will, in theory, reduce conflicts between the intersections.

Operational Performance

A limited traffic operations study was conducted and determined that there are no currently observed issues with any interchange specific movements, and it is anticipated that there will be minimal effect on those movements by any of the build options.

Alternatives 1 & 2 do show better future operational performance at the I-90 ramp terminal intersections than Alternatives 3 (Eastbound Ramp Terminal Roundabout) shows for the I-90 ramp terminal intersections.

Alternatives 1 & 3 is estimated to be able to be completed within 1 construction season with the crossroad remaining open to traffic during most construction activity. Because of the grade changes, construction of Alternative 2 is estimated to take up to 2 construction seasons and will require complete closure of the crossroad for the majority of the construction activity. The effect of closing the crossroad for construction of Alternative 2 will require additional detours and

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delay for users of the local network during construction as compared to Alternatives 1 & 3.

Evaluation Matrix

	Alternative 0 No Build	Alternative 1 Diamond	Alternative 2 Diamond with Mainline I-90 Under	Alternative 3 Diamond with Roundabout EB Ramp Terminal
Meets all SDDOT Geometric Design Criteria	No	No*	No* (Yes with Grade Separated RR Crossing)	No*
Meets SDDOT Access Criteria	No	No*	No* (Yes with Grade Separated RR Crossing)	No
Ramp Terminal to Nearest Access Point Distance	60'	100' (RR Crossing) 300' Road	300'	0' (Service Road is part of the ramp terminal roundabout)
Lowest Ramp Terminal Intersection Level of Service, 2036	B	B	B	B
Construction Duration	None	1 Construction Season	2 Construction Seasons	1 Construction Season
ROW Impacts	None	Minimal	Some	Minimal
Environmental Impacts	None	Minimal	Minimal	Minimal
Safety Improvement	None	Some	Some	Minimal
Bicycle / Pedestrian Improvements	None	Better	Better	Good

- At-grade railroad crossing is within the control of access along the crossroad.

Coordination

The SDDOT has a long history of public involvement in the development of transportation plans and projects. Public Meetings were held as part of the *Interstate 90 Black Hawk – Sturgis Corridor Preservation Study* in February, May and August of 2004.

Specific to this interchange project, land owner meetings are not anticipated, as all necessary right of way was purchased for a previous project.

As part of the environmental assessment for the *Interstate 90 Black Hawk – Sturgis Corridor Preservation Study*, a website was established that provided access to the environmental documents and displays public open houses. A screenshot of the website can be seen in Figure 13. The website is no longer active, but the approved environmental assessment is available at <http://www.sddot.com/transportation/highways/environmental/assessments/docs/MasterFinalEAandFONSISeptember292008.pdf>.

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I-90 Environmental Assessment
(Exit 40 to Exit 50)

[Purpose & Need](#) [Study Area](#) [Alternatives](#)

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Welcome...

The South Dakota Department of Transportation (SDDOT) is continuing work on an Environmental Assessment (EA) for the I-90 corridor between Exit 40 and Exit 50.

Please read about the general scope of this project on the [Study Area](#) page. The preferred alternative alignments for the north and south service roads appear on the [Alternatives](#) page. Public comments received at the two public meetings are summarized on the [Public Meetings](#) page.

The project schedule has been delayed due to additional time required to coordinate appropriate service road alignments with the State Historic Preservation Office and affected landowners. Also, SDDOT's project schedule for the service road on the north side of I-90 between Exits 44 and 46 has been delayed until 2011 due to sharp increases in construction costs. Consequently, the 30-day public comment period for the Draft EA document is tentatively scheduled to begin in February 2008. The date of availability of the document for review and the date of the public meeting will be announced in this website and in the third and final project newsletter in February 2008.

Contact us with your questions and comments.

Last updated: December 16, 2007

A South Dakota Department of Transportation **SDDOT** Project Website

Figure 13: Screenshot of I-90 Black Hawk to Sturgis Environmental Assessment Webpage

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Chapter 8: FUNDING PLAN

The planned project to replace the existing Exit 44 Interchange is currently estimated to cost \$29.555 million (in 2013 dollars). The SDDOT is currently anticipating funding the project with the combination of funding sources as shown in Table 10.

Table 10 : Anticipated Funding Allocation Breakdown				
State Funding Category	Federal Funding Category	Federal Funds	State Funds	Total Funds
Interstate	National Highway Performance Program	\$25.589 Million	\$3.966 Million	\$29.555 Million
Total		\$25.589 Million	\$3.966 Million	\$29.555 Million

Note: As funding is fluid, category breakdown may be different at time of project authorization.

