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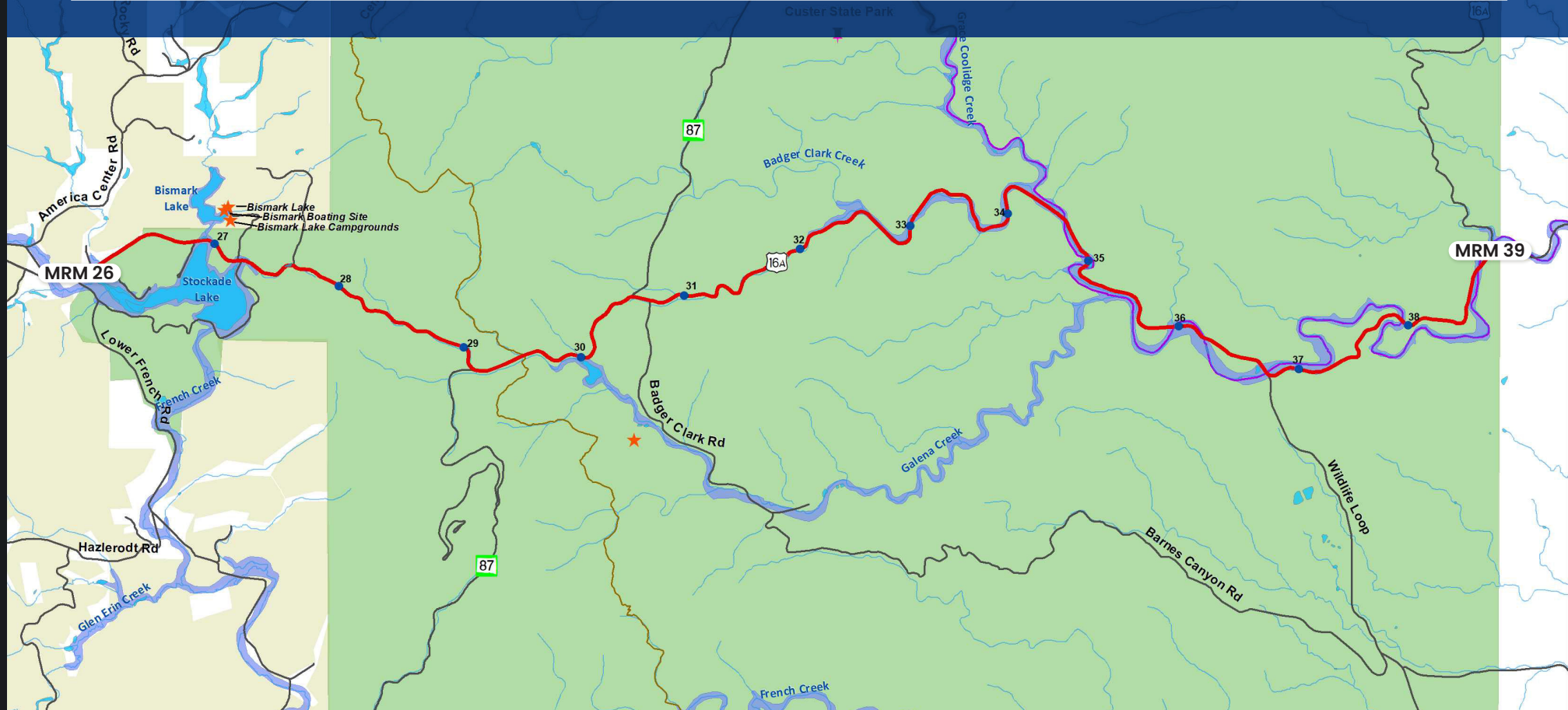
BLACK HILLS CONTEXT SENSITIVE CORRIDORS STUDY

PHASE 3 REPORT | CORRIDOR 7: US 16A-CUSTER STATE PARK



Black Hills
CONTEXT SENSITIVE CORRIDORS STUDY

PHASE 3 REPORT

CORRIDOR 7 – US HIGHWAY 16A CUSTER STATE PARK

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1. INTRODUCTION

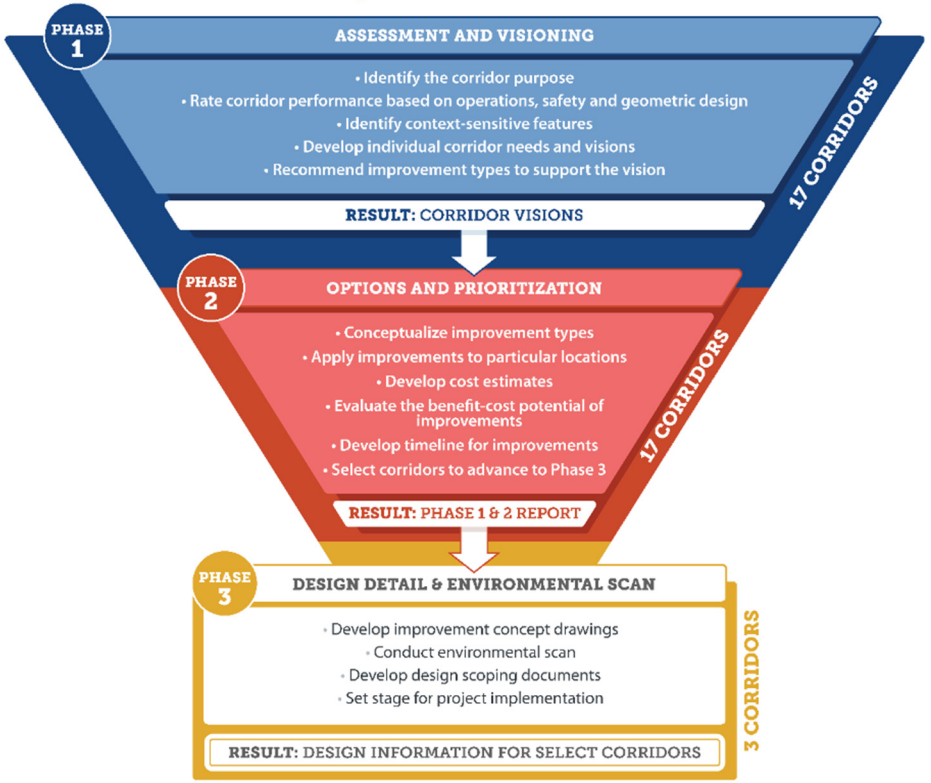
The Black Hills Context Sensitive Corridors Study team has crafted visions for improving 17 corridors in the scenic Black Hills of South Dakota. These corridors traverse topography substantially different from other areas in the state and serve functions that emphasize the drive/ride experience provided by the road along with the ability to convey traffic.

While the environment surrounding the study corridors and the reasons some travelers are present on the routes are different from South Dakota Department of Transportation (SDDOT) routes in other parts of the state, the SDDOT has the same responsibility to maintain safe routes in a good state of repair. Fulfilling this responsibility incorporates applying the SDDOT design guidelines to address lane width, curve radius, shoulder and clear zone. Even when these standards are adjusted to account for mountainous conditions, a standard design configuration may impact adjacent terrain, geologic features, and/or streams and may bring a perceived negative impact to corridor user experience. The study has addressed each impact perceived as a challenge by balancing engineering guidelines with the sensitive contextual conditions of the area.

The visions for improving these corridors were assembled through the application of Context Sensitive Solutions (CSS) principles. The visions recommend the types of transportation improvements to be applied to each corridor and provide preliminary locations and future prioritization of improvements.

The study has followed a program of three phases, as shown on **Figure 1**. Upon completion of corridor visioning through Phases 1 and 2, the study team identified a subset of corridors for further design detail and environmental evaluation in Phase 3. The vision for improving Corridor 7, US Highway 16A Custer State Park, was selected for further development in Phase 3 to provide information needed for the SDDOT to implement corridor projects.

Figure 1. Study Phases



1.1 Study Area

Corridor 7 is US Highway 16A extending 13 miles through Custer State Park. **Figure 2** displays the corridor limits. It is located within Custer County within the Black Hills National Forest. The current section of Corridor 7 provides 2 travel lanes throughout with wider shoulders within the westernmost 1.5 miles and more narrow shoulders throughout the remainder of the corridor. The roadway alignment winds through scenic surroundings, and is itself a portion of the Peter Norbeck Scenic Byway. **Appendix A** provides a map view of the corridor and current characteristics.

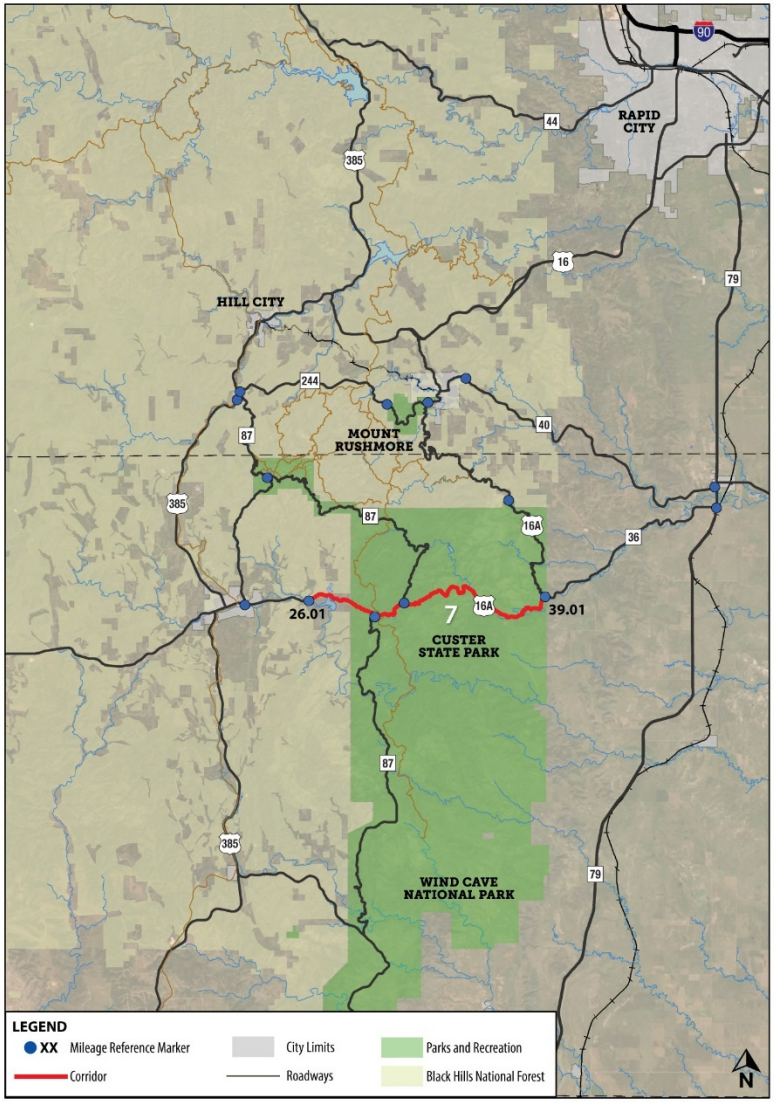
1.2 Phase 3 Report Content

The Phase 3 effort creates more detailed layouts, documents potential impacts, and provides review with project participants and the public. Phase 3 of the overall project is the focus of this document, including:

- Review the Context Sensitive Solutions (CSS) steps taken to develop, evaluate, screen, and recommend alternatives.
- Restate the corridor vision to support this document being standalone and separate from the Phase 1 and 2 document.
- Detail corridor enhancement design information to document the scope of potential improvement projects fitting within the defined corridor vision.
- Document corridor proposed concepts to be carried forward into conceptual and final design as improvements are advanced through project development when the need and funding are coordinated.

This report reviews the corridor vision developed in Phase 1, highlights the improvements recommended in Phase 2, and provides the additional design and environmental Phase 3 information for Corridor 7.

Figure 2. Study Corridor Location



2. CONTEXT-SENSITIVE PROCESS

CSS principles were used as a framework for developing the study. As applied in many transportation infrastructure projects, CSS provides a method for planning, designing, and constructing infrastructure improvements that are consistent with the purpose and role fulfilled by a corridor.

CSS operates with the following core principles (fhwa.dot/gov/planning/css):

- Strive toward a shared stakeholder vision to provide a basis for decisions
- Demonstrate a comprehensive understanding of contexts
- Foster continuing communication and collaboration to achieve consensus
- Exercise flexibility and creativity to shape effective transportation solutions, while preserving and enhancing community and natural environments

While the study represents a less formal implementation of CSS, these principles have guided the study team toward successful completion of Phases 1 and 2. Described as follows, stakeholder and public collaboration has supported the technical work, and the study team followed a series of steps to reach outcomes in line with CSS principles.

2.1 Study Oversight

Central to creating the context sensitive plan was discussion and information sharing with state/federal agency, county, and appropriate local jurisdictions throughout plan development. Before initiating the work, the SDDOT identified and invited representatives from the following agencies to participate on the Study Advisory Team (SAT):

- United States Forest Service, including representatives from each Ranger District in the region; with Hell Canyon, Northern Hills, Mystic, and Black Hills National Forest invited to participate
- United States National Park Service representatives from Jewel Cave and Mount Rushmore properties
- South Dakota Game Fish and Parks representatives from Custer State Park
- Spearfish Canyon Association
- Federal Highway Administration

SDDOT representatives from the following divisions participated on the SAT:

- Administration
- Bridge Design
- Custer Area Office
- Project Development
- Rapid City Area Office
- Rapid City Region Office
- Road Design
- Transportation Inventory Management

The SAT's role was to oversee the major project milestones, provide technical input, and monitor the progress of the planning process.

2.2 Stakeholder and Public Collaboration

In addition to ongoing guidance from the SAT, efforts were made to obtain feedback from other interested groups. The study team contacted a broad list of potential stakeholders and met with many representatives.

2.2.1 Phase 1 and 2 In-Person Public Meeting

In Phase 1, stakeholder input was received through the following efforts:

- Small group meetings with adjacent landowners/stakeholders with an interest in individual or a range of corridors.
- Municipal representative meetings in which current issues and future development traffic impacts on the corridors were discussed. Entities included the cities of Custer, Hermosa, Spearfish, Lead, and Deadwood.
- Meetings with the Black Hills Council of Governments and Chambers of Commerce associated with the cities of Spearfish, Lead, and Deadwood, along with the School District encompassing the Lead and Deadwood area.
- Individual agency meetings with staff responsible for specific properties along one or more of the corridors, including Custer State Park.

General public meetings in support of Phases 1 and 2 were held in both the north and south regions of the study area in August 2018. Each meeting was broadcast live via YouTube. Participants had the opportunity to comment on issues they experience within one or more corridors and their perception of corridor desired functions. In-person attendees and people participating remotely (live or delayed through watching the recorded meeting) were provided with the opportunity to send comments and/or questions via email.

A website was established to provide current information and serve as a tool for public feedback throughout Phases 1 and 2 of the study.

2.2.2 Phase 3 Virtual/Remote Public Meeting

Due to restrictions associated with COVID-19, the opportunity to communicate with the public and receive feedback was provided virtually through displays and recorded presentations available on the project website. Information provided through the website included:

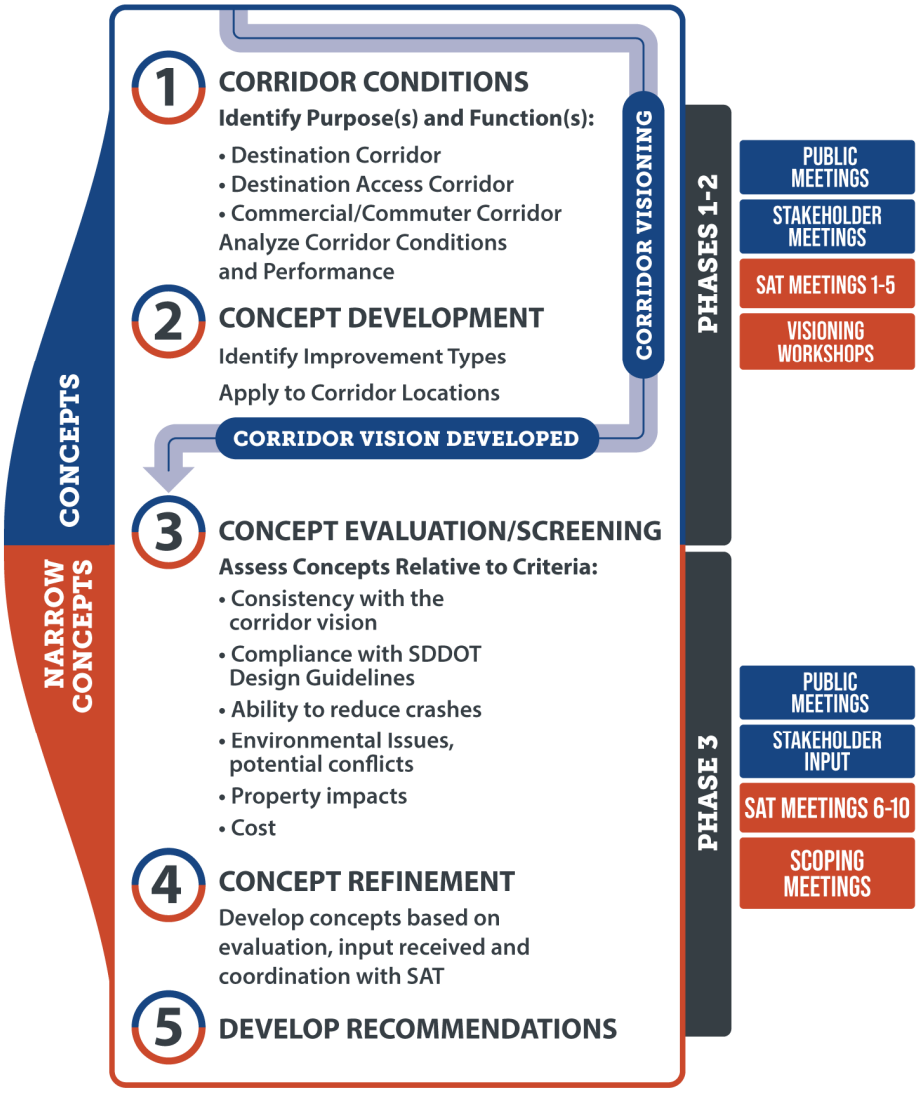
- Informational narrated recordings reintroducing the individual corridors, presenting alternatives to address needs/gaps, and summarizing results of alternative assessment relative to a consistent set of evaluation criteria.
- Detailed concept diagrams of the range of alternatives being considered to address needs within the definition of context sensitivity, including potential impact areas and types of impacts.
- Contact information for residents, business representatives, and other stakeholders to provide feedback and/or discuss with consultant team members their questions/concerns about the study process, alternatives, or findings.

2.3 Context Sensitive Visioning and Concepts

Figure 3 outlines the steps taken to reach a corridor vision and then develop, evaluate, screen, and recommend a design concept through the Context Sensitive Corridors Study. Phases 1 and 2 involved collecting pertinent information about each of the 17 corridors to understand their purpose and quantify their performance across a range of categories. Possessing this knowledge base, the study team identified improvement types that could be applied to further each corridor's purpose and meet the current and future needs. Improvement types include Design, Multimodal Operations, Safety, Intelligent Transportation Systems (ITS), and Aesthetics. The corridor vision includes locations for improvement types, assessments of costs and benefits, and timelines for implementing corridor improvements.

Criteria such as purpose/design inconsistency, safety benefit/cost, crash frequency and urgency of condition were used to advance a subset of corridors to Phase 3. In Phase 3 detail has been added to corridor improvements to better understand potential impacts associated with adding shoulder width, realigning segments, adding retaining walls and guardrail, and/or improving access into/out of the individual corridors to address safety and geometric deficiencies. The intent of Phase 3 is to narrow concepts and advance recommendations while increasing the detail provided. In addition to the concept layouts, a deliverable for Phase 3 is an environmental scan document.

Figure 3. Concept Development and Visioning Process



3. VISIONING

This section addresses the development of the context sensitive vision for US 16A through Custer State Park.

3.1 Purpose, Performance, and Needs

The study team developed a rating system to display key corridor conditions, including:

Purpose – The corridors are assigned ratings based on their tendency to serve as Destination, Destination Access, or Commuter/Commercial roadways. The rating system allows recognition of multiple purposes served within the same corridor and serves as a background for identifying and selecting appropriate corridor improvements.

In a Destination Corridor, driver/passenger experience of the road is the reason for the trip. Curves, narrower lanes, and slower speeds are not considered deficiencies but rather desirable characteristics of the adventure provided by the trip.

A Destination Access Corridor describes a hybrid corridor whose role is to carry travelers between their accommodation location (hotel/campground/ home) and the recreation venue to be visited. In addition, as the corridor provides direct access to a nature/park site, the environment next to the road traveled may also provide a complementary scenic view as part of the trip.

A Commuter/Commercial Corridor provides connectivity between residential and employment areas and/or is intended to carry goods from one point in the region to another or through the region. A Commuter/Commercial Corridor emphasizes vehicle throughput over access to adjacent property, reduced and reliable travel time, and lane and shoulder widths commensurate with commercial vehicles.

Corridor 7 is characterized primarily as a Destination Access Corridor, serving an access role to convey visitors to Custer State Park. The corridor is nearly equally a Destination corridor, providing an enjoyable scenic travel experience. In addition to these functions, US 16A is the primary roadway connection from Custer to SD Highway 79, thereby serving a commuter/commercial purpose.

User Mix – Corridors were reviewed relative to the traffic volume and user type/vehicle mix observed in the corridor compared to the other 16 corridors in the study. Traffic volumes are relatively high, approximately 2400/3000 weekday/weekend vehicles per day currently with potential to reach 3000/4100 by the Year 2050. Within this overall volume, data indicate that the composition of vehicle types tends toward higher percentages of bus/RV traffic. Pedestrian activity is common crossing and along the roadway due to activity centers, attractions and campgrounds adjacent to the roadway throughout the corridor.

Context – The nature and intensity of unique features "beyond the pavement" along the corridor are rated. Along Corridor 7, the State Park surroundings present unique viewsheds, wildlife presence and a high degree of enjoyment for travelers and users. Unique geological features are observable from the roadway.

Traffic Operations – Traffic operations are rated based on Level of Service (LOS) findings for current and projected Year 2050 traffic levels compared with SDDOT LOS criteria. Current and future traffic operations were found to be acceptable.

Safety –Safety is rated based on the relative magnitude of crash history compared with expected norms for roadways of similar type. Overall, Corridor 7 demonstrates slightly below expected total crash frequency with concentrated areas of higher crash experience through horizontal curves. Wildlife and roadway departure crashes show a higher percentage within the total reported crashes.

Road Design – Geometric features of the roadway are rated relative to conforming to established standards. Along Corridor 7, design deficiencies exist with respect to shoulder width, clear zone and sight distance. Corridor 7 contains numerous tight horizontal curves signed with advisory speeds.

Table 1 summarizes the key characteristics.

Table 1. Corridor Characteristics Summary

Characteristic Category	Description
Purpose	Primary: Destination Access Secondary: Destination and Commuter Commercial
User Mix	Higher traffic volumes, higher percentages of bus/RV vehicles with pedestrian presence throughout. Consider pedestrian safety measures while preserving vehicular capacity for unique and important route
Context	Heavy presence of attractions, amenities, campgrounds and scenery along the roadway. State Park provides wildlife viewing and enjoyable user experience.
Traffic/Safety Conditions	Acceptable current and future 2-lane Level of Service. Corridor 7 demonstrates lower than expected total crash frequency with higher percentages of roadway departure and wildlife collisions at concentrated locations through curves and at more populated wildlife areas.
Road Design	design deficiencies exist with respect to shoulder width, clear zone and sight distance. Horizontal curve (curves with signed advisory speeds) density higher than most study corridors.

3.2 Visioning Results

The corridor vision consists of two elements: 1) a statement describing the envisioned future of the corridor and 2) a list of improvement types and locations that demonstrate the potential to support the vision.

Vision: Portion of Norbeck Byway that balances scenic route and State Park visitors with serving commuter traffic. Needs safety improvements for horizontal curves and nonmotorized treatments.

List of Improvements: The initial range of alternatives developed for Corridor 7 consisted of 48 improvement types categorized as follows:

- **Design**: Improvements or changes to the current physical roadway conditions that focus on lane width, shoulder width, vertical and horizontal curvature of the road, superelevation through a curve, ditch slopes, objects immediately outside the pavement area, and auxiliary lanes aiding entry or exit from the road
- **Multimodal Operations:** Improvements that reduce platooning behind slower moving vehicles, intersection control changes, better accommodating mixed traffic (bicycles, pedestrians and the range of motor vehicles) along and across a road
- **Safety:** Actions/improvements that affect visibility, speed, traction in wet/snow/ice conditions, and feedback if vehicles stray from travel lanes
- **ITS:** The range of vehicle detection and information feedback that influence driver behavior, such as speed management devices, advance warning devices, weather information systems, etc.
- **Aesthetics:** Improvements that may not have an effect on driver behavior but can be measured in crash reduction. However, such improvements are complementary to safety motivated actions and consistent with the context sensitive nature of routes covered in the study.

Improvement types demonstrating the ability to support the vision were identified from this initial list over the course of the two visioning workshops, which in the context sensitive approach played a critical role in balancing the application of improvement types with the preservation of the corridor's unique surroundings. In the workshops,

possessing an understanding of corridor purpose and performance, the study team, SDDOT, and agency staff set initial road design expectations for the design speed and typical section, applying judgment regarding context-sensitive implementation. The workshop attendees selected improvements to deliver safety benefits, improve consistency with SDDOT design standards, and bring the corridor configuration more in line with its designated purpose.

While posted at 35 miles per hour (mph), US 16A includes 23 horizontal curves with lower advisory speed signs. These curves introduce potential safety concerns by limiting sight distance and requiring drivers to adjust speeds and alignment. Such curves in the vicinity of MRMs 31.2, 36.8 (near the Custer State Park Visitor Center) and 37.5 show higher crash experience. While causing some safety concern, the presence of these and other curves also serves to calm traffic speeds and increase driver awareness through a sensitive area. Safety improvements to roadway curvature, where identified, must strike the balance between corridor throughput and visitor enjoyment.

It is not uncommon for end-to-end travelers to encounter slower moving larger vehicles-causing delay. While widening the roadway is not needed for acceptable traffic operations, providing additional pullouts and/or improving current pullouts should be considered.

Pedestrian activity is noted at Legion Lake (MRM 30), the Game Lodge (MRM 36) and the Visitor Center at MRM 36.8. Additional signage and pavement markings/treatments can improve conditions for pedestrian visibility and safety.

Effective improvement types would allow the corridor to better support the characterized purpose and function. A shortened list of improvement types was identified by evaluating the current conditions within the corridor relative to the vision; reviewing the findings from the operations, safety and design evaluations; and receiving input from the visioning workshops and the public meetings held in support of Phases 1 and 2. **Table 2** highlights the improvement types identified for US 16A.

Table 2. Summary of Improvement Types to Support Vision

Improvement Type	Supports Vision by
Horizontal curve safety improvements	Addressing locations of higher crash experience
Improvements (traffic control and/or turn lanes) at SD 87, Bismark Lake site, Wildlife Loop Road and US 16A intersections	Improves accessibility of adjacent land uses while minimizing impacts to through travel along US 16A
Sight distance improvements	Improve visibility of nonmotorized activity centers and traffic safety
Pullout improvements/additions to accommodate scenery and speed differentials	Addresses needs of commuter traffic
Non-motorized safety improvements to areas of activity	Provides destination awareness for traffic and improves appeal of corridor amenities
Wildlife collision mitigation strategies	Reduces safety hazard for travelers and for wildlife

4. CONCEPT EVALUATION

Understanding the desired corridor travel functions, current and future operations, and the need to support the vision, the study team undertook a series of actions to craft unique actions for Corridor 7. Scoping meetings were also held to identify and discuss ideas about the appropriate improvements to the corridors. The concepts developed and discussed through the scoping represent the range of improvements reviewed through Phase 3.

Considerations informing the development of concepts include:

- **SDDOT road design standards:** The guidance for road design characteristics contained within the Road Design Manual was used as the initial basis for refining the roadway typical sections, design speed, and other parameters. In developing concepts, the study team implemented a context sensitive design approach balancing the meeting of standards with preservation of the unique context of the corridor.

With this approach, the following items were considered in addition to design standards:

- **Corridor purpose and function:** Pursue concepts that assist in aligning the physical layout of the roadway corridor with its purpose and function in the transportation system primarily as a Destination Access route yet possessing characteristics of a Destination route and Commuter/Commercial route; providing access to Custer State Park and supporting amenities while serving through traffic.
- **Corridor characteristics:** Effective concepts will address corridor conditions identified during visioning; including locations where crash frequency and/or severity is higher than expected, locations of contextual features to preserve/protect/avoid, public and stakeholder input, and information from the SAT regarding known concerns and objectives.

4.1 Concept Development

Initial design concepts were developed to meet the following objectives:

- **Traffic Capacity:** The analysis of current and projected traffic volumes indicates that a two-lane highway can accommodate traffic volumes at acceptable LOS into the future. Therefore, a section providing two travel lanes is appropriate.
- **Traffic Safety:** Seek design treatments that demonstrate the potential to reduce the frequency of crashes occurring at horizontal curves and involving wildlife.
- **Intersection Design:** US 16A provides access to numerous and diverse properties. Seek to enhance safety and efficiency of access by realigning/updating intersections. Address current intersection designs contributing to safety concerns.
- **Typical Section – Provide typical section and roadside design meeting SDDOT design standards:** Additional paved width to provide 12-foot travel lanes and 8-foot shoulders would reduce crashes and enhance travel time and reliability. A minimum clear zone of 10 feet is identified as the design objective. Address roadside drainage concerns.
- **Vision Improvements:** Implement technology/Intelligent Transportation Systems (ITS) solutions, including weather sensing equipment and communications devices/network. Provide enhanced wayfinding to emphasize destination guidance.

Table 3 outlines design dimension objectives.

Table 3. Key Cross Section Components – Current and Objective

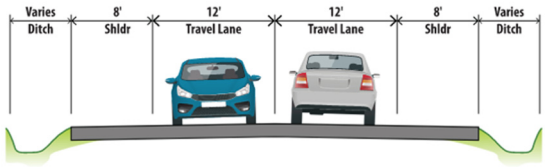
Design Element	Design Dimension	
	Current	Objective
Design Speed	Unknown; posted at 35 MPH	35 MPH
Lane Width	12 ft	12 ft
Shoulder (Paved)	0–8 ft	8 ft
Clear Zone	varies	10

4.2 Typical Section Concepts

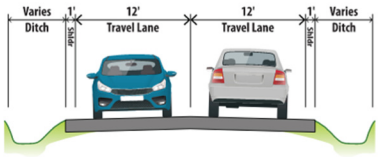
Potential typical section concepts were developed by initially crafting concept layouts that would achieve the design objective then considering appropriate adjustments in light of contextual features. Currently, US 16A provides the typical sections depicted on **Figure 4**. As shown, the western minority portion of the corridor provides the objective shoulder width of 8 feet while the eastern portion generally provides a more constrained shoulder width of 1 foot. A travel lane width of 12 feet is provided throughout.

