New Mexico DEPARTMENT OF TRANSPORTATION
MOBILITY FOR EVERYONE

US 180 PHASE I-A/B ALIGNMENT STUDY

BAYARD TO DEMING ◦ MILE POST 123 TO 161
SEPTEMBER 2021 ◦ CN 1101840

Photo of Chino Mine courtesy of JN Stuart via Flickr.

Parametrix

US 180 Phase 1-A/B Alignment Study, Bayard to Deming, Milepost 123 to 161, CN 1101840

Prepared for
New Mexico Department of Transportation

Concurrence:

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ACRONYMS AND ABBREVIATIONS

	A
AADT	annual average daily traffic
AASHTO	American Association of State Highway and Transportation Officials
	B
BLM	Bureau of Land Management
BOP	beginning of project
	C
CBCs	concrete box culverts
	D
dbA	A-weighted decibels
	E
EOP	end of project
EPA	Environmental Protection Agency
	F
FEMA	Federal Emergency Management Agency
FHWA	Federal Highway Administration
FIS	Flood Insurance Studies
	H
HCM	Highway Capacity Manual
HMVMT	hundred million vehicle miles of travel
	I
I-10	Interstate 10
ISD	intersection sight distance
	L
LOS	level of service
	M
MOT	maintenance of traffic
MP	milepost
mph	miles per hour
	N
NAC	Noise Abatement Criteria
NEPA	National Environmental Policy Act
NMAC	New Mexico Administrative Code
NMDOT	New Mexico Department of Transportation
NMED	New Mexico Environment Department
NMSLO	New Mexico State Land Office
	P
PDO	property damage only
PM_{10}	particulate matter less than 10 microns in particle size
$PM_{2.5}$	particulate matter less than 2.5 microns in particle size
PSD	passing sight distance
PTSF	percent time spent following
	R
R/W	right-of-way
	S
SO_2	sulfur dioxide
SAMM	State Access Management Manual
SUE	subsurface utility engineering
	T
TRB	Transportation Research Board
	U
UNM	University of New Mexico

1. INTRODUCTION AND BACKGROUND

1.1 Introduction and Background

This report summarizes and documents the investigations, analyses, findings, and recommendations for the US 180 Alignment Study from Bayard (milepost [MP] 123) to Deming (MP 161). The project is located in southwest New Mexico in Grant and Luna counties and covers a 38-mile section of US 180 that runs from Bayard to Deming, as shown in Exhibit 1-1.

The lead agency for the US 180 Alignment Study is the New Mexico Department of Transportation (NMDOT). In addition, the study is being coordinated with other federal, state, and local agencies with jurisdiction and/or responsibility for lands and resources within the study area. Key agencies invited to participate in the study process include the Federal Highway Administration (FHWA), New Mexico State Land Office (NMSLO), Bureau of Land Management (BLM), Grant and Luna Counties, and the towns of Silver City, Bayard, Hurley, and Deming.

The purpose of this project is to improve highway safety, traffic operations, and the condition of the roadway and associated infrastructure. Improvements are also needed to support economic development. The primary purpose of this Alignment Study is to document the process used to identify the preferred alternative for US 180. The alignment study process serves to: (1) identify and evaluate the specific problems and conditions within the study area that may require improvements to the existing highway; (2) identify and evaluate improvement options; and (3) identify the preferred alternative. This alignment study was prepared consistent with the NMDOT *Location Study Procedures* — the NMDOT's process for project development from the planning phase through environmental documentation and preliminary design. The Location Study Procedures process is consistent with the National Environmental Policy Act (NEPA) of 1966 (as amended), FHWA's Environmental Impact and Related Procedures (23 CFR 771), and federal statewide planning regulations (23 CFR 450, Subpart B).

This report also documents the activities used to inform and involve the public in decisions. US 180 is a major highway used by the general public as well as the many businesses and major industries active within southwest New Mexico. The activities and efforts used to involve and engage the public and agencies in the US 180 Alignment Study are discussed in Chapter 2 of this report.

1.2 Project Setting

US 180 is a principal arterial and an essential link in the state and local transportation system of southwestern New Mexico. Within the project limits, US 180 consists of a 2-lane roadway with a posted speed of 55 miles per hour (mph) north of Hurley and 65 mph south of Hurley. The typical roadway section transitions from 2 lanes to 4 lanes at the beginning and end of the project limits. Average daily traffic volumes are less than 7,000 between Bayard and Hurley. South of Hurley, average daily traffic is less than 3,000. While traffic volumes are relatively low, heavy truck volumes comprise about 17 percent or more of traffic, since the route is used for the transport of commercial goods to Silver City and by the large mines in the area. It is one of only two state highways that connect the area to Interstate 10 (I-10) in Deming and Lordsburg and is essential for access and the economy of the communities along its path.

US 180 in Bayard

Communities located within the project limits include the towns of Bayard and Hurley:

- Bayard – The project begins in this community with a population of about 2,100 people. US 180 functions as Bayard's main street and consists of a 5-lane section through most of the town. The highway transitions to a 2-lane highway at Bayard's southern limits. The beginning of project (BOP) starts where US 180 transitions to a 2-lane highway near MP 123.
- Hurley – This town has a population of about 1,200 people. The developed areas in this community are located east of US 180, as the highway generally skirts the west edge of Hurley. The connection between the highway and community is limited to two streets. In addition, there is an overpass located in Hurley. Historically, this overpass was used to facilitate truck traffic across the highway when a large copper smelter was in operation east of Hurley. By 2007, the smelter ceased operations and the use of the overpass has since diminished.

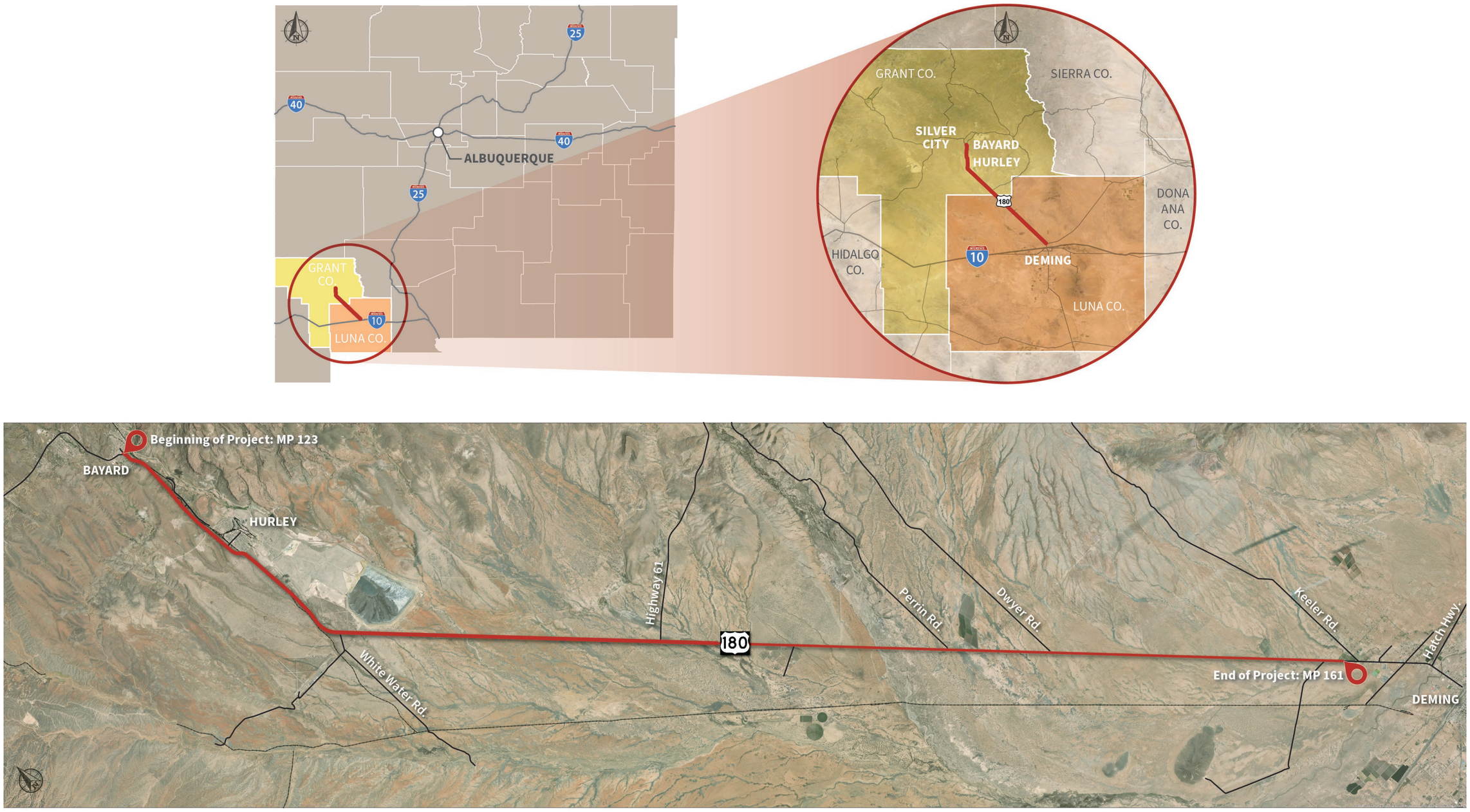
Hurley Overpass

Beyond the north and south limits of the project, US 180 also serves the communities of Silver City and Deming:

- Silver City is located about 15 miles from Bayard where the project limits begin. About 9,800 people live in Silver City.
- Deming has a population of about 14,000 and is located near the project's end of project (EOP).

Outside of the community developments described above, US 180 traverses undeveloped range lands. Near Bayard, the project is in the foothills of nearby mountains and the surrounding terrain is generally rolling piñon-juniper grasslands with deep drainages. Immediately south of Hurley, the terrain consists of grasslands with scattered shrubs and cacti. North of Deming near MP 161, terrain is primarily a mix of heavy mesquite shrublands and grasslands. Ownership across the project corridor is a mixture of lands managed by the NMSLO and BLM, privately held parcels, and large ranches. Much of the private property is owned by Chino Mines and is leased for grazing.

Exhibit 1-1. US 180 Alignment Study Location Map



The study area is in a region with extensive history starting as early as 10,000 B.C. when Paleoindian hunters and gatherers roamed the landscape and extending to more recent times associated with mining activities. An early historic overland stagecoach and mail route, the Butterfield Trail, extended through the area in the mid-1800s, linking midwestern cities such as St. Louis, to the Southwest, and eventually to California. Remnants of this route are still visible, and a historic marker exists where the highway crosses the trail. By the early 1900s, mining and ranching were the primary economic activities in the region and were linked to other population and economic centers through several railroad networks. Fort Bayard was established in the late 1800s to provide protection to the incoming settlers and miners within the area.

The economy of the Silver City area and, more specifically, the communities of Bayard and Hurley, is heavily dependent on mining operations. Chino Mines is one of the oldest open-pit copper mines in the world and until recently, employed about 1,000 people. The mine has undergone several openings and closings over the last 15 years. These changes heavily influence traffic volumes and truck use of US 180, as is evidenced in historic traffic counts. Tourism is also an important aspect of the economy in the Silver City region. US 180 provides access to the Gila National Forest in New Mexico and Apache-Sitgreaves National Forest in southeast Arizona.

1.3 Report Organization

The information in this report summarizes the key elements of the data, analysis, and decision process used to identify and evaluate potential alternatives to improve US 180 and to select a preferred alternative. The report is organized as follows:

- Chapter 2 discusses the activities used to inform and involve the public and key stakeholders. This chapter also provides a summary of comments received, as well as how stakeholder and public input has shaped the alternatives.
- Chapter 3 summarizes the existing conditions within the corridor including:
  - The engineering features and physical conditions of the existing highway including the roadway typical section, horizontal and vertical alignment data, bridges and major structures, drainage, utilities and other pertinent data, and conditions
  - Traffic and crash data
  - Land ownership and the communities, businesses, and industry found within the project limits
  - Environmental and cultural resources within the study area
- Chapter 4 describes the purpose of the project and explains why it is needed. It also identifies proposed alternatives and explains the process used to screen the alternatives.
- Chapter 5 provides a detailed analysis of the alternatives that advanced through the initial screening described in Chapter 4.
- Chapter 6 identifies a preferred alternative and describes next steps for the project.

2. STAKEHOLDER COORDINATION AND PUBLIC INVOLVEMENT

2.1 Introduction

As part of this Alignment Study, NMDOT has provided opportunities for the public and key stakeholders to provide input on issues of concern, the project purpose and need, alternatives to consider, and the preferred alternative. The public involvement approach was focused on providing opportunities for people to express local values on US 180 driving and safety concerns and design considerations. Public involvement activities conducted as part of this Alignment Study are summarized below and are discussed in greater detail in this chapter. It is important to note that this Alignment Study was conducted during the COVID-19 pandemic while social distancing requirements mandated by the New Mexico Health Department were in effect. This condition required a different and innovative approach to public involvement. Based on the amount of community participation that occurred, the outreach and involvement methods were effective in obtaining public comment and engagement.

- **Initial Project Notice and Public Survey** – An initial public notice and invitation to participate in a US 180 public survey was sent to area residents and key stakeholders and was advertised in local newspapers and social media in December 2020. NMDOT received over 800 responses to the survey.
- **Online Public Meeting and Informational Website** – A virtual public meeting was held on March 4, 2021, to discuss the alternatives development and screening process, the project's purpose and need, and request input on the preferred alternative and other roadway design considerations. In addition, an informational website was developed to provide information to the public and obtain input on the alternatives and key roadway design elements.

2.2 Project Stakeholders

A project stakeholder list was developed to identify and engage community members, elected officials, agencies and local governments, and area businesses in the Alignment Study. This stakeholder list was developed by evaluating County assessor parcel data to develop a mailing list that included residents and businesses located within the project limits. Other stakeholders were found by identifying community governments and agencies having jurisdiction within the project limits. An initial mailing list was created that included about 250 postal addresses and 40 email addresses as summarized below:

- Property owners and residents located within the project limits including those in the communities of Silver City, Bayard, Hurley, and Deming.
- Elected officials and agencies in Luna County, Grant County, Silver City, Bayard, Hurley, and Deming.
- Elected area representatives to the New Mexico State legislature.
- Institutions and industries in the study area who rely on US 180 for access, transport of materials and goods, or other critical operations include Chino Mines, Bayard Schools, Deming Schools, NMSLO, BLM, the airport, and transfer station.

The notice that was sent to elected officials included a request to pass the information along to their constituents and others having a potential interest in the project.

2.3 Initial Project Notice and Public Survey

An initial public notice and invitation to participate in a US 180 public survey was sent to area residents and key stakeholders and was advertised in local newspapers and social media in December 2020. The notice informed people that the Alignment Study was underway, explained what was to be studied and why improvements to US 180 are being considered, identified next steps, and invited people to complete a public survey to solicit input on important US 180 roadway considerations and concerns.

The public notice and survey invitation were distributed and advertised as follows:

- A flyer and email were sent to approximately 290 people during the week of December 7, 2020.
- The *Grant County Beat* published the notice and survey notification on December 10, 2020. A reminder for people to complete the survey was published on December 29, 2020.
- NMDOT published the notice on their website on December 14, 2020, and Facebook page on December 17, 2020.
- Newspaper advertisements were published in the *Silver City Daily Press* on December 15, 2020, and the *Deming Headlight* on December 16, 2020.

The public survey was live from December 9, 2020, through January 10, 2021. A total of 838 responses were received. A summary of the survey questions and responses is provided below.

2.3.1 Summary of Public Survey Results

The survey contained ten questions with mix of multiple-choice responses and fill-in-the-blank responses. A summary of the questions and the responses received are provided below.

Question 1 – Where do you live?

- Silver City = 57%
- Other = 13%
  - Common responses included: Arenas Valley, Pinos Altos, Mimbres, Cliff, and Tyrone, among others.
- Deming = 11%
- Bayard = 7%
- Santa Clara = 5%
- Hurley = 4%
- I do not live in the area = 3%

Question 2 – Where does your trip begin and end?

Most respondents indicated are either travelling to or from Deming/Silver City, with the trip from Silver City to Deming being the most common trip. Las Cruces and Bayard were other common responses for trip destinations.

Question 3 – How often do you make this trip?

- Daily = 11%
- Weekly = 31%
- Other = 58%
- "Other" responses frequently indicated that they traveled the project area monthly, twice a month, or twice a week. Another portion of responses claimed to travel the route approximately every 2 to 3 months.

Question 4 – What highway concerns do you typically encounter?

- Poor road or pavement conditions = 62%
- Inadequate shoulder areas to pull off the highway = 53%
- Lack of left turn lanes at intersecting roads = 48%
- Other = 47% these responses primarily identified:
  - A lack of safe passing lanes as a major concern
  - There is no turning lane onto NM 61
  - Poor visibility and debris on roadway
  - Wildlife and lack of wildlife crossings
- Lack of deceleration lanes at intersecting roads = 43%
- Lack of acceleration lanes when turning onto the highway = 41%
- The reduced speeds through the curves at the railroad crossing just south of Hurley = 29%

Question 5 – What safety issues or concerns do you typically encounter?

- Drivers attempting to make unsafe passing moves = 87%
- Slow moving vehicles resulting in multiple vehicles lined up behind them, making passing difficult = 80%
- Lack of safe passing areas = 77%
- Conflicts with large commercial trucks = 60%
- Inability to see oncoming traffic because of hills or curves = 49%
- Flooding on the highway after major rainstorms = 21%
- Other = 17%, these responses varied greatly with some common responses including:
  - Unsafe passing conditions
  - Poor surface quality
  - Unsafe biking conditions
  - Dust issues
- Conflicts with animals (deer and cattle) on the highway = 14%

Question 6 – What type of improvements would you like NMDOT to consider?

- A majority of responses requested additional passing lanes, extra lanes, or turn lanes. Several responders also indicated support for wider shoulders.
- Visibility issues and dust problems were mentioned
- Improved pavement surface

Question 7 – Are there special needs or considerations through the Hurley area?

- Improving the highway where it crosses the railroad tracks = 72%
- Roadside features to let drivers know they are entering Hurley = 37%
- Other = 24%, these responses frequently indicated:
  - The curve at the railroad crossing is sharp and unexpected.
  - Issues with traffic exiting and entering at the Hurley intersection.
  - Conflicting comments related to speed - some responders indicated that speeds should be slower through Hurley with others asking for higher speeds.
- Ways to slow traffic through the Hurley area should be considered in the highway improvements = 22%
- Traffic speeds are too high = 7%

Question 8 – Does the bridge in Hurley have any special significance?

- No, I am not aware of any special significance or importance = 76%
- Yes, it is significant/important = 24% (169 responses) indicated it was significant for the following reasons:
  - 56 of the responses identified the bridge as a landmark for welcoming sports teams and soldiers, a mark for giving directions, or a piece of history.
  - 65 of the responses identified the bridge as a heavy truck relief route and mining traffic access point.
  - 48 of the responses identified the bridge as an additional access point in Hurley, claiming landfill access as a major use of the bridge.
  - The remaining responses did not provide a clear reason for the importance of the bridge.

Question 9 – Do you have any other comments on US 180?

- A majority of the responders requested a 4-lane roadway, wider shoulders, or additional passing lanes.
- A few responders suggested that the roadway be repaired or repaved; debris causes cracked windshields.
- Other responses included:
  - Additional speed limit signs or other signage.
  - Reduce dust and improve visibility.
  - Add bike lanes.
  - Develop wildlife bridges.
- About 2% of responders indicated that improvements are not needed, or any improvements should be minor.

Question 10 – Would you like to be added to our mailing list?

- Approximately 325 participants asked to be added to the project mailing list.

2.3.2 Additional Public Comments Received During the Survey Period

In addition to the survey responses discussed above, NMDOT received three comments during the survey period. Those comments included:

- A comment from a Silver City resident stating that they hope that no new lighting would be installed along US 180 for the sake of star gazers and the existing dark skies in southern New Mexico.
- A letter from a local citizen indicating that the individual is opposed to any improvements on US 180, particularly expanding the roadway to 4 lanes. From the commenters view, this section of US 180 has light traffic, appropriate speeds, a limited number of intersecting roads, and few curves. This individual felt that funds could be better spent on improvements to other highways.
- An email from a local citizen and member of the Grant County Bicycle Advocacy Group suggesting various roadway design considerations for bicycle safety.

2.4 Public Meeting and Website

Once project alternatives were developed and screened, additional public outreach was conducted to describe key issues and concerns identified in the corridor; describe how alternatives were developed and screened; and obtain feedback on the proposed alternatives to inform the development of a preferred alternative. Due to public health considerations for COVID-19, an in-person public meeting was replaced with other opportunities for people to obtain information about the project, ask questions, and provide feedback. Those opportunities included attending an online public meeting, obtaining project information from a project website, submitting questions or comments, and obtaining hard copy information via U.S. postal mail. These opportunities for public engagement were announced using the following methods:

- NMDOT published a notice on their website on February 16, 2021.
- A meeting announcement was sent via US postal mail to 533 people on Friday, February 19, 2021 and an email was sent to 353 people on Monday, February 22, 2021.
- The *Grant County Beat* published the notice on February 22 and February 25, 2021.
- The *Silver City Daily Press* published an article about the US 180 survey and results on February 22, 2021. The notice was published on February 23, 2021, and an article was published on March 6, 2021 discussing NMDOT's recommended alternative that was presented at the March 4, 2021 public meeting.
- The *Deming Headlight* published the notice on February 24, 2021.

