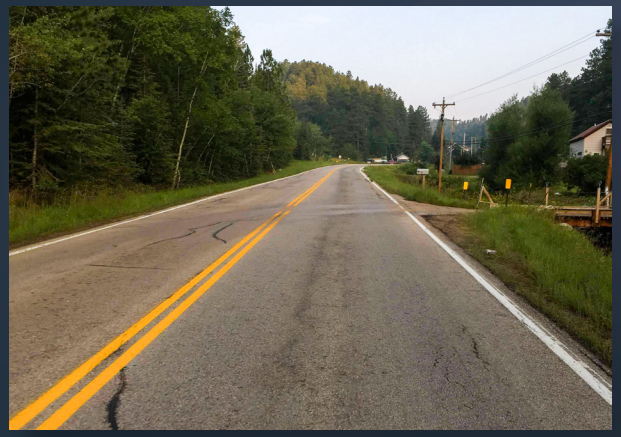
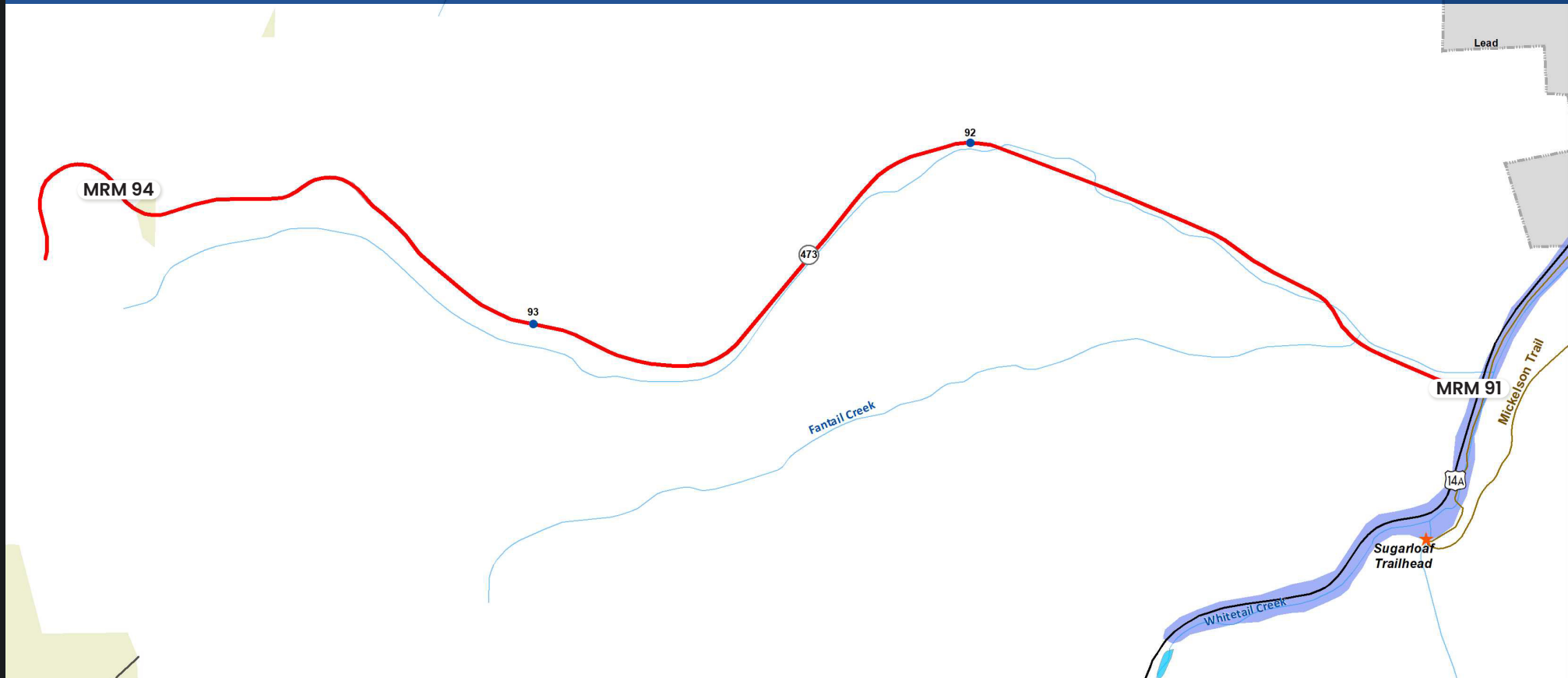


BLACK HILLS CONTEXT SENSITIVE CORRIDORS STUDY

PHASE 3 REPORT

CORRIDOR 5: SD 473-NEVADA GULCH ROAD



Black Hills
CONTEXT SENSITIVE CORRIDORS STUDY

PHASE 3 REPORT

CORRIDOR 5 – SD HIGHWAY 473 NEVADA GULCH ROAD

Prepared for:

South Dakota Department of Transportation
700 E Broadway Ave
Becker Hansen Bldg
Pierre, SD 57501-2586

Prepared by:

FELSBURG HOLT & ULLEVIG

In cooperation with:

SRF Jacobs

FHU Reference No. 117385-01

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1. INTRODUCTION

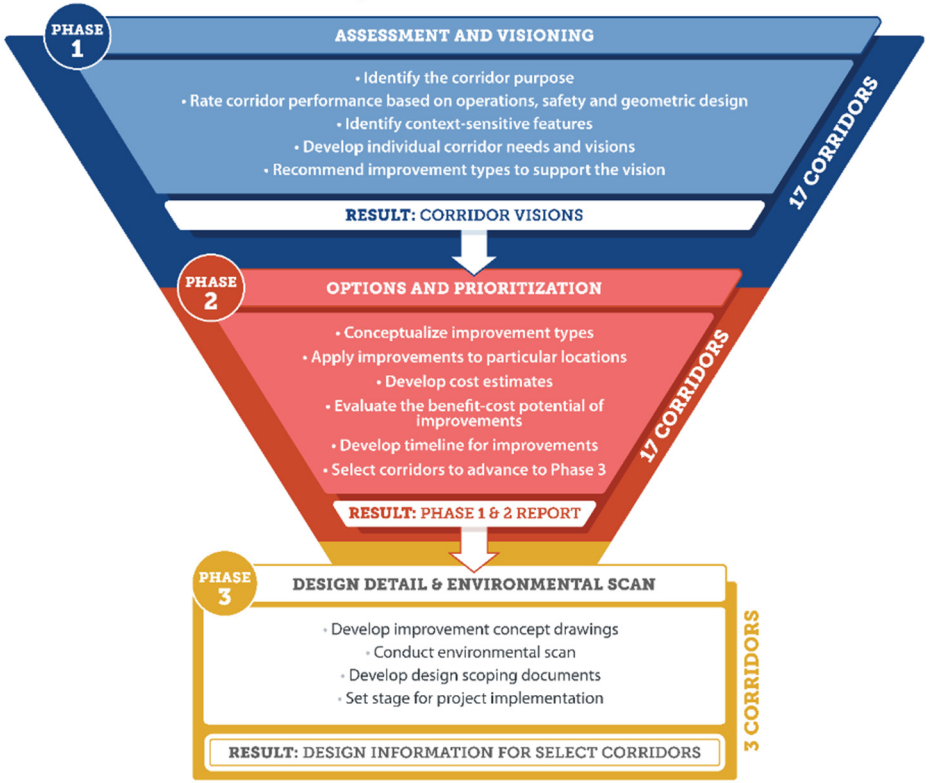
The Black Hills Context Sensitive Corridors Study team has crafted visions for improving 17 corridors in the scenic Black Hills of South Dakota. These corridors traverse topography substantially different from other areas in the state and serve functions that emphasize the drive/ride experience provided 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 5, Nevada Gulch Road, 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 5 is South Dakota Highway 473 (SD473) extending 3.16 miles west from US85. **Figure 2** displays the corridor limits. It is located within Lawrence County and is not within the Black Hills National Forest. The current section of Corridor 5 varies along its length, providing 2 travel lanes throughout but varying shoulder width. The roadway slopes upward from US85 east to west toward the Terry Peak Ski Area and the Wharf Mine property. The upper portion of the roadway (approximately 0.75 miles) was rebuilt with a new alignment in 2012. **Appendix A** provides a map view of the corridor and current characteristics.

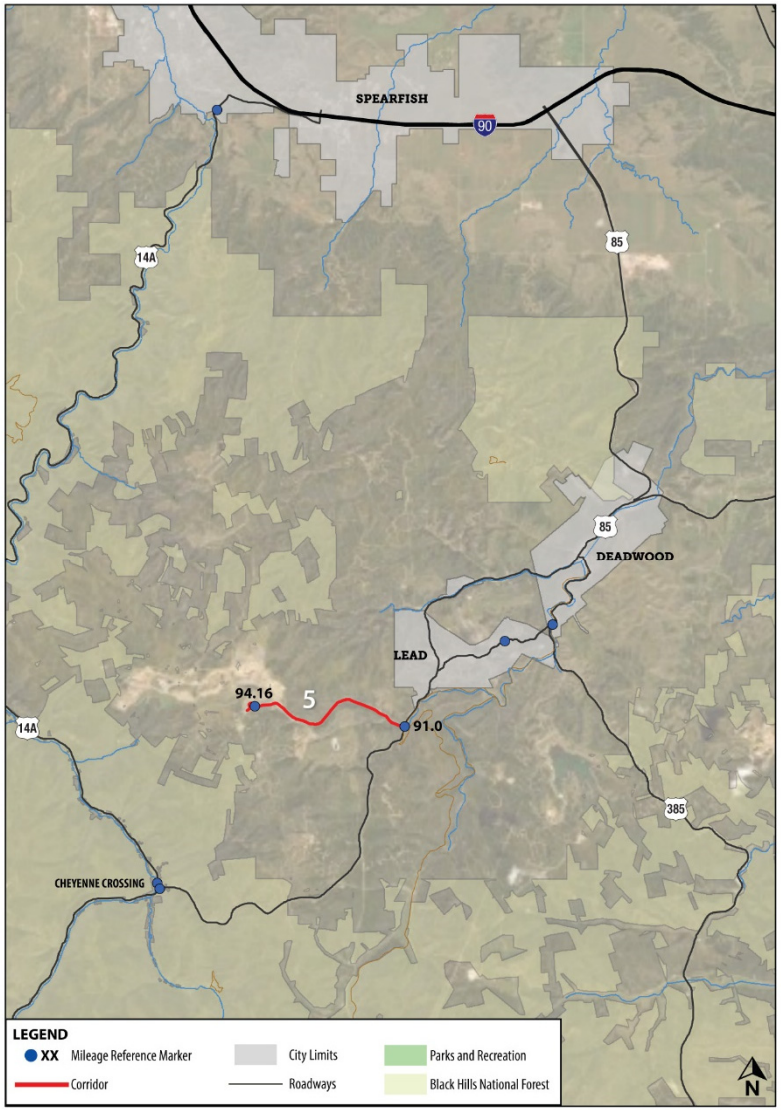
1.2 Phase 3 Report Content

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 5.

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:

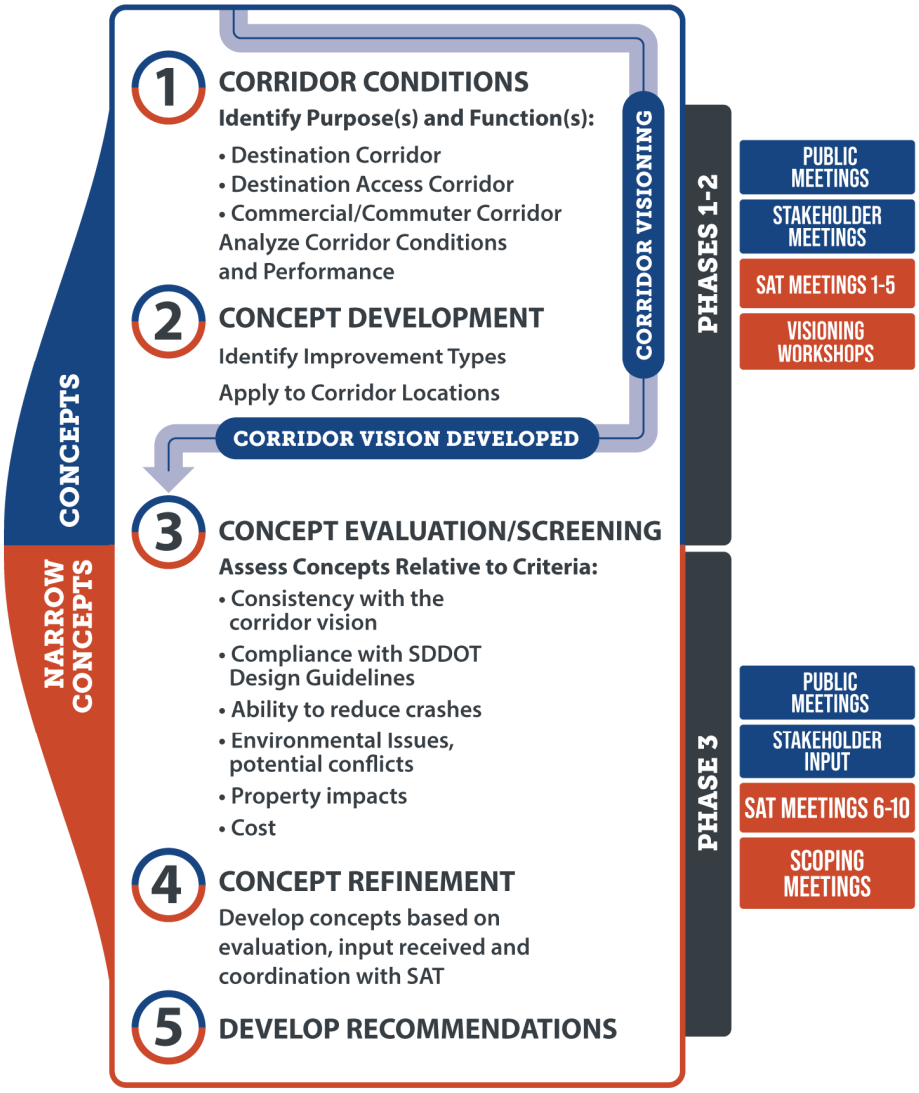
- Informational narrated recordings reintroducing the individual corridors, presenting alternatives to address needs/gaps, and summarizing results of alternative assessment relative to a consistent set of evaluation criteria.
- Detailed concept diagrams of the range of alternatives being considered to 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 SD473, Nevada Gulch Road.

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 5 is characterized primarily as a Destination Access Corridor, serving an access role within the transportation system as a 3+ mile roadway that serves to connect to residences, businesses and a resort area. It is secondarily characterized as a Commuter/Commercial corridor, serving a mix of employment and residential properties who depend on the roadway for daily work activities.

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 moderate, approximately 1300 vehicles per day. Within this overall volume, data indicate that the composition of user types tends toward higher percentages of passenger vehicles and bus/RV traffic. Pedestrian activity is common due to adjacent residences, particularly within the eastern portion of the corridor. Bicycle travel is rare, likely consisting of more expert cyclists.

Context – The nature and intensity of unique features "beyond the pavement" along the corridor are rated. Along Corridor 5, private development abuts the roadway and recreational resources are featured in the form of resort access. Unique geological features and viewsheds are less prominent.

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. Corridor 5 demonstrates higher than expected total crash frequency. Weather-affected roadway conditions combined with horizontal and vertical curvature (wet, icy, snow, slush, etc.) contributed to a majority of the reported crashes.

Road Design – Geometric features of the roadway are rated relative to conforming to established standards. Along Corridor 5, design deficiencies exist with respect to shoulder width, access spacing and vertical grade.

Table 1 summarizes the key characteristics.

Table 1. Corridor Characteristics Summary

Characteristic Category	Description
Purpose	Primary: Destination Access Secondary: Commuter/Commercial
User Mix	Moderate traffic volumes, higher percentages of passenger and bus/RV vehicles with pedestrian presence in lower portion. Prioritize auto and larger vehicle traffic along the corridor.
Context	Private development alongside roadway, including residential, commercial and recreational uses. Less prominent natural contextual features.
Traffic/Safety Conditions	Acceptable current and future 2-lane Level of Service. Corridor 5 demonstrates higher than expected total crash frequency. Weather-affected roadway conditions combined with horizontal and vertical curvature (wet, icy, snow, slush, etc.) contributed to a majority of the reported crashes.
Road Design	design deficiencies exist with respect to shoulder width, access spacing and vertical grade.

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: Recreational access and residential character join to create a unique context for SD473. Roadside improvements, access consolidation, weather treatments and added shoulder width are needed.

List of Improvements: The initial range of alternatives developed for Corridor 5 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.

