US 550 South Connection to US 160

SUPPLEMENTAL DRAFT ENVIRONMENTAL IMPACT STATEMENT/ SECTION 4(f) EVALUATION

TO THE US HIGHWAY 160 FROM DURANGO TO BAYFIELD EIS

CDOT Project #FC-NH(CX)162-2(048)

October 2011

US 550 South Connection to US 160

SUPPLEMENTAL DRAFT ENVIRONMENTAL IMPACT STATEMENT/SECTION 4(f) EVALUATION

TO THE US HIGHWAY 160 FROM DURANGO TO BAYFIELD EIS

CDOT Project #FC-NH(CX)162-2(048)

Submitted Pursuant to:
42 USC 4332, 49 USC 303, and 23 USC 138
by the
US Department of Transportation, Federal Highway Administration
and
Colorado Department of Transportation

Submitted by:

Kerrie E. Neet 9/28/11
Kerrie E. Neet
Region 5 Regional Transportation Director
Colorado Department of Transportation

Date

Concurred by:

Timothy J. Harris 9/28/11
Timothy J. Harris, P.E.
Chief Engineer
Colorado Department of Transportation

Date

Approved by:

John M. Cater 10/3/11
John M. Cater, P.E.
Division Administrator, Colorado Division
Federal Highway Administration

Date

A federal agency may publish a notice in the Federal Register, pursuant to 23 USC §139(1), indicating that one or more federal agencies have taken final action on permits, licenses, or approvals for a transportation project. If such notice is published, claims seeking judicial review of those federal agency actions will be barred unless such claims are filed within 180 days after the date of publication of the notice, or within such shorter time period as is specified in the federal laws pursuant to which judicial review of the federal agency action is allowed. If no notice is published, then the periods of time that otherwise are provided by the federal laws governing such claims will apply.

ACRONYMS AND ABBREVIATIONS

- A -	
AADT	Annual Average Daily Traffic
AASHTO	American Association of State Highway and Transportation Officials
ACBM	Asbestos-Containing Building Materials
ACHP	Advisory Council on Historic Preservation
ADAAG	Americans with Disabilities Act Accessibility Guidelines
ADT	Average Daily Traffic
AM	Morning
AMI	Area Median Income
APE	Area of Potential Effects
AST	Aboveground Storage Tank
ASTM	American Society for Testing and Materials
AUM	Animal Unit Months
- B -	
B	Business Route
BA	Biological Assessment
BCC	Birds of Conservation Concern
BFE	Base Flood Elevation
BLM	Bureau of Land Management
BMP	Best Management Practice
BO	Biological Opinion
BOD	Biological Oxygen Demand
BP	Before the Present
- C -	
CAA	Clean Air Act
CAQCC	Colorado Air Quality Control Commission
CBM	Coal Bed Methane
CCR	Code of Colorado Regulations
CDBG	Community Development Block Grant
CDOT	Colorado Department of Transportation
CDOW	Colorado Division of Wildlife
CDPHE	Colorado Department of Public Health and Environment
CDPS	Colorado Discharge Permit System
CEQ	Council on Environmental Quality
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CERCLIS	Comprehensive Environmental Response, Compensation, and Liability Information System
CFR	Code of Federal Regulations
cfs	Cubic Feet per Second
CGS	Colorado Geological Survey
CHS	Colorado Historical Society

CLOMR	Conditional Letter of Map Revision
CMAQ	Congestion Mitigation and Air Quality
CNAP	Colorado Natural Areas Program
CNHP	Colorado Natural Heritage Program
CO	Carbon Monoxide
CORA	Colorado Open Records Act
CORRACTS	Resource Conservation and Recovery Act Corrective Action
CR	County Road
CRS	Colorado Revised Statutes
CWA	Clean Water Act
	- D -
dB	Decibel
dBA	Hourly A-weighted Sound Level in Decibels
DE	Diesel Exhaust
DOI	US Department of the Interior
DOL	US Department of Labor
DOT	US Department of Transportation
DPM	Diesel Particulate Matter
	- E -
ECS	Erosion Control Supervisor
EJ	Environmental Justice
EO	Executive Order
EPA	US Environmental Protection Agency
ESA	Endangered Species Act
	- F -
FEIS	Final Environmental Impact Statement
FEMA	Federal Emergency Management Agency
FHWA	Federal Highway Administration
FIRM	Flood Insurance Rate Map
FOIA	Freedom of Information Act
FOR	Final Office Review
FPPA	Farmland Protection Policy Act
	- G -
GIS	Geographic Information Systems
gpm	Gallons Per Minute
gps	Global Positioning System
	- H -
HABS	Historic American Buildings Survey
HAER	Historic American Engineering Record
HAP	Hazardous Air Pollutant
HB	House Bill
HC	Hydrocarbons
HHS	Health and Human Services

HOV	High Occupancy Vehicle
- I -	
IAR	Interstate Access Request
INWMP	Integrated Noxious Weed Management Plan
IRIS	Integrated Risk Information System
ISA	Initial Site Assessment
ITS	Intelligent Transportation Systems
- L -	
LEDPA	Least Environmentally Damaging Practicable Alternative
L(eq)	Equivalent continuous noise level
Leq(h)	Hourly equivalent sound level
LOMR	Letter of Map Revision
LOS	Level of Service
LUST	Leaking Underground Storage Tank
- M -	
MBTA	Migratory Bird Treaty Act
MESA	Modified Phase I Environmental Site Assessment
$\mu g/m^3$	Micrograms per Cubic Meter
µm	Micrometers
µS/cm	Micro-Siemens per Centimeter
MLS	Multiple Listing Service
MMI	Multihazard Mapping Initiative
MOA	Memorandum of Agreement
MP	Milepost
Mph	Miles Per Hour
MS4	Municipal Separate Storm Sewer System
MSAT	Mobile Source Air Toxics
MSE	Mechanically Stabilized Earth
- N -	
NAAQS	National Ambient Air Quality Standards
NAC	Noise Abatement Criteria
NAGPRA	Native American Graves Protection and Repatriation Act
NDIS	Colorado Natural Diversity Information Source
NEPA	National Environmental Policy Act of 1969
NESHAP	National Emissions Standards for Hazardous Air Pollutants
NFIA	National Flood Insurance Act
NFIP	National Flood Insurance Program
NFRAP	No Further Remedial Action Planned
NHPA	National Historic Preservation Act of 1966
NLEV	National Low Emission Vehicle
NO_2	nitrogen dioxide
NOA	Notice of Availability
NOI	Notice of Intent

NO_x	Oxides of Nitrogen
NPDES	National Pollutant Discharge Elimination System
NPL	National Priority List
NPS	National Park Service
NR-A	Non-Rural Principal Highway
NRC	National Resource Center
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
NSJB	Northern San Juan Basin
	- O -
O_3	Ozone
OAHP	Office of Archaeology and Historic Preservation
OIS	Oil Inspection Survey
OPS	Colorado Department of Labor and Employment's Division of Oil and Public Safety
	- P -
ppb	Parts Per Billion
ppm	Parts Per Million
PA	Programmatic Agreement
Pb	Lead
PCA	Potential Conservation Area
PCB	Polychlorinated Biphenyl
PL	Public Law
PM	Evening
$PM_{2.5}$	Particulate Matter with an Aerometric Diameter Less Than 2.5 Microns
PM_{10}	Particulate Matter Less Than 10 Microns in Diameter
	- R -
R-A	Regional Highway
REC	Recognized Environmental Conditions
RCRA	Resource Conservation and Recovery Act
REDDSC	Region 9 Economic Development District of Southwest Colorado, Inc.
RCRIS	Resource Conservation and Recovery Information System
RFG	Reformulated Gasoline
RIP	Recovery Implementation Plan
ROD	Record of Decision
ROW	Right-of-Way
RTP	Regional Transportation Plan
RV	Recreational vehicle
	- S -
SAFETEA-LU	Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users
Satisfi	Satisfi Environmental Information
SB	Senate Bill
SDEIS	Supplemental Draft Environmental Impact Statement
SDWA	Safe Drinking Water Act

SDO	State Demography Office
SEIS	Supplemental Environmental Impact Statement
SEO	State Engineer's Office
SGPI	Shortgrass Prairie Initiative
SH	State Highway
SHPO	State Historic Preservation Officer
SIP	State Implementation Plan
SMART	Safe Multimodal Aesthetic Regional Transportation
SO_2	Sulfur Dioxide
SPUI	Single-Point Urban Interchange
STIP	State Transportation Implementation Program
STP	Surface Transportation Program
SUCAP	Southern Ute Community Action Plan
SUIT	Southern Ute Indian Tribe
SWMP	Stormwater Management Plan
	- T -
T&E	Threatened and Endangered
TCM	Transportation Control Measure
TDM	Transportation Demand Management
THP	Total Petroleum Hydrocarbons
THPO	Tribal Historic Preservation Officer
TIP	Transportation Implementation Program
TMDL	Total Maximum Daily Load
TNM	Traffic Noise Model
TSM	Transportation system management
TSS	Total Suspended Solids
	- U -
Uniform Act	Surface Transportation and Uniform Relocation Assistance Act of 1987
URS	URS Corporation
US	United States
US 160	US Highway 160
US 550	US Highway 550
USACE	US Army Corps of Engineers
USC	US Code
USDA	US Department of Agriculture
USDOT	US Department of Transportation
USFS	US Forest Service
USFWS	US Department of Interior Fish and Wildlife Service
USGS	US Geological Service
UST	Underground Storage Tank
	- V -
VISTA	VISTA information system
VMT	Vehicle Miles Traveled

VOCs	Volatile Organic Compounds
VRM	Visual Resource Management
-W-	
WHI	Weighted Hazard Index
WQCC	Water Quality Control Commission

TABLE OF CONTENTS

PAGE NO.

List of Appendices

List of Figures

Page No.

LIST OF TABLES

PAGE NO.

LIST OF PHOTOGRAPHS — PAGE NO.

Executive Summary

Introduction

The US Highway 550 (US 550) South Connection to US Highway 160 (US 160) Supplemental Draft Environmental Impact Statement (SDEIS) supplements information contained in the US Highway 160 from Durango to Bayfield Environmental Impact Statement and Final Section 4(f) Evaluation signed by the Federal Highway Administration on May 12, 2006 (2006 US 160 EIS). This SDEIS addresses impacts that were not previously evaluated or that have been changed based on revisions to the design. These impacts are confined to a limited portion of the project where US 550 connects to US 160 east of Durango, Colorado.

On November 7, 2006, FHWA signed the US Highway 160 (US 160) from Durango to Bayfield Record of Decision. This SDEIS is being prepared because of issues that have come to light during preliminary design of the US 550 South connection to US 160 based on the alternative selected in the 2006 US 160 ROD. These issues include (1) a gas well constructed in the US 550 alignment of the preferred alternative from the 2006 US 160 EIS, and (2) in 2008, the portion of the Marie J. Webb Ranch (Webb Ranch) property on Florida Mesa was determined eligible for the National Register of Historic Places (NRHP). The US 550 alignment selected in the 2006 US 160 ROD that connects to US 160 crosses this historic property.

The Selected Alternative from the 2006 US 160 ROD on US 160 is 16.2 miles, extending from milepost (MP) 88.0, located east of Durango, to MP 104.2, located east of Bayfield. The Selected Alternative extends four lanes on US 160 to east of Bayfield, generally along the existing alignment with an alignment to the south in Gem Village from MP 100 to MP 101. It also includes reconstruction of the US 160/US 550 (south) intersection as an interchange and a new section of US 550 that is necessary to connect the interchange on US 160 to the US 550 corridor south of Durango. The proposed action in this SDEIS revises the location and length of US 550 from south of County Road (CR) 220 to where it connects to US 160. The proposed action on US 550 in the SDEIS is slightly longer than that selected in the 2006 US 160 ROD to allow for a design shift that lessens impacts and avoids a gas well. With the design shift described in this SDEIS, the length of US 550 now extends from the previous 1.2 miles long to the proposed 1.5 miles long. The realigned portion of US 550 would be improved from a two-lane to a four-lane highway.

Purpose and Need

The purpose of the project identified in the 2006 US 160 Environmental Impact Statement (EIS) is to improve conditions for the traveling public within the corridor. Specifically, the purpose of the project is to:

- Increase travel efficiency/capacity to meet current and future needs.
- Improve safety for the traveling public by reducing the number and severity of crashes.
- Control access for safety and mobility improvements.

The need for this project is based on the projected increased travel demands on highway capacity and efficiency, and the existing substandard design that contributes to accidents associated with roadway deficiencies. This document re-evaluates the basis of the need based upon the most recent data on population, traffic volumes, and the number and severity of crashes. The re-evaluation of updated information confirms the basis of need as described above and in the 2006 US 160 EIS.

Alternatives Development and Analysis

The SDEIS focuses on the connection of US 550 to US 160 and the portion of US 550 needed to connect US 550 to the US 160 corridor. Reasonable alternatives have been developed for the US 550 south connection to US 160 that meet the purpose and need for the project. Other alternatives have been considered and dismissed. The No Action Alternative is considered throughout the alternative development process as a basis for comparison. The goal of the alternative development was to arrive at a Preferred Alternative that is reasonable, satisfies the project purpose and need, and minimizes environmental impacts.

Consistent with the 2006 US 160 EIS, the development of alternatives in the SDEIS merge the analysis under the National Environmental Policy Act (NEPA) with Section 404 of the Clean Water Act (CWA). The merger process in the 2006 US 160 EIS demonstrated to the US Army Corps of Engineers (USACE) that the Preferred Alternative under NEPA was also the Least Environmentally Damaging Practicable Alternative (LEDPA) under the CWA. A Section 404 permit under the CWA was obtained for the corridor in conjunction with signing of the 2006 US 160 ROD. Alternatives developed for the SDEIS address CWA requirements in addition to NEPA.

The SDEIS includes two screening levels. The first screening level is based on purpose and need and other criteria for determining whether an alternative is reasonable under NEPA such as logistics and cost. This screening level is similar to the Feasibility Alternatives screening in the 2006 US 160 EIS. The second screening level in the SDEIS evaluates alternatives based on NEPA, CWA and Section 4(f) criteria. This screening level is similar to the Preliminary Alternatives screening level from the 2006 US 160 EIS. The second screening level in the SDEIS, however, also considers Section 4(f) criteria which are new for this document. The second level screen is used in the SDEIS to identify the Preferred Alternative.

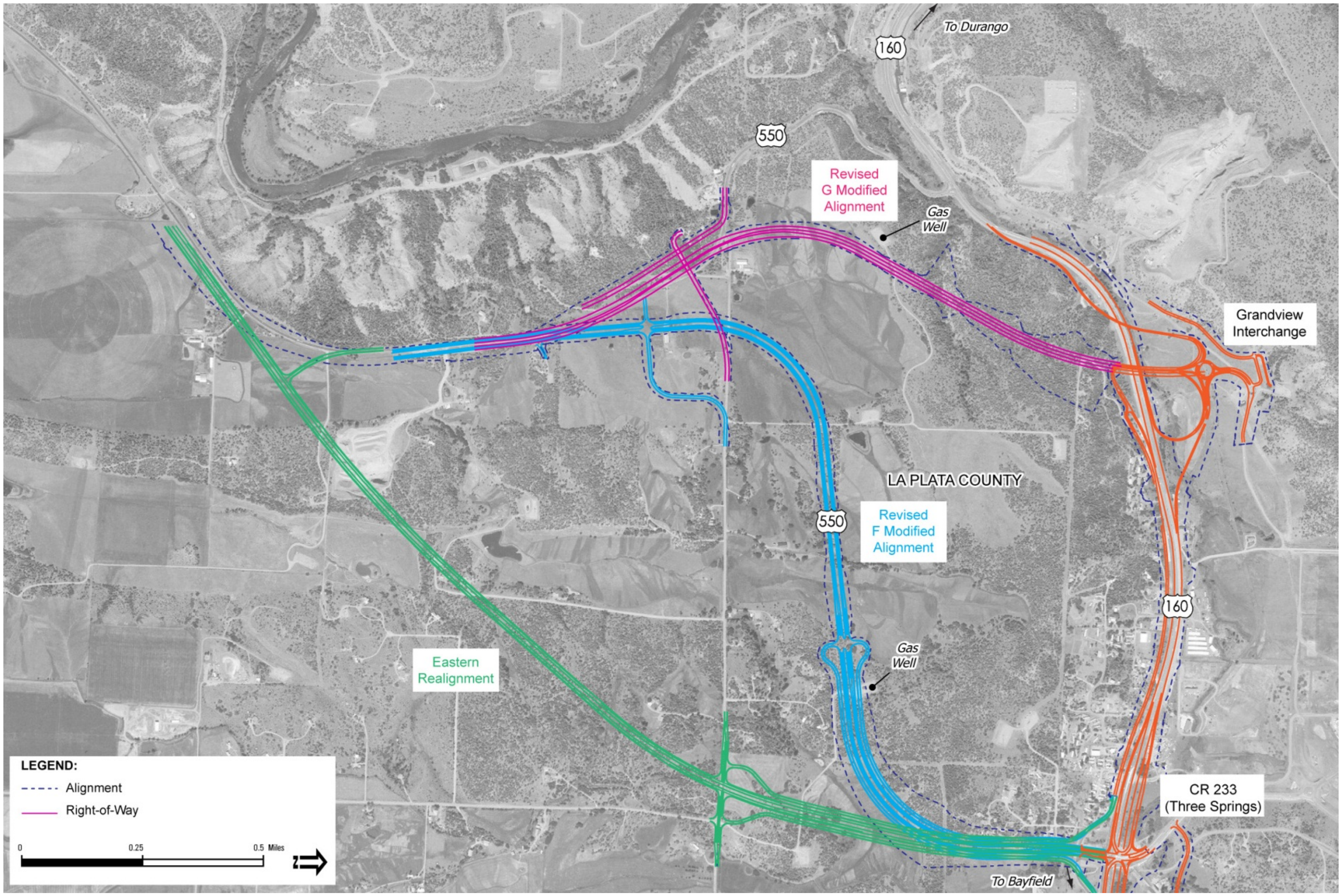
All the reasonable alternatives are in the Grandview Section. The Grandview Section includes US 160 from approximately mile marker 88 west of the US 160/ US 550 (south) intersection to the State Highway 172 (SH 172)/ CR 234 intersection, and US 550 from south of CR 220 to US 160. All the alternatives in the Grandview Section include the existing Grandview Interchange, single point urban interchanges (SPUIs) at CR 233 (Three Springs) and SH 172/CR 234, and four lanes on US 160. The reasonable alternatives considered in this SDEIS include the Revised G Modified Alternative, Revised F Modified Alternative and the Eastern Realignment Alternative. These alternatives are summarized below and illustrated on Figure ES-1.

No Action Alternative
The No Action Alternative assumes completion of the US 160 project as defined in the Record of Decision with the exception of the connection of US 550 to US 160. Auxiliary lanes are included between the west project limit and the interchange at CR 233 (Three Springs). The additional auxiliary lanes are considered a design variation of the alternatives described in the 2006 US 160 EIS. The additional auxiliary lanes, which extend from the west limit of the project to the CR 233 (Three Springs) Interchange, are needed for each of the alternatives in the SDEIS based on updated traffic analyses (see Appendix C), and, therefore, were not part of the screening of alternatives within this document. The auxiliary lanes can be added within the right-of-way and identified footprint of the alternatives in the 2006 US 160 EIS. The Grandview Interchange addresses development along US 160 without the connection of US 550. In this case, US 550 remains on its current alignment where poor geometry, low design speeds and two lane capacity, on a north facing steep grade presents capacity and safety issues. See Chapter 1 of this document for more information on the problems associated with the current alignment.

Revised G Modified Alternative
The Revised G Modified Alternative connects US 550 to US 160 via the Grandview Interchange. This alternative was considered for detailed analysis in the 2006 US 160 EIS. The Revised G Modified Alternative is essentially the same alternative as that selected in the 2006 US 160 ROD but it has been revised to avoid a gas well that was installed in the alignment selected in the 2006 US 160 ROD. For these reasons, "Revised" has been added to the title of this alternative.