2.4.1 Online Public Meeting

An online public meeting was held on March 4, 2021 and began at 6:00 p.m. Thirty-four people attended the online meeting. Twelve NMDOT staff and consultant staff participated as presenters and/or panelists. Six of the 34 citizens called in via telephone and the remaining 28 participants attended online.

The purpose of the meeting was to discuss existing conditions on US 180, proposed alternatives, and key findings from this US 180 Phase 1-A/B Alignment Study. A presentation was made during the first 35 minutes of the meeting that explained the purpose of the US 180 alignment study, existing conditions, results of the public survey, alternatives considered, and NMDOT's initial recommendation. After the presentation, the NMDOT and consultant team answered questions from the public. The public presentation and question and answer session lasted about an hour and fifteen minutes. Appendix A, Public Meeting provides the public meeting notes and a copy of the presentation.

2.4.2 Project Website

The project website was launched for the public on February 24, 2021 that contained information in both English and Spanish. The project website contained the following information:

- Information provided in the online public meeting presentation that described existing conditions, proposed alternatives, and key findings of this US 180 Phase 1-A/B Alignment Study.
- A weblink to the online public meeting was provided up to March 4, 2021. After the online public meeting on March 4, 2021, a link to the video of the public meeting was provided.
- A link to a public comment form. The comment period was from February 24, 2021 through March 22, 2021.
- Contact information for questions or to request accommodations under the Americans with Disabilities Act, translation services, and/or printed copies of informational project materials.

2.4.3 Questions and Comments Received on the Alternatives Considered

NMDOT received 112 comments on the proposed project through the comment period. The comments are summarized below. Of the 112 comments received, some people chose to provide comments using more than one of the options available. For example, some people chose to provide comments at the public meeting and through email.

- 10 people asked questions and made comments at the March 4, 2021 online public meeting.
- 15 people provided written comments via email.
- 87 people provided comments using the comment form provided on the website.

Section 5.9 Public and Stakeholder Perspectives, provides a summary of the comments received, responses to the comments, and a discussion of how public input received as part of the public comment period was used to shape the recommended preferred alternative and issues that will be considered during the design phase.

3. EXISTING CONDITIONS

3.1 Introduction

This chapter describes and documents existing conditions within the project limits. The discussion includes the existing conditions for engineering (roadway, bridges and structures, drainage, and utilities); traffic and safety; property ownership and land use; and the environment.

3.2 Roadway Conditions

3.2.1 Functional Class

The functional classification of a roadway affects the applicable design standards such as speed and the horizontal and vertical alignment. Factors that affect the determination of functional classification include mileage, traffic volume, speed, capacity, and existing and future land uses (NMDOT 2014). US 180 is defined as a principal arterial by NMDOT using criteria developed by the FHWA (NMDOT 2014). Principal arterials provide a high degree of mobility for long distance, high speed trips. Principal arterials are either defined as urban or rural. Within the project limits, the section through Bayard was evaluated as an urban principal arterial and the section south of Bayard to the EOP at MP 161 was evaluated as a rural principal arterial.

US 180 is included as a "Tier 1 Rural" bicycle facility in the *New Mexico Prioritized Statewide Bicycle Plan* (NMDOT 2018a). Tier 1 routes are a high priority for bikeways that provide intra-community and statewide connections between New Mexico's communities for cross-state travel.

3.2.2 Posted Speeds

Posted speeds in the US 180 corridor range from 35 mph to 65 mph through the corridor. Exhibit 3-1 summarizes posted speed limits by MP and direction. Existing speed limit zones are shown in Exhibit 3-4 to Exhibit 3-7 (pages 3-3 to 3-6), Existing Conditions Corridor Maps.

Exhibit 3-1. Posted Speeds

MP	Southbound	Northbound
123.26	45	35
123.44	55	45
127.7	40 Advisory	40 Advisory
128.08	65	55
160.7	55	65
162.3	45	55

3.2.3 Typical Sections

In general, US 180 is a 2-lane rural highway consisting of two 12-foot lanes with shoulders that vary from 8 to 10 feet as described in Exhibit 3-3. There are exceptions to this typical section at the BOP, the EOP, and major access points along the corridor. Near the BOP, there is a 4-mile section with 12-foot shoulders.

Through Bayard, the typical section is a 4-lane urban arterial comprised of 12-foot lanes, a 16-foot raised median, 4-foot shoulders, curb and gutter, and 5-foot sidewalks.

US 180 includes auxiliary lanes at the following major access points through Hurley:

- North Hurley Road (MP 125.3)
- Pit Access Road (MP 126)
- Carrasco Avenue (MP 127.1)

Further south, the roadway also includes auxiliary lanes at the intersections of NM 61 (MP 141) and Wells Fargo Drive (rest stop) at MP 144.6.

Nearing the EOP, US 180 widens to a 4-lane typical section with an 8-foot flush median at MP 161. An existing cross-section for US 180 in its typical 2-lane configuration is shown in Exhibit 3-2 and typical sections are inventoried in Exhibit 3-3.

Exhibit 3-2. Existing Typical Section

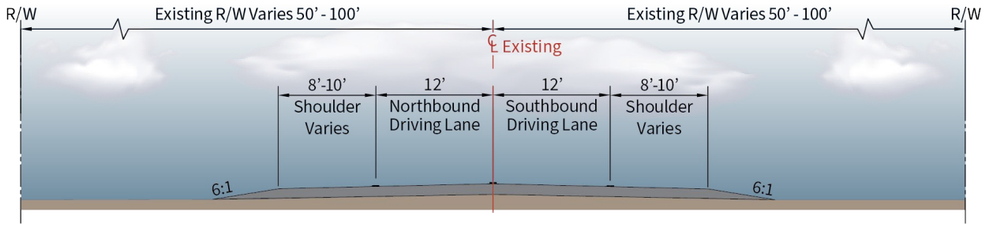


Exhibit 3-3. Inventory of Typical Roadway Sections

MP	Lane Width	Shoulder Width	Description
123.0 to 123.8	12	4.5	4, 12-foot wide lanes with 4.5-foot wide shoulders; curb and gutter; and a 5-foot wide sidewalk
123.8 to 123.7	Varies	Varies	Transition from 4, 12-foot wide lanes to 2, 12-foot wide lanes; Transition from 4.5-foot wide shoulders to 12-foot wide shoulders
123.7 to 125.1	12	12	2, 12-foot wide lanes and 12-foot wide shoulders
125.1 to 125.3	12	12	2, 12-foot wide lanes and 12-foot wide shoulders with 1, 12-foot wide auxiliary lane for NB traffic and 1, 12-foot wide left turn lane for SB traffic onto N. Hurley Road
125.3 to 125.5	12	12	2, 12-foot wide lanes and 12-foot wide shoulders with 1, 12-foot wide auxiliary lane for SB traffic and 1, 12-foot wide right turn lane for NB traffic onto N. Hurley Road
125.5 to 126.0	12	12	2, 12-foot wide lanes and 12-foot wide shoulders with 1, 12-foot wide auxiliary lane for NB traffic and 1, 12-foot wide left turn lane for SB traffic onto Landfill Road
126.0 to 126.1	12	12	2, 12-foot wide lanes and 12-foot-wide shoulders with 1, 12-foot wide auxiliary lane for SB traffic and 1, 12-foot wide right turn lane for NB traffic onto Landfill Road
126.1 to 126.9	12	12	2, 12-foot wide lanes and 12-foot wide shoulders
126.9 to 127.1	12	12	2, 12-foot wide lanes and 12-foot wide shoulders with 1, 12-foot wide auxiliary lane for NB traffic and 1, 12-foot wide left turn lane for SB traffic onto Carrasco Avenue
127.1 to 127.2	12	12	2, 12-foot wide lanes and 12-foot wide shoulders with 1, 12-foot wide auxiliary lane for SB traffic and 1, 12-foot wide right turn lane for NB traffic onto Carrasco Avenue
127.2 to 128.0	12	12	2, 12-foot wide lanes and shoulders
128.0 to 131.0	12	9	2, 12-foot wide lanes and 9-foot wide shoulders
131.0 to 133.0	12	10	2, 12-foot wide lanes and 10-foot wide shoulders
133.0 to 144.5	12	9	2, 12-foot wide lanes and 9-foot wide shoulders
144.5 to 144.7	12	9	2, 12-foot wide lanes and 9-foot wide shoulders with 1, 12-foot wide passing lane for NB traffic and 1, 12-foot wide additional lane for SB traffic for a rest area turnout
144.7 to 146.1	12	8	2, 12-foot wide lanes and 8-foot wide shoulders
146.1 to 150.0	12	9	2, 12-foot wide lanes and 9-foot wide shoulders
150.0 to 159.0	12	10	2, 12-foot wide lanes and 10-foot wide shoulders
159.0 to 160.8	12	9	2, 12-foot wide lanes and 9-foot wide shoulders
160.8 to 160.9	Varies	Varies	Transition from 2, 12-foot wide lanes to 4, 12-foot wide lanes; Transition from 9-foot wide shoulders to 7.5-foot wide shoulders
160.9 to 161.0	12	7.5	4, 12-foot wide lanes and 7.5-foot wide shoulders

NB = Northbound; SB = Southbound

Exhibit 3-4. Existing Conditions Corridor Map 1

Segment Description	Average Weekday Daily Traffic	Percent of Heavy Commercial Trucks
123 - 125.1	6413	5%
125.1 - 126.1	6179	4%
126.1 - 126.7	4565	14%
126.7 - 127.8	4997	17%
127.8 - 141.1	1918	14%

Exhibit 3-5. Existing Conditions Corridor Map 2

Exhibit 3-6. Existing Conditions Corridor Map 3

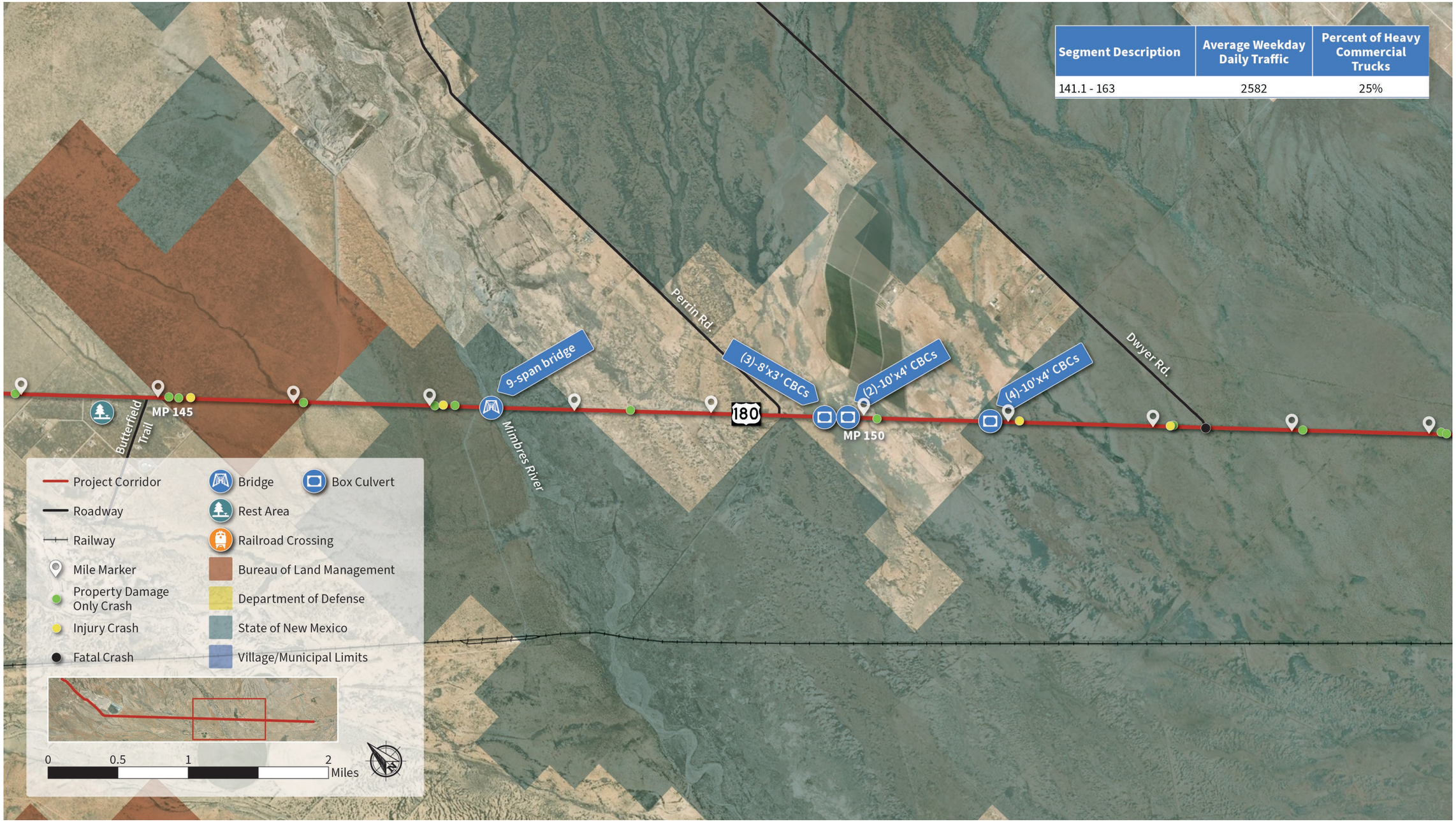
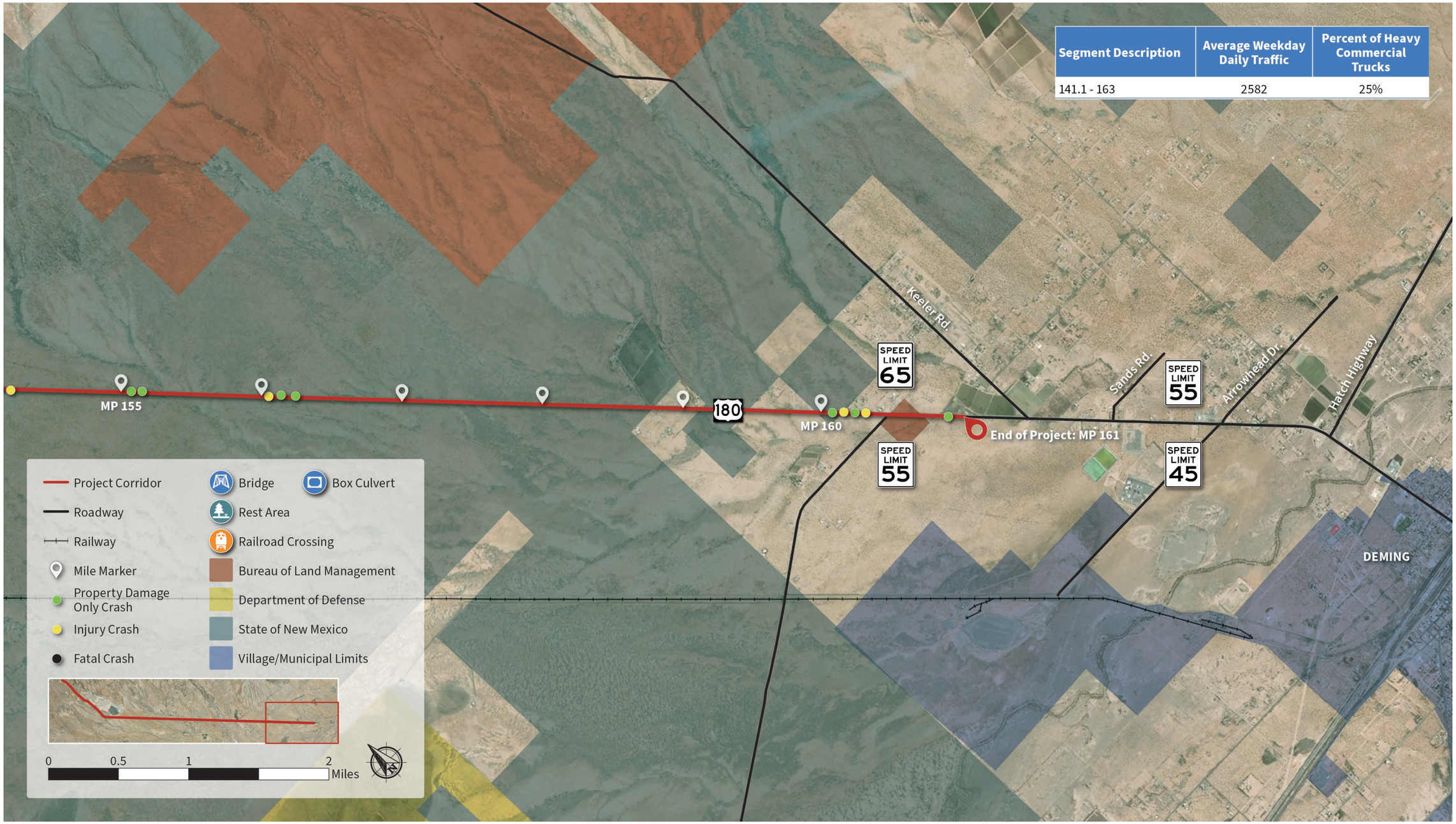


Exhibit 3-7. Existing Conditions Corridor Map 4



3.2.4 Horizontal and Vertical Alignment

The horizontal alignment was determined by recreating US 180's centerline in AutoCAD based on existing right-of-way maps and field evidence (monuments and photogrammetry). The survey data was used to approximate the existing superelevation of the horizontal curves. These data (curve radii and approximate superelevation rates) were used to assess the horizontal alignment and identify any deficiencies corresponding to the presumed design speeds (5 miles per hour over the posted speeds). Superelevation is the banking of a roadway along a horizontal curve, so drivers can comfortably and safely maneuver the curve at reasonable speeds. This analysis was based on a maximum superelevation rate of six percent (AASHTO 2018, Table 3-9) for all curves except the horizontal curves through Bayard, which were assessed using the American Association of State Highway and Transportation Officials (AASHTO) Table 3-13, Minimum Radii and Superelevation for Low-Speed Streets in Urban Areas (AASHTO 2018).

There are twelve horizontal curves in the project limits. The analysis indicates six curves are deficient, based on their radii and approximated superelevation rates. Of the six deficient curves, two were found to be marginally deficient (meaning the design speed is within 5 mph or less of the posted speed); four had curves with geometry that corresponded to a difference of more than 5 mph between the posted speed and the design speed. Most notably, the horizontal curve at the railroad crossing (MP 127.5) was found to be deficient due to the superelevation, which is limited by the grade of the railroad tracks. Exhibit 3-8 lists deficient horizontal curves along the roadway.

Exhibit 3-8. Summary of Horizontal Curves and Deficiencies

MP	Radius (feet)	Length (feet)	Direction	Existing Posted Speed	Presumed Design Speed	Existing Superelevation[a]	Min Radius for Actual E (feet)
123.39	2,864.8	1431.8	R	55 mph	60 mph	4.5%	2,920
127.19	1,909.9	1547.8	L	55 mph	60 mph	5%	2,330
127.49	1,145.9	897.3	R	[b]55 mph	60 mph	2%	4,680
127.98	5,729.6	249.8	R	65 mph	70 mph	2.5%	8,380
129.38	5,729.6	479.8	R	65 mph	70 mph	Normal Crown	14,100
130.13	5,729.6	739.7	R	65 mph	70 mph	1%	10,300

Min = minimum; e= rate of superelevation; mph = miles per hour

a Approximate superelevation obtained from the surface

b Advisory speed is 40 mph

The existing vertical alignment of US 180 was approximated in AutoCAD based on survey data. As with the horizontal alignment, it was analyzed for deficiencies based on presumed design speeds corresponding to posted speeds. Vertical curves were not approximated where the algebraic difference in grade was less than 0.5 percent; this value is used in common practice as the maximum allowable difference not requiring a vertical curve.

There are 62 vertical curves along the alignment: 32 crest curves and 30 sag curves. The analysis considered both stopping and passing sight distances. There were nine curves found to be marginally deficient (meaning the design speed is within 5 mph or less of the posted speed) for stopping sight distance: four crest curves and five sag curves as shown in Exhibit 3-9.

Exhibit 3-9. Summary of Vertical Curve Deficiencies

MP	Type	Curve Length (feet)	K	Existing Posted Speed	Presumed Design Speed	Min Kcrest SSD	Min Ksag
124.90	Sag	600	124.4	55 mph	60 mph	151	136
131.11	Crest	300	167.4	65 mph	70 mph	247	181
131.39	Sag	400	174.1	65 mph	70 mph	247	181
143.23	Sag	200	153.4	65 mph	70 mph	247	181
157.00	Crest	400	211.1	65 mph	70 mph	247	181
159.52	Sag	200	180.2	65 mph	70 mph	247	181
159.65	Crest	200	182.4	65 mph	70 mph	247	181
160.16	Crest	250	235.4	65 mph	70 mph	247	181
160.42	Sag	200	169.0	65 mph	70 mph	247	181

Min = minimum; SSD=stopping sight distance; mph = miles per hour

3.2.5 Passing Zones

US 180 does not have any designated passing lanes in the project limits. As shown in Exhibit 3-10, there are 12 passing zones along the corridor. These were compared to the vertical alignment, and it was found that 5 passing zones do not provide adequate passing sight distance (PSD) because they overlap with crest vertical curves that do not meet the minimum K value for this criterion. The passing zones listed in Exhibit 3-10 are striped to allow passing in either direction, except as noted.