The ability of SD473 between to effectively serve its primary purpose is hampered by a narrow paved width. The continuous vertical grade (averaging nearly 7 percent) creates safety challenges during wintry conditions. Closely spaced accesses introduce vehicular conflict points that could be reduced through access management strategies. The intersection of SD473 with Terry Gulch Road, located at MRM 91.25 is a skewed intersection with a sizeable undefined surface area along the Terry Gulch Road intersection approach. The lack of pavement and delineation to regulate this approach causes traffic safety concern.

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 SD473.

Table 2. Summary of Improvement Types to Support Vision

Improvement Type	Supports Vision by
Additional pavement surface friction	Providing additional traction along vertical grade assisting with wintry safety
Roadside drainage improvements	Improving infrastructure condition for roadside accesses
Access spacing and intersection geometry	Improving safety by reducing access conflicts and providing defined intersection design
Weather sensing and communications ITS devices	Improved wintry driving experience for users; enhancing safety
Speed mitigation through residential area	Better align roadway usage with presence of adjacent homes
Add lane/shoulder width through residential area	Improve pedestrian safety and consistency with SDDOT design guidance

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 5. 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 as a Destination Access route; providing access to recreational and commercial sites while passing through adjacent residential development.
- **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:** Reduce the frequency of crashes resulting from weather-affected roadway conditions by addressing roadway curvature and surfacing.
- **Access spacing and Intersection Design:** SD473 provides access to numerous and diverse properties. Seek to enhance safety and efficiency of access by consolidating accesses where possible. Address 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 6-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 30-40 MPH	40 MPH
Lane Width	12 ft	12 ft
Shoulder (Paved)	0–1 ft (6 ft[1])	6 ft
Clear Zone	varies	10
Grade	7-10 percent (average-max)	8 percent

[1]6 ft. shoulder provided in recently reconstructed portion between MRM 93.5 and 94.16

4.2 Roadway Alignment Concepts

The study team evaluated a concept that would reduce the severity of the vertical grade along a steep portion of the roadway averaging 9.5 percent grade between MRM 92.5 and MRM 93.2. Consistent with the design objectives, a concept providing a maximum grade of 8 percent was considered. These improvements would require a new horizontal alignment to maintain traffic during construction and large volume cuts and fills to flatten the roadway grade with impacts to private property and the environment. **Figure 4** provides a plan and profile view of this concept. As shown, the realignment concept would require a horizontal realignment of the roadway, and the adjacent retaining wall needed to reduce the vertical grade could reach up to 60 feet in height. The anticipated cost and extent of impacts compared to the potential benefits in safety, operations, and travel time were analyzed and the high costs compared to minimal benefit did not support further consideration of vertical or horizontal realignment of the roadway.

4.3 Typical Section Concepts

Potential typical section concepts were developed and evaluated in similar fashion to the roadway alignment concepts; initially crafting a concept layout that would achieve the design objective then considering appropriate adjustments in light of contextual features.

The design objectives shown in **Table 3** provided an initial framework for typical section elements, including lane width, shoulder width, and clear zone. Implementation of the design objective would result in a paved surface width of 40 to 44 feet, 12 to 16 feet wider than the existing paved surface throughout the corridor. Widening the roadway to provide this additional surface width and drainage infrastructure would help to reduce crash frequency and severity and accommodate pedestrian activity within the residential portion of the corridor.

Figure 5 provides a cross-sectional view of a widened section paired with a roadside drainage ditch that currently exists through portions of the SD473 corridor. **Figure 6** depicts an adjusted cross section introducing a valley gutter to be applied as appropriate through portions of the corridor to address drainage needs.

Figure 4. Vertical Grade Adjustment Realignment Concept

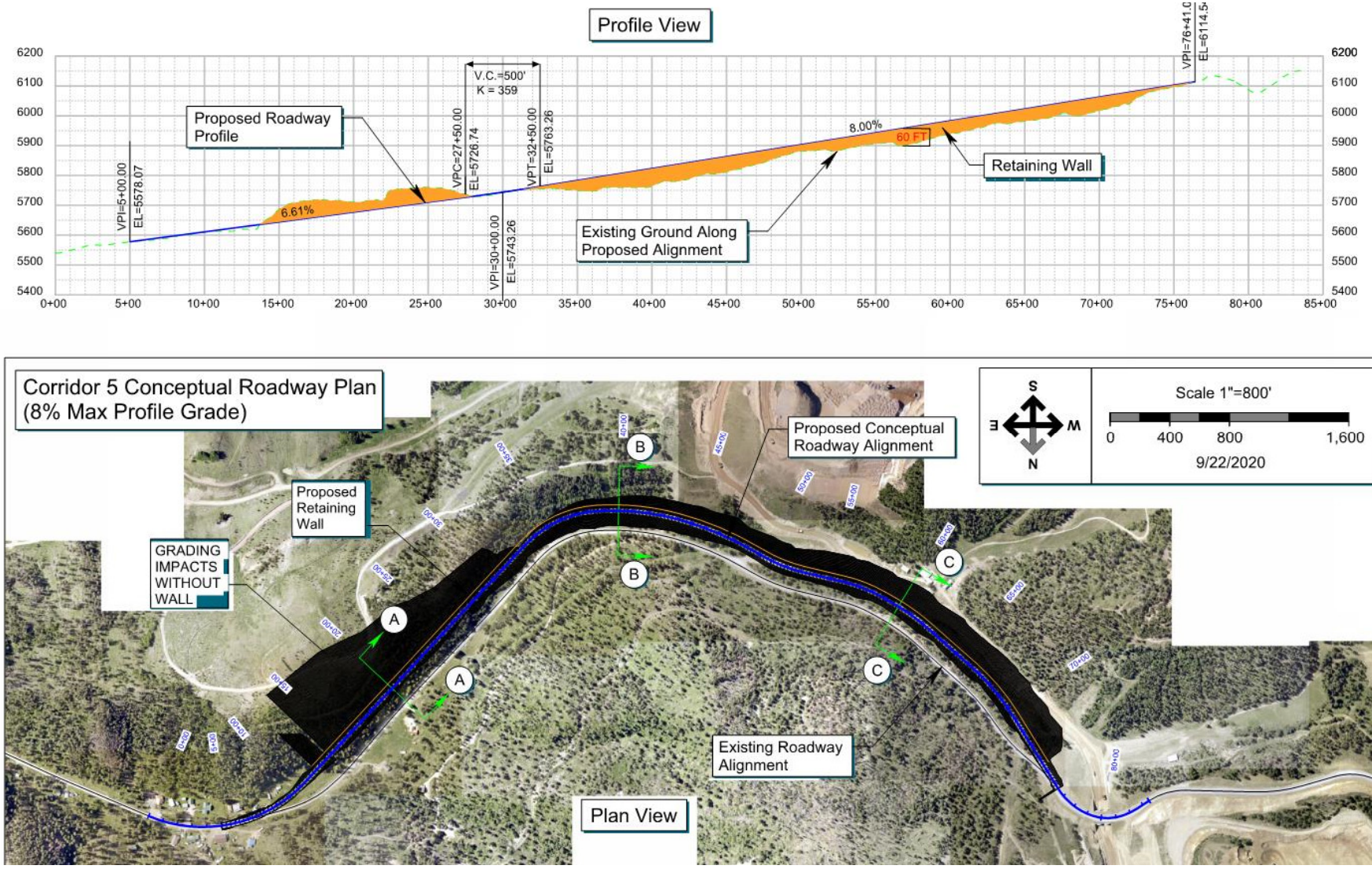


Figure 5. Realigned US85 Typical Section

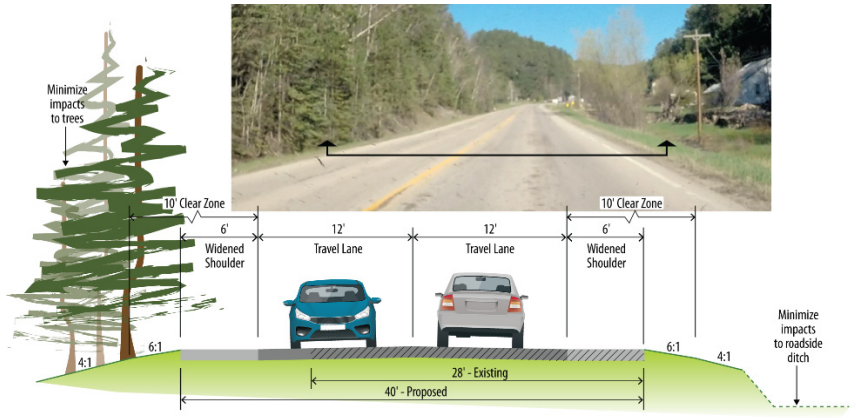
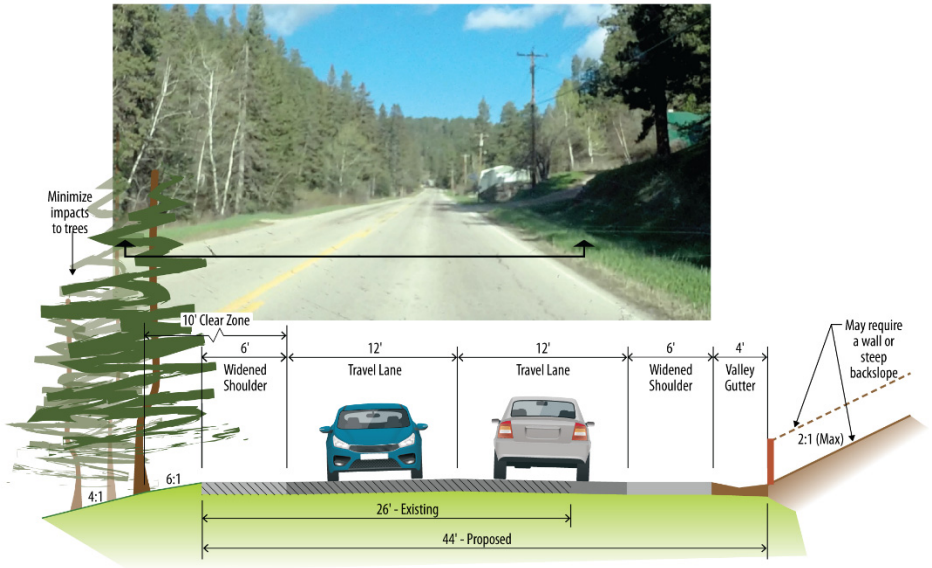


Figure 6. Typical Section with Gutter



4.4 Additional Improvement Concepts

A number of additional applications of improvement types are identified for potential application to SD473, including weather sensing and driver communication devices, potential chain station locations, intersection and access consolidation/delineation and high friction surface treatment. Additional information is provided as follows:

4.4.1 *Intersection and Access*

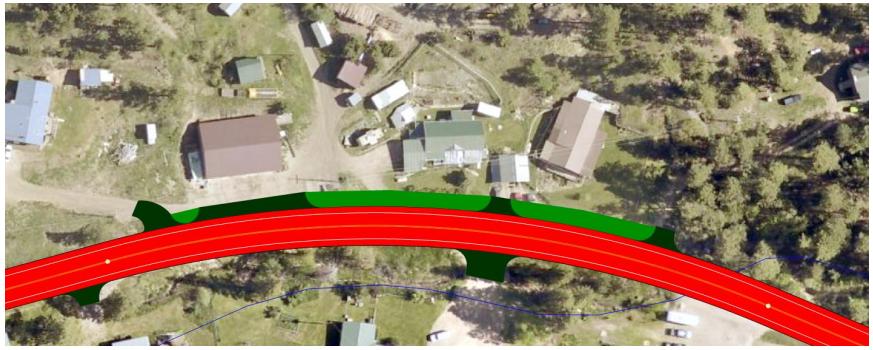
Terry Gulch Road, a gravel-surfaced roadway, currently intersects Nevada Gulch Road at a skew angle, resulting in a sizeable expanse of undefined roadway surface. A concept to provide a 90-degree intersection by realigning the Terry Gulch Road approach is depicted on **Figure 7**. Implementation of this concept would require additional paved surfacing and pavement markings along Terry Gulch Road.

Figure 7. Terry Gulch Road Intersection Definition

There are several properties between MRM 91 and 92 that introduce multiple vehicular accesses within a short distance and or broad undefined access, creating vehicular conflict points and lack of clarity for turning movements. configurations provide efficient property access, but negatively impact roadway safety. Shown on **Figure 8** is a location slightly west of MRM 92. Reconfiguring these accesses to provide improved definition of driveways and consolidate access can continue to

serve the property's needs while reducing the overall number of accesses, thereby improving traffic safety and corridor travel efficiency.

Figure 8. Potential Access Consolidation near MRM 92



Implementation of the preliminary access concept shown on **Figure 8** or similar treatments elsewhere along the corridor would require additional coordination with individual properties to better understand the current access condition and craft the appropriate solution.

4.4.2 Weather Treatments

The observed pattern of weather-related crashes along SD473 indicates potential for crash reduction through implementation of weather-specific strategies and improvements. Potential concepts include:

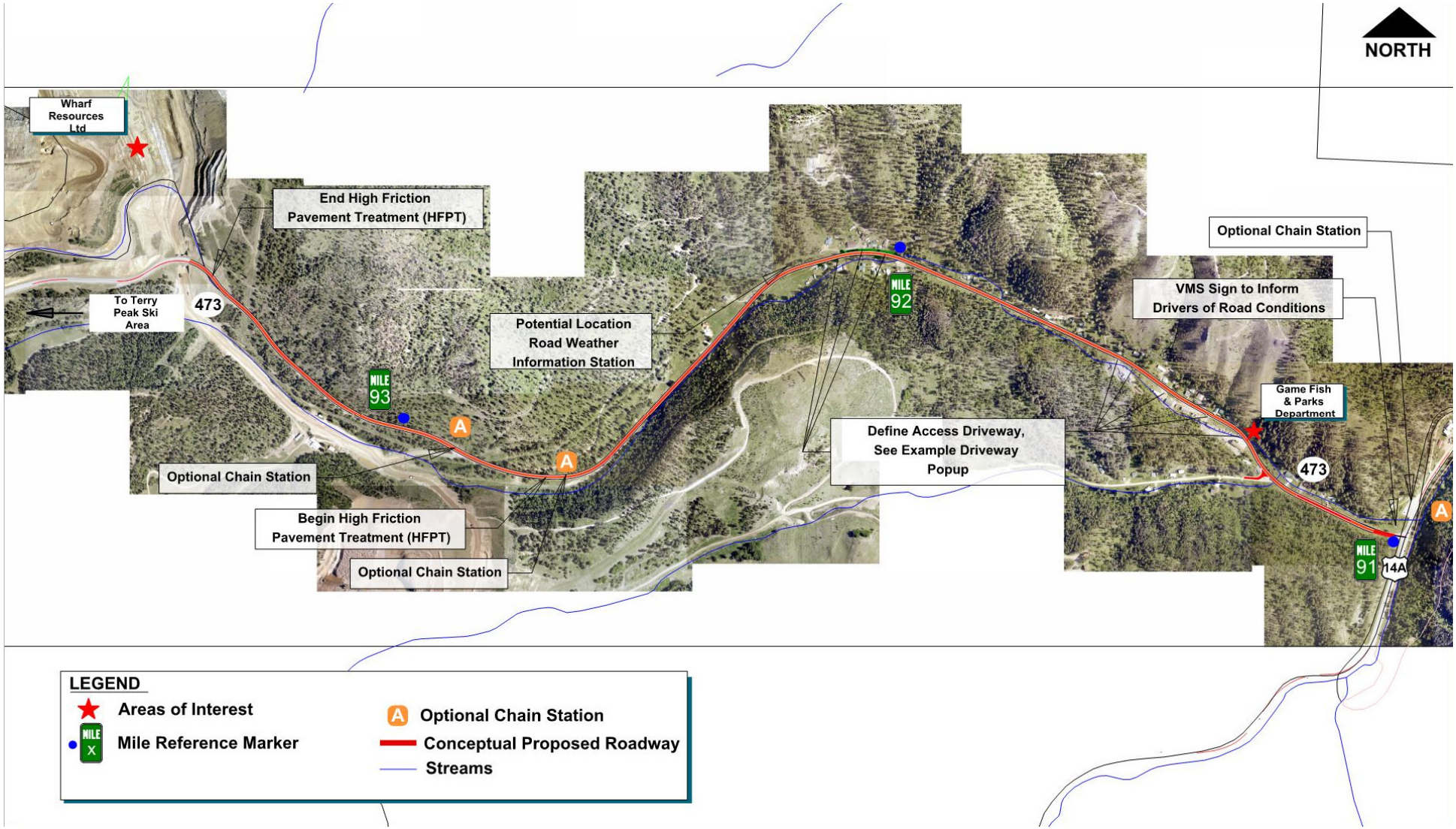
Chain Stations – The provision of roadside area for drivers to exit the roadway and install tire chains would serve as a proactive measure to prevent loss of traction along the steep grade of SD473. Tire chains can be particularly helpful to large trucks seeking to navigate steeper grades during snowy/icy conditions.