As the project is anticipated to be let to contract in Federal fiscal year 2016, the inflated estimated cost for the overall project is \$31.364 Million.

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Chapter 9: RECOMMENDATIONS

This modification request is to slightly reconfigure the existing Exit 44 interchange, but maintaining the diamond configuration, as shown in Figure 10 in Chapter 5.

This recommendation addresses the eight policy requirements for new or revised access points to the existing Interstate system published in the Federal Register Volume 74 Number 165; August 27, 2009.

1. The need being addressed by the request cannot be adequately satisfied by existing interchanges to the Interstate, and/or local roads and streets in the corridor can neither provide the desired access, nor can they be reasonably improved (such as access control along surface streets, improving traffic control, modifying ramp terminals and intersections, adding turn bays or lengthening storage) to satisfactorily accommodate the design year traffic demands (23 CFR 625.2(a)).

This modification request is to reconfigure an existing interchange. No additional access to the Interstate System is being requested. The reconfiguration of the existing interchange will have a negligible effect on the Interstate's traffic operations when compared with the existing interchange's configuration.

The 2001 *Interstate Corridor Study* reviewed the existing interchange characteristics. Existing geometric features were reviewed using the original construction plans for the interchange. Some of the geometric deficiencies for the interchange include:

- The inslopes for the on the ramps being 4:1.
- The width for all the ramps is only 24'.
- The unsignalized intersection of Sturgis Road and 218th Street is located about 60' west of the eastbound ramp terminal intersection.

Additionally, both the pavement and the bridge structures of the interchange are in need of major rehabilitation or replacement. The mainline I-90 pavement through the intersection is 1958 Mesh design and showing signs of aggregate reactivity. The structures for Exit 44 are classified as structurally deficient with a deck rating of Poor.

2. The need being addressed by the request cannot be adequately satisfied by reasonable transportation system management (such as ramp metering, mass transit, and HOV facilities), geometric design, and alternative improvements to the Interstate without the proposed change(s) in access (23CFR 625.2(a)).

This modification request is to reconfigure the geometrics of an existing interchange. No additional access to the Interstate System is being requested.

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Existing characteristics and development in the vicinity of the existing interchange limited the cost feasible options for interchange reconfiguration.

The *Interstate 90 Black Hawk – Sturgis Corridor Preservation Study* initially developed three build alternatives, which were then narrowed down to two feasible alternatives for the corridor's environmental assessment (EA). Both alternatives looked at by the EA were a diamond configuration with the eastbound ramp terminal intersection shifted to the west of its current location to provide greater separation between the ramp terminal intersections. The first alternative maintained I-90 over the crossroad whereas the second alternative called for both mainline I-90 and the crossroad being regraded to provide for the crossroad over.

The diamond configuration maintaining I-90 over the crossroad was eventually selected as the preferred option by the EA primarily for costs. The EA's preferred option also involved realigning Sturgis Road to move the intersection of Sturgis Road and the interchange crossroad (218th Street) further west to provide separation between the Sturgis Road intersection and the eastbound ramp terminal intersection, which will be completed with another project that will be completed prior to the interchange reconstruction. This will vastly improve the spacing between the eastbound ramp terminal intersection and the Sturgis Road intersection of 218th Street. The increase in distance between the intersections improves the operation of the crossroad intersections, including the ramp terminal intersections by providing additional queue space for left turns.

There are no areas within the State of South Dakota that will consistently experience congestion levels extreme enough to make ramp metering or HOV facilities economically feasible in the foreseeable future.

3. An operational and safety analysis has concluded that the proposed change in access does not have a significant adverse impact on the safety and operation of the Interstate facility (which includes mainline lanes, existing, new, or modified ramps, ramp intersections with crossroad) or on the local street network based on both the current and the planned future traffic projections. The analysis shall, particularly in urbanized areas, include at least the first adjacent existing or proposed interchange on either side of the proposed change in access (23 CFR 625.2(a), 655.603(d) and 771.111(f)). The crossroads and the local street network, to at least the first major intersection on either side of the proposed change in access, shall be included in this analysis to the extent necessary to fully evaluate the safety and operational impacts that the proposed change in access and other transportation improvements may have on the local street network (23 CFR 625.2(a) and 655.603(d)).

Requests for a proposed change in access must include a description and assessment of the impacts and ability of the proposed changes to safely and

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efficiently collect, distribute and accommodate traffic on the Interstate facility, ramps, intersection of ramps with crossroad, and local street network (23 CFR 625.2(a) and 655.603(d)). Each request must also include a conceptual plan of the type and location of the signs proposed to support each design alternative (23 U.S.C. 109(d) and 23 CFR 655.603(d)).