Exhibit 3-10. Passing Zones and Sight Distance

From MP	To MP	Length (Miles)	Description	Passing Sight Distance (PSD) Deficiency?	Notes
123.66	124.57	0.91	Includes sections of passing permitted for either the northbound or southbound direction only.	Yes	Includes crest vertical curve with insufficient PSD.
124.60	125.15	0.55	Includes sections of passing permitted for either the northbound or southbound direction only.	Yes	Includes crest vertical curve with insufficient PSD.
125.52	125.77	0.25		No	
126.26	126.79	0.53	Includes sections of passing permitted for only the southbound direction	Yes	Includes crest vertical curve with insufficient PSD.
127.76	131.36	3.6	Includes sections of passing permitted for southbound direction only.		
131.61	132.2	0.59		No	
132.46	140.81	8.35		No	
141.08	144.32	3.24		No	
144.91	146.14	1.23		No	
146.36	146.61	0.25		No	
146.79	155.01	8.22		Yes	Includes crest vertical curve with insufficient PSD.
155.95	160.34	4.39		Yes	Includes crest vertical curve with insufficient PSD.

3.2.6 Access to/from US 180

Access Spacing

There are 19 intersections and 58 turnouts along US 180; all of the intersections are full access, and the secondary street is stop controlled. For this study, intersections include public streets, county and state roads, and those serving a larger area and/or multiple parcels. Exhibit 3-11 provides an inventory of the intersections located along US 180; a list of the turnouts is provided in Appendix B, US 180 Turnouts.

Exhibit 3-11. US 180 Intersections

MP	East/West	Cattle Guard	Steep Grades	Gate	Surfacing Type (Gravel, Dirt, Asphalt)	Comments
123	West/East		X		Asphalt	Fahey Street and Snell Middle School, school crossing
123	West		X		Asphalt	McKee Street
123	West		X		Asphalt	Lusk Street
123.1	West		X		Asphalt	Guinevan Street
123.2	West		X		Asphalt	Taylor Street with large approach
125.3	East	X			Asphalt	N. Hurley Road with turning lanes, railroad crossing
126	West	X			Asphalt	Landfill Road with turning lanes and culvert
127.1	East				Asphalt	Carrasco Avenue with turning lanes, culvert, power poles, and flashing overhead signal
131.5	West				Asphalt	Airport Road with adjacent culvert
141	East				Asphalt	NM 61 with culvert and turnaround spot
144.1	West	X			Gravel	Cooke Road with culvert
144.9	West	X		X	Gravel	Butterfield Trail
147.3	West	X		X	Gravel	Topeka Road with multiple mailboxes
149.5	East	X		X	Asphalt	Perrin Road/A010
150.7	East	X		X	Asphalt	County Road A037
152.4	East	X		X	Gravel	Dwyer Road with adjacent fencing
153.5	West	X		X	Dirt	County Road D017 with culvert
160.4	East				Gravel	Centerfire Road with multiple mailboxes
160.5	West	X			Asphalt	Rifle Range Road (D016)

Between the BOP at MP 123 to MP 123.3, the five intersecting streets in Bayard are approximately 300 feet apart. This spacing does not satisfy the State Access Management Manual (SAMM) for an urban principal arterial. Per the SAMM, unsignalized intersections should be spaced at 1,320 feet. While this spacing is inconsistent with SAMM requirements, the close spacing is prevalent throughout the village and will not be addressed by the US 180 project.

The remainder of US 180 was evaluated as a rural principal arterial. Per the SAMM, for a posted speed of 55 mph or greater, unsignalized intersections should be spaced at 2,640 feet and turnouts should be spaced at 775 feet.

The following access points and areas do not satisfy recommended minimum spacings; Appendix B, US 180 Turnouts provides the MP locations of the turnouts listed below:

- Carrasco Avenue and the Cemetery access
- Rest area turnout and Butterfield Trail
- A010 and Perrin Road and Turnout-38)
- County Road A037 and Turnout-39
- Turnout-45 to Turnout-50
- Turnout-53 to Turnout-55 (Race Road)
- Centerfire Road to Turnout-57

Deceleration Lanes

Major access points were assessed to see if they met the SAMM warrant criteria for left- or right-turn deceleration lanes using adjusted turning movement counts collected for the study. Where provided, deceleration lane and taper lengths were evaluated to check for adequacy per the SAMM. In general, most deceleration lane lengths were deficient for at least one turning movement as shown with gray shading in Exhibit 3-12.

Exhibit 3-12. Deceleration Lane Analysis

Intersecting Road	Left Turn Decel Lane Warranted?	Min Decel Lane Length (feet)	Existing Length (feet)	Min Decel Taper Length (feet)	Existing Length (feet)	Right Turn Decel Lane Warranted?	Min Decel Lane Length (feet)	Existing Length (feet)	Min Decel Taper Length (feet)	Existing Length (feet)
Taylor St	No					Yes	230	280	100	0
N. Hurley Rd	Yes	550	400	200	200	No	525	450	200	200
Pit Access Rd	Yes	550	360	200	150	Yes	525	580	200	300
Carrasco Rd	Yes	550	550	200	200	Yes	525	170	200	75
Airport Rd	No					Yes	700	190	250	0
NM 61	Yes	725	[a]	250	[a]	Yes	700	100	250	0

Decel = deceleration; Min = minimum; cells shaded in gray indicate turning lane deficiencies

a At the intersection with NM 61, left turns are made from the existing through lane and the shoulder is used as a bypass lane.

While there are several intersections that do not provide the required speed change lane (with standard pavement markings and signs), in practice, deceleration is likely achieved in the shoulder. For example, at two intersections the rumble strip and edge striping are truncated in advance of the intersecting street so that the shoulder can be used for right turns. However, there are no pavement markings or signs to indicate a right-turn lane, though one is warranted. In this regard, these intersections are deemed deficient for not providing the required deceleration lane.

The intersection of NM 61 is notable in that left turns are made from the through lane; southbound through traffic is provided a short auxiliary lane in which to pass. Turning movement counts warrant a deceleration lane here; however, there are no pavement markings or signs indicating a left-turn lane. This presents a safety hazard as drivers would not expect a vehicle to be stopped in the through lane to make a left turn. Further, the upstream taper of the bypass lane is inadequate if evaluated as a redirect taper. A redirect taper should be based on a length-to-width ratio of the posted speed limit to one; this would equate to 780 feet (65 feet by 12 feet). The existing taper is approximately 200 feet.

US 180 intersection with NM 61

Acceleration Lanes

Acceleration lanes in both directions are provided at North Hurley Road, the Pit Access Road, and Carrasco Avenue. Acceleration lane and taper lengths were compared to recommended values in the SAMM. Two acceleration lane lengths were found to be deficient in providing adequate length. Exhibit 3-13 summarizes existing acceleration lanes and shows deficiencies with gray shading.

Exhibit 3-13. Acceleration Lane Analysis

Intersecting Road	Min Accel Lane Length (feet)	Min Accel Taper Length (feet)	Northbound Existing Accel Length (feet)	Northbound Existing Taper Length (feet)	Southbound Existing Accel Length (feet)	Southbound Existing Taper Length (feet)
North Hurley Road	960	230	1,200	230	1000	NA
Pit Access Road	960	230	1,170	NA	590	450
Carrasco Avenue	960	230	1,110	300	800	NA

Accel = acceleration; Min = minimum; NA = not applicable

Intersection Sight Distance

Intersection sight distance (ISD) was checked at major intersections using AASHTO Case B1 – Left Turn from the Minor Road (AASHTO 2018). Appropriate adjustments were made for design vehicles (passenger car for Bayard and combination truck south of Bayard to the EOP) and time gaps for two-lane or multilane roadways. Both horizontal and vertical sight lines were checked for obstructions. There were two intersections found to be deficient in providing the recommended ISD: Fahey Street and the Pit Access Road (MP 126). Additional analysis is needed to determine if sight distance is an issue at US 180 and Airport Road.

US 180 intersection with Airport Road

At Fahey Street, an existing property fence and billboard may obstruct the departure sight triangle for viewing traffic from the left. The posted speed limit is 35 mph; however, the 85th percentile speed (the average of northbound and southbound directions) was recorded at 42 mph.

At the Pit Access Road at MP 126, while speed change lanes are provided, an existing crest vertical curve obstructs the departure sight triangle for viewing traffic from the left. The posted speed limit in this area is 55 mph; however, the 85th percentile speed was recorded at 59 mph. The deficient ISD may be a contributing factor to the cluster of accidents recorded at this location.

At Airport Road, an existing panel sign may obstruct the departure sight triangle for viewing traffic from the right. Additional field data to record the clear height to the bottom of the sign, sign dimensions, and distance from the edge of the road would be needed to complete an analysis. The 85th percentile speed ranges from 58 to 68 mph in this area, and it is posted at 65 mph. If the ISD provides to be deficient at this intersection, it may be a contributing factor to the cluster of crashes recorded at this location.

Traffic Signals

There are no traffic signals within the project limits; however, at Carrasco Avenue (MP 127.1) in Hurley there is an intersection control beacon. The beacon is installed on a span wire consisting of one signal face per leg: flashing yellow for US 180 traffic, and red for Carrasco Avenue.

3.2.7 Right-of-Way and Right-of-Way Fencing

The right-of-way width is 90 feet in Bayard and expands to 200 feet from south of Bayard through Hurley. South of Hurley to the end of the project, the right-of-way varies from 100 feet to 135 feet wide. The right-of-way corridor is fenced on both sides with barbed wire fencing. Exhibit 3-14 summarizes the existing right-of-way widths and the fencing type.

Exhibit 3-14. Right-of-Way Widths and Fencing

MP	Right-of-Way	Fencing Type
123.0 to 123.2	90.0	Barbed Wire
123.2 to 127.5	200.0	Barbed Wire
127.5 to 131.0	100.0	Barbed Wire
131.0 to 160.7	130.0	Barbed Wire
160.7 to 161.0	135.0	Barbed Wire

3.2.8 Pavement and Geotechnical Considerations

Pavement borings were obtained along the highway at a frequency of every 1/2 mile, in both northbound and southbound travel lanes. Borings were also obtained in the shoulders though at a lesser frequency. In total, 180 pavement borings were taken. The existing pavement thicknesses and observed general condition are listed in Appendix C, Pavement Thickness and additional information about pavement condition and soils can be found in the *Preliminary Geotechnical Report* under separate cover. In summary, the existing pavement is in good to fair condition from the BOP at MP 123 to approximately MP 143. From MP 143 to the EOP, the pavement condition was observed to be fair to poor. This appears to align with findings in the *Draft Pavement Condition Assessment Report*, prepared by NMDOT in July 2020. This report recommends minor rehabilitation from MP 123 to MP 140, and major rehabilitation from MP 141 to MP 161.

Asphalt thickness in the travel lanes ranges from 7 inches to 15.5 inches, with a corridor average thickness of approximately 12 inches. The aggregate base course depth ranges from 4 to 6 inches, with an average of 4.5 inches in both the travel lanes. The pavement borings show an aggregate base course depth of 6 inches from the BOP and MP to MP 134. From MP 134 to the EOP at MP 161, the base course depth is 4 inches.

Asphalt thickness for the roadway shoulders ranges from 4.5 inches to 10 inches, with a corridor average thickness of about 7 inches. Base course depth in the shoulders ranges from 4 to 6 inches from the BOP to about MP 144. At MP 144, the base course depth in the shoulders is 4 inches to the EOP.

In addition, hard to very hard bedrock outcrops are exposed along the existing road cut embankments from approximately MP 123.2 to MP 123.6. Per *Preliminary Geotechnical Report*, this material will likely require rock excavation and/or blasting if roadway widening occurs in this area. In addition, on-site poorly graded, well graded, and silty sands and gravel are anticipated to be suitable for use as structural backfill for drainage structures. Conversely, on-site clay, silt, and clayey sand soils will likely not be suitable for use as structural backfill. Groundwater depth is expected to be greater than about 50 to 100 feet below the existing grade; however, shallower depths have been recorded along existing drainages.

3.2.9 Roadside Barriers

There is W-beam guardrail along the corridor, provided at major structures, bridges, and other roadway features. The height to the top of the rail was measured as either 25, 28, or 30 inches, depending on the location. This does not meet the current NMDOT minimum height requirement of 31 inches.

3.2.10 Other Roadside Features

Roadside Markers

There are two historic markers along US 180 – one for Bayard located at MP 124, and another commemorating Mangas Coloradas at MP 132.4. Both are located on the east side of the road. There are also ten descansos located along US 180 in the project limits.

Rest Area

A rest area is provided at MP 144.6 approximately midway between Hurley and Deming, on the west side of the highway. Speed change lanes are provided at this access.

Historic marker located at MP 124

Historic marker located at MP 132.4

Rest area located at MP 144.6

3.3 Bridges and Major Structures

There are 13 bridges and major structures along the corridor; these are summarized in Exhibit 3-15. Twelve of these are crossings over drainageways on US 180 and one is the Hurley overpass, private road 17-Z000, over US 180.

The existing structure conditions were assessed based on field observations, discussions with the NMDOT Patrol Foremen, and the most recent NMDOT bridge inspection reports available. The two US 180 bridges and the Hurley overpass are in satisfactory condition and can remain in service. The Mimbres River Bridge and the large concrete box culverts (CBCs) at the Whitewater Draw have had overtopping and near overtopping reported, respectively.

Approximately 32 of the drainage structures consist of CBCs built in the 1930s that were later extended with corrugated metal pipes. While the conditions of the CBCs would allow them to remain in service, they were designed for lighter vehicle loads than the current standard. Also, the multiple metal pipes were placed directly adjacent or nearly adjacent to each other, so they lack support from the surrounding soils.

Built in 1980, the Mimbres River Bridge (#8152) is in satisfactory conditions, but overtopping has been reported.

Several box culverts have been extended with adjacent corrugated metal pipes and lack support from surrounding soils.

Exhibit 3-15. Bridges and Major Structures

Bridge No.	MP	Location	Structure Type and Size	Year Built	Condition of Structure	Remarks
6215	126.3	Private Road 17-Z000 over US 180	3-span bridge, 130 feet long, 24 feet wide with precast, prestressed concrete girders on concrete hammerhead piers and abutments	1960	Deck = good, superstructure and foundations = satisfactory	Some public comments have identified this as a Gateway feature for Hurley community. Barrier protection for bridge piers along US 180 is substandard.
7982	135.15	US 180 over Whitewater Draw	Concrete box culvert, 4 barrels with a 10-foot span by 10-foot rise	1980	Moderate damage	Has come close to overtopping. Scour issue at outlet.
7983	140.2	US 180 over Lampbright Draw	Concrete box culvert, 5 barrels with a 12-foot span by 7-foot rise	1980	Deterioration noted	Possible flow capacity concerns. Inlet channelization has been considered but not implemented due to ROW issues.
7160	142.07	US 180 over Cold Water Creek	5-span bridge, 117 feet long, 47 feet wide with reinforced concrete slabs on concrete abutments and pier caps with steel pipe pile foundations	1970	Deck and superstructure = satisfactory, foundations = good	Bridge Inspection Report recommends minor repairs and cleaning
2111	142.8	US 180 over unnamed waterway	Concrete box culvert, 3 barrels with a 10-foot span by 6-foot rise	1933	Deterioration noted	Load rating is substandard (HS 15 Inventory)
2110	143.5	US 180 over unnamed waterway	Concrete box culvert, 2 barrels with a 10-foot span by 7-foot rise	1933	Deterioration noted	Load rating is substandard (HS 15 Inventory)
8152	147.4	US 180 over Mimbres River	9-span bridge, 346 feet long, 47-foot wide with reinforced concrete slab on concrete abutments and pier caps with steel H-pile foundations	1980	Deck, superstructure, and foundations = satisfactory	Overtopping reported
2113	149.75	US 180 over unnamed waterway	Concrete box culvert, 3 barrels with an 8-foot span by 3-foot rise extended with 6, 36-inch diameter corrugated metal pipes	1933	Minor deterioration	Load rating is substandard (HS 15 Inventory). Pipe ends damaged.
2112	149.9	US 180 over unnamed waterway	Concrete box culvert, 3 barrels with an 8-foot span by 3-foot rise extended with 6, 36-inch diameter corrugated metal pipes	1933	Minor deterioration	Load rating is substandard (HS 15 Inventory). Pipe ends damaged.
2109	150.4	US 180 over unnamed waterway	Concrete box culvert, 2 barrels with a 10-foot span by 4-foot rise extended with 4, 48-inch diameter corrugated metal pipes	1933	Minor deterioration	Load rating is substandard (HS 15 Inventory)
2108	150.8	US 180 over unnamed waterway	Concrete box culvert, 2 barrels with a 10-foot. span by 3-foot rise extended with 6, 36-inch diameter corrugated metal pipes	1933	Minor deterioration	Outlet 75% silted. Damaged inlet. Load rating is substandard (HS 15 Inventory)
2107	150.9	US 180 over unnamed waterway	Concrete box culvert, 4 barrels with a 10-foot span by 4-foot rise extended with 8, 48-inch diameter corrugated metal pipes	1933	Minor deterioration	40 % silted. Load rating is substandard (HS 15 Inventory)
2106	151.48	US 180 over unnamed waterway	Concrete box culvert, 2 barrels with a 10-foot span by 3-foot rise extended with 6, 36-inch diameter corrugated metal pipes	1933	Minor deterioration	Inlet damage. Load rating is substandard (HS 15 Inventory)

3.4 Drainage

3.4.1 Drainage Basins and Structures

Drainage basins for existing structures within the project limits predominately lie northeast of US 180. Runoff typically flows in a southerly direction to the US 180 roadway alignment and after crossing the roadway, infiltrates or eventually reaches the Mimbres River in the southern part of the study area.

Drainage culverts and bridges are in place to allow drainage flows to cross under US 180 during storms. When considering improvements to US 180, modifications to drainage structures may be considered where necessary to accommodate the proposed roadway and/or to meet NMDOT's drainage criteria. The criteria are found in the NMDOT's *Drainage Design Manual* (NMDOT 2018b). Major drainages with watershed areas greater than 10 square miles that cross US 180 are listed in Exhibit 3-16. Typically, these are ephemeral waterways.

Exhibit 3-16. Major Drainage Crossing Structures

MP	ID	Name	Drainage Area (square miles)	100-year Peak Flow (cfs)	Existing Structure
135.15	DS-23	Whitewater Draw	57	4,400	4, 10-foot by 10-foot box culverts (Br. #7983)
140.2	DS-35	Lampbright Draw	82	7,500	5, 12-foot by 7-foot box culverts (Br. #7982)
142.07	BR-1	Cold Water Creek	37	3,400	5-span bridge (#7160)
147.4	BR-2	Mimbres River	501	31,700	9-span bridge (#8152)
150.0	DS-54	Unnamed waterway	65	2,900	2, 10-foot by 4-foot box culverts, extended with 4, 48-inch diameter pipes
150.2	DS-55	Porter Draw	10.4	1,200	10-foot by 6-foot box culvert
155.3	DS-67	Unnamed waterway	10.8	1,200	2, 8-foot by 6-foot box culverts
159.1	DS-70	Unnamed waterway	24	410	1, 24-inch diameter pipe
160.8	DS-72	Unnamed waterway	30	TBD	1, 24-inch diameter pipe

cfs = cubic feet per second; TBD = to be determined

A total of 77 cross drainage culverts, plus two bridges over Coldwater Creek and the Mimbres River, along with 19 turnout culverts, were identified within the project limits. Fifty-six of the crossing culverts are round, corrugated metal pipes, single or multiple barrels, ranging in size between a 24 to 66 inches in diameter; two of the crossing culverts are reinforced concrete pipes, single barrels, ranging in size between 54 to 84 inches in diameter; and seven of the crossings are corrugated metal pipe arches, single or multiple barrels, ranging in size from a 42-inch span by 29-inch rise to a 46-inch span by 34-inch rise. Another twelve CBCs with single or multiple barrels ranging from a 5-foot span by 5-foot rise to a 10-foot span by 7-foot rise also exist on this project. Most existing pipe culverts are projecting with no end treatments. Existing culverts from the BOP to the railroad crossing at Hurley at MP 127.5 and MP 159 to EOP are either mitered to slope or have end sections. Standard headwalls and wingwalls exist at the ends of the CBCs, with concrete barriers or guardrails. Several of the existing culverts were observed as having visible corrosion with mild to moderate damage. This may be the result of soil conditions or chemicals carried by the runoff and, depending on the severity, may require design measures to mitigate.

Built in 1970, the US 180 Cold Water Creek Bridge (#7160) is in satisfactory to good condition.

Twenty-seven culverts had sediment built up around the inlet and/or outlet. In addition to sedimentation, erosion issues were also identified, typically at the culvert outlet where large scour holes were present. Fourteen culverts were found to have scour at the inlet and/or outlet. Vegetation, mainly composed of tumbleweeds and sagebrush, was also seen at some of the crossings. This vegetation may restrict the culverts' ability to convey flows. The embankment slopes and culvert depths create access issues and may make maintenance of these areas difficult. A summary of field notes and the existing structures inventory is contained in the *Preliminary Drainage Report*, under separate cover.

Erosion at the Whitewater Draw culvert at MP 135.15.