Variable Message Sign (VMS) – Providing an electronic display at the entry to SD473 that can be dynamically adjusted to convey weather warnings to drivers would help improve safety conditions through proactive provision of information. The VMS would be provided as a device within a corridor Road Weather Information System (RWIS). The RWIS would include a weather station along SD473 to sense and convey weather messages. Successful implementation of this strategy would require a broader Intelligent Transportation Systems (ITS) network allowing for remote control of devices.

High Friction Pavement Treatment (HFPT): With potential reconstruction and/or resurfacing of the SD473 section, consideration may be given to applying High Friction Pavement Treatment (HFPT) along steeper portions of the roadway. Such treatment shows the potential to reduce weather-related crash experience and has been successfully deployed along other state highways to improve travel safety.

Figure 9 depicts the overall initial corridor concept.

Figure 9. Overall Concept Summary



4.5 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 SD473 includes more developed areas with a lesser presence of unique geologic features and viewsheds. Roadway widening and intersection improvements may be implemented without overly impacting natural features within the area.
- Achieving consistency with the corridor vision as described in **Section 3**. Safety and travel time benefits are desired for this Destination Access Corridor.
- Incorporating public input. The potential concept outlined in **Section 0** was presented at the Phase 3 virtual public meeting for review and comment. 56 unique users visited the online meeting. Public feedback included comments received via the online comment form and via email.

  All respondents agreed with the proposed changes. These changes include intersection configuration, consolidating access, and widening shoulders for safety. Respondents included suggestions such as adding a live web camera and wayfinding information for non-local travelers.

Following completion of the virtual public meeting, the SAT held a meeting to determine refinements to the concept. The discussion confirmed support for the concepts as presented to the public.

The concept includes the following:

- Widening of roadway section to provide 6-foot shoulders and a 10-foot clear zone.
- Intersection definition and access consolidation within the MRM 91 to MRM 92 portion of the corridor
- Installation of High Friction Pavement Treatment (HFPT) through the steeper grade section
- Implementation of a Road Weather Information System (RWIS) along SD473
- Provision of roadside chain up stations

5. RECOMMENDATIONS

It is recommended that the refined concept as described in **Section 4.5** be implemented along SD473. This concept is reasonable for addressing the corridor vision while balancing impacts to the surrounding context.

Appendix B 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. A preliminary profile is also provided. 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.

5.1 Environmental Scan

Appendix C 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 3.

5.2 Cost Estimates

Detailed survey information is not currently available for SD473, 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 5 – Improvement Cost Estimates

ITEM	DESCRIPTION	UNIT	CONTINGENCY	UNIT COST	QUANTITY	COST
110	Earthwork and Removals (2' Depth)	SY		$ 22	58421	$ 1,285,262
110	Earthwork (Significant Impacts)	CY		$ 12	69960	$ 839,520
380	Surfacing (Highway)	SY		$ 145	50913	$ 7,382,385
380	Surfacing (Access Road)	SY		$ 110	3863	$ 424,930
650	Curb and Gutter	LF		$ 50	8200	$ 410,000
651	Sidewalk & Median	SF		$ 15	0	$ -
	SUBTOTAL (A)					**$ 10,342,097**
530	Structures - Bridge	SF		$ 210	0	$ -
530	Structures - Wall	SF		$ 120	41000	$ 4,920,000
450	Drainage - New	% of (A)	30%	$ -		$ 3,102,630
451	Utility Relocations	% of (A)	7%	$ -		$ 723,950
632/633	Traffic - Signing/Striping	% of (A)	5%	$ -		$ 517,110
634	Traffic Control	% of (A)	10%	$ -		$ 1,034,210
734	Erosion Control/Environmental	% of (A)	12%	$ -		$ 1,241,060
	SUBTOTAL (B)					**$ 11,538,960**
635	Traffic - Signals (New)	EACH		$ 280,000		$ -
009	Mobilization	% of (A)+(B)	9%	$ -		$ 1,969,300
	Contingency	% of (A)+(B)	30%	$ -		$ 6,564,320
	SUBTOTAL (C)					**$ 8,533,620**
	CONSTRUCTION TOTAL (D)	**(A)+(B)+(C)**				**$ 30,414,677**
18	Design Engineering	% of (D)	5%	$ -		$ 1,520,740
900	Construction Engineering	% of (D)	10%	$ -		$ 3,041,470
20	Commercial ROW**	SF		$ -	0	$ -

ITEM	DESCRIPTION	UNIT	CONTINGENCY	UNIT COST	QUANTITY	COST
	Rural ROW**	SF		$ -		$ -
						$ 34,976,887
	PROJECT TOTAL (E)					**$ 34,977,000**
	Construction + ROW Cost**					**$ 30,500,000**

* Surfacing Unit Cost Includes Base Course

** ROW Costs Not Included

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.

Black Hills
CONTEXT SENSITIVE CORRIDORS STUDY

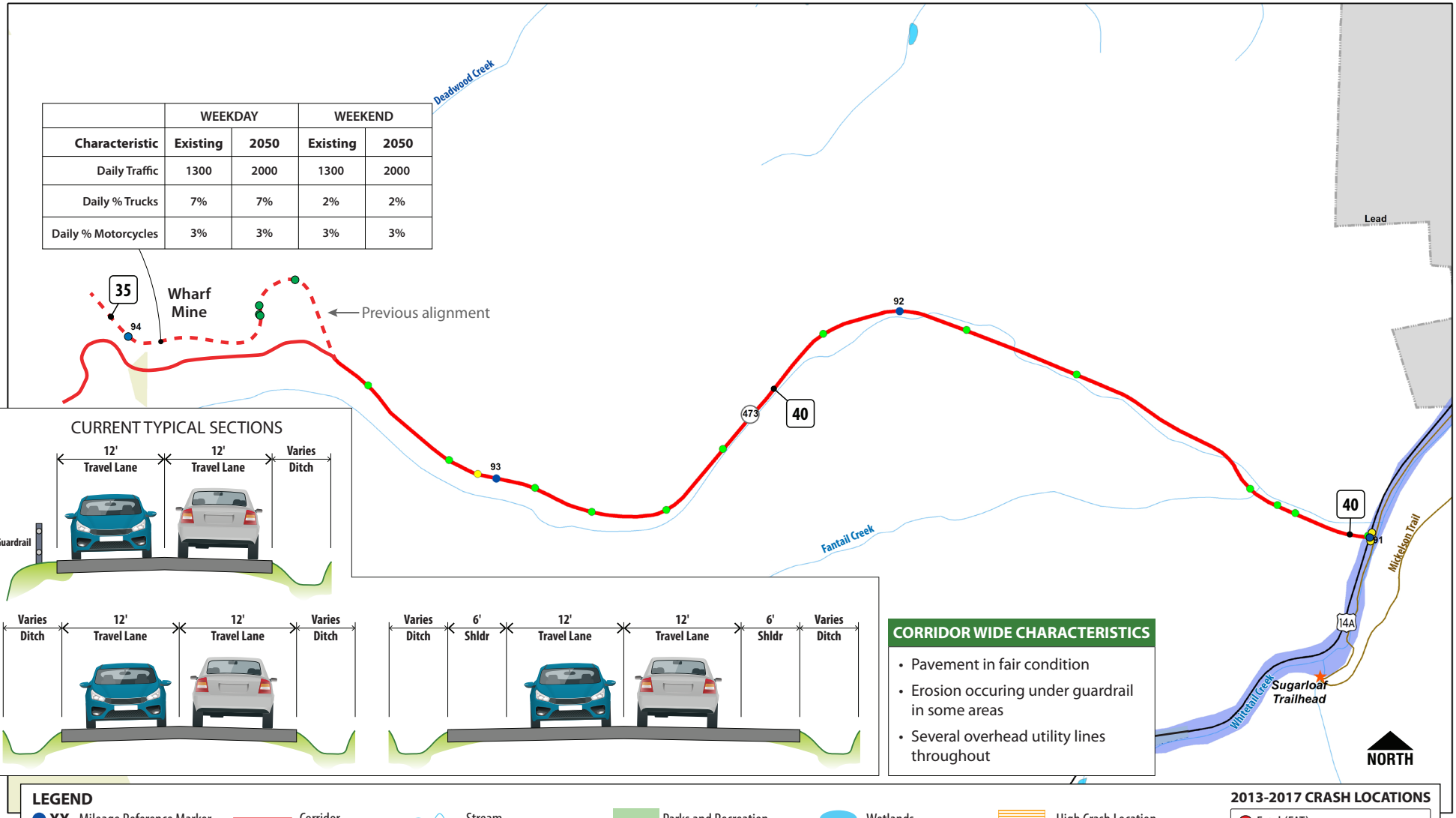
APPENDIX A CORRIDOR CHARACTERISTICS

Black Hills
CONTEXT SENSITIVE CORRIDORS STUDY

CORRIDOR 5
SD 473: Nevada Gulch Rd.

Corridor Characteristics

	WEEKDAY		WEEKEND	
Characteristic	Existing	2050	Existing	2050
Daily Traffic	1300	2000	1300	2000
Daily % Trucks	7%	7%	2%	2%
Daily % Motorcycles	3%	3%	3%	3%



CORRIDOR WIDE CHARACTERISTICS

- Pavement in fair condition
- Erosion occuring under guardrail in some areas
- Several overhead utility lines throughout

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)

APPENDIX B ENVIRONMENTAL SCAN DOCUMENT

Environmental Scan

Black Hills Context Sensitive Corridors Study – Corridor 5

SD 473: Nevada Gulch Road

Environmental Review and Design

Lawrence County, South Dakota
P 0473(11)92 N PCN - 074U

View of SD 473 facing southwest, approximately 1.45 miles west of the SH 473 and US 14A intersection.

Prepared for:
South Dakota Department of Transportation

Prepared by:
Felsburg Holt & Ullevig
6400 S Fiddlers Green Circle, Suite 1500
Greenwood Village, CO 80111
303.721.1440

October 2022

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Appendices

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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.

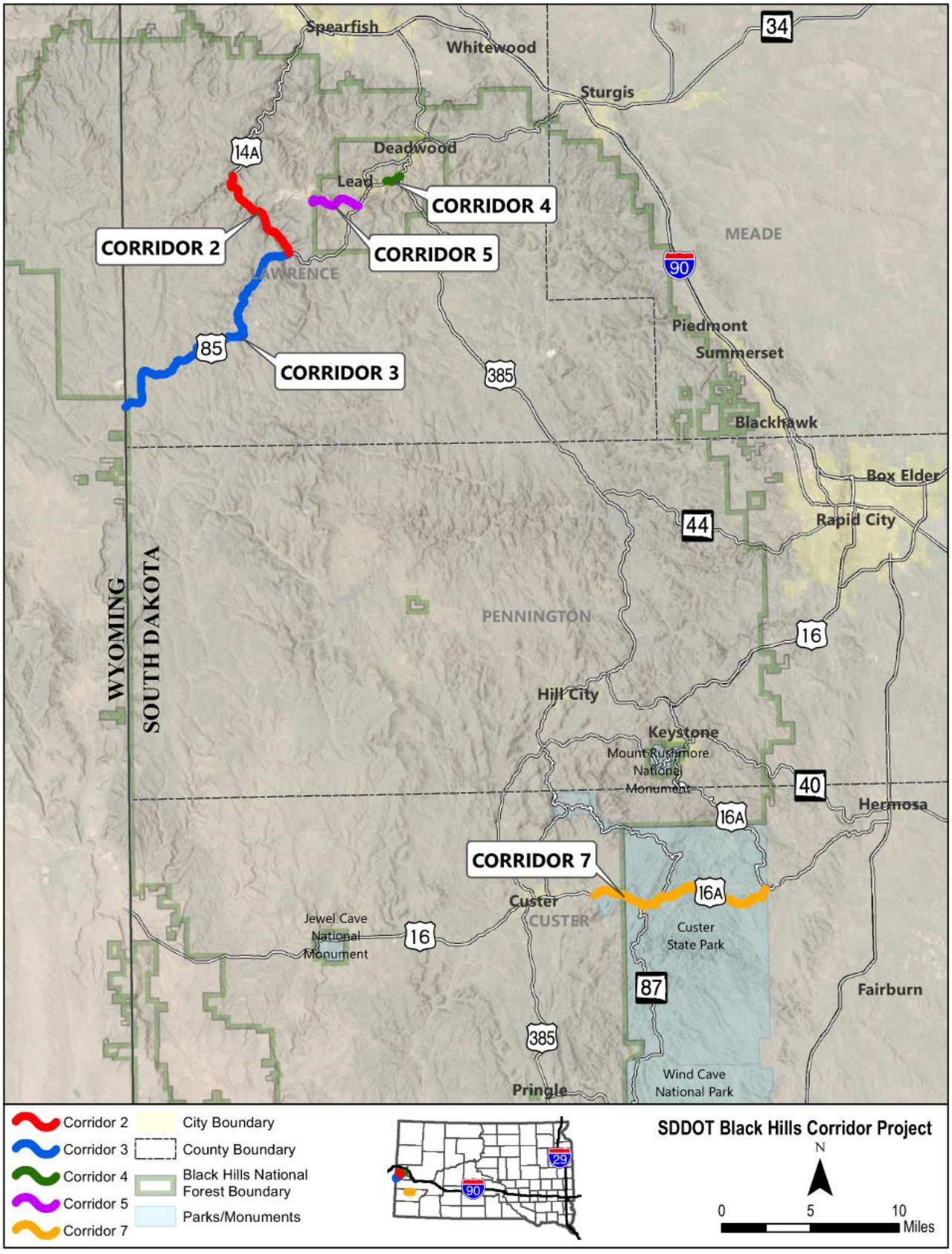
This study is establishing a corridor-wide preliminary purpose and need statement as well as goals and objectives that will be later developed and refined as project-specific purpose and needs for use in the National Environmental Policy Act (NEPA) process. The results of analyses from the previous transportation 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 SD 473: Nevada Gulch Road corridor (Corridor 5) which is 3.16 miles in length. The regional location of Corridor 5 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*; and a preliminary corridor-wide *purpose and need statement* to be refined during the NEPA process. The *Environmental Resource* sections documents known and potential environmental resources within the environmental study area for **Corridor 5**.

FIGURE 1. REGIONAL LOCATION MAP



1.1 Corridor Context

This corridor is SD 473 between US 85 and Terry Peak Ski Area, which is South Dakota's largest ski area. Corridor 5 serves commuters and the movement of commercial goods as its primary functions.

The primary functions of Corridor 5 are to serve **Commuters and Commercial Goods Movement.**

Corridors supporting the purpose of destination access 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.

Curves, narrower lanes, and the associated slower speeds are considered deficiencies associated with Corridor 5, are not desirable characteristics in fulfilling the commuter/commercial function.

A secondary function of this corridor is to provide connectivity between residential areas and employment areas or is intended to carry goods from one point in the region to another or through the region **(Commuter/Commercial**). Numerous residences are present along the eastern end of Corridor 5. Wharf Mine, which is an open pit, heap leach operation, is also located at the western end of corridor 5.

Characteristics defining this commuter/commercial corridors include:

- 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.