Figure 4. Current US 16A Typical Sections

MRM 26 to MRM 28

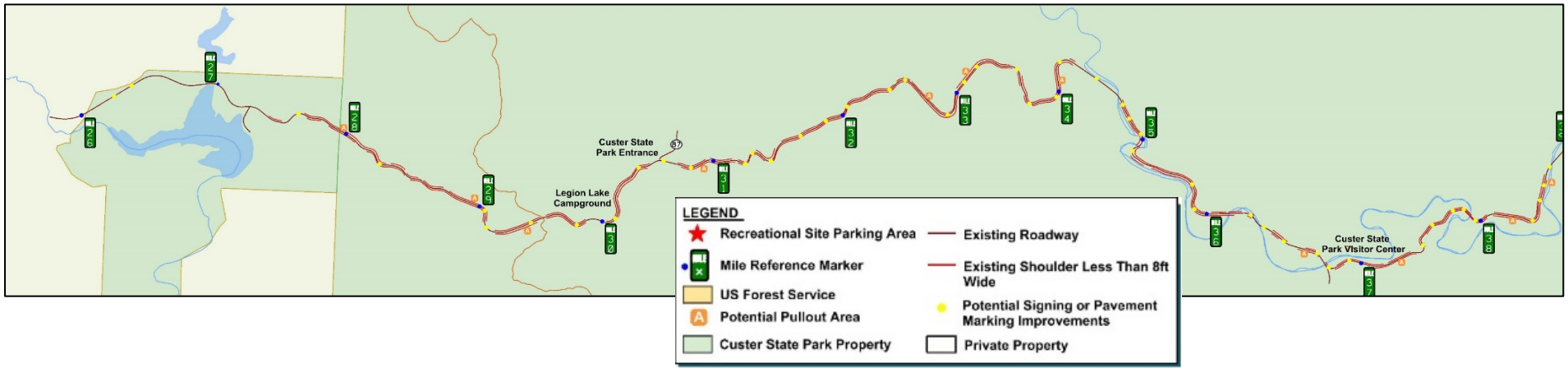


MRM 28 to MRM 39



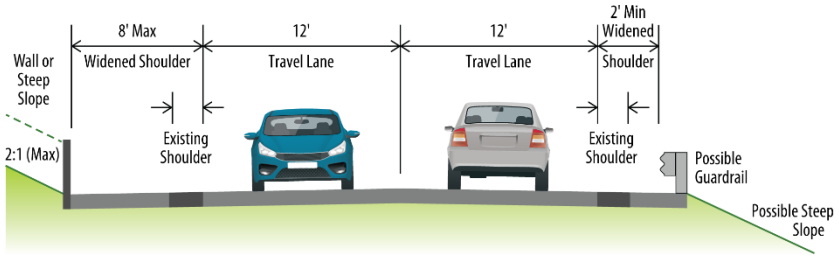
To reflect the design objectives, the study team explored the potential to widen shoulders to 8 feet between MRM 28 and MRM 39. **Figure 5** depicts the locations along the corridor where existing shoulders are less than the objective of 8 feet wide. It was found that the effort to physically widen the shoulder may require tree and/or rock removal,

Figure 5. Widening Areas for 8 Foot Shoulder



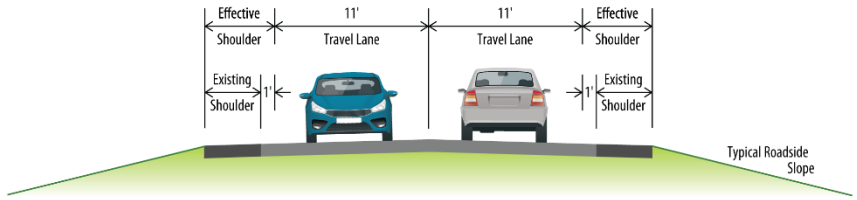
embankment excavation, steep roadway side slopes with barrier or guardrail protection, or a combination of the above to accommodate up so 14 feet of additional roadway surface width. **Figure 6** depicts an option to provide shoulders up to 8 feet in width, requiring adjustment to roadside slope and/or provision of guardrail.

Figure 6. Physical Shoulder Widening Option



To manage the physical impacts associated with widening the roadway to this extent, the study team developed a second option to reapply pavement markings creating 11 foot travel lanes with the additional 1 foot of pavement added to the roadway shoulder. **Figure 7** depicts this option.

Figure 7. Restriping Shoulder Widening Option



Both options were advanced for further SAT consideration and public and stakeholder input.

4.3 Horizontal Alignment Concepts

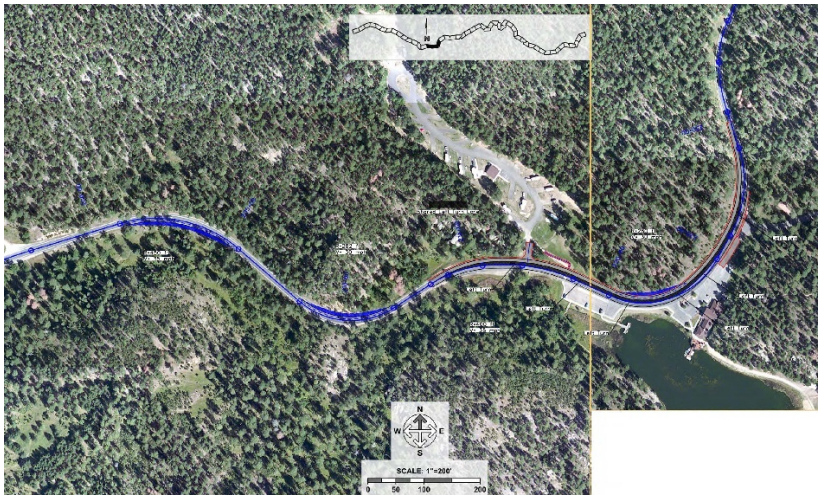
As previously noted, the US 16A corridor is The study team evaluated concepts that would increase horizontal curve radii at several locations along the corridor with the primary goal of improving travel safety. In coordination with the SAT, it was determined that the horizontal alignment of US 16A would remain as-is throughout most of the corridor to limit impacts to the surrounding context. Potential realignment efforts are directed at locations showing potential for enhanced travel safety.

The identified locations are described as follows:

4.3.1 Legion Lake (MRM 30) Adjustments

The roadway currently navigates a series of curves in the vicinity of Legion Lake Lodge. These curves cause limitations in sight distance through an area with heightened pedestrian crossing and vehicular turning activity. **Figure 8** depicts potential smoothing of horizontal curvature west of Legion Lake Lodge. Along with this smoothing, a center left turn lane would be added with improved access delineation.

Figure 8. MRM 30 Realignment

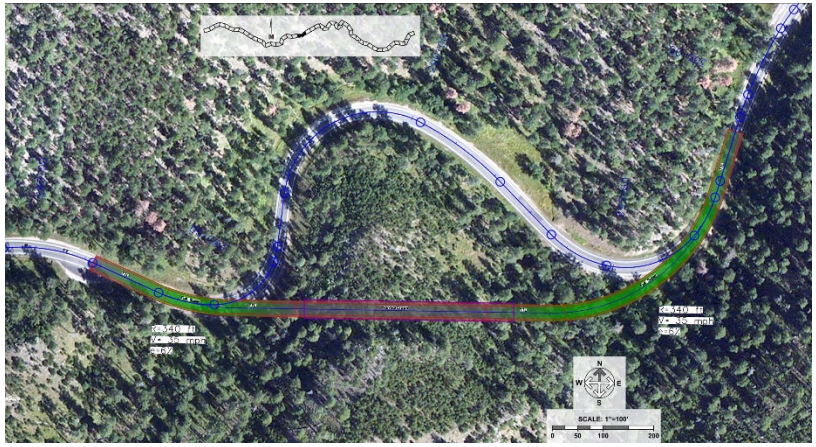


The horizontal realignment would provide 30 mph or greater design speed through the area.

4.3.2 MRM 31.1 Realignment

Three consecutive horizontal curves near MRM 31.1 are currently posted with an advisory speed of 20 MPH. The review of crash information indicates higher than expected frequency and a pattern of roadway departure crashes. The study team evaluated several potential adjustments to horizontal alignment through this area. **Figure 9** depicts a scenario under which the corridor design speed objective of 35 mph could be achieved through these curves.

Figure 9. MRM 31.1 35 mph Option



As shown, this option would significantly impact adjacent land, likely requiring construction of a tunnel beneath the hillside south of the roadway. Based on rough preliminary estimates, tunnel construction cost would likely exceed $75 Million.

Figure 10 depicts a 30 mph advisory speed option, allowing for smoothing of curves while avoiding the need for tunneling.

Figure 10. MRM 31.1 30 mph Option

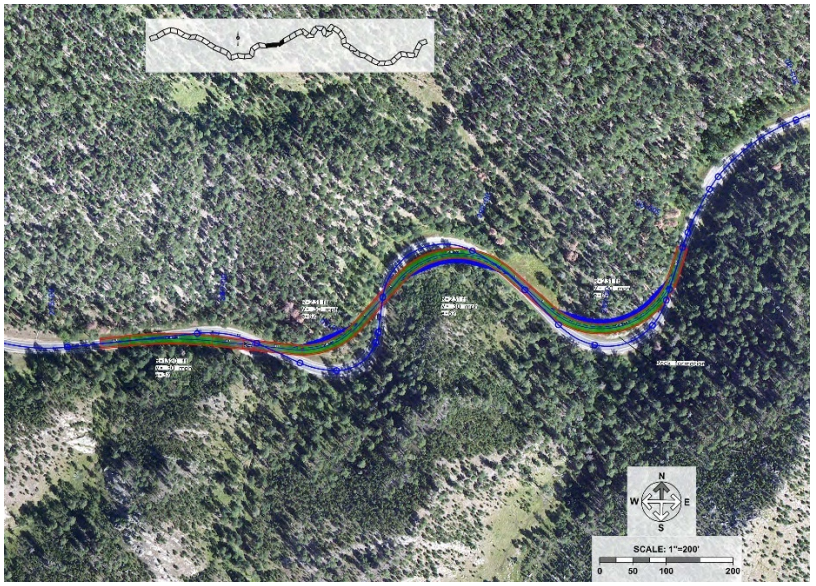
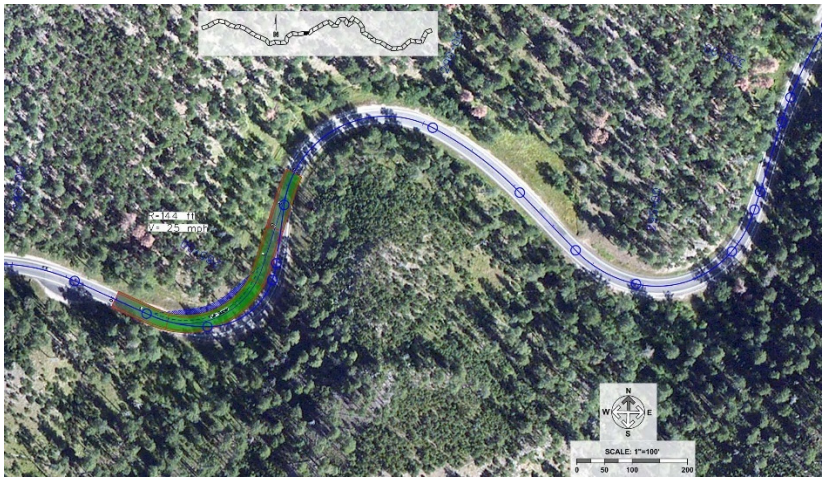


Figure 11 depicts a 25 mph advisory speed option.

Figure 11. MRM 31.1 25 mph Option

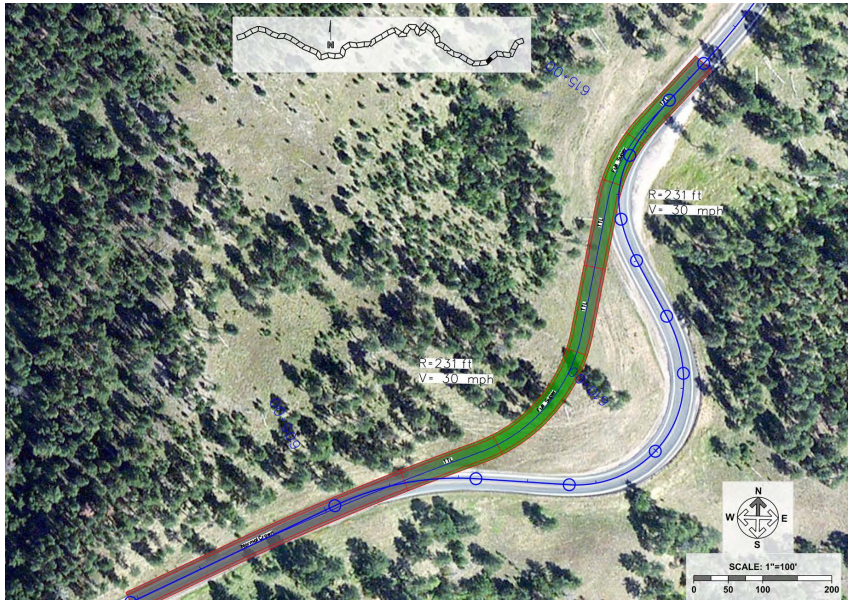


Upon review of the physical impacts and costs with the SAT, the study team advanced the 25 mph option for further consideration and public and stakeholder input.

4.3.3 MRM 37.5 Realignment

Horizontal curves through the MRM 37.5 area are posted at a 20 mph advisory speed, 15 mph below the design speed objective for the corridor. Crash experience through these curves is moderate based on history from 2013 to 2017 showing two motorcycle roadway departure crashes. The study team explored two options for realigning the roadway; one that would achieve a 35 mph design speed and the other a 30 mph advisory speed (depicted on **Figure 12** below for illustrative purposes).

Figure 12. MRM 37.5 30 mph Option



Upon review of the physical impacts of these realignment options and the relatively low frequency of crashes occurring through these curves, the study team determined that no horizontal curve realignment would be advanced for further consideration through the MRM 37.5 area.

4.3.4 Visitor Center/Wildlife Loop Concept

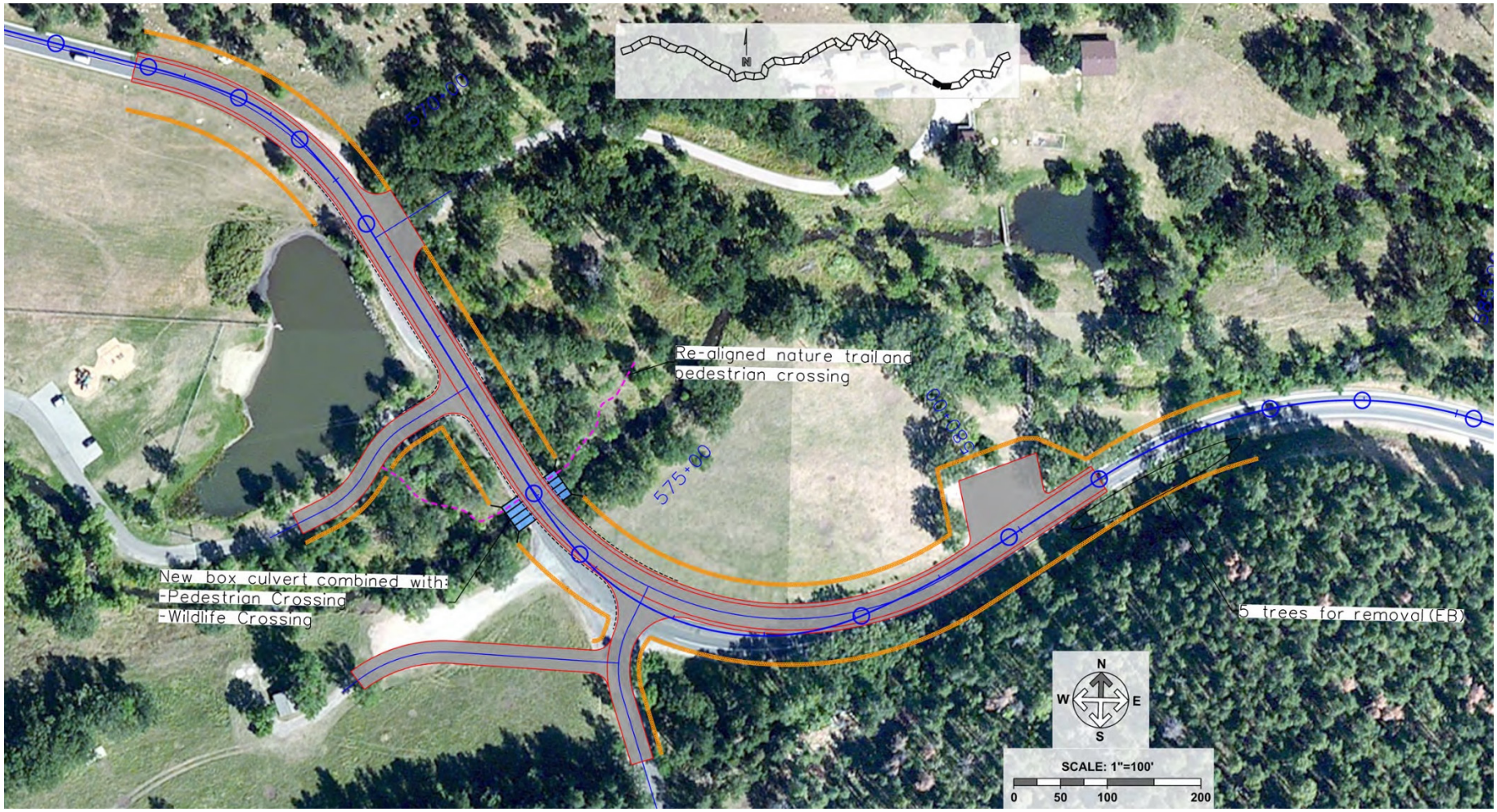
The Custer State Park Visitor Center is located along US 16A near MRM 36.8, near its intersection with Wildlife Loop Road. The area represents a confluence of pedestrian, vehicular and wildlife activity. Wildlife are attracted to this vegetated area and numerous reported vehicle-wildlife collisions reflect this attraction.

Modifications to the intersection with Wildlife Loop and realignment of US 16A were identified to improve sight distance approaching and at the intersection. This concept would include relocating the intersection and various driveways and service roads serving the area. Some roadside clearing would also be required. Non-motorized user accommodations are also planned at this location, including modifications to parking areas and construction of a series of box culvert structures under US 16A that will have three distinct purposes:

1. continue to effectively convey water under US 16A,
2. provide a possible crossing beneath US 16A for wildlife as wildlife-vehicle collisions have been reported in this area, and
3. accommodate planned and existing trail features and provide a pedestrian crossing under US 16A.

Wildlife fencing was considered through this section to supplement the box culvert construction and increasing the effectiveness of a wildlife crossing. However, it was felt that the fence would negatively distract from the scenic nature of the area and restrict pedestrian access. As such, wildlife fence was not advanced for further consideration as as part of this option.

Figure 13. Visitor Center Area Concept

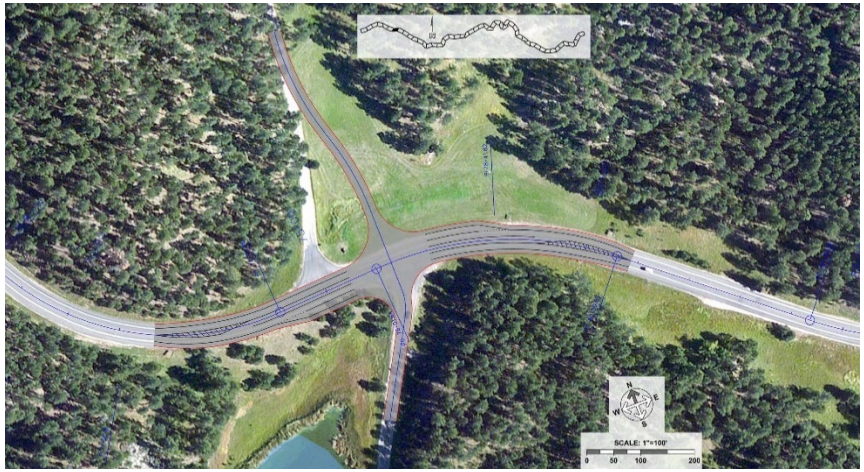


4.4 Intersection and Access Concepts

4.4.1 MRM 26.2 Stockade Lake Drive

The intersection of US 16A with Stockade Lake Drive and the entrance to the Bismarck campground is proposed to be reconstructed as an aligned intersection at a new location slightly east that would better balance available sight distance on all legs of the intersection. In addition, US 16A would be widened to provide for dedicated right and left turn lanes. **Figure 14** provides a graphical depiction of the concept.

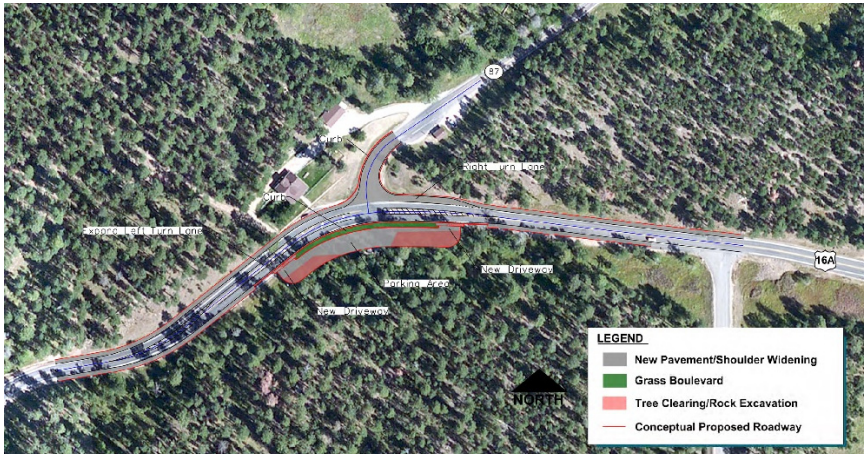
Figure 14. Stockade Lake Intersection Realignment Concept



4.4.2 US 16A/SD 87 Intersection

The US 16A intersection with SD 87 is a major junction within Custer State Park and provides a gathering point for visitor traffic. The intersection concept would widen the roadway to provide right and longer left turn lanes along US 16A. The improvements would also include construction of a more formal and controlled parking area south of US 16A near the existing Park Access and Visitor Information station. This, added parking in combination with curb sections along SD 87, approaching the intersection, is intended to discourage on-street parking along SD 87 and US 16A in the vicinity of the intersection.

Figure 15. US 16A/SD 87 Intersection Concept



4.5 Additional Concepts

4.5.1 Pullout Locations

With the scenic nature and use of the US 16A corridor, another need identified related to the roadway section is provisions for designated pullout opportunities along the corridor. Such pullouts provide a refuge for drivers needing a short pause and allow faster moving traffic to progress more safely and efficiently. It also provides an opportunity for safe viewing of the corridor landscape. Exact locations for the pullouts need to consider a number of factors including what roadside impacts may exist and whether there is ample sight distance for approaching drivers and those using the pullouts to safely operate. An initial assessment identified 11 potential locations along the corridor for installing or improving pullouts.

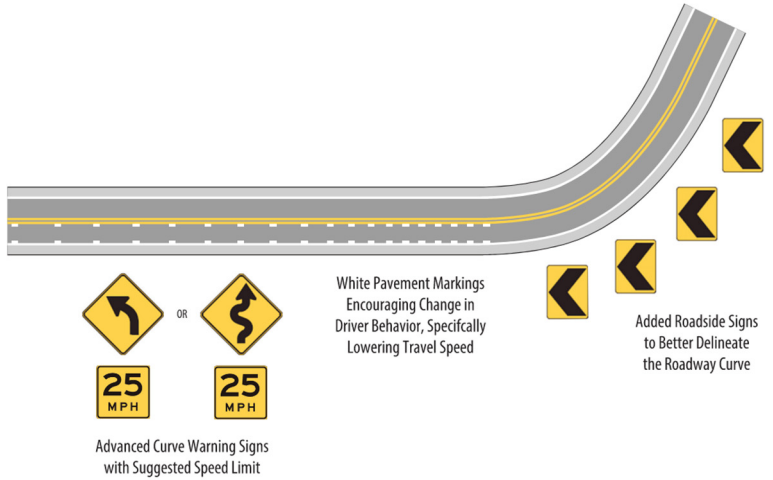
4.5.2 Horizontal Curve Safety Treatments

For locations where roadway realignment is not feasible, existing roadway curvature is not conducive to speed limit travel, or a history of crashes exist, a less impactful and lower cost improvement in the form of roadway signs and pavement markings can be considered. **Figure 16** depicts some of these traffic control strategies that can be considered individually or in combination for a given roadway curve or curves.

At a minimum, for roadway curves identified as needing improvement, curve ahead signs with advisory speed plaques are recommended. In addition to the curve ahead advisory signs, chevron signs could be installed along the outside of the roadway curve to better delineate the curve to an approaching driver. Chevrons are especially useful for curves that follow a longer section of straight roadway. Added pavement markings, designed to influence driver behavior and lower travel speed, could be considered, especially at locations where a crash history attributed to excessive speed exists.

These traffic control strategies provide a "softer" approach to roadway curve improvements with impacts to the existing roadside and scenery generally limited to visual impacts rather than physical changes to the roadside features.

Figure 16. Horizontal Curve Speed Management Treatments



4.6 Concept Refinement

Concept refinement reemphasized the uniqueness of the context sensitive corridor purposes and functions and ensured these are reflected in study recommendations. Refinements were considered in light of:

- Corridor context. Relative to the other corridors included in the study, the context of US 16A through Custer State Park (along the Norbeck Scenic Byway) includes more unique geologic features and viewsheds. Roadway widening and intersection improvements may be implemented where impacts can be managed.
- Achieving consistency with the corridor vision as described in **Section 3.2**. Safety and travel time benefits are desired for this Destination Access Corridor.
- Incorporating public input. The potential concept outlined in **Section 4.1** was presented at the Phase 3 virtual public meeting for review and comment. 56 unique users visited the online meeting and 21 comments specific to Corridor 7 were received. Public feedback included comments received via the online comment form and via email, and follow up conversations.

  Public comments emphasized the natural beauty of the corridor surroundings and the importance of the scenic byway as a unique travel experience. In recognition of this importance, respondents indicated resistance to physical shoulder widening, citing negative impacts to natural resources, scenic views and the enjoyment of traveling the corridor. Additionally, respondents expressed concern that widened shoulders could encourage non-motorized and/or higher speed travel along US 16A, negatively impacting travel safety.

Following completion of the virtual public meeting, the SAT held a meeting to determine refinements to the concept. The discussion outcome determined that shoulders would not be physically widened through the constrained eastern portion of the corridor while the other concepts should be advanced as recommendations:

The refined concept includes the following:

- Curve realignment:
  - MRM 30 (Legion Lake) – Curve realignment, added turn lane and parking delineation
  - MRM 31.1 – Increase advisory speed to 25 mph through curve realignment
  - MRM 36.8 (Visitor Center) – Implement curve realignment, access reconfiguration and wildlife and pedestrian culvert treatments
- Intersection concepts:
  - US 16A/Stockade Lake intersection
  - US 16A/SD 87 intersection
- Additional/enhanced roadside pullouts
- Horizontal curve safety treatments

5. RECOMMENDATIONS

It is recommended that the refined concept as described in **Section 4.6** be implemented along US 16A. This concept is reasonable for addressing the corridor vision while balancing impacts to the surrounding context.

5.1 Environmental Scan

Appendix B contains the Environmental Scan Report. This document provides a "bridge" between the three-phase corridor planning studies and the subsequent National Environmental Policy Act (NEPA) process. The sections within the Environmental Scan Report include the corridor context within the Black Hills, transportation system context, and a preliminary corridor-wide purpose and need statement to be refined during the NEPA process. The preliminary purpose and need statement was provided for public review during the Phase 3 virtual public meetings. The Environmental Resources sections within the Environmental Scan Report document known and potential environmental resources within the environmental study area for Corridor 7.

5.2 Design Concept

Appendix C provides a drawing of the concept. Overlaid on an aerial photo background, the drawing depicts the edge of pavement, cut and fill limit lines, and intersections. More advanced levels of design are likely to reveal physical characteristics that would affect design outcomes. Also, as design advances, locations where the layout is unable to meet design standards will require consideration and documentation.

5.3 Cost Estimates

Detailed survey information is not currently available for US 16A, and the terrain of the impact area creates an environment of uncertainty for preparing detailed cost estimates. The following key assumptions were used to develop an Opinion of Probable Cost:

- Unit cost by linear foot for roadway improvements/ replacement.
- Cut and fill limit estimates are based on USGS contour information for the rugged areas alongside the current alignment. This source will yield an order of magnitude estimate, which requires substantial refinement as project development continues.
- Costs associated with drainage, utilities, erosion control, traffic control, and similar elements are based on a typical percentage of items, including earthwork, highway surfacing, and installation of curb and gutter if applicable.

The study team developed planning level generalized cost estimates for the improvements envisioned for each corridor. The team reviewed the improvement types with respect to the limits and locations as presented to quantify the materials needed to implement these improvements. Unit costs were developed in collaboration with SDDOT staff, using the SDDOT pay items and representative unit costs. The costs of some improvements were estimated based on past projects.

Table 4 documents the cost assumption, units required, and estimated construction costs for the recommended concept.