The NMDOT Highway Patrol Foremen for Silver City and Deming who oversee maintenance operations in the area were contacted to identify notable drainage issues along the US 180 corridor. They mentioned issues at several locations:

- The Whitewater Draw CBC has been close to overtopping several times, and the fence at the northwest embankment is being undermined. The outlet protection at this CBC has been undermined multiple times.
- North of NM 61 at Lampbright Draw, flows eroded the embankment on the north side of the culvert, which required placement of new fill and riprap to repair
- Overtopping at the Mimbres River Bridge near MP 147 has been reported
- Overtopping issues near MP 159 to MP 160
- Roadway embankment erosion near the utility boxes near MP 161.5, south of Keeler Farm Road

3.4.2 Floodplains

Floodplains mapped by the Federal Emergency Management Agency (FEMA) exist in several areas along the US 180 corridor. These floodplains are designated as Zone A. Per the Flood Insurance Studies (FIS) for Luna County, New Mexico (2010), and Grant County, New Mexico (2011), "Zone A is the flood insurance rate zone that corresponds to the 1-percent-annual-chance floodplains that are determined in the FIS by approximate methods." Locations of floodplains along US 180 are summarized in Exhibit 3-17. Flooding of US 180 has been reported near the Mimbres River near MP 147 and Keeler Road at the south end of the corridor from MP 159.1 to 161.7, as discussed previously in Section 3.4.1.

Exhibit 3-17. Mapped FEMA Floodplains

MP	ID	Flood Insurance Rate Map	Notes
123.4	DS-1	35017C1019E, 35017C1260E	At culvert crossing
126.2-126.7	DS-14B to DS-15	35017C1260E	Parallel to US 180 upstream of DS-15 culvert crossing
135.15	DS-23 (Whitewater Draw)	35017C1550E	At culvert crossing
140.2	DS-35 (Lampbright Draw)	35017C1550E	At culvert crossing
142.8	DS-39	35029C0075C	At culvert crossing
143.5	DS-42	35029C0075C	At culvert crossing
147.4-147.8	BR-2 (Mimbres River), DS-47A, DS-47	35029C0275C	Mimbres River floodplain
148.6-149.0	DS-49 and DS-50	35029C0275C	Mimbres River branch
149.7-150.2	DS-52 to DS-55	35029C0275C	Encompasses a series of crossing culverts
155.3	DS-67	35029C0300C	At culvert crossing
159.1	DS-70	35029C0500C	At culvert crossing
160.6-161.7	DS-72	35029C0500C	Parallel to US 180

3.5 Utilities

A Level D subsurface utility engineering (SUE) was performed for the corridor. Level D SUE entails records research. Based on available records, there is a full complement of utilities through Bayard, as can be expected in a typical urban setting: sanitary sewer, storm drain, water, overhead power, telephone, and gas. Generally, the prevalent utilities within the project limits are fiber optic (telephone and cable) which run along the right-of-way fence, switching back and forth between the east and west sides, and overhead electric which parallels US 180 but is well outside of the right-of-way. A summary of utilities located within the project limits is provided below. Detailed utilities information is available in the *Utility Mapping Plans*, under separate cover.

3.5.1 Fiber Optic

There are existing fiber optic lines (telephone and cable) that run adjacent to edge of pavement on the east side of US 180 from south of Bayard (MP 123.5) to North Hurley Road (MP 127) where they are outside of right-of-way boundaries. Cable fiber optic reenters the existing right-of-way just south of the railroad crossing at MP 127.7 and runs along the east right-of-way line to MP 131.5 where it crosses the roadway at Airport Road (MP 131.5).

At Airport Road, telephone fiber optic from the airport runs along the east right-of-way line to MP 132 where it crosses US 180 and continues adjacent to the west right-of-way line. It crosses back to the east side at MP 148 then continues on the east right-of-way line until the end of the project.

At Butterfield Trail (MP 144.9), cable fiber optic enters the right-of-way and runs adjacent to the telephone fiber optic to the EOP (MP 161). Another fiber optic cable enters the right-of-way at Rifle Range Road (CR D016) at MP 160.5 and runs along the west right-of-way line to the EOP.

3.5.2 Electric

Overhead electric runs predominantly west of the corridor and at minimum 200 feet west of the right-of-way line. There are locations of overhead power on the east side as well, approximately 170 feet from the existing right-of-way line south of Hurley.

3.5.3 Water

An existing water line crosses US 180 at MP 123, north of the overpass, and turns south along the east right-of-way line. It appears to cross under the roadway again at the south end of Hurley.

3.5.4 Gas

There is an existing gas line that crosses the highway at MP 125.7 and runs outside of the right-of-way corridor on the east side through Hurley to the railroad crossing. Two gas lines appear parallel and outside of the east right-of-way line from MP 128.2 to MP 130.8, just south of Apache Tejo Road.

3.5.5 Street Lighting

There is existing continuous street lighting along US 180 through Bayard appearing to consist of 250-watt high pressure sodium luminaires on 30-foot poles with 10-foot arms, in a staggered configuration. Spacing ranges from approximately 150 feet to 190 feet, with 165 feet being the typical. The streetlights are fed by underground power and are located behind the sidewalk.

There is existing intersection lighting at North Hurley Road and Carrasco Avenue, limited to luminaires mounted on short (2-foot) arms on existing wood power poles. These are fed via overhead power.

3.5.6 Railroad

Southwestern Railroad operates the Whitewater Line through the study area. It includes a single-track mainline and industry track. Within the project limits, from Bayard through Hurley, the railroad lies to the east of US 180. Just south of Hurley at MP 127.7, there is an at-grade crossing where the railroad tracks switch to the west side of US 180 and continues south to Whitewater and then to Deming.

The crossing consists of concrete panels supported by concrete pavement on each side. Due to the skew of the roadway/railway intersection, the crossing is approximately 110 feet long.

3.6 Traffic

Existing traffic on US 180 reflects the function of this highway and its importance to the transportation system in southwest New Mexico. US 180 is part of the east-west highway system serving Arizona, New Mexico, and Texas. It is classified as a rural principal arterial and, at the local level, connects the Silver City area with I-10. US 180 is an essential commuter route used by workers and students traveling between the small communities located along its route and is also an essential shipping corridor to deliver goods to the region and transport materials and supplies to and from the large mining facilities that are iconic to the area. The highway is also traveled by tourists, recreational traffic, and other visitors heading to Silver City, area attractions such as the Gila Cliff Dwellings, and the many recreational areas located within the Gila National Forest to the north.

Existing and future traffic volume and composition are important elements in determining the need, type, and extent of highway improvements. The traffic analysis included a review of historic traffic data, collection of new traffic count data, projections of future traffic, and a quantitative assessment of traffic level of service (LOS). Each of these elements is discussed below.

3.6.1 Existing Traffic Volumes

Existing traffic on US 180 was evaluated using traffic counts collected by NMDOT over the last several years and traffic counts were collected in late 2020. Exhibit 3-18 summarizes annual average daily traffic (AADT) volumes and truck traffic for 2017 through 2019. This data was collected at four permanent traffic monitoring stations operated by NMDOT.

Exhibit 3-18. Annual Average Daily Traffic and Truck Volumes

	2017		2018		2019		3-Year Average	
Location	AADT	% HC	AADT	% HC	AADT	% HC	AADT	% HC
MP 121.5 to 125.9	6,607	23.5%	6,699	15.2%	6,565	13.2%	6,624	17.3%
MP 125.9 to 130.2	2,991	23.7%	3,033	15.1%	2,972	13.2%	2,999	17.3%
MP 130.2 to 139.6	2,974	23.5%	3,016	15.2%	2,956	13.2%	2,982	17.3%
MP 139.6 to 162.3	2,754	23.5%	2,795	8.2%	3,519	12.8%	3,023	14.8%

AADT = average annual daily traffic for weekdays and weekends, HC = heavy commercial trucks as a percentage of daily traffic volumes
Source: NMDOT count data for location IDs 5124, 25327, 23821, and 23814

To augment the count data for 2017 through 2019, additional data was collected in early October 2020 using tube counters and video cameras. The tube counts included six locations along US 180 and were used to collect traffic volume, vehicle classification, and speed data. Video cameras were used at six intersections to collect turning movement counts. These traffic counts were collected for a three-hour period in the morning (6:00 am to 9:00 am) and three hours in the evening (3:00 pm to 6:00 pm). Exhibit 3-19 summarizes the data at the six tube count locations.

Exhibit 3-19. 2020 Traffic Counts

Location	24-Hour Volume	PM Peak Hour	Truck Volume	Truck %	Average Speed[a]
MP 123.2 (Lusk Street in Bayard)	5,344	486	222	4.6%	43 mph
MP 125.1 (North Hurley)	5,150	433	207	4.0%	58 mph
MP 126.1 (North Hurley)	3,804	356	549	14.3%	59 mph
MP 126.7 (North of Carrasco Avenue)	4,146	358	857	17.3%	62 mph
MP 127.8 (South of the Railroad Crossing)	1,668	191	340	14.3%	58 mph
MP 141.1 (South of NM 61)	2,246	215	216	25.0%	68 mph

a Average speed = the 85th percentile; mph = miles per hour

The traffic volume and percent truck data collected in 2020 were similar to the general patterns observed in the data from 2017 through 2019. However, the overall traffic volumes and percentage of trucks in the vehicle stream were consistently lower. The decline in traffic is likely a consequence of the social distancing restrictions implemented in response to the COVID-19 pandemic. In addition, mining operations at Chino Mines were on a reduced schedule for much of 2020. The slowdown at this mine was associated with a drop in copper prices and COVID-19 related restrictions. According to news reports (Albuquerque Journal 2020) furloughs may have affected up to 850 employees. Changes in employment numbers at the mine affect both commuter traffic and the number of trucks operating on US 180. These factors likely contributed to the lower traffic levels and number of trucks observed. It is noted that the percentage of trucks was substantially higher at two of the count locations. The reason for this is unknown but the area of increase coincides with two reginal material pits located on the west side of the highway.

As shown by the data in Exhibit 3-18 and Exhibit 3-19, average daily traffic volumes on US 180 within the project limits are relatively low and decline as the distance from Bayard increases. The highest volumes occur between Bayard and Hurley. Traffic drops considerably south of Carrasco Avenue (the primary access road into Hurley) and is consistently less than 3,000 vehicles per day.

The corridor does have a disproportionately high amount of truck use. Historic data shows the percentage of trucks using US 180 is almost 24 percent in some years, although the daily counts collected in 2020 indicate heavy commercial trucks accounted for about 17 percent of daily traffic. Mining operations contribute significantly to the number of trucks traveling on US 180. As mentioned above, the recent decline in mining operations over the last few years and COVID-related impacts has likely contributed to the decrease in truck traffic. This trend could be reversed with a rebound in the copper industry.

Average travel speeds are generally within 5 mph of the posted speeds, even in the long straight-away segments of US 180 south of MP 130. The one exception to this is the segment immediately north of Carrasco Avenue where the average speed was 7 mph above the posted speed of 55 mph.

3.6.2 Traffic Operations

Traffic LOS was analyzed using the Highway Capacity Manual (HCM) using the two-lane highway segment methodology (TRB 2016). The highway was analyzed as a Class I highway, meaning that motorists are expected to travel at relatively high speeds. Level of service for Class I highways is based on both the average travel speed and the percent time spent following (PTSF). PTSF is the average percentage of time that vehicles must travel in platoons behind slower vehicles due to the inability to pass. The worse of the two LOS prevails. The traffic volume and truck percentages used for the analysis were adjusted using the volumes shown in Exhibit 3-18 and Exhibit 3-19. Adjustments were made to better represent overall traffic volumes and the number of trucks using the highway for non-COVID conditions. The mainline LOS and adjusted volumes and truck percentages assumed are shown in Exhibit 3-20.

LOS is an indicator of how well a transportation facility is operating. It includes six levels designated by the letters A through F with LOS A representing the best operating conditions and LOS F the worst. For rural highways, LOS C or better is considered acceptable. As shown in Exhibit 3-20, all segments of US 180 analyzed currently operate at LOS C or better.

Exhibit 3-20. Existing Traffic Levels of Service

Location	AADT	% Trucks	PTSF (NB/SB)	LOS (NB/SB)
MP 123.2 to 125.3 (Bayard to Hurley Road)	6,410	15%	60% / 60%	C / C
MP 125.3 to 127.1 (Hurley Road to Carrasco Avenue)	4,165	20%	56% / 56%	B / B
MP 127.1 to 131.5 (Carrasco Avenue to Airport Road)	2,650	25%	36% / 35%	B / A
MP 131.5 to 140.9 (Airport Road to NM 61)	2,580	25%	24% / 28%	A / A
MP 140.9 to 161 (NM 61 to Keeler Road)	2,580	25%	32% / 28%	A / A

AADT = average annual daily traffic; PTSF = percent time spent following; NB = northbound; SB = southbound; LOS = level of service

If traffic volumes and/or the number of trucks using US 180 increase, traffic LOS could degrade. Traffic volumes are typically tied to the population and number of jobs in the area served by the highway of interest. Because US 180 serves a broad area in Grant County and Luna County, population projections for these two counties were reviewed. Population projections for the counties in New Mexico are developed by the University of New Mexico (UNM), Geospatial Population Studies Division. According to data published by UNM, the population of both Grant County and Luna County is expected to decrease within the next 20 years — a decrease of 16 percent is projected

for Grant County and a decrease of almost 10 percent is projected for Luna County. Based on the population projections, it is unlikely that traffic will increase on US 180 over the next 20 years. Therefore, the estimated traffic LOS for the existing condition is a reasonable representation of the future condition.

3.7 Safety

Safety of travel on US 180 is affected by several factors including the volume and composition of traffic, access points, roadway vertical and horizontal alignment, and the typical roadway section. Safety issues related to passing and stopping sight distance, intersections, and shoulder widths are discussed in Section 3.2. This section of the report is focused on a review of the crash history for the US 180 study area.

Crash reports specific to the study limits of US 180 were assembled from data maintained by the Traffic Safety Bureau of the NMDOT. The review included all reported crashes for the 4-year period from 2014 through 2018. Review of the crash reports show a total of 111 crashes within the US 180 study limits. Additional crashes occurred in the Village of Bayard just north of the BOP at MP 123 and in the area just south of the EOP at MP 161. Of the 111 reported crashes, two crashes (2%) resulted in fatalities, 29 crashes (26%) involved injuries, and the remaining 80 crashes (72%) were limited to property damage only (PDO). Exhibit 3-4 through Exhibit 3-7 on pages 3-3 through 3-6 illustrate the locations and types of crashes within the corridor. Exhibit 3-21 through Exhibit 3-23 summarize crash data by type, class, and crash rate.

Exhibit 3-21. Crashes by Type and Highway Segment 2014 through 2018

Segment	MP	Total Crashes	Fatal Crashes	% Fatal Crashes	Injury Crashes	% Injury Crashes	PDO Crashes	% PDO Crashes
Bayard to Carrasco Avenue	123.2 to 127.1	39	0	0%	4	10%	35	90%
Carrasco Avenue to Airport Road	127.1 to 131.5	17	1	6%	6	35%	10	59%
Airport Road. to NM 61	131.5 to 140.9	22	0	0%	8	36%	14	64%
NM 61 to EOP	140.9 to 160.9	33	1	3%	11	33%	21	64%

PDO = Property damage only

Exhibit 3-22. Crashes by Class 2014 through 2018

Crash Class/Event	Number of Crashes	% of Total
Crashes Involving Animals	40	36%
Crash Involving Two or More Vehicles	26	23%
Overturn / Rollover Crashes	19	17%
Crashes with Fixed Objects (e.g., signs, fences)	14	13%
Other Crash Types	10	9%
Crashes Involving Bicyclists	2	2%
Totals	**111**	**100%**

Exhibit 3-23. Crash Rates by Severity

Segment	MP	Crash Rate[a]	Severe Crash Rate[b]
Bayard to Carrasco Avenue	123.2 to 127.1	1.0	2.55
Carrasco Avenue to Airport Road	127.1 to 131.5	0.78	4.61
Airport Road to NM 61	131.5 to 140.9	0.49	0.0
NM 61 to EOP	140.9 to 160.9	0.35	4.21

a Crash rate is the number of crashes per one million vehicle miles of travel

b Severe crash rate is the number of fatal crashes and crashes involving incapacitating injury per one hundred million vehicle miles

As shown in Exhibit 3-21 and Exhibit 3-4 through Exhibit 3-7, crashes are distributed throughout the project limits. Crash density is generally highest in the two segments between Bayard and Airport Road south of Hurley. This segment has a high number of crashes involving animals, primarily deer with occasional crashes involving “pigs” and elk. While it cannot be ascertained from the crash reports, the notation of pigs is likely javelina, which inhabit the area. The number of crashes involving two or more vehicles and roll-over crashes are high with four of ten crashes involving these two crash types. Crashes involving fatalities are generally low with only two fatal crashes reported over the 4 years evaluated. About one-third of all crashes result in injury.

The crash rate for the four segments evaluated range from a low of 0.35 to a high of 1.0. Crash rate describes the number of crashes on a highway segment compared to the traffic volume for a given time period. Calculating a crash rate allows comparison with other similar highways. Crash rates can be calculated for all crashes or for a subset of crashes such as fatal or serious injury crashes. According to data published by the NMDOT Highway Safety Improvement Program in 2019, the statewide 5-year average fatality rate for rural principal arterials is 1.26 per one hundred million vehicle miles of travel (HMVMT) and the serious injury rate is 1.85 per HMVMT. Serious injuries are those that involve incapacitating injuries. In comparison, the serious injury crash rate is 2.55 for the segment of US 180 between Bayard and Carrasco Avenue and 3.16 for the segment between NM 61 and the EOP — both substantially higher than the statewide average. In contrast, the fatal crash rate for US 180 is substantially lower than the statewide average for similar highways.

Two specific locations were noted with higher crash risk. Several crashes involving injuries have been recorded near MP 128 just south of the railroad crossing in Hurley. This curve has an advisory speed limit of 40 mph and is between segments of the highway posted at 55 mph to the north and 65 mph to the south. The roadway alignment combined with the railroad crossing and abrupt speed changes may contribute to crashes in this location. The intersection of US 180 and Airport Road also appears to have high risk. This intersection does not have deceleration, acceleration, or turn lanes. While most of the crashes at this intersection resulted in property damage only, a fatal crash did occur at the intersection in 2014.

The crash analysis did not identify a correlation of crashes with time of day, day of the week, or month. Likewise, no major trends were identified specific to weather conditions, lighting conditions, or alcohol involvement.

3.8 Communities

3.8.1 Community Resources, Demographics, and Environmental Justice

Community resources that are located within or close to the study area include schools, parks, emergency response providers, and government services, such as the post office. While most of these resources are not located directly in the study area, US 180 provides primary access to these services in Bayard and Hurley at the north end of the study area and Deming at the south end. Continued access to these facilities during construction is expected to be a topic of concern to the general public.

Data from the Environmental Protection Agency's (EPA's) Environmental Justice Screening and Mapping Tool was reviewed to characterize the economic and demographic make-up of the study area. This tool uses the most recent data available from the United States Census Bureau at the block-group level to identify demographic characteristics of a study area defined by the user. Exhibit 3-24 displays the information found in using the EPA's tool (EPA 2021). The area included a population of just under 4,000 people located in four block-groups, covering an area of about 2,200 miles. This data showed that 62 percent of the population in the US 180 study area identifies as a minority race or ethnicity, which is the same as the state average. About 50 percent are classified as low income compared with 42 percent in the state. Approximately 7 percent of the study area population is linguistically isolated compared with about 5 percent across the state. Environmental justice will be considered when evaluating the proposed improvements as part of the environmental phase.

Exhibit 3-24. Study Area Demographics

Demographic Indicator	Study Area	New Mexico
Minority Population	62%	62%
Low-Income Population	50%	42%
Linguistically Isolated Population	7%	5%
Population with Less than a High School Education	20%	15%
Population under 5 years of age	5%	6%
Population over 64 years of age	23%	16%

Source: EPA 2021

3.8.2 Property Ownership

Land ownership within the project limits includes privately owned parcels and lands owned by NMSLO and BLM as shown in Exhibit 3-4 to Exhibit 3-7, Existing Conditions Corridor Maps (pages 3-3 through 3-6). As shown in the exhibits, most of the land in the northern portion of the project area between the BOP at MP 123 to MP 145 is privately owned, with some small pockets of state and federally owned lands. From MP 145 to the EOP, the land is primarily owned by NMSLO and BLM with some pockets of privately owned lands. Land owned by the Forest Service and the Department of Defense are in the project vicinity but are located over 2 miles from the proposed project footprint.

3.8.3 Major Industry and Businesses

US 180 is a heavily used highway that provides connection to I-10. Multiple communities within southwest New Mexico are connected by US 180. These communities include the small cities of Silver City, Bayard, Hurley, and Deming. US 180 provides access to community resources and business between these communities and is the primary route to access workplaces and services for many residents. Multiple historic sites are located within the project limits and mining operations, including a previous smelter operation, can be observed while traveling on US 180 near Hurley. Additionally, agricultural and rail activity is located along the corridor.

The communities of Bayard and Hurley consist primarily of residences with local commercial services to support the needs of residents. The larger towns of Silver City and Deming provide lodging accommodations, emergency services, and larger retail stores. Small farms and ranches are in the middle and southern portions of the corridor in the grasslands and mesquite land of Luna County.

US 180 also provides access to multiple points of interest for tourists. Some of these points include The City of Rocks, Fort Bayard, Gila Cliff Dwellings, and multiple historical markers. In addition, Western New Mexico University in Silver City provides education and research opportunities. US 180 also serves as a main access point to the Gila National forest, a common retreat for outdoor activities such as camping, hiking, and hunting.

3.9 Environmental Conditions

Environmental conditions were identified based on a review of existing data and supplemental field survey. This overview describes some of the existing environmental conditions and constraints to be considered throughout project development and identifies issues of concern for evaluating alternatives.