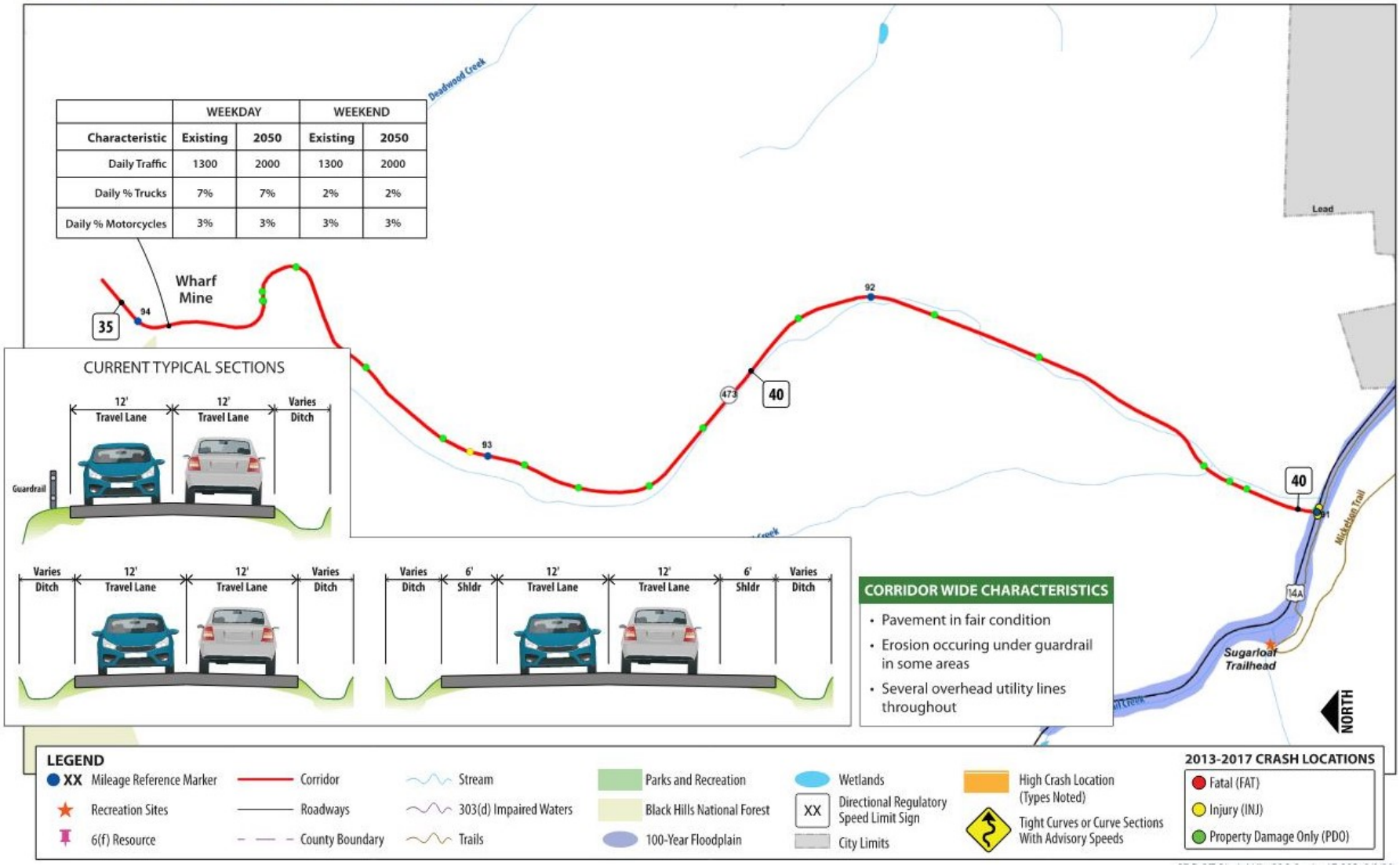
1.2 Transportation System Context

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 5 is a two-lane road with 12-foot travel lanes and stormwater drainage ditches on either side of the roadway.

Most of the highway has little to no shoulders and there appears to be inadequate clear zones in many places due to cut slopes on the north side and downslopes to Nevada Gulch on the south. There is extensive guardrail in the western portion and there are numerous curves along the corridor, both moderate and sharp. This corridor has a steep uphill grade (nearly 12%) in the westbound direction. Overall, the pavement is in fair condition.

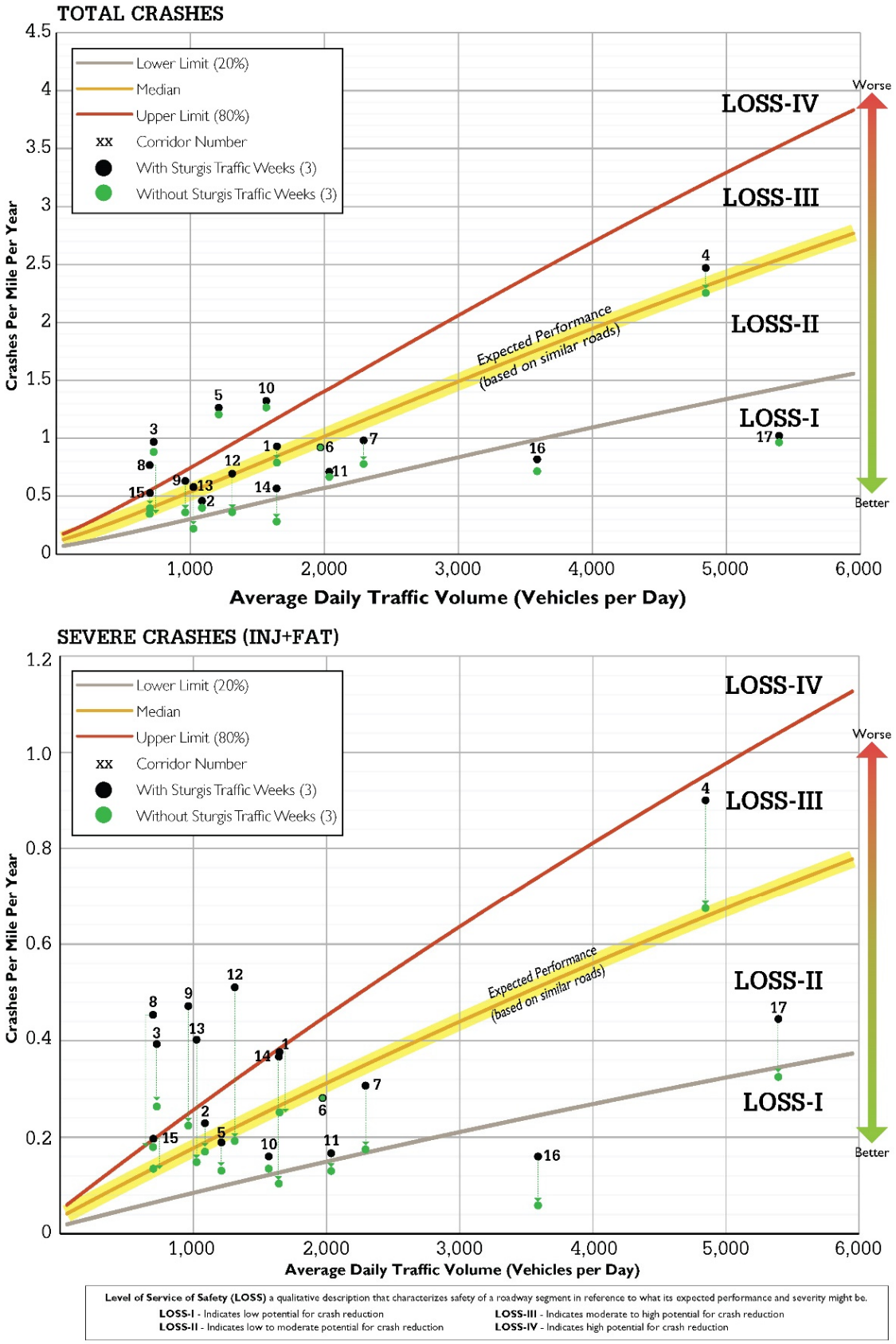
Reported crashes within the 2013-2017 time frame translate to a Level of Service of Safety (LOSS) of IV for total crashes both including and excluding the Sturgis Rally weeks. The primary crash type reported in this corridor is roadway departure (see Error! Reference source not found.**3).**

FIGURE 2. CORRIDOR 5 CHARACTERISTICS



	WEEKDAY		WEEKEND	
Characteristic	Existing	2050	Existing	2050
Daily Traffic	1300	2000	1300	2000
Daily % Trucks	7%	7%	2%	2%
Daily % Motorcycles	3%	3%	3%	3%

FIGURE 3. CORRIDOR SAFETY PERFORMANCE, 2013-2017



The corridor experiences higher than expected numbers of total crashes. There are no concentrated crash locations along the corridor and a majority of the crashes occurred during inclement weather. The crash frequency history indicates a high potential for crash reduction.

The current daily traffic volume is approximately 1,300 vehicles and the 2050 forecast is approximately 2,000 vehicles per day for both weekday and weekend traffic. The most prominent transportation user group in this corridor are cars and bus/RVs (as a percentage of heavy vehicles).

1.3 Purpose and Need

The following purpose and need sections for Corridor 5 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 SD 473 Nevada Gulch Road corridor transportation improvements are intended to improve travel time; improve safety of travel during inclement weather conditions; and enhance the user experience along the corridor. The improvements should be resilient and reconcile the distinct corridor characteristics of residences and recreation access.

1.3.2 Preliminary Corridor-wide Need for the Proposed Action

This section summarizes the transportation needs for the SD 473 Nevada Gulch Road Corridor. The transportation improvements are needed to address:

- **Travel Time**: The efficient movement of people, goods, and services along the corridor is critical and the roadway has several deficiencies that need to be addressed to improve speed of vehicular travel through the corridor.
- **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 six feet) would allow for an appropriate accommodation of engineering standards and higher travel speeds.
- **Access configuration:** Closely spaced, full movement accesses are present through the eastern portion of the corridor, introducing multiple turning conflicts over shorter distances and adding to travel time. Consolidating accesses, where feasible and workable for properties, would assist in improving travel time.
- **Intersection configuration –** The SD 473/Terry Gulch Road intersection is angular and not well defined, causing some driver confusion. Creating a better defined, less angular intersection would improve travel time.

- **Inclement Weather Travel**: The corridor is affected by wintry weather conditions, which can extend travel time and affect vehicular safety. Improvements are needed to mitigate these effects.
- **Road surface friction —** Improve surface friction of pavement since the corridor is frequently accessed during winter for recreation access. Creating additional surface friction could have a positive effect on travel time and vehicular safety.

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 has experienced higher than expected safety concerns.
  - **Vehicular** — Address the high incidences of higher than expected crashes throughout the corridor. Improvements should attempt to result in a LOSS II for the entire year, including Sturgis Rally weeks.
  - **Pedestrian and Bicycle** — Address the inadequate to zero shoulders and absence of pedestrian amenities along residential segments of the corridor. Mitigate vehicle speeds within the residential segments of the corridor for pedestrian safety. Should create shoulders and lane widths to accommodate safe pedestrian and bicycle traffic in the corridor.
- **User Experience:** This context in the corridor is unique in that it serves as both a recreation access as well as a residential area. The context of the corridor serving as a destination access and the residential character of the corridor requires consideration of transportation improvements that reconcile the distinct corridor characteristics. Consequently, efficient movement of through traffic and compatibility with a residential setting are both priorities.
  - **Residential Area —** The homes along SD 473 in the eastern portion of the corridor presents local traffic access and pedestrian travel issues. Adding lane/shoulder width through the residential area could enhance the user experience in this area.
  - **Inclusion of weather sensing and communication devices and speed mitigation options through the residential area would further enhance the user experience of the corridor.** This would include with information on road conditions and variable speed limit signs would reflect weather conditions. Locations for chain installation would also assist drivers during inclement weather.
- **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.

- **Roadside Drainage** Improvements: Currently North Gulch runs adjacent to the roadway and shifts from north to south of the road throughout the corridor. Drainage improvements are needed to ensure culverts are functioning properly to prevent surface water from collecting on the roadway.

1.4 Proposed Project

1.4.1 Project Termini

The project termini are described as follows:

- **Western Terminus:** Mileage Reference Marker (MRM) 94.16 at the intersection of SD 473 and Steward Slope Road, is the western terminus of the state highway.
- **Eastern Terminus:** MRM 91.00 at the intersection of SD 473 and US 14A, is the eastern terminus of the state highway.

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: Recreational access and residential character create a unique context for SD473. Seek roadside improvements, access consolidation, weather treatments and added shoulder width	
Improvement Type:	**Supports Vision by:**
Additional pavement surface friction	Providing additional traction along vertical grade assisting with wintry safety
Roadside drainage improvements	Improving infrastructure condition for roadside accesses
Access spacing and intersection geometry	Improving safety by reducing access conflicts and providing defined intersection design
Weather sensing and communications ITS devices	Improved wintry driving experience for users; enhancing safety
Speed mitigation through residential area	Better align roadway usage with presence of adjacent homes
Add lane/shoulder width through residential area	Improve pedestrian safety and consistency with SDDOT design guidance

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:

- Widen 1-ft shoulders to 6 ft and retain 12-ft lanes
- Establish 10 ft clear zones
- Reconfigure intersections and accesses
- Enhance roadside drainage

The scope of the environment scan data and mapping would cover future considerations of other corridor 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 5 had a total of nine responses and zero emails. All respondents agreed with the proposed changes. These changes include intersection configuration, consolidating access, and widening shoulders for safety. Respondents included suggestions such as adding a live web camera and wayfinding information for non-local travelers.

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

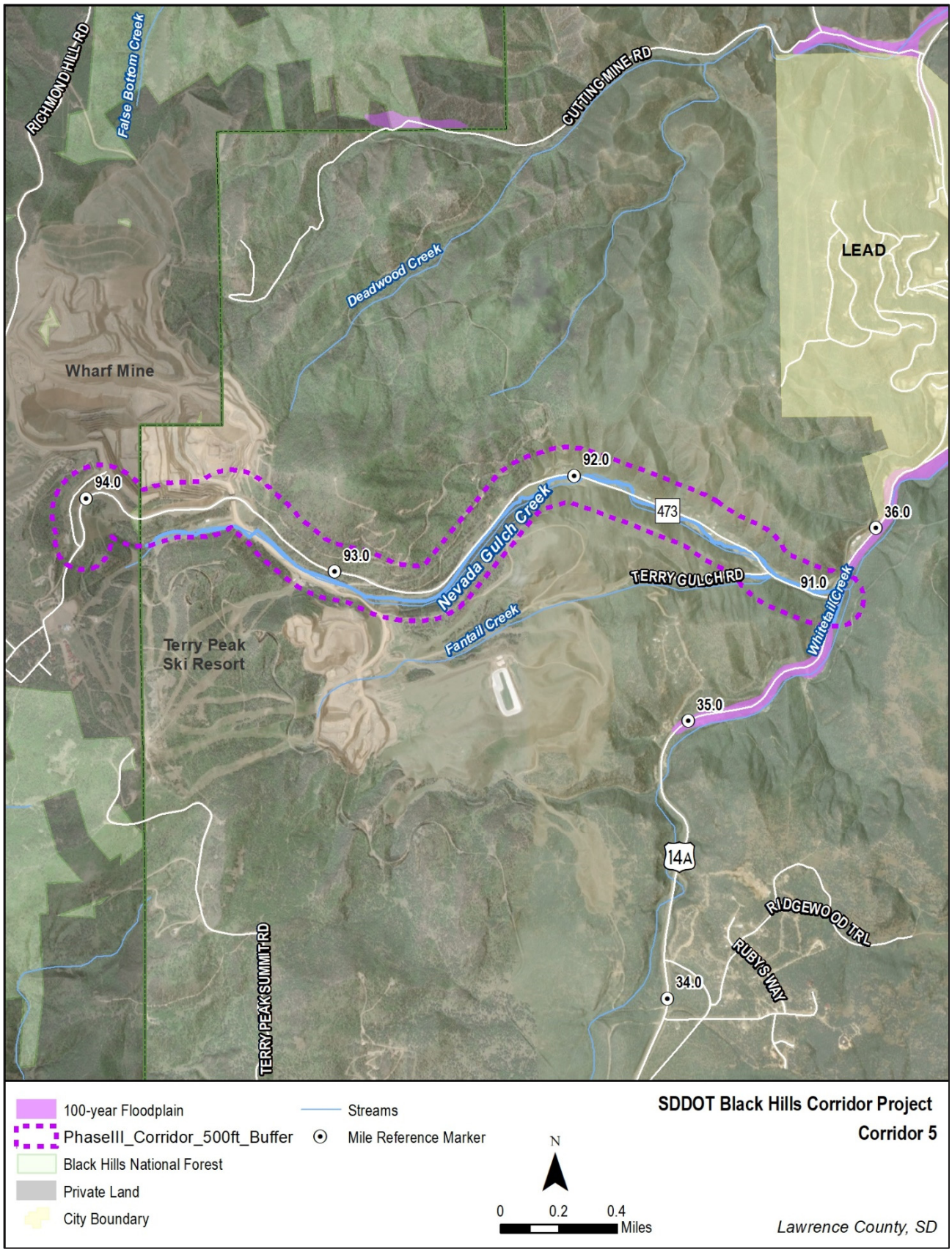
This chapter provides a review of known and potential environmental resources within the environmental study area that may be important considerations for construction of the potential improvements. The environmental study area consists of a 500-ft buffer of the existing SD 473 roadway between MRM 91.00 at the intersection of SD 473 and US 14A and MRM 94.16 at the intersection of SD 473 and Steward Slope Road. **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
- Floodplains
- Wetlands and Waterways
- Vegetation and Wildlife
- Threatened and Endangered Species
- Environmental Justice
- Historic and Cultural Resources
- Federal and Tribal Lands
- Traffic Noise
- Section 4(f) and 6(f)
- Visual Resources
- Hazardous Materials

Several environmental resources with regulatory drivers but without applicability to the environmental study area for **Corridor 5** 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.