Revised F Modified Alternative
The F Modified Alternative was the other alternative in the Grandview Section considered for detailed analysis in the 2006 US 160 EIS. US 550 crosses Florida Mesa and connects to US 160 at the CR 233 (Three Springs) Interchange. Frontage roads parallel the alignment from US 160 south for about a mile. These roads provide local access to the properties south of US 160. The Revised F Modified Alternative is the same as in the 2006 US 160 EIS except it includes the Grandview Interchange. The

Figure ES-1. Reasonable Alternatives Considered In this SDEIS



Grandview Interchange is included in this alternative as traffic analyses updated to 2030 indicate that three interchanges are needed in the Grandview Section even without a US 550 South Connection (Appendix C). For these reasons, "Revised" has been added to the title of this alternative.

Eastern Realignment Alternative

The Eastern Realignment Alternative was developed specifically to avoid the Webb Ranch, a historic resource and Section 4(f) property. US 550 connects to US 160 at the CR 233 (Three Springs) Interchange but has a different US 550 south alignment when compared to the Revised F Modified Alternative. Frontage roads parallel the alignment from US 160 to CR 220. These roads provide local access to the properties south of US 160.

Identification of Preferred Alternative

The Preferred Alternative in this SDEIS is the Revised G Modified Alternative (Preferred Alternative) similar to the G Modified Alternative identified as the Preferred Alternative in the 2006 US 160 EIS. Revised G Modified Alternative has the least amount of impacts to residents and businesses, the least amount of impacts to irrigated farmlands, wildlife habitat and wetlands. It also appears to be the least harm alternative under Section 4(f). Of the three alternatives, the Eastern Realignment Alternative has the most impacts to residents and businesses, wetlands, wildlife habitat, irrigated farmlands and it also is the most costly. The Eastern Realignment Alternative also has more Section 4(f) uses compared to the Revised G Modified Alternative. The Revised F Modified Alternative is the lowest cost alternative but compared to the Revised G Modified Alternative, it has more impacts to residents and businesses, more use of Section 4(f) properties, approximately 16 times the impact to wetlands (0.033 acres vs. 0.53 acres), and more impacts to wildlife habitat. Based on these reasons, the Revised G Modified Alternative is the Preferred Alternative, appears to be the LEDPA and appears to be the least harm alternative under Section 4(f).

Although a Preferred Alternative has been identified in this SDEIS, no final decision will be made until after comments have been received during the public and agency review period. The final decision will be documented in a Record of Decision.

Impacts and Mitigation

In compliance with NEPA, the existing conditions of the human and natural environment that could be impacted, beneficially or adversely, by the action alternatives were identified and analyzed. In addition, cumulative impacts of this project with other projects or activities in the past, present, or reasonably foreseeable future were considered.

The environmental impacts identified in Chapter 4 are based on the alternative designs contained in Chapter 2. The alternative designs evaluated in the NEPA portion of this analysis have been developed with different southern termini along US 550, resulting in different lengths, depending on where they deviate from US 550. These southern termini are different than those used in Chapter 5 Section 4(f), which were developed with common southern termini in order to allow for equal comparison among alternatives as it relates to their differing uses of Section 4(f) properties in this area. As a result, some of the impact quantities discussed in Chapter 4 are different than those contained in Chapter 5. These different southern termini as used in Chapter 5 could also be used for the US 550 EA project, if a different Preferred Alternative is selected for the US 550 South Connection to US 160 Project.

The primary resources of concern for this project identified in the 2006 US 160 EIS include wetlands and water resources; socioeconomics and relocations; environmental justice; wildlife and fisheries; threatened, endangered and sensitive species; and visual resources. The historic resources identified in the study area led in part to the preparation of the *US 550 Connection to US 160 at Farmington Hill Draft Section 4(f) Evaluation* and this SDEIS and are, therefore, also considered a primary resource of concern. A key element of the selection of these resources was the evaluated significance of the impacts to the resource. For example, water quality is recognized as an important resource, and impacts to water quality from all alternatives are evaluated in the 2006 US 160 EIS. However, short-term and long-term construction and indirect impacts to water quality will be mitigated through the implementation and maintenance of permanent best management practices (BMPs) for stormwater management. Therefore, water quality is not included as a "primary resource of concern" for this project. A summary of mitigation measures for each resource category is found in Table 4-14, Summary of Mitigation Measures, in Chapter 4.

Impacts and mitigation measures for the primary resources of concern are summarized below. The impact assessment is strictly limited to the US 550 and US 160 connection (i.e. the proposed action) and is not directly comparable to the impacts disclosed in the 2006 US 160 EIS which broke out impacts for the entire Grandview Section.

Wetlands and Water Resources: Approximately 0.03 acres of wetland would be impacted by the Revised G Modified (Preferred) Alternative—the fewest of the action alternatives. Wetland impacts range from 0.03 acres for the Revised G Modified (Preferred) Alternative to 3.2 acres for the Eastern Realignment Alternative. High value functions that receive the greatest level of impact under the action alternatives include general wildlife habitat, threatened and endangered species habitat, groundwater discharge/recharge and sediment/nutrient/toxicant retention or removal (see Table 4-5, Table 4-6, and Table 4-7 for summaries of wetland and functional impacts for the action alternatives being considered.). Temporary impacts will likely be incurred during construction due to operation of construction equipment within wetlands, and will be determined during final design. Indirect impacts to wetlands may occur from sediment discharges associated with stormwater, erosion, hydrologic modifications, noxious weed establishment, and habitat degradation from litter, trash, noise, or diminished diversity. These indirect impact factors are discussed in greater depth in the 2006 US 160 EIS. The majority of these impacts can be reduced or eliminated through mitigation measures discussed below.

Direct impacts to wetlands will occur from wetland fills for highway construction. The amount of wetland impacts associated with the Revised G Modified (Preferred) Alternative (0.03 acre) is relatively minor when compared to overall impacts for the entire US 160 Durango to Bayfield corridor (20.9 acres) or the Grandview Section (7.32 acres). Efforts to further reduce these impacts will be addressed in conjunction with final design of phased construction projects.

The functional analysis of wetland impacts indicates that moderate and high functions, as well as total acres of wetland impacts, are fewer for the Revised G Modified (Preferred) Alternative than other action alternatives (see Table 4-5, Table 4-6, and Table 4-7 in Chapter 4, for more detail).

No change is anticipated in wetland cumulative impacts as described in Section 4.23.10.3 of the 2006 US 160 EIS.

The 2006 US 160 EIS includes a discussion of avoidance, minimization, and mitigation measures and the preference for applying these measures in the stated order for both jurisdictional and non-jurisdictional wetlands in compliance with Executive Order 11990. The avoidance and minimization measures presented in the 2006 US 160 EIS are applicable to future phased projects and are also a condition of the Section 404 Individual Permit for the corridor. The Section 404 Permit requires submittals for US 160 phased construction projects including a description of the methods taken to further avoid and minimize impacts to waters of the US taking into considerations cost, existing technology, and logistics in light of the overall project purpose. Compensatory mitigation for unavoidable wetland and waters of the US impacts will be conducted in accordance with current USACE mitigation policies. The permit contained conditions that required coordination with the USACE on each construction project, including submittal of detailed impact plans and a final mitigation and monitoring plan.

BMPs for sediment control and sediment reduction techniques will be incorporated into the alternatives. These measures will ensure that sedimentation and siltation caused during the construction phase is reduced and water quality impacts are limited.

Socioeconomics and Relocation (including Environmental Justice): No community resources (sewer, water, school, churches, fire stations, police stations, and others) will be relocated or impeded due to any action alternative. Any action alternative would provide additional jobs during construction. Additionally, a connection between US 160 and US 550 may facilitate existing and planned commercial, mixed commercial and industrial, medium density residential, and mixed use land use development immediately adjacent, north and south, of the interchange (La Plata County, 2011). This could encourage growth and development, potentially creating new jobs.

All of the action alternatives transect more than one functional ranch and will cause permanent loss of land. All action alternatives will also cross irrigation ditches in the study area.

The majority of the potentially impacted residences in the study area are single family homes and one is a mobile home. Since it was determined that more than half of all low-income families in La Plata County reside in mobile homes, there is a possibility that some of the impacted individuals are considered low-income.

The Revised G Modified (Preferred) Alternative has no residential or business relocations, which is less than four residential relocations and one displaced gas well for the Revised F Modified Alternative and six residential relocations and displacement of a commercial gravel pit for the Eastern Realignment Alternative.

Any relocations, residential and business, if conducted, would be completed in accordance with the Uniform Relocation Assistance Act and CDOT would provide relocation benefits and assistance to any impacted individuals. More detailed information on mitigation for socioeconomic resources can be found in Section 4.3.2.7 of the 2006 US 160 EIS. No additional mitigation is required.

Functional irrigation systems will be restored during construction with no permanent interruption of service. Any temporary inability to maintain irrigation service will be compensated for the lost value of the crops affected. A farm equipment/livestock underpass will be installed on the Webb Ranch beneath US 550 to provide passage for continued farming and ranching operations and livestock.

Wildlife and Fisheries: Short-term, localized impacts to wildlife are expected during construction of any of the action alternatives. Removal (and restoration) of vegetation and increased noise and activity from the highway construction could cause temporary and permanent displacement of individuals from these areas. Construction activities have the potential to alter breeding behavior and destroy nests of bird species protected under the Migratory Bird Treaty Act (MBTA), including raptors. Since the MBTA protects all bird species except the house sparrow, the European starling, the domestic pigeon, and the monk parakeet, it is reasonable to assume that MBTA protected bird species occur within the project area. Wildlife would incur adverse impacts from loss of habitat due to expansion of the existing highway and the addition of access roads and driveways. In addition to habitat loss, the highway improvements would accommodate high traffic densities with an associated increase in mortality from vehicle collisions and/or avoidance of the highway. Increases in traffic volume and speed are positively correlated to increases in vehicle-wildlife collisions. The highway itself can create a physical barrier to the movements of small, medium and large animal species.

Implementation of the Revised G Modified (Preferred) Alternative would result in direct impacts to wildlife from the loss of approximately 36.6 acres of piñon-juniper woodlands, and 0.03 acres of wetlands. This is less impact to habitat used by wildlife than for the Revised F Modified Alternative which would result in impacts of approximately 39.3 acres of piñon juniper woodlands and 0.53 acres of wetlands. Construction of the Eastern Realignment Alternative would result in the most impact to wildlife with approximately 49.1 acres of piñon-juniper woodlands and 3.2 acres of wetlands lost as wildlife habitat.

The project area serves as range for various wildlife species. The design carried forward in the 2006 US 160 EIS identified 3 locations for wildlife crossings in the Grandview Section. Two of these crossings will be included along the Revised G Modified (Preferred) Alternative alignment on US 550 south of US 160. These wildlife crossing locations have been moved east with the Revised G Modified (Preferred) Alternative alignment design, and will be situated in the same general locations along the alignment as what was originally proposed. Deer exclusionary measures will be placed along the entire length of the Revised G Modified (Preferred) Alternative (with breaks for major road crossings) to funnel animals into the proposed wildlife crossing locations.

All raptor species are protected under the MBTA, which prohibits removing or disturbing active nests except under permit from the US Fish and Wildlife Service (USFWS). Raptor nest surveys will be completed prior to start of construction to identify active nests and potential areas where seasonal restrictions on construction may be required. If nests are located in the study area, protective seasonal buffer zones in compliance with those recommended by the CDOW will be established around active nests during construction to avoid disturbance to individual birds while nesting.

To the extent possible, vegetation removal activities will be timed to avoid the migratory bird breeding season (April 1 through August 31). Areas that must be scheduled for vegetation removal between April 1 and August 31 shall be surveyed for nests and cleared by a qualified biologist prior to initiation of work. If active nests are identified a 50-foot buffer will be required. Appropriate inactive nest removal and hazing/exclusion measures shall be incorporated into the work to avoid the need to disturb active migratory bird nests.

Threatened, Endangered, and Sensitive Species: Since habitat for federally listed threatened, endangered, or candidate species was not identified within the Revised F Modified Alternative or the Revised G Modified (Preferred) Alternative alignments study area, these alternatives would have *No Effect* on listed species. The Eastern Realignment Alternative would impact 1.1 acres of suitable southwestern willow flycatcher habitat. Presence/absence surveys in these sites has not occurred, but would be conducted prior to the implementation of this alternative. Assuming that presence/absence surveys do not identify threatened southwestern willow flycatchers utilizing the identified areas, it is probable that the removal of portions of or all of these patches from the construction and operation of the highway system *May Affect, but is Not Likely to Adversely Affect* this species. If survey efforts indicate the identified habitat patches are occupied, then it is probable that these impacts would likely be determined to *May Affect, and is Likely to Adversely Affect* the southwestern willow flycatcher. Formal consultation with USFWS would establish and formalize the determination of effects for this species.

Bald eagles, a state-listed species which is also protected by the Bald and Golden Eagle Protection Act, may be attracted by roadkilled wildlife, which makes them vulnerable to injury or death from vehicle collisions. The potential for vehicle collisions with bald eagles would decrease under all action alternatives, as wildlife exclusionary fencing will be included in the highway design. Construction of the Revised G Modified (Preferred) Alternative may impact, but is unlikely to significantly impact bald eagles. No known nests or communal roost sites would be impacted. Approximately 81.4 acres of bald eagle winter range/foraging, and approximately 51.3 acres of bald eagle winter concentration area would be removed as a result of this alternative. The Revised F Modified Alternative would have similar impacts to bald eagles as the Revised G Modified (Preferred) Alternative. This alternative would not impact any known nests or communal roost sites, but would remove approximately 91.4 acres of bald eagle winter range/foraging and 20.6 acres of bald eagle winter concentration area. The Eastern Realignment Alternative would impact 114.4 acres of bald eagle winter range and 19.6 acres of bald eagle winter concentration area. Given the abundance and close proximity of habitat in the area, these alternatives would not reduce the size or overall distribution of the wintering population.

Bald eagle nest surveys will be conducted within 0.5 mile of the study area prior to starting construction. If an active or inactive nest is identified, a 0.5-mile buffer will be required around the nest, and seasonal restrictions on construction in the area will be implemented. Seasonal restrictions will coincide with Raptor Buffer Guidelines established by the CDOW. If bald eagle nocturnal roosts are identified, construction activity will be restricted within 0.25 mile of active nocturnal roost sites between November 15 and March 15, if bald eagles are present. Perch and roost trees removed during construction will be replaced at a 2:1 ratio with an appropriate tree species, such as cottonwood.

Visual Resources: Visual impacts that could be associated with any of the action alternatives include temporary visual impacts due to construction activities, slope cuts and fills, expansion of paved areas, removal of trees and vegetation, the addition of new structures, and the addition of new roadway alignments in rural areas.

The Preferred Alternative would relocate US 550 from the west face of Farmington Hill to the top of Florida Mesa, eventually descending the north side of Farmington Hill approximately 3,200 feet east of the existing intersection. On the relocated alignment, impacts to visual resources would occur from large areas of cut-and-fill that will be necessary, by enlarging the roadway in areas to accommodate access roads and expanded intersection features, widening the roadway from two to four lanes, and by moving traffic closer to residences.

Both the Preferred Alternative and the Revised F Modified Alternative pass through a landscape that appears mostly natural, with scattered rural residences. Building a roadway in this area would introduce a major built-up feature that would impact the existing scenery and would impact the views of residences on Farmington Hill and developments in Grandview. This Revised F Modified Alternative also requires access roads on both sides of the roadway, increasing the area of disturbance to the landscape. Scenic integrity would be heavily altered, which would impact more local residences than the Preferred Alternative.

Impacts from the Eastern Realignment Alternative are similar to those described for the Revised F Modified Alternative. The Eastern Realignment Alternative is a longer roadway that requires frontage roads along the northern portion of the alignment. This alternative would have the most residences and rural landscape with visual impacts.

Visual contrasts created by the action alternatives would be additive to the existing condition. However, measures will be taken to mitigate visual impacts to the extent possible. Construction of cut-and-fill slopes will be minimized and the cut line will be blended into the existing terrain. Revegetation will occur as soon as possible after construction to stabilize soils and reduce visual contrasts. Retaining walls and bridge structures will include design features to add to the scenic quality of the built area. Architectural guidelines were required by the 2006 US 160 EIS and were developed for the Grandview Interchange. Removal of adjacent roadside vegetation will be minimized, where possible. Areas that will lose vegetation that provides important visual screens will be revegetated with taller plant species (trees and shrubs) that can serve the same function. These areas will be determined in final construction plans. The original US 550 alignment at Farmington Hill will be obliterated and revegetated with native species, including shrubs and trees.

Historic Preservation: Three archaeological sites located adjacent to the existing US 550 alignment near the south terminus of the action alternatives would be directly affected by earth moving activities for all action alternatives. All sites are eligible for the National Register of Historic Places (NRHP). The Revised G Modified (Preferred) Alternative would directly affect the fewest (six) NRHP-eligible archaeological sites (5LP9588, 5LP9589 and 5LP9590 in addition to the three listed above). The Revised F Modified Alternative would directly affect nine NRHP-eligible archaeological sites and the Eastern Realignment Alternative would directly affect eight sites. Controlled data recovery excavations at each site will effectively mitigate the adverse effect, as stipulated in the draft Section 106 Memorandum of Agreement executed for the project (see Appendix H).

At such time as one or more NRHP eligible archaeological sites referenced above is within the limits of a planned and funded construction project and therefore in danger from earth-moving activities, an Archaeological Data Recovery Plan defining the methodology and goals for excavation will be completed according to all Secretary of the Interior's Standards and Guidelines for Archaeological Documentation, and Colorado Office of Archaeology and Historic Preservation procedures and protocols. The plans will be reviewed and approved by the State Historic Preservation Officer (SHPO) prior to issuance of an excavation permit and initiation of controlled excavations. The consulting parties and tribal governments will also be provided the opportunity to review and comment on the excavation plan(s) prior to implementation.

No human remains, associated or unassociated funerary objects or sacred objects, or objects of cultural patrimony are expected to be encountered during construction. If such items are discovered, work will cease in the vicinity of the find and all appropriate coordination will ensue with the SHPO, consulting parties and tribal governments, and other involved entities, as necessary.

The historic properties affected by the project are ranches, a residential property, and ditches located on Florida Mesa (see Figure 4-12). All action alternatives would result in an adverse effect to the Craig Limousin Ranch, and no adverse effect to the Co-op Ditch. The SHPO has concurred with this determination (see Appendix A). The amount and location of effects to these properties varies by alternative.

In addition to the impacts common to all action alternatives, the Revised G Modified (Preferred) Alternative also impacts the Webb Ranch. CDOT has determined that the

Revised G Modified (Preferred) Alternative results in an adverse effect to this historic ranch. The SHPO has concurred with this finding (see Appendix A).

In addition to the impacts common to all action alternatives, the Revised F Modified Alternative impacts the Clark Property, the Schaeferhoff-Cowan Ranch, the Webb Ranch, and the Webb-Hotter Lateral Ditch. CDOT has determined that the Revised F Modified Alternative results in an adverse effect to these historic resources. The SHPO has concurred with this determination (see Appendix A).

In addition to the to the impacts common to all action alternatives, the Eastern Realignment Alternative impacts the Schaeferhoff-Cowan Ranch, and the Webb-Hotter Lateral Ditch. CDOT has determined that the Eastern Realignment Alternative results in an adverse effect to the Schaeferhoff-Cowan Ranch and a no adverse effect to the Webb-Hotter Lateral Ditch. The SHPO has concurred with this determination (see Appendix A).

Impacts to historic resources will be mitigated through archival documentation and interpretive signage. Efforts to minimize harm to historic and archaeological properties will be assessed during the final design phase and may include, but not be limited to, narrower roadway width, use of retaining walls, steeper slopes, and creative underpass and irrigation design, as applicable. Contributing features of historic properties will be protected during construction and avoided to the extent practicable.