A limited analysis of the impact of the proposed interchange modification at Exit 44 on the Interstate's operations was completed as per discussions with FHWA documented on January 7, 2011, June 18, 2012, and June 24, 2013. This analysis indicates no operational issues at the interchange.

Alternative 1: Diamond Interchange with Realigned South Frontage Road (Recommended Alternative).

Figure 10 shows the recommended alternative of a diamond interchange with the crossroad under I-90, similar to the existing interchange configuration.

The intersection LOS results of the ramp terminal intersections with 218th Street are shown for the year 2036 in Table 7

One of the key factors that can affect the safety and operations of an interchange is the permanent signing associated with the interchange. As the proposal is for replacement of an existing interchange, not much change in permanent signing is anticipated from the permanent signing that is currently in place. As such, the permanent signing plan for the new interchange has not yet been developed. The existing signing of the existing interchange can be seen in Figure 14.

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Figure 14: Existing Signing

4. The proposed access connects to a public road only and will provide for all traffic movements. Less than “full interchanges” may be considered on a case-by-case basis for applications requiring special access for managed lanes (e.g., transit, HOVs, HOT lanes) or park and ride lots. The proposed access will be designed to meet or exceed current standards (23 CFR 625.2(a), 625.4(a) (2), and 655.603(d)).

The access improvement will maintain a connection to a public road (218th Street) and will replace the current full access interchange with a reconfigured full access interchange. The reconfigured interchange will continue to provide for all traffic movements. The improvement will meet or exceed current standards for Federal-aid projects on the Interstate system.

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5. The proposal considers and is consistent with local and regional land use and transportation plans. Prior to receiving final approval, all requests for new or revised access must be included in an adopted Metropolitan Transportation Plan, in the adopted Statewide or Metropolitan Transportation Improvement Program (STIP or TIP), and the Congestion Management Process within transportation management areas, as appropriate, and as specified in 23 CFR part 450, and the transportation conformity requirements of 40 CFR parts 51 and 93.

The proposed interchange improvement is consistent with local land use plans, the STIP, and the Rapid City MPO transportation plans.

6. In corridors where the potential exists for future multiple interchange additions, a comprehensive corridor or network study must accompany all requests for new or revised access with recommendations that address all of the proposed and desired access changes within the context of a longer-range system or network plan (23 U.S.C. 109(d), 23 CFR 625.2(a), 655.603(d), and 771.111).

Previous studies conducted in the past 12 years (the *South Dakota Interstate Corridor Study* completed in February 2001, the *Interstate 90 Black Hawk – Sturgis Corridor Preservation Study* completed in December 2004, and the 2010 *South Dakota Decennial Interstate Corridor Study* completed in November 2010) indicated no need for any future interchange additions along the segments of Interstate 90 between Exit 44 and the adjacent exits.

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7. When a new or revised access point is due to a new, expanded, or substantial change in current or planned future development or land use, requests must demonstrate appropriate coordination has occurred between the development and any proposed transportation system improvements (23 CFR 625.2(a) and 655.603(d)). The request must describe the commitments agreed upon to assure adequate collection and dispersion of the traffic resulting from the development with the adjoining local street network and Interstate access point (23 CFR 625.2(a) and 655.603(d)).

The proposed interchange modification is the result of the *Interstate 90 Black Hawk – Sturgis Corridor Preservation Study* and the corresponding *I-90 Environmental Assessment (Exit 40 to Exit 51)*. The study was jointly coordinated by SDDOT, Meade County, and FHWA staff.

The reconfiguration of the interchange is being proposed to address future traffic growth relative to the anticipated future population growth of the entire Northern Black Hills. After analysis of several alternatives for the corridor, the *Interstate 90 Black Hawk – Sturgis Corridor Preservation Study* recommended the relocation of several service roads, the redesign of several interchanges, and the reconstruction and widening of the I-90 mainline in some areas between Black Hawk and Sturgis when traffic and condition warrants. Unfortunately, both terrain restraints of the Northern Black Hills and the location of nearby federal lands create a geographic bottleneck that limits the amount of parallel corridors to operationally support I-90 that can be feasibly constructed.

8. The proposal can be expected to be included as an alternative in the required environmental evaluation, review and processing. The proposal should include supporting information and current status of the environmental processing (23 CFR 771.111).

The proposed revised access is included in the 2014-2017 STIP for 2016 and is the result of the corridor's environmental assessment completed in September 2008.