Table 4. Corridor 7 – Improvement Cost Estimates

ITEM	DESCRIPTION	UNIT	CONTINGENCY	UNIT COST	QUANTITY	COST
110	Earthwork and Removals (2' Depth)	SY		$ **22**	20,047	$ 441,034
110	Earthwork (Significant Impacts)	CY		$ **12**	2,800	$ 33,600
380	Surfacing (Municipal Street)	SY		$ **145**	16,548	$ 2,399,460
380	Surfacing (Access Road)	SY		$ **110**	7,569	$ 832,590
650	Curb and Gutter	LF		$ **50**	1,047	$ 52,350
651	Sidewalk & Median	SF		$ **15**	4,643	$ 69,645
	SUBTOTAL (A)					$ **3,828,679**
530	Structures - Bridge	SF		$ **210**		$ -
530	Structures - Wall	SF		$ **210**		$ -
450	Drainage - New	% of (A)	**30%**	$ -		$ 1,148,610
451	Utility Relocations	% of (A)	**7%**	$ -		$ 268,010
632/633	Traffic - Signing/Striping	% of (A)	**5%**	$ -		$ 191,440
634	Traffic Control	% of (A)	**15%**	$ -		$ 574,310
734	Erosion Control/Environmental	% of (A)	**20%**	$ -		$ 765,740
	SUBTOTAL (B)					$ **2,948,110**
635	Traffic - Signals (New)	EACH		$ **280,000**		$ -
009	Mobilization	% of (A)+(B)	**10%**	$ -		$ 677,680
	Contingency	% of (A)+(B)	**30%**	$ -		$ 2,033,040
	SUBTOTAL (C)					$ **2,710,720**

	CONSTRUCTION TOTAL (D)	**(A)+(B)+(C)**					**$**	**9,487,509**
18	Design Engineering	% of (D)	**12%**	**$**	**-**		$	1,138,510
900	Construction Engineering	% of (D)	**18%**	**$**	**-**		$	1,707,760
20	Commercial ROW	SF		**$**	**15**		$	-
	Rural ROW	SF		**$**	**1.00**		$	-
							$	***12,333,779***
	PROJECT TOTAL (E)						**$**	**12,334,000**
		Construction + ROW Cost					**$**	**9,500,000**

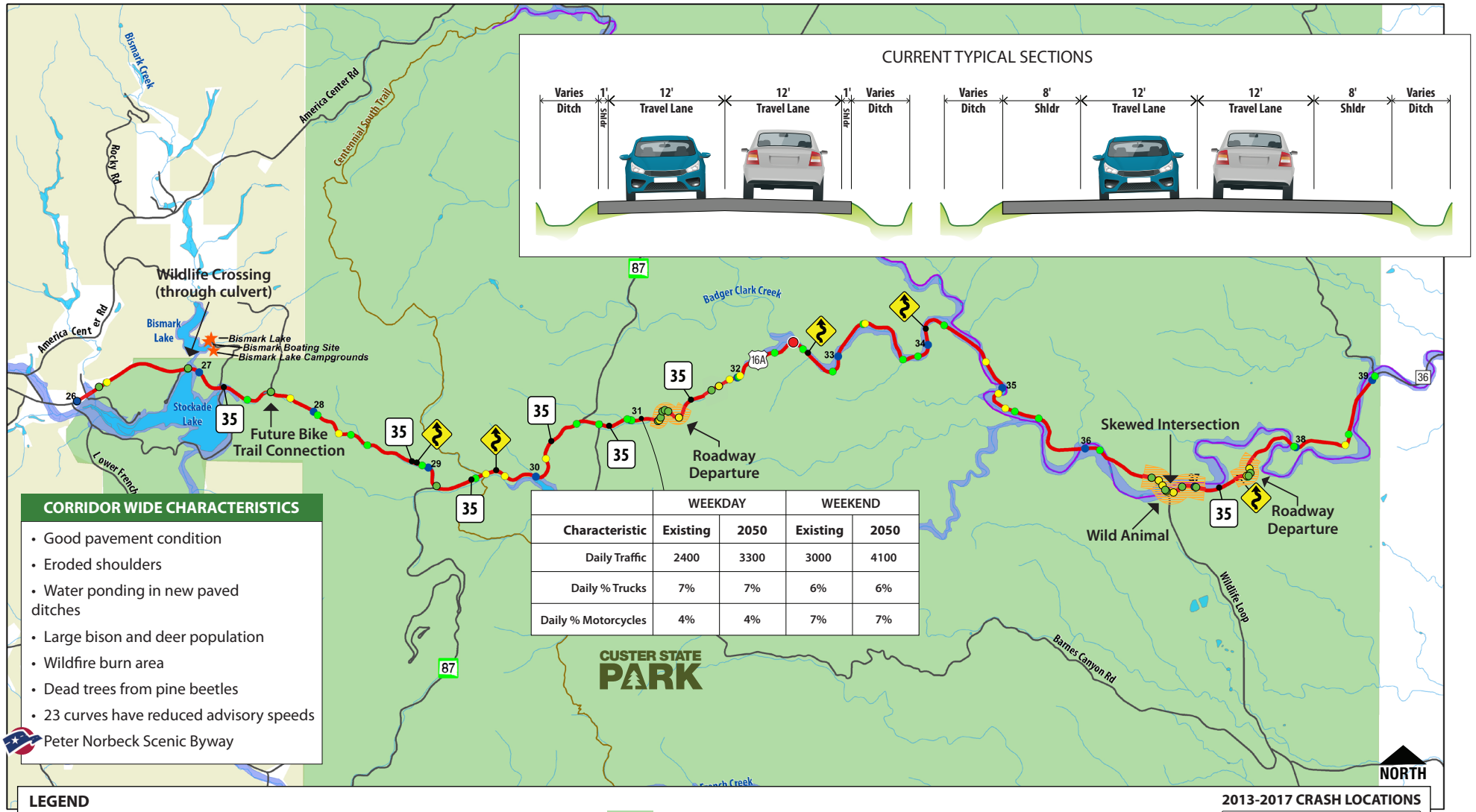
* Surfacing Unit Cost Includes Base Course

Note: In providing opinions of probable construction cost, the Client understands that Felsburg Holt & Ullevig has no control over costs or the price of labor, equipment or materials, or over the Contractor's method of pricing. The unit prices and percentages shown above were applied under the direction of the South Dakota Department of Transportation and FHU makes no warranty, expressed or implied, as to the accuracy of such opinions as compared to bid or actual costs.

APPENDIX A CORRIDOR CHARACTERISTICS

CORRIDOR 7
US 16A: Custer State Park

Corridor Characteristics



CORRIDOR WIDE CHARACTERISTICS

- Good pavement condition
- Eroded shoulders
- Water ponding in new paved ditches
- Large bison and deer population
- Wildfire burn area
- Dead trees from pine beetles
- 23 curves have reduced advisory speeds
- Peter Norbeck Scenic Byway

	WEEKDAY		WEEKEND	
Characteristic	Existing	2050	Existing	2050
Daily Traffic	2400	3300	3000	4100
Daily % Trucks	7%	7%	6%	6%
Daily % Motorcycles	4%	4%	7%	7%

LEGEND

- XX Mileage Reference Marker
- Recreation Sites
- 6(f) Resource
- Corridor
- Roadways
- County Boundary
- Stream
- 303(d) Impaired Waters
- Trails
- Parks and Recreation
- Black Hills National Forest
- 100-Year Floodplain
- Wetlands
- XX Directional Regulatory Speed Limit Sign
- City Limits
- High Crash Location (Types Noted)
- Tight Curves or Curve Sections With Advisory Speeds

2013-2017 CRASH LOCATIONS

- Fatal (FAT)
- Injury (INJ)
- Property Damage Only (PDO)

SDDOT Black Hills CSC Study 17-385 2/3/20

APPENDIX B ENVIRONMENTAL SCAN

Environmental Scan

Black Hills Context Sensitive Corridors Study – Corridor 7
US 16A: Norbeck National Scenic Byway
Environmental Review and Design

Custer County, South Dakota
NH <#>; PCN <#>

View west toward US 16A approximately 1.7 miles east of US 16A and SD 87 intersection.

Prepared for:
South Dakota Department of Transportation

Prepared by:
Felsburg Holt & Ullevig
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Greenwood Village, CO 80111
303.721.1440

December 2021

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List of Acronyms

ACS	American Community Survey
ADA	Americans with Disabilities Act
AEP	Area of Potential Effect
AMM	Avoidance and Minimization Measure
BGEPA	Bald and Golden Eagle Protection Act
CAA	Clean Air Act
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CMR	Contaminated Materials Review
EDR	Environmental Data Resources
EJ	Environmental Justice
EO	Executive Order
ESA	Endangered Species Act
FEMA	Federal Emergency Management Agency
FHU	Felsburg Holt & Ullevig
FHWA	Federal Highway Administration
GLO	General Land Office
IPaC	Information, Planning and Conservation system
LEP	Limited English Proficiency
LOS	Level of Service
LWCF	Land and Water Conservation Fund
MBTA	Migratory Bird Treaty Act
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act
NRHP	National Register of Historic Places
SDARC	South Dakota Archaeological Research Center
SDCL	South Dakota State Law
SDDENR	South Dakota Department of Environment and Natural Resources
SDDOT	South Dakota Department of Transportation
SDGFP	South Dakota Department of Game Fish and Parks
SDSHPO	South Dakota State Historic Preservation Office

TMDL	total maximum daily load
USC	United States Code
USCB	U.S. Census Bureau
USDOT	U.S. Department of Transportation
USEPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
WOUS	Waters of the United States

1. INTRODUCTION

South Dakota Department of Transportation (SDDOT) is conducting a context sensitive analysis of highway corridors in the Black Hills through a three-phase program, in conjunction with the Federal Highway Administration, US Forest Service, South Dakota Game, Fish & Parks Department, and the National Park Service. The study is being conducted to identify existing conditions, anticipated challenge areas, safety, and operational needs along these corridors and to determine its short-term and long-term transportation priorities.

The first phase encompassed an overall traffic and safety needs analysis of 17 corridors, and the second phase involved an assessment of opportunities for transportation-related improvements for each corridor. These initial corridor planning investigations are documented in the *Black Hills Context Sensitive Corridors Study, Phase 1 & 2 Report* (Study), May 2020.

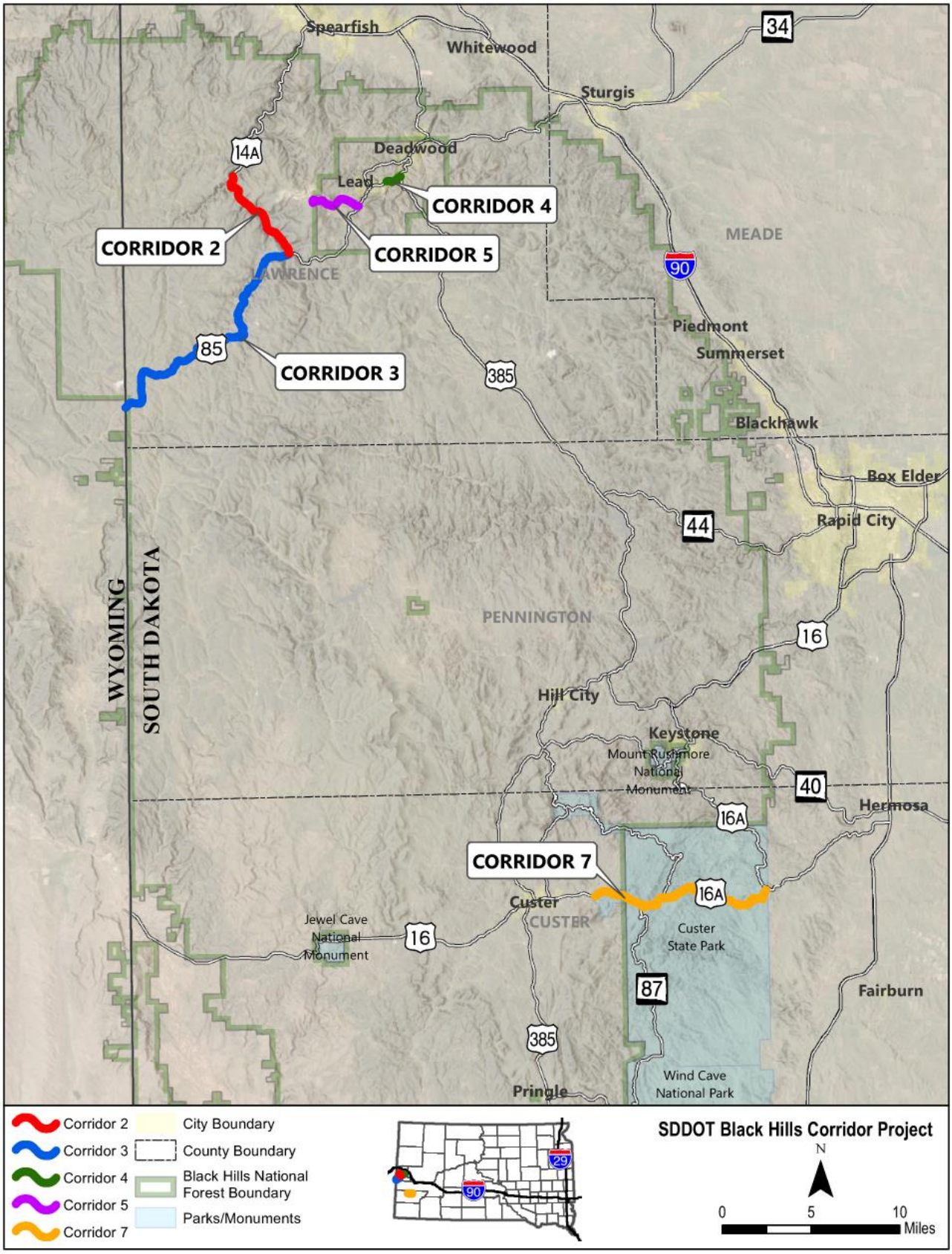
In the Phase 3 studies, these corridors were then prioritized for their ability to deliver safety benefits and address urgent infrastructure needs, based on current level of service, crash history, road purpose, and public review and comment. Five high priority corridors were selected for more detailed planning, conceptual design, and public review, including Corridors 2, 3, 4, 5, and 7 (**Figure 1**).

This study is establishing a corridor-wide preliminary purpose and need statement as well as goals and objectives that will be later developed and refined as project-specific purpose and needs for use in the National Environmental Policy Act (NEPA) process. The results of analyses from the previous transportation planning process are being used to shape the corridor-wide preliminary purpose and need statement, and, thereby, the range of alternative concepts. The corridor-wide preliminary purpose and need statement and the goals and objectives will be used to comparatively measure the effectiveness of alternatives. This comparison could occur in the Environmental Scan document but could also occur in the NEPA process. The corridor-wide purpose and need addresses the primary transportation issue in the corridor. Subsequent NEPA projects may address portions of the corridor needs but could have a project-specific purpose and need.

This Environmental Scan addresses the US 16A: Norbec National Scenic Byway (Corridor 7) which is approximately 13-miles long. The regional location of Corridor 7 within the Black Hills is shown on **Figure 1.**

The purpose for this Environmental Scan Report is to create a “bridge” between the 3-phase corridor planning studies, and a subsequent National Environmental Policy Act (NEPA) process. The following sections include the *corridor context* within the Black Hills; *transportation system context*; purpose and need a preliminary corridor-wide *purpose and need statement* to be refined during the NEPA process. The *Environmental Resource* sections document known and potential environmental resources within the environmental study area for **Corridor 7**.

FIGURE 1. REGIONAL LOCATION MAP



1.1 Corridor Context

The primary function of Corridor 7 is to provide access to key recreational venues (**Destination Access**). The corridor is viewed as a destination itself.

Corridor 7 is a section of US 16A / Peter Norbeck National Scenic Byway, within Custer State Park, between milepost 26 and milepost 39. The corridor primarily serves as destination access to and through Custer State Park, and serves daily traffic accessing SD Highway 79 to the east and the City of Custer to the west. The corridor is forested with unique geological features, numerous recreation resources and popular viewsheds. Several creeks are in the corridor including Galena Creek, Badger Clark Creek and Grace Coolidge Creek. Wildlife (bison and deer) are an important resource in the corridor but can also pose a safety concern.

Corridors supporting a destination access purpose are hybrids in that they carry travelers between their accommodation's location (hotel/campground/home) and the venue to be visited and they provide an effective level of adjacent access to key destinations. They are also routes that connect venues travelers may visit in a day trip.

A secondary function of this corridor is to carry goods and travelers from one point in the region to another or through the region (Commuter/Commercial). Curves, narrower lanes, slower speeds are typically considered deficiencies and not desirable characteristics of the trip.

Thus, characteristics of these corridors are:

- Vehicle throughput and efficient access to/from adjacent property are more equally balanced.
- Reducing travel time through the corridor is of high importance.
- Providing or maintaining a reliable travel time is of high importance.

1.2 Transportation System Context

For corridor transportation system context, **Figure 2** illustrates the current typical roadway section, high crash locations, daily traffic data, tight curves, and an overview of corridor-wide characteristics.

The typical section of Corridor 7 is a two-lane road with 12-foot travel lanes and stormwater drainage ditches on either side of the roadway. The paved shoulders in both directions are negligible and there appears to be inadequate clear zones in many places.

Figure 3 presents findings that compare the total and severe crashes reported along this corridor with what is expected for similar roadways, represented by the center line in the graph. There are numerous of curves which are both moderate and sharp.

FIGURE 2. CORRIDOR 7 CHARACTERISTICS

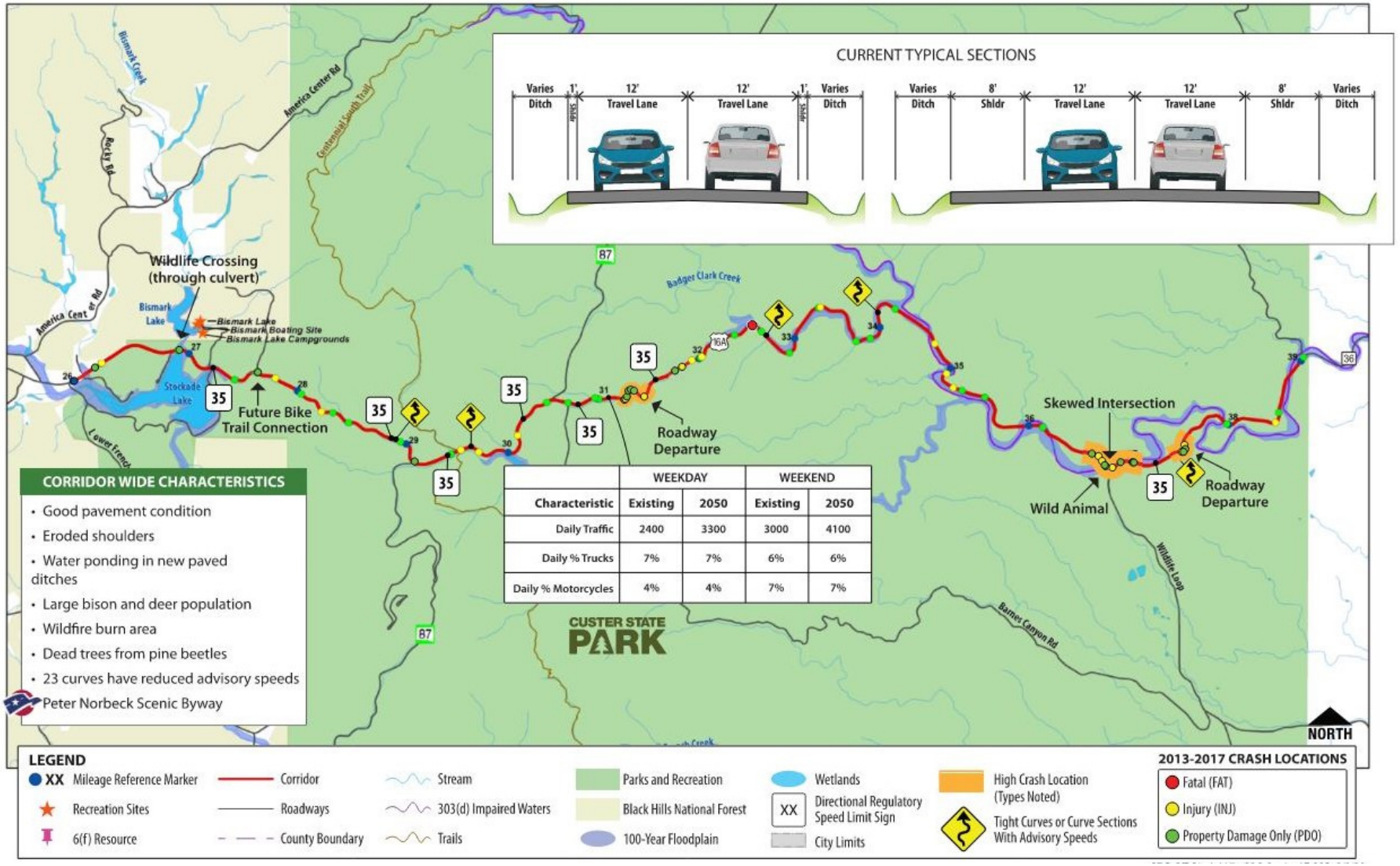
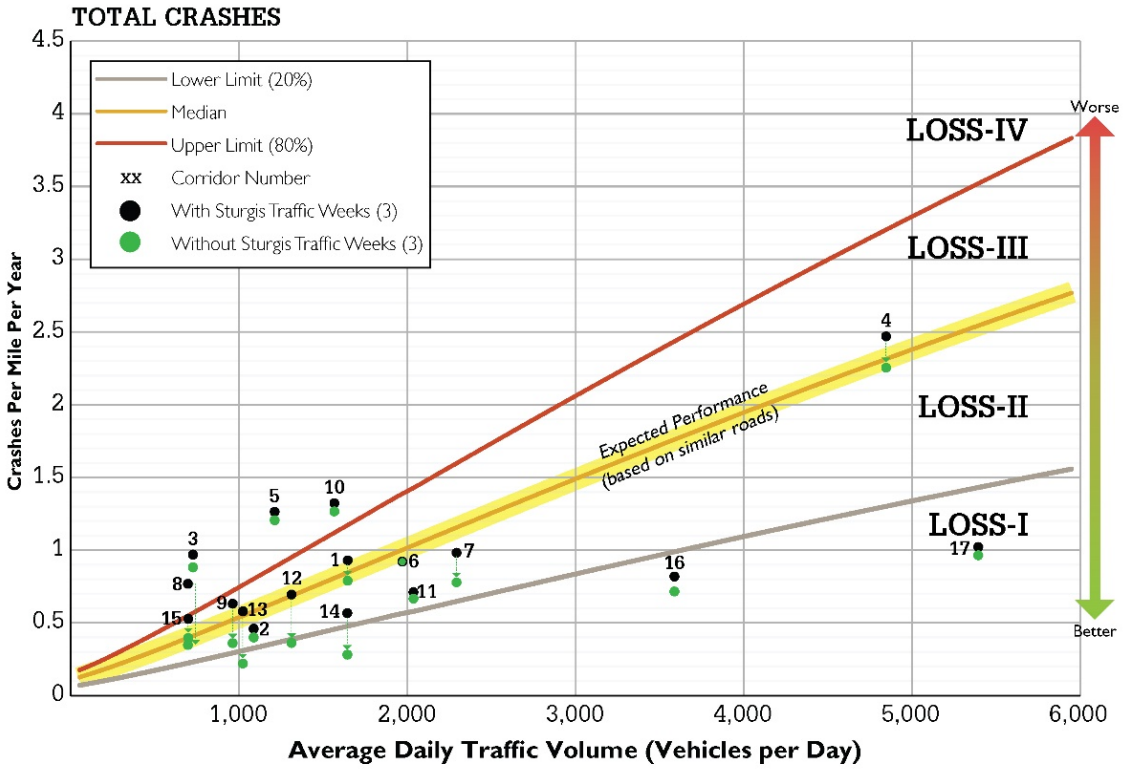
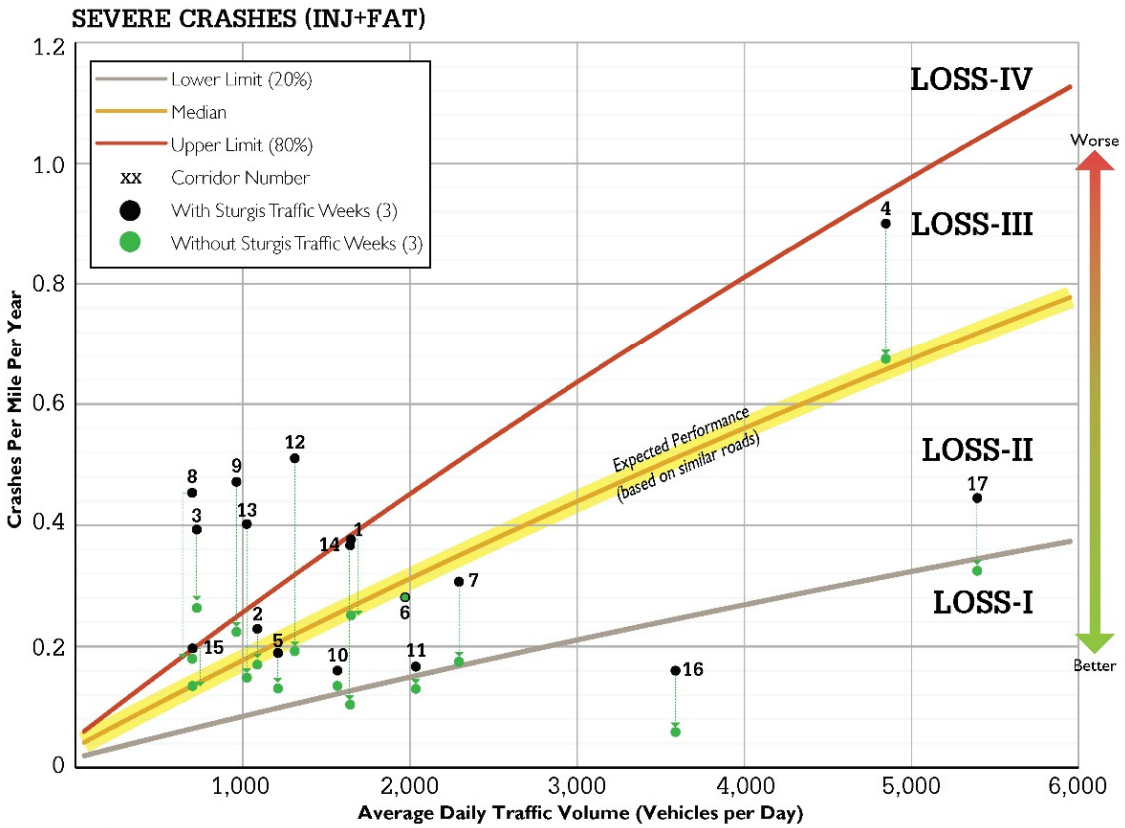


FIGURE 3. CORRIDOR SAFETY PERFORMANCE, 2013-2017





Level of Service of Safety (LOSS) a qualitative description that characterizes safety of a roadway segment in reference to what its expected performance and severity might be.

LOSS-I - Indicates low potential for crash reduction
LOSS-II - Indicates low to moderate potential for crash reduction
LOSS-III - Indicates moderate to high potential for crash reduction
LOSS-IV - Indicates high potential for crash reduction

This reported crash frequency along this corridor results in a Level of Service of Safety (LOSS) of II both including and excluding the weeks of the Sturgis Rally. The primary crash type in this corridor is roadway departures followed by wild animal collisions. For the full length of the corridor, the total and severe crash frequency is below expected levels, indicating lower potential for crash reduction. However, there are three locations of crash concentrations along the corridor.

Between Mileage Reference Marker (MRM) 31.1 and 31.4 there are four curves with no reduced advisory speed signage and minimal shoulders and clear zones. The primary crash type in this area consisted of roadway/lane departure.

Between MRM 36.6 and 37.1 there are three curves with minimal shoulder and clear zones. There are also two vehicular accesses between two of the curves, including the skewed intersection with Wildlife Loop Road. The primary crash type in this area consisted of wild animal collisions.

At mile marker 37.4 there are three closely spaced curves and the primary crash type in this area consisted of roadway departures.

The current daily traffic volume ranges from 2,400 to 3,000 vehicles and the 2050 estimate ranges from 3,300 to 4,100 vehicles. The heaviest transportation user group in this corridor are cars, followed by buses/RVs and pedestrians.

1.3 Purpose and Need

The following purpose and need sections for Corridor 7 include descriptions of the *preliminary corridor-wide purpose and need* for the proposed Action, and project goals, to be refined during the NEPA process.

1.3.1 Preliminary Corridor-wide Purpose for the Proposed Action

The US 16A Peter Norbeck National Scenic Byway corridor transportation improvements are intended to: improve travel time; increase mobility for pedestrians; support access to recreational resources; and enhance the user experience along the corridor. The improvements should be resilient and support the underlying context of the corridor as a National Scenic Byway.

1.3.2 Preliminary Corridor-wide Need for the Proposed Action

This section summarizes the transportation needs for the US 16A Peter Norbeck National Scenic Byway Corridor. The transportation improvements are needed to address:

- **Travel Time**: Safety and natural character are priorities over travel efficiency in this corridor, though the roadway has several deficiencies that need to be brought to appropriate engineering standards.
- **Inadequate shoulders**: There is currently little to no shoulders throughout the corridor. Maximizing shoulder width as much as physically practicable, when considering substantial

physical constraints (up to eight feet) would allow for an appropriate accommodation of engineering standards.

- **Intersections**: Improve traffic control and/or turn lanes at the following intersections:
  - **Bismark/Stockade Lake access**: This offset intersection adds conflict through the area. Correction to provide a traditional intersection and the addition of turn lanes would improve travel time.
  - **SD 87**: This intersection provides a central access to Custer State Park. Defining and enhancing the parking area south of the intersection, adding and/or lengthening turn lanes and widening the roadway surface to provide additional shoulder width would improve park accessibility and through travel conditions along US 16A.
  - **Wildlife Loop Road**: Improvements are needed to address a history of wildlife collisions and high presence of pedestrian and visitor activity in the area.
- **Curve Safety**: Improve horizontal curve and sight distance shortcomings at the curves between MRM 31.1 and 31.4, while maintaining the natural context of the corridor.

1.3.3 Project Goals

This section addresses goals of the project that each improvement type is intended to address. These goals are important to the character of the corridor but does not rise to actual transportation need for the corridor. These goals may result in the selection of alternatives when other needs are equal, and one alternative addresses the goals better than other alternatives.

- **Safety**: the corridor in its entirety has not experienced crash frequency indicating high potential for crash reduction. However, there are a number of locations along the corridor that demonstrate elevated crash frequency and patterns of crash types. The high recreational value of the corridor underlines the importance of traffic safety.
  - **Vehicular**: Address the incidences of crashes along the corridor with a focus on concentrated crash locations listed in **Section 3.0**. Improvements will be formulated to maintain a LOSS II for the entire year, including Sturgis Rally weeks.
  - **Pedestrian and Bicycle**: Address the inadequate to zero shoulders in the corridor as possible given physical and scenic constraints. Create shoulders that are wide enough to accommodate safe bicycle traffic and pedestrians in the corridor. Pedestrian usage occurs with visitors accessing the area for recreation and consideration of these uses should be addressed.
- **User Experience:** The corridor is attractive for travelers and requires consideration of transportation improvements that further enhances this use. This context in the corridor serves as a portion of the Peter Norbeck National Scenic Byway that balances scenic route and State Park visitors with serving commuter traffic. Consequently, efficient and predictable movement of through traffic and compatibility with a recreational setting are both needed.

Users experience this corridor via passenger vehicles, motorcycles, buses/RVs, bicycles, and as pedestrians. Inclusion of pull outs and enhanced parking areas to accommodate scenery and speed differentials would further enhance the user experiences of the corridor.

- **Commuter Route:** Curves, narrower lanes, and slower speeds are typically considered deficiencies and not desirable characteristics of a commuter trip. The addition of horizontal curve improvements; traffic control and turn lane enhancements; and sight distance and clear zone modifications will enhance the user experience for a commuter route.
- **Clear Zone:** A design consideration advanced by project stakeholders is the provision of a 7-to-10-foot clear zone along the roadway, meeting the applicable minimum as documented in the AASHTO Roadside Design Guide. Some improvement locations may not be fully able to achieve this width through improvements. This is due to substantial physical constraints such as substantial steep grades, rock ridges, and the presence of waterbodies. Achieving standard clear zone widths may not be practical when balancing reasonableness and context sensitivity.

1.4 Proposed Project

1.4.1 Project Termini

The project termini are described as follows:

- **Western Terminus:** Mileage Reference Marker (MRM) 26.1, at the US 16A and Lower French Creek Road intersection, lies within the Black Hills National Forest.
- **Eastern Terminus:** MRM 39.01, at the US 16A and SD 36 intersection, is located at the eastern limit of Custer State Park.

1.4.2 Proposed Improvements

A corridor visioning exercise was completed during the Black Hills Context Sensitive Corridors Study. The visioning exercise included technical analyses and intensive consultation with the SDDOT, partner agencies, stakeholders and the general public. The vision includes a list of appropriate improvement types to support the vision, summarized below:

Vision Statement: US 85 is a National Highway System (NHS) route serving high speed commuter/commercial traffic. A corridor reconstruction effort increasing lane and shoulder widths and addressing horizontal curvature is needed to provide improved mobility and safety.	
Improvement Type:	**Supports Vision by:**
Additional pullouts alongside the roadway	Improving operations and safety
Widened roadway section including lane and shoulder width	reducing crashes and improve heavy vehicle travel conditions
Horizontal curve treatments	reducing crashes and create more consistent travel speed

Speed management signage/devices	Helping to smoothly transition vehicles from higher-speed western portion to tighter, lower speed western portion
Motorcycle safety treatments	Reducing motorcycle crash frequency
Roadside embankment slope stability/drainage improvements	Maximizing safety of roadside design while addressing infrastructure needs

Upon reaching and confirming the vision, the study team compiled and evaluated concepts to improve the corridor. Concepts were developed to address SDDOT road design standards, advance the corridor's purpose and function, and address corridor safety and operational needs. Design concepts were presented during public meetings to gather feedback and discussed with the Study Advisory Team to review impacts to the corridor context and adjust the concept to more effectively balance such impacts. A recommended concept emerged from the refinement, including the following components:

A package of safety improvements to meet the transportation needs for Corridor 7 limits transportation improvements to spot locations, rather than establishing corridor-wide shoulders and roadway alignment changes, as follows:

- Address curves with safety concerns
- Shoulder widening to 8 ft where physically possible
- Reconfigure intersections
- Provide grade separated pedestrian / drainage connection near Visitor Center
- Provide additional pullouts and enhance existing pullouts

The scope of the environment scan data and mapping would cover future considerations of other corridor-wide improvements.