FIGURE 4. ENVIRONMENTAL STUDY AREA



2.1 Soils/Geology

This section highlights the soil and rock outcrop constraints associated with the Black Hills adjacent to SD 473: Nevada Gulch Road. 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).

2.1.1 Existing Conditions

The following is a profile of constraints associated with selected soil types adjacent to Corridor 5 side slopes that could contain potentially unstable slopes:

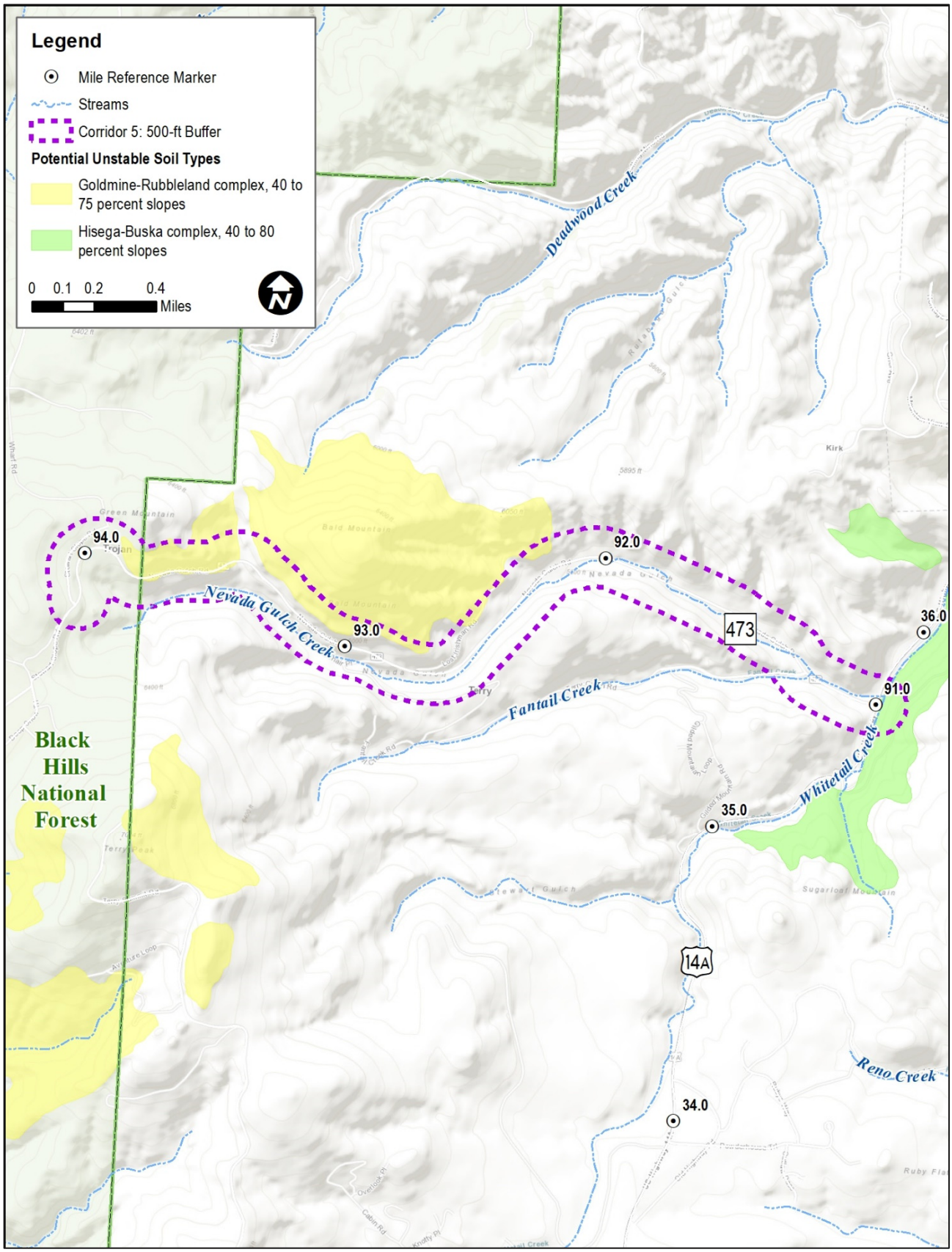
- **Hisega-Buska outcrop complex (40 to 80 % slopes)**
  - **General Characteristics**: Deep, well drained soils and Rock outcrop on mountain ridges and on the sides of mountain valleys in the Black Hills.
  - **Revegetation**: Low fertility, most areas are in ponderosa pine forest. Some areas also have native and seeded grasses and shrubs.
  - **Hazards**: Erosion hazard during tree removal (timbering). Shrinking and swelling of the soils. Slippage occurs if the soils are disturbed. This soil type is generally not well suited for building sites, local roads and streets, or sanitary facilities. Strengthening the base material is needed to help overcome the low strength of the Buska soil and to support vehicular traffic. Control of roadside erosion is needed in borrow and cut areas.
  - **Erosion:** 0.43K/0.28K; 3-5T; wind erosion groups 6 & 8 = Very Severe
- **Goldmine-Rubbleland complex (40 to 75% slopes)**
  - **General Characteristics:** Well drained and excessively drained soils.
  - **Revegetation**: Most areas are in ponderosa pine forest. Some areas also have native and seeded grasses and shrubs.
  - **Erosion:** 1-3T; wind erosion groups 6 & 8 = Very 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

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 50 miles south of the corridor. Badlands National Park (Badlands/Sage Creek Wilderness Area) is approximately 75 miles southeast of the corridor. Road improvement projects typically would not be a concern for Class I areas, particularly 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 Whitetail Creek. Floodplains within the environmental study area have been classified as "Flood Zone A", which is the areas covered by a 100-year flood (see **Figure 6**) on Flood Insurance Rate Map (FIRM) Panel 4600946081C. No floodplains were identified for Nevada Gulch Creek or its tributaries (see **Figure 6**).

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. For projects within the floodplains, local jurisdictions typically require floodplain development permits.

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 SD 473: Nevada Gulch Road within Corridor 5 are summarized by MRM in **Table 1**, and on the Environmental Resources Map Book in **Appendix A**.

FIGURE 6. FLOODPLAINS

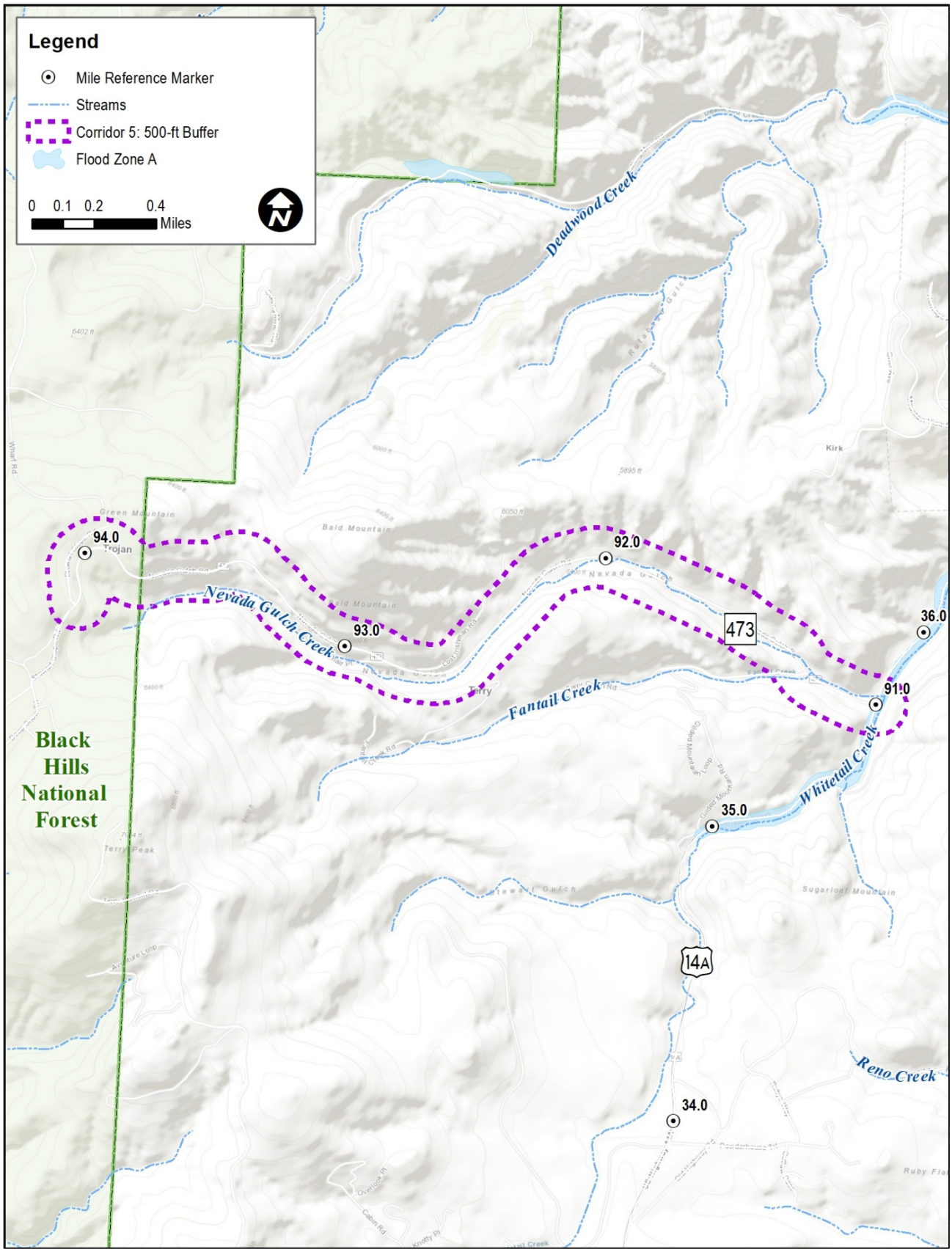


TABLE 1. CORRIDOR 5 INVENTORY OF STREAMS AND POTENTIAL WETLANDS

Streams and Wetlands	Location (MRM or MRM Range)
Stream Crossings / Adjacent Streams	91.0 - 91.4
Nevada Gulch Creek	91.54 - 92.1
Fantail Creek	92.25 - 92.6
Potential Wetlands	91.0 – 91.3

A total of 1.83 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*).

Nevada Gulch Creek runs adjacent to the roadway for most of the corridor. Whitetail Creek and Fantail Creek were also found within the environmental study area. 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.

2.6 Vegetation and Wildlife

This section describes the existing vegetation and wildlife that occurs within the environmental study area for Corridor 5.

2.6.1 Existing Conditions

Vegetation

The environmental study area is located in the Black Hills Core Highlands 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 Core Highlands sub-ecoregion consists of higher elevations and cooler temperatures. Increased rainfall in this area fosters boreal species such as white spruce, aspen, and birch trees.

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*
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*

Common Name	Scientific Name
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 homes, vacation rentals, and commercial properties found within the study area, especially in the eastern end of the study area, and the Warf Mine is located on the west end of the study area, north of SD 473. Much of the environmental study area is comprised of undeveloped forested land and the very western end of the study area lies within the Black Hills National Forest boundary.

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 has been reported in Lawrence County, but the other six species have documented populations. Locally listed noxious weed species in Lawrence County include Canada thistle, common Tansy (*Tanacetum vulgare*), and common mullein (*Verbascum thapsus*) (Lawrence 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*).

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) 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 the Black Hills National Forest and/or Lawrence County.

2.7.3 Existing Conditions

Table 3 identifies federal and state listed species potentially located in the **Corridor 5** 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 caves and mines.	Potential summer roosting habitat for the northern long-eared bat exists along Northern Gulch Creek and other drainages that cross 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 near Northern Gulch Creek; 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.
American Dipper (*Cinclus mexicanus*)	ST	Rocky, unpolluted streams. Streams with cliffs, ledges, or bridges nearby are important nesting habitats.	Suitable nesting habitat is present near Northern Gulch Creek; however, no nest sites have been identified.
Peregrine Falcon (*Falco peregrinus*)	SE	Habitat consists of tall cliffs for nesting with open landscapes for foraging. Nests are often established on cliffs at heights ranging from 50 to 200 meters.	Currently the peregrine is a rare summer resident of the Black Hills.
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.
Fish			
Finescale dace (*Chrosomus neogaeus*)	SE	Cool spring-fed bogs, lakes and creeks; small, weedy, sluggish streams and small lakes. Sometimes associated with beaver ponds.	Potential habitat is located within the environmental study area along Northern Gulch Creek.

Common Name	Status	Habitat	Comments
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.

FE = Federally Endangered ST = State Threatened

FT = Federally Threatened SE = State Endangered

References: SDGFP – Accessed July 2021 USFWS Species Profiles – ECOS, IPaC July 2021

In Lawrence County, three federally listed species were identified through the USFWS IPaC. Potential northern long-eared bat summer foraging habitat is present at wooded habitats along Northern Gulch Creek, and other drainages, 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 six state listed species as having potential to occur in Lawrence County, South Dakota, including one 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 Northern Gulch Creek for the finescale dace.

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 9666, 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 320 habitants within one mile of the proposed project corridor. The minority population is approximately 1 percent, while that of the State of South Dakota is 18 percent. The low-income population is approximately 15 percent, while that of the State of South Dakota 31 percent. The demographic index is 8 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 or low-income EJ population.

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

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 5 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 SD 473, within the study limits of Corridor 5 (see Section 1.4.1 Logical Termini).
- Mapping of previously recorded resources within 500 ft of SD 473.
- Reviewing all previously recorded sites within the 500 ft buffer and identifying NRHP Listed NRHP Eligible sites that may potentially be affected by Corridor 5 improvements.

2.9.3 Existing Conditions

A total of 16 previously recorded resources listed in **Table 4** were identified within the 500 ft buffer for Corridor 5, including 5-NRHP eligible properties.

TABLE 4. CORRIDOR 5 – PREVIOUSLY RECORDED RESOURCES ADJACENT TO SD HWY 473

Resource ID / Site ID	Resource Type	Location	Description	Most Recent National Register Eligibility Determination
7693 / **LA00000639**	Structure	T4N, R3E NE ¼ of NE ¼ of Section 6	Nevada Gulch School (b.1939)	***NRHP Eligible***
7694 / **LA00000646**	Structure	T4N, R3E NE ¼ of NE ¼ of Section 6	Log House (b.1910)	***NRHP Eligible***
7164 / **LA00000703**	Structure	T4N, R2E NE ¼ of SE ¼ of Section 1	Abandoned House (date unknown)	*Unevaluated*
13744 / **LA00000916**	Structure	T4N, R3E SE ¼ of NE ¼ of Section 6	Clinton Mine & Lode (b.pre-1900)	*Unevaluated*
12195 / **39LA0291**	Site	T4N, R3E SW ¼ of NW ¼ of Section 6	dump	*Recommended Not Eligible*
12452 / **39LA0376**	Site	T4N, R2E NE ¼ of Section 2	Townsite	***NRHP Eligible***
12196 / **39LA0385**	Site	T4N, R2E Section 1 & T4N, R3E Section 6	dump	*Recommended Not Eligible*

Resource ID / Site ID	Resource Type	Location	Description	Most Recent National Register Eligibility Determination
12459 / **39LA0386**	Site	T4N, R3E SW ¼ of NW ¼ of Section 6	mine	*Unevaluated*
13027 / **39LA0387**	Site	T4N, R3E SW ¼ of NW ¼ of Section 6	mine	*Recommended Not Eligible*
13028 / **39LA0388**	Site	T4N, R2E NE ¼ of SE ¼ of Section 1	mine	*Unevaluated*
12182 / **39LA0439**	Site	T4N, R2E NE ¼ of NE ¼ of Section 2	foundation	*NRHP Not Eligible (SHPO Concurrence)*
12486 / **39LA0402**	Site	T4N, R2E NE ¼ of SE ¼ of Section 1	industrial	*Recommended Not Eligible*
12486 / **39LA0488**	Site	T4N, R2E NE ¼ of SE ¼ of Section 1	industrial	*Recommended Not Eligible*
12204 / **39LA0737**	Site	T4N, R2E NE ¼ of NE ¼ of Section 2	euroamerican artifact scatter; euroamerican depression	*Unevaluated*
13550 / **39LA2000**	Site	T4N, R2E SE ¼ of NE ¼ of Section 2	railroad	***NRHP Eligible***
13554 / **39LA2009**	Site	T4N, R2E NE ¼ of NW ¼ of Section 1	railroad	***NRHP Eligible***
	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

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 Lawrence 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 Lawrence 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

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

SD 473 in this corridor is an existing two-lane highway through a rural, mountainous setting. There are dispersed residences and other developed sites 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): There were no Non-Historic Section 4(f) properties identified within the within the 500 ft study area for Corridor 5.