Section 4(f) Evaluation

The intent of Section 4(f) of the US Department of Transportation Act of 1966 (as amended) is to avoid use of public parks, recreation areas, wildlife and waterfowl refuges, and historic sites by transportation projects. Section 4(f) specifies that a transportation program or project requiring the use of Section 4(f) properties may be approved only if there is no feasible and prudent alternative to using that land, and the project includes all possible planning to minimize harm to the resource. Several options were explored to avoid or minimize impacts to these resources. A *US 550 Connection to US 160 at Farmington Hill Draft Section 4(f) Evaluation* was completed in March 2011 for the six historic properties that would be impacted by the project. These properties include three historic ranches (Webb Ranch, Craig Limousin Ranch, and Schaeferhoff-Cowan Ranch), one historic residential property (the Clark Property), and two ditches (Webb-Hotter Lateral Ditch and Co-op Ditch). Because these historic resources make up the land surrounding the proposed action, neither the Preferred Alternative nor the other action alternatives would avoid the properties entirely. The Revised G Modified (Preferred) Alternative would result in the fewest direct use of historic resources (three), followed by the Eastern Realignment Alternative (direct use of four historic resources), with the Revised F Modified Alternative resulting in the direct use of all six historic resources. A revised Section 4(f) Evaluation is included in the SDEIS.

Public Involvement

Public involvement activities conducted during the SDEIS include a newsletter distribution to property owners in the project area, meeting with the *Durango Herald*, press releases, SEIS web page, presentations at two La Plata County Alliance meetings, and receipt of four phone calls/emails from members of the public.

This SDEIS is available for a 45-day review and comment period, and a public hearing will be held during this time. The Notice of Availability (NOA) for this SDEIS, the comment period, and public hearing date and location has been announced via postcards (in English and Spanish); web site; press releases; email announcements to regional towns, counties, and elected officials; and publication in the *Federal Register* and local media (news and radio). The NOA begins the comment period; the SDEIS will be distributed at least 15 days prior to the public hearing.

Written comments received during the 45-day comment period of the SDEIS, as well as written and verbal comments received at the public hearing, will be included as an official part of the project record, and documented in the Supplemental Final Environmental Impact Statement (SFEIS). A final newsletter will be distributed announcing the results of the SFEIS and next steps, the website will be updated, and press release will be distributed.

After receipt and full consideration of public and agency comments on the SFEIS, an alternative will be selected for implementation. The selected alternative, the basis for its selection, and the response to agency and public comments will be documented in the Record of Decision.

Agency Coordination

Coordination with federal and state agencies and Native American tribal governments has been ongoing throughout both the 2006 US 160 EIS and this Supplemental Environmental Impact Statement (SEIS) process. The Advisory Council on Historic Preservation (ACHP) has elected to participate in the consultation process under Section 106 of the National Historic Preservation Act. Correspondence with these agencies and Tribes is documented in Appendix A.

FHWA and CDOT have coordinated with the USACE on the SEIS. An initial meeting was held with the USACE on April 26, 2011 to determine how to coordinate on the SDEIS. Consistent with the signed 2008 NEPA/404 Merger Agreement Document, it was determined that USACE would provide a separate concurrence on the SDEIS prior to publishing the Record of Decision. FHWA and CDOT requested concurrence from the USACE on the process leading to the Preferred Alternative in a letter dated August 15, 2011. Concurrence was requested on the project purpose and need, alternative evaluated in detail and that the Preferred Alternative appears to be the LEDPA. The USACE provided concurrence on all three points in a letter dated September 8, 2011.

Other agencies, such as the USFWS and the Natural Resources Conservation Service, (NRCS) have been consulted with regarding updated information for special status species and prime farmlands. Correspondence with these agencies is included in Appendix A. State and federal agencies will continue to be consulted with throughout the process as needed.

1.0 Purpose and Need

1.1 Introduction

A supplement to an Environmental Impact Statement (EIS) prepared under the National Environmental Policy Act (NEPA) is required whenever there are substantial changes relevant to environmental concerns or significant new circumstances or information bearing on the proposed action or its impacts that was not identified in the most recently distributed version of the draft or final EIS (40 CFR §1502.9(c)). The Supplemental EIS (SEIS) needs to address only those changes or new information that are the basis for preparing the supplement and were not addressed in the previous EIS (23 CFR §771.130(a)).

In 2006 the Federal Highway Administration (FHWA) signed the US Highway 160 (US 160) from Durango to Bayfield Final Environmental Impact Statement (2006 US 160 EIS) and the US Highway 160 (US 160) from Durango to Bayfield Record of Decision (2006 US 160 ROD). Due to its size the project was broken into phases for final design and construction. During final design for one phase of the project it was discovered that certain ranches and a residential property were eligible for protection under Section 106 of the National Historic Preservation Act (NHPA). Accordingly, consultation began under Section 106 of the NHPA, and an evaluation under Section 4(f) of the Department of Transportation Act of 1966 (23 USC 138) was initiated. Therefore, a Draft Section 4(f) Evaluation was prepared and completed on March 21, 2011, and this Draft Supplemental EIS is being prepared.

The US Highway 550 (US 550) South Connection to US 160 Supplemental Draft Environmental Impact Statement (SDEIS) supplements information contained in the 2006 US 160 EIS and 2006 US 160 ROD. This SDEIS has been prepared in compliance with the Council on Environmental Quality regulations for implementing NEPA (40 CFR 1500 et seq.), FHWA's environmental impact and related regulations (23 CFR Parts 771 and 774 et seq.), the FHWA Technical Advisory T 6640.8A (Guidance for Preparing and Processing Environmental and Section 4[f] documents), and other applicable laws.

This SDEIS addresses impacts that were not previously evaluated or that have been changed based on revisions to the design. This SDEIS also addresses impacts of newly defined alternatives on previously unidentified historic and archaeological resources. These impacts are confined to a limited portion of the project where US 550 connects to US 160 east of Durango, Colorado. Based on a Draft Section 4(f) Evaluation dated March 21, 2011, and after the comment period on this document was complete, FHWA determined that the proposed action would result in significant environmental impacts to historic and Section 4(f) properties which were not evaluated in the 2006 US 160 EIS and 2006 US 160 ROD. This SDEIS is therefore focused on evaluating this part of the corridor and changes identified in this area since the US 160 ROD was completed. More specifically, the SDEIS covers:

- A shift in the alignment of one US 550 south connection to US 160 alternative to avoid a gas well on the historic Webb Ranch.
- The discovery of additional historic and archaeological resources in the project vicinity of where US 550 connects to US 160.

This chapter includes the proposed action, provides a brief history of the project, and describes the purpose and need. Results of reevaluations that have been performed for projects built in the US 160 corridor since the 2006 US 160 ROD are also included to represent an up-to-date consideration of the effect on the human environment.

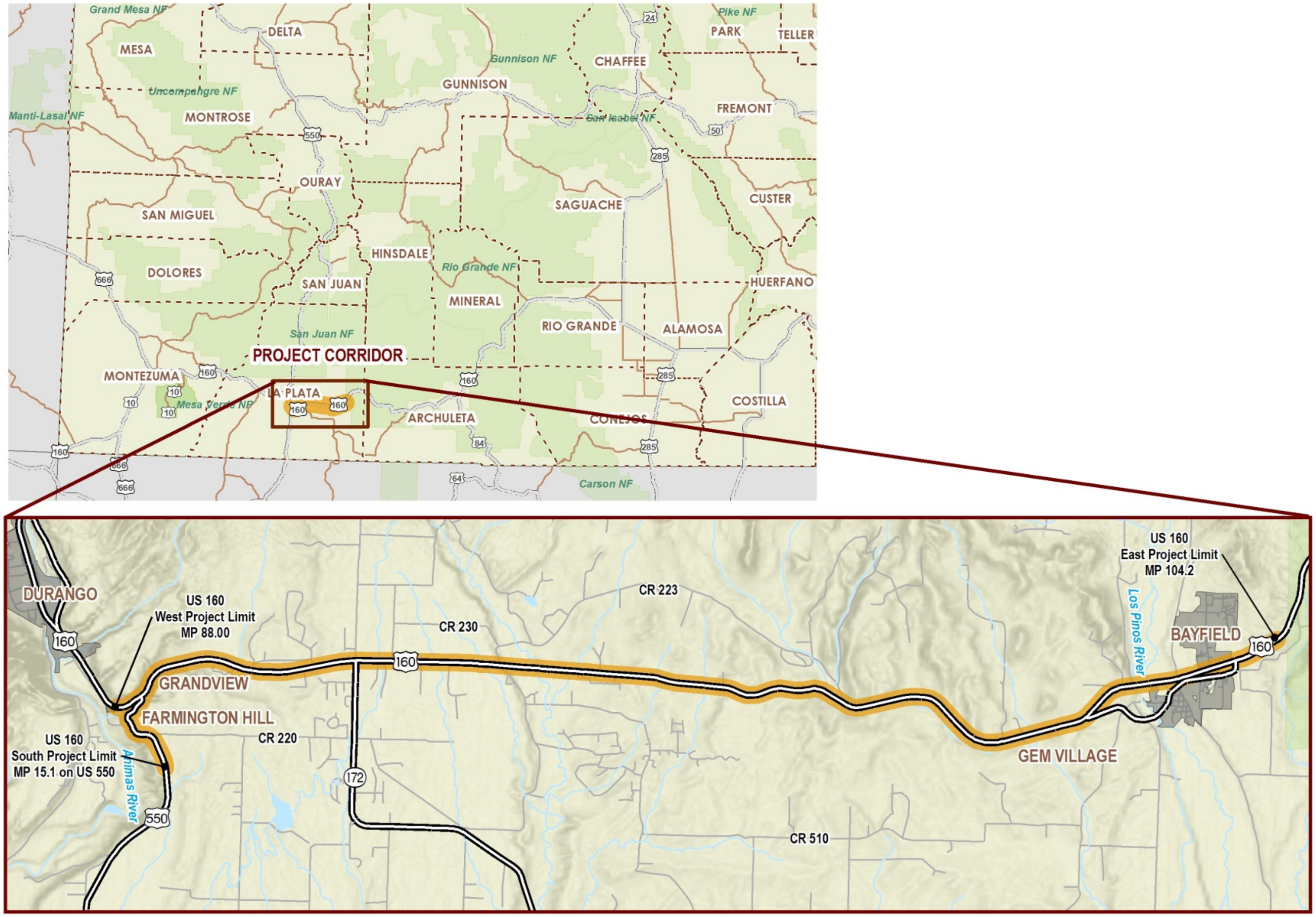
The project is located in La Plata County, Colorado and includes the connection of US 550 to US 160, approximately a half of a mile east of Durango, Colorado (see Figure 1-1). US 160 is a National Highway System route and is the only principal east-west highway in southern Colorado. It includes two westbound lanes and two eastbound lanes east of Durango in an area known as Grandview. US 550 is the principal north-south highway in the western portion of Colorado, extending from the New Mexico state line to Grand Junction. US 550 is a narrow two-lane highway with limited shoulders south of Durango and connects to US 160 at an intersection approximately 16 miles north of the New Mexico state line. This intersection is locally known as Farmington Hill. Because there is another intersection of US 550 and US 160 in Durango, the intersection of US 550 to US 160 at this location is hereinafter referred to as Farmington Hill or the US 160/ US 550 (south) intersection. The alignment of US 550 as it connects to US 160 is hereinafter referred to as the US 550 south alignment or US 550 south connection to US 160.

1.2 Proposed Action

The Selected Alternative from the 2006 US 160 ROD on US 160 is 16.2 miles, extending from milepost (MP) 88.0, located east of Durango, to MP 104.2, located east of Bayfield. The Selected Alternative extends four lanes on US 160 to east of Bayfield, generally along the existing alignment with an alignment to the south in Gem Village from MP 100 to MP 101. It also included reconstruction of US 160/US 550 (south) intersection as an interchange and a new section of US 550 necessary to connect the interchange on US 160 to the US 550 corridor south of Durango.

The proposed action in this SDEIS revises the location and length of US 550 from south of CR 220 to where it connects to US 160. The proposed action on US 550 in the SDEIS is slightly longer than that selected in the 2006 US 160 ROD to allow for a design shift that

Figure 1-1. US 160 Corridor Regional Map



lessens impacts and avoids a gas well. In the 2006 US 160 EIS and 2006 US 160 ROD, the length of US 550 was described as being 1.2 miles long. With the design shift described in this SDEIS, the length of US 550 is 1.5 miles long. The realigned portion of US 550 would be improved to a four-lane highway.

1.3 Background

This SDEIS is being prepared because of issues that have come to light during preliminary design of the US 550 connection based on the alternative selected in the 2006 US 160 ROD. These issues include (1) a gas well constructed in the US 550 alignment of the preferred alternative from the 2006 US 160 EIS, and (2) in 2008, the portion of the Marie J. Webb Ranch (Webb Ranch) property on Florida Mesa was determined eligible for the National Register of Historic Places (NRHP). The US 550 alignment selected in the 2006 US 160 ROD that connects to US 160 crosses this historic property. A brief history of the project is described as follows:

A Feasibility Study that included the US 160 corridor from Durango to Bayfield and US 550 from the New Mexico Stateline to Durango was completed in 1999. The Feasibility Study was a planning level study that identified broad recommendations and strategies. The Feasibility Study recommended widening US 160 between Durango and Bayfield from two lanes to four lanes, and constructing an interchange for the connection of US 550 to US 160. The study recommended the interchange be constructed generally near the existing location of the US 160/US 550 (south) intersection also known as Farmington Hill. These recommendations were carried into the subsequent NEPA processes for US 160 between Durango and Bayfield, and US 550 south of Durango for further evaluation and study.

The NEPA process for US 550 south of Durango was an Environmental Assessment (EA) completed to a Finding of No Significant Impact (FONSI) in 2005. Improvements to US 550 included widening from two to four lanes along the existing highway from the New Mexico state line to MP 15.4.

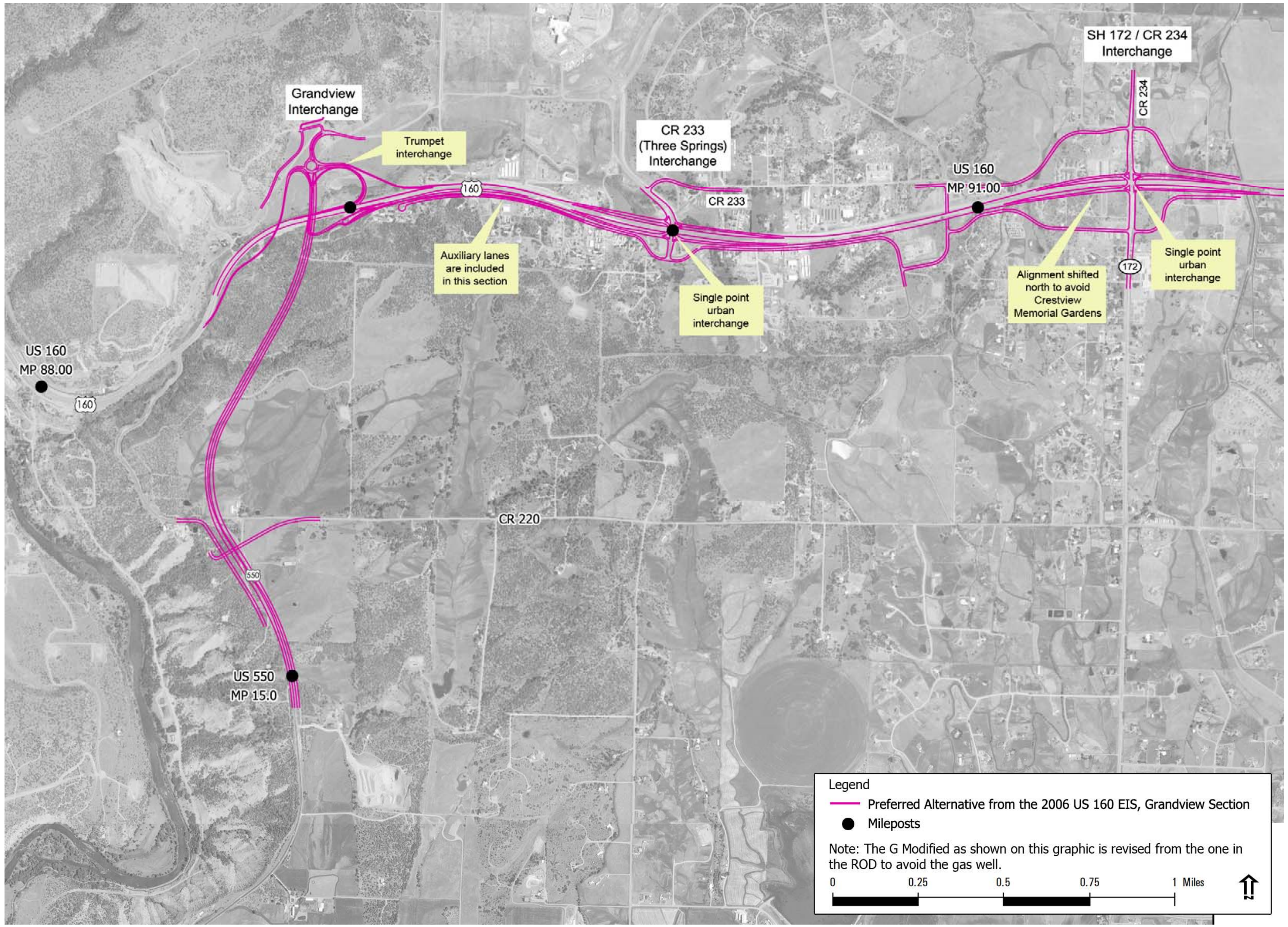
For the US 160 project between Durango and Bayfield, a preliminary Environmental Assessment (EA) was prepared between February 1999 and January 2002. The study area for this corridor included the connection of US 550 to US 160 east of Durango. A portion of US 550 was included in this study only as needed to connect it to the US 550 alignment described in the US 550 EA and FONSI. Based on the US 160 preliminary EA and the environmental impacts, the FHWA determined that an EIS was the appropriate level of NEPA documentation for this project.

The EIS process commenced with publication of the notice of intent to prepare an EIS in the Federal Register on December 24, 2002. A public and agency scoping meeting was held on March 5, 2003 to identify public and agency issues. On September 23, 2005, the Draft EIS/Draft Section 4(f) Evaluation was made available to the public. A public hearing was held on the Draft EIS/Draft Section 4(f) Evaluation on October 13, 2005. The *US Highway 160 Durango to Bayfield Final EIS/Final Section 4(f) Evaluation* (2006 US 160 EIS) was signed in May 2006. The 2006 US 160 EIS was made available for public review on May 26, 2006 with a public hearing on June 7, 2006. The *US Highway 160 from Durango to Bayfield Record of Decision* (2006 US 160 ROD) was signed by FHWA on November 7, 2006. The 2006 US 160 EIS and 2006 US 160 ROD are available at http://www.coloradodot.info/projects/us160eis. The US 160 ROD limitation on claims notice was published in the Federal Register on May 14, 2007 and was not legally challenged within the 180-day statute of limitations timeframe.

Based on the approved 2006 US 160 ROD, the US 160 corridor would receive phased improvements to a 16.2 mile segment of US 160 between Durango and Bayfield in La Plata County, Colorado (see Figure 1-2). The Selected Alternative in the 2006 US 160 ROD included four lanes on US 160 between Durango and Bayfield and on the US 550 south alignment, generally along the existing roadway. The corridor was divided into four sections: Grandview, Florida Mesa and Valley, Dry Creek and Gem Village, and Bayfield. The Selected Alternative in the 2006 US 160 ROD is a combination of the preferred alternatives for each project section. The Grandview Section is located in the western part of the corridor on US 160 from MP 88.0 west of the Farmington Hill intersection to State Highway 172 (SH 172)/County Road 234 (CR 234) (i.e., Elmore's Corner). It includes a segment of US 550 that extends from just south of County Road 220 (CR 220) to US 160 (i.e., US 550 connection to US 160). This section is labeled "Grandview" as it is in the Grandview area which consists of the area east of Farmington Hill straddling US 160 to both the north and south to CR 234 and SH 172 intersection (City of Durango 2004). The preferred alternative in the Grandview Section, G Modified, included a trumpet interchange of US 160 and US 550 approximately 0.6 mile east of the current US 160/US 550 (south) intersection, and single-point urban interchanges at County Road 233 [CR 233 (Three Springs)] and SH 172/County Road 234 (CR 234) (see Figure 1-2).