1.5 Stakeholder and Public Involvement

General public meetings in support of Phases 1 and 2 were held in August of 2018 and both meetings were broadcast live via YouTube. Participants had the opportunity to provide comments on issues they have experienced within one or more of the corridors and their perception of corridor desired

functions. A website was established to provide information and serve as a tool for public feedback throughout Phases 1 and 2. Meetings with various stakeholders were also held, which included:

- Small group meetings with adjacent landowners/stakeholders.
- Municipal representative meetings with the cities of Custer, Hermosa, Spearfish, Lead, and Deadwood.
- Black Hills Council of Governments and Chambers of Commerce associated with the cities of Spearfish, Lead, and Deadwood, along with the School District encompassing the Lead and Deadwood area.
- Individual agency meetings, including Custer State Park.

Two Visioning Workshops were held in Phases 1 and 2. These workshops helped to facilitate proper identification of corridor purposes, needs and improvement types.

Public engagement tasks for Phase 3 included presenting previous findings of the corridor studies, improvement options, and engagement tools for receiving public input. A project website was created, and it served as the primary portal of information for members of the public wanting to learn more about the study and to provide feedback.

A virtual public meeting was hosted instead of an in-person meeting due to the recommendations by the Centers for Disease Control. Information about participating in the public meeting was posted on the project website, as well as through different channels of communication. The project website included general project information, access to the interactive public meeting platform, and information on how to subscribe and access documentation form previous public meetings.

The meeting website and public comment period was launched on June 23, 2021 and closed at noon on August 20, 2021. Press releases, flyers, and mailing lists were all used to notify the public of the start of the comment period. Agency stakeholders included in the notifications included:

- City of Custer
- Black Hills Council of Governments
- Town of Hermosa
- Custer County
- Lawrence County
- City of Keystone
- City of Lead
- City of Deadwood
- City of Spearfish

Social Pinpoint, a community engagement platform, was used for the virtual public meeting. The virtual public meeting had almost two thousand visits to all corridors from 420 unique users. Corridor 7 had a total of twenty-one responses and zero emails. Respondents do not support straightening the road as it could damage the scenic drive within the state park. Respondents also believe that straightening the road could lead to higher speed and become a larger safety hazard, when they are

already concerned with the current speeds in the area and do not support higher speeds. Turning lanes, the provision of pullouts, and improvements to the park access and visitor center were all well received with some concern that realignment of intersection approaches is not necessary. Finally, shoulder widening is believed to generate higher speeds, damage the scenic landscape, and generate more points of conflict with bicyclists and pedestrians. For these reasons, respondents do not fully support it.

Agency involvement included coordination and correspondence with agencies for identifying issues and understanding needs and concerns in the corridors. The Study Advisory Team (SAT) was comprised of the following members:

- U.S. Forest Service (USFS)
- U.S. National Park Service (USNPS)
- South Dakota Game, Fish, and Parks
- Spearfish Canyon Association
- Federal Highway Administration
- SDDOT

The SAT's role was to oversee the major project milestones, provide technical input, and to monitor the progress of the planning process. A total of nine SAT meetings have been held to date, four of which has been during Phase 3 of the study.

2. Environmental Resources

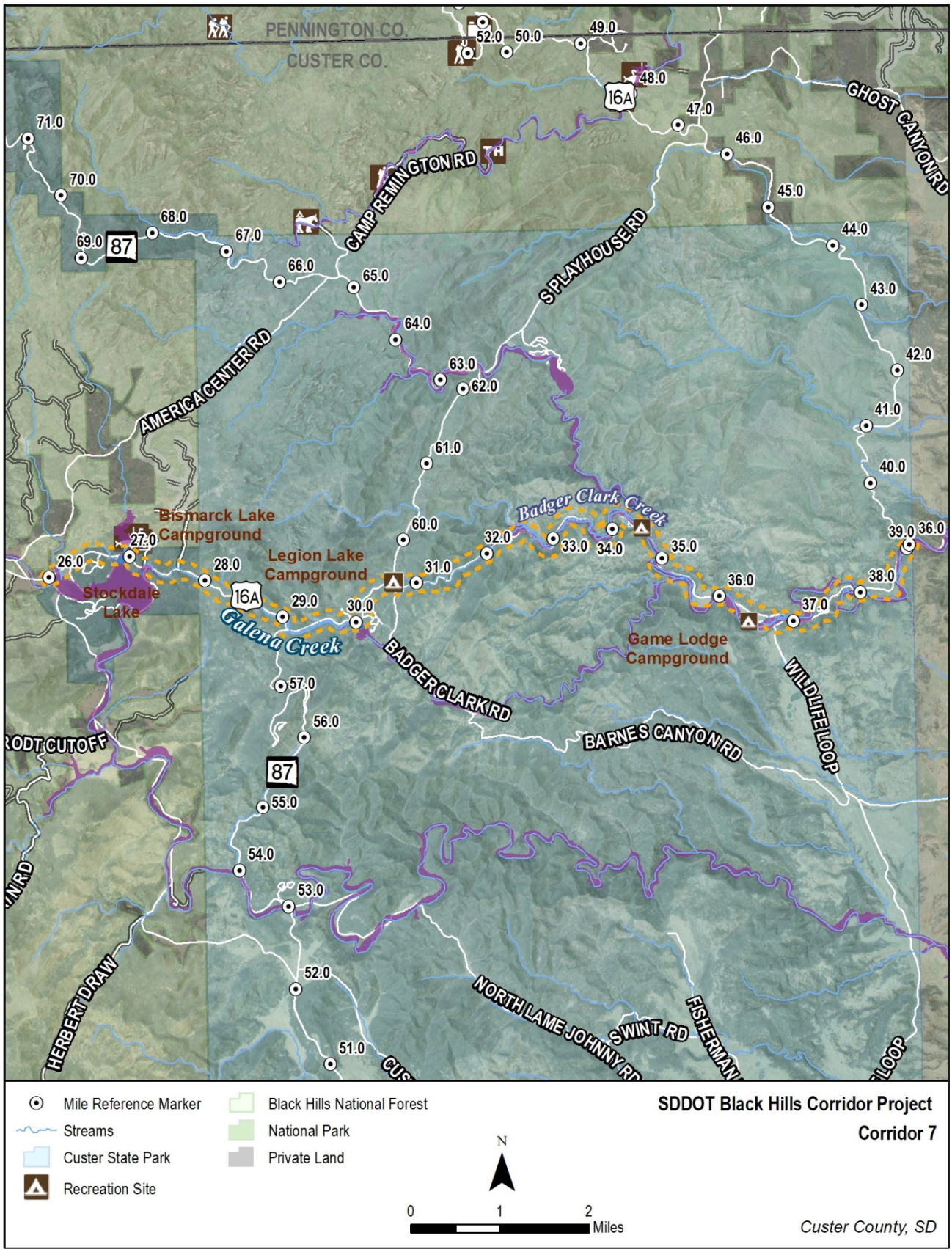
This chapter provides a review of known and potential environmental resources within the environmental study area that may be important considerations for construction of the potential improvements. The environmental study area consists of a 500-ft buffer of the existing 16A roadway between MRM 26.1, at the US 16A and Lower French Creek Road intersection and MRM 39.01, at the US 16A and SD 36 intersection. **Figure 4** provides an overview of the study area.

The review focuses on resources with the potential to delay or stop project development or permitting, including resources with specific regulatory drivers such as the Clean Water Act (CWA). Evaluated resources are as follows:

- Soils/Geology
- Air Quality
- Water Quality
- Environmental Justice
- Historic and Cultural Resources
- Federal and Tribal Lands

- Floodplains
- Wetlands and Waterways
- Vegetation and Wildlife
- Threatened and Endangered Species
- Traffic Noise
- Section 4(f) and 6(f)
- Visual Resources
- Hazardous Materials

FIGURE 4. ENVIRONMENTAL STUDY AREA



Several environmental resources with regulatory drivers but without applicability to the environmental study area for Corridor <#> were excluded from further review, including contaminated materials, farmlands, invasive species, wild and scenic rivers, socioeconomic resources. The following subsections provide an overview of the environmental resources, findings of this evaluation and, where appropriate, additional considerations for the proposed project.

2.1 Soils/Geology

This section highlights the soil and rock outcrop constraints associated with the Black Hills adjacent to US 16A. Soil constraints associated with roadway widening or realignments into the moderate to very steep side slopes include erosion, instability, rock outcrops, and revegetation challenges. The focus of this section is on selected soils on steep to very steep slopes with rock outcrops. The primary source of information is from the Soil Survey of Custer and Pennington Counties, Black Hills Parts, South Dakota (USDA, 1985).

2.1.1 Existing Conditions

The following is a profile of constraints associated with selected soil types adjacent to Corridor 7 side slopes. Soil constraints associated with roadway widening or realignments into the moderate to very steep side slopes include erosion, instability, rock outcrops, and revegetation challenges. The focus of this section is on selected soils on steep to very steep slopes with rock outcrops. The primary source of information is from the Soil Survey of Lawrence County, South Dakota (USDA, 1976).

- **Hopdraw-Sawdust-rock outcrop complex (40%-80% slopes)**
  - **General Characteristics**: Deep and very steep soils intermingled with areas of rock outcrop. These soils are on the sides of mountain valleys and canyons in the southern limestone plateau. Excessively drained Hopdraw and well drained soils are intermingled with rock outcrop.
  - **Vegetation**: Most areas are forested with ponderosa pine, with Rocky Mountain juniper. The understory is in grasses and shrubs, including mountain mahogany, sumac, juniper and yucca.
  - **Hazards**: Mass soil movement or slippage may occur when soils are disturbed. Steep slopes and water erosion are management concerns.
  - **Erosion**: 0.10-0.24K; 5T; wind erosion group 8 = very severe

- **Mocmont-Rock outcrop complex (40% - 75% slopes)**

  This information was not included in the Soil Survey Report. This is based on the information included on the website NRCS SoilWeb: https://casoilresource.lawr.ucdavis.edu/gmap/

- **General Characteristics**: Deep, well drained, very steep Mocmont soil intermingled with areas of rock outcrop. This soil is formed from in material weathered from granitic rock.
- **Revegetation**: The overstory is dominantly ponderosa pine. Some quaking aspen, paper birch, and bur oak grow on this soil. The understory is dominantly little bluestem, needlegrass, sedges, leadplant, snowberry, and bearberry.
- **Hazards**: Erosion and large boulders are hazards
- **Erosion**: 5T; wind erosion group 6 = Very Severe

Pactola-Pactola shallow-Rock outcrop complex, dry (40% - 80% slopes)

This information was not included in the Soil Survey Report. This is based on the information included on the websites: https://casoilresource.lawr.ucdavis.edu/gmap/ and https://soilseries.sc.egov.usda.gov/OSD_Docs/P/PACTOLA.html

- **General Characteristics**: Deep, well drained soils
- **Revegetation**: Native vegetation is dominantly ponderosa pine with lesser amounts of Black Hills spruce, aspen, and birch. The understory is sparse amounts of shrubs and grasses.
- **Hazards**: steep slopes, erosion.
- **Erosion**: 1-3T; wind erosion groups 5-6 = Very Severe

Vanocker, dry Sawdust-Rock outcrop complex (40% - 80% slopes)

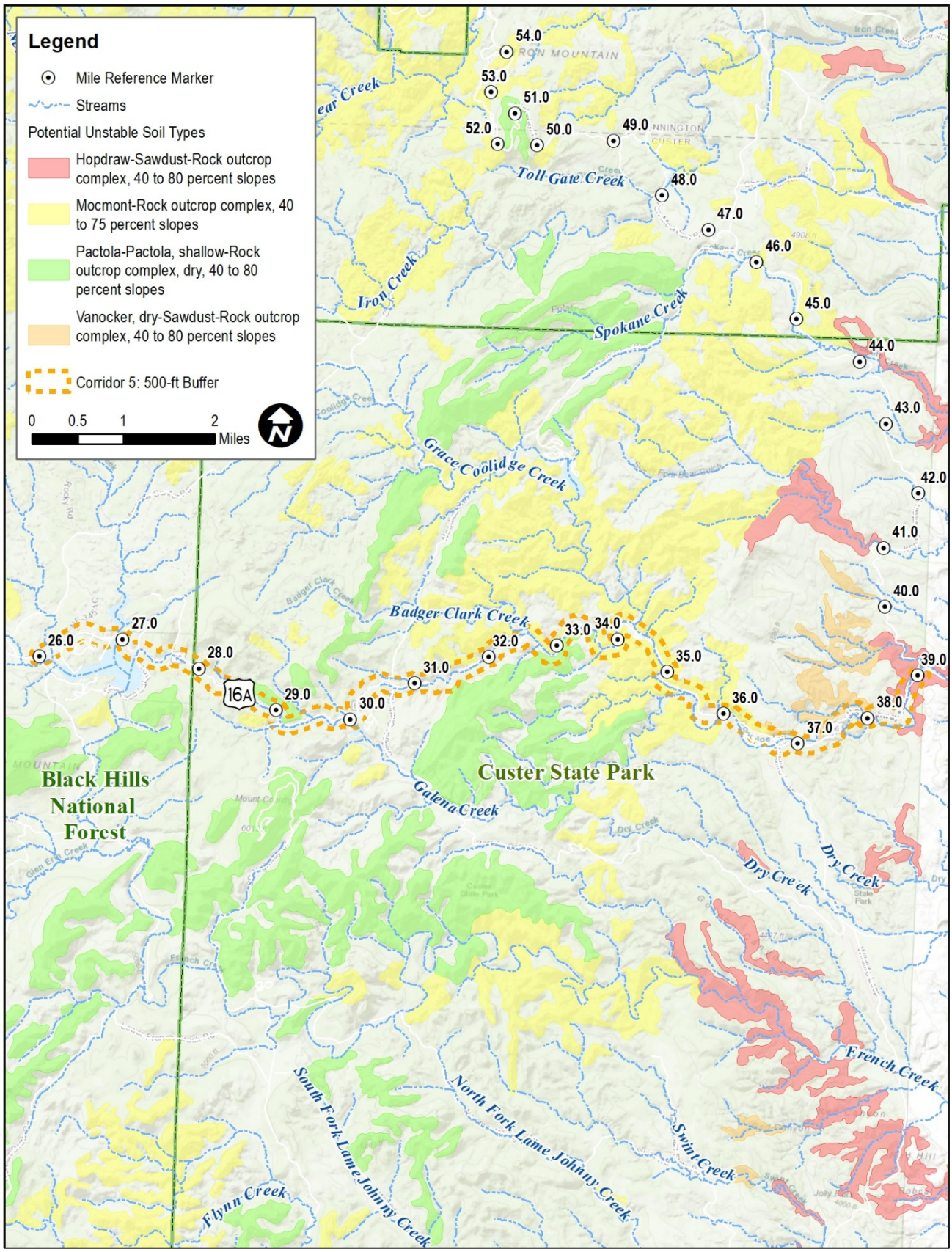
- **General Characteristics**: Deep and well drained soils on very steep slopes intermingled with rock outcrop areas. Soils are formed in material weathered from limestone and calcareous sandstone on sides of mountains and canyons at lower elevations on the Limestone Plateau.
- **Revegetation**: The overstory is dominantly ponderosa pine, with an understory of grasses and shrubs, including shrubs and grasses
- **Hazards**: Mass soil movement occur in or above disturbed areas.
- **Erosion**: 0.17-0.24K; 3-5T; wind erosion group 8 = severe

Figure 5 provides an overview of the corridor and areas of potential unstable soil types.

2.1.2 Next Steps

Certain soil types along the corridor could pose a risk to the roadway. These soils will need to be further evaluated during the preliminary design phase and NEPA process.

FIGURE 5. POTENTIAL UNSTABLE SOIL TYPES



2.2 Air Quality

Air quality is primarily regulated under the federal 1970 Clean Air Act (CAA) and amendments from 1977 and 1990. The purpose of the CAA is to protect and enhance air quality to promote public health, welfare, and the productive capacity of the nation.

2.2.1 Regulatory Setting

Through the CAA, National Ambient Air Quality Standards (NAAQS) were established for six criteria air pollutants: carbon monoxide, particulate matter, lead, sulfur dioxide, nitrogen dioxide and ozone. Each of the states have evaluated their air quality with respect to the NAAQS. Any areas that exceeded the NAAQS were designated as nonattainment areas and are subject to more rigorous air pollution control measures. Over time and with air quality improvements, nonattainment areas may transition into NAAQS maintenance areas or NAAQS attainment areas. Transportation sources are most closely associated with carbon monoxide, particulate matter, nitrogen dioxide and chemical precursors of ozone.

A group of hazardous air pollutants are regulated under the CAA; a subset of which are called mobile source air toxics (MSAT). Greenhouse gases (GHG) are also covered by the CAA.

The CAA established mandatory Class I federal areas, which receive extra protection and consideration from impairment from man-made air pollution. This primarily focuses on visibility/haze and aerosols from large industrial sources and includes prevention of significant deterioration to the air quality.

For reasons described in the following section, the CAA transportation conformity regulations do not apply in South Dakota. However, the SDDOT Environmental Procedures Manual (2019) states:

> "Air quality is an environmental concern within the broad purview of NEPA and the thresholds/screening criteria included in the transportation conformity regulations and guidance can be helpful in deciding whether an air quality analysis of a proposed transportation project is warranted for NEPA purposes."

SDDOT has the option to consider transportation conformity concepts voluntarily. Such voluntary analyses are determined case by case.

Construction may temporarily affect air quality (e.g., fugitive dust). Permits are likely to be needed when construction begins.

2.2.2 Existing Conditions

South Dakota currently has no air quality nonattainment or maintenance areas designated by the U.S. Environmental Protection Agency for NAAQS pollutants under the CAA. This is indicative of good overall air quality across the state, including the Black Hills. Consequently, the federal CAA

transportation conformity regulations do not apply in South Dakota and transportation projects, in general, would be expected not to be concerns regarding the NAAQS.

There are two Class I areas in South Dakota and both are in the vicinity of the corridor. Wind Cave National Park is approximately nine miles south of the corridor. Badlands National Park (Badlands/Sage Creek Wilderness Area) is approximately 45 miles east of the corridor. Road improvement projects typically would not be a concern for Class I areas, even at these distances.

2.2.3 Next Steps

If a NEPA clearance is required for the corridor improvements, an appropriate air quality analysis will be scoped and completed. Transportation conformity analysis under the CAA will not be required, but SDDOT has the option to choose voluntary conformity-based analyses—that decision will be made at that time in response to the circumstances and concerns in place.

The need for and extent of MSAT or GHG analyses generally depends on the NEPA class of action. These analyses may be either qualitative or quantitative. An EA or EIS generally requires progressively greater consideration of MSAT and GHG. The level of analysis needed for these will be determined when the NEPA decision for the corridor is made.

The corridor improvements are unlikely to be a concern for either of the two Class I areas nearby and no associated air quality analysis is expected, but the two areas should be acknowledged.

Analysis of construction emissions is not needed for most projects. Permits are likely to be needed for construction and typical best practices should be required to minimize construction emissions and address air quality issues.

2.3 Water Quality

2.3.1 Regulatory

Water Quality is regulated under the Federal Water Pollution Control Act Amendments of 1972 (CWA). The objective is to restore and maintain the chemical, physical, and biological integrity of the nation's waters by preventing point and non-point pollution sources, providing assistance to publicly owned treatment works for the improvement of wastewater treatment, and maintaining the integrity of wetlands. Each state has jurisdiction for managing water quality in its respective state. Section 303(d) of the CWA requires each state to evaluate water quality conditions in designated waterbodies and list as impaired any waterbodies not meeting water quality standards; this is to be reported every other year.

2.3.2 Methodology

The 2020 South Dakota Integrated Report lists five categories to present information on the Section 303(d) finding in a descriptive and comprehensive manner (SDDANR, 2020). Category 5

waterbodies where one or more beneficial uses are determined to be impaired by one or more pollutants and a total maximum daily load (TMDL) has not been developed. States must develop and implement TMDLs (i.e., pollutant management plans) for waterbodies identified as having a Category 5 impairment.

2.3.3 Existing Conditions

The *2020 South Dakota Integrated Report for Surface Water Quality Assessment* (SDDANR, 2020) does not list any waterbody within or near the study area as impaired.

2.3.4 Next Steps

During the NEPA process, mitigation measures to reduce impacts to water quality would be incorporated and includes developing a Storm Water Pollution Prevention Plan (SWPPP) and a National Pollutant Discharge Elimination System (NPDES) Construction Storm Water Permit would be required from the South Dakota Department of Agriculture and Natural Resources (SDDANR). Furthermore, best management practices (BMPs) from the South Dakota DOT Erosion Control Guide would be implemented to minimize pollutants entering waterbodies.

2.4 Floodplains

2.4.1 Regulatory

Floodplains are the lands on either side of a waterway that are inundated when a channel exceeds its capacity. The following regulatory requirements apply to floodplains:

- **Executive Order (EO) 11988, Floodplain Management (1977)**, directs federal agencies to "provide leadership and take action to reduce the risk of flood loss, to minimize the impacts of floods on human safety, health and welfare, and to restore and preserve the natural and beneficial values served by floodplains." This EO assists in furthering the NEPA, the National Flood Insurance Act of 1968 (amended), and the Flood Disaster Protection Act of 1973.
- **Code of Federal Regulations (CFR), Title 23 – Highways**, prescribes the policies and procedures that FHWA is directed to implement in the location and hydraulic design of highway encroachments on floodplains.
- **CFR, Title 44 – Emergency Management and Assistance**, contains the basic Federal Emergency Management Agency (FEMA) policies and procedures to regulate floodplain management and to analyze, identify, and map floodplains for flood insurance purposes.

2.4.2 Methodology

The 100-year floodplains and floodways were identified using FEMA digital GIS data. For projects within the floodplains, local jurisdictions typically require floodplain development permits.

2.4.3 Existing Conditions

The main floodways and floodplains within the study area are those associated with French Creek, Galena Creek, Badger Clark Creek, and Grace Coolidge Creek, and their tributaries. All floodplains within the environmental study area have been classified as "Flood Zone A," the area covered by a 100-year flood (see **Figure 6**) on Flood Insurance Rate Map (FIRM) Panel 4600946033C.

2.4.4 Next Steps

This project requires that a floodplain analysis be completed to determine whether potential floodway impacts are associated with the project elements. If impacts are found, the level of these impacts will be identified, as well as measures to mitigate or eliminate these impacts. The floodplain analysis uses modeling to assess significant changes. These areas would require a Conditional Letter of Map Revision (CLOMR) from FEMA.

2.5 Wetlands and Waterways

2.5.1 Regulatory

Wetlands and Waters of the United States (WOUS) are protected under Section 404 of the CWA, as amended (33 USC 1344), and EO 11990 of 1977 (Protection of Wetlands). Discharge of fill into wetlands and WOUS requires a Section 404 permit from the United States Army Corps of Engineers (USACE). Additionally, SDDENR reviews and issues certification for Section 401 of the CWA, which requires states to review federal projects for water quality certification.

2.5.2 Methodology

Wetlands are defined as "those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions" (33 CFR 328). Wetlands and riparian areas are important because they provide habitat for various plant, fish, and wildlife species; serve as groundwater recharge areas; provide storage areas for storm and flood waters; serve as natural water filtration areas; and provide protection from wave action, erosion, and storm damage.

Potential wetlands were mapped within the study area, based on field observations and aerial photography.

2.5.3 Existing Conditions

Initial inventories of streams and wetlands adjacent to or crossing US 16A: Norbeck National Scenic Byway within Corridor 7 are summarized by MRM in **Table 1**, and shown on **Figure 7** and on the Environmental Resources Map Book in **Appendix** A.**B**.

FIGURE 6. FLOODPLAINS

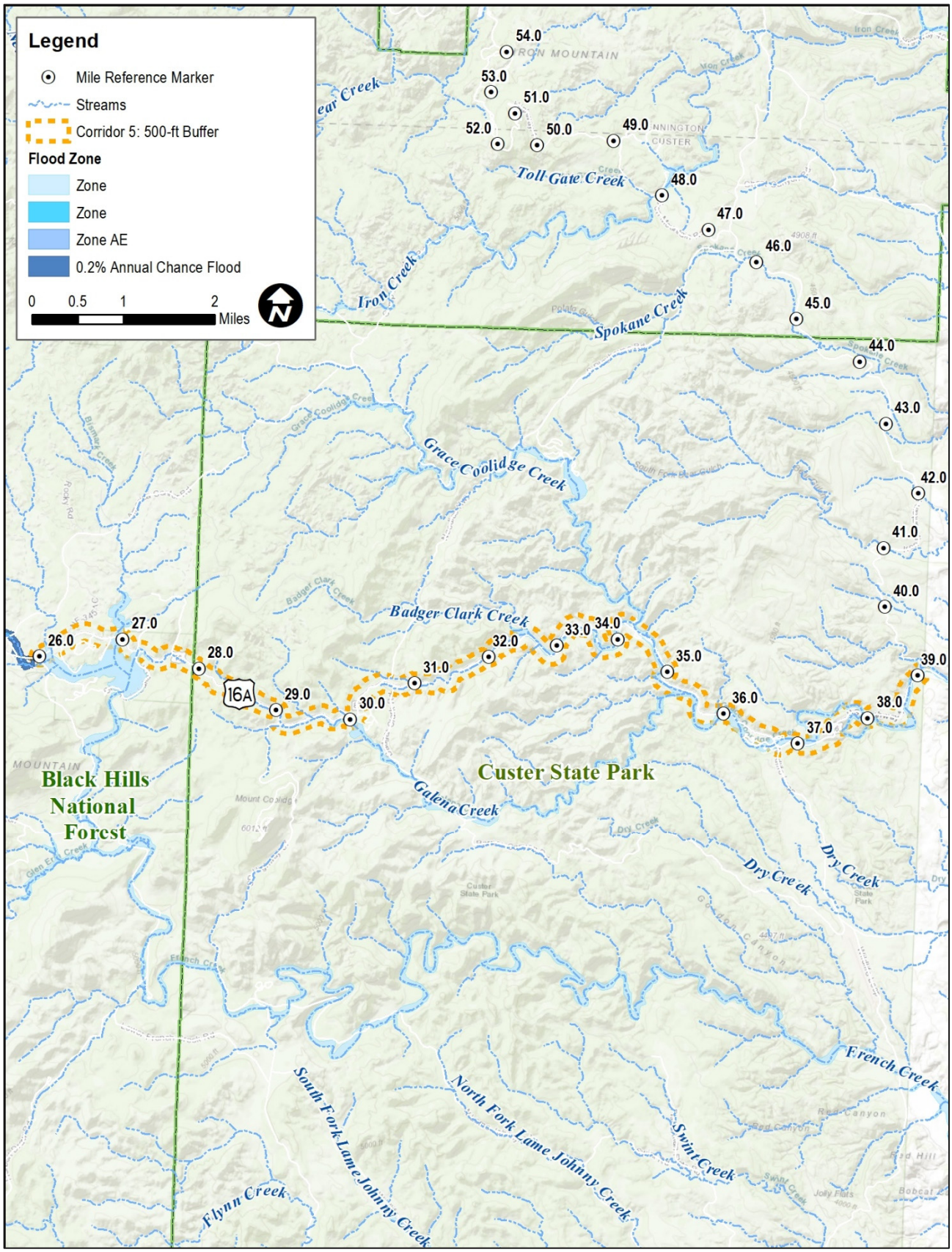


TABLE 1. CORRIDOR 7 INVENTORY OF STREAMS AND POTENTIAL WETLANDS

Streams and Wetlands	Location (MRM or MRM Range)
Stream Crossings / Adjacent Stream Bismark Creek Gelena Creek	26.14
	26.77
	27.3
	27.57
	27.67
	27.98
	28.45
	29.87 - 30.0
	30.58 - 32.3
	32.52 - 32.88
	33.08
	34.35 - 34.53
	28.56 - 29.7
	33.23 - 34.23
	34.34 - 34.53
	34.64 - 34.96
	35.03
	35.1 - 35.6
	35.96 - 36.2
	36.69
	37.92
	38.85
Body of Water	30.0
	36.61 - 36.65
Potential Wetlands	26.14
	26.89 - 26.95
	27.3 - 27.63
	27.69 - 27.88
	28.47 - 28.55
	28.8 - 28.93

Streams and Wetlands	Location (MRM or MRM Range)
	29.2 - 29.7
	29.87 - 30.0
	30.5 - 30.94
	31.09 - 31.13
	31.35 - 31.43
	31.68 - 31.8
	31.89 - 31.6
	32.07 - 32.1
	32.22 - 32.4
	34.32 - 34.4
	34.48 - 34.53
	34.63 - 34.96
	35.1 - 35.6
	35.96
	36.06 - 36.2
	36.6 - 36.7

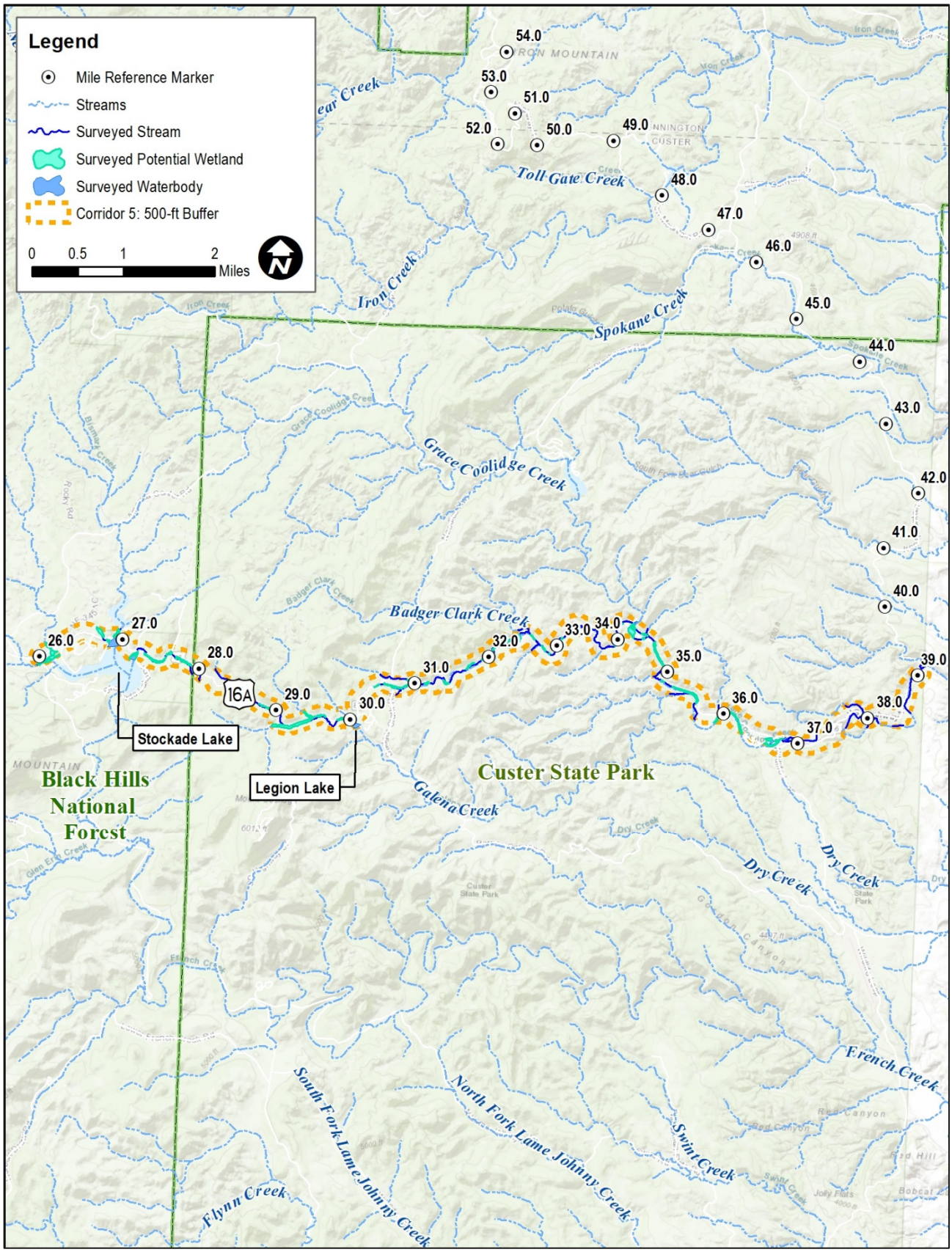
A total of 52.28 acres of potential wetlands were identified within the environmental study area. The wetlands consisted of palustrine emergent (PEM) and palustrine scrub-shrub (PSS) wetlands. PEM wetland vegetation included species such as baltic rush (*Juncus balticus*), cattail (*Typha* sp.), common threesquare (*Schoenoplectus pungens*), Nebraska sedge (*Carex nebrascensis*), prairie cordgrass (*Spartina pectinate*), reed canarygrass (*Phalaris arundinacea*), sedge (*Carex* sp.), smartweed (*Polygonum* sp.), and softstem bulrush (*Schoenoplectus tabernaemontani*). Vegetation in the PSS wetlands included Arroyo willow (*Salix lasiolepis*), Bebb willow (*Salix bebbiana*), peachleaf willow (*Salix amygdaloides*), and sandbar willow (*Salix interior*).