There are 5 historic 4(f) properties that are NRHP eligible within the 500 ft study area for Corridor 5, including:

- Property # 7693 /LA00000639: Nevada Gulch School—NRHP eligible
- Property # 7694 /LA00000646: Log House—NRHP eligible
- Property # 12452 /39LA0376: Townsite—NRHP eligible
- Property # 13550 /39LA2000: railroad—NRHP eligible
- Property # 13554 /39LA2009: railroad—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.

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) resource 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 5 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 5).

2.13.2 VIA Scoping

A visual resource scoping process was conducted for Corridor 5, to identify issues related to the transportation improvement concepts planned for SD 473: Nevada Gulch Road, and to establish Visual Impact Assessment (VIA) requirements for the National Environmental Policy Act (NEPA) phase.

Context and Landscape Character

Nevada Gulch is a narrow tree-lined corridor that parallels a narrow roadside ditch with riparian ditch and stone retaining walls. Recreational access and residential character join to create a unique context. This is a residential corridor and a destination route to Terry Peak Ski Area.

2.13.3 Next Steps

The VIA Scoping process resulted in a score of **16 points**, indicating that an *Abbreviated VIA* would briefly describe project features, impacts and mitigation requirements. Visual simulations would be optional.

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

A desktop review of the study area revealed facilities that may utilize hazardous materials daily such as the following:

- Wharf Mine (Wharf Mine Road)
- Chadams Auto Service (11322 Nevada Gulch Road)

In addition to the facilities listed above, 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. Finally, there could 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.

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Appendix A. Environmental Resources Map Book

Black Hills Phase III Corridors
Corridor 5: Sheet 1 of 6

Legend

- Tenth Mile Markers
- Mile Reference Marker
- Other Environmental Resource
- Snowmobile Trail
- Streams
- Corridor 5: Existing Alignment
- Potential Wetland
- Waterbodies
- Corridor 5: 500 ft Buffer
- Black Hills National Forest
- City Boundary

0 100 200 300 Feet

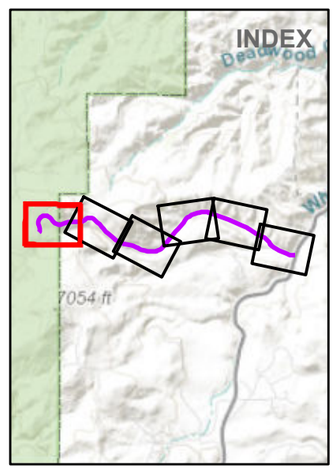
94.0

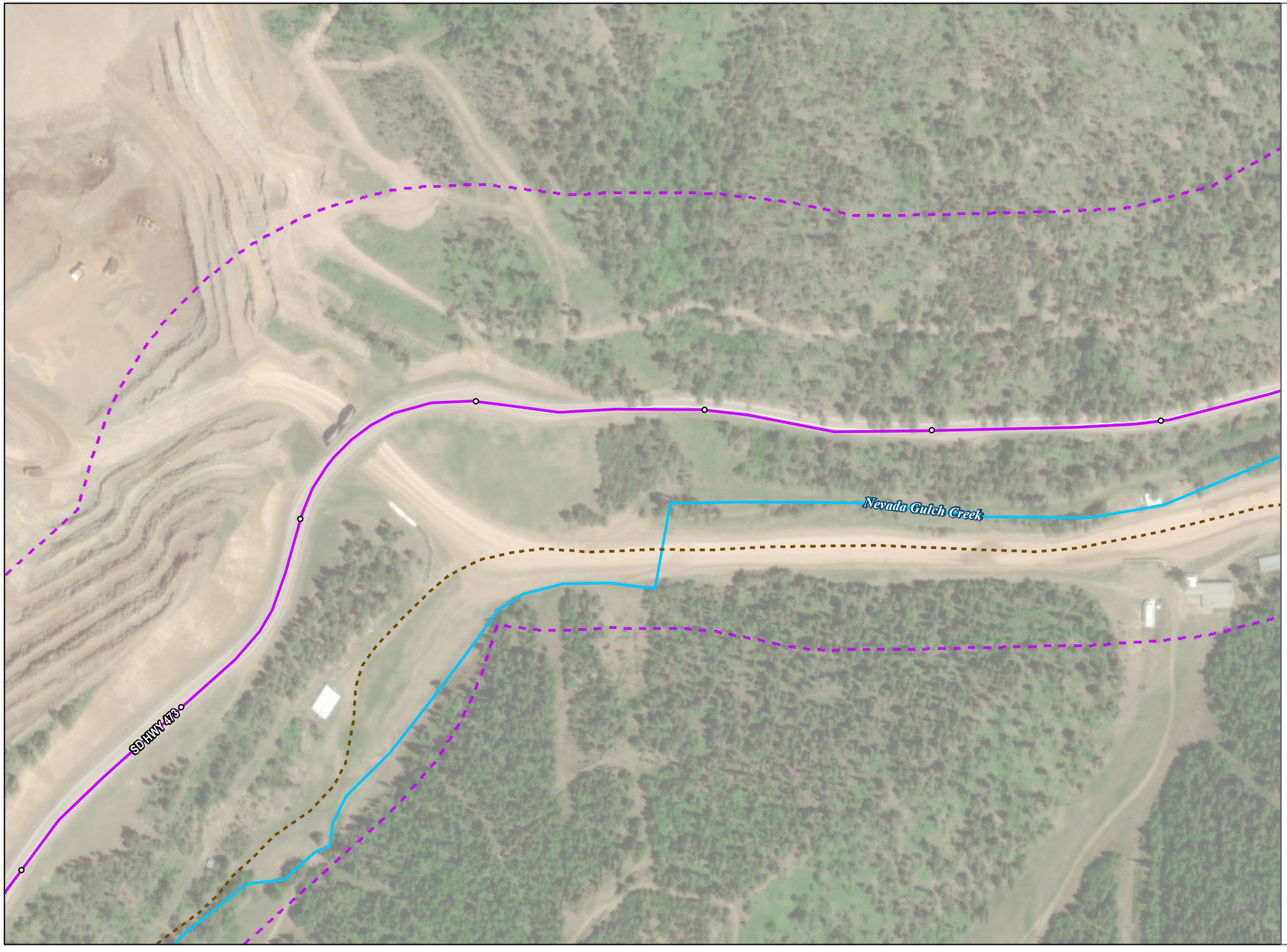
Black Hills
National Forest

STEWART SLOPE RD

SD HWY 473

Nevada Gulch Creek



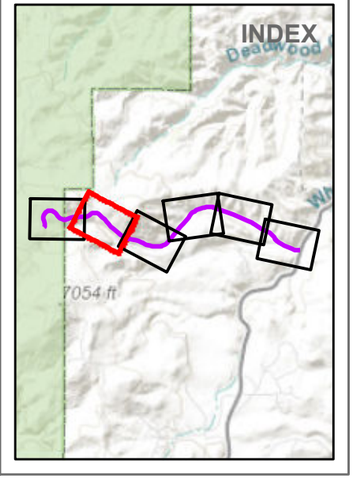


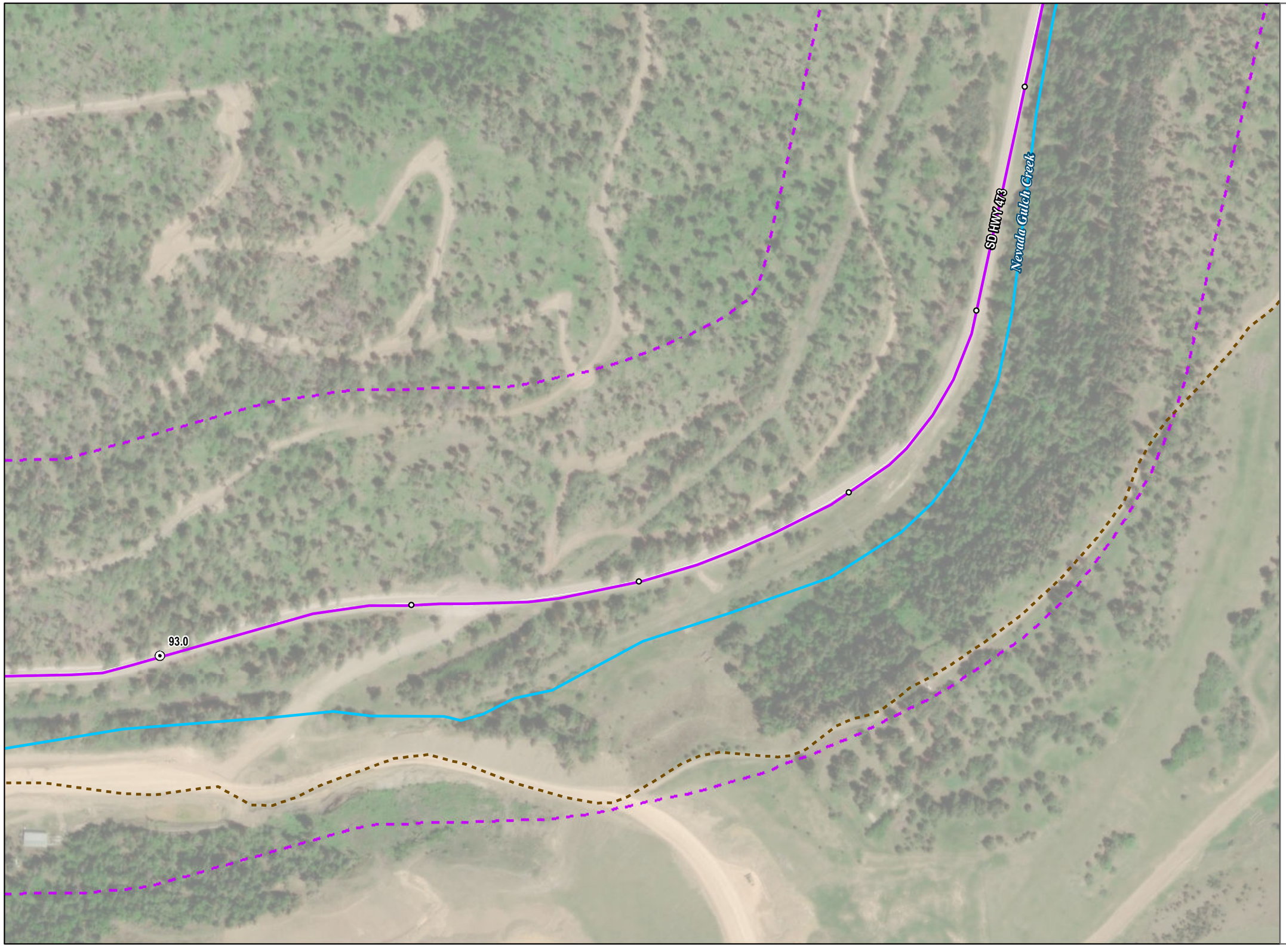
Black Hills Phase III Corridors
Corridor 5: Sheet 2 of 6

Legend

- Tenth Mile Markers
- Mile Reference Marker
- Other Environmental Resource
- Snowmobile Trail
- Streams
- Corridor 5: Existing Alignment
- Potential Wetland
- Waterbodies
- Corridor 5: 500 ft Buffer
- Black Hills National Forest
- City Boundary

0 100 200 300 Feet





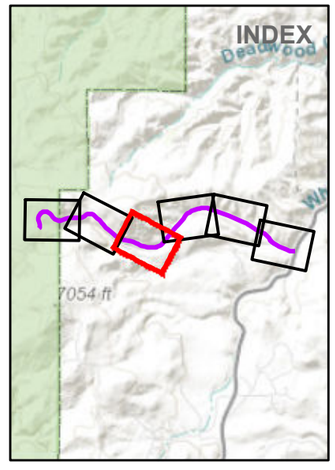
Black Hills Phase III Corridors
Corridor 5: Sheet 3 of 6

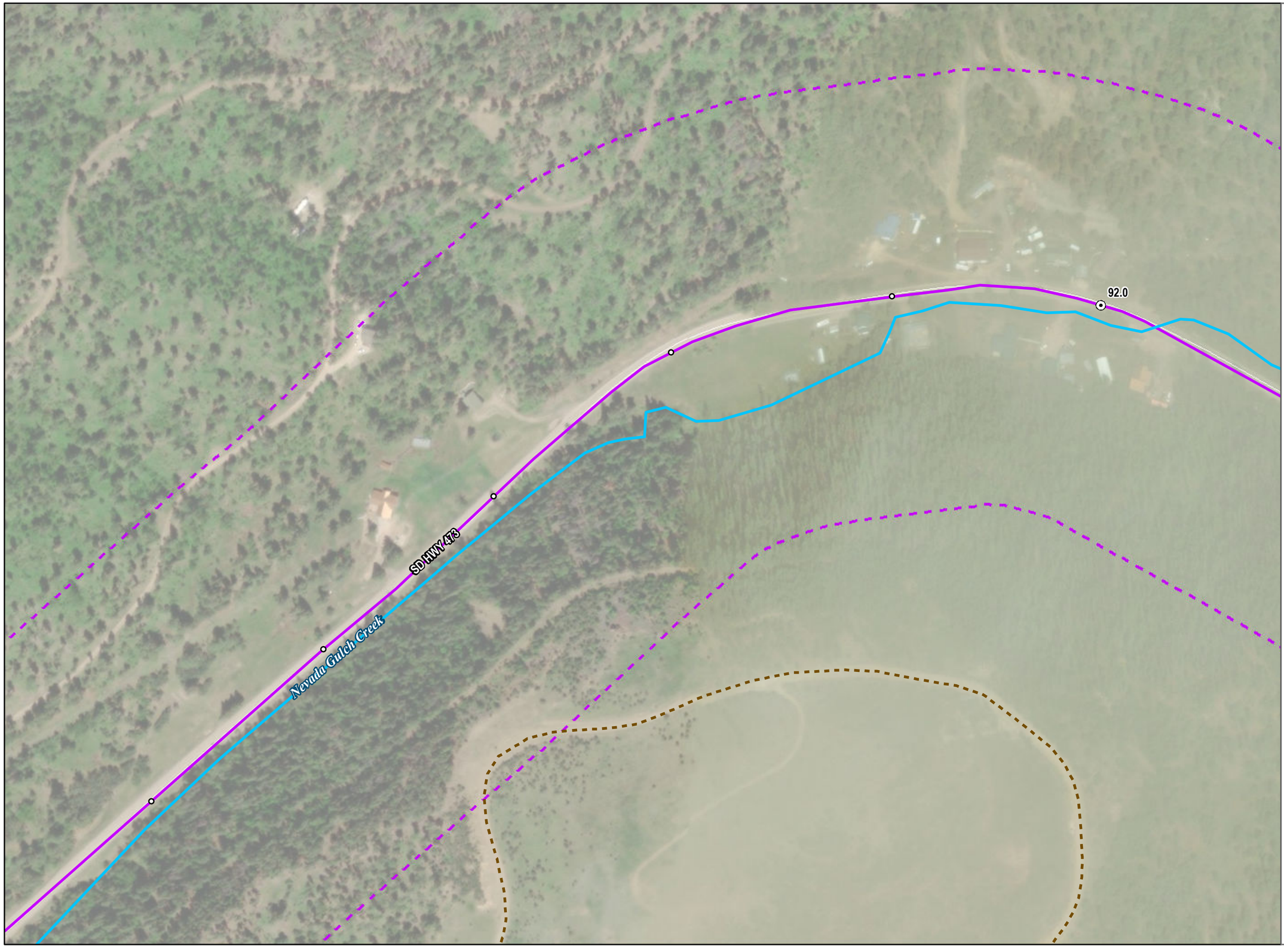
Legend

- Tenth Mile Markers
- Mile Reference Marker
- Other Environmental Resource
- Snowmobile Trail
- Streams
- Corridor 5: Existing Alignment
- Potential Wetland
- Waterbodies
- Corridor 5: 500 ft Buffer
- Black Hills National Forest
- City Boundary