Due to the length and cost of the Selected Alternative, construction was broken into phases, consisting of smaller independent construction projects. After the 2006 US 160 ROD was completed, CDOT designed and began construction of a portion of the trumpet interchange approximately 0.6 mile east of Farmington Hill on US 160. CDOT also began design for the connection of US 550 to US 160. During the design process, a gas well was discovered within the alignment selected in the 2006 US 160 ROD. The US 550 connection was redesigned to avoid this gas well. As part of the design process for the US 550 connection to US 160, and in response to changing criteria for identifying qualifying resources under Section 106 of NHPA, CDOT re-assessed environmental impacts and conditions. In 2008, a portion of the Marie J. Webb Ranch (Webb Ranch)

Figure 1-2. Preferred Alternative from the 2006 US 160 EIS, Grandview Section



was identified as an eligible historic resource under Section 106 of the NHPA (see Appendix A). In addition, an independent cultural resources inventory was conducted on behalf of the Webb family on the western portion of the ranch that identified a number of previously unrecorded archaeological sites (SEAS, 2008). Based on the SEAS Report, a formal inventory of these sites was conducted, as described in Appendix A. Under the selected alternative for the Grandview Section of the 2006 US 160 ROD, the historic Webb Ranch is crossed by the US 550 south connection to US 160, which would be a use of the property under Section 4(f) the Department of Transportation Act of 1966 as amended [Section 4(f)] and triggered the requirement to prepare a Section 4(f) evaluation. In consultation with the State Historic Preservation Officer (SHPO), CDOT determined that the Preferred Alternative in the 2006 US 160 EIS would result in an adverse effect to the Webb Ranch as defined in 36 CFR 800.5. Because of this new information, the Preferred Alternative from the 2006 US 160 EIS is now being reassessed with other alternatives in the vicinity of the US 550 south connection to US 160.

Construction on the interchange located approximately 0.6 mile east of the existing US 160/US 550 (south) intersection is expected to be completed in 2012. The interchange ("Grandview Interchange") is being completed to provide safe and direct access to existing and planned development (including a regional retail center, three schools, a 5,467 unit residential development, a hospital, and a park) to the north. The Grandview Interchange currently being constructed does not include a connection to US 550. It accommodates future projected seasonal traffic volumes on US 160 (of 85,910 vehicles a day), facilitates east-west travel and provides safe and direct access to current and future development (including a regional medical hospital, two banks, commercial and office developments, and a several-hundred unit residential development) north and south of US 160 in the Grandview Section.

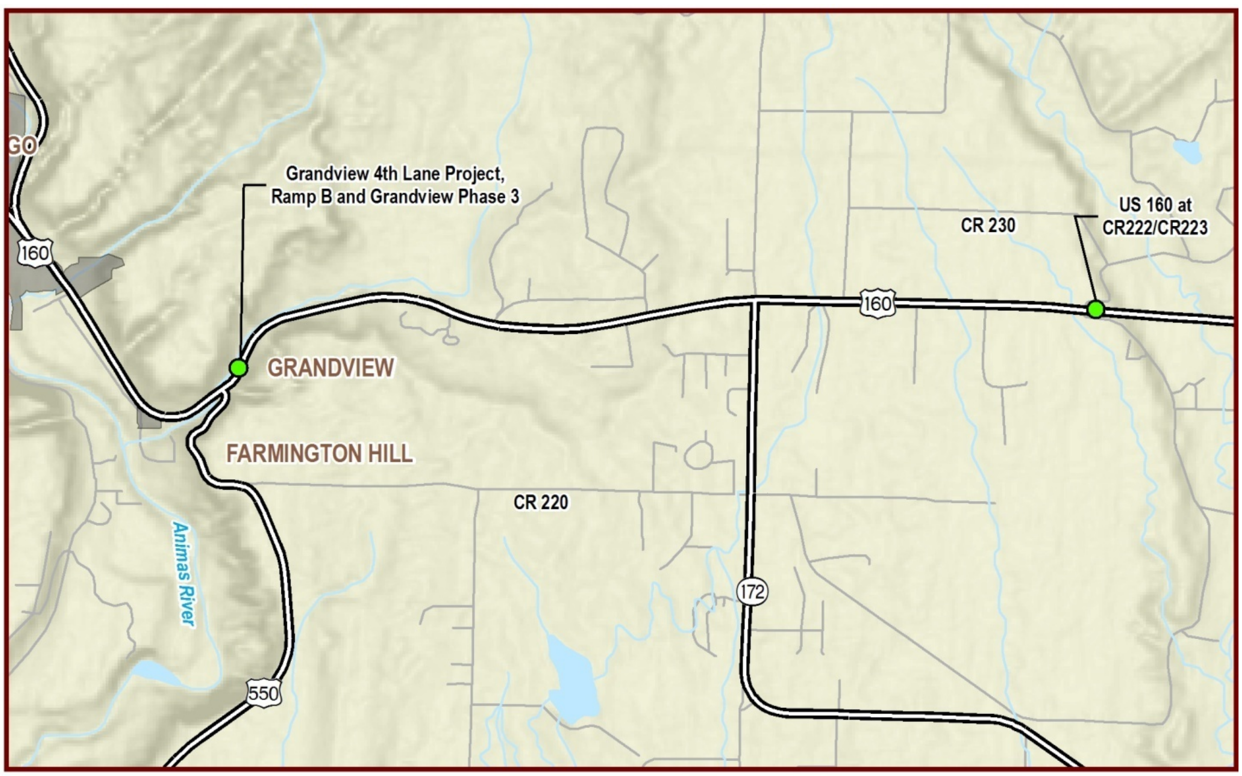
Documentation of the need for the Grandview Interchange even without a US 550 connection is provided in an FHWA memorandum from Doug Bennett to Karla Petty dated December 12, 2008 (see Appendix B) and in the *Year 2030 Traffic Operations Analysis for Alternatives of the US 160 FEIS* (SEH, 2010) provided in Appendix C. This analysis makes it clear that completion of the Grandview Interchange can proceed without a connection to US 550 South and that the US 550 South Connection to US 160 can proceed in an independent manner from the Grandview Interchange. Each has independent utility from the other.

FHWA approved the Draft Section 4(f) Evaluation on March 22, 2011. Based on the evaluation, FHWA determined that the Selected Alternative from the 2006 US 160 ROD would result in significant environmental impacts to historic and Section 4(f) properties which were not evaluated in the 2006 US 160 EIS and 2006 US 160 ROD. According to 23 CFR §771.130(a)(2), this determination requires a SEIS be prepared. As explained in a letter from FHWA to CDOT dated April 5, 2011, the SEIS will only cover a limited portion of the overall project. The SEIS is limited to the US 550 south connection to US 160 at Farmington Hill where these new significant environmental impacts are located. Per 23 CFR 771.130(f) the preparation of this supplement shall not: (1) Prevent the granting of new approvals; (2) Require the withdrawal of previous approvals; or (3) Require the suspension of project activities; for any activity not directly affected by the supplement (see Appendix A).

1.4 Project Status of 2006 US 160 EIS and ROD

Several projects that are part of the Selected Alternative have been built since the US 160 ROD was completed in 2006. Information on these projects is provided to represent an up-to-date consideration of the Selected Alternative and its effects on the human environment. These projects include the Grandview 4th Lane Project, the Grandview Ramp B Project, the CR 222/223 Intersection Project, and the Grandview Phase 3 Project. The location of these projects is provided on Figure 1-3. A brief description of each project is provided in the following sections as it relates to a reevaluation of project impacts and project scope. Additional information on the reevaluation of these projects is provided in Appendix D.

Figure 1-3. Projects in the US 160 Corridor Constructed Since the 2006 US 160 ROD



1.4.1 Grandview 4th Lane Project

The Grandview 4th Lane Project included roadway improvements to meet current design standards and partial construction of the Grandview Interchange on US 160 between Mile Post (MP) 88.0 and 89.5. Work included the following construction components: utility relocations, geotechnical investigations, earthwork, drainage improvements, resurfacing, signing, striping, signalization, lighting, bridge structures, landscaping, guardrail, retaining walls, and wetland mitigation. The project resulted in the addition of a 4th lane through the US 160/550 (south) intersection that ties into the existing four lanes to the west. Four bridge ramps were built over Wilson Gulch to tie into a roundabout proposed for subsequent phases. Retaining walls were constructed at various locations along the roadway to limit impacts and right-of-way requirements.

FHWA provided concurrence on the environmental compliance and certification on December 18, 2007. The Grandview 4th Lane Project was a Modified Design/Build project within the limits of the Selected Alternative for the Grandview Section in the 2006 US 160 ROD. The Design/Build contract incorporated required mitigation for project impacts and applicable restrictions, conditions, and permit submittals by the Contractor consistent with the FHWA approved 2006 US 160 EIS and 2006 US 160 ROD. Construction of the Grandview 4th Lane Project was completed in the late fall 2010.

1.4.2 Ramp B

The Ramp B Project included partial construction of a two-way ramp (Ramp B) and an access road to meet current design standards for the Grandview Interchange. The change from a “T” intersection to a roundabout design within the same footprint analyzed in the 2006 US 160 EIS provided better capacity, functionality, and traffic movement. Minor design changes to the ramp to accommodate the access road were within the 2006 US 160 EIS anticipated right of way (ROW) and did not result in additional impacts beyond those disclosed in the 2006 US 160 EIS. The Ramp B Project was the second phase of completion for a future functional interchange that will eventually allow a connection between the north and south sides of Grandview. Excavated fill material for the construction of Ramp B was hauled and placed to the north of US 160 for the future roundabout component of the interchange.

FHWA concurrence on the Re-evaluation for the Ramp B Project was provided by on April 9, 2009. As stated in the Re-evaluation, clearances for noise, archaeology, and paleontology were readdressed based on the final design plans that included changes to Ramp B and an extended access road. Mitigation commitments from the 2006 US 160 EIS required that additional noise analyses be conducted for Gohn’s Homestead Mobile Home Park to determine whether moving Ramp B closer to these residential properties and extending the access road warranted additional noise mitigation. Based on the noise analysis, no additional or new receivers would be impacted and noise mitigation was still considered not feasible or reasonable (see Appendix D). The archaeology and paleontology clearances for this project included additional on the ground reconnaissance to assess potential resources on previously unsurveyed Bureau of Land Management (BLM) lands. Based on the revised design, the ROW on BLM property was reduced to avoid identified cultural sites, and coordination on potential paleontological sites on BLM land was completed without the need for a Paleontology Monitor during construction. Construction on the Ramp B Project was completed in fall 2010.

1.4.3 US 160 at CR222/CR223

The US 160 at CR 222/CR 223 Project addressed safety improvements to the County Road (CR) 222 and 223 intersection with US 160, located approximately 10 miles east of Durango. This intersection was identified in the 2006 US 160 EIS as being a safety concern because the site distance is less than 200 feet east of the intersection, and because of sharp skewed approach angles to US 160 for both of the county roads. The intersection had a high accident history before it was improved.

The US 160 at CR 222/2223 Project relocated the county road intersection approximately one mile east of the previous location on US 160. The new intersection location increases horizontal sight distance to a minimum of 822 feet and includes new connections for the county roads. The county road connections were designed perpendicular to US 160 to improve safety for vehicles entering US 160. The US 160 at CR 222/CR 223 Project also included roadway improvements to meet current design standards and consolidation of property accesses to address access control requirements of the purpose and need statement in the 2006 US 160 EIS. Widening US 160 to four lanes to meet the future capacity requirement of the purpose and need statement will be completed at a later date, as funding and budgets allow.

FHWA provided concurrence on the Re-evaluation for the US 160 at CR 222/CR 223 Project on November 20, 2009. The affected environment between the signing of the ROD and project advertisement changed slightly based on the project area containing potential habitat for a new Candidate species under the Endangered Species Act (ESA), the New Mexico meadow jumping mouse. In addition, an established Red-tailed hawk's nest was identified in close proximity to the US 160 at CR 222/CR 223 Project, and a small population of Gunnison's prairie dog inhabited the project area. Additional mitigation measures were developed to reduce impacts to these resources as required in the 2006 US 160 EIS. Mitigation measures included seasonal restrictions on construction within habitat for the New Mexico meadow jumping mouse and the Red-tailed hawk and passive hazing of Prairie dogs to relocate individuals outside the limits of disturbance. The impacts to these resources were minimized by implementing the timing and hazing measures described and were not considered significant to warrant preparation of a SEIS. Construction on this project is anticipated to be completed during the summer of 2011.

1.4.4 Grandview Phase 3

The Grandview Phase 3 Project includes the final phase of construction between mileposts 88.0 to 89.6 on US 160 in Grandview which will complete the Grandview Interchange, including a highway access road tying into Ramp B. The Grandview Phase 3 Project will result in a functional interchange that will provide access north and south of US 160. The Grandview Phase 3 Project is adjacent and within the same project area as the Grandview 4th Lane and Ramp B projects. The new access road area includes new disturbance of north facing forested slopes that fall within the 2006 US 160 EIS anticipated ROW. The Grandview Phase 3 Project includes completion of roundabout fills, subgrade placement, paving of existing ramps and roundabout, construction of Walls A, B, and C, completion of a southern access road to Ramp B, drainage, lighting, landscaping, tree replacement, and guardrail installation.

FHWA provided concurrence on the Re-evaluation for the Grandview Phase 3 Project on October 21, 2010. There were no discernable changes to the affected environment or setting between the 2006 US 160 ROD and the Grandview Phase 3 Project advertisement that warranted additional studies or a Supplemental EIS. Notable changes to the project design for the Grandview Interchange as noted in the discussion for Ramp B includes a roundabout instead of a "T" intersection and direct connection of an access road south of US 160 to Ramp B. These design changes were previously addressed and received FHWA concurrence in conjunction with the design and Re-evaluation for Ramp B.

The Grandview Phase 3 Project had no effect on the additional ESA candidate species the New Mexico meadow jumping mouse and did not warrant formal or informal consultation with USFWS. Additional clearances that addressed changes to the roundabout and Ramp B access road included cultural resources, paleontology, noise, and Colorado Division of Wildlife (CDOW) coordination of proposed reptile and amphibian (herpetofauna) and small mammal crossings. With the exception of the CDOW coordination, all other clearances were addressed in conjunction with prior Ramp B clearances that addressed the design that is currently being constructed during Phase 3. Completion of construction on the Grandview Phase 3 Project is anticipated in the fall of 2011.

For each of the above listed projects, FHWA determined that the US 160 ROD was valid. No new significant impacts were identified. Results of the reevaluations for these projects and additional documentation are contained in Appendix D.

1.5 Purpose and Need Statement

Proposed improvements to the US 160 Durango to Bayfield corridor were analyzed in the 2006 US 160 EIS in accordance with FHWA regulations (23 CFR Part 771, *et seq.*) as a means to improve conditions for the traveling public within the corridor. The purpose and need for this project remains unchanged from the 2006 US 160 EIS. Specifically, the purpose of the project is to:

- Increase travel efficiency/capacity to meet current and future needs.
- Improve safety for the traveling public by reducing the number and severity of crashes.
- Control access for safety and mobility flow improvements.

The basis of the need is described in the 2006 US 160 EIS. This SDEIS re-evaluates the basis of the need based upon updated data and reflects the most recent information on population, traffic volumes and the number and severity of crashes. Projected traffic volumes in the Grandview Section have been updated from 2025 to 2030 in the SDEIS; these projections are included in Appendix C. Travel efficiency and capacity and safety issues are updated in the SDEIS for US 550 and US 160 in the Grandview area as described below. The updated information confirms the basis of need as described in the 2006 US 160 EIS.

1.6 Basis of Need

Population growth in La Plata County is placing increasing demand on the transportation system. This trend described in the 2006 US 160 EIS is reconfirmed in the SDEIS based on more recent population data from the Colorado Demography Section (CDS). In the 2006 US 160 EIS, the population was expected to increase from 45,614 in 2001 to 74,464 by 2025. According to more recent CDS data (CDS, 2011), the population of La Plata County is projected to increase from 51,334 in 2010 to 79,762 in 2030. Much of this growth is anticipated along the US 160 project corridor.

The 2006 US 160 EIS described anticipated growth in the Grandview area based on the *Grandview Area Plan* (City of Durango 2004). The plan anticipates a regional retail center, three schools, a 5,467 unit development, a hospital and a park. Since the 2006 US 160 ROD, the hospital was completed and approximately 116 housing units, and 229,300 square feet of office and commercial buildings have been constructed. Most of the development that has occurred and is anticipated to occur within the next 20 to 30 years is part of the Three Springs development north of US 160. In addition, approximately 1,700 housing units and commercial uses are planned over the next 20 years for Ewing Mesa, a large tract of undeveloped land about 1 mile north of Farmington Hill.

The growth in population and associated commercial and office-related facilities are the major reasons for the expected traffic volume increases throughout the county and especially along the US 160 project corridor. Tourism traffic is anticipated to remain high during the summer months, and would likely increase as the number of resort and recreational facilities increases in the region.

All the above factors contribute to changes in traffic in the area.

1.6.1 Travel Efficiency and Capacity

The 2006 US 160 EIS describes the importance of US 550 and US 160 in southwestern Colorado. As described in the 2006 US 160 EIS, the need for capacity improvements is based on an increase in demand that would exceed capacity by 2025. This SDEIS updates the capacity information to 2030 for US 550 and US 160 near the current intersection location. Based on the updated information in the SDEIS, capacity is expected to be exceeded in 2030 based on projected traffic volumes and the level of service on the highway and at key intersections such as US 160 at US 550 (south).

1.6.1.1. Traffic Volume

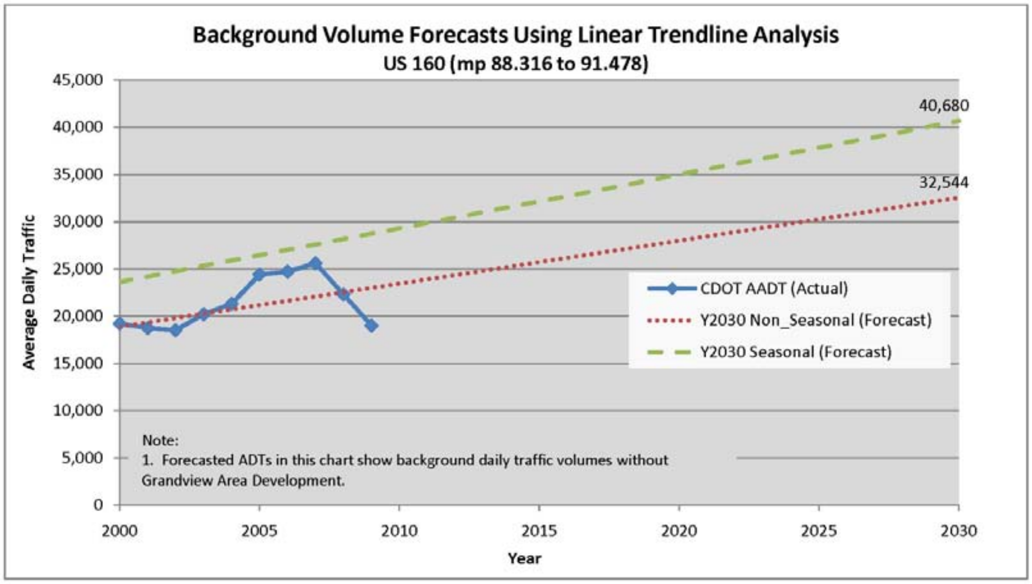
The Annual Average Daily Traffic (AADT) volumes described in the 2006 US 160 EIS were based on 2001 data from the CDOT traffic counting station No. 217, located at US 160 MP 101.30 between Gem Village and Bayfield. At the time the 2006 US 160 EIS was being prepared, this counter was the only automated traffic recorder (ATR) station in the US 160 corridor. This traffic counter is referred to as the Gem Village ATR. Traffic volumes in other sections of the corridor including the western portion near the US 550/US 160 (south) intersection were estimated in the 2006 US 160 EIS based on extrapolation and/or short duration counts.

In 2009 an ATR (the "Durango ATR") was installed at MP 84.4 on US 160 just west of the US 550/US 160 (south) intersection. The projected traffic volumes in this SDEIS are based on the actual data from the Durango ATR which was correlated with recent short term traffic counts in the Grandview Corridor. Historic trends in growth rate in the SDEIS are based on extrapolated information from annual short term traffic counts in the corridor, population statistics in the area, and traffic counts from both the Gem Village and Durango ATRs.

The peak season daily traffic volume in 2009 was approximately 25 percent above the AADT based on traffic counts at the "Durango" ATR at MP 84.4. This confirms the seasonal differences above the AADT for traffic on US 160 and the need to accommodate heavier traffic volumes in the summer. For these reasons, capacity needs are based on seasonal daily traffic volumes (SDTV).

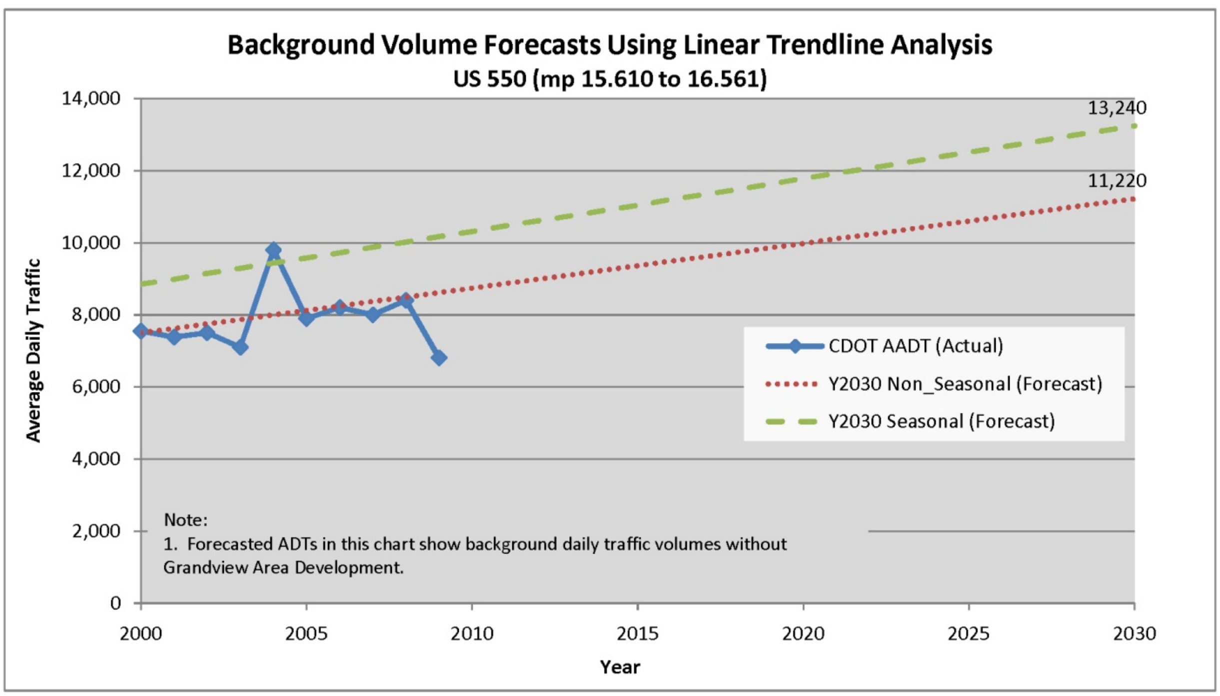
Based on updated information for the SDEIS, the AADT in the corridor continues to increase with an AADT of 22,300 vehicles per day (vpd) near the current US 160/US 550 (south) intersection in 2009 as compared to 19,200 vpd in 2001 (CDOT, 2011). Figure 1-4 provides updated information for the SDEIS and shows the expected growth rate in both seasonal and non-seasonal annual daily traffic versus the actual AADT based on collected data between 2001 and 2010. The graph shows that from 2001 to 2003, measured traffic volumes remain nearly constant or exhibited a slight decrease; from 2003 to 2006, US 160 experienced a sharper than average increase in traffic volumes; from 2006 to 2008, traffic volumes increased on US 160 at a rate equal to the overall increasing trend in both the seasonal and non-seasonal traffic volumes; and from 2008 to 2010, traffic volumes decreased sharply. Though there are fluctuations in traffic volumes between each year, viewing the dataset as a whole shows that there is a general trend of increasing volumes per year based on the statistical trendline analysis. The average growth rate using linear regression analysis is approximately 2 percent per year. By comparison, the average annual growth rate from the CDOT website for US 160 in Grandview is 2.25 percent per year (CDOT, 2011). The average annual growth rate on CDOT's web site is calculated based on historic annual short-term traffic count data collections and statistical analysis of this data to project the future growth of the highway corridor. Based on a growth rate of 2.25 percent and taking into account the development in Grandview and more current traffic data, the seasonal ADT on US 160 in 2030 is expected to be 85,910 vpd. This compares to 91,450 vpd projected for 2030 based on the data and trends from the 2006 US 160 EIS. It also compares to 87,900 vpd projected for 2025 from the 2006 US 160 EIS. More information on how these numbers have been derived is provided in the memo *US 160 and US 550 Year 2030 Traffic Volume Verification* (SEH, 2011) in Appendix C.

Figure 1-4. Annual Daily Traffic Expected Growth Rate on US 160



The traffic volumes on US 550 just south of the US 550/US 160 (south) intersection continue to grow with an AADT of 7,549 in 2001 compared to an AADT of 8,400 vpd in 2009 (CDOT, 2011). The seasonal adjustment for US 550 was derived from daily traffic volumes collected from the "Stateline" ATR in 2010 on US 550 at the New Mexico State Line, approximately 15 miles from the intersection of US 550 and US 160. Actual short term AADT volumes on US 550 within the study area of this document were collected yearly between 2001 and 2010. The actual short term AADTs were plotted on a graph and a linear trend line was used to forecast the volumes to the year 2030. The trend line was statistically calculated to represent the linear line that best fits the CDOT AADT dataset. Figure 1-5 shows the actual short term CDOT AADTs versus the non-seasonal and seasonal forecasted volumes for US 550. The graph shows a consistent increase in yearly traffic volumes between 2000 and 2009 (10-year period) using the short-term counts. The variability in the years 2005 (sharp increase) and 2010 (sharp decrease) can be attributed to increased or decreased local and visitor travel that happened to occur during the 5- to 10-day count period in each of those years. These anomalies do not necessarily represent the traffic growth for the entire year since the remaining 355 days may have been normal and these counts could have happened to catch the 5 to 10 highest or lowest travel days in each of those years. This data is best analyzed using several years of data, in this case 10 years, to develop a statistical trend line to exclude anomalies that could create erroneous growth projections.

Figure 1-5. Annual Daily Traffic Expected Growth Rate on US 550



The annual average growth rate for US 550 from the CDOT website is 1.3 percent versus the trend line analysis which is approximately 1.6 percent. With the new Stateline ATR data becoming available in 2010 and using these factors, the seasonal ADT for US 550 in 2030 is expected to be 19,550 vpd based on traffic growth prediction and planned development in the Grandview area. This compares to 20,550 vpd projected for 2030 based on the data and trends from the US 550 EA completed in 2005. More information on how these numbers have been derived is provided in the memo *US 160 and US 550 Year 2030 Traffic Volume Verification* (SEH, 2011) in Appendix C.

Future peak season traffic volumes are shown in Table 1-1, Existing and Projected SDTV and level of service (LOS). In summary, the SDTV for 2025 in the 2006 US 160 EIS was projected to be 87,900 vpd on US 160 near Farmington Hill which would equate to 91,450 vpd in 2030. Based on the updated 20-year growth factor, the current projection is that there will be 85,910 vpd on US 160 near Farmington Hill in 2030. For US 550 south of the US 160/US 550 (south) intersection, the SDTV from the US 550 EA for 2025 was projected to be 15,583 vpd which equates to 20,550 vpd in 2030. Based on the updated data, the current SDTV projection for US 550 is 19,550 vpd in 2030. Although the updated projections for both US 160 and US 550 are slightly lower than that described in the 2006 US 160 EIS, traffic forecasts for this SDEIS still show a two- to three-fold increase in traffic by 2030.

Table 1-1. Existing and Projected Seasonal Daily Traffic Volumes and LOS

Location	2010		2030	
	SDTV*	LOS	SDTV*	LOS
US 160 west of SH 172/CR 234	37,575	B	85,910	F
US 550 south of US 160/US 550 (south) intersection	8,985	B	19,550	E

*Seasonal Daily Traffic Volume

Traffic analyses have also been completed since the 2006 US 160 EIS to determine the following: (1) confirmation of traffic modeling results for the Grandview Section alternatives evaluated in the 2006 US 160 EIS to the year 2025; (2) evaluation of alternatives from the 2006 US 160 EIS in the Grandview Section and to determine if they meet the capacity requirement for the purpose and need in the year 2030; (3) determination of whether three interchanges are necessary in the Grandview Section based on 2030 traffic volumes; and (4) evaluation of alternatives considered for the SEIS and the Section 4(f) evaluation to determine if they meet the capacity requirement of the purpose and need in the year 2030.

Traffic analyses indicate that the alternatives in the Grandview Section require auxiliary lanes in each direction to extend from the west limit of the Grandview Section to the

CR 233 (Three Springs) Interchange (see Appendix C). The auxiliary lanes can be added within the right-of-way and identified footprint of the alternatives in the 2006 US 160 EIS and do not create additional impacts that have not been disclosed in the 2006 US 160 EIS.

Traffic and engineering analyses also demonstrate the need for three interchanges in the Grandview Section regardless of the location of the US 550/ US 160 connection (see Appendices C and E). In the 2006 US 160 EIS, interchanges were identified at SH 172/CR 234 Interchange (Elmore's Corner Interchange), US 160/CR 233 [CR 233 (Three Springs Interchange)], and the US 550/US 160 connection (now titled the Grandview Interchange without the US 550 connection). The location of these interchanges is shown on Figure 1-2.

1.6.1.2. Highway Level of Service

LOS is designated by letter codes ranging from A for excellent conditions to F for extremely poor conditions. LOS A signifies a free-flow condition with no slowing or interference to traffic, while LOS F represents a complete breakdown in traffic flow and in the worst case, traffic jams. Factors influencing LOS are the percentage of trucks and other large vehicles, volume of traffic, directional distribution of traffic, type of terrain, roadway geometry, number of access points, signalization, and number of through lanes.

US 160 west of the SH 172/CR 234 intersection is considered to be urban because of anticipated growth and existing and future annexation plans of Durango (*Grandview Area Plan, 2004*). A LOS of D is generally the lowest acceptable operating level for an urban highway (see Appendix C). For this SDEIS, the LOS on US 160 in the urban Grandview Section has been updated based on traffic data collected in 2009 and projected to 2030.

As shown in Table 1-1, in 2010 the US 160 highway section through Grandview and the US 550 roadway connecting to US 160 were operating at LOS B. Based on recorded traffic volume growth trends, if left unimproved, future peak-period traffic volumes on this existing facility would fall below the minimum acceptable LOS of D. Peak periods are defined as the AM and PM rush hours of a typical weekday. Future 2030 traffic volumes on US 160 will exceed the threshold of 57,000 AADT to be able to operate at a LOS D or better. Future 2030 traffic volumes on US 550 will exceed the threshold of 13,500 AADT to be able to operate at a LOS of D or better.

1.6.1.3. Intersection Level of Service

The overall operation level of service of highways corridors cannot be adequately determined without investigating the operational capacities of the intersections along the highway corridor. If an intersection in the corridor does not operate effectively then this operational deficiency will affect the entire level of service for the corridor during peak travel periods. Intersection analysis consists of estimating the traffic-carrying ability of an intersection. The methodology of analyzing signalized intersections is described below.

The capacity of a highway is primarily related to roadway geometrics and traffic patterns at the intersection. For signalized intersections, time allocation is an additional element of capacity determination. The LOS is evaluated on the basis of average stopped delay per vehicle. Delays can cause increased travel time, additional fuel consumption, degradation of air quality, and driver frustration.

LOS is also dependent on quality of vehicle progression, signal cycle length, and the ratio of vehicle flow rate to intersection capacity. Generally, LOS is determined for both the AM and PM peak-hour traffic volumes. Intersection LOS criteria are shown in Table 1-2, Signalized Intersection Level of Service. According to generally accepted standards, for this highway, the minimum acceptable future-year urban signalized intersection operation is LOS D for both the AM and PM peak periods.

Table 1-2. Signalized Intersection Level of Service

At **LOS A**, there is very good progression through the intersection. Most vehicles arrive during the green phase; most do not have to stop. Vehicle delay is 10 seconds per vehicle or less.
At **LOS B**, more vehicles stop than in LOS A, but generally there is still good progression. Delay ranges from 10 to 20 seconds per vehicle.
At **LOS C**, the number of vehicles stopping is significant, although many still pass through the intersection. Delay ranges from 20 to 35 seconds per vehicle.
At **LOS D**, the influence of congestion becomes more noticeable. Many vehicles stop and the proportion of vehicles that do not stop declines. Some vehicles do not make it through the intersection in one cycle length. The range for delay is 35 to 55 seconds per vehicle, which is considered to be the limit of acceptable delay.
At **LOS E**, there are longer delays of 55 to 80 seconds per vehicle, poor vehicle movement between signalized intersections, and individual cycle failures.
At **LOS F**, vehicle arrival rates exceed the capacity of the intersection. This condition is considered unacceptable to most drivers. Delay is greater than 80 seconds per vehicle.

Source: Transportation Research Board. 2000.

The intersections in the urban sections of the project corridor were evaluated. The signalized intersection LOS analysis was updated to 2010 and projected to 2030 to evaluate operations at the intersection of US 160 with US 550 (south). The forecasted seasonal 2030 traffic volumes were analyzed to determine if LOS ratings would be above, at, or below the preferred LOS D. The results of this analysis are shown in Table 1-3.

Table 1-3. Signalized Intersection Level of Service Summary

Signal Location	2010 LOS AM/PM	2030 LOS No Improvements AM/PM
US 160 at US 550 (south) (Farmington Hill)	B/B	F/F

If unimproved, future signalized intersection operations at the US 160/US 550 (south) would fail during the peak periods in 2030.

1.6.1.4. Travel Efficiency and Capacity Needs Summary

In summary, this SDEIS confirms the need for capacity as described in the 2006 US 160 EIS to meet future transportation demands. Based on updated traffic volumes and LOS data, demand would exceed capacity by 2030 on US 550 and US 160 in the Grandview Section and at the US 160/US 550 (south) intersection. Traffic volumes are expected to more than double over the next 20 years as residential and commercial development increases. These increases in traffic volume are expected to result in failing levels of service—below LOS D for urban highways[1]. Consequently, traffic operations would be unacceptable to most drivers at peak periods.

1.6.2 Safety

Safety is a key aspect of project purpose and need. The 2006 US 160 EIS describes the safety issues in the corridor. As described in the 2006 US 160 EIS, US 160 has numerous uncontrolled accesses; lack of shoulders, no turning lanes, identified conflicts between wildlife and vehicles; and steep grades with insufficient lanes for passing. These problems are compounded by the increasingly high traffic demands that are being placed on this section of highway. Design improvements are needed for US 160 to reduce both the accident rates and the severity of the crashes. These improvements will need to include measures to decrease collisions between wildlife and vehicles.

The safety issues on US 550 from CR 220 to US 160, and on US 160 from west of the US 160/US 550 (south) intersection to east of the CR 233 (Three Springs) intersection are summarized and updated for this SDEIS. In the 2006 US 160 EIS, data was provided for the period of December 31, 1996 to December 31, 2001. This information has been updated in the SDEIS for the period January 1, 2005 to December 31, 2009, the most recent accident data available in CDOT's database.

[1] US 160 east of the Grandview Section is considered to be a rural, a LOS C or below is considered to be failing for this part of the corridor.

The updated information for US 550 and US 160 near Farmington Hill confirms that the same safety issues and trends have continued to occur over the last few years (2005 to 2009) as were the case between 1996 and 2001.

1.6.2.1. US 550 from CR 220 to US 160

The section of US 550 extends south from the US 160/US 550 (south) intersection as a two-lane highway, ascending from the Animas River Valley to the Florida Mesa in an area known as Farmington Hill (see Photo 1-1). The roadway is cut into the side of the Farmington Hill hillside and follows the sharp horizontal curves of the hillside at a steep grade, rising over 200 feet in approximately 0.66 mile. There are minimal paved shoulders of 2 feet or less. The traversable ground surface outside the roadway is as narrow as 5 feet or less in many places, and only one-third of the roadway section has guardrail along the downward slope of the hillside leaving little room for driver error or emergency stops. Outside the traversable area, the hillside both above and below the roadway is steep: approximately 34 degrees (the hillside slope either drops or rises one foot vertically for every three feet of horizontal movement off the edge of pavement). The bottom toe of the hillside below the roadway ranges from 46 to 290 feet below the roadway. The existing roadway runs primarily along the north-facing slope of the hillside, this location of the road surface receives less direct sunlight and is prone to icing in the winter. The steep hillside above the roadway is comprised of decomposed shale overlain by sandy cobbles and boulders, which are prone to falling/erosion onto the roadway surface, creating hazards for drivers. Because of the sharp horizontal curves, driver visibility along the road is short—as little as 100 feet at some locations; hence, at 30-miles per hour (mph), the posted travel speed, drivers have only 2 seconds to react to roadway hazards.

Photo 1-1. Section of US 550

The roadway conditions are factors in the type and severity of crashes occurring on US 550 [see Figure 1-6 (a and b), US 550 Weighted Accident Concentration Graph]. Figure 1-6 (a and b) indicates that 38.9 percent of the crashes on US 550 between MP 14 and MP 16.56 were on the steep winding decent to the Farmington Hill intersection (MP 15.8 to MP 16.56) 91 percent of the crashes on the US 550 decent to the intersection are related to the steep winding roadway, icing conditions, and roadway obstructions that contribute to drivers losing control of their vehicles. If drivers lose control, the narrow shoulders, lack of guardrails, and steep embankments make it difficult for them to regain control once their vehicles leave the roadway. Figure 1-6 (a and b) also indicates

Figure 1-6a. US 550 Crash Location and Weighted Accident Concentration

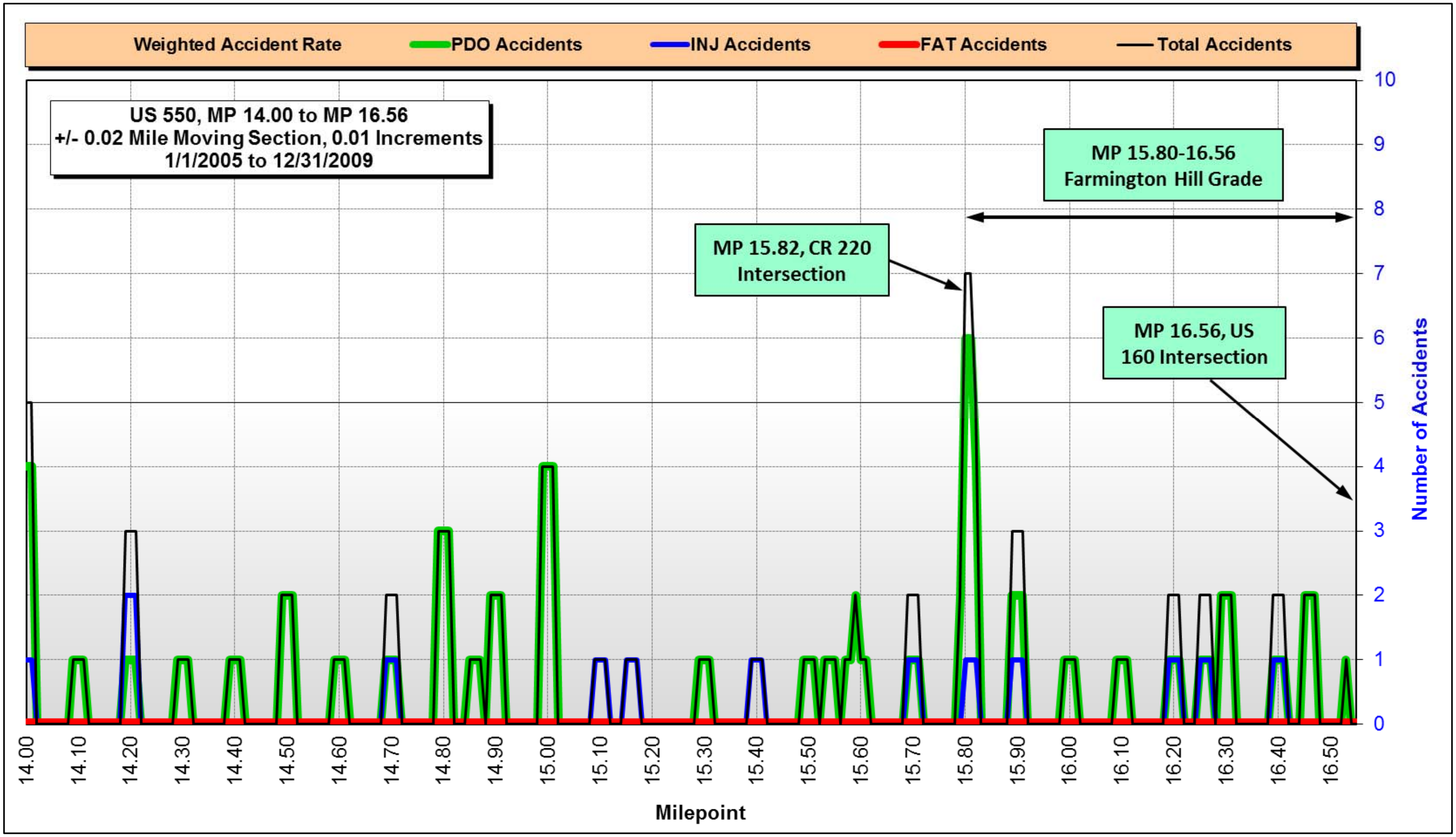
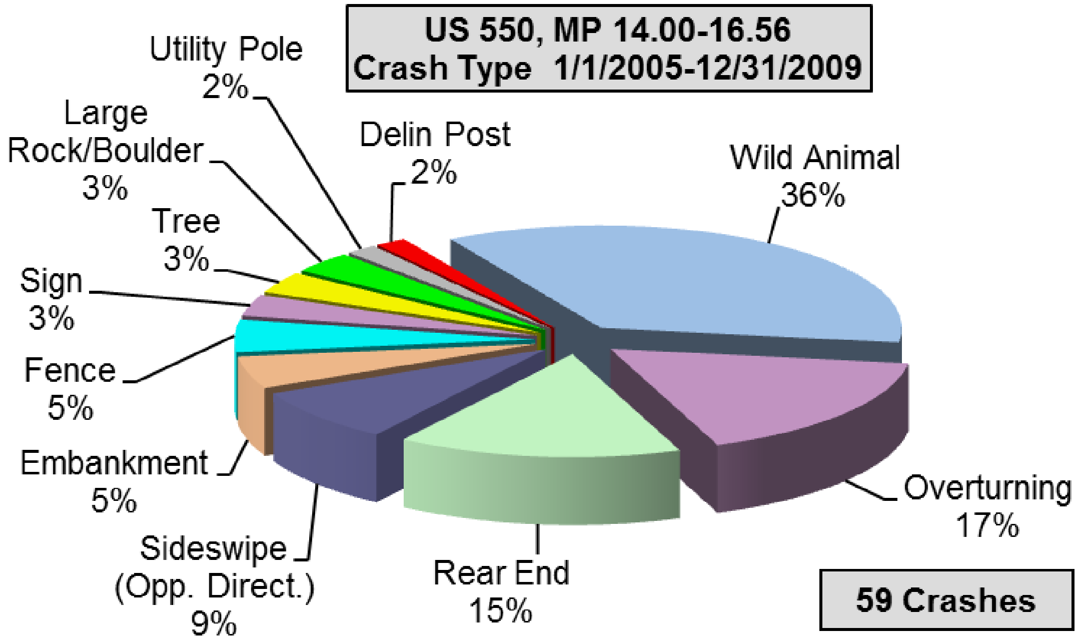
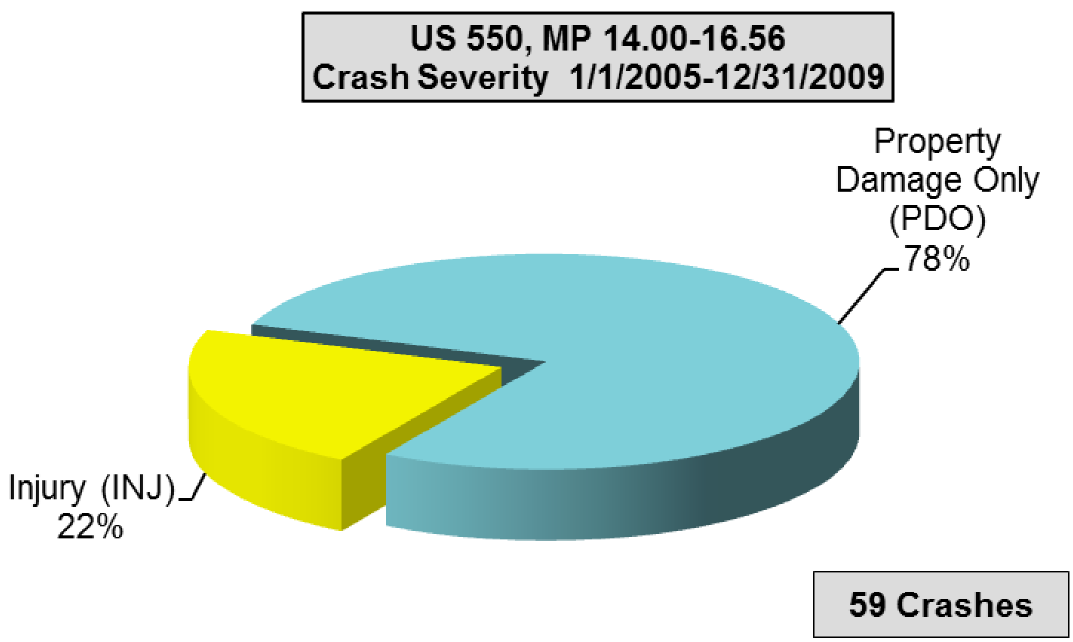


Figure 1-6b. US 550 Crash Type and Severity





a spike of crashes that occur around MP 14.2. Specific analysis of this location found that 9 of the 11 crashes recorded in the last five years were wildlife collisions.

1.6.2.2. US 160 from West of the US 160/US 550 (South) Intersection to East of the CR 233 (Three Springs) Intersection

The safety issues on US 160 near the US 160/US 550 (south) intersection are also updated for the SDEIS. As stated in the 2006 US 160 EIS, this area is an area of increasing development and has the highest traffic volumes in the US 160 corridor. Based on the updated information for the SDEIS, traffic volumes are expected to more than double within the next 20 years (see Section 1.6.1). Uncontrolled access and lack of turning lanes contribute to the safety issues on US 160 from MP 87.8 to MP 90.6 in the Grandview area (see Appendix C). Figure 1-7 (a and b) indicates that the highest prevalence of crashes on US 160 in this area are rear-end (39 percent), Wildlife (18 percent), Fixed Objects (12 percent), Sideswipe (Same Direction) (10 percent), and Approach Turn (8 percent). Combined, these crashes account for over 69 percent of the total crashes. Most of these crashes can be related to the numerous accesses and intersections along the corridor. A lack of turning lanes for vehicles leaving or entering the roadway, and unsafe passing due to the frequent entering and exiting of vehicles from the numerous accesses and intersections creates additional safety issues along this corridor.

<u>Safety Needs Summary</u>

The US 160 corridor and US 550 south alignment to US 160 projected to 2030 are expected to have a higher than average number and severity of crashes when compared to other similar highways in the state of Colorado (see Appendix C). The higher number and severity of crashes is attributed to a lack of highway shoulders, turning lanes, limited sight distances, clear zones, collisions with wildlife, and steep grades with insufficient lanes for passing. In addition, many of the accesses and intersections include steep grades, limited sight distance, sharp angles and lack of left turn storage lanes and right turn acceleration/deceleration lanes. The accident analysis from the 2006 US 160 EIS has been updated as documented in Appendix C. The same safety issues and crash trends have continued to occur in the last few years (2005 to 2009) as were the case between 1996 and 2001.

1.6.3 Access

Access is a part of project purpose and need. The 2006 US 160 EIS describes the uncontrolled access issues in the US 160 corridor. This is a result of a high density of undefined business and private accesses, terrain features that affect sight distance, areas with poorly defined accesses and anticipated future density of development along the corridor. All of these features contribute to the accident rates and accident distribution along the US 160 corridor. As described in the 2006 US 160 EIS, there are 57 access

Figure 1-7a. US 160 Crash Location and Weighted Accident Concentration

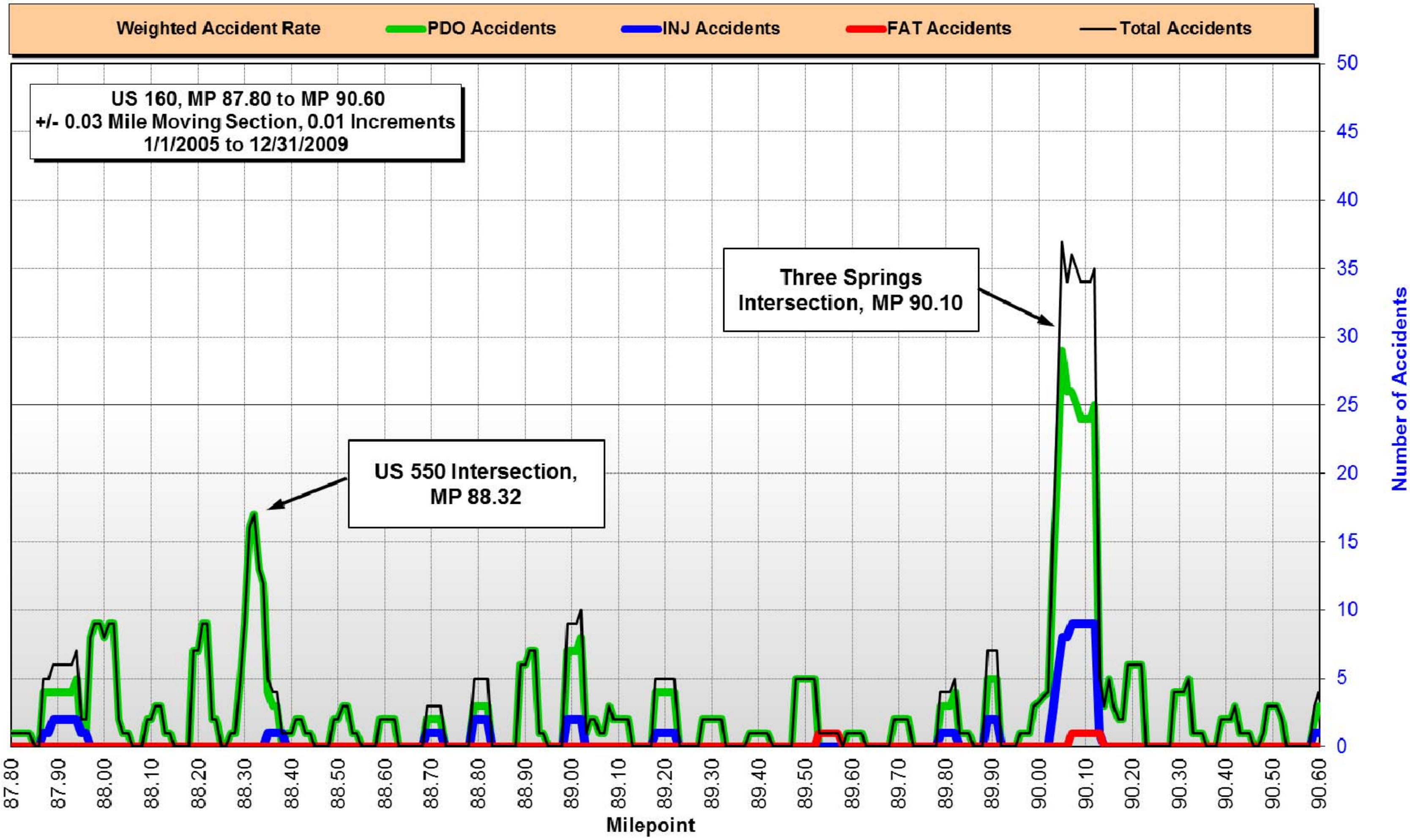
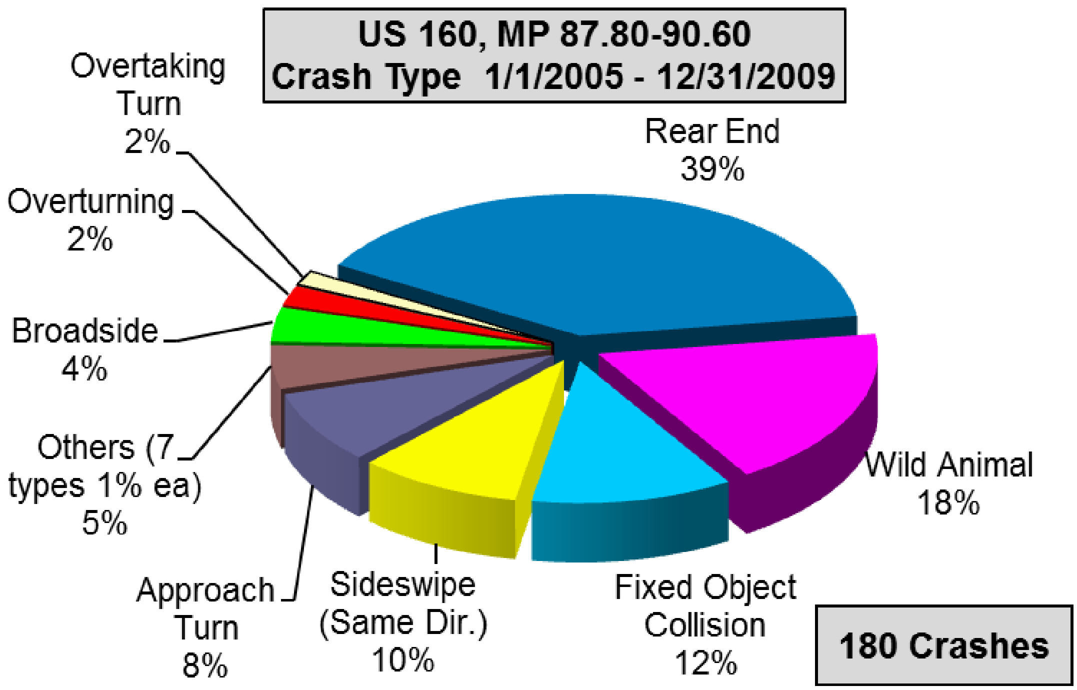
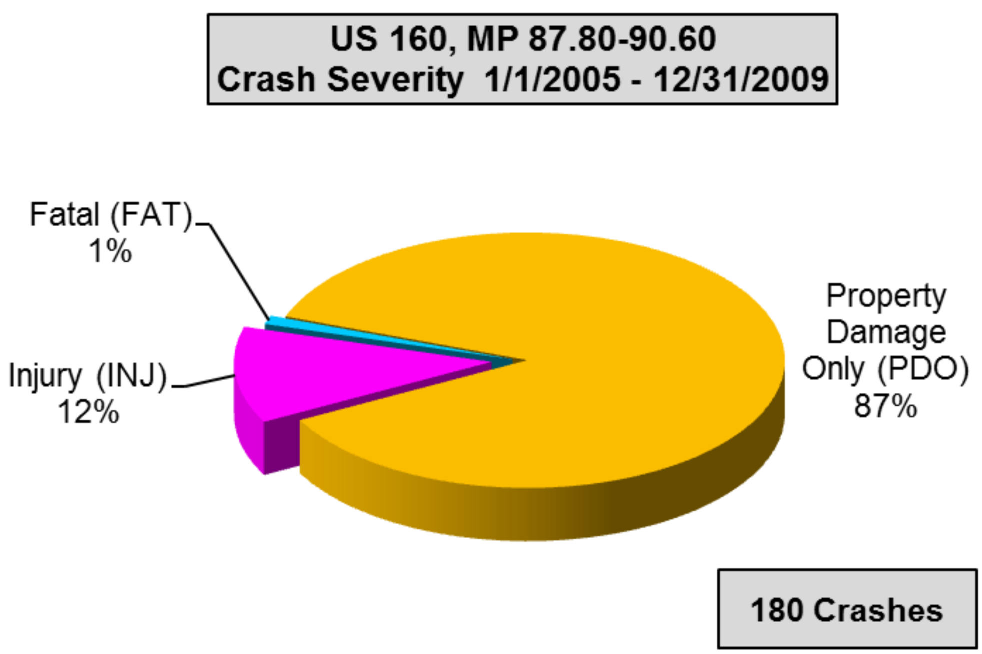


Figure 1-7b. US 160 Crash Type and Severity





points in the Grandview Section. This number of access points has remained nearly unchanged (slight increase) from the 2006 US 160 EIS. Access conditions also have not changed for the US 550 south alignment and its connection to US 160. US 550 south of US 160 has fewer accesses due to the rural nature of the roadway and geographic constraints (steep slopes) that prevent access from being made along portions of the roadway.

Supporting documentation and detailed descriptions of the purpose and need for the corridor project are found in Chapter 1 of the 2006 US 160 EIS.

2.0 Alternatives

The SDEIS supplements the 2006 US 160 EIS. The SDEIS is being prepared to address significant environmental impacts to historic and Section 4(f) properties not evaluated in the 2006 US 160 EIS and 2006 US 160 ROD.

This chapter describes and compares alternatives for the US Highway 550 (US 550) south alignment to connect to US Highway 160 (US 160). It defines new alternatives developed to avoid or minimize impacts to newly identified historic and archaeological resources. It defines differences between the alternatives analyzed in detail and identifies a preferred alternative. It also discloses additional alternatives considered but eliminated from detailed study while providing the rationale for their dismissal.

2.1 Background

Chapter 2 of the 2006 US Highway 160 from Durango to Bayfield EIS (2006 US 160 EIS) evaluates a range of alternatives, describes why some alternatives were eliminated from detailed study, identifies reasonable alternatives carried forward for detailed study, and identifies the preferred alternative based on a comparison to other reasonable alternatives. The 2006 US 160 EIS used several screening levels to arrive at the advanced alternatives including a Corridor screening level, a Feasibility Alternatives screening level and a Preliminary Alternatives screening level. In the Corridor screening level, broad strategies were evaluated such as transportation system management and transportation demand management, alignment shifts, and typical sections for the entire corridor. The Feasibility Alternatives screening level screened alternatives based on the purpose and need and whether the alternatives had unacceptable environmental or social impacts compared to other alternatives. The Preliminary Alternatives screening level evaluated alternatives based on combining criteria for NEPA and the Clean Water Act (CWA) such as practicability criteria for logistics, cost and environmental consequences. More detail on screening of the alternatives is documented in Chapter 2 of the 2006 US 160 EIS.