Galena Creek, Bismark Creek, Grace Coolidge Creek, Badger Clark Creek, French Creek, and several unnamed tributaries were found within the environmental study area (see **Figure 7**). The project has a potential to impact Waters of the U.S., including wetlands.

2.5.4 Next Steps

A wetland delineation would be required during the NEPA phase of the project to ensure that the areas preliminarily identified within the study area contain all three requirements of a wetland. When wetland impacts cannot be avoided through design, adequate time must be built into the project schedule to allow for wetland permitting and mitigation.

FIGURE 7. WATERS OF THE U.S., INCLUDING WETLANDS



2.6 Vegetation and Wildlife

This section describes the existing vegetation and wildlife that occurs within the environmental study area for Corridor 7.

2.6.1 Existing Conditions

Vegetation

The environmental study area is located in the Black Hills Plateau sub-ecoregion within the Middle Rockies Ecoregion (USEPA, 2006). The Middle Rockies ecoregion consists of individual mountain ranges of mixed geology intermingled with high elevation, grassy parkland. The Black Hills are an outlier of the Middle Rockies and share with them a montane climate, hydrography, and land use pattern. Land uses such as ranching and woodland grazing, logging, recreation, and mining are commonly found throughout this ecoregion. The Black Hills Plateau sub-ecoregion consists of a relatively flat, elevated expanse covering the mid-elevation slopes and grasslands of the Black Hills. It includes areas of sharply tilted metamorphic rock and lower elevation granite outcrops (USEPA, 2006).

Table 2 provides a list of species observed within the Black Hills corridors.

TABLE 2. OBSERVED BLACK HILLS VEGETATION LIST

Common Name	Scientific Name
Tree	
Aspen	*Populus tremuloides*
Bur oak	*Quercus macrocarpa*
Paper birch	*Betula papyrifera*
Ponderosa pine	*Pinus ponderosa*
Rocky Mountain juniper	*Juniperus scopulorum*
White spruce	*Picea glauca*
Shrub	
Arroyo willow	*Salix lasiolepis*
Bebb willow	*Salix bebbiana*
Buffaloberry	*Shepherdio canadensis*
Chokecherry	*Prunus virginiana*
Common bearberry	*Arctostaphylos uva-ursi*
Common hackberry	*Celtis occidentalis*
Common snowberry	*Symphoricarpos albus*

Common Name	Scientific Name
Creeping Oregon grape	*Mahonia repens*
Ground juniper	*Juniperus communis*
Mountain ninebark	*Physocarpus monogynus*
Peachleaf willow	*Salix amygdaloides*
Prickly wild rose	*Rosa acicularis*
Sandbar willow	*Salix interior*
Saskatoon serviceberry	*Amelanchier alnifolia*
Wood's rose	*Rosa woodsii*
Herb	
Baltic rush	*Juncus balticus*
Bearded wheatgrass	*Elymus caninus*
Canada goldenrod	*Solidago canadensis*
Cattail	*Typha* sp.
Common cowparsnip	*Heracleum sphondylium*
Common dandelion	*Taraxacum officinale*
Common threesquare	*Schoenoplectus pungens*
Common Yarrow	*Achillea millefolium*
Curly dock	*Rumex crispus*
Indian ricegrass	*Oryzopsis hymenoides*
Kentucky bluegrass	*Poa pratensis*
Little bluestem	*Schizachyrium scoparium*
Nebraska sedge	*Carex nebrascensis*
Oxeye daisy	*Leucanthemum vulgare*
Prairie cordgrass	*Spartina pectinata*
Reed canarygrass	*Phalaris arundinacea*
Roughleaf ricegrass	*Oryzopsis asperifolia*
Sedge	*Carex* spp.
Smartweed	*Polygonum* sp.
Smooth brome	*Bromus inermis*
Softstem bulrush	*Schoenoplectus tabernaemontani*
True forget-me-not	*Myosotis scorpioides*

There are a few scattered homes, lodges, vacation rentals, tourist attractions and commercial properties found within the study area. However, much of the environmental study area is comprised of undeveloped forested land within the Black Hills National Forest and Custer State Park.

At the time of September 2020 field visit, no noxious weeds were observed within the study area, but they are still possible through the environmental study area. State-listed noxious weed species from the SDDANR (2021) include:

- Absinth wormwood (*Artemisia absinthium*)
- Leafy spurge (*Euphorbia esula*)
- Canada thistle (*Cirsium arvense*)
- Perennial sow thistle (*Sonchus arvensis*)
- Hoary cress (*Cardaria draba*)
- Purple loosestrife (*Lythrum salicaria*)
- Salt cedar (*Tamarix sp.*)

No purple loosestrife or absinth wormwood has been reported in Custer County, but the other five species have documented populations. Locally listed noxious weed species in Custer County include St. Johnswort (*Hypericum perforatum*), spotted knapweed (*Centaurea maculosa*), black henbane (*Hyoscyamus niger*), common mullein (*Verbascum thapsus*), yellow toadflax (*Linaria vulgaris*), and white horehound (*Marrubium vulgare*) (Custer County, 2021).

Wildlife

The Fish and Wildlife Coordination Act of 1958, as amended, recognizes the vital contribution of wildlife resources to the Nation and requires equal consideration and coordination of wildlife conservation with water resources development programs.

This area is home to a variety of species due to the presence of streams, lakes, varied topography, and vegetation in the Black Hills National Forest. Ungulate species known to occur in or near the environmental study area include mule deer (*Odocoileus hemionus*), white-tailed deer (*Odocoileus virginianus*), elk (*Cervus canadensis*), and pronghorn (*Antilocapra americana*). Bison (*Bison bison*) are common and can be seen wandering around Custer State Park, as well as mountain goats (*Oreamnos americanus*) and a band of burros (*Equus asinus*).

Many carnivore species occur in the environmental study area, including raccoon (*Procyon lotor*), coyote (*Canus latrans*), red fox (*Vulpes vulpes*), and mountain lion (*Puma concolor*). Individuals of these species may use this area as a movement corridor, for hunting purposes, or for denning purposes.

Many rodent species may occur in the environmental study area. This group is very large, and species likely to be found in or near the environmental study area include the beaver (*Castor canadensis*), muskrat (*Ondatra zibethicus*), yellow-bellied marmot (*Marmota flaviventris*), porcupine (*Erethizon dorsatum*), mountain cottontail (*Sylvilagus nuttallii*), least chipmunk (*Tamias minimus*), pine squirrel

(*Tamiasciurus hudsonicus*). Various mice, voles, and woodrats (*Neotoma* sp.) could also use the environmental study area.

Several bat species have the potential to occur in the environmental study area. These species include the Long-eared Myotis (*Myotis evotis*), Northern Long-eared Bat (*Myotis septentrionalis*), and the Silver-haired Bat (*Lasionycteris noctivagans*).

Several reptile and amphibian species can be present in the environmental study area due to the presence of suitable habitat within the riparian area surrounding streams crossing the environmental study area. Species such as: bull frogs (*Lithobates catesbeianus*), snapping turtles (*Chelydra serpentina*), common garter snakes (*Thanmophis sirtalis*), bull snakes (*Pituophis catenifer sayi*), and prairie rattlesnakes (*Crotalus viridis*).

Migratory Birds and Raptors

The Migratory Bird Treaty Act (MBTA) of 1918 provides protection of birds classified as migratory birds by the U.S. Fish and Wildlife Service (USFWS). The Migratory Bird Permit memorandum issued in April 2003 stipulates there is no prohibition against destruction of inactive nests. Additionally, any disturbance to these nesting areas must follow the stipulations outlined in the MBTA. Specific protection for Bald and Golden Eagles is authorized under the Eagle Protection Act (16 United States Code 668), which provides additional protection to these species from intentional or unintentional harmful conduct.

Most birds found in South Dakota and their nests are protected under the MBTA. Species not included in the MBTA are nonnative species whose occurrences in the United States are solely the result of intentional or unintentional human-assisted introduction. Disturbance of active migratory bird nests is prohibited (USFWS, 2020a).

Bald eagles (*Haliaeetus leucocephalus*) require mature trees near large, open bodies of water for nesting and winter roosting. Golden eagles (*Aquila chrysaetos*) generally nest on cliffs or escarpments. The study area contains suitable habitat that may provide opportunities for forage, roosts, and nesting to migrating birds, such as raptors and passerines.

2.6.2 Next Steps

A field survey would be required to establish the presence or absence of noxious weeds, migratory bird and raptor nests, and species-specific wildlife habitat during the NEPA phase of the project.

Disturbance of soil due to project activities would have the potential to introduce or spread noxious weeds and other invasive plant species. Mitigation measures should include seeding disturbed areas with mixtures that comply with South Dakota Seed Laws in order to reduce the potential for invasive plant infestations and to comply with South Dakota laws regarding weed and pest control (South Dakota Code, 2005).

2.7 Threatened and Endangered Species

2.7.1 Regulatory

The Endangered Species Act (ESA), administered by the United States Fish and Wildlife Service (USFWS), provides protection to imperiled species and their habitats. Section 7 of the ESA requires federal agencies to consult with USFWS for federally funded or federally permitted projects that may affect a species listed under the ESA. South Dakota State Law (SDCL 34A-8), administered by South Dakota Department of Game Fish and Parks (SDGFP), protects state listed threatened and endangered species.

2.7.2 Methodology

Felsburg Holt & Ullevig (FHU) environmental scientists used the USFWS Information, Planning, and Conservation System (IPaC) website to identify the latest information on threatened and endangered species that may occur in the study area (USFWS, 2021). SDGFP county lists were also reviewed for threatened, endangered, proposed, and candidate species (SDGFP, 2021). Habitat was evaluated in the project area for species listed as potentially present in Custer County.

2.7.3 Existing Conditions

Table 3 identifies federal and state listed species potentially located in the Corridor 7 area.

TABLE 3. THREATENED AND ENDANGERED SPECIES LIST

Common Name	Status	Habitat	Comments
Mammals			
Northern long-eared bat (*Myotis septentrionalis*)	FT	Northern long-eared bats are typically found near water and dense forest conditions. Roost sites consist of shedding bark and tree cavities, open buildings, and caves or mines. Winter hibernacula are frequently in caves and mines.	Potential summer roosting habitat for the northern long-eared bat exists along streams that cross the environmental study area.
Black-footed Ferret (*Mustela nigripes*)	FE/SE	Grasslands, steppe, and shrub steppe. This species is limited to open habitat, the same used by prairie dogs.	No suitable habitat within the environmental study area.
Northern River Otter (*Lontra canadensis*)	ST	Streams, lakes, ponds, swamps, marshes, estuaries (in some areas), beaver flowages. When inactive, occupies hollow log, space under roots, log, or overhang, abandoned beaver lodge, dense thicket near water, or burrow of other animal; such sites also are used for rearing young.	There are several ponds and streams found within the study area that potentially could provide suitable habitat.

Common Name	Status	Habitat	Comments
Swift Fox (*Vulpes velox*)	ST	Open prairie and plains, including areas intermixed with winter wheat fields.	No suitable habitat within the environmental study area.
Birds			
Osprey (*Pandion haliaetus*)	ST	Lakes, rivers, and coastal bays are primary habitat. Builds nests at the tops of large living or dead trees, utility poles, cellphone towers, and other tall structures.	Suitable nesting habitat is present within the study area; however, no nest sites have been identified.
Red Knot (*Calidris canutus rufa*)	FT	Red knots breed in dry tundra areas and winter at intertidal marine habitats near coastal inlets, estuaries, and bays.	Project lacks dry tundra areas and suitable intertidal marine habitats.
Whooping Crane (*Grus americana*)	FE/SE	Whooping Cranes migration habitat includes freshwater marshes, wet prairies, shallow portions of rivers and reservoirs, grain stubble fields and submerged sandbars in rivers with good horizontal visibility for feeding and resting.	Although individuals can be found during migration anywhere in South Dakota, they are most commonly found along and adjacent to the Missouri River.
American Dipper (*Cinclus mexicanus*)	ST	Rocky, unpolluted streams. Streams with cliffs, ledges, or bridges nearby are important nesting habitats.	No suitable habitat within the environmental study area.
Fish			
Blacknose Shiner (*Notropis heterolepis*)	SE	The Blacknose Shiner is found in small streams, slow-moving rivers, and lakes with sandy bottoms. It prefers streams or creeks with cool, clear water and large pools. It can often be found in areas with extensive vegetation.	Potential habitat is located within the environmental study area.
Longnose sucker (*Catostomus catostomus*)	ST	Habitat for longnose sucker may be lentic or lotic. They prefer cool, clear, spring-fed streams and lakes.	The species is known to exist in very few locations. No recent populations are found on National Forest System lands. No suitable habitat within the environmental study area.
Sturgeon chub (*Macrhybopsis gelida*)	ST	Sturgeon chub prefer areas with moderate to strong current on large rivers with rocks, gravel or coarse sand substrates.	No suitable habitat within the environmental study area.

FE = Federally Endangered ST = State Threatened

FT = Federally Threatened SE = State Endangered

References: SDGFP – Accessed July 2021 USFWS Species Profiles – ECOS, IPaC July 2021 NGP – Blacknose Shiner, July 2021 NatureServe Explorer – Accessed July 2021

In Custer County, four federally listed species were identified through the USFWS IPaC. Potential northern long-eared bat summer foraging habitat is present at wooded habitats along streams, which

also includes adjacent non-forested habitats such as wetlands and open fields. There are also several bridges within the study area that could also be considered potential summer habitat.

The SDGFP identified ten state listed species as having potential to occur in Custer County, South Dakota, including two species that is also federally listed. In general, habitat is lacking for state listed species within the environmental study area. While some species use stream habitat, channels present within the study area lack suitable habitat. There is potentially suitable habitat along the small creeks for the blacknose shiner.

2.7.4 Next Steps

A field survey would be required to establish the presence or absence of federal or state listed threatened and endangered species habitat during the NEPA phase of the project.

The following measures should be implemented during planning and construction of the project:

- Disturbance to riparian and wetland areas should be kept to an absolute minimum.
- If riparian vegetation is lost it should be quantified and replaced onsite. Seeding of indigenous species should be accomplished immediately after construction to reduce sediment and erosion.
- A site-specific sediment and erosion control plan should be part of the project.
- A post construction erosion control plan should be implemented to provide interim control before reestablishing permanent vegetative cover on the disturbed site.

As the project moves into the NEPA phase, USFWS and SDGFP should be coordinated with for concurrence on effects to the listed species and to identify necessary mitigation commitments.

2.8 Environmental Justice

2.8.1 Regulatory

Under Executive Order 12898 (1994), Federal Actions to Address Environmental Justice in Minority Populations, projects are required to identify and address disproportionately high and adverse human health or environmental effects, including the interrelated social and economic effects of their programs, policies, and activities on minority populations and low-income populations in the United States. In accordance with Council on Environmental Quality (CEQ) guidance, EJ populations occur where either:

- The minority or low-income population of the affected area exceeds 50%.
- The population percentage of the affected area is meaningfully greater than the minority population percentage in the general population or other appropriate unit of geographical analysis.

Title VI of the Civil Rights Act of 1964 (Title VI) ensures that individuals are not excluded from participation in, denied the benefit of, or subjected to discrimination under any program or activity receiving federal financial assistance based on race, color, or national origin (42 United States Code [USC] 2000d et seq.). Executive Order 12898 on environmental justice directs that programs, policies, and activities not have a disproportionately high and adverse human health or environmental effect on minority and low-income populations (59 FR 7629).

When federal funding or a federal action is involved, the lead federal agency procedures for identifying EJ populations should be followed. The potential for disproportionately high or adverse impacts to be borne by EJ populations when compared to the non-EJ populations will need to be determined. Additionally, the opportunity for EJ populations to participate fully in the decision-making process must be provided. The denial, reduction, or delay of receipt of benefits by minority and low-income populations cannot occur.

2.8.2 Methodology

To be consistent with the requirements of Title VI and Executive Order 12898, demographic characteristics of the environmental study area were examined to determine whether a low-income and/or minority population occurs within the study area. The demographic and economic character of the environmental study area was compared with that of the State of South Dakota using data from EJSCREEN, USEPA's Environmental Justice Screening and Mapping Tool (Version 2020) (USEPA, 2020).

2.8.3 Existing Conditions

The study area lies within Census Tract 9651, Block Group 1. A block group is an area defined by the U.S. Census Bureau that usually has in the range of 600-3,000 people living in it. Low-income populations are defined by USEPA as: "*The percent of a block group's population in households where the household income is less than or equal to twice the federal poverty level*." Minority populations are defined by the U.S. Census Bureau as: "*A population of people who are not single-race white and not Hispanic. Populations of individuals who are members of the following population groups: American Indian or Alaskan Native; Asian or Pacific Islander; Black, not of Hispanic origin; or Hispanic*."

EPA's EJSCREEN tool was used and reports approximately 93 habitants within one mile of the proposed project corridor. The minority population is approximately 12 percent, while that of the State of South Dakota is 18 percent. The low-income population is approximately 39 percent, while that of the State of South Dakota 31 percent. The demographic index is 25 percent, while that of the State of South Dakota is 24 percent. The demographic index in EJSCREEN is a combination of percent low-income and percent minority. State Percentiles are a way to see how local residents compare to the rest of the State of South Dakota. Instead of just showing numbers out of context, EJSCREEN compares a community to the rest of the state, by using percentiles. The State percentile tells you

what percent of the State population an equal or lower value has, meaning less potential for exposure/ risk/ proximity to certain facilities, or a lower percent minority (USEPA, 2020).

Based on the EJSCREEN the project does not lie within a minority population, however, the low-income population percentage was 8 percent higher than that of the State.

2.8.4 Next Steps

A more detailed EJ analysis should be completed during the NEPA process to verify the proposed project does not have a potential for disproportionately high or adverse impacts on EJ populations and identify ways to avoid and mitigate for any impacts.

2.9 Historic and Cultural Resources

2.9.1 Regulatory Guidance

Historic resources are defined as any prehistoric or historic district, site, building, structure, or object included in, or eligible to the National Register of Historic Places (NRHP). Cultural resources are defined as man-made features and physical remains of past human activity, generally at least 45 years old (properties constructed in 1975 or earlier). Cultural resources include historic buildings, bridges, railroads, roads, other structures, and archeological sites. Section 106 of the National Historic Preservation Act of 1966 requires evaluation of project effects on historic properties that are on, or eligible for, the National Register of Historic Places (NRHP). Criteria for determinations of eligibility are set forth in 36 Code of Federal Regulations (CFR) Part 60.4 (70) and are described in National Register Bulletin How to Apply the National Register Criteria for Evaluation (NPS 1995).

2.9.2 Methodology

An initial inventory and analysis of historic and cultural resources was conducted for Corridor 7 by a historian with FHU. This process involved the following steps:

- Initiating a record search request to the South Dakota Archaeological Research Center (SDARC), for previously recorded historic and archaeological resources within a 1-mile buffer of US 16A, within the study limits of Corridor 7 (see Section 1.4.1 Logical Termini).
- Mapping of previously recorded resources within 500 ft of US 16A.
- Reviewing all previously recorded sites within the 500 ft buffer and identifying NRHP Listed NRHP Eligible sites that may potentially be affected by Corridor 7 improvements.

Results of the Corridor 4 historic and cultural resources inventory and analysis are documented in **Table 4**.

2.9.3 Existing Conditions

A total of 46 previously recorded resources listed in **Table 4** were identified within the 500 ft buffer for Corridor 7, including 7-NRHP eligible properties.

TABLE 4. CORRIDOR 7 – PREVIOUSLY RECORDED RESOURCES ADJACENT TO US 16A

Resource ID / Site ID	Resource Type	Location	Description	Most Recent National Register Eligibility Determination
18273 / **CU00000279**	Structure	T3S, R5E SE ¼ of NW ¼ of Section 25	Visitor's Center (b.1934)	***NRHP Eligible***
26271 / **CU00500005**	Structure	T3S, R5E SE ¼ of NW ¼ of Section 25	108A (b.1990)	*Unevaluated*
26272 / **CU00500006**	Structure	T3S, R5E SE ¼ of NW ¼ of Section 25	109A (b.1990)	*Unevaluated*
26273 / **CU00500007**	Structure	T3S, R5E SW ¼ of NE ¼ of Section 25	110A (b.1975)	*Unevaluated*
26274 / **CU00500008**	Structure	T3S, R5E SW ¼ of NE ¼ of Section 25	Legion Lake-111A (b.1975)	*Unevaluated*
26748 / **CU00500016**	Structure	T3S, R5E SE ¼ of NE ¼ of Section 25	Legion Lake Cabin-148A (date unknown)	***NRHP Eligible***
22253 / **CU00500026**	Structure	T3S, R5E SE ¼ of NE ¼ of Section 25	Legion Lake Lodge (b.1933-1939)	*Unevaluated*
22302 / **CU00500030**	Structure	T3S, R6E SW ¼ of SW ¼ of Section 19	Supervisor's Home (b.1938)	*Unevaluated*
22304 / **CU00500031**	Structure	T3S, R5E NW ¼ of NW ¼ of Section 30	Spring House (b.1938)	*Unevaluated*
22305 / **CU00500032**	Structure	T3S, R6E SW ¼ of SW ¼ of Section 19	Well-Pump House (b.1934-1942)	*Unevaluated*
26238 / **CU00500033**	Structure	T3S, R6E SW ¼ of SW ¼ of Section 19	Garage-Across from Needles Hwy Cabin-71A (date unknown)	***NRHP Eligible***

Resource ID / Site ID	Resource Type	Location	Description	Most Recent National Register Eligibility Determination
26971 / **CU00500034**	Structure	T3S, R6E SW ¼ of SW ¼ of Section 19	Wilsons Crossing-74A (date unknown)	*Unevaluated*
26918 / **CU00500035**	Structure	T3S, R6E SW ¼ of SW ¼ of Section 19	Entrance Cabin-70A (date unknown)	*Unevaluated*
26970 / **CU00500036**	Structure	T3S, R6E SW ¼ of SW ¼ of Section 19	Wilsons Crossing-73A (date unknown)	*Unevaluated*
26618 / **CU00900021**	Structure	T3S, R6E SW ¼ of NE ¼ of Section 20	Park Shop-Machine Shop-96A (b.1925)	*Unevaluated*
22297 / **CU01100002**	Structure	T3S, R6E NW ¼ of NE ¼ of Section 27	Tourist Cabin #1 (b.1939-1941)	*Unevaluated*
22298 / **CU01100003**	Structure	T3S, R6E NW ¼ of NE ¼ of Section 27	Tourist Cabin #35 (b.1939-1941)	*Unevaluated*
22299 / **CU01100004**	Structure	T3S, R6E NW ¼ of NE ¼ of Section 27	Tourist Cabin #3 (b.1939-1941)	*Unevaluated*
22300 / **CU01100005**	Structure	T3S, R6E NW ¼ of SW ¼ of Section 22	State Park Office (date unknown)	*Unevaluated*
22301 / **CU01100006**	Structure	T3S, R6E NW ¼ of NE ¼ of Section 27	Tourist Cabin #34 (b.1939-1941)	*Unevaluated*
22263 / **CU01100007**	Structure	T3S, R6E SW ¼ of NW ¼ of Section 26	Barn (b.1920s)	*Unevaluated*
22264 / **CU01100008**	Structure	T3S, R6E NE ¼ of NE ¼ of Section 27	Utility Building (b.1920s)	***NRHP Eligible***
22306 / **CU01100009**	Structure	T3S, R6E SE ¼ of NE ¼ of Section 27	Fire Station (date unknown)	*Unevaluated*
22307 / **CU01100010**	Structure	T3S, R6E SE ¼ of NE ¼ of Section 27	Carpenter's (date unknown)	*Unevaluated*
22308 / **CU01100011**	Structure	T3S, R6E NW ¼ of NE ¼ of	Coolidge Inn (b.1927)	*Unevaluated*

Resource ID / Site ID	Resource Type	Location	Description	Most Recent National Register Eligibility Determination
		Section 27		
22310 / **CU01100013**	Structure	T3S, R6E NE ¼ of NE ¼ of Section 27	Dormitory (date unknown)	*Unevaluated*
26974 / **CU01700002**	Structure	T3S, R6E SW ¼ of NW ¼ of Section 22	Hwy 16A 98A (date unknown)	*Unevaluated*
26975 / **CU01700003**	Structure	T3S, R6E SE ¼ of NE ¼ of Section 21	99A (date unknown)	*Unevaluated*
26750 / **CU01700005**	Structure	T3S, R6E NE ¼ of NW ¼ of Section 21	Hodsons House-103A (date unknown)	***NRHP Eligible***
26793 / **CU01700006**	Structure	T3S, R6E NE ¼ of NW ¼ of Section 21	Hodsons Grill-Box-104A (date unknown)	*NRHP Not Eligible (SHPO Concurrence)*
26752 / **CU01700008**	Structure	T3S, R6E NE ¼ of NE ¼ of Section 21	Grace Coolidge Residence102A (date unknown)	***NRHP Eligible***
26973 / **CU01700011**	Structure	T3S, R6E NW ¼ of SW ¼ of Section 22	Shady Grove-107A/ Fish House-97A (date unknown)	*Unevaluated*
26788 / **CU01700012**	Structure	T3S, R6E SW ¼ of NW ¼ of Section 21	Shady Grove-107A (date unknown)	*Unevaluated*
26622 / **CU01900003**	Structure	T3S, R5E SE ¼ of SW ¼ of Section 21	Pumphouse at Garden Stockade-B60 (b.1940)	***NRHP Eligible***
26777 / **CU01900010**	Structure	T3S, R5E NW ¼ of SW ¼ of Section 22	STL Day Use Vault Toilet #1 B71 (b.1980)	*Unevaluated*
26910 / **CU01900017**	Structure	T3S, R5E SE ¼ of SW ¼ of Section 21	Stockade Lake Area-B59 (b.1920, 1940, & 1970)	*Unevaluated*
1765 / **CU00000625**	Bridge	T3S, R6E NE ¼ of NE ¼ of Section 27	Bridge 17-338-071 (b.1950)	*NRHP Not Eligible (SHPO Concurrence)*
5552 / **39CU0819**	Site	T3S, R6E SE ¼ of NE ¼ of Section 21	Pelican Lake Artifact Scatter	*Unevaluated*

Resource ID / Site ID	Resource Type	Location	Description	Most Recent National Register Eligibility Determination
4450 / **39CU1027**	Site	T3S, R5E SW ¼ of NE ¼ of Section 25	Native American Isolated Find	*NRHP Not Eligible (SHPO Concurrence)*
22549 / **39CU2021**	Site	T3S, R6E NE ¼ of NE ¼ of Section 27	Railroad	*Unevaluated*
5410 / **39CU2099**	Site	T3S, R6E SE ¼ of NW ¼ of Section 26	Euroamerican Alignment	*Unevaluated*
4303 / **39CU2794**	Site	T3S, R6E SE ¼ of NW ¼ of Section 20	Nonfarm Ruins	*Unevaluated*
4305 / **39CU2796**	Site	T3S, R6E SW ¼ of SW ¼ of Section 22	Native American Isolated Find	*NRHP Not Eligible (SHPO Concurrence)*
4306 / **39CU2797**	Site	T3S, R6E NW ¼ of NE ¼ of Section 27	Native American Isolated Find	*NRHP Not Eligible (SHPO Concurrence)*
4058 / **39CU2804**	Site	T3S, R6E SE ¼ of NE ¼ of Section 26	Native American Artifact Scatter	*Unevaluated*
4450 / **39CU3328**	Site	T3S, R5E SE ¼ of SW ¼ of Section 21	Fort	*Unevaluated*
	Previously recorded National Register listed or eligible resources			
	Eligibility determination: not eligible/SHPO concurrence, unevaluated, or *unknown*			

2.9.4 Next Steps

Next steps would be for the responsible agency to initiate a cultural resources survey to determine whether the undertaking (project) could affect these previously recoded historic and cultural resources that are National Register listed or eligible. If so, the agency proceeds to define the Area of Potential Effects (APE), which is the area that an undertaking may directly or indirectly cause changes in the character of use of historic resources. Once the APE has been defined, a cultural resources survey would be conducted, and the agency would consult with the appropriate State Historic Preservation Officer (SHPO) and/or Tribal Historic Preservation Officer (THPO) on effects to historic or potentially historic resources located within the APE.

2.10 Federal and Tribal Lands

2.10.1 Regulatory Guidance

Tribal consultation is conducted for all transportation projects that may be of interest to a Tribe in South Dakota and with Tribes with aboriginal ties to lands in in South Dakota, particular the Black Hills. For projects involving federal funding, SDDOT coordinates with FHWA to conduct regular and meaningful consultation with Tribes, in accordance with Executive Order 13175 on Tribal Consultation.

2.10.2 Methodology

Tribes with interests in lands within Custer County were identified based on FHWA's list of *Counties of Interest for Tribes in and near South Dakota* (Environmental Procedures Manual, Table 2.5-1, SDDOT. 2019)

2.10.3 Tribal Consultation

Tribal consultation through coordination with FHWA, the Bureau of Indian Affairs and Custer County would involve the following tribes in South Dakota: Cheyenne River Sioux Tribe, Lower Brule Sioux Tribe, Oglala Sioux Tribe, Sisseton-Wahpeton Oyate, Standing Rock Sioux Tribe, Yankton Sioux Tribe, Three Affiliated Tribes (Mandan Hidatsa Arikara Nation), Ponca Tribe of Nebraska, Northern Arapaho Tribe, and the Chippewa Cree Tribe.