3.9.1 Cultural Resources

Cultural resources are located throughout the study area. At the north end, within the community of Bayard, there are 19 presumed historic buildings adjacent to US 180. Further south near the EOP, there are two additional historic structures. In addition, the rail line in Hurley, currently known as the Whitewater Line, is a historic rail line that was previously known as the Atchison, Topeka, and Santa Fe Railroad. There are nine culverts or bridges within the study area that will need to be evaluated for their eligibility for listing to the National Register of Historic Places due to the age of the structures.

In addition, seven archaeological sites have been documented within or adjacent to the current right-of-way. The project team conducted a field visit and determined that there were no artifacts located within the current right-of-way for all seven sites. However, five of the sites were found to contain prehistoric artifacts visible outside the right-of-way. One site consists of a large historic ranching complex located fully outside the right-of-way. One additional site consists of a historic berm, presumably related to ranching activities in the area. In addition to the archaeological sites, the historic Butterfield Trail also crosses the study area at approximately MP 145 and a monument commemorating the crossing is located within the highway right-of-way. Any roadway widening or modifications to the US 180 alignment that would extend beyond the current roadway prism in some areas and beyond the existing right-of-way in others could affect these resources.

3.9.2 Natural Resources

Ranging in elevation from 5,800 to 4,400 feet above sea level, the study area spans the Mogollon-Datil volcanic field, a large volcanic field in western New Mexico, at the north end of the study area and the Basin and Range Physiographic Province at the south end. The higher elevations at the north end of the study area are located within the Mogollon Mountains while south of Hurley, US 180 descends in elevation and crosses through increasingly open grasslands and desert scrubland. Vegetation at the north end of the study area includes some piñon and juniper with various desert shrubs and grasses found throughout. While there is no officially designated critical habitat for any species protected by the Endangered Species Act, the study area does provide ample amounts of general wildlife habitat.

No wetlands were identified in the study area during the biological surveys but multiple ephemeral drainages cross US 180 in the study area. In the northern portion of the study area, Whitewater Creek runs roughly parallel to US 180 on the east side of the road before crossing underneath the roadway at approximately MP 135. At that point, US 180 continues in a southeast direction while Whitewater Creek extends to the southwest, eventually draining into the Mimbres River which runs roughly east/west and crosses beneath US 180 south of the study area. Several other unnamed drainages also cross beneath US 180 throughout the study area. While recent changes to the Navigable Waters Protection Rule exclude these ephemeral drainages from regulation by the United States Army Corps of Engineers, the NMDOT still follows the stipulations for Clean Water Act Section 404 Nationwide Permit 14 and Section 401 water quality certification as a stewardship practice. This should be considered when evaluating drainage improvements in these areas.

3.9.3 Hazardous Materials

NMDOT completed a preliminary initial site assessment on February 5, 2021 that is included as Appendix D, Preliminary Initial Site Assessment. The preliminary report found 21 properties located near US 180 where hazardous substances or petroleum products were used, stored, and/or released. Of the 21 sites, nine are located directly adjacent to US 180 and three bridges that cross over US 180 may contain lead based paint. Most of these properties pose a minimal risk to the possibility of encountering hazardous materials during construction. However, two of the nine sites located directly adjacent to US 180 will require additional evaluation to determine possible risks and the three bridges likely painted using lead-based paint will require further investigation. NMDOT will conduct a more detailed initial site assessment once preliminary design is complete.

3.9.4 Air Quality

Grant and Luna Counties are classified by the EPA as being in attainment for criteria pollutants listed under the National Ambient Air Quality Standards. There is a maintenance area for sulfur dioxide ($S0_2$) emissions associated with operations at the previous Chino Copper Smelter in Hurley. The smelter was closed in 2002 and dismantled in 2007. $S0_2$ is a gas primarily emitted from fossil fuel combustion at power plants and industrial facilities and processes, such as extracting metal from ore (NMED 2021). The maintenance area is defined as a 3.5-mile radius around the smelter and includes high elevation areas above 6,470 feet within an 8-mile radius. In 2014, the EPA approved the Grant County $S0_2$ Limited Maintenance Plan (NMED 2021) which regulates $S0_2$ emissions from the smelter. The Grant County maintenance area currently has no major sources of SO_2 and has monitored negligible levels of SO_2 for over 5 years. There are no special requirements or considerations for mobile sources of SO_2 emissions, such as vehicle emissions, under the Limited Maintenance Plan.

In addition, the New Mexico Environment Department (NMED) has developed a *High Wind Fugitive Dust Mitigation Plan for Doña Ana and Luna Counties* for particulate matter (PM_{10} when less than 10 microns in particle size and $PM_{2.5}$ when less than 2.5 microns) dispersion during high wind events. In these counties, windstorms are common during the late winter and spring months and these counties experience the majority of PM_{10} exceedances in the state. Blowing dust and soil erosion originate from exposed and erodible desert areas.

In 2018, NMED developed a fugitive dust rule (20.2.23 New Mexico Administrative Code [NMAC], *Fugitive Dust Control*) in conjunction with the mitigation plan to detail mandatory measures to abate certain controllable sources of dust in Doña Ana and Luna Counties. This rule requires the implementation of specific best management practices during construction to minimize possible effects from fugitive dust. In addition, the NMDOT has done work to mitigate a source of dust adjacent to US 180 near MP 150. Fugitive dust and implementation of required dust management practices will need to be included in any future construction plans in this corridor.

3.9.5 Noise

This Alignment Study considers alternatives that involve alignment changes and/or the addition of passing or general-purpose lanes. As such, it will likely qualify as a Type I project as defined in 23 CFR 772, which will require an analysis of potential traffic noise impacts to nearby properties. While detailed noise analysis will be completed as needed in the environmental phase of the project, the FHWA Traffic Noise Model Version 3 was used to conduct a screening-level analysis to identify potential traffic noise.

Land uses in the study area include residential, community, and commercial properties within and just outside of Hurley; residential properties at the south end of the project area; and agricultural and vacant lands throughout the corridor. Among these areas, the residential areas are the most noise sensitive. Three locations were modeled and included Hurley in the north part of the corridor; the intersection of US 180 and NM 61 near MP 141 in the middle of the corridor; and a cluster of houses near the EOP (MP 161). When modeling noise, receivers were placed at the edge of selected properties likely to be impacted by traffic noise. FHWA identifies Noise Abatement Criteria (NAC)—the traffic noise level at which consideration of mitigation measures is required—for residential properties and most community services and businesses as 67 A-weighted decibels (dbA) and 72 dbA for restaurants and hotels. There is no NAC defined for agricultural and vacant lands.

Within Hurley, noise levels ranged from 49 to 59 dbA. The low of 49 dbA was found approximately 830 feet from US 180 at the south end of Hurley. This location was a considerable distance from US 180 in an area where the speed limit on US 180 is 45 mph. The high noise level was located at the north end of Hurley approximately 280 feet from US 180 in a 55-mph zone. At the intersection of NM 61 and US 180, there were no homes or properties to base a receiver to calculate modeled noise, so receivers were placed at 250 feet, 500 feet, and 1,000 feet. Noise levels near this location ranged from 49 dbA to 58 dbA, with higher noise levels near US 180, moving to lower noise levels further away. At the southern end of the project, receivers were placed at the edge of properties likely to be influenced by traffic noise. Noise levels within this section ranged from 52 dbA at approximately 950 feet from the roadway, to a high of 62 dbA at approximately 150 feet from the roadway. While this is only a preliminary analysis, the modeled noise levels do not currently meet the NAC for the associated land uses in the area and traffic noise is not anticipated to be an issue in evaluating alternatives. As mentioned above, additional detailed analysis will be completed as needed.

3.9.6 Environmental Conditions and Constraints Summary

Access to community resources would not change as a result of the project, regardless of the alternative chosen. Environmental justice will be considered as part of the environmental phase.

Cultural and natural resources are located adjacent to the right-of-way and within the right-of-way just beyond the area that has been disturbed by highway construction and maintenance. Any alignment adjustments outside of the existing roadway prism could potentially have an adverse effect to these resources. The more extensive the alignment modification or roadway widening, the more probable it would be to have a negative impact.

A preliminary initial site assessment for hazardous materials was completed and additional evaluation will be conducted as part of the environmental phase during preliminary design. In addition, any construction activities would need to incorporate mitigation measures per requirements in 20.2.23 NMAC, *Fugitive Dust Control.* Finally, the screening analysis for noise did not identify locations where traffic noise approaches or exceeds FHWA Noise Abatement Criteria. Additional noise modeling will be conducted as part of the environmental phase to assess noise levels with build alternatives.

4. PROJECT ALTERNATIVES AND SCREENING

4.1 Introduction

This chapter summarizes and documents corridor issues and needs and includes a purpose and need statement. It also identifies alternatives that could meet the project purpose and need to improve highway safety, traffic operations, the condition of the roadway and associated infrastructure and support economic development. This chapter includes a discussion of the criteria used to screen the alternatives and the findings of the initial screening analysis.

4.2 Project Purpose and Need

Based on project needs identified in Chapter 3, Existing Conditions and summarized below, the proposed purpose of this project is to improve highway safety, traffic operations, and the condition of the roadway and associated infrastructure. Improvements are also needed to support economic development. The primary factors that contribute to the need for improving US 180 are summarized below:

- Hurley railroad crossing – As described in Chapter 3, Existing Conditions, the horizontal curve at the Hurley railroad crossing does not meet current design criteria for superelevation. Superelevation is how the roadway banks along a horizontal curve so drivers can safely and comfortably maneuver the curve at reasonable speeds. The superelevation at the Hurley railroad crossing is limited by the grade of the railroad tracks. This curve needs to be improved to increase the speed that drivers can safely navigate this curve. Review of crash records for the corridor show a higher concentration of crashes in the curve just south of the railroad crossing. While the cause of these crashes cannot be ascertained by the information included in the reports, the sharp speed reduction and roadway curvature may be a contributing factor.
- Speed differential – Because of the high percentage of trucks using this highway (17 percent), there is a speed differential between larger trucks who often travel at slower speeds than other traffic. This condition results in a substantial amount of passing maneuvers. Because few passing zones are available within the project limits, passing occurs in the opposite direction driving lane, resulting in the potential for severe conflicts. In addition, several of the auxiliary lanes provided at intersections need to be lengthened to meet current standards to provide safe turning movements.
- Pavement condition – Pavement condition, particularly in the south end of the project limits, needs to be improved.
- Drainage structures – Drainage improvements are needed to address occasional flooding that occurs near the Mimbres River bridge located at MP 147 and areas south near the EOP. In addition, several drainage structures need to be improved to meet current standards for vehicle loads.
- Economic development – US 180 is an essential link in the state and local transportation system of southwestern New Mexico and is one of two state highways that connects communities in southwestern New Mexico to I-10. US 180 is essential for the economy of the communities along its path including Silver City, Santa Clara, Bayard, Hurley, and Deming. US 180 is used for the transport of commercial goods to Silver City and by the large mines in the area. The economy of the Silver City area and, more specifically, the communities of Bayard and Hurley, is heavily dependent on mining operations. Chino Mines is one of the oldest open-pit copper mines in the world and until recently, employed about 1,000 people. The mine has undergone several openings and closings over the last 15 years. These changes heavily influence traffic volumes and truck use of US 180. Tourism is also an important aspect of the economy in the Silver City region. US 180 provides access to the Gila National Forest in New Mexico and Apache-Sitgreaves National Forest in southeast Arizona.

4.3 US 180 Corridor Segments

The project team divided the 38-mile US 180 corridor into three segments based on differing roadway conditions and features found in different parts of the corridor. Dividing the corridor into segments allowed the alternatives to be mixed-and-matched to best meet corridor needs and constraints. For example, a 4-lane roadway alternative in Segment 1 could be matched with a 2-lane roadway alternative in Segment 3. The segments are shown in Exhibit 4-1 and include:

- Segment 1: BOP/Bayard (MP 123) to North of the Hurley Railroad Crossing (MP 127.25) – This segment of highway begins in Bayard where US 180 transitions from a 4-lane highway to a 2-lane highway. This segment has the highest traffic volumes and crash rates in the corridor.
- Segment 2: Hurley Railroad Crossing (MP 127.25 to MP 128.5) – Segment 2 includes the railroad crossing in Hurley and areas located just north and south of the railroad crossing.
- Segment 3: South of the Hurley Railroad Crossing (MP 128.5) to the EOP/Deming (MP 161) – This segment of highway is the longest segment, covering about 32 miles of roadway. Traffic volumes in this section of the highway are about half of the traffic volumes in Segment 1.

Exhibit 4-1. US 180 Corridor Segments Map

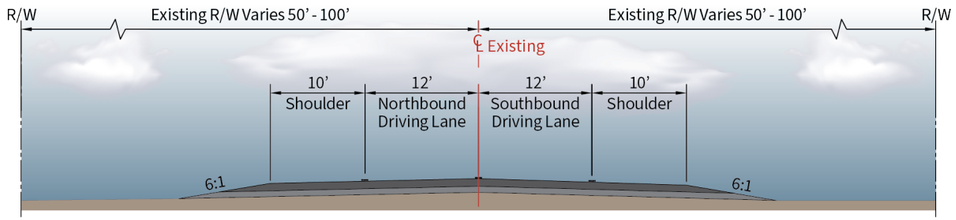
4.4 Alternatives Identification

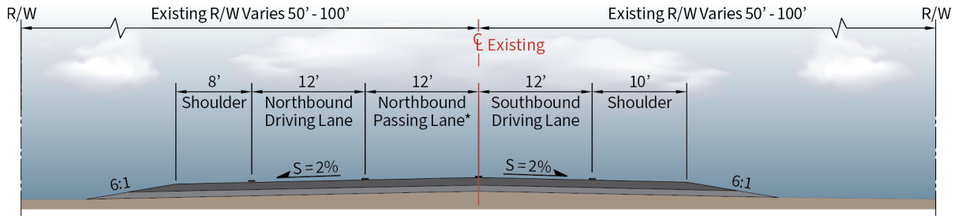
Four improvement alternatives were considered including an enhanced 2-lane highway, super 2 highway, divided 4-lane highway with a flush median, and a divided 4-lane highway with a depressed median as shown and described below.

4.4.1 Enhanced 2-Lane Alternative

Exhibit 4-2 provides a typical cross-section for the Enhanced 2-Lane Alternative. With this alternative, US 180 would remain a 2-lane highway through Segments 1 and 2 in Bayard and Hurley. South of Hurley, four, 2-mile passing zones would be provided in each direction in Segment 3 from MP 128.5 to the EOP at MP 161.

Exhibit 4-2. Enhanced 2-Lane Alternative





** Typical section shown for segments with a northbound passing lane. Sporadic passing lanes will also be provided for the southbound direction of travel.*

Passing lanes would be provided at approximately 4-mile intervals in each direction, which means drivers would be provided a 2-mile long passing lane every 4 miles in either the northbound or southbound direction. The Enhanced 2-Lane Alternative would provide a total of 8 miles of passing lanes in each direction, or 16 miles of total passing lanes over the 32-mile stretch of Segment 3 as shown in Exhibit 4-3.

In addition to passing lanes, the Enhanced 2-Lane Alternative would rehabilitate pavement, widen shoulders, realign US 180 at the Hurley railroad crossing, and improve intersections as described in Exhibit 4-4.

Exhibit 4-3. Enhanced 2-Lane Alternative Proposed Passing Lanes

Passing Lane Location	Direction	Length (miles)
MP 128.09 to 130.07	Northbound	1.98
MP 132.19 to 134.24	Southbound	2.05
MP 136.53 to 138.59	Northbound	2.05
MP 140.41 to 142.41	Southbound	2.00
MP 144.24 to 146.24	Northbound	2.00
MP 148.06 to 150.06	Southbound	2.00
MP 151.89 to 153.89	Northbound	2.00
MP 155.52 to 157.51	Southbound	2.00

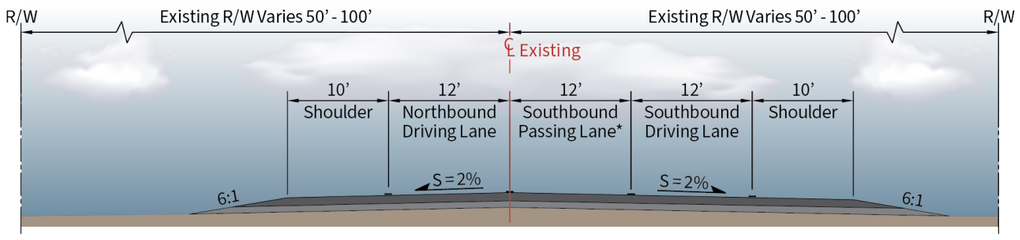
Exhibit 4-4. Proposed Intersection Improvements

Location	Description
North Hurley Road	Lengthen the southbound left turn and the northbound right turn lanes.
Pit Access Road/New Access Road	Lengthen the northbound left turn and southbound acceleration lanes. If the Hurley overpass is removed, the Pit Access Road intersection would be closed, and a new intersection would be built where the overpass is currently located.
Carrasco Avenue	Reconfigure the intersection and turn lanes.
Airport Road	Lengthen the southbound right turn lane.
NM 61	Provide a southbound left turn lane and a northbound right turn lane, acceleration lanes in both directions could be considered.
Rest Area	Lengthen the southbound right turn and northbound left turn lanes.
Butterfield Trail	Provide northbound acceleration and deceleration lanes and southbound deceleration lanes at Wells Fargo Drive and Butterfield Trail.
Perrin Road	Provide northbound and southbound deceleration lanes.

4.4.2 Super 2 Alternative

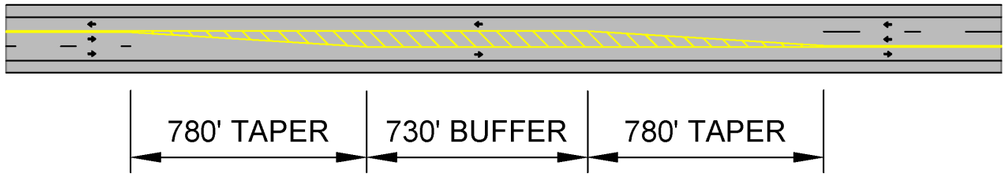
Exhibit 4-5 provides a typical cross-section for the Super 2 Alternative. With this alternative, US 180 would remain a 2-lane highway through Segments 1 and 2 in Bayard and Hurley as described above for the Enhanced 2-Lane Alternative. A Super 2 concept would not be feasible in Segments 1 and 2 due to its short length and number of driveways, intersections, and turn lanes. South of Hurley in Segment 3, alternating passing lanes would be provided in each direction. The Super 2 Alternative would provide a total of approximately 25 miles of passing lanes, with about 12.5 miles of passing lanes (7 passing lanes in each direction over the 32-mile stretch of Segment 3. The length of the passing lanes will vary, but most of them will range from 1.7 miles to 2 miles long with a 1/4-mile transition zone as shown in Exhibit 4-6. There are a few locations where passing lanes would be shorter than 1.7 miles due to brides or the need for turn lanes. Passing lanes would not be provided at the two bridges, which include the bridge over Coldwater Creek at MP 142 or the bridge over the Mimbres River at MP 147. In addition to passing lanes, the Super 2 Alternative would rehabilitate pavement, widen shoulders, realign US 180 at the Hurley railroad crossing, and improve intersections as described in Exhibit 4-4.

Exhibit 4-5. Super 2 Alternative



** Passing lane alternates between northbound and southbound travel direction.*

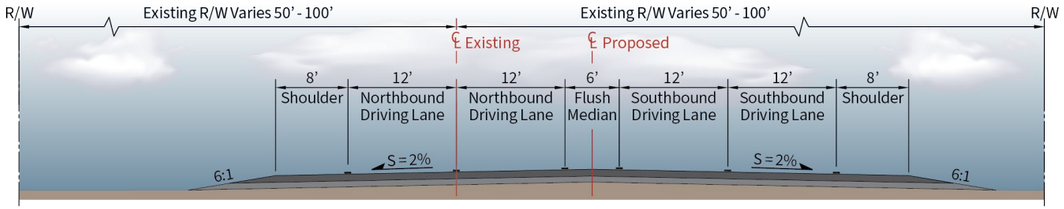
Exhibit 4-6. Plan View of Super 2 Alternative Lane Configuration in Segment 3



4.4.3 4-Lane Divided Flush Median Alternative

Exhibit 4-7 provides a typical cross-section for the 4-Lane Divided Flush Median Alternative. This alternative would widen US 180 to a 4-lane highway with 2 travel lanes in each direction for the entire corridor and a 6-foot-wide median between the northbound and southbound lanes. This is the same typical section that exists south of Keeler Road at the EOP. In addition, the 4-Lane Divided Flush Median Alternative would rehabilitate pavement, widen shoulders, realign US 180 at the Hurley railroad crossing, and improve intersections as described in Exhibit 4-4.

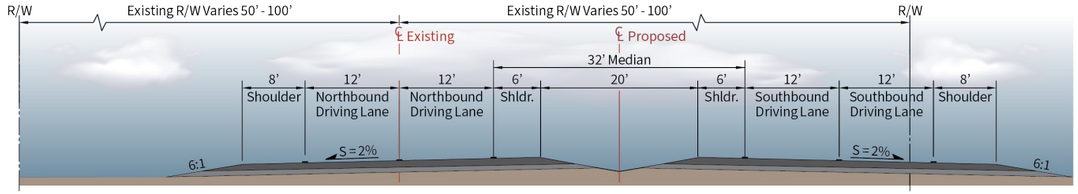
Exhibit 4-7. 4-Lane Divided Flush Median Alternative



4.4.4 4-Lane Divided Depressed Median Alternative

Error! Not a valid bookmark self-reference. provides a typical cross-section for the 4-Lane Divided Depressed Median Alternative. This alternative would widen US 180 to a 4-lane highway with 2 travel lanes in each direction for the entire corridor. With this alternative, a 32-foot-wide median would be provided between the northbound and southbound lanes, which includes 6-foot shoulders on each side of the depressed median. In addition, the 4-Lane Divided Depressed Median Alternative would rehabilitate pavement, widen shoulders, realign US 180 at the Hurley railroad crossing, and improve intersections as described in Exhibit 4-4.