N

0 100 200 300
Feet



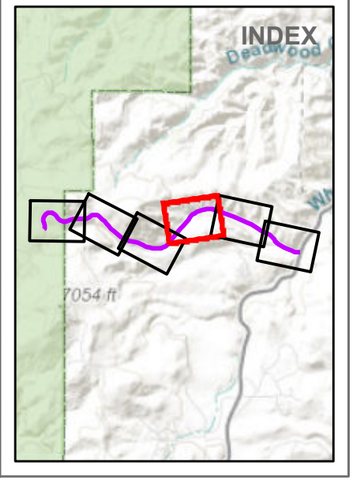


Black Hills Phase III Corridors
Corridor 5: Sheet 4 of 6

Legend

- Tenth Mile Markers
- Mile Reference Marker
- Other Environmental Resource
- Snowmobile Trail
- Streams
- Corridor 5: Existing Alignment
- Potential Wetland
- Waterbodies
- Corridor 5: 500 ft Buffer
- Black Hills National Forest
- City Boundary

0 100 200 300
Feet



Black Hills Phase III Corridors
Corridor 5: Sheet 5 of 6

Legend

- Tenth Mile Markers
- Mile Reference Marker
- Other Environmental Resource
- Snowmobile Trail
- Streams
- Corridor 5: Existing Alignment
- Potential Wetland
- Waterbodies
- Corridor 5: 500 ft Buffer
- Black Hills National Forest
- City Boundary

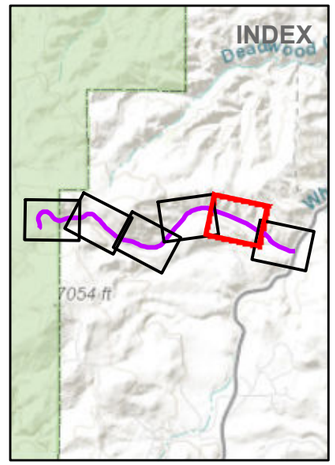
N

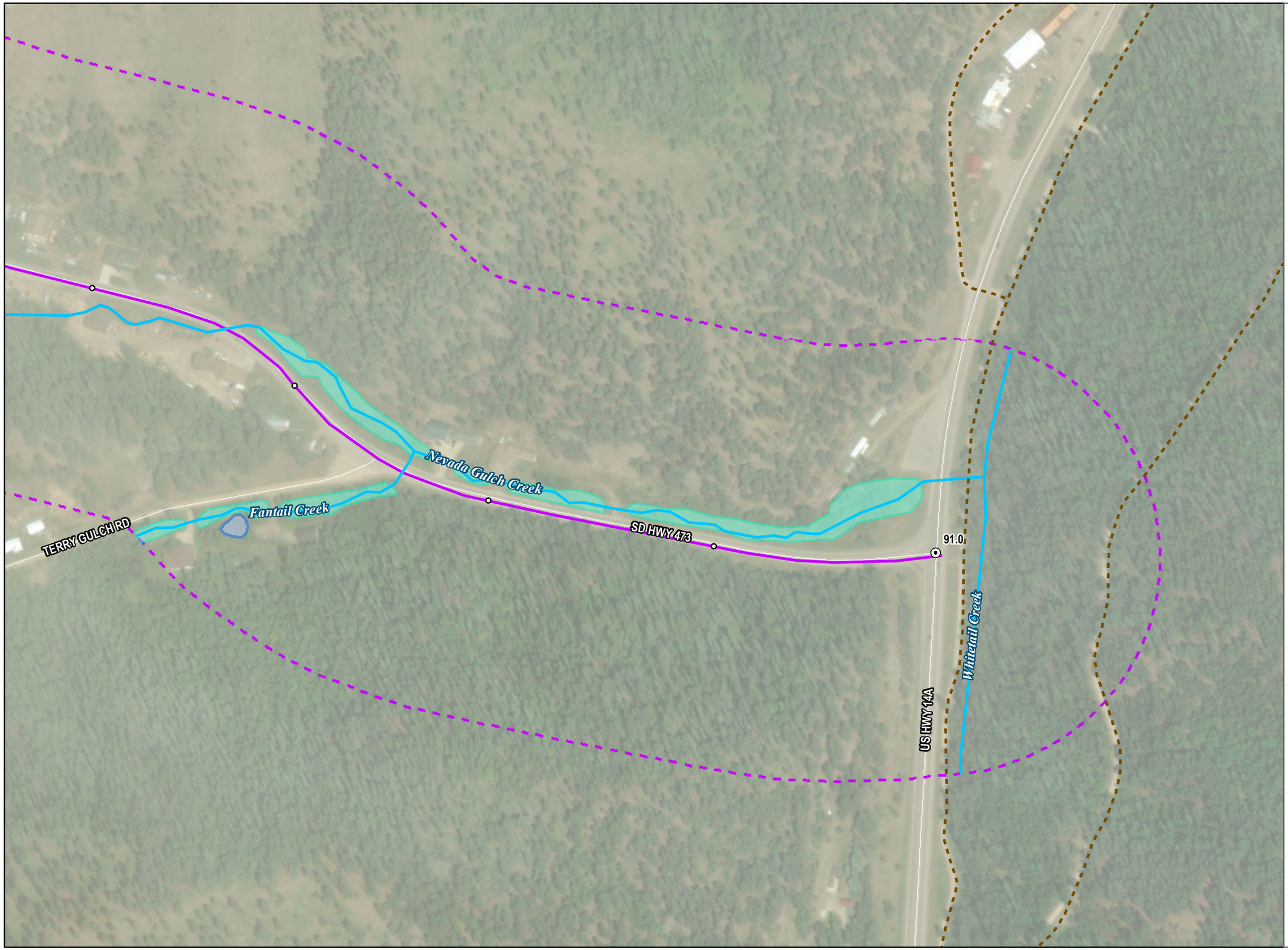
0 100 200 300
Feet

SD HWY 473

Nevada Gulch Creek

TERRY GULCH RD



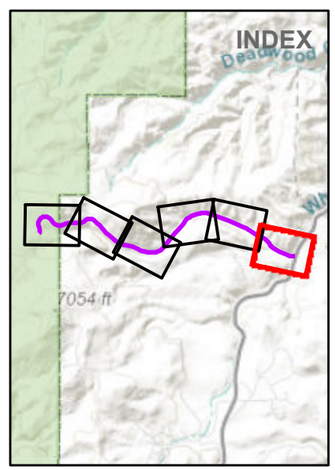


Black Hills Phase III Corridors
Corridor 5: Sheet 6 of 6

Legend

- Tenth Mile Markers
- Mile Reference Marker
- Other Environmental Resource
- Snowmobile Trail
- Streams
- Corridor 5: Existing Alignment
- Potential Wetland
- Waterbodies
- Corridor 5: 500 ft Buffer
- Black Hills National Forest
- City Boundary

0 100 200 300
Feet



Appendix B. Visual Impact Analysis Scoping

2.15 Appendix C. Corridor 5 Visual Impact Assessment Scoping

2.15.1 Introduction

This visual impact assessment (VIA) scoping for Corridor 5 identifies issues related to the transportation improvement concepts planned for SD 473: Nevada Gulch Road and anticipates the visual resource requirements for the National Environmental Policy Act (NEPA) phase. The VIA scoping process applied to Corridor 5 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 5 concept planning and design, corridor videos, and the Lawrence County *2030 Comprehensive Plan* (Lawrence County, 2020).

The following sections include the initial Corridor 5 VIA Scoping Questionnaire responses, with assumptions, supporting information, and next steps to consider for NEPA.

2.15.2 VIA Scoping

Corridor 5 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)
   - **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)
   - **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)
   - **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)
   - **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)
   - 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 5: SD 473: Nevada Gulch Road context-sensitive planning and design documentation. **With a score of 16 points, an Abbreviated VIA would be appropriate for NEPA documentation (see below)**.

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.

☐ ***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.

X ***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

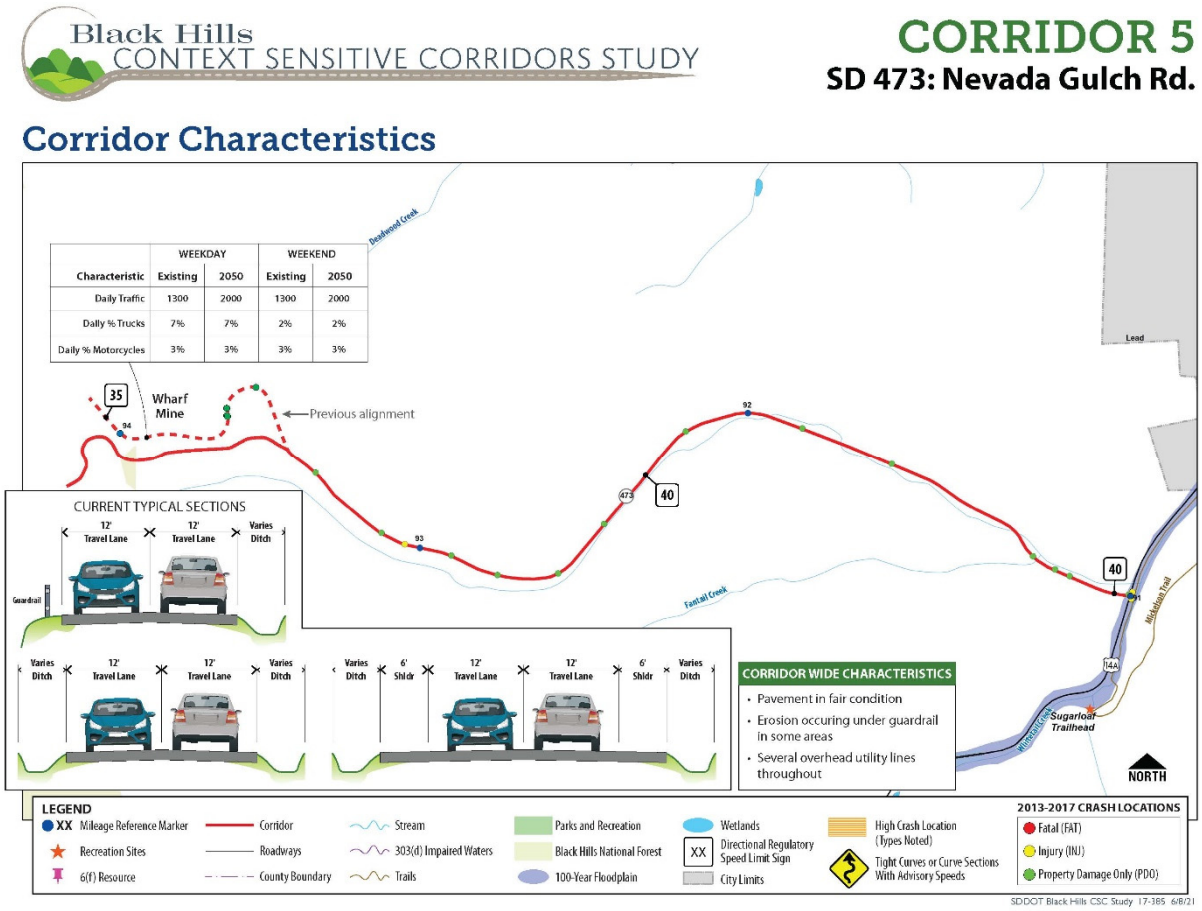
Context and Landscape Character

Nevada Gulch is a narrow tree-lined corridor that parallels a narrow roadside ditch with riparian ditch and stone retaining walls. Recreational access and residential character join to create a unique context. This is a residential corridor and a destination route to Terry Peak Ski Area.

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

- **Current Typical Roadway Section**: Corridor 5, SD 473: Nevada Gulch Road is a 2-lane roadway with inadequate (1 ft) shoulder widths and roadside drainage issues.
- **Roadway Deficiencies:** The 3-mile road with narrow right-of-way is a residential corridor with individual driveway connections. The posted and design speed is 40 mph. This 3-mile-long corridor lacks regional continuity. It is more like a long cul-de-sac / destination corridor to Terry Peak Ski Area. Mining-related truck traffic runs back and forth through the corridor to the mine.

Attachment A. Corridor 5 Corridor Characteristics



Characteristic	WEEKDAY Existing	WEEKDAY 2050	WEEKEND Existing	WEEKEND 2050
Daily Traffic	1300	2000	1300	2000
Daily % Trucks	7%	7%	2%	2%
Daily % Motorcycles	3%	3%	3%	3%

Transportation Improvements and Visual Change (see **Attachment B**)

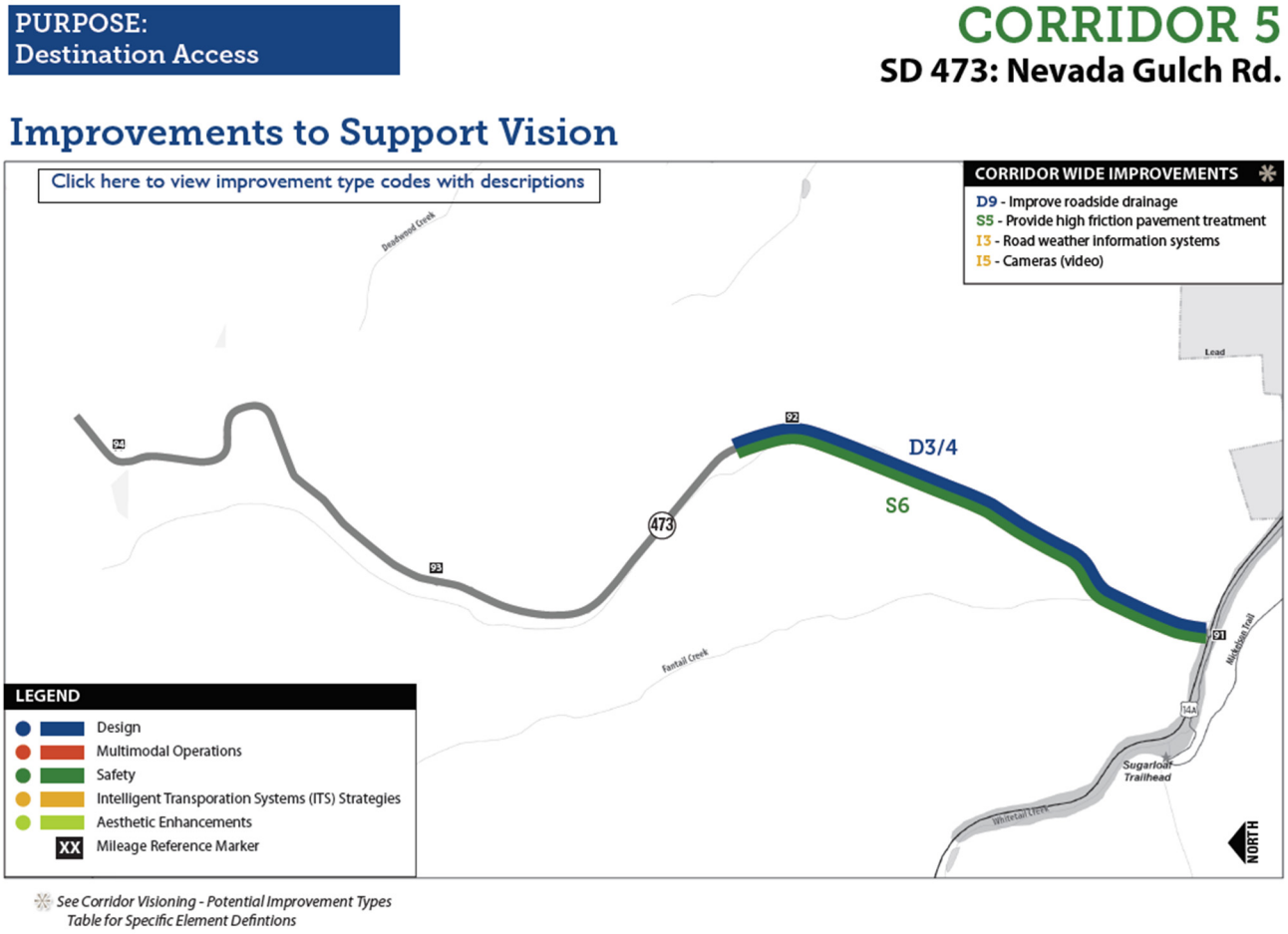
The following transportation improvements could result in moderate levels of visual contrast and noticeable permanent visual change:

- Widen 1-ft shoulders to 6 ft and retain 12-ft lanes, as shown in **Attachment C.**

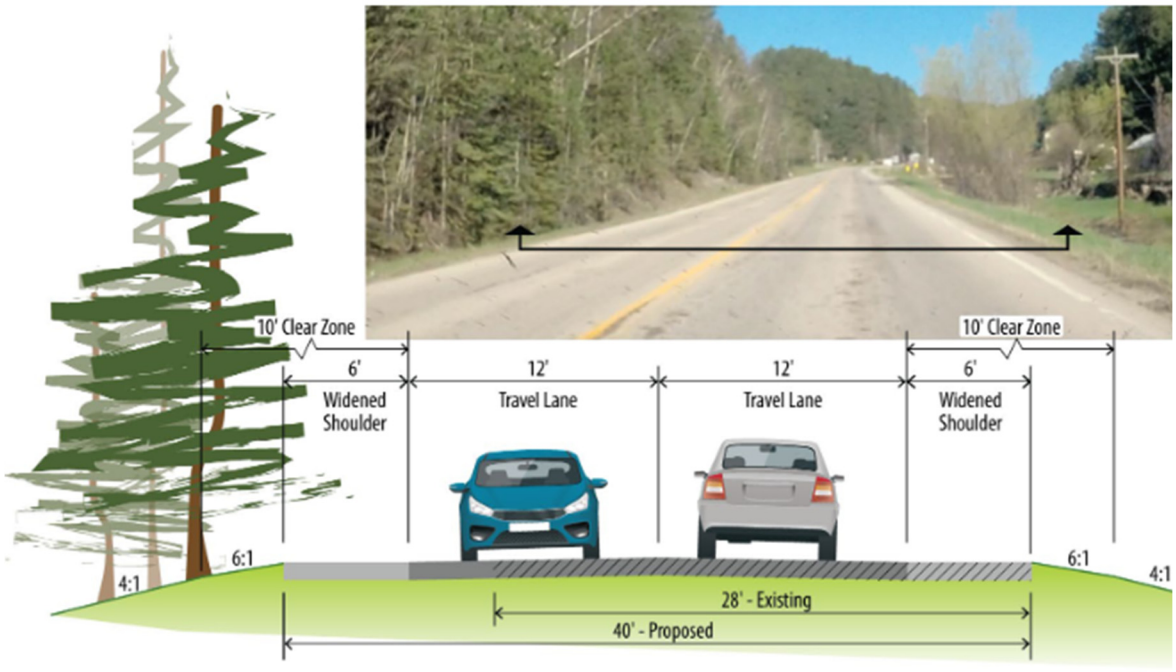
Other planned improvements that are less likely to attract attention and noticeable visual change include:

- Access consolidation

Attachment B. Corridor 5 Improvements to Support Vision



Attachment C. Proposed Typical Cross Section (MRM 91.2)



Question EC-2: Assumptions

Shoulder widening may result in vegetation clearing and cut slopes along the edge of the roadway. The low to moderate levels of visual contrast of the planned improvements are considered highly compatible with the community values.