2.10.4 Next Steps

An initial step in the NEPA scoping process will be to prepare a letter to each designated tribal representative, including a description of the proposed project, a map, and an invitation to become a consulting party. Under Section 106 regulations, tribes are offered the opportunity to identify concerns about cultural resources, and comment on how the project might affect them. Tribes that that elect to become consulting parties for the undertaking will be notified of the results of any necessary historic property surveys, and they will be asked to comment on eligibility and effects determinations.

2.11 Traffic Noise

Traffic noise can be an important and contentious environmental consideration for highway projects. The locations most often of concern for traffic noise are exterior areas of frequent human use.

2.11.1 Regulatory Setting

At the federal level, highway traffic noise is addressed under 23 CFR 772. The *Noise Analysis and Abatement Guidance* is South Dakota DOT's compliance with 23 CFR 772 and guides highway noise analyses in South Dakota. These regulations apply to projects that receive federal funding or are otherwise subject to FHWA approval. State-only actions do not require a noise analysis.

Some, but not all, federal-aid or federal-approval highway improvement projects will require a traffic noise analysis. Type I projects require a noise analysis; South Dakota does not participate in Type II projects; Type III projects are exempt. No new through lanes are currently planned, so the most likely reasons an improvement may be Type I is from a substantial vertical shift in the road surface near a receptor or a shift in the road alignment that halves the distance between the road and a receptor. In most other cases, the project is likely to be Type III.

If the project is determined to be Type I, a traffic noise impact analysis will be undertaken through computer modeling using prescribed software. The analysis will focus on the presence or absence of noise impacts in the study corridor. Noise abatement, typically in the form of noise barriers, will be evaluated for any noise impacts identified. Noise abatement actions found to be feasible and reasonable, if any, must be included in the final project.

2.11.2 Existing Conditions

US 16A in this corridor is an existing two-lane highway through a rural, mountainous setting. There are dispersed residences and developed sites typical of a large state park within 300 feet of the highway, so nominally there will be noise receptors to consider. Substantial changes to the elevation and alignment of the road are not expected due to the cost and difficulty that would entail but some changes are expected (e.g., curve flattening). There are no existing SDDOT noise abatement measures present.

2.11.3 Next Steps

The specific improvements proposed at the NEPA phase will need to be reviewed to determine the noise type status and what noise analysis may be required. As envisioned by the recommendations from Phases 1 and 2, the conceptual improvements for the corridor suggest a Type III noise project is likely, which will not require a traffic noise analysis. If future decisions on corridor improvements result in a Type I project, a noise analysis may be needed during the NEPA phase where noise impacts and abatement actions are evaluated in accordance with *Noise Analysis and Abatement Guidance*.

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

Section 4(f) properties include publicly owned parks, recreational areas, wildlife and waterfowl refuges, or public and private historical sites as defined in the US Department of Transportation (DOT) Act of 1966. FHWA and other DOT agencies cannot approve use of these properties for transportation projects unless certain conditions apply.

Section 6(f) properties include recreational resources developed with federal funding through the Land and Water Conservation Fund (LWCF). Section 6(f) of the LWCF Act prohibits the conversion of these properties to anything other than public outdoor recreation uses.

2.12.1 Regulatory

Section 4(f) stipulates that FHWA and other United States Department of Transportation (DOT) agencies cannot approve the use of land from publicly owned parks, recreational facilities, wildlife and waterfowl refuges, or historic sites unless there is no feasible and prudent alternative to the use of the land and unless the action includes all possible planning to minimize harm to the property resulting from use. Historic sites that are on or eligible for the NRHP qualify for protection under Section 4(f).

Section 6(f) of the Land and Water Conservation Act requires that the conversion of lands or facilities acquired with LWCF Act funds be coordinated with the Department of Interior. Usually, replacement in kind is required. Evaluation of Section 6(f) properties is completed for the following reasons:

- To preserve the intended use of public funds for land and water conservation
- To comply with several legal mandates that pertain to the LWCF and Section 6(f)

Section 6(f) of the Act assures that once an area has been funded with LWCF assistance, it is continually maintained for public recreation use unless the NPS approves a substitute property of reasonably equivalent usefulness and location and of at least equal fair market value.

2.12.2 Methodology

Section 4(f): Preliminary inventory included a review of available GIS data for parks, recreational facilities, wildlife and waterfowl refuges for non-historic Section 4(f) resources. For historic Section 4(f) resources, the information provided in Section 2.9 was used to determine the presence of historic Section 4(f) resources.

Section 6(f): Information from The Land and Water Conservation Fund (LWCF) was referenced to identify Section 6(f) properties potentially located near the study area.

2.12.3 Existing Conditions

Section 4(f): Non-Historic Section 4(f) properties located within the within the 500 ft study area for Corridor 7 include:

- Norbeck Wildlife Preserve
- Custer State Park

There are 7-NRHP eligible properties within the 500 ft study area for Corridor 7, including:

- Property #26750 /CU01700005: Visitor's Center (b.1934)—NRHP eligible
- Property # 26750 /CU01700005: Legion Lake Cabin-148A (date unknown)—NRHP eligible
- Property # 26238 /CU00500033: Garage-Across from Needles Hwy Cabin-71A—NRHP eligible

- Property # 22264 /CU01100008: Utility Building (b.1920s)—NRHP eligible
- Property # 26750 /CU01700005: Hodsons House-103A—NRHP eligible
- Property # 26752 /CU01700008: Grace Coolidge Residence102A—NRHP eligible
- Property # 26622 /CU01900003: Pumphouse at Garden Stockade-B60—NRHP eligible

Section 6(f): The Black Hills National Forest - Spring Creek Watershed is located just five miles south of Custer, South Dakota. The 350-acre Spring Creek Watershed property was added to the Black Hills National Forest in 2020 using an investment of $1.719 million from the LWCF in 2019. The acquisition will preserve wildlife habitat, protect watersheds and streams, and provide recreational opportunities for the public, including new access to hunting areas (LWCF, 2021). Information available from the LWCF indicates the boundary of the Black Hills National Forest is included in the Section 6(f) resource boundary.

According to the LWCF past projects information, there have been 23 separate grants in Custer State Park that have utilized LWCF funding, beginning in 1967 and most recently in 2019. Custer State Park has received investments totaling over $2.7 million from the LWCF through the State and Local Assistance Program (LWCF, 2021).

2.12.4 Next Steps

Section 4(f): If, during the project development processes, parks, trails, or open space are impacted, the next steps of the Section 4(f) process require evaluations of publicly owned parks, trails, and open space lands to be conducted to determine if there are any properties that qualify for protection under Section 4(f). The law says that FHWA (and other DOT agencies) cannot approve the use of land from publicly owned parks, recreation areas, wildlife refuges, or historic sites unless there is no feasible and prudent alternative to the use and the action includes all possible planning to minimize harm to the property. The substantive provisions of Section 4(f) apply only to agencies within the USDOT. A Section 4(f) evaluation would be required for the conversion of any publicly owned parks, trails, or open space lands for transportation improvements.

Section 6(f): During the NEPA process, the boundary for the Black Hills National Forest Section 6(f) and Custer State Park resources will be verified and determine if there will be any impacts to Section 6(f) properties. For Section 6(f) properties located in the areas of the improvements, alternatives should be designed to avoid a conversion of these properties and/or determine if improvements would be a benefit to the property. If a conversion of land cannot be avoided, efforts will be made to mitigate effects to these properties. SDDOT, in cooperation with the local government landowner, must identify replacement land of equal value, location, and usefulness before a transfer of property under Section 6(f) can occur.

2.13 Visual Resources

2.13.1 Regulatory

The VIA scoping process applied to Corridor 2 follows guidance from FHWA's Guidelines for the Visual Impact Assessment of Highway Projects (FHWA, 2015) for assessing impacts on visual resources in context to NEPA (See Appendix C, Visual Resource Scoping - Corridor 7).

2.13.2 VIA Scoping

A visual resource scoping process was conducted for Corridor 7, to identify issues related to the transportation improvement concepts planned for US 16A: Norbec National Scenic Byway and to establish Visual Impact Assessment (VIA) requirements for the National Environmental Policy Act (NEPA) phase. The VIA scoping process applied to Corridor 3 follows guidance from FHWA's Guidelines for the Visual Impact Assessment of Highway Projects (FHWA, 2015) for assessing impacts on visual resources in context to NEPA (See Appendix B, Visual Resource Scoping - Corridor 7).

Context and Landscape Character

The US 16A through Custer State Park is part of the Peter Norbec National Scenic Byway loop through the Black Hills National Forest. The Scenic Byway alignment fits into the contours of the surrounding topography, following the narrow valleys at the base of forested hills landscape, connecting Legion Lake with the Park headquarters at Wildlife Loop Rd.

2.13.3 VIA Scoping Issues and Next Steps

Transportation improvements to the Peter Norbec National Scenic Byway within Custer State Park gained considerable public comment through the public outreach in July-August 2021, as highlighted in Appendix B. The proposed concept of limiting transportation improvements to spot locations and dropping corridor-wide shoulder widening and curve realignments, would reduce the level of visual contrast with the landscape character, visual quality and views within the US 16 corridor. Interagency and stakeholder collaboration in the VIA process will create opportunities for achieving compatibility of the proposed transportation improvements with the visual resources of the corridor setting.

The VIA Scoping process resulted in a score ranging from **20-21 points**, indicating that a *Standard VIA* would be appropriate for NEPA documentation. Assumptions are that the proposed project elements could potentially result in adverse visual impacts, and the VIA would receive extensive local, perhaps statewide, public review. The VIA would typically include several visual simulations and involve a thorough examination of Forest planning and policy documents supplemented with a direct agency and public engagement processes to determine visual preferences, and mitigation.

If corridor-wide improvements and realignment options become considerations in the future, additional VIA Scoping would be required.

2.14 Hazardous Materials

2.14.1 Regulatory

Hazardous materials are regulated by various state and federal regulations. NEPA, as amended (42 US Code (USC) 4321 et seq., Public Law 91-190, 83 Stat. 852), mandates that decisions involving federal funds and approvals consider environmental effects from hazardous materials. Other applicable regulations include the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) (42 USC 9601 et seq.), which provides federal authority for the identification, investigation, and cleanup of sites throughout the US that are contaminated with hazardous substances (as specifically designated in the CERCLA) and the Resource Conservation and Recovery Act of 1976 (RCRA) (42 USC 321 et seq.), which establishes a framework for the management of both solid and hazardous waste. The federal Hazardous and Solid Waste Amendments of 1984 established a new comprehensive regulatory program for underground storage tanks containing petroleum products and hazardous chemicals regulated under CERCLA. In 2016, the EPA retired the CERCLA Information System database, and replaced it with a more modern system called the Superfund Enterprise Management System.

2.14.2 Existing Conditions

No facilities were noted within the US 16A Corridor during the desktop review, however, there may other properties that were previously located within the study area that may have affected groundwater and subsurface soils but have since been occupied by another business. There could also be facilities located near the study area that may be undergoing active groundwater remediation.

2.14.3 Next Steps

Prior to final design, an environmental database records search of federal and state environmental resources should be obtained and reviewed for the study area. The environmental database records would be evaluated with respect to the status of the facility listing and its location within the study area boundaries. The facilities identified in the environmental database would be ranked as having either a high, medium, or low potential to impact based on the location of these facilities and known releases.

In addition to the environmental database review, an on-site visual inspection of the study area and surrounding areas should be completed. The site visit should be completed by a qualified environmental professional, skilled and experienced in identifying hazardous materials and waste issues, to identify and evaluate present conditions.

Finally, a review of historical site information such as Sanborn fire insurance maps, US Geological Survey topographic maps, and readily available historical aerial photographs should be completed.

This review of historical sources should include all obvious uses from the study area's first obvious developed use or 1940, whichever is earlier, to the present time.

If findings from the historical and/or database reviews indicate that subsurface contamination may be present, a limited subsurface investigation to collect soil and/or groundwater samples may be warranted. Based on the information gathered during the subsurface investigation, a Materials Management Plan (MMP) may be recommended to detail the Standard Operating Procedures for handling potentially contaminated media, specifically soil and/or groundwater. The MMP will be designed to minimize worker exposure to potentially contaminated material, prevent releases to the environment, and ensure proper disposal.

2.15 Summary

This environmental review was prepared to evaluate issues and the potential for conflicts with human and natural environment from highlighted key resources within each corridor with a likelihood of potential effects depending on the proposed action and project design development.

Next steps would follow SDDOT NEPA process in coordination with FHWA. Scan report is intended to provide a starting point for the NEPA process.

3. REFERENCES

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Appendix A. Environmental Resources Map Book

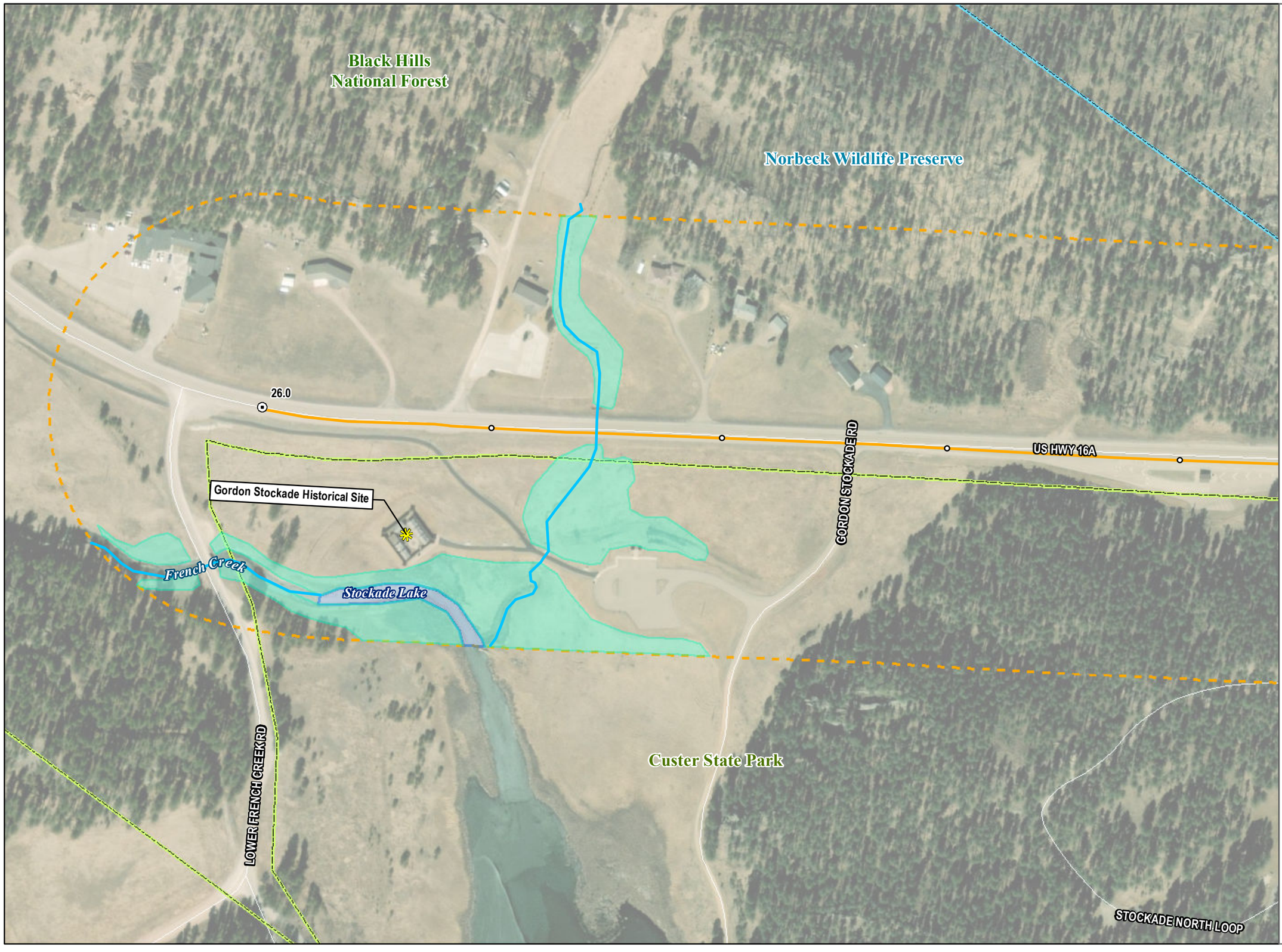
Black Hills Phase III Corridors

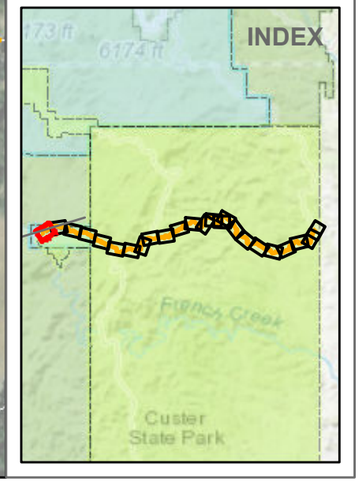
Corridor 7: Sheet 1 of 24

Legend

- Tenth Mile Marker
- Mile Reference Marker
- Other Environmental Resource
- Snowmobile Trail
- Streams
- Corridor 7: Existing Alignment
- Potential Wetland
- Waterbodies
- Corridor 5: 500 ft Buffer
- Norbeck Wildlife Preserve
- SD Parks and Recreation Area
- Black Hills National Forest

0 100 200 300 Feet



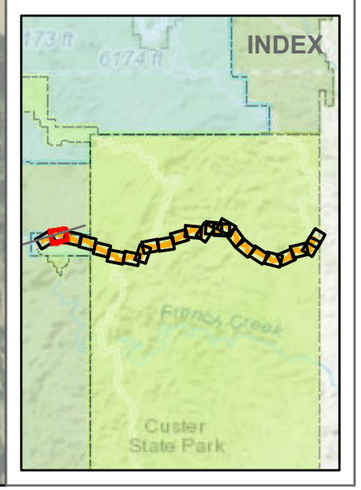


Black Hills Phase III Corridors
Corridor 7: Sheet 2 of 24

Legend

- Tenth Mile Marker
- Mile Reference Marker
- Other Environmental Resource
- Snowmobile Trail
- Streams
- Corridor 7: Existing Alignment
- Potential Wetland
- Waterbodies
- Corridor 5: 500 ft Buffer
- Norbeck Wildlife Preserve
- SD Parks and Recreation Area
- Black Hills National Forest

0 100 200 300 Feet



Black Hills National Forest

Norbeck Wildlife Preserve

Bismark Creek

US HWY 16A

STOCKADE NORTH LOOP

Stockade Lake

Custer State Park

STOCKADE DAY USE RD

Custer State Park

Norbeck Wildlife Preserve

BISMARCK LAKE RD

27.0

Stockade Lake

STOCKADE LAKE RD

US HWY 16A

Stockade Lake

Black Hills Phase III Corridors
Corridor 7: Sheet 3 of 24

Legend

- Tenth Mile Marker
- Mile Reference Marker
- Other Environmental Resource
- Snowmobile Trail
- Streams
- Corridor 7: Existing Alignment
- Potential Wetland
- Waterbodies
- Corridor 5: 500 ft Buffer
- Norbeck Wildlife Preserve
- SD Parks and Recreation Area
- Black Hills National Forest

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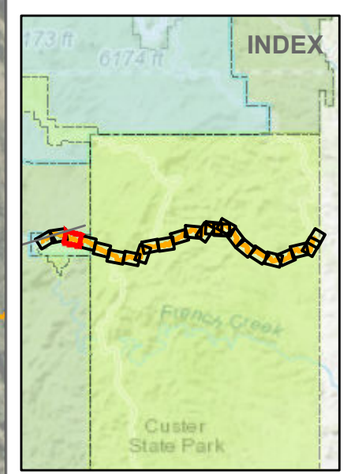
0 100 200 300
Feet



Custer State Park

CAMP BOB MARSHALL RD

Custer State Park

US HWY 16A

28.0

Black Hills
National Forest

Norbeck Wildlife Preserve

Black Hills Phase III Corridors
Corridor 7: Sheet 4 of 24

Legend

- Tenth Mile Marker
- Mile Reference Marker
- Other Environmental Resource
- Snowmobile Trail
- Streams
- Corridor 7: Existing Alignment
- Potential Wetland
- Waterbodies
- Corridor 5: 500 ft Buffer
- Norbeck Wildlife Preserve
- SD Parks and Recreation Area
- Black Hills National Forest

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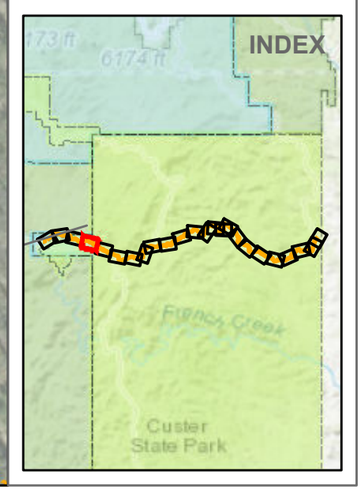
Feet



Custer State Park

Galena Creek

US HWY 16A

Black Hills Phase III Corridors
Corridor 7: Sheet 5 of 24

Legend

- Tenth Mile Marker
- Mile Reference Marker
- Other Environmental Resource
- Snowmobile Trail
- Streams
- Corridor 7: Existing Alignment
- Potential Wetland
- Waterbodies
- Corridor 5: 500 ft Buffer
- Norbeck Wildlife Preserve
- SD Parks and Recreation Area
- Black Hills National Forest

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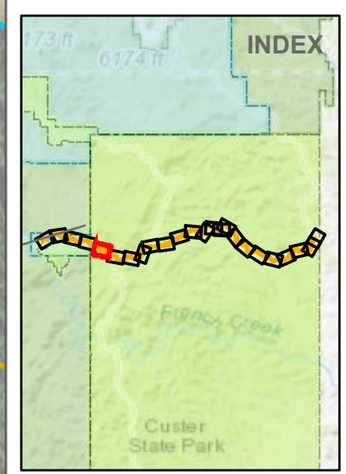

Black Hills Phase III Corridors
Corridor 7: Sheet 6 of 24

Legend

- Tenth Mile Marker
- Mile Reference Marker
- Other Environmental Resource
- Snowmobile Trail
- Streams
- Corridor 7: Existing Alignment
- Potential Wetland
- Waterbodies
- Corridor 5: 500 ft Buffer
- Norbeck Wildlife Preserve
- SD Parks and Recreation Area
- Black Hills National Forest

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0 100 200 300 Feet

US HWY 16A

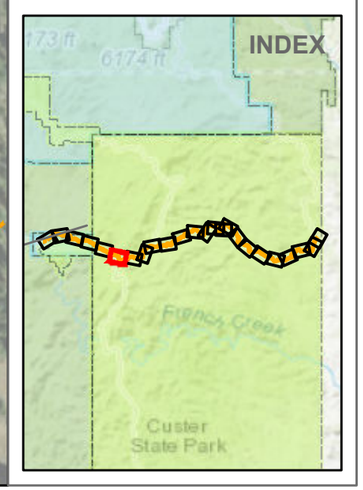
29.0

SD HWY 87 S

SD HWY 87 SD HWY 87 N

Galena Creek

Custer State Park



Black Hills Phase III Corridors
Corridor 7: Sheet 7 of 24

Legend

- Tenth Mile Marker
- Mile Reference Marker
- Other Environmental Resource
- Snowmobile Trail
- Streams
- Corridor 7: Existing Alignment
- Potential Wetland
- Waterbodies
- Corridor 5: 500 ft Buffer
- Norbeck Wildlife Preserve
- SD Parks and Recreation Area
- Black Hills National Forest

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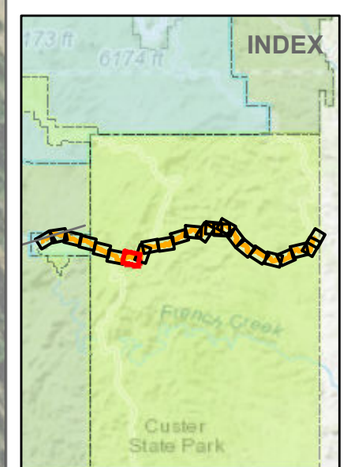

Galena Creek

30.0

US HWY 16A

Legion Lake

LEGION LAKE CABINS

Custer State Park

Black Hills Phase III Corridors
Corridor 7: Sheet 8 of 24

Legend

- Tenth Mile Marker
- Mile Reference Marker
- Other Environmental Resource
- Snowmobile Trail
- Streams
- Corridor 7: Existing Alignment
- Potential Wetland
- Waterbodies
- Corridor 5: 500 ft Buffer
- Norbeck Wildlife Preserve
- SD Parks and Recreation Area
- Black Hills National Forest

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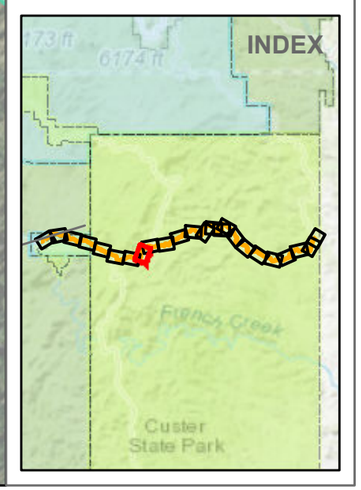


Custer State Park

SD HWY 87

US HWY 16A

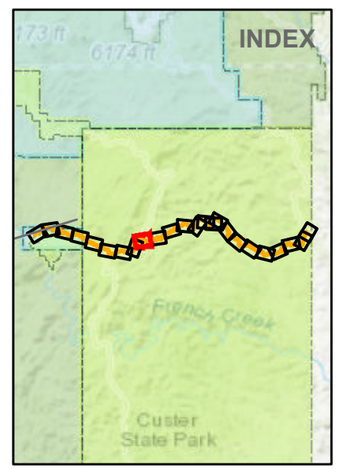
BADGER CLARK RD

Black Hills Phase III Corridors
Corridor 7: Sheet 9 of 24

Legend

- Tenth Mile Marker
- Mile Reference Marker
- Other Environmental Resource
- Snowmobile Trail
- Streams
- Corridor 7: Existing Alignment
- Potential Wetland
- Waterbodies
- Corridor 5: 500 ft Buffer
- Norbeck Wildlife Preserve
- SD Parks and Recreation Area
- Black Hills National Forest

0 100 200 300 Feet



Custer State Park

31.0

US HWY 16A

Black Hills Phase III Corridors

Corridor 7: Sheet 10 of 24

Legend

- Tenth Mile Marker
- Mile Reference Marker
- Other Environmental Resource
- Snowmobile Trail
- Streams
- Corridor 7: Existing Alignment
- Potential Wetland
- Waterbodies
- Corridor 5: 500 ft Buffer
- Norbeck Wildlife Preserve
- SD Parks and Recreation Area
- Black Hills National Forest

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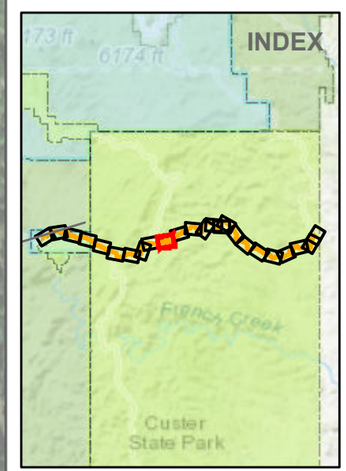

Custer State Park

US HWY 16A

32.0

Black Hills Phase III Corridors
Corridor 7: Sheet 11 of 24

Legend

- Tenth Mile Marker
- Mile Reference Marker
- Other Environmental Resource
- Snowmobile Trail
- Streams
- Corridor 7: Existing Alignment
- Potential Wetland
- Waterbodies
- Corridor 5: 500 ft Buffer
- Norbeck Wildlife Preserve
- SD Parks and Recreation Area
- Black Hills National Forest

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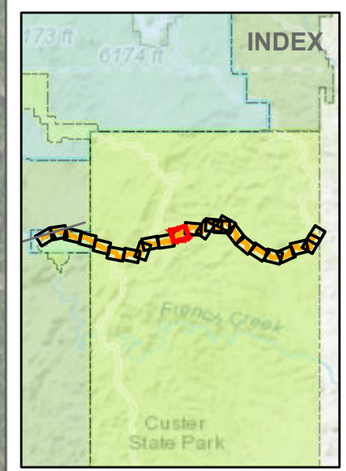

Black Hills Phase III Corridors
Corridor 7: Sheet 12 of 24

Legend

- Tenth Mile Marker
- Mile Reference Marker
- Other Environmental Resource
- Snowmobile Trail
- Streams
- Corridor 7: Existing Alignment
- Potential Wetland
- Waterbodies
- Corridor 5: 500 ft Buffer
- Norbeck Wildlife Preserve
- SD Parks and Recreation Area
- Black Hills National Forest

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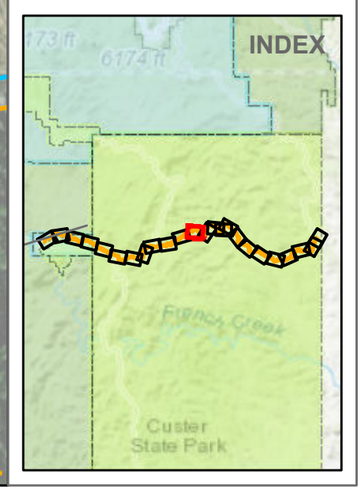
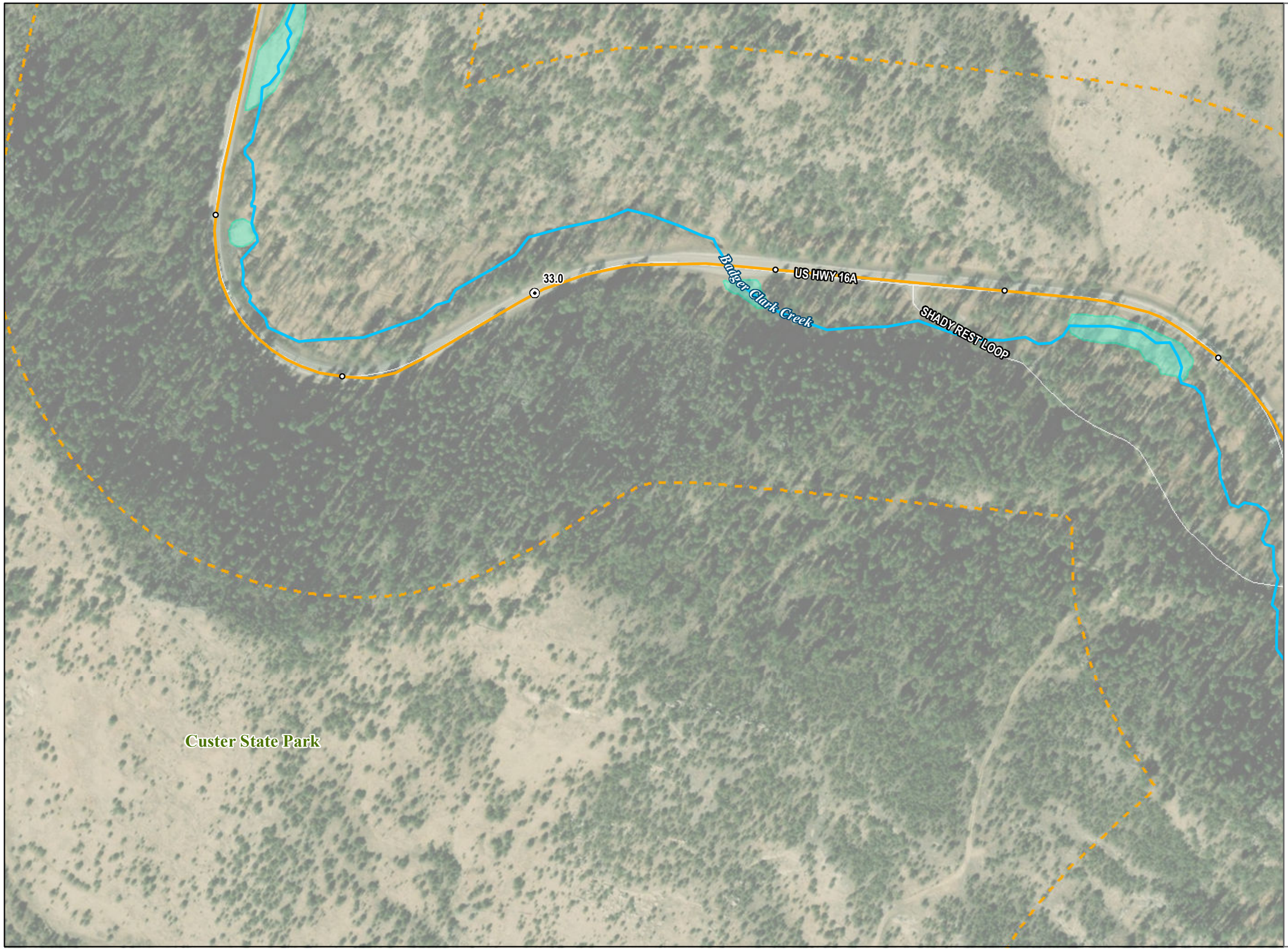
0 100 200 300 Feet