Exhibit 4-8. 4-Lane Divided Depressed Median Alternative



4.5 Screening Methods and Metrics

4.5.1 Screening Methods

As an initial step of the evaluation process, the four alternatives were assessed using a screening process. The screening process included quantitative and qualitative analyses to compare key aspects, advantages, and disadvantages of each alternative. The findings of the analyses were summarized in a screening matrix found in Exhibit 4-9 through Exhibit 4-11. Based on this qualitative assessment, the most favorable alternatives were advanced for further consideration, while the least favorable alternatives were dropped.

The metrics used in the screening analysis include:

- Traffic – The degree to which traffic operations would improve from the proposed improvements.
- Safety – The degree of safety enhancement resulting from the proposed improvements.
- Right-of-Way and Utility Impacts – The amount of new right-of-way needed and potential impacts to utilities.
- Bridges and Major Structures – The possible effects of the alternative on bridges and major drainage structures.
- Maintenance of Traffic and Constructability – The ability to construct proposed improvements while maintaining two-way traffic and potential construction challenges.
- Public and Stakeholder Acceptance – Likelihood of acceptance by the public and stakeholders based on their input into the initial project survey discussed in Chapter 2.
- Environmental Considerations – Amount of disturbance/effects to habitat located outside of the existing footprint of US 180 and potential fatal flaws, such as impacts to cultural natural resources that could not be mitigated or permitted.
- Economic Development – The potential to support economic development in the major communities served by the US 180 corridor.
- Cost – Cost of the proposed improvements.

Exhibit 4-9. Initial Screening Analysis Segment 1: BOP/Bayard (MP 123) to North of the Hurley Railroad Crossing (MP 127.25)

Note: The Super 2 Alternative was not considered for this segment

Alternative/Metric	Enhanced 2-Lane Alternative	4-Lane Divided Flush Median Alternative	4-Lane Divided Depressed Median Alternative
Traffic • Changes to traffic operations	• LOS would remain the same.	• Traffic operations would be improved from LOS C to LOS A from MP 123 to 125.3 and LOS B to A from MP 125.3 to the railroad crossing.	• Traffic operations would be improved from LOS C to LOS A from MP 123 to 125.3 and LOS B to A from MP 125.3 to the railroad crossing.
Safety • General safety improvements • Potential to reduce passing and/or intersection conflicts	• Frequency of intersections and the short segment length limits the feasibility of passing lanes. • Auxiliary lane improvements at intersections would reduce conflicts.	• Overall safety is improved; speed differential is mitigated. • Crash risk from unsafe passing is substantially improved.	• Overall safety is improved, speed differential is mitigated. • Crash risk from unsafe passing is substantially improved.
Right-of-Way (R/W) and Utility Impacts • Amount of R/W needed • Utility impacts	• 0 acres, no new R/W needed • No utility impacts identified.	• 5 acres of R/W needed • No utility impacts identified.	• 16 acres of R/W needed • No utility impacts identified.
Bridges and Major Drainage Structures • Effects on bridges and major drainage structures	• The roadside barrier at the Hurley overpass does not meet current standards. • Bridge piers supporting the Hurley overpass limit the ability to widen shoulders.	• The Hurley overpass would be removed, and access would be provided at-grade or would be relocated.	• The Hurley overpass would be removed, and access would be provided at-grade or would be relocated.
Maintenance of Traffic (MOT) and Constructability • MOT during construction • Construction challenges	• Construction would reduce traffic to 1 lane within construction zones, which would cause delays. • Areas of unstable subgrade soils requiring remediation/replacement may be a challenge.	• Two-way traffic could be maintained during most construction activities if pavement widening occurs to one side. The primary challenge would be construction at the rock cut at MP 123.6 and intersections. • Areas of unstable subgrade soils requiring remediation/replacement may be a challenge.	• Two-way traffic could be maintained during most construction activities. The primary challenge would be construction at the rock cut near MP 123.6 and intersections. • Areas of unstable subgrade soils requiring remediation/replacement may be a challenge.
Public and Stakeholder Acceptance • Input received from the initial survey	• A lack of passing lanes and/or additional travel lanes would not meet public expectations.	• Adding travel lanes to mitigate passing problems is consistent with public expectations.	• Adding travel lanes to mitigate passing problems is consistent with public expectations.
Environmental Considerations • Acres of habitat potentially affected • Potential fatal flaws	• Approximately 2 acres of habitat converted to roadway. • No fatal flaws	• Approximately 15 acres of habitat converted to roadway. • No fatal flaws	• Approximately 29 acres of habitat converted to roadway. • No fatal flaws
Economic Development • The potential to support economic development	• Maintains existing conditions but would not improve conditions for economic development.	• Improves conditions for economic development by improving traffic operations, enhancing safety, and improving connections for efficient goods transport.	• Improves conditions for economic development by improving traffic operations, enhancing safety, and improving connections for efficient goods transport.
Cost[a] • Design and construction cost	• $7.0 million	• $15.7 million	• $19.4 million

a Costs include a 25% contingency, design, and construction management and do not include costs for right-of-way acquisition or New Mexico gross receipts tax.

Exhibit 4-10. Initial Screening Analysis Segment 2: Hurley Railroad Crossing (MP 127.25 to MP 128.5)

Note: The Super 2 Alternative was not considered for this segment

Alternative/Metric	Enhanced 2-Lane Alternative	4-Lane Divided Flush Median Alternative	4-Lane Divided Depressed Median Alternative
Traffic • Changes to traffic operations	• LOS would remain the same, which is LOS B in the northbound direction and LOS A in the southbound direction.	• LOS in the northbound direction would be improved from LOS B to A. Traffic operations in the southbound direction would stay LOS A.	• LOS in the northbound direction would be improved from LOS B to A. Traffic operations in the southbound direction would stay LOS A.
Safety • General safety improvements • Potential to reduce passing and/or intersection conflicts	• Safety significantly improved at railroad crossing. • Posted speed of 45 to 55 mph can be achieved.	• Safety significantly improved at railroad crossing. • Posted speed of 45 to 55 mph can be achieved.	• Safety significantly improved at railroad crossing. • Posted speed of 45 to 55 mph can be achieved.
Right of Way (R/W) and Utility Impacts • Amount of R/W needed • Utility impacts	• 12 acres of R/W needed • Electric, gas, and water lines are located under the railroad crossing.	• 12 acres of R/W needed • Electric, gas, and water lines are located under the railroad crossing.	• 12 acres of R/W needed • Electric, gas, and water lines are located under the railroad crossing.
Bridges and Major Drainage Structures • Effects on bridges and major drainage structures	• No bridges or major structures in this segment.	• No bridges or major structures in this segment.	• No bridges or major structures in this segment.
Maintenance of Traffic (MOT) and Constructability • MOT during construction • Construction challenges	• Two-way traffic could be maintained, but detours and delays would occur at intersections and tie-in locations.	• Two-way traffic could be maintained during most construction activities. The primary challenge would be construction at intersections and tie-in locations.	• Two-way traffic could be maintained during most construction activities. The primary challenge would be construction at intersections and tie-in locations.
Public and Stakeholder Acceptance • Input received from the initial survey	• A lack of passing lanes and/or additional travel lanes would not meet public expectations.	• Adding travel lanes to mitigate passing problems is consistent with public expectations.	• Adding travel lanes to mitigate passing problems is consistent with public expectations.
Environmental Considerations • Acres of habitat potentially affected • Potential fatal flaws	• Approximately 9 acres of habitat converted to roadway, with the potential to restore 2 to 5 acres where the existing roadway is located. • No fatal flaws	• Approximately 14 acres of habitat converted to roadway, with the potential to restore 2 to 5 acres where the existing roadway is located. • No fatal flaws	• Approximately 18 acres of habitat converted to roadway, with the potential to restore 2 to 5 acres where the existing roadway is located. • No fatal flaws
Economic Development • The potential to support economic development	• Maintains existing conditions but would not improve conditions for economic development.	• Improves conditions for economic development by improving traffic operations, enhancing safety, and improving connections for efficient goods transport.	• Improves conditions for economic development by improving traffic operations, enhancing safety, and improving connections for efficient goods transport.
Cost[a] • Design and construction cost	• $5.9 million	• $8.3 million	• $9.5 million

a Costs include a 25% contingency, design, and construction management and do not include costs for right-of-way acquisition or New Mexico gross receipts tax.

Exhibit 4-11. Initial Screening Analysis Segment 3: South of the Hurley Railroad Crossing to EOP/Deming (MP 128.5 to MP 161)

Alternative/Metric	Enhanced 2-Lane Alternative	Super 2 Alternative	4-Lane Divided Flush Median Alternative	4-Lane Divided Depressed Median Alternative
Traffic • Changes to traffic operations	• LOS would remain the same (LOS A) in this segment with a small section of LOS B for northbound traffic heading from MP 131.5 to MP 128.5. • Traffic LOS is acceptable for a rural 2-lane highway; however, occasional conflicts due to speed differential would remain.	• LOS would remain the same (LOS A) in this segment with a small section of LOS B for northbound traffic heading from MP 131.5 to MP 128.5. • Traffic LOS is acceptable for a rural 2-lane highway; however, occasional conflicts due to speed differential would remain.	• LOS would remain the same (LOS A) in most of the segment; however, the northbound LOS from MP 131.5 to MP 128.5 would improve from LOS B to LOS A. • Traffic operational issues associated with speed differential would be mitigated. • The wider roadway section could result in higher travel speeds. While crash risk is reduced, crash severity could increase with higher-speed travel.	• LOS would remain the same (LOS A) in most of the segment; however, the northbound LOS from MP 131.5 to MP 128.5 would improve from LOS B to LOS A. • Traffic operational issues associated with speed differential would be mitigated. • The wider roadway section could result in higher travel speeds. While crash risk is reduced, crash severity could increase with higher-speed travel.
Safety • General safety improvements • Potential to reduce passing and/or intersection conflicts	• Safety is improved by eliminating passing conflicts and improving auxiliary lanes at major intersections.	• Safety is substantially improved by eliminating passing conflicts and improving auxiliary lanes at major intersections.	• Safety is substantially improved by eliminating passing conflicts and adding auxiliary lanes at major intersections.	• Safety is substantially improved by eliminating passing conflicts and improving auxiliary lanes at major intersections.
Right of Way (R/W) and Utility Impacts • Amount of R/W needed • Utility impacts	• 11 acres of R/W needed. • Approximately 18,000 feet of utility lines on the west potentially affected.	• 14 acres of R/W needed. • Approximately 81,000 feet of utility lines on the west potentially affected.	• 86 acres of R/W needed. • Approximately 153,000 feet of utility lines on the west would potentially be affected.	• 185 acres of R/W needed. • Approximately 153,000 feet of utility lines on the west would potentially be affected.
Bridges and Major Drainage Structures • Effects on bridges and major drainage structures	• Passing lane not provided at bridges. • Major structures were considered when locating passing lanes, some drainage extensions would be required.	• Passing lane not provided at bridges. • Structure extensions required for drainage structures.	• Bridge widening or new parallel bridges at two bridge locations. • Structure extensions required for drainage structures.	• New parallel bridges at two locations. • Structure extensions required for drainage structures.
Maintenance of Traffic (MOT) and Constructability • MOT during construction • Construction challenges	• Construction would reduce traffic to 1 lane adjacent to construction zones, which would cause delays. • Areas of unstable subgrade soils requiring remediation/replacement may be a challenge.	• Two-way traffic could be maintained during most construction activities. The primary challenge would be construction at intersections. • Areas of unstable subgrade soils requiring remediation/replacement may be a challenge.	• Two-way traffic could be maintained during most construction activities if pavement widening occurs to one side. The primary challenge would be construction at intersections. • Areas of unstable subgrade soils requiring remediation/replacement may be a challenge.	• Two-way traffic could be maintained during most construction activities. The primary challenge would be construction at intersections. • Areas of unstable subgrade soils requiring remediation/replacement may be a challenge.
Public and Stakeholder Acceptance • Input received from the initial survey	• Adding passing lanes would partially meet public expectations.	• Adding passing lanes would partially meet public expectations.	• Adding travel lanes to mitigate passing problems is consistent with public expectations.	• Adding travel lanes to mitigate passing problems is consistent with public expectations.
Environmental Considerations • Acres of habitat affected • Potential fatal flaws	• Approximately 29 acres of habitat converted to roadway. • No fatal flaws	• Approximately 62 acres of habitat converted to roadway. • No fatal flaws	• Approximately 118 acres of habitat converted to roadway. • No fatal flaws	• Approximately 221 acres of habitat converted to roadway. • No fatal flaws
Economic Development • The potential to support economic development	• Improves conditions for economic development by enhancing safety and providing passing opportunities for slower vehicles, including freight.	• Improves conditions for economic development by enhancing safety and providing passing opportunities for slower vehicles, including freight. The Super 2 provides more passing opportunities than the Enhanced 2-Lane Alternative.	• Improves conditions for economic development more than the 2-lane alternatives by enhancing safety by eliminating the need for all passing maneuvers and providing a continuous 4-lane corridor from Silver City to Deming, connecting to I-10, to provide efficient goods transport.	• Improves conditions for economic development more than the 2-lane alternatives by enhancing safety by eliminating the need for all passing maneuvers and providing a continuous 4-lane corridor from Silver City to Deming, connecting to I-10, to provide efficient goods transport.
Cost[a] • Design and construction cost	• $64.9 million	• $79.3 million	• $119.5 million	• $136.5 million

a Costs include a 25% contingency, design, and construction management and do not include costs for right-of-way acquisition or New Mexico gross receipts tax.

4.6 Initial Screening Analysis and Findings

Major findings of the screening analysis include:

- Traffic – The 4-lane alternatives would achieve the best traffic LOS. However, acceptable traffic operations could be achieved by both the Enhanced 2-Lane Alternative and the Super 2 Alternative.
- Safety – All of the alternatives include the improvements at major intersections and the reverse curves at the railroad crossing. These improvements would reduce crash risks associated with turning traffic and travel through the reverse curves at the railroad crossing. The 2-lane alternatives would not eliminate passing risks in Segments 1 and 2, but the addition of passing lanes in Segment 3 would substantially reduce crash risk in this segment. Likewise, the Super 2 Alternative would also substantially reduce passing conflicts in Segment 3. Both 4-lane alternatives would eliminate the need for passing maneuvers.
- Right-of-Way and Utility Impacts – All of the alternatives would require right-of-way acquisition, though none of them would require acquiring buildings or residences. The Enhanced 2-Lane Alternative would require the least right-of-way acquisition due to the smaller size of the overall project footprint. The 4-Lane Divided Depressed Median Alternative would require the most right-of-way and more than double the amount of right-of-way required to build the 4-Lane Divided Flush Median Alternative.
- Bridges and Major Drainage Structures – The 2-lane alternatives would not require replacing or relocating the Hurley overpass or widening the two bridges in Segment 3. The 4-lane alternatives would require replacing or relocating the Hurley overpass and the two bridges would also need to be widened or two new parallel bridges would need to be built. The 4-lane alternatives would require more extensive drainage structure improvements than the 2-lane alternatives.
- MOT and Constructability – Two-way traffic could be maintained during construction through most of the corridor if either of the 4-lane alternatives were built. Construction of the 2-lane alternatives would cause more traffic delays during construction since traffic would be reduced to 1 lane within many construction zones For all of the alternatives, areas of unstable subgrade soils may be a challenge. In addition, the 4-lane alternatives would require areas of rock cut near MP 123.2 in Segment 1, which would not be an issue for the Enhanced 2-Lane Alternative.
- Public and Stakeholder Acceptance – All of the proposed alternatives would add passing lanes, improve the railroad crossing, and make improvements at major intersections, which were some of the main concerns people identified in the public survey. While public comment did not express a clear preference for any alternative, many people stated a preference for a 4-lane highway.
- Environmental Considerations – None of the alternatives have fatal flaws and obtaining the necessary environmental approvals and permits would be feasible. The Enhanced 2-Lane Alternative is expected to have the fewest overall environmental effects, since it would have a smaller overall footprint and would convert the least amount of general habitat to roadway.
- Economic Development – The 4-lane alternatives would support economic development to a greater degree than the 2-lane alternatives because they would provide a continuous 4-lane highway from Silver City to Deming/I-10. Four-lane highways with good connectivity to the interstate system are a major consideration of manufacturing industries when they evaluate the location of new sites. The 4-lane alternatives would be an advantage to the communities along US 180 as they compete to attract new industry. The 4-lane alternatives are consistent with statewide efforts from the late 1990s to promote safety and economic development. US 180 was included as part of these statewide efforts but was never completed due to a lack of funding. Building a 4-lane roadway between Bayard and Deming is consistent with *The New Mexico 2040 Plan* (NMDOT 2015a), NMDOT's long-range transportation plan and NMDOT's *Southwest Regional Transportation Plan* (NMDOT 2015b).
- Cost – The Enhanced 2-Lane Alternative is the lowest cost alternative in each Segment. The 4-Lane Divided Depressed Median Alternative is more than double the cost of the Enhanced 2-Lane Alternative if it were constructed throughout the entire corridor. The Super 2 Alternative is about $14 million more than the Enhanced 2-Lane Alternative and it provides about 9 additional miles of passing lanes than the Enhanced 2-Lane Alternative. Of the 4-lane alternatives, the 4-Lane Divided Flush Median Alternative provides similar roadway capacity for a cheaper cost than the 4-Lane Divided Depressed Median Alternative.

4.7 Alternatives Recommended for Detailed Analysis

Based on the screening evaluation, all of the proposed alternatives would meet the project purpose and need, though some alternatives would meet the needs better than others. Because of this, the following alternatives were recommended for more detailed analysis:

- Enhanced 2-Lane Alternative
- Super 2 Alternative
- 4-Lane Divided Flush Median Alternative

The 4-Lane Divided Depressed Median Alternative was dropped from further consideration, because it has much higher costs and greater impacts to the environment, right-of-way, bridges, and major structures than the 4-Lane Divided Flush Median. In addition, the 4-Lane Divided Flush Median would meet safety and operational needs in the corridor.

5. DETAILED ANALYSIS OF ALTERNATIVES

5.1 Introduction

This chapter provides a more detailed analysis of the alternatives that were carried forward for additional analysis: the Enhanced 2-Lane, Super 2, and 4-Lane Divided Flush Median Alternatives. This chapter describes the criteria used to further evaluate the alternatives and provides a recommended alternative in each segment of the corridor. Conceptual plans and profiles for the three alternatives are provided in Appendices E, F, and G.

5.2 Evaluation Methods and Metrics

The metrics used to evaluate and compare alternatives were similar to those used for the screening analysis. The primary difference between the initial screening and detailed analyses is the level of detail and emphasis on quantitative metrics. These metrics include:

- Traffic – The degree to which traffic operations would improve from the proposed improvements.
- Safety – The degree of safety enhancement resulting from the proposed improvements.
- Right-of-Way Acquisition – The amount of new right-of-way needed.
- Utility Impacts – Discussion of utilities impacts.
- Bridges and Major Drainage Structures – The possible effects of the alternative on bridges and major drainage structures.
- Maintenance of Traffic and Constructability – The ability to construct proposed improvements while maintaining two-way traffic and potential construction challenges.
- Public and Stakeholder Perspectives – Input received from the public and stakeholders as part of the online public meeting.
- Environmental Considerations – Area of disturbance/effects to habitat located outside of the existing footprint of US 180, permitting, and cultural resource considerations.
- Economic Development – The potential to support economic development in the major communities served by the US 180 corridor.
- Cost – Cost of the proposed improvements.

5.3 Traffic

5.3.1 Segment 1

With the 4-Lane Divided Flush Median Alternative, traffic operations in Segment 1 would improve from LOS C to LOS A from MP 123 to 125.3 and LOS B to A from MP 125.3 to the Hurley railroad crossing. In addition, operational issues associated with speed differential and a high number of large trucks would be mitigated. With the Enhanced 2-Lane Alternative, traffic operations would remain the same, though intersection and auxiliary lane upgrades would improve conditions for drivers.

5.3.2 Segment 2

In Segment 2, both alternatives would significantly improve roadway conditions at the railroad crossing. The additional travel lanes with the 4-Lane Alternative would improve LOS in the northbound direction from LOS B to A. With the 4-Lane Alternative, traffic operations in the southbound direction would remain LOS A. Traffic operations with the Enhanced 2-Lane Alternative would remain the same (LOS A), since new lanes would not be built.

5.3.3 Segment 3

South of Hurley, traffic volumes in this segment reduce by about half to less than 3,000 average daily vehicles. Traffic operations in this segment are currently LOS A, which is acceptable for a rural 2-lane highway, though there are conflicts due to speed differential. There is a small section of this segment from MP 131.5 to MP 128.5 that operates at LOS B for northbound traffic. The 2-lane alternatives would not improve LOS in this section of US 180, while the 4-Lane Alternative would improve the LOS to A in this 3-mile section.