The 2006 US 160 EIS merged analysis under the NEPA with Section 404 of the CWA as outlined in the NEPA/404 Merger Agreement (updated in 2008) between CDOT, FHWA and the USACE. The merger process demonstrated to the USACE that the Preferred Alternative under NEPA was also Least Environmentally Damaging Practicable Alternative (LEDPA) under the Clean Water Act. A Section 404 permit under the Clean Water Act was obtained for the corridor in conjunction with signing of the 2006 US Highway 160 from Durango to Bayfield Record of Decision (2006 US 160 ROD). Appendix A of this document includes a letter from the USACE concurring with the first three steps in the merger process, including agreement that the Preferred Alternative appears to be the LEDPA.

2.2 Process for the Supplemental Draft EIS (SDEIS) and Alternative Analysis

In this SDEIS, a range of alternatives is considered for the US 550 south alignment to US 160, including some alternatives not considered during the 2006 US 160 EIS. The SDEIS evaluates the affected area and impacts located in this US 550/US 160 south connection area.

The SDEIS does not reanalyze project alternatives for the Florida Mesa and Valley Section, the Dry Creek and Gem Village Section or the Bayfield Section as those were fully evaluated in the 2006 US 160 EIS. In addition, the SDEIS does not reanalyze alternatives or impacts for the entire Grandview Section. For the SDEIS, the focus is on the connection of US 550 to US 160 and the portion of US 550 needed to connect from US 160 to the US 550 corridor described in the US 550 Environmental Assessment (EA) and Finding of Significant Impact (FONSI).

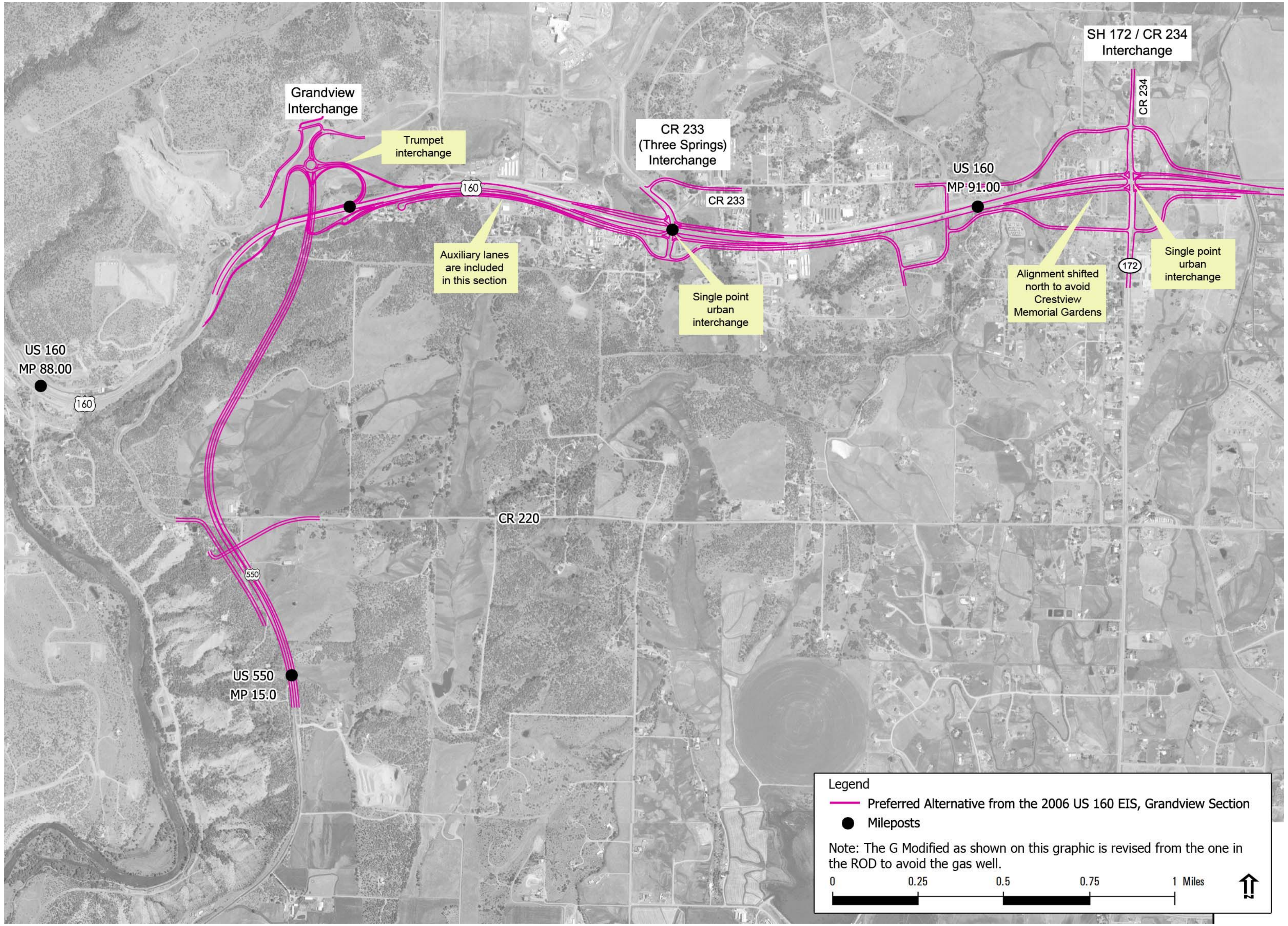
The SDEIS includes two screening levels: a first screening level based on purpose and need and other criteria for determining whether an alternative is reasonable under NEPA such as logistics and cost. This screening level is similar to the Feasibility Alternatives screening in the 2006 US 160 EIS in that it focuses on whether the alternative meets the purpose and need for the project. The second level screen in the SDEIS evaluates alternatives based on NEPA, CWA and Section 4(f) criteria. This screening level is similar to the Preliminary Alternatives screening level from the 2006 US 160 EIS in that it considers practicability criteria under the CWA. The second screening level in the SDEIS, however, also considers Section 4(f) criteria which are new for this document. The second level screen is used in the SDEIS to identify the Preferred Alternative.

2.3 Elements Common to All SDEIS Alternatives in the Grandview Section

The Grandview Section includes US 160 from the west project limit at approximately mile marker 88 west of the US 160/US 550 (south) intersection to the State Highway 172 (SH 172)/County Road 234 (CR 234) intersection, and US 550 from south of County Road 220 (CR 220) to US 160 (see Figure 2-1). For this SDEIS, all the alternatives in the Grandview Section include the existing Grandview Interchange, single point urban interchanges (SPUIs) at County Road 233 (CR 233) (Three Springs) and SH 172/CR 234, and four lanes on US 160.

Traffic and engineering analyses also demonstrate the need for the three interchanges in the Grandview Section regardless of the location of the US 550 south connection to US 160 (see Appendices C and E). In the selected alternative from the 2006 US 160 ROD, interchanges were identified at US 160/SH 172 (SH 172/CR 234 Interchange), US 160/CR 233 [CR 233 (Three Springs)], and the US 550/US 160 connection (this is now the location of the "Grandview Interchange," which has been built without the

Figure 2-1. Preferred Alternative from the 2006 US 160 EIS, Grandview Section



US 550 south connection). The location of these interchanges is shown on Figure 2-1. US 160 remains on the existing alignment except near the SH 172/CR 234 intersection, where it is shifted north to avoid Crestview Memorial Gardens. US 550 will be four lanes throughout the entire project area addressed in this supplement.

Although the two SPUIs at CR 233 (Three Springs) and SH 172/CR 234 are included as part of the Grandview Section alternatives they are not discussed further as part of this analysis because the focus of the SDEIS is on the impacts of the connection of US 550 south alignment to US 160. The alternatives are different mainly in the location of the US 550 south alignment, where it connects to US 160, and how it connects to US 160. Alternatives for the alignment and connection of US 550 to US 160 are revised or added based on the newly identified impacts.

2.4 Alternatives for the US 550 South Connection to US 160

This section describes the alternatives considered for the US 550 south alignment and its connection to US 160. Alternatives evaluated in the SDEIS include those alternatives advanced in the US 160 EIS, those further developed based on additional design information for the US 550 south alignment and its connection to US 160, and those that were developed specifically to avoid or minimize use of Section 4(f) properties near the US 550/US 160 connection. These alternatives are described below.

2.4.1 No Action Alternative

The No Action Alternative assumes completion of the US 160 project as defined in the Record of Decision with the exception of the connection of US 550 to US 160. Auxiliary lanes are included between the west project limit and the interchange at CR 233 (Three Springs). The additional auxiliary lanes are considered a design variation of the alternatives described in the 2006 US 160 EIS. The additional auxiliary lanes, which extend from the west limit of the project to the CR 233 (Three Springs) Interchange, are needed for each of the alternatives in the SDEIS based on updated traffic analyses (see Appendix C), and, therefore, were not part of the screening of alternatives within this document. The auxiliary lanes can be added within the right-of-way and identified footprint of the alternatives in the 2006 US 160 EIS. The Grandview Interchange addresses development along US 160 without the connection of US 550. In this case, US 550 remains on its current alignment where poor geometry, low design speeds and two lane capacity, on a north facing steep grade presents capacity and safety issues. See Chapter 1 of this document for more information on the problems associated with the current alignment.

2.4.2 US 550 at US 160 At-Grade Intersection Alternative

This alternative includes a revised US 550 at US 160 signalized intersection at its current location (Feasibility Alternative 1B in the 2006 US 160 EIS). The intersection includes double turn lanes from US 160 westbound to US 550 southbound, triple turn lanes from

US 550 northbound to US 160 westbound and single turn lanes from US 160 eastbound to US 550 southbound and US 550 northbound to US 160 eastbound (see Figure 2-2).

This alternative includes several design variations submitted to FHWA from Mr. McNeill on behalf of the Webb Ranch: T.1.4, T.1.6, and T.4.4. Each design variation illustrates US 550 intersecting US 160 as an at-grade intersection at the existing US 550/US 160 intersection location. The intersection geometry is also the same for T.1.4, T.1.6 and T.4.4 as illustrated on Figure 2-2. The differences occur in the percent grade and radius for 2 curves: one approximately 500 feet away from the US 550/ US 160 (south) intersection where the horizontal curvature and grade varies (the lower curve) and the other at the top of the mesa where the highway first starts descending the hillside (the upper curve). The design variations are described as follows:

- **Design Variation T.1.4** includes a 1050-foot radius for the lower curve and a 700-foot radius for the upper curve with a four percent uniform grade throughout both curves.
- **Design Variation T.1.6** includes a 925-foot radius for the lower curve and a 700-foot radius for the upper curve with a six percent uniform grade throughout both curves.
- **Design Variation T.4.4** includes a 1250-foot radius for the lower curve and a 1000-foot radius for the upper curve with a four percent uniform grade throughout both curves.

2.4.3 Partial Interchange at the Existing US 550/US 160 (South) Intersection Alternative

This alternative includes a partial interchange at the existing US 550/US 160 location. This alternative proposes to modify the signalized intersection at US 160/US 550 by eliminating the left turn movement from northbound US 550 to westbound US 160 and replacing it with a loop ramp to service the left turn volumes at the intersection.

This alternative (illustrated on Figure 2-3) includes several design variations submitted to FHWA from Mr. Thomas McNeill on behalf of the Webb Ranch: T.2.4, T.2.6, T.3.4, and T.3.6. Each design variation illustrates US 550 intersecting US 160 as an at-grade intersection at the existing US 550/US 160 intersection location but with a flyover to accommodate the northbound left turn movement. The differences in the "T" design variations occur in the percent grade and radius for 2 curves: one approximately 500 feet away from the US 550/US 160 (south) intersection where the horizontal curvature and grade varies (the lower curve) and the other at the top of the mesa where the highway first starts descending the hillside (the upper curve). The design variations are described as follows:

Figure 2-2. **US 550 at US 160 At-Grade Intersection Alternative**

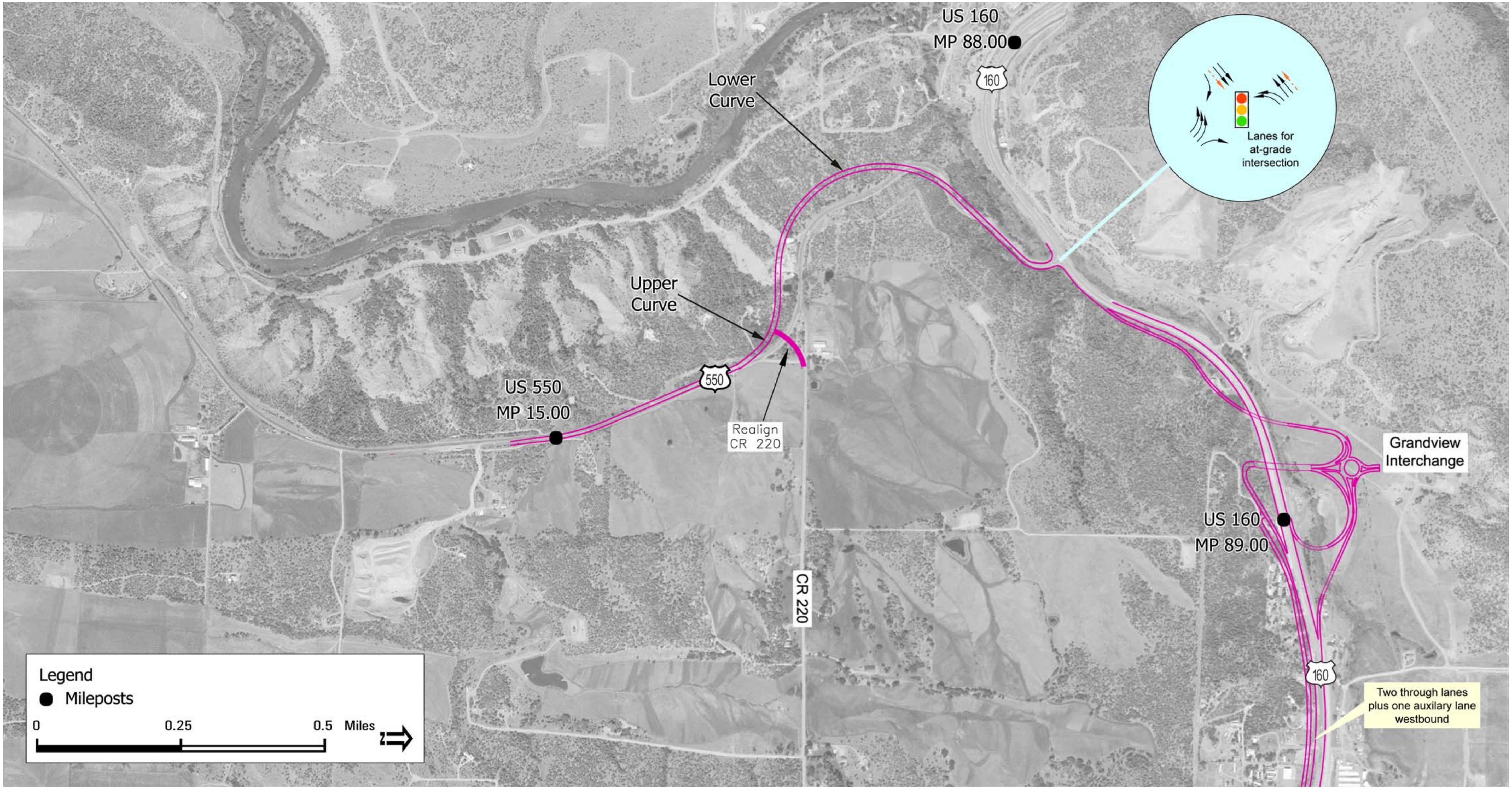
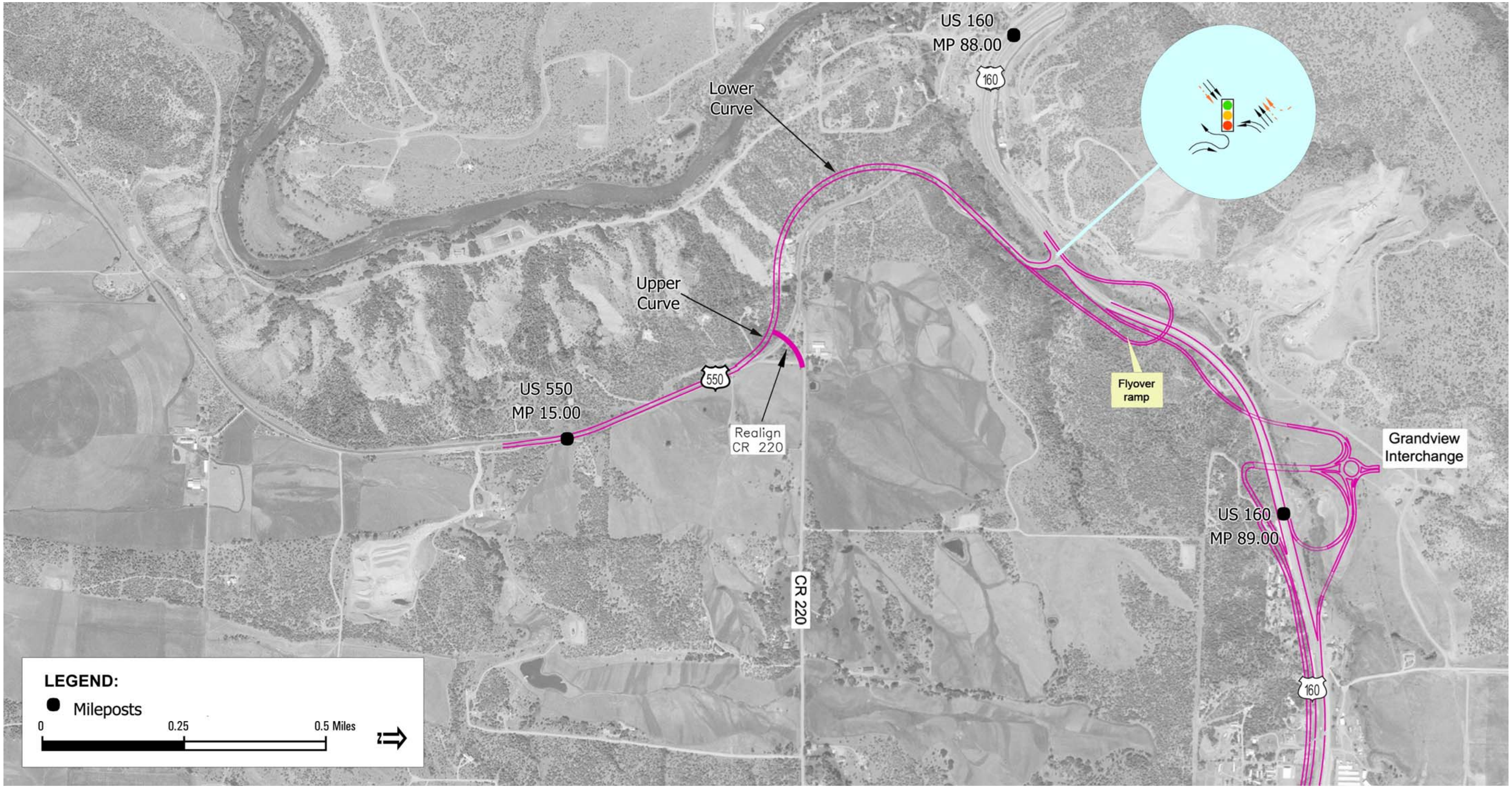


Figure 2-3. Partial Interchange at the Existing US 550/US 160 (South) Intersection Alternative



- Design **Variation T.2.4** includes a 1050-foot radius for the lower curve and a 700-foot radius for the upper curve with a four percent uniform grade throughout both curves. The location of the flyover has half of the loop on each the north and south side of US 160 and traffic flow is in a counterclockwise direction with the flyover crossing US 160 approximately 1,300 feet (1/4 mile) east of the US 550/US 160 intersection.
- **Design Variation T.2.6** includes a 925-foot radius curve for the lower curve and 700-foot radius for the upper curve with a six percent uniform grade throughout both curves. The location of the flyover has half of the loop on each the north and south side of US 160 and traffic flow is in a counterclockwise direction with the flyover crossing US 160 approximately 1,300 feet (1/4 mile) east of the US 550/US 160 intersection.
- **Design Variation T.3.4** includes a 1050-foot radius for the lower curve and a 700-foot radius for the upper curve with a four percent uniform grade throughout both curves. The location of the flyover loop is entirely on the north side of US 160 and traffic flow is in a clockwise direction with the flyover crossing US 160 approximately 500 feet east of the US 550/US 160 intersection.
- **Design Variation T.3.6** includes a 925-foot radius curve for the lower curve and a 700-foot radius for the upper curve with a six percent uniform grade throughout both curves. The location of the flyover loop is entirely on the north side of US 160 and traffic flow is in a clockwise direction with the flyover crossing US 160 approximately 500 feet east of the US 550/US 160 intersection.