US HWY 16A

Badger Clark Creek

Custer State Park





Black Hills Phase III Corridors
Corridor 7: Sheet 13 of 24

Legend

- Tenth Mile Marker
- Mile Reference Marker
- Other Environmental Resource
- Snowmobile Trail
- Streams
- Corridor 7: Existing Alignment
- Potential Wetland
- Waterbodies
- Corridor 5: 500 ft Buffer
- Norbeck Wildlife Preserve
- SD Parks and Recreation Area
- Black Hills National Forest

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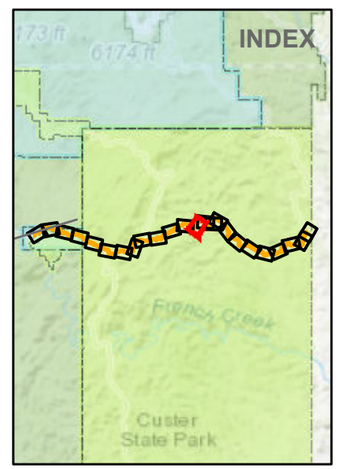

Custer State Park

US HWY 16A

SHADY REST LOOP

Badger Clark Creek

US HWY 16A

Badger Clark Creek

Black Hills Phase III Corridors
Corridor 7: Sheet 14 of 24

Legend

- Tenth Mile Marker
- Mile Reference Marker
- Other Environmental Resource
- Snowmobile Trail
- Streams
- Corridor 7: Existing Alignment
- Potential Wetland
- Waterbodies
- Corridor 5: 500 ft Buffer
- Norbeck Wildlife Preserve
- SD Parks and Recreation Area
- Black Hills National Forest

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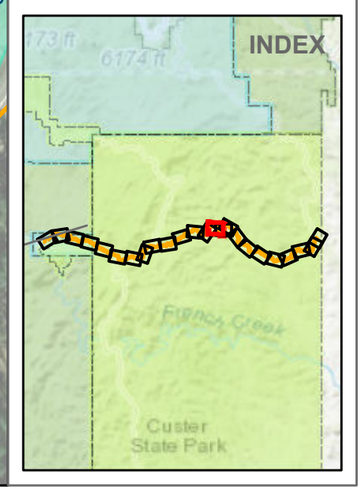


Black Hills Phase III Corridors
Corridor 7: Sheet 15 of 24

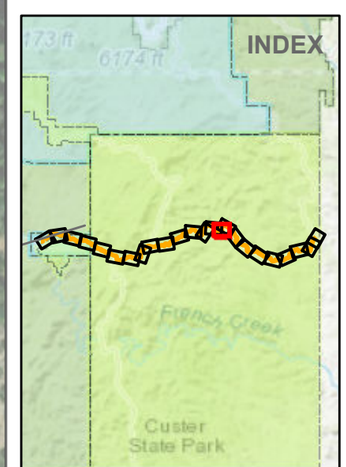
Legend

- Tenth Mile Marker
- Mile Reference Marker
- Other Environmental Resource
- Snowmobile Trail
- Streams
- Corridor 7: Existing Alignment
- Potential Wetland
- Waterbodies
- Corridor 5: 500 ft Buffer
- Norbeck Wildlife Preserve
- SD Parks and Recreation Area
- Black Hills National Forest

N

0 100 200 300 Feet

INDEX



Grace Coolidge Creek

COOLIDGE BYWAY

US HWY 16A

Grace Coolidge Creek

Grace Coolidge Creek

34.0

Badger Clark Creek

Custer State Park

Custer State Park

Grace Coolidge Creek

Badger Clark Creek

COOLIDGE BYWAY

US HWY 16A

Grace Coolidge Tent Area

Grace Coolidge Creek

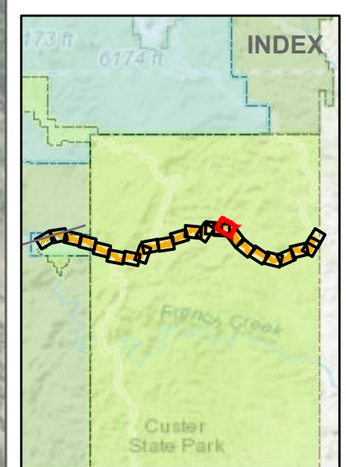
34.0

Black Hills Phase III Corridors
Corridor 7: Sheet 16 of 24

Legend

- Tenth Mile Marker
- Mile Reference Marker
- Other Environmental Resource
- Snowmobile Trail
- Streams
- Corridor 7: Existing Alignment
- Potential Wetland
- Waterbodies
- Corridor 5: 500 ft Buffer
- Norbeck Wildlife Preserve
- SD Parks and Recreation Area
- Black Hills National Forest

0 100 200 300 Feet



Tent Area

US HWY 16A

Grace Coolidge Creek

35.0

Grace Coolidge Creek

Custer State Park

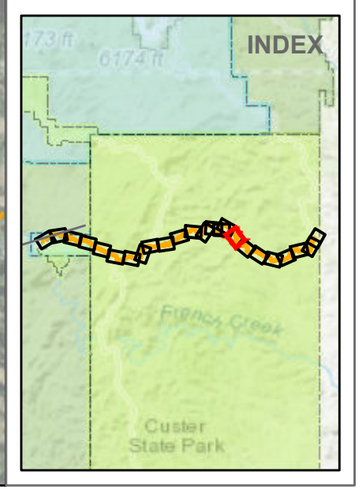
Black Hills Phase III Corridors

Corridor 7: Sheet 17 of 24

Legend

- Tenth Mile Marker
- Mile Reference Marker
- Other Environmental Resource
- Snowmobile Trail
- Streams
- Corridor 7: Existing Alignment
- Potential Wetland
- Waterbodies
- Corridor 5: 500 ft Buffer
- Norbeck Wildlife Preserve
- SD Parks and Recreation Area
- Black Hills National Forest

0 100 200 300 Feet



Black Hills Phase III Corridors
Corridor 7: Sheet 18 of 24

Legend

- Tenth Mile Marker
- Mile Reference Marker
- Other Environmental Resource
- Snowmobile Trail
- Streams
- Corridor 7: Existing Alignment
- Potential Wetland
- Waterbodies
- Corridor 5: 500 ft Buffer
- Norbeck Wildlife Preserve
- SD Parks and Recreation Area
- Black Hills National Forest

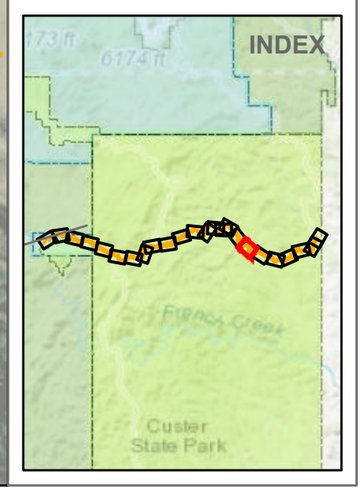
0 100 200 300 Feet

US HWY 16A

Galena Creek

Grace Coolidge Creek

Custer State Park

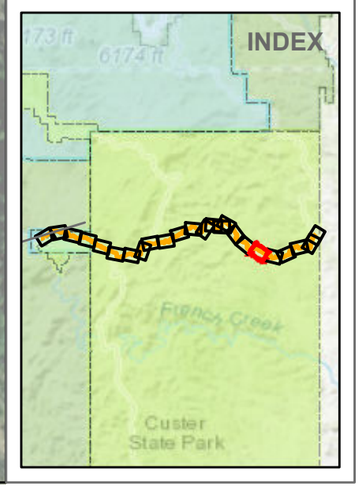


Black Hills Phase III Corridors
Corridor 7: Sheet 19 of 24

Legend

- Tenth Mile Marker
- Mile Reference Marker
- Other Environmental Resource
- Snowmobile Trail
- Streams
- Corridor 7: Existing Alignment
- Potential Wetland
- Waterbodies
- Corridor 5: 500 ft Buffer
- Norbeck Wildlife Preserve
- SD Parks and Recreation Area
- Black Hills National Forest

0 100 200 300 Feet



Custer State Park

VISITOR CENTER LOOP

Grace Coolidge Creek

US HWY 16A

WILDLIFE LOOP

Black Hills Phase III Corridors

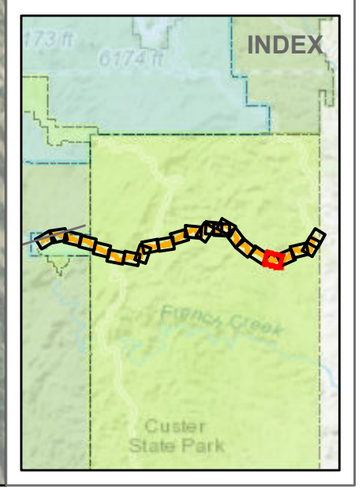
Corridor 7: Sheet 20 of 24

Legend

- Tenth Mile Marker
- Mile Reference Marker
- Other Environmental Resource
- Snowmobile Trail
- Streams
- Corridor 7: Existing Alignment
- Potential Wetland
- Waterbodies
- Corridor 5: 500 ft Buffer
- Norbeck Wildlife Preserve
- SD Parks and Recreation Area
- Black Hills National Forest

N

0 100 200 300 Feet



Custer State Park

37.0

Grace Coolidge Creek

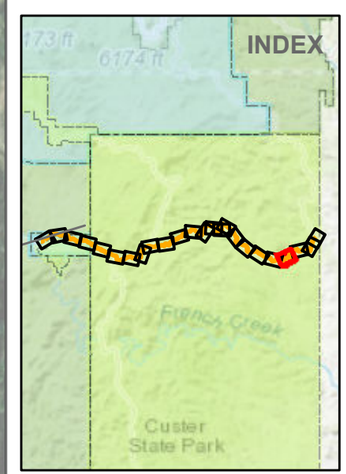
US HWY 16A

Black Hills Phase III Corridors
Corridor 7: Sheet 21 of 24

Legend

- Tenth Mile Marker
- Mile Reference Marker
- Other Environmental Resource
- Snowmobile Trail
- Streams
- Corridor 7: Existing Alignment
- Potential Wetland
- Waterbodies
- Corridor 5: 500 ft Buffer
- Norbeck Wildlife Preserve
- SD Parks and Recreation Area
- Black Hills National Forest

0 100 200 300 Feet



Grace Coolidge Creek

38.0

US HWY 16A

Grace Coolidge Creek

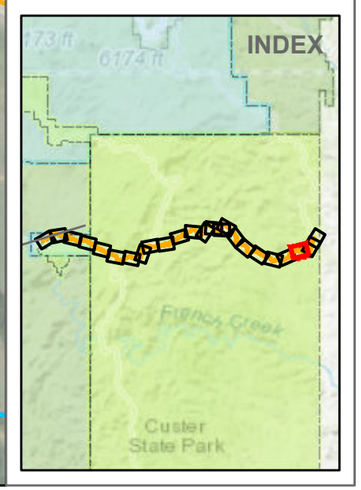
Custer State Park

Black Hills Phase III Corridors
Corridor 7: Sheet 22 of 24

Legend

- Tenth Mile Marker
- Mile Reference Marker
- Other Environmental Resource
- Snowmobile Trail
- Streams
- Corridor 7: Existing Alignment
- Potential Wetland
- Waterbodies
- Corridor 5: 500 ft Buffer
- Norbeck Wildlife Preserve
- SD Parks and Recreation Area
- Black Hills National Forest

0 100 200 300 Feet

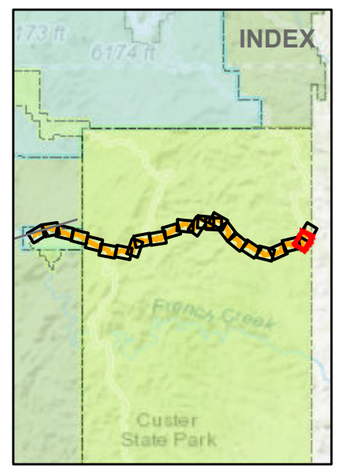


Black Hills Phase III Corridors
Corridor 7: Sheet 23 of 24

Legend

- Tenth Mile Marker
- Mile Reference Marker
- Other Environmental Resource
- Snowmobile Trail
- Streams
- Corridor 7: Existing Alignment
- Potential Wetland
- Waterbodies
- Corridor 5: 500 ft Buffer
- Norbeck Wildlife Preserve
- SD Parks and Recreation Area
- Black Hills National Forest

0 100 200 300 Feet



Custer State Park

Grace Coolidge Creek

US HWY 16A

39.0

36.0

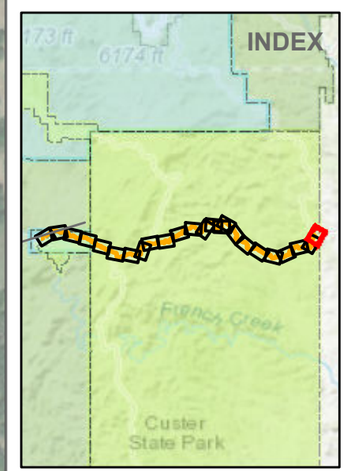
SD HWY 89

Black Hills Phase III Corridors
Corridor 7: Sheet 24 of 24

Legend

- Tenth Mile Marker
- Mile Reference Marker
- Other Environmental Resource
- Snowmobile Trail
- Streams
- Corridor 7: Existing Alignment
- Potential Wetland
- Waterbodies
- Corridor 5: 500 ft Buffer
- Norbeck Wildlife Preserve
- SD Parks and Recreation Area
- Black Hills National Forest

0 100 200 300 Feet



Appendix B. Visual Impact Analysis Scoping

2.15 Appendix B. Corridor 7 Visual Impact Assessment Scoping

2.15.1 Introduction

This visual impact assessment (VIA) scoping for Corridor 7 identifies issues related to the transportation improvement concepts planned for US 16A: Norbec National Scenic Byway and anticipates the Visual Impact Assessment (VIA) requirements for the National Environmental Policy Act (NEPA) phase. The VIA scoping process applied to Corridor 7 follows guidance from FHWA's *Guidelines for the Visual Impact Assessment of Highway Projects* (FHWA, 2015) for assessing impacts on visual resources in context to NEPA.

These FHWA Guidelines include a scoping questionnaire, to be applied early in project planning, as a tool to determine the appropriate level of effort for assessing the visual impacts that may result from a proposed highway project. The questionnaire consists of 10 questions, including 5 questions covering *environmental compatibility* and 5 questions covering *viewer sensitivity,* with a scoring system to help determine if a VIA would be required, and if so, the appropriate level of VIA for NEPA documentation: Expanded, Standard, Abbreviated, or Memorandum.

This initial scoping process was based primarily on the Corridor 7 concept planning and design; corridor videos; criteria from the *Black Hills National Forest Land and Resource Management Plan, 1997 Revision, Phase II Amendment,* with guidance from the Black Hills National Forest Landscape Architect regarding applicable Scenic Integrity Objectives and guidelines; and the *Custer State Park Resource Management Plan,* (2010–2015). Feedback related to visual resources from the Phase 3 public meetings will be incorporated.

The following sections include the initial Corridor 7 VIA Scoping Questionnaire responses, with assumptions, supporting information, and next steps to consider for NEPA.

2.15.2 VIA Scoping

Corridor 7 Scoping Questionnaire

Environmental Compatibility

The five questions about *environmental compatibility* in the VIA Scoping Questionnaire are:

1. ***Will the project result in a noticeable change in the physical characteristics of the existing environment?***

   Consider all project components and construction impacts, both permanent and temporary, including landform changes, structures, noise barriers, vegetation removal, railing, signage, and contractor activities.

   - **High level of permanent change (3)** (with shoulder widening option)
   - **Moderate level of permanent change (2)**
   - Low level of permanent or temporary change (1)
   - No Noticeable Change (0)

   Assumptions: See **Section 2.15.3**, **Supporting Information and Assumptions**, for Question EC-1, following the questionnaire.

2. ***Will the project complement or contrast with the visual character desired by the community?***

   Evaluate the scale and extent of the project features compared to the surrounding scale of the community. Is the project likely to give an urban appearance to an existing rural or suburban community? Do you anticipate that the change will be viewed by the public as positive or negative? Research planning documents, or talk with local planners and community representatives to understand the type of visual environment local residents envision for their community.

- **Low Compatibility (3)** (with shoulder widening option)
- **Moderate Compatibility (2)**
- **High compatibility (1)**

Assumptions: See **Section 2.15.3**, **Supporting Information and Assumptions**, for Question EC-2, following the questionnaire.

3. ***What types of project features and construction impacts are proposed? Are there particular concerns related to bridge structures, large excavations, sound barriers, vegetation removal, or other features of the proposed project that will raise concerns?***

Certain project improvements can be of special interest to local citizens, causing a heightened level of public concern, and requiring a more focused visual analysis.

- **High concern (3)** (with shoulder widening option)
- **Moderate concern (2)**
- Low concern (1)
- Negligible Project Features (0)

Assumptions: See **Section 2.15.3**, **Supporting Information and Assumptions**, for Question EC-3, following the questionnaire

4. ***Will the project changes likely be mitigated by normal means such as landscaping and architectural enhancements, or will avoidance or more extensive compensation measures be necessary to minimize adverse change?***

- **Extensive Non-Conventional Mitigation Likely (3)** (with shoulder widening option)
- **Some non-conventional Mitigation Likely (2)**
- Only Conventional Mitigation Likely (1)
- No Mitigation Likely (0)

Assumptions: See **Section 2.15.3**, **Supporting Information and Assumptions**, for Question EC-4, following the questionnaire

5. ***Will this project, when seen collectively with other projects, result in cumulative adverse impacts to visual resources or their visual character?***

Identify any projects [both state and local] in the area that have been constructed in recent years and those currently planned for future construction. The window of time and the extent of area applicable to possible cumulative impacts should be based on a reasonable anticipation of the viewing public's perception.

- Cumulative Impacts likely: 0-5 years (3)
- Cumulative Impacts likely: 6-10 years (2)
- **Cumulative Impacts unlikely (1)**

Assumptions: See **Section 2.15.3**, **Supporting Information and Assumptions**, for Question EC-5, following the questionnaire.

Viewer Sensitivity

The five questions about *viewer sensitivity* in the VIA Scoping Questionnaire are:

1. ***What is the potential that the project proposal may be controversial within the community, or opposed by any organized group?***

This can be researched initially by talking with the state DOT and local agency management and staff familiar with the affected community's sentiments as evidenced by past projects and/or current information

- **High Potential (3)** (with shoulder widening option)
- **Moderate Potential (2)**

- Low Potential (1)
- No Potential (0)

Assumptions: See **Section 2.15.3**, **Supporting Information and Assumptions**, for Question VS-1, following the questionnaire.

2. ***How sensitive are potential viewer-groups likely to be regarding visible changes proposed by the project?***

   Consider among other factors the number of viewers within the group, probable viewer expectations, activities, viewing duration, and orientation. The expected viewer sensitivity level may be scoped by applying professional judgment, and by soliciting information from other DOT staff, local agencies, and community representatives familiar with the affected community's sentiments and demonstrated concerns.

   - **High Sensitivity (3)**
   - Moderate Sensitivity (2)
   - Low Sensitivity (1)

   Assumptions: See **Section 2.15.3**, **Supporting Information and Assumptions**, for Question VS-2, following the questionnaire.

3. ***To what degree does the project appear to be consistent with applicable laws, ordinances, regulations, policies, or standards regarding visual preferences?***

   - Low Compatibility (3)
   - **Moderate Compatibility (2)**
   - High compatibility (1)

   Assumptions: See **Section 2.15.3**, **Supporting Information and Assumptions**, for Question VS-3, following the questionnaire.

4. ***Are any permits going to be required by outside regulatory agencies (i.e., Federal, State, or local) that will necessitate a particular level of Visual Impact Assessment?***

   Permit requirements can have an unintended consequence on the visual environment. Anticipated permits, as well as specific permit requirements – which are defined by the permitter, may be determined by talking with the project environmental planner and project engineer. Note: Coordinate with the state DOT representative responsible for obtaining the permit prior to communicating directly with any permitting agency. Permits that may benefit from additional analysis include permits that may result in visible built features, such as infiltration basins or devices under a stormwater permit or a retaining wall for wetland avoidance or permits for work in sensitive areas such as coastal development permits or on Federal lands, such as impacts to Wild and Scenic Rivers.

   - Yes (3)
   - **Maybe (2)**
   - No (1)

   Assumptions: See **Section 2.15.3**, **Supporting Information and Assumptions**, for Question VS-4, following the questionnaire.

5. ***Will decision-makers (including the project designers) or the public benefit from a more detailed visual analysis in order to help reach consensus on a course of action?***

   Consider the proposed project features, possible visual impacts, and probable mitigation recommendations.

   - **Yes (3)**
   - Maybe (2)
   - No (1)

Assumptions: See **Section 2.15.3**, **Supporting Information and Assumptions**, for Question VS-5, following the questionnaire.

Summary of VIA Scoping Results

This represents an initial VIA scoping effort to get the process started based on a preliminary review of the Corridor 7: US 16A: Norbec National Scenic Byway context-sensitive planning and design documentation. **With a score ranging from 20-21 points, a Standard VIA would be appropriate for NEPA documentation (see below)**.

* Note that incorporating Corridor-wide shoulder widening into corridor improvements would increase the total score up to 25 points, triggering the potential for adverse visual impacts and possibly the need for preparing an Expanded VIA.

Determining the Level of Visual Impact Assessment

Total scores of the answers to all 10 questions on the Visual Impact Assessment Scoping Questionnaire indicate the appropriate level of VIA to perform for the project. If there remains doubt about whether a VIA needs to be completed, it may be prudent to conduct an Abbreviated VIA. If there remains doubt about the level of the VIA, begin with the simpler VIA process. If visual impacts emerge as a more substantial concern than anticipated, the level of VIA documentation can always be increased.

The level of the VIA can initially be based on the following ranges of total scores:

☐ ***Score 25–30*** An *Expanded VIA* is probably necessary. It is recommended that it should be proceeded by a formal visual scoping study prior to beginning the VIA to alert the project team to potential highly adverse impacts and to develop new project alternatives to avoid those impacts. These technical studies will likely receive statewide, even national, public review. Extensive use of visual simulations and a comprehensive public involvement program would be typical.

X ***Score 20–24*** A *Standard VIA* is recommended. This technical study will likely receive extensive local, perhaps statewide, public review. It would typically include several visual simulations. It would also include a thorough examination of public planning and policy documents supplemented with a direct public engagement processes to determine visual preferences.

☐ ***Score 15–19*** An *Abbreviated VIA* would briefly describe project features, impacts and mitigation requirements. Visual simulations would be optional. An Abbreviated VIA would receive little direct public interest beyond a summary of its findings in the project's environmental documents. Visual preferences would be based on observation and review of planning and policy documents by local jurisdictions.

☐ ***Score 10–14*** A *VIA Memorandum* addressing minor visual issues that indicates the nature of the limited impacts and any necessary mitigation strategies that should be implemented would likely be sufficient along with an explanation of why no formal analysis is required.

☐ ***Score 6–9*** No noticeable physical changes to the environment are proposed and no further analysis is required. Print out a copy of this completed questionnaire for your project file to document that there is no effect. A *VIA Memorandum* may be used to document that there is no effect and to explain the approach used for the determination.

2.15.3 Supporting Information and Assumptions

Environmental Compatibility

The following provides supporting documentation and assumptions related to scores assigned to Environmental Compatibility (EC) Questions 1–5.

Question EC-1: Assumptions

Context and Landscape Character

The US 16A corridor through Custer State Park is part of the Peter Norbec National Scenic Byway loop through the Black Hills National Forest. The Scenic Byway alignment fits into the contours of the surrounding topography, following the narrow valleys at the base of forested hills landscape, connecting Legion Lake with the Park headquarters at Wildlife Loop Rd.

Roadway Characteristics and Deficiencies (see **Attachment A**)

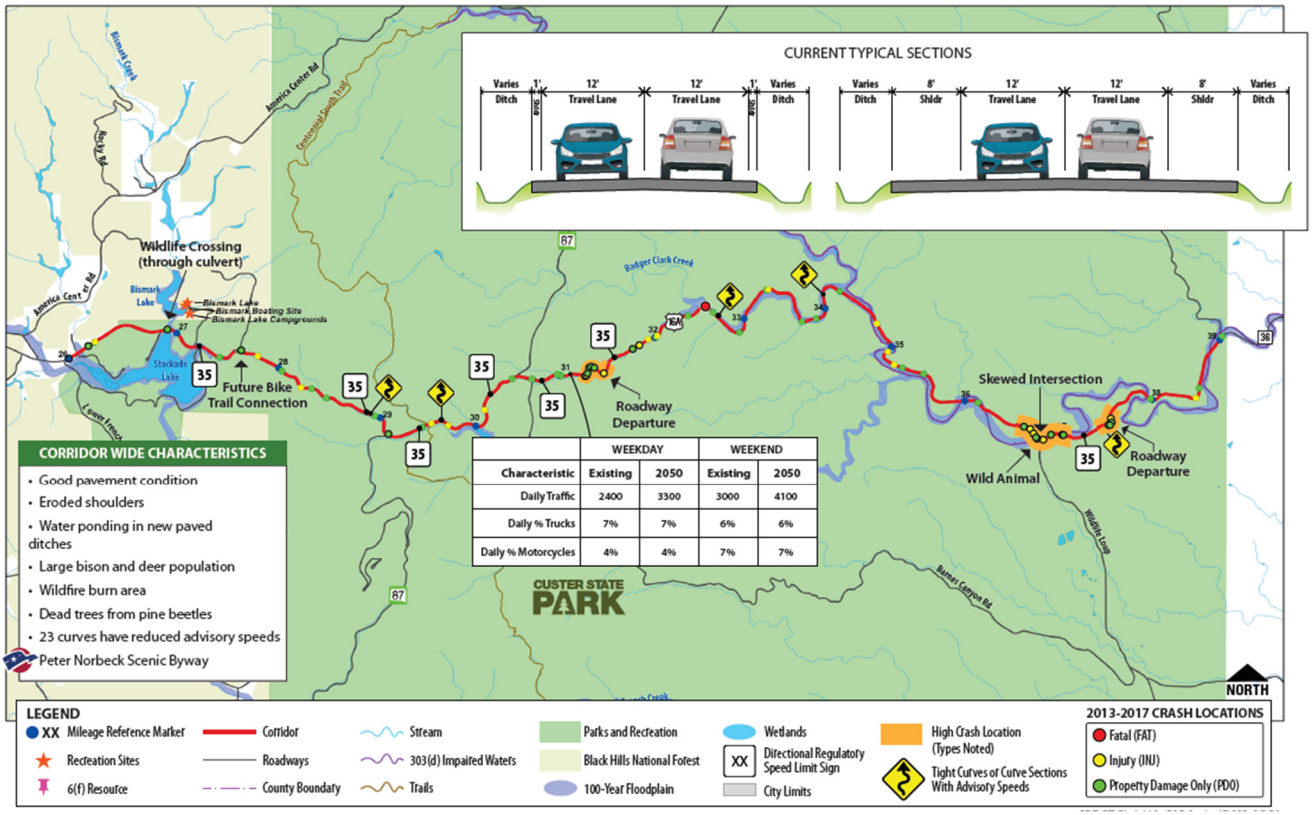
- **Current Typical Roadway Section**: US 16A, Norbec National Scenic Byway, is a 13-mile corridor crossing through Custer State Park with 12-foot lanes and variable/inadequate shoulder widths. The curvilinear roadway alignment has a posted speed of 35 mph.
- **Roadway Deficiencies**: The proposed safety improvements for this portion of the Norbec Byway are planned to balance the scenic route and State Park visitor travel with commuter traffic.