Both 2-lane alternatives would add passing lanes, which would substantially improve travel conditions for drivers, allowing them to pass slower traffic at several locations. The Enhanced 2-Lane Alternative would provide a total of 8 miles of passing lanes in each direction of US 180 for a total of 16 miles of passing lanes. The Super 2 Alternative would provide about 12.5 miles of passing lanes in each direction for a total of 25 miles of passing lanes. . Either of these alternatives would provide a substantial improvement over existing conditions where passing lanes are not provided.

The 4-Lane Alternative would mitigate traffic operational issues associated with speed differential, and would offer a greater improvement for traffic, by providing an extra lane in each direction for the entire segment.

5.4 Safety

5.4.1 Segment 1

Of the two alternatives proposed in Segment 1, the 4-Lane Alternative would provide the most potential to improve safety because the additional lane in each direction would eliminate passing conflicts. As described in Chapter 3, Existing Conditions, this segment of US 180 has the highest traffic volumes and highest number of crashes in the corridor. In addition, the serious injury rate in this section is higher than the statewide average. The Enhanced 2-Lane Alternative would offer modest improvement in this segment by improving turning, acceleration, and deceleration lanes at major intersections.

5.4.2 Segment 2

Both the Enhanced 2-lane and the 4-Lane Alternatives in Segment 2 would improve safety by realigning the highway at the railroad crossing to improve conditions for drivers. In addition, both alternatives would improve turning, acceleration, and deceleration lanes, which would also improve safety. Both alternatives would offer a similar level of improvement from a safety perspective.

5.4.3 Segment 3

Of the three alternatives being considered, the 4-Lane Alternative would improve safety the most, since the roadway would have 2 lanes in each direction and would eliminate passing conflicts. This alternative could also result in higher travel speeds. While crash rates would be reduced, crash severity could increase if travel speeds increase. The Super 2 and Enhanced 2-Lane Alternatives would also improve safety by providing multiple passing opportunities and by improving or adding turning lanes, acceleration lanes, and deceleration lanes.

5.5 Right-of-Way Acquisition

All three project alternatives would require the acquisition of property adjacent to the existing highway as shown in Exhibit 5-1. The amount of right-of-way needed is greatest with the 4-Lane Alternative with about 103 acres needed. Right-of-way needs are similar with the Enhanced 2-Lane and Super 2 Alternatives with approximately 23 acres and 26 acres affected, respectively.

Exhibit 5-1. Summary of Right-of-Way Impacts

	Enhanced 2-Lane	Super 2	4-Lane
Segment 1	0 acres	0 acres [a]	5 acres
Segment 2	12 acres	12 acres [a]	12 acres
Segment 3	11 acres	14 acres	86 acres
Total	**23 acres**	**26 acres**	**103 acres**

a The Super 2 Alternative assumes the same improvements as the Enhanced 2-Lane Alternative since it is not feasible to develop a Super 2 concept in Segments 1 and 2.

In most locations, right-of-way acquisition is limited to narrow bands of property adjacent to the existing highway. The Enhanced 2-Lane Alternative has the least amount of impact with acquisition needs limited to narrow slivers of property less than 15 feet wide, though the widths increase up to 25 feet in a few isolated locations. The width of affected property increases with the Super 2 Alternative and includes swaths ranging from 20 to 40 feet wide. Right-of-way acquisition with the 4-Lane Alternative would affect almost the entire length of the project limits. The width of property needed ranges from 20-feet up to 70 feet. For all alternatives, none of the property needed for new right-of-way includes houses or other buildings.

The proposed realignment of US 180 in Segment 2 at the railroad crossing in Hurley would be constructed in new right-of-way and would acquire up to a 150-foot swath of land for a distance of up to 3,500 feet. The acquired property consists of vacant land and would not affect any developed property or buildings.

Most of the needed right-of-way are privately owned parcels, though some property owned by the NMSLO and the BLM would be needed in Segment 3. The Enhanced 2-Lane and Super 2 Alternatives would require acquisition of privately owned lands and state and federal lands would not be acquired. The 4-Lane Alternative would acquire privately owned land and would also require approximately 28 acres of lands owned by the NMSLO and 4 acres of BLM lands.

5.6 Utility Impacts

5.6.1 Segment 1

Utility impacts are expected to be minor for the Enhanced 2-Lane Alternative. In Bayard anticipated impacts consist of manhole or valve adjustments to grade, typical of pavement rehabilitation projects. For the 4-Lane Alternative, impacts would include relocation of existing streetlights and manhole and valve adjustments at the south end of Bayard.

5.6.2 Segment 2

A realignment of US 180 at the railroad tracks is proposed in Segment 2 with any of the proposed alternatives. With either realignment option, and either the 2-Lane Enhanced Alternative or the 4-Lane Alternative, an existing water line at MP 127.59 will be covered by the new roadway. The existing fiber optic cable that runs just inside the east right-of-way line south of the railroad crossing would be impacted by realignment Option 2, as would a pair of gas lines that parallel US 180 that sit outside of the existing right-of-way.

5.6.3 Segment 3

With the 2-Lane Enhanced Alternative, the existing fiber optic cable(s) along the west side of the right-of-way line from MP 132 to MP 142 would be covered with additional fill associated with pavement widening for the passing lanes.

Similarly, the existing fiber optic cable(s) along the west side of the right-of-way line from MP 132 to MP 147.5 would be covered with additional fill associated with pavement widening for the passing lanes for the Super 2 Alternative, as would two crossings of the fiber lines at Airport Road at MP 131. At MP 130, two gas lines cross the roadway and would be covered with additional fill due to roadway widening.

With the 4-Lane Alternative, the gas line crossings at MP 130 and the fiber optic crossings at Airport Road have similar impacts as the Super 2 Alternative. In addition, impacts to the existing fiber optic lines along the west side of the right-of-way would occur from MP 132 to MP 161. Depending on the ultimate design, profile grade, and tie slopes, the fiber optic cables could be covered with additional fill or potentially impacted by cut slopes.

5.7 Bridges and Major Drainage Structures

5.7.1 Segment 1

The one major structure in this segment is the overpass in Hurley. Because the Enhanced 2-Lane Alternative would not require substantial widening of US 180 under this overpass, this structure can remain in place. Full-width shoulders cannot be accommodated under the overpass because of the pier locations. Thus, the highway would not meet design criteria at the bridge approaches and under the bridge. The 4-Lane Alternative would require either rebuilding the overpass or providing access at-grade at this location. Because of its limited use, it is unlikely that a new bridge would be constructed and a new at-grade intersection would be constructed in its place. It may be possible to combine this intersection with the access point located about 0.25 miles north of the overpass at the Pit Access Road. This would reduce conflict points and improve safety. An example of this concept is shown in Exhibit 5-2. The decision to use an at-grade intersection in lieu of replacing the overpass structure will be determined in final design.

Exhibit 5-2. Hurley Overpass At-Grade Roadway Concept

5.7.2 Segment 2

There are no bridges or major structures in this segment, so bridges and structures would not be impacted by either alternative.

5.7.3 Segment 3

The Enhanced 2-Lane Alternative would have the fewest effects to bridges and major structures in this segment, followed by the Super 2 Alternative and the 4-Lane Alternative. The 2-lane alternatives would not affect the two bridges located in this segment, because passing lanes would not be provided at the bridges. The Enhanced 2-Lane Alternative would require some improvements/extensions for major drainage structures but would be designed to minimize the need to expand these facilities, where feasible. The Super 2 Alternative would not affect the bridges but would require structure extensions at multiple major drainage structures. The 4-Lane Alternative would require widening of both bridges or construction of new parallel bridges and widening of all the major drainage structures in this segment.

As discussed in Chapter 3, the majority of the existing reinforced CBCs under US 180 were originally built in the 1930s and were designed for lighter trucks than the current standards. Thirty-two of these were extended with corrugated metal pipes, placed side by side with minimal separation. In locations where the adjacent pipes will be under the new travel lanes, they should be removed and the concrete boxes extended or replaced with another culvert type.

As an option, the existing CBCs could be replaced. This would bring the load ratings up to current standards. The preliminary estimate of replacement costs at 41 locations is $1,550,000. Note, this would be in addition to the cost of culvert extensions for the proposed roadway alternatives. Additional considerations for major drainage structures in Segment 3 are discussed below.

Lampbright Draw CBCs

The preliminary drainage analysis indicated the existing CBCs under US 180 at the Lampbright Draw are undersized for the 50-year design storm. The existing five 12-foot-span by 7-foot-rise boxes surcharge and cause the channel to overflow to the south. Since the existing roadway is perched above the floodplain, overtopping of US 180 is unlikely and has not been reported. Replacing the culverts with a bridge could be considered as an option. A new bridge with a length of 180 feet and a width of 47 feet on a 45-degree skew was the assumed concept, with a construction cost of $2,067,000 including the roadway approaches. The roadway grade would need to be raised by about 6 feet to accommodate the new structure. With the lack of reported issues, and assuming the channel can overflow without major impacts to US 180 or other properties, extending the existing box culverts is a low-cost option. Additional drainage analysis will be performed as the project moves forward.

Mimbres River Bridge

At the US 180 Bridge over the Mimbres River, the earth berms along the south bank of the river upstream of US 180 have eroded over time. The preliminary drainage analysis shows flood flows will escape the main channel and inundate areas to the south. Major storms will overtop US 180 and Perrin Road where it intersects US 180, 2.1 miles south of the Mimbres River Bridge. Although the overtopping may extend more than a mile along US 180 south of the Bridge, the 100-year flow depth would be relatively shallow. Options to improve drainage in this area include repairing existing earth berms and/or constructing new berms upstream of the bridge. Berms would be extensive (over 1,000 feet long) and could require easements from private property owners. The potential overtopping risk will be evaluated during preliminary design.

5.8 Maintenance of Traffic and Constructability

5.8.1 Segment 1

Construction challenges unique to Segment 1 include areas of rock cut from MP 123.2 to MP 123.6. Per the *Preliminary Geotechnical Report*, the material (hard to very hard bedrock) will likely require rock excavation and/or blasting. This is not expected to be an issue for the Enhanced 2-Lane Alternative but may present challenges to MOT with the 4-Lane Alternative.

Per the Draft Pavement Condition Assessment Report, minor pavement rehabilitation such as a partial mill and overlay may be suitable for Segment 1 due to the existing pavement being in generally good condition. For the Enhanced 2-Lane Alternative, a mill and overlay operation will require closure of one side of the roadway; traffic will be reduced to 1 lane/two-way operation under flagger/pilot car control. The length of the work zone will be limited so that excessive delays do not result. For the 4-Lane Alternative, pavement widening to one side could occur, allowing traffic to be maintained on the existing pavement. After construction of the new pavement, traffic can be switched to allow rehabilitation of the existing asphalt.

5.8.2 Segment 2

Maintenance of 2 lanes of traffic is anticipated to be feasible for all alternatives in Segment 2 since this section of roadway would be realigned. Construction at intersections and tie-in locations will present the primary challenges.

5.8.3 Segment 3

Based on the findings of the *Draft Pavement Condition Assessment Report*, pavement mill and overlay may be suitable to rehabilitate the existing pavement. Thus, MOT could be provided as described in Section 5.8.1.

From MP 140 to the EOP, major rehabilitation is recommended; this could entail full depth reconstruction. Reconstruction may introduce further challenges due to pavement drop-off requirements and may require temporary pavement for maintenance of traffic.

5.9 Public and Stakeholder Perspectives

NMDOT received 112 comments on the proposed alternatives and key findings of this US 180 Phase 1-A/B Alignment Study through the comment period that ran from February 24, 2021 through March 22, 2021 as summarized below:

- 10 people asked questions and made comments at the March 4, 2021 online public meeting.
- 15 people provided written comments via email.
- 87 people provided comments using the comment form provided on the website.

Of the 112 comments received, some people chose to provide comments through more than one of the options listed above. For example, some people chose to provide comments at the public meeting and through email. The 112 comments received focused around several comment themes. These comment themes and responses are provided below in Exhibit 5-3.

Exhibit 5-3. Summary of Key Public Comment Themes and Responses

Theme	Comment Summary	Response
Extend the pedestrian/bike path from Bayard to Hurley	About half of the comments received asked if this project could build a non-motorized connection between Bayard and Hurley that would be similar to the one being constructed between Santa Clara and Bayard. Several people suggested that the non-motorized path could be extended to Silver City to connect Silver City, Santa Clara, Bayard, and Hurley. While many people indicated strong support for the concept of a non-motorized pathway, there were some people who were concerned increased lighting, increased costs, and if the projected use would warrant a pathway.	At this time, NMDOT is not proposing to extend the walkway or build a non-motorized connection between Bayard and Hurley; however, the construction of a non-motorized connection would not be precluded by NMDOT's preferred alternative. NMDOT's preferred alternative includes widening roadway shoulders to safely accommodate bicycles (see the response related to bike accommodations). While there could be a variety of benefits of providing a non-motorized connection between Bayard and Hurley, this is a relatively new idea and one that is not solely a NMDOT decision. Typically, regional trails/non-motorized connections, such as this proposal, are developed and prioritized through local and regional planning processes that would include Grant County, the Towns of Bayard and Hurley, the Southwest Regional Transportation Planning Organization, the NMDOT and other key stakeholders. This non-motorized connection is not identified in Grant County's current Comprehensive Plan, June 2017. It is our understanding that Grant County is starting a cross-jurisdictional trails planning process. That planning process will engage a wide variety of interested parties to collectively identify and prioritize future trail-related projects in Grant County. The concept of a non-motorized connection between Bayard and Hurley could be considered and developed as part of these broader planning efforts. The NMDOT shared public comments received related to extending this trail with Grant County.
Lighting Concerns	Many citizens, including several residents from the Butterfield Estates area near the rest stop, asked if lighting is proposed and expressed concern about impacts to night skies. Several people expressed concern about the lighting that has been installed in Bayard and indicated strong opposition to the addition of lighting from Bayard to Deming.	Lighting improvements on US 180 between Bayard and Deming will be limited to specific intersections that require additional lighting for safety reasons. These include areas such as intersecting roads in Hurley and the rest stop intersection near the Butterfield Estates area. NMDOT understands that many people, including residents of Butterfield Estates are not supportive of additional lighting and want night skies to be preserved. However, NMDOT needs to balance safety with neighborhood concerns. If NMDOT does implement lighting, full cutoff LED lighting will be used, to comply with the New Mexico Night Sky Protection Act. A final decision on lighting at intersections will be made during project design (the next step in the process).
Bike Accommodations	Several commenters expressed a desire for safe bike accommodations on US 180, specifically because US 180 is an important corridor for local and regional bicyclists and there are several events that occur in the area. Specific comments included requesting that the US 180 shoulders have a clear, usable space of 5-feet for bicycle travel that is free of a rumble strip. It was suggested that the design provide gaps in the rumble strips to minimize possible effects to bike tires and gears.	US 180 is included as a "Tier 1 Rural "bicycle facility in the *New Mexico Prioritized Statewide Bicycle Plan* (NMDOT 2018a). Tier 1 routes are a high priority for bikeways that provide community and statewide connections. Based on posted speeds in the project limits, design criteria in NMDOT's Bicycle Plan recommends 6 feet of available clear area on highway shoulders for use by bicyclists. As documented in NMDOT's Bicycle Plan, the minimum operational clear space is at least 4 feet of clear space, though widths of greater than 5 feet are desirable on roadways with average daily traffic volumes over 1,500 vehicles per day and the percentage of truck traffic is greater than or equal to 10 percent of the traffic stream. As part of the preferred alternative, roadway shoulders will be widened where needed to provide 6-feet of clear area for bicyclists. However, this width may need to be reduced for short distances where turn lanes are added. In these cases, the NMDOT will work to provide 5-feet of usable width. Rumble strips will be designed with breaks in them to provide cyclists with space to move in and out of the roadway shoulder.
4-Lanes	Several commenters indicated that they preferred a 4-lane roadway between Bayard and Deming over a 2-lane roadway.	The initial recommendation presented at the March 4, 2021 public meeting included a 4-lane roadway between Bayard and Hurley and a 2-lane roadway with passing lanes from Hurley to Deming. NMDOT received comments from multiple people indicating a preference for a 4-lane roadway for the entire corridor from Bayard to Deming. NMDOT considered these comments and needs in the corridor and is advancing a 4-lane roadway from Bayard to Deming to improve safety and support economic development.
Safety	Several commenters indicated that safety was the most important issue to them. Some commenters expressed support for NMDOT's initial recommendation for a 4-lane roadway from Bayard to Hurley and a 2-lane roadway with passing lanes from Hurley to Deming while others stated a preference for a continuous 4-lane highway for the entire length of highway between Bayard and Deming.	The NMDOT considered the comments received and support for 4-lane concept. While public opinion varied, the NMDOT's recommendation is to widen US 180 to 4 lanes through the entire corridor from Bayard to Deming. NMDOT's recommendation is based on the better safety performance of the 4-Lane Divided Flush Median Alternative, as compared to the Enhanced 2-Lane, and better potential to facilitate economic development of the communities served by this highway.
Turn Lanes	Several commenters expressed support for adding turn lanes on US 180 and suggested that NMDOT consider intersection improvements at Butterfield Trail, Cooke Road, Perrin Road, and Dwyer Road. In the short-term, a couple of commenters asked if NMDOT could add signs indicating the intersections at Butterfield and Cooke and extend the double-yellow solid lines from the rest stop to at least ½ mile beyond Butterfield and Cooke.	In response to public comments received during the public comment period, the project team reviewed information on additional intersections in the corridor and has added intersection improvements at Butterfield Trail and Perrin Road (heading east from US 180). In the short-term, NMDOT will investigate the need for additional signage and striping at Butterfield and Cooke.
Cost	A couple of commenters indicated concerns with the cost of the proposed improvements and indicated that the money could be better spent elsewhere, or that to save costs, NMDOT should focus on rehabilitating the pavement and other improvements should be left out.	NMDOT evaluated a range of alternatives. Cost was a factor in the evaluation, but other factors, such as roadway condition, safety, traffic operations, right-of-way, environmental impacts, and the ability to support economic development were also important considerations. The recommended alternative was selected because it addresses key issues in the corridor, including roadway condition, safety, traffic operations, and economic development while balancing costs by allowing for phased construction as funds become available.
Historic Markers	A couple of commenters requested that historical markers, such as the marker for the Butterfield Trail and the Mangas Coloradas be relocated if they would be affected by the proposed improvements. One commenter provided information on the history of the Butterfield Trail and requested that it be relocated to the south side of US 180 with parking so people can pull of the highway and safely view it.	As part of preliminary design, NMDOT will determine if these historical markers will be affected by the proposed improvements. If they will be affected, NMDOT will provide a recommendation of where the signs will be relocated. Typically, NMDOT tries to relocate historical makers near their current location. There will be sufficient space for people to pull off of the highway to view the marker. NMDOT will provide additional information on these markers at the next public meeting.
Roadway Sweeping	A few commenters asked if the roadway could be swept to remove debris.	NMDOT routinely picks up litter as part of ongoing roadway maintenance. Street sweeping occurs on an as-needed basis in areas identified by NMDOT road patrol or in response to concerns raised by citizens.
Public Transportation	One commenter asked NMDOT to consider public transportation with regular and reliable schedules.	Corre Caminos provides public transit service in the area. This service is funded by grants from the NMDOT. For more information on public transit service provided in Silver City, Santa Clara, Bayard, and Deming, visit https://correcaminosnm.com/.

Exhibit 5-4 summarizes questions and responses that were discussed at the public meeting. Appendix A contains the online public meeting presentation and notes.

Exhibit 5-4. Summary of Questions and Responses at the Public Meeting

Theme	Question	Response
Funding	1. Is US 180 eligible for federal funds? 2. There was a $300 million appropriation for projects for this year, would any of those funds be eligible for this project?	1. US 180 is eligible for federal and state funding. Being eligible for federal and state funding provides opportunity to procure funding for this project. 2. Capital outlay funds are designated through the legislative process. The capital program from the 2021 session did not appropriate funds specifically for US 180.
Construction Phasing	1. Will the entire project be worked on at the same time with different construction paths, or will segments be completed at different times? 2. Can you give approximate completion dates for this project with full, quick funding and limited, slow funding? 3. What are ways that traffic delays can be minimized?	1. Based on the size of this project, it is likely that the NMDOT will build the project in several phases. Construction phasing will be based on available funding. 2. Completion dates will depend on when funding is available and how much funding is provided. 3. Ways to minimize delays to traffic during construction will be considered as the project moves forward, construction phasing and detours will depend on funding.
Kirkland Road	Would it be possible to study and include improvements with Kirkland Road with this project? It is a very dangerous intersection, and would it be something that could be added to the projects scope?	NMDOT is aware of this intersection and some of the concerns in this area. NMDOT has examined the area and met with county officials to discuss it. Kirkland Road is outside of the project area for project. Possible changes in the Kirkland Road area can be considered as a separate project outside of this Corridor Study.
Passing Lane Safety	One of my biggest concerns with passing lanes, is that some vehicles do not pay attention to when passing lanes are ending, and that can create a dangerous situation, has that been considered?	To help minimize this possibility, the proposed passing lanes are about 2 miles long to allow for ample safe space for drivers to safely pass. Design would also include signage to indicate where the passing lanes begin and end. The sight distance on US 180 is good in areas where passing lanes are proposed, which will also minimize potential conflicts.
Access to the Landfill	Many Hurley residents use the Hurley overpass to access the landfill. If this overpass is taken out, will there be a westbound access to the landfill?	If the Hurley overpass is removed, there will be an at-grade intersection with turn lanes and acceleration/deceleration lanes that would allow access across US 180 to the landfill.
Wildlife Considerations	Have there been any discussions or considerations about a possible wildlife corridor either over or under the highway?	The project area is not within the designated wildlife corridors that the NMDOT is looking at throughout the state. We have identified locations within the corridor where car collisions have occurred with deer or other wildlife. We did look at what opportunities there might be for wildlife crossings in the first 4 miles of the project since that is the area where most of the wildlife collisions have occurred. No suitable areas were identified where wildlife could safely and easily be diverted under the highway. Because of this, no wildlife corridors are being considered at this time.
Public Outreach	When will the next public engagement meeting or webinar be held?	The next public meeting has not been scheduled, but it will likely occur in May or early summer 2021.