Question EC-3: Assumptions

The proposed shoulder widening design concepts and retaining walls would minimize impacts and could be designed to blend in with the character of existing walls in the corridor.

Question EC-4: Assumptions

Shoulder widening within the narrow roadway corridor will require creative design solutions.

Question EC-5: Assumptions

The landscape character of the SD 473 corridor is visually diverse, with a range of large-scale visually dominant mining-related landforms.

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.

Question VS-2: Assumptions

The proposed improvements will be within the foreground of residential properties.

Question VS-3: Assumptions

The Lawrence County *2030 Comprehensive Plan* (Lawrence County, 2020) provides a framework to address the balance between growth and preserving local character and community values. The corridor vision for the SD 473 corridor supports these planning goals.

Question VS-4: Assumptions

The proposed improvements are required to meet water quality and drainage standards.

Question VS-5: Assumptions

The proposed improvements are visually compatible with the corridor, and additional visual analysis will not be needed.

APPENDIX C CORRIDOR DESIGN INFORMATION

STATE OF SOUTH DAKOTA
DEPARTMENT OF TRANSPORTATION
PLANS FOR PROPOSED

PROJECT P 0473 (11) 92, PCN 074U
SD 473: NEVADA GULCH ROAD
LAWRENCE COUNTY

TYPICAL SECTIONS, CONCEPTUAL PLAN SHEETS

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	P 0473 (11) 92, PCN 074U	1	12

Plotting Date: 2-2-2022

INDEX OF SHEETS

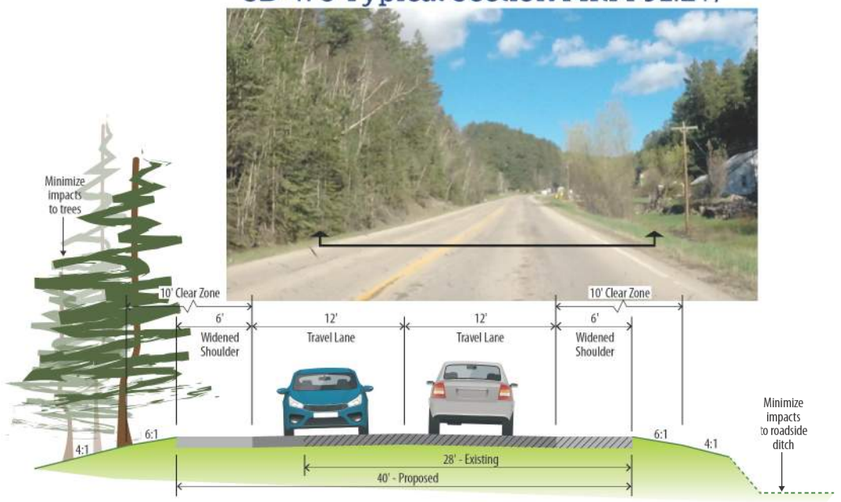
2/2/2022

Black Hills CONTEXT SENSITIVE CORRIDORS STUDY

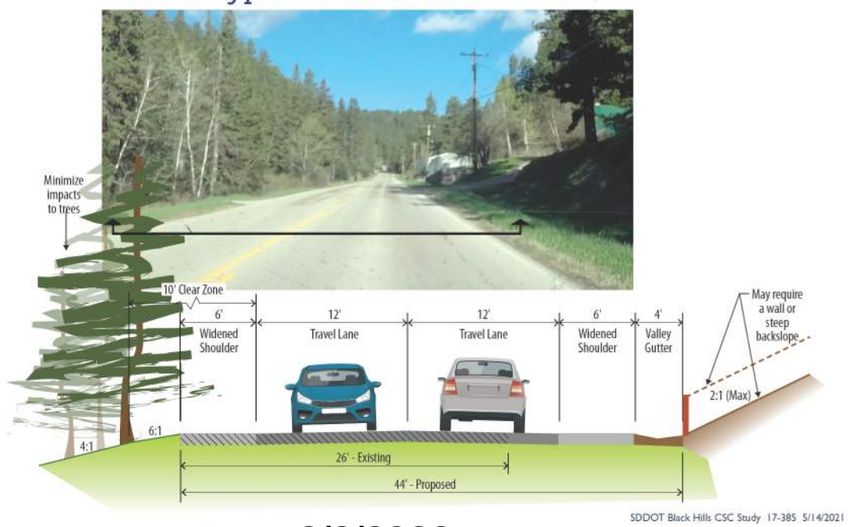
CORRIDOR 5

SD 473 (MRM 91-92+) **Improvement: Widen Shoulders**

SD 473 Typical Section MRM 91.2+/-



SD 473 Typical Section MRM 91.75+/-



SDDOT Black Hills CSC Study 17-385 5/14/2021

Corridor 5 (SD 473: Nevada Gulch Rd.)

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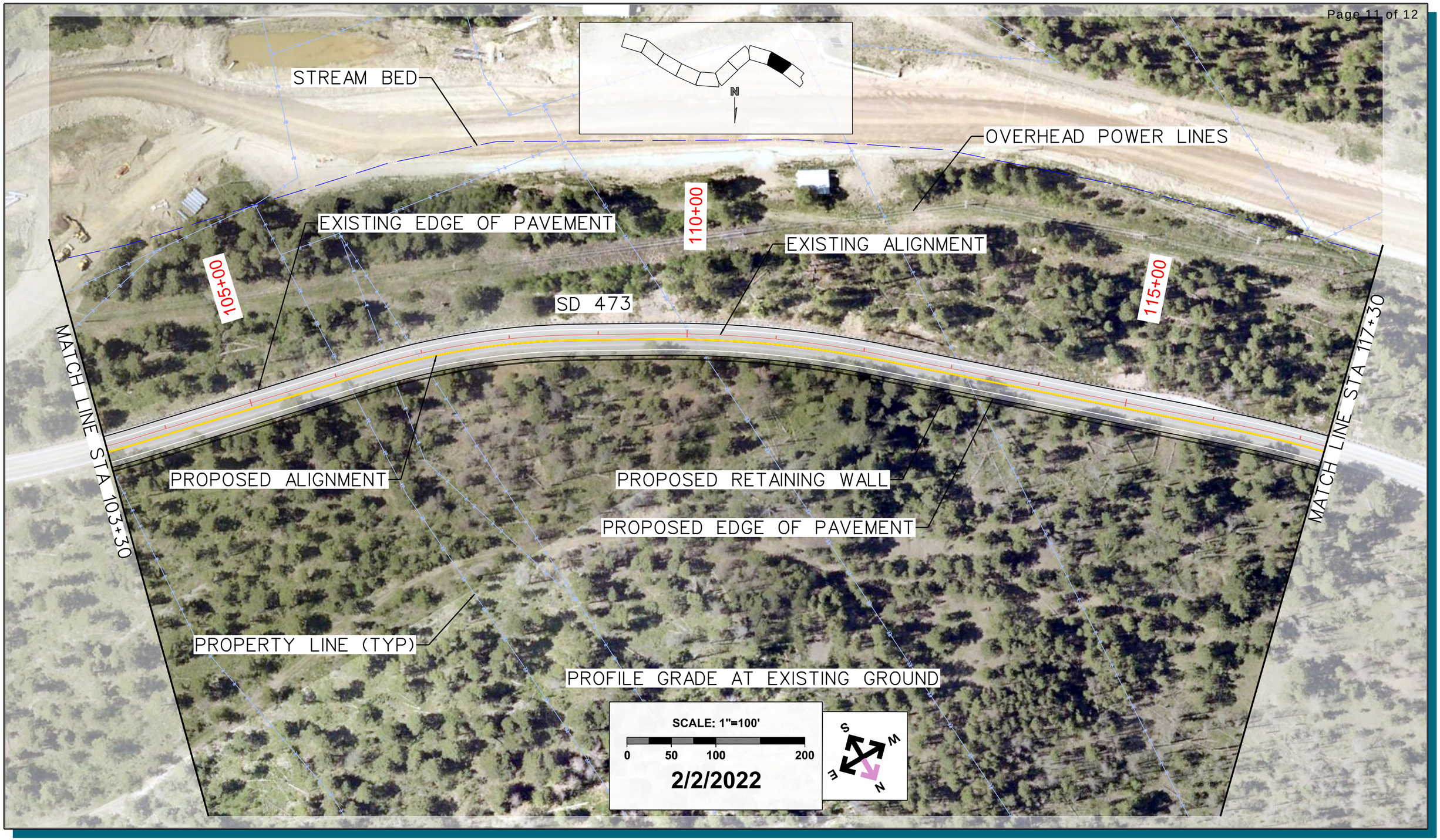
Corridor 5 (SD 473: Nevada Gulch Rd.)

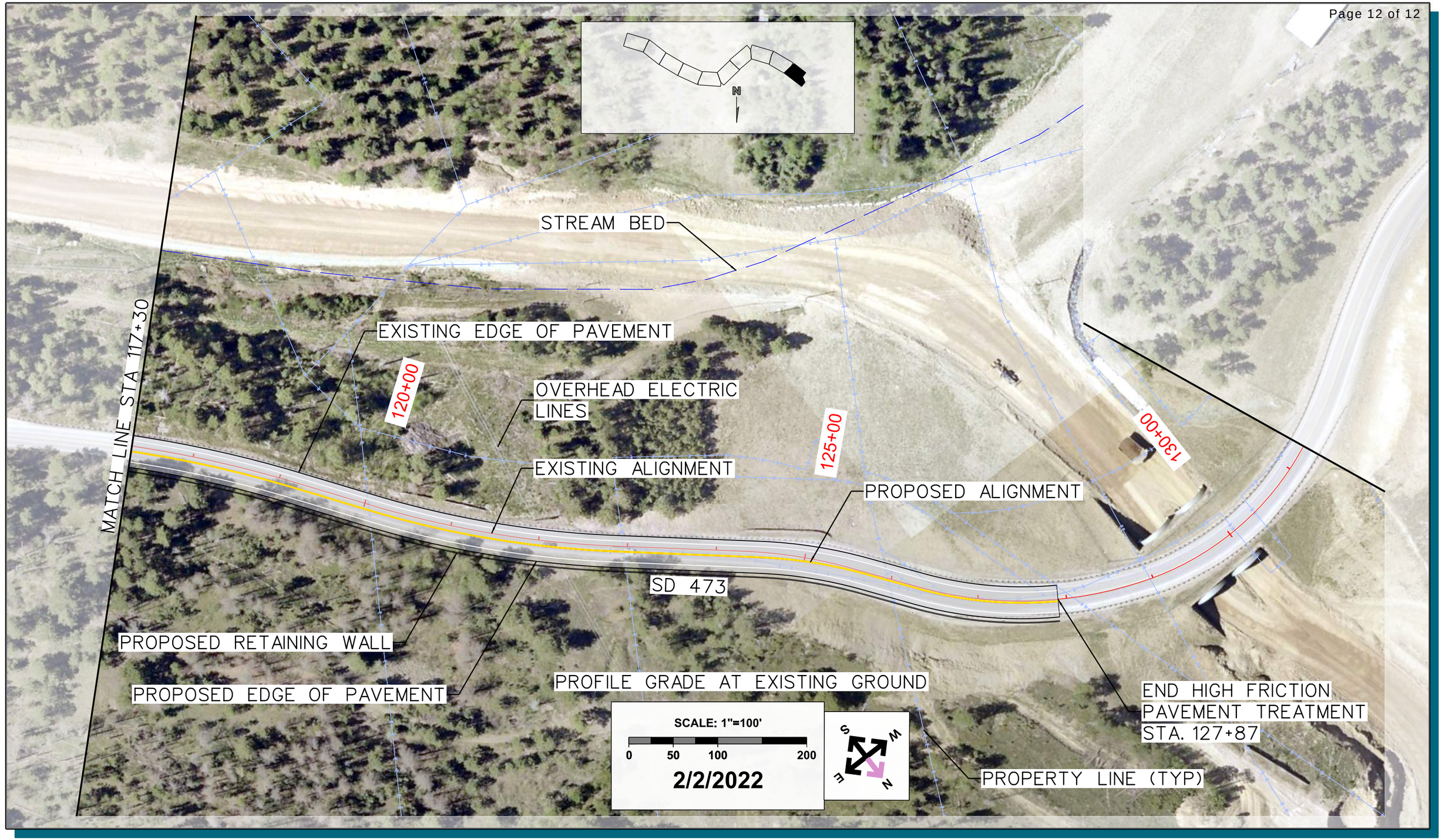
Corridor 5 (SD 473: Nevada Gulch Rd.)

Corridor 5 (SD 473: Nevada Gulch Rd.)

Corridor 5 (SD 473: Nevada Gulch Rd.)


PROPERTY LINE (TYP)
N
OVERHEAD POWER LINES
95+00
EXISTING ALIGNMENT
90+00
SD 473
100+00
FANTAIL CREEK RD
MATCH LINE STA 89+30
MATCH LINE STA 103+30
PROPOSED ALIGNMENT
PROPOSED RETAINING WALL
PROPOSED EDGE OF PAVEMENT
OPTIONAL CHAIN STATION
OVERHEAD POWER LINES
PROFILE GRADE AT EXISTING GROUND
SCALE: 1"=100'
0 50 100 200
2/2/2022
S
W
E
N


STREAM BED
OVERHEAD POWER LINES
EXISTING EDGE OF PAVEMENT
EXISTING ALIGNMENT
105+00
110+00
115+00
SD 473
MATCH LINE STA 103+30
MATCH LINE STA 117+30
PROPOSED ALIGNMENT
PROPOSED RETAINING WALL
PROPOSED EDGE OF PAVEMENT
PROPERTY LINE (TYP)
PROFILE GRADE AT EXISTING GROUND
N
SCALE: 1"=100'
0 50 100 200
2/2/2022
S
W
E
N


N
STREAM BED
EXISTING EDGE OF PAVEMENT
STA 117+30
MATCH LINE STA
120+00
OVERHEAD ELECTRIC LINES
EXISTING ALIGNMENT
125+00
PROPOSED ALIGNMENT
130+00
SD 473
PROPOSED RETAINING WALL
PROPOSED EDGE OF PAVEMENT
PROFILE GRADE AT EXISTING GROUND
END HIGH FRICTION PAVEMENT TREATMENT STA. 127+87
PROPERTY LINE (TYP)
SCALE: 1"=100'
0 50 100 200
2/2/2022
S W E N