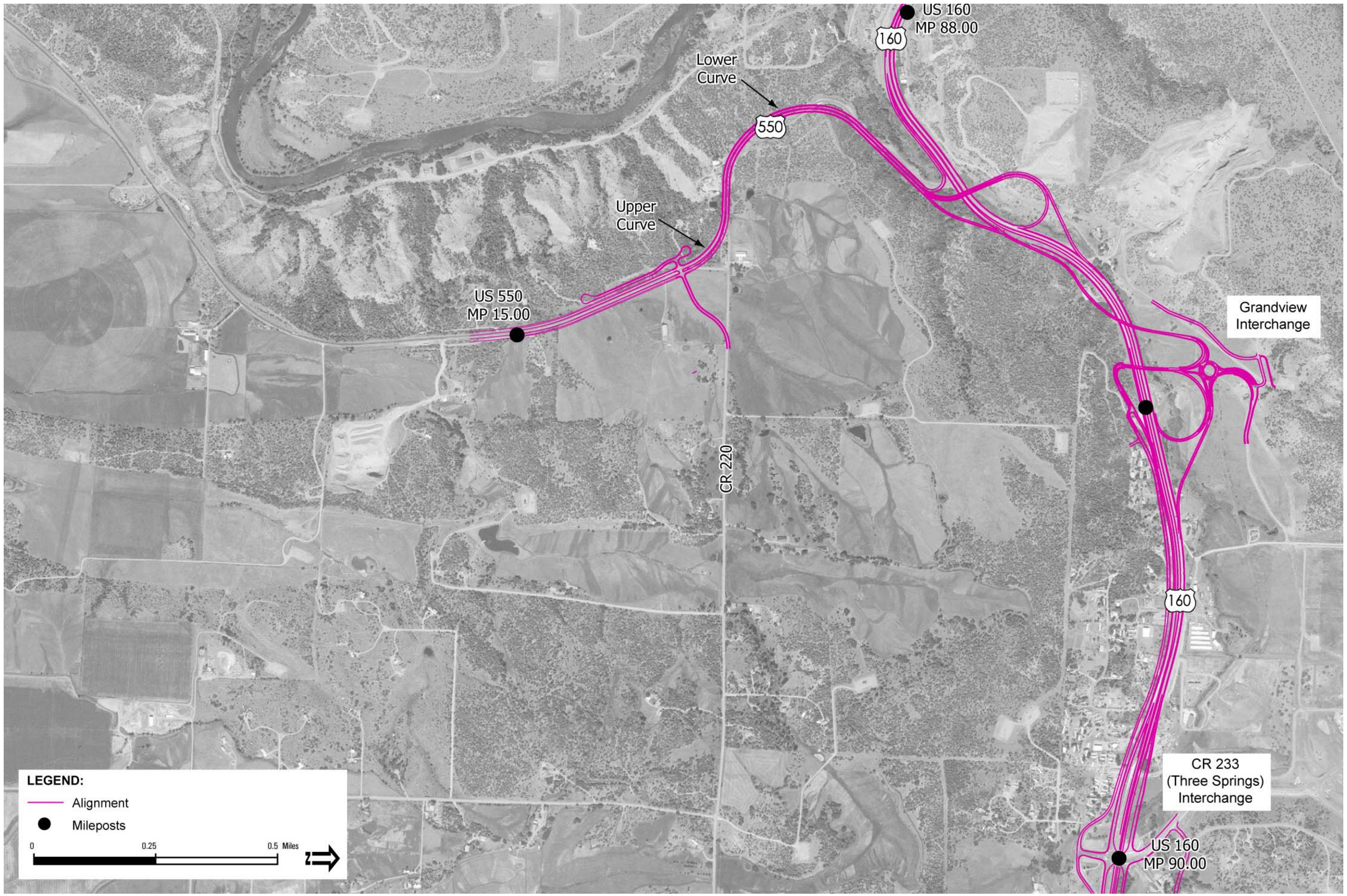
2.4.4 Revised Preliminary Alternative A

The Revised Preliminary Alternative A is illustrated on Figure 2-4. It includes a grade-separated trumpet interchange at the existing US 550/US 160 (south) connection. Revised Preliminary Alternative A is the same as in the 2006 US 160 EIS for the US 550 alignment and the connection to US 160. “Revised” has been added to title of this alternative to reflect inclusion of the Grandview Interchange.

2.4.5 G Modified/Revised G Modified Alternative

This alternative has undergone several design variations. G Modified was the Selected Alternative in the 2006 US 160 ROD. It connects US 550 to US 160 via the Grandview Interchange which is approximately 0.6 miles east of the existing US 160/US 550 (south) intersection. Early in the project development process for the 2006 US 160 EIS, the alternative was modified to follow the western edge of the Webb Ranch to minimize impacts to the ranch.

Figure 2-4. Revised Preliminary Alternative A



Revised G Modified Alternative is essentially the same alternative but it has been revised to avoid a gas well that was installed in the alignment selected in the 2006 US 160 ROD. Revised G Modified Alternative is illustrated on Figure 2-5. The revision to the alternative, in addition to avoiding the gas well, has approximately 4 acres fewer impacts to wildlife habitat and 0.11 acres less impacts to wetlands as compared to the original alignment in the 2006 US 160 EIS. The Revised G Modified Alternative is what is considered in the SDEIS.

2.4.6 F Modified/Revised F Modified Alternative

F Modified Alternative was the other alternative in the Grandview Section considered for detailed analysis in the 2006 US 160 EIS. US 550 crosses Florida Mesa and connects to US 160 at CR 233 (Three Springs) Interchange. Frontage roads parallel the alignment from US 160 south for about a mile. These roads provide local access to the properties south of US 160. Like G Modified, F Modified Alternative also impacts a gas well on the Webb Ranch so design adjustments to avoid the gas well were considered. The feasibility of avoiding the gas well was explored and not incorporated into this alternative because a shift to the north results in the acquisition of four additional residences and a shift to the south requires acquisition of two additional residences.

Revised F Modified Alternative is the same as in the 2006 US 160 EIS except it includes the Grandview Interchange. For these reasons, "Revised" has been added to the title of this alternative. The Revised F Modified Alternative is illustrated on igure 2-6.

2.4.7 Eastern Realignment Alternative

The Eastern Realignment Alternative is shown on Figure 2-7. This alternative was developed specifically to avoid the Webb Ranch, a historic resource and Section 4(f) property. US 550 connects to US 160 at the CR 233 (Three Springs) Interchange but has a different US 550 south alignment when compared to the Revised F Modified and Revised G Modified Alternatives. Frontage roads parallel the alignment from US 160 to CR 220. These roads provide local access to the properties south of US 160 along the new US 550 alignment.

2.4.8 Western Realignment Alternative

This alternative, shown on Figure 2-8, relocates the existing US 160/ US 550 (south) intersection to the west where it would intersect US 160 with a directional interchange. This alternative was specifically developed to avoid the historic ranches and other Section 4(f) properties on top of Florida Mesa. This alternative diverges from the current US 550 at approximately milepost 13.17 on the top of Florida Mesa before descending into the Animas Valley where it parallels the Animas River to the north and connects to US 160 at approximately milepost 88.0, approximately 0.5 mile west of the existing US 160/US 550 (south) intersection.

Figure 2-5. Revised G Modified Alternative

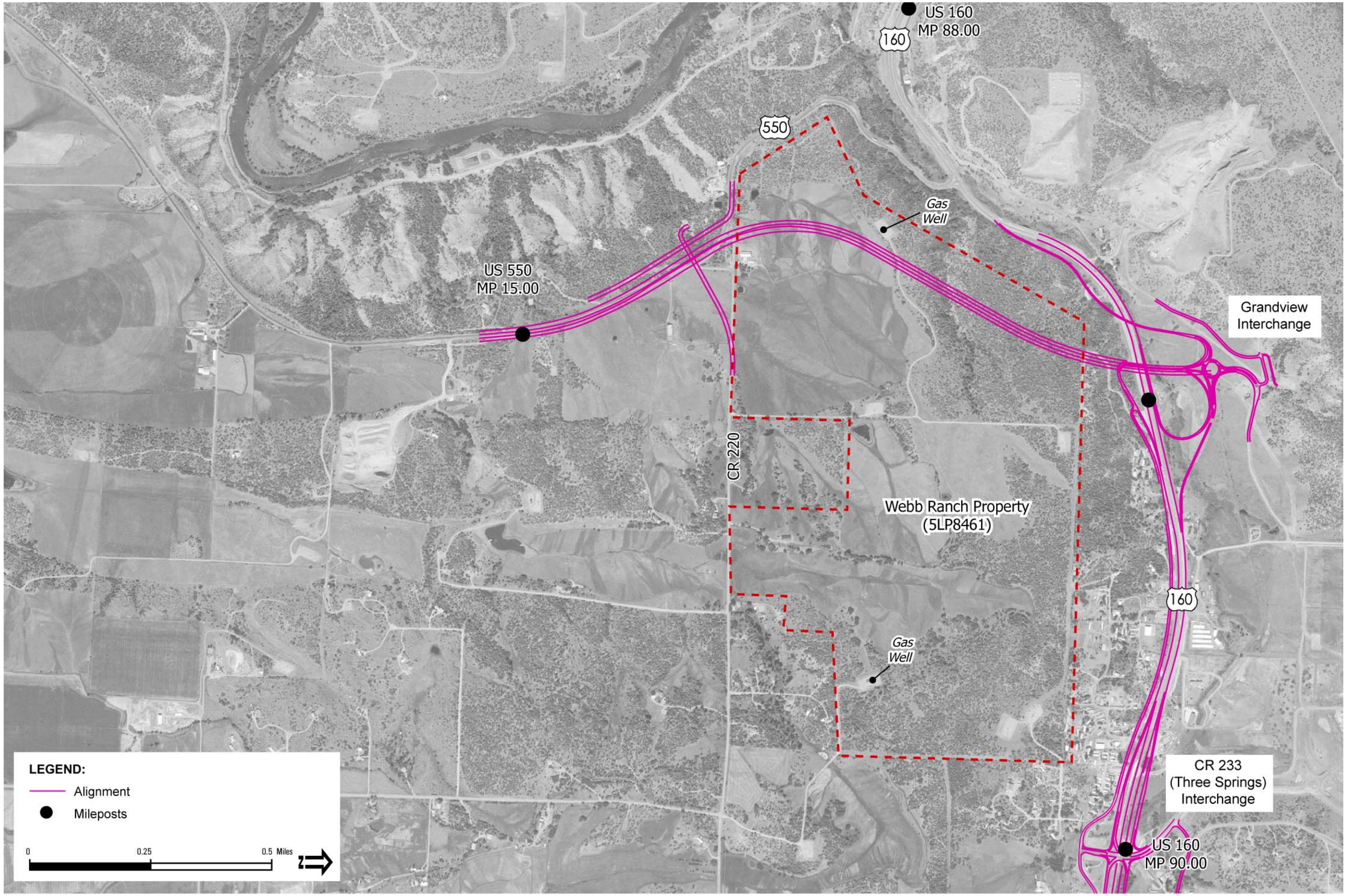


Figure 2-6. Revised F Modified Alternative

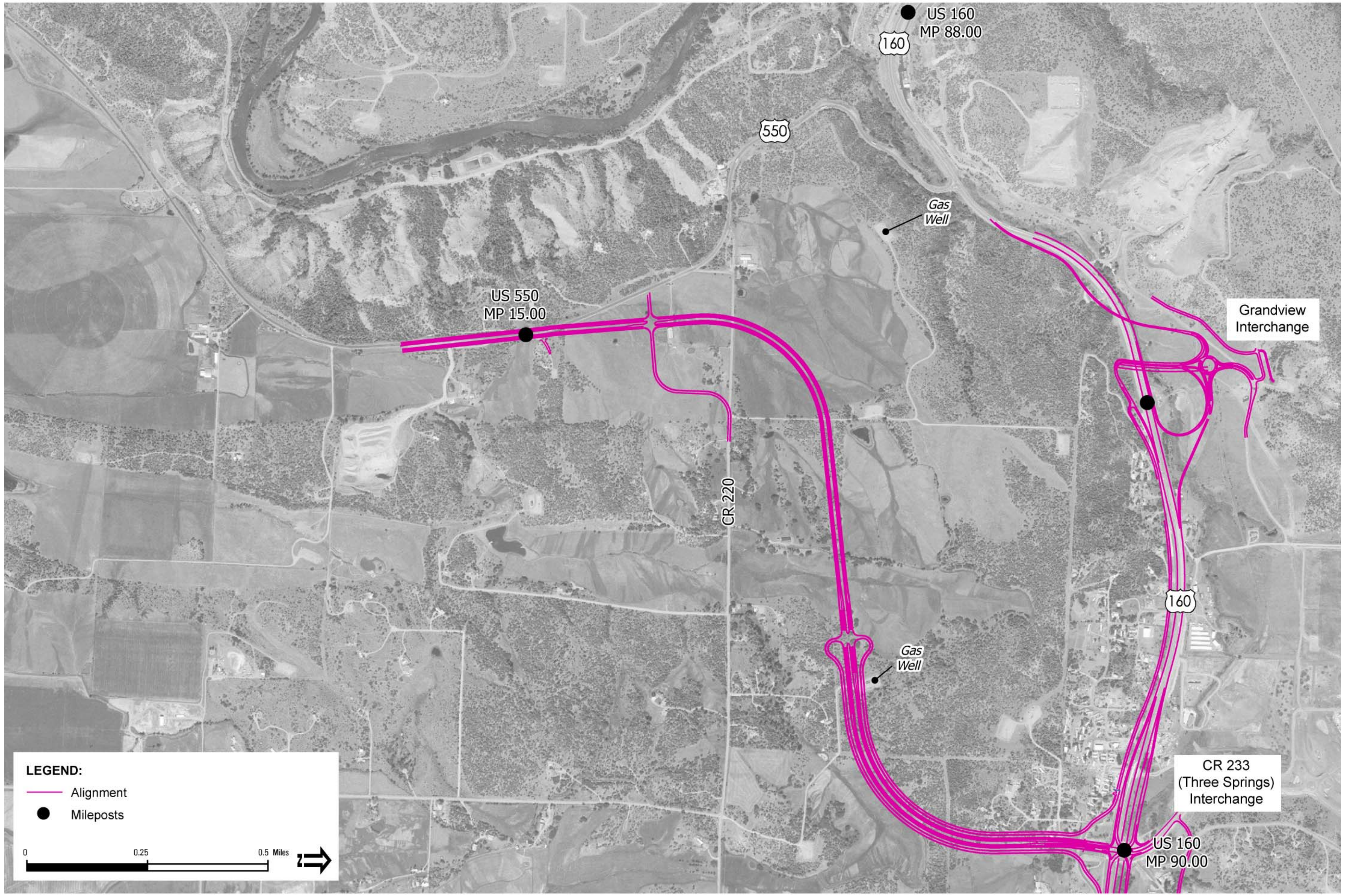


Figure 2-7. Eastern Realignment Alternative

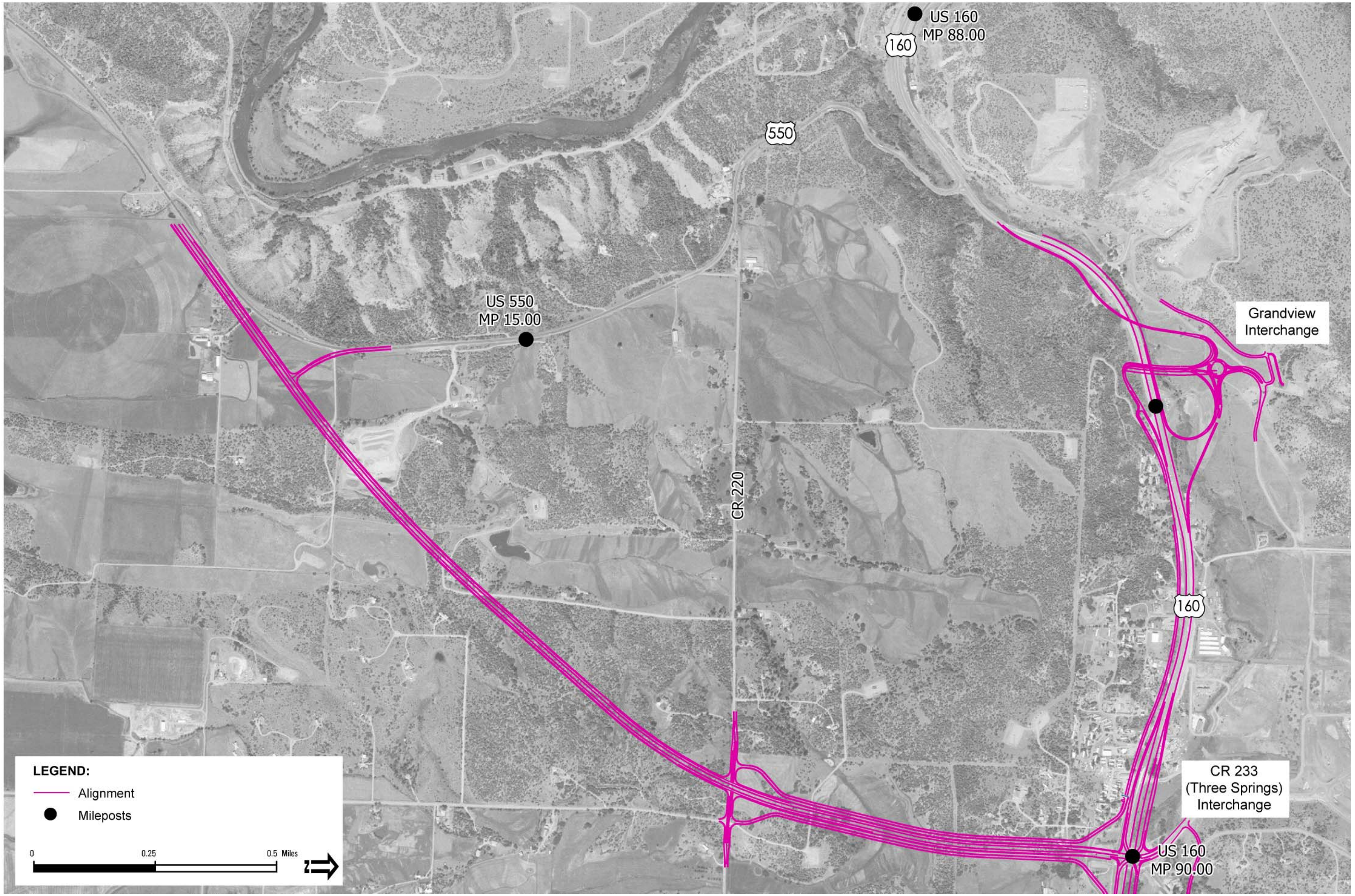