5.10 Environmental Considerations

The 4-Lane Alternative would have the most environmental effects due to its much larger footprint. The Enhanced 2-Lane Alternative would have the fewest effects, due to a much smaller overall footprint. Exhibit 5-5 compares the area of affected habitat for each of the alternatives. The Enhanced 2-Lane Alternative would affect the smallest area but would still disturb/pave over existing habitat by expanding shoulders, improving intersections, and adding passing lanes in Segment 3. Note that in Segment 2, there would be an option with any of the alternatives to restore 2 to 5 acres of habitat where the existing US 180 alignment would be abandoned. None of the affected habitat is designated as critical habitat for threatened or endangered species.

Exhibit 5-5. Summary of Habitat Disturbance

	Enhanced 2-Lane	Super 2	4-Lane
Segment 1	2 acres	2 acres [a]	15 acres
Segment 2	9 acres, 2 to 5 acres could be restored	9 acres[a], 2 to 5 acres could be restored	14 acres, 2 to 5 acres could be restored
Segment 3	29 acres	62 acres	118 acres
Total	**40 acres**	**73 acres**	**147 acres**

a The Super 2 Alternative assumes the same improvements as the Enhanced 2-Lane Alternative, since it is not feasible to develop a Super 2 concept in Segments 1 and 2.

All the proposed alternatives could potentially affect archaeological sites in the study area. The 4-Lane Alternative would shift the right-of-way to the west and could potentially impact six of the seven archaeological sites, while a shift east is likely to affect five archeological sites. A shift of the right-of-way into an archaeological site will require additional field survey to ensure no historical or pre-historic artifacts are located within the site. If cultural resources would be affected by the alternative, archaeological excavation may be required. The proposed Enhanced 2-Lane and Super-2 lane Alternatives would likely impact the same archeological sites as the 4-Lane Alternative; however, they would potentially affect smaller areas of the identified archaeological sites. Each of the alternatives would need to avoid the Historic Butterfield Trail monument at MP 145. If avoidance is not possible, the monument would need to be temporarily moved and then placed back as near to its original location as possible after construction.

No wetland habitat was identified in the existing right-of-way; however, additional environmental considerations include impacts to ephemeral drainages and floodplains. While recent changes to the Navigable Waters Protection Rule exclude ephemeral drainages from regulation by the United States Army Corps of Engineers, the NMDOT still follows the stipulations for Clean Water Act Section 404 Nationwide Permit 14 and Section 401 water quality certification as a stewardship practice. In addition, portions of the project lie within floodplains. Any changes that might add fill to floodplain areas would require approval under flood regulations administered by FEMA. The 4-Lane Alternative would affect drainage and floodplains to a greater degree than the 2-lane alternatives, since more drainage structures would require improvement and the project footprint would be bigger.

A preliminary assessment of hazardous materials sites was completed, and a more detailed analysis will be completed as part of the environmental and preliminary design phases. As mentioned in Chapter 3, major issues with hazardous materials are not anticipated, but there may be a small number of sites and/or bridges that pose risk that will be evaluated.

The southern end of the project area near MP 150 is an area where large dust storms can occur that limit driver visibility. The NMDOT, in cooperation with area landowners, has completed a dust mitigation project near MP 150. The dust mitigation efforts include signage warning motorists that it is a dust storm area and revegetation of areas with exposed soils. These efforts have helped reduce visibility impacts during dust storms. Mitigating the conditions outside of the highway right-of-way that contribute to blowing dust are beyond the scope of this US 180 project; however, additional measures to reduce risks can be implemented as part of this project. These include building wider shoulders and a graded roadside area to enable motorists to stop and park well away from travel lanes; additional static and/or dynamic warning signs to alert motorists of reduced visibility and the proper actions to follow to reduce risk when visibility is impaired; and enhancing roadside revegetation to reduce dust sources within the highway right-of-way. In addition, construction activities for any of the alternatives would need to incorporate other mitigation measures required in 20.2.23 NMAC, *Fugitive Dust Control*. These construction mitigation measures would apply equally to any of the alternatives and would be needed to manage dust, due to the dust mitigation efforts that are underway in the corridor.

Access to community resources would not change as a result of the project regardless of the alternative chosen. As described in Chapter 3, a screening-level noise analysis was completed. No receiver sites were identified that approach or exceed FHWA NAC. Additional detailed noise analysis may be completed as part of the environmental phase, if needed.

Environmental justice will be considered as part of the environmental phase but is not anticipated to be a major issue for any of the alternatives because overall effects to the community (including low-income and minority populations) are expected to be minor. Impacts would be temporary and could include travel delays during construction and minor losses of private property converted to highway right-of-way. No residential or commercial buildings would be acquired, and noise impacts would not occur. These impacts would not disproportionately impact any particular population or area. In contrast, the proposed project will have widespread benefits as a result of increased mobility, improved access at major intersection, and overall safety benefits for all users of this route and those served by US 180.

5.11 Economic Development

The 2-lane alternatives would improve safety compared with existing conditions and would create opportunities for passing in a corridor that has higher freight volumes. The 4-Lane Alternative would support economic development to a greater degree than the 2-lane alternatives because it would provide a continuous 4-lane roadway from Silver City to Deming/I-10. Four-lane highways with good connectivity to the interstate system are a major consideration of manufacturing industries when they evaluate the location of new plant sites. The 4-Lane Alternative would be an advantage to the communities along US 180 as they compete to attract new industry. The 4-Lane Alternative is consistent with statewide efforts from the late 1990s to promote safety and economic development. US 180 was included as part of these statewide efforts but was never completed due to a lack of funding. Building a 4-lane roadway between Bayard and Deming is consistent with *The New Mexico 2040 Plan* (NMDOT 2015a), NMDOT's long-range transportation plan and NMDOT's *Southwest Regional Transportation Plan* (NMDOT 2015b).

5.12 Cost

Costs for the alternatives in each segment are summarized in Exhibit 5-6. The estimated costs include a 25 percent contingency, design, and construction management, and they do not include costs for right-of-way acquisition or New Mexico gross receipts tax.

Exhibit 5-6. Cost Estimates for the Alternatives

	Enhanced 2-Lane	Super 2	4-Lane
Segment 1	$7.0 million	$7.0 million [a]	$15.7 million
Segment 2	$5.9 million	$5.9 million [a]	$8.3 million
Segment 3	$64.9 million	$79.3 million	$119.5 million
Total Cost[b]	**$77.8 million**	**$92.2 million**	**$143.5 million**

a The Super 2 Alternative assumes the same improvements as the Enhanced 2-Lane Alternative, since it is not feasible to develop a Super 2 concept in Segments 1 and 2.

b Costs include 25% contingency, design, and construction management and do not include costs for right-of-way acquisition or New Mexico gross receipts tax.

5.13 Additional Design Considerations

Several design considerations that apply to all the alternatives are described below. These will be reviewed and incorporated, as appropriate into the preliminary design.

5.13.1 BOP Transition at Bayard

The proposed improvements begin near milepost 123 at the south end of Bayard. The existing typical section in this area consists of an urban design with four travel lanes, a raised median, curb and gutter, and sidewalks. Two city streets (Guinevan and Taylor Streets) intersect with US 180 in this area. The design of the transition between the developed area in Bayard and the undeveloped area to the south has not been determined and will require additional coordination with Village officials and the NMDOT. One potential option in this area is extending the 4-lane urban section further south past Taylor Street before transitioning to the 2-lane or 4-lane rural section. If the Enhanced 2-Lane Alternative is advanced, a short transition area (approximately 1/4 mile) with 2 southbound lanes may be needed to allow smaller vehicles to pass larger, slower moving trucks before entering the more constrained parts of the corridor.

5.13.2 Roadway Alignment Options at the Hurley Railroad Crossing

Roadway realignment is necessary at the existing railroad crossing to improve the speed motorists can safely travel through the reverse curves at this location. The current crossing is under an advisory speed and requires motorists to substantially reduce their speed through the crossing. This condition is a result of a short tangent section of roadway between two horizontal curves which does not provide sufficient distance to develop the required curve superelevation and match the crossing grade of the railroad. To correct this situation, roadway realignment options are being considered for the railroad crossing to improve its design speed to meet a posted speed of 45 to 55 mph. The alignment options considered will work with either the Enhanced 2-Lane or the 4-Lane Alternatives.

Exhibit 5-7 shows two of the roadway alignment options across the railroad that have been considered. Option 1 would maintain the existing crossing angle of the railroad and the highway but would lengthen the tangent section to achieve the necessary superelevation and transitions prior to the crossing. To achieve this would require realigning the highway south of the railroad crossing by shifting the roadway to the east. The highway curve north of the railroad crossing would require minor realignment but would still closely follow the existing roadway. Option 2 would maintain the existing right-of-way south of the railroad crossing and add an additional tangent and curve realignment north of the railroad crossing. With Option 2, the skew angle of the intersection between the highway and the railroad would increase making visibility of approaching trains more difficult. Additional right-of-way would be required to accommodate the proposed improvements for either option.

The advantages of Option 1 are that it corrects the horizontal alignment concerns without increasing the skew angle of the existing railroad crossing. The disadvantage is that it conflicts with two existing underground gas lines east of the highway and south of the crossing, requires more right-of-way acquisition, and could have more impacts to traffic during construction. The advantages of Option 2 are that it provides a slightly smoother horizontal transition than Option 1, it would place the roadway further from the cul-de-sac, and may be less expensive due to its shorter length. Traffic may have fewer impacts during construction, since more of the roadway could be built offline. It also avoids the gas lines in the immediate area. The disadvantages are that it crosses the railroad at a flatter angle. The design team will continue to refine this alignment as part of preliminary design with the goal of developing a roadway alignment that avoids the gas lines, improves the crossing angle, and achieves a design speed of 45 to 55 mph. Additionally, the railroad alignment will continue to be refined throughout design to accommodate highway traffic and bicycles.

In addition to the at-grade options described above, the NMDOT considered constructing a bridge at this location to separate US 180 from the railroad to eliminate any waiting time at the railroad tracks for US 180 traffic. Bridges could be built on alignments similar to those presented in Options 1 or 2 with either 2 or 4 lanes. Cost estimates were developed to compare bridge options with the at-grade options. A 2-lane bridge over the railroad tracks would cost about $4.7 million more than the at-grade option. A 4-lane bridge over the railroad tracks would cost about $6.5 million. The Southwestern Railroad currently operates about 2 trains per day on this section of the rail line.

For both crossings, coordination with the Southwestern Railway will be necessary to modify the existing crossing and the railroad owner's requirements and desires will need to be considered. Both options will require signalized crossings and upgraded approach signing. These safety measures would help offset the reduced visibility risks of the increased skew angle with Option 2.

Exhibit 5-7. Hurley Railroad Alignment Options 1 and 2

5.13.3 Hurley Overpass and Traffic Calming in Hurley

The Hurley overpass will also need to be considered in detail as part of preliminary design. The 4-Lane Alternative would require reconstructing this overpass and/or replacing it with an at-grade intersection. These options could also be considered for the Enhanced 2-Lane Alternative. Based on the initial public survey, about 75 percent of the public survey responses received indicated that this overpass was not significant, while about 25 percent indicated that it is an important structure for reasons such as serving as a landmark, alternative route, and route for truck traffic. There are various ways to accommodate the landmark function that this overpass serves; for example, median treatments and signs could be constructed that welcome motorists to Hurley or roadside markers could be installed announcing Hurley. These types of improvements could also serve to slow drivers as they approach the intersections serving Hurley.

Speed studies show that this segment has average driving speeds well above the posted speed of 55 mph—a condition that is in conflict with a number of intersections in this area. Decreasing speeds in this area could benefit traveler safety due to the higher crash rate through this area and the town directly adjacent to it. Roadway features and signage that would encourage slower travel through Hurley could be considered. Input received from the initial public survey indicated a mix of responses, with some people advocating for slower speeds through Hurley and others requesting faster speeds. The treatment of the Hurley Overpass and the need for and type of traffic calming will be further discussed with the community during project design.

5.13.4 Floodplain Near the EOP at Keeler Road

The proposed widening of US 180 has the potential to affect regulatory floodplains by placing roadway embankment material in existing ponding areas adjacent to the highway. Generally speaking, the volume of new embankment material should be insignificant relative to the overall size of the floodplain. The potential effects will be evaluated in coordination with local floodplain administrators as design proceeds. Ditch grading may be proposed as a way to offset any lost storage volume due to widening.

Flooding of US 180 has been reported near Keeler Road at the south end of the corridor from MP 159.1 to 161.7. Because the flooding extends beyond the project limits, a detailed hydraulic analysis was not performed. For the area along US 180 within the project limits, minor flooding less than 6 inches deep may occur in the southbound lanes during the 100-year event. Further south, outside the project limits, there is a sag point along US 180 near Keeler Road, between MP 161.5 and 161.8, where overtopping may occur. The solution to this flooding is outside of the scope of this Alignment Study and would require coordination with multiple agencies. The flooding is a historic condition and would not be affected by the improvements being considered on US 180. A separate project to address flooding issues may be considered for this area and would require intergovernmental coordination with affected agencies with jurisdiction. As part of this project, warning signs could be added or roadway closures when flooding occurs could be considered.

5.13.5 Bike Accommodations

As described in Chapter 3, US 180 is included as a "Tier 1 Rural" bicycle facility in the *New Mexico Prioritized Statewide Bicycle Plan* (NMDOT 2018a). Tier 1 routes are a high priority for bikeways that provide intra-community and statewide connections between New Mexico's communities for cross-state travel. Based on the posted speeds within the project limits, the design criteria recommend 6-feet of available clear area on the highway shoulders for bicycle use. The proposed roadway shoulders for any of the proposed alternatives could meet this recommendation in most areas and accommodating bicycles will be a consideration of the roadway design for any of the alternatives. For all of the alternatives, roadway shoulders would be widened where needed to provide 6-feet of clear area for bicyclists, except this width may need to be reduced for short distances where turn lanes are added. In these cases, NMDOT will work to provide 5 feet of usable width. In addition, the rumble strips in the shoulder area will be intermittent to provide breaks where cyclists can move in and out of the roadway shoulder.

5.13.6 Wildlife Considerations near Bayard

As described in the Chapter 3 safety discussion, the highway segment between Bayard and Hurley has a number of crashes involving deer and other large wildlife. This segment of highway does not include any bridge structures or large box culverts which could be used by wildlife to travel under the highway and the terrain is not conducive to the construction of wildlife crossings under the highway. Likewise, the addition of lighting to improve driver visibility of wildlife near the highway may not be practical due to public concerns about preserving night-skies. A wider roadway section including additional lanes and wider shoulders would improve driver visibility and maneuverability to avoid large wildlife on the highway. Active signage could also be used to warn motorists of deer crossing areas. These measures will be investigated as part of the environmental documentation and preliminary design phase.

5.14 Recommendations

5.14.1 Preferred Alternative

Based on the findings described above and after considering public input from the March 4, 2021 public meeting and public comment period, the recommended preferred alternative is the 4-Lane Divided Flush Median Alternative through the entire corridor from MP 123 to 161. The preferred alternative would reconstruct US 180 as a 4-lane highway with a 6-foot flush median and shoulders that are at least 8 feet. Existing pavement would be rehabilitated throughout the corridor. Other improvements include:

- Realigning US 180 at the railroad tracks to improve safety to achieve a posted design speed of 45 to 55 mph.
- Removing the Hurley overpass where it crosses over US 180 and replacing it with an at-grade roadway crossing at the Pit Access Road.
- Improving intersections at the following locations:
  - North Hurley Road
  - Pit Access Road/New Access Road
  - Carrasco Avenue
  - Airport Road
  - NM 61
  - Rest Area
  - Butterfield Trail
  - Perrin Road

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6. SUMMARY AND RECOMMENDATIONS

6.1 Introduction

This chapter provides an overview of the Alignment Study conducted by the NMDOT for US 180 including: (1) the preferred alternative identified by the detailed screening analysis and public and stakeholder input; (2) preliminary cost estimates and right-of-way needs for the preferred alternative; (3) a potential project phasing plan; and (4) next steps to be taken by the NMDOT to begin project implementation.

6.2 Preferred Alternative

Based on the findings described in Chapter 5, the preferred alternative recommended for further design and analysis and construction programming is the 4-Lane Divided Flush Median Alternative through the entire corridor from MP 123 to 161. The preferred alternative would reconstruct US 180 as a 4-lane highway with a 6-foot flush median and shoulders that are at least 8 feet. Existing pavement would be rehabilitated throughout the corridor. Other improvements include:

- Realigning US 180 at the railroad tracks to improve safety to achieve a posted design speed of 45 to 55 mph.
- Removing the Hurley overpass where it crosses over US 180 and replacing it with an at-grade roadway crossing at the Pit Access Road.
- Improving intersections at the locations listed below in Exhibit 6-1.

Exhibit 6-1. Proposed Intersection Improvements

Location	Description
North Hurley Road	Lengthen the southbound left turn and the northbound right turn lanes.
Pit Access Road/New Access Road	Lengthen the northbound left turn and southbound acceleration lanes. If the Hurley overpass is removed, the Pit Access Road intersection would be closed, and a new intersection would be built where the overpass is currently located.
Carrasco Avenue	Reconfigure the intersection and turn lanes.
Airport Road	Lengthen the southbound right turn lane.
NM 61	Provide a southbound left turn lane and a northbound right turn lane, acceleration lanes in both directions could be considered.
Butterfield Trail	Provide northbound acceleration and deceleration lanes and southbound deceleration lanes at Wells Fargo Drive and Butterfield Trail.
Perrin Road	Provide northbound and southbound deceleration lanes.

6.3 Cost

Costs for the preferred alternative are estimated at $143.5 million in 2021 dollars as summarized in Exhibit 6-2. The cost estimate provide does not include costs for obtaining right-of-way or New Mexico gross receipts tax.

Exhibit 6-2. Estimated Construction Costs for the Preferred Alternative

Location	Estimated Cost
Segment 1 – Bayard to North of the Hurley Railroad Crossing (MP 123 to MP 127.25)	$15.7 million
Segment 2 – Hurley Railroad Crossing (MP 127.25 to MP 128.5)	$ 8.3 million
Segment 3 – South of the Hurley Railroad Crossing to Deming (MP 128.5 to 161)	$119.5 million
Estimated Total	$143.5 million

Costs are estimated in 2021 dollars and include a 25% contingency, design, and construction management and do not include costs for right-of-way acquisition or New Mexico gross receipts tax.

6.3.1 Right-of-Way Needs

Exhibit 6-3 shows right-of-way needs of about 103 acres for the proposed alternative. This estimate is conceptual and could change during design, particularly at the railroad crossing where a new US 180 alignment is proposed.

Exhibit 6-3. Estimated Right-of-Way Needs for the Preferred Alternative

Location	Estimated Acreage Needed
Segment 1 – Bayard to North of the Hurley Railroad Crossing (MP 123 to MP 127.25)	5 acres
Segment 2 – Hurley Railroad Crossing (MP 127.25 to MP 128.5	12 acres
Segment 3 – South of the Hurley Railroad Crossing to Deming (MP 128.5 to 161)	86 acres
Estimated Total	103 acres

Right-of-way estimates are conceptual and are subject to change during project design.

Most of the right-of-way that would be required between Bayard and Hurley is privately owned Land located between Hurley and Deming has a mix of landowners including private owners, the BLM, and the NMSLO.

6.4 Project Phasing

The project will be built in phases. Construction phases will depend upon funding, but will tentatively include:

- Phase 1: Bayard to Hurley to just south of the railroad tracks
- Phase 2: Hurley, south of the railroad tracks to NM 61
- Phase 3: NM 61 to Deming

NMDOT is recommending building the improvements between Bayard and Hurley as the first phase because traffic volumes and crash rates are highest in these segments and improvements at the railroad crossing are needed to improve the speed motorists can safely travel through the reverse curves at this location. The remainder of the improvements between Hurley and Deming would be built once additional funding is secured.

6.5 Next Steps

Next steps for the project include the following:

- Preliminary engineering – The design team will prepare preliminary engineering plans for the preferred alternative. This includes the development of preliminary plans for roadway and pavement design, drainage, bridges and structures, construction phasing, and right-of-way needs.
- Environmental analysis and compliance – Based on the data collected and analysis completed to date, no significant environmental impacts are anticipated for the proposed project and a NEPA Categorical Exclusion is the recommended NEPA document. The project team will prepare a Categorical Exclusion that evaluates environmental effects. The Categorical Exclusion will include supporting studies for cultural resources, natural resources, and hazardous materials. As part of the environmental analysis, additional field work will be completed to assess potential archaeological sites that could be affected by the preferred alternative.
- Stakeholder Coordination – Stakeholder coordination will continue with interested parties including the Town of Hurley, Grant and Luna Counties, State Representatives and Senators, the Southwestern Railroad, and Freeport-McMoRan.
- Public Involvement – Responses to common comments received at the March 4, 2021 public meeting were distributed to commenters and the public via email and through the project website in May 2021. In addition, a public meeting was held in September 2021 to provide an update on the recommended preferred alternative and preliminary engineering activities.

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