Attachment A. Corridor 7 Corridor Characteristics

Black Hills CONTEXT SENSITIVE CORRIDORS STUDY

CORRIDOR 7
US 16A: Custer State Park

Corridor Characteristics



Transportation Improvements and Visual Change

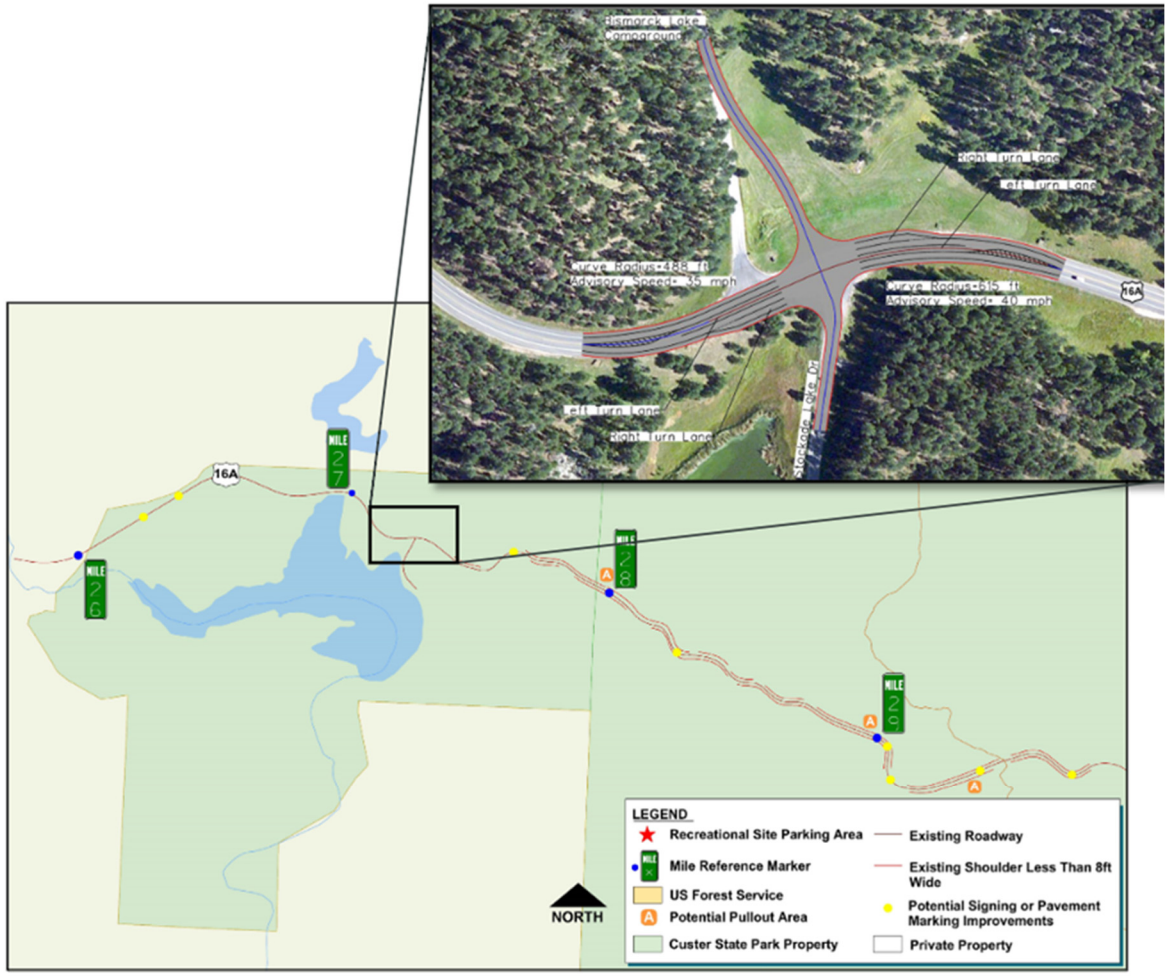
In response to public comments, proposed transportation improvements will be limited to spot location improvements, rather than roadway alignment changes, to retain the visual quality of the landscape setting and viewsheds from the Norbec National Scenic Byway, including creating pullout areas rather than a continuous shoulder, as shown in **Attachment B.** Context-sensitive improvements for the west end, middle, and east end of the corridor are described below:

- West End corridor concepts are shown in **Attachment B**.
- Mid-Corridor concepts are shown in **Attachment C**.
- East End corridor concepts are shown in **Attachment D**.

Future consideration for corridor-wide shoulder widening would require re-scoping the visual issues and NEPA requirements for visual impact assessment and mitigation.

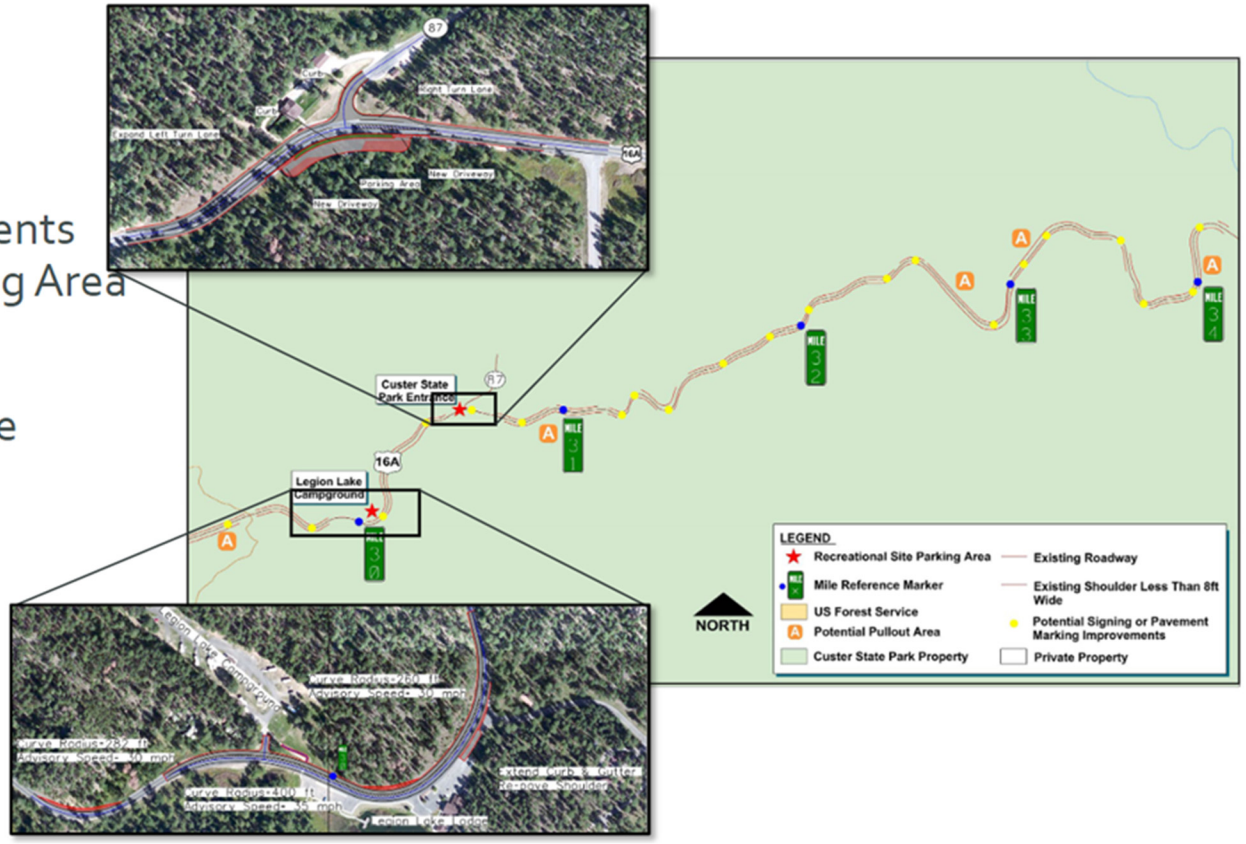
Attachment B. West End Corridor Concepts

- Add Roadway Curvature Traffic Control
- Add Pullout(s)
- US 16A/Stockade Lake Dr./ Bismarck Lake Campground Intersection Improvement



Attachment C. Mid-Corridor Concepts

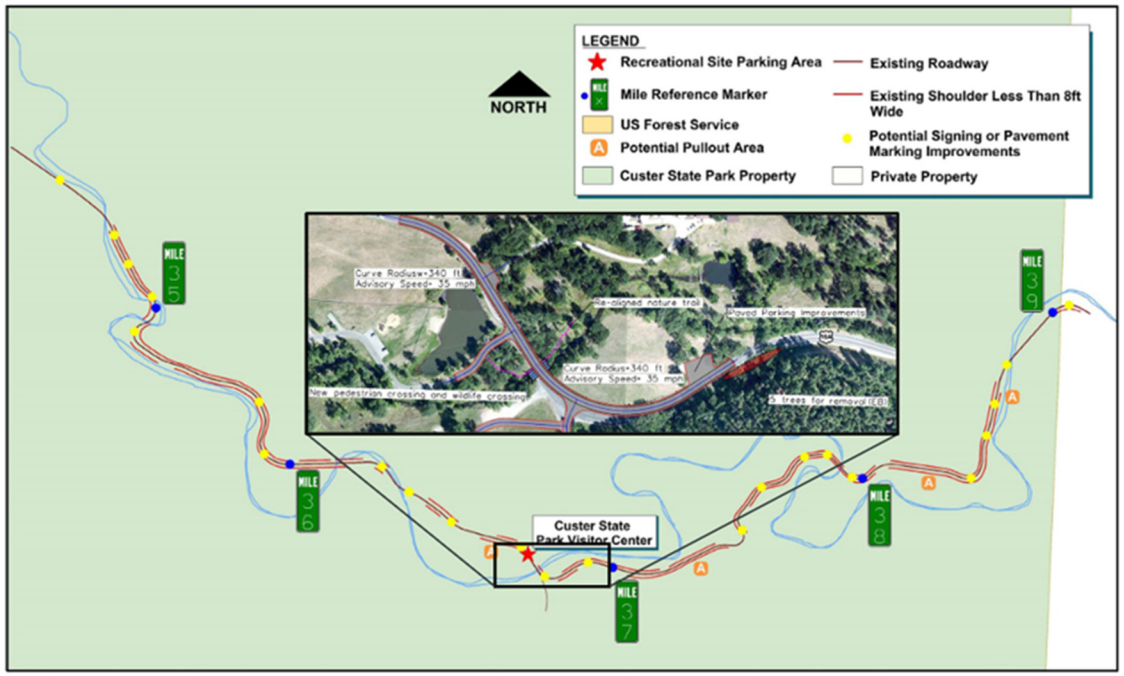
- Add Turn Lanes Near Legion Lake
- US 16A and SD 87 Intersection Improvements with Designated Parking Area
- Add Pullout(s)
- Add Roadway Curvature Traffic Control



x Hills

Attachment D. East End Corridor Concepts

- Pedestrian and Parking Improvements
- Wildlife Loop and Park Visitor Center Intersection Improvements
- Add Pullout(s)
- Add Roadway Curvature Traffic Control



Question EC-2: Assumptions

The design concepts for US 16A safety improvements are planned to balance the recreation experience for Norbec National Scenic Byway travelers and Custer State Park visitors with commuter traffic. The visual contrast of the proposed curve realignments and turn lanes resulting from new cut and fill slopes and from tree removal within forested hills would be moderately compatible with the recreation values of the Scenic Byway corridor within Custer State Park.

Question EC-3: Assumptions

The following improvements could result in moderate to high levels of change to the Scenic Byway views within the Black Hills landscape of Custer State Park and may raise moderate to high levels of concern:

- US 16A/Stockade Lake Drive intersection reconfiguration
- US 16A/ SH 87 intersection
- 30 mph and 35 mph realignment alternatives east of Wildlife Loop Road
- US 16A/Wildlife Loop intersection reconfiguration
- 30 mph realignment of 4-curves, east of Badger Creek Rd
- 25 and 35 mph curve realignment alternatives east of Badger Creek Rd
- Center-turn lane improvement west of Legion Lake and Badge Hole Rd
- Turn lanes with shoulder and sight distance improvements (76 ft wide typical section

Question EC-4: Assumptions

Site-specific mitigation for impacts resulting from curve realignments, turning lane and shoulder widening through undisturbed forested hills and intersection reconfigurations would require context-sensitive design approaches. The level of non-conventional visual resource-related mitigation development would vary by alternative and by the extent of tree removal and road cuts. Mitigation strategies may include conducting detailed site surveys and applying design techniques to reduce visual contrast to the form, line, color, texture, and scale of landform, vegetation, or structural changes, such as:

- Slope rounding and warping to blend cut slopes into adjacent terrain
- Revegetation
- Aesthetic treatment to retaining walls or structural elements

Question EC-5: Assumptions

The concept-level corridor improvement package represents the primary transportation changes anticipated for US 16A within Custer State Park.

Viewer Sensitivity

The following provides supporting documentation and assumptions related to scores assigned to Viewer Sensitivity (VS) Questions 1–5.

Question VS-1: Assumptions

Ongoing public, agency, and stakeholder involvement in the planning and design process will create a positive collaborative approach. Input from community outreach will provide additional insight into community responses to the proposed transportation safety improvements.

Question VS-2: Assumptions

Scenic Byway travelers and Custer State Park visitors would likely be highly sensitive to the level of visual changes to the landscape character resulting from the proposed transportation improvements.

Summary of community comments from the public outreach on proposed improvements (July-August 2021):

- **Proposed improvements – Corridor Segment 1:** Concerns for realignment and shoulder widening within Custer State Park – impacts to natural beauty
- **Proposed improvements – Corridor Segment 2:**
  - Concerns for curve realignment – *Leave the curves alone. Add to the scenic beauty and characteristics of the road. The intent of this road is a scenic drive, not an expressway.*
  - Concerns for shoulder widening – *Takes away from the scenic aspect of the Park. Shoulder widening would have a negative effect on the aesthetics of this area.*
- **Proposed improvements – Corridor Segment 3:**
  - Shoulder widening – *Shoulder widening would have a negative effect on the aesthetics of this area.*
  - Tree clearing – *Will take away from the aesthetics of the drive coming into the Park.*

Question VS-3: Assumptions

The proposed improvements would likely be moderately compatible with the Norbec National Scenic Byway travelers and Custer State Park management guidelines *(Custer State Park Resource Management Plan, 2010–2015).*

Goals of Forest Management Activity include a forest diversity objective to:

- Provide healthy forest communities along the *travel/visual corridors* to enhance viewing opportunities for the public

Visual Corridors (or viewsheds) are areas within the visual corridors to be managed to provide a healthy forest environment while using each area's capability for diversity. When visual corridors are entered for management, their special characteristics should be identified. Characteristics such as scenic vistas, geologic formations, hardwood stands, meadows, and developed areas should be enhanced and protected.

Question VS-4: Assumptions

The project may be subject to visual resource-related permits within the Black Hills National Forest. This will require agency consultation.

Question VS-5: Assumptions

The VIA evaluation process will provide opportunities for project-specific mitigation strategies for the proposed improvements to the US 16A corridor.

APPENDIX C CORRIDOR DESIGN INFORMATION

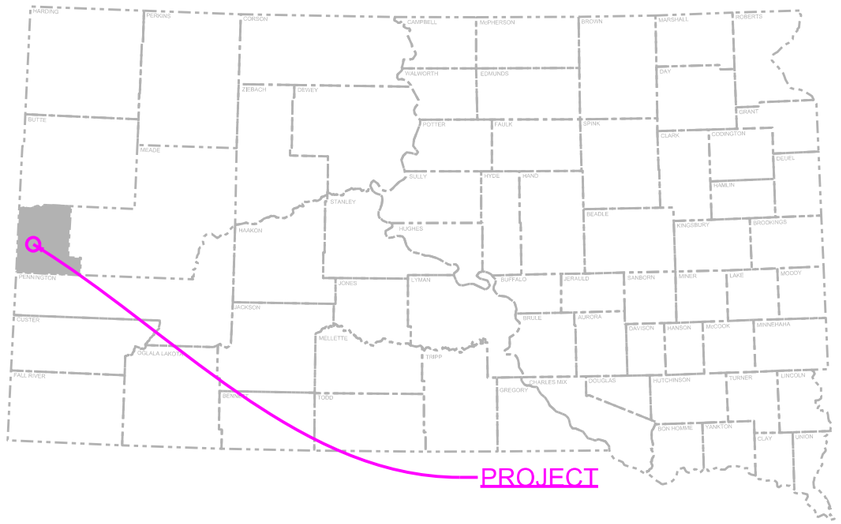
STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	NH 0085 (106) 0 N, PCN ____	1	8

Plotting Date: 12-23-2021

STATE OF SOUTH DAKOTA
DEPARTMENT OF TRANSPORTATION
PLANS FOR PROPOSED

PROJECT NH 0085 (106) 0, PCN ____
US HIGHWAY 16A
LAWRENCE COUNTY

CONCEPTUAL PLAN SHEETS

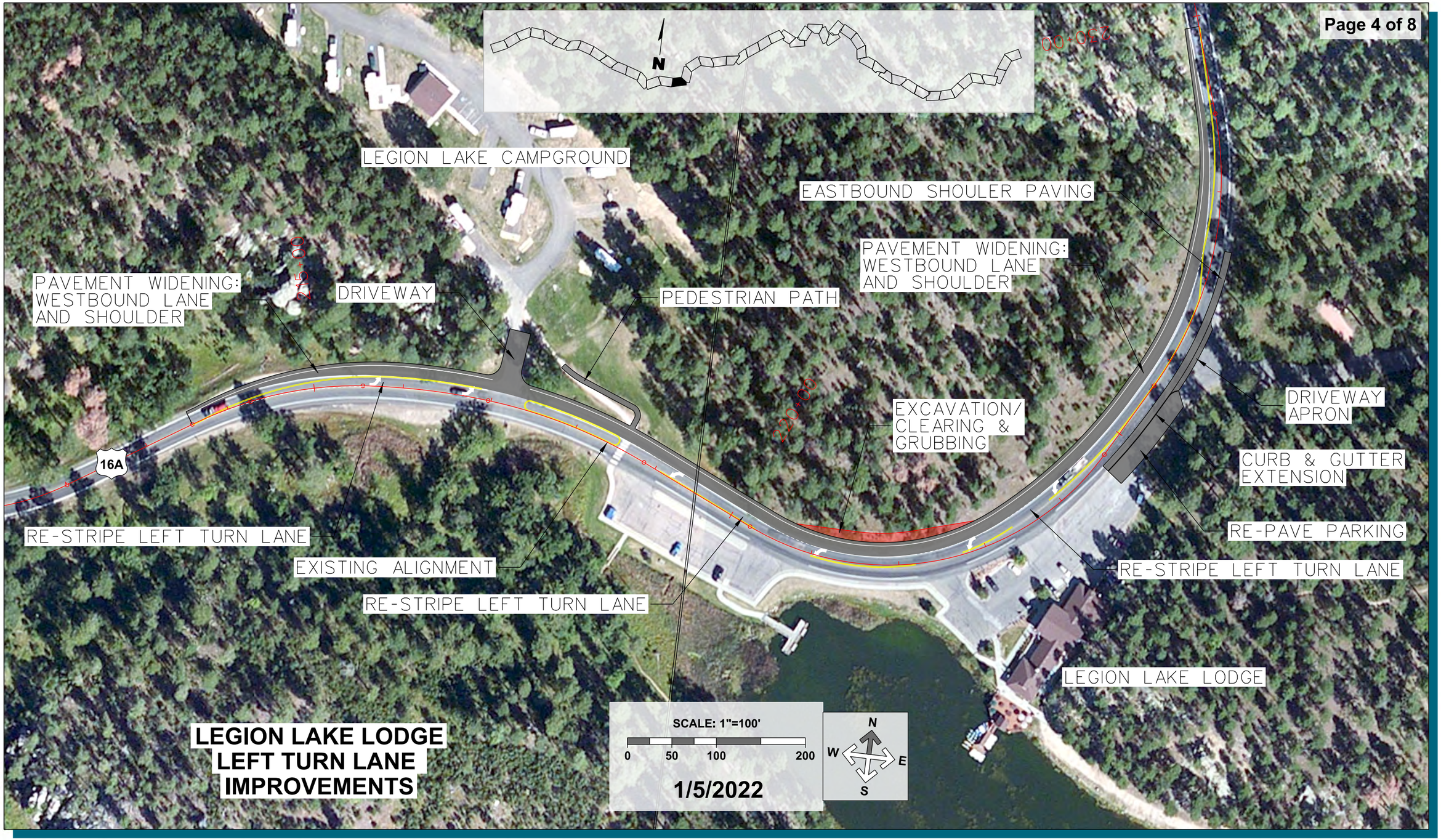


INDEX OF SHEETS

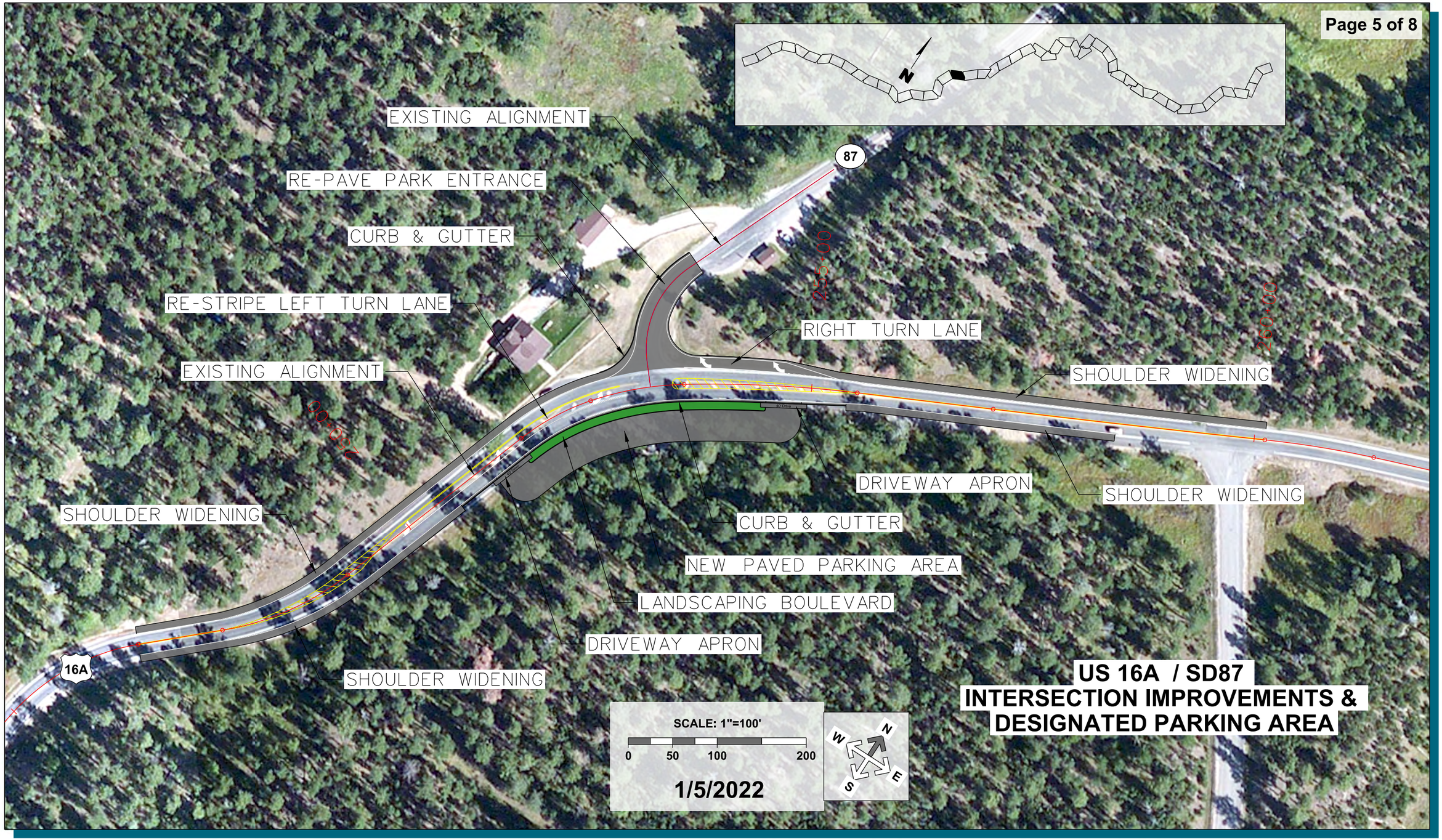
SHEET NO.	DESCRIPTION
1:	TITLE SHEET
2-8:	PLAN SHEETS

STOCKADE LAKE DR/ BISMARCK LAKE CAMPGROUND INTERSECTION IMPROVEMENTS

Corridor 7 (US 16A: East of Morris Pl.)



LEGION LAKE LODGE LEFT TURN LANE IMPROVEMENTS



US 16A / SD87
INTERSECTION IMPROVEMENTS & DESIGNATED PARKING AREA


PULLOUT AREA
(SEE 35 MPH PULLOUT DETAIL)
355+00
360+00
365+00
370+00
16A
SCALE: 1"=100'
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100
200
1/5/2022
N
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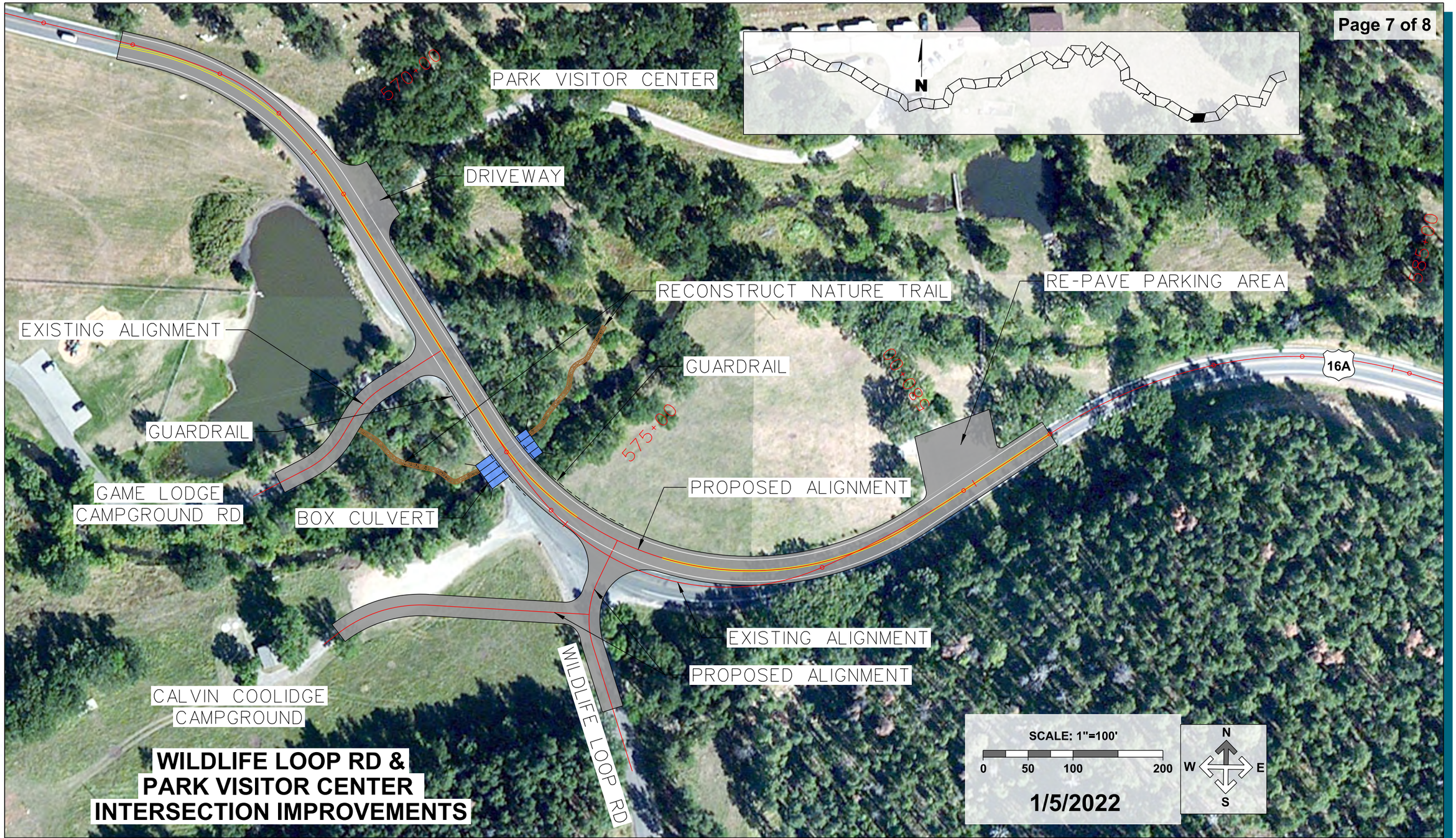
S


570+00
PARK VISITOR CENTER
N
DRIVEWAY
RECONSTRUCT NATURE TRAIL
RE-PAVE PARKING AREA
585+00
EXISTING ALIGNMENT
GUARDRAIL
580+85
16A
GUARDRAIL
575+00
PROPOSED ALIGNMENT
GAME LODGE
CAMPGROUND RD
BOX CULVERT
EXISTING ALIGNMENT
PROPOSED ALIGNMENT
WILDLIFE LOOP RD
CALVIN COOLIDGE
CAMPGROUND
WILDLIFE LOOP RD &
PARK VISITOR CENTER
INTERSECTION IMPROVEMENTS
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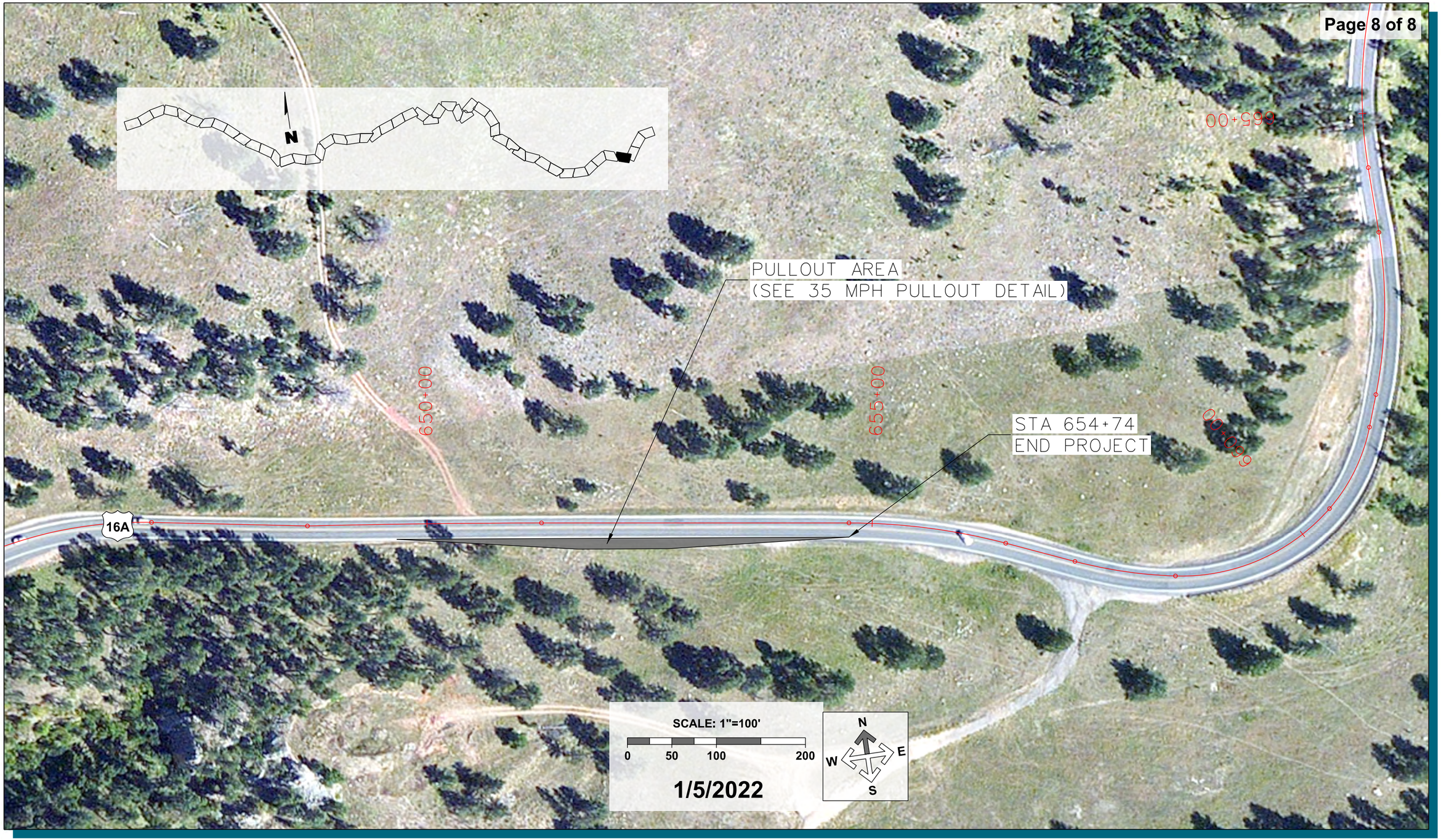
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650+00
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665+00
PULLOUT AREA
(SEE 35 MPH PULLOUT DETAIL)
STA 654+74
END PROJECT
16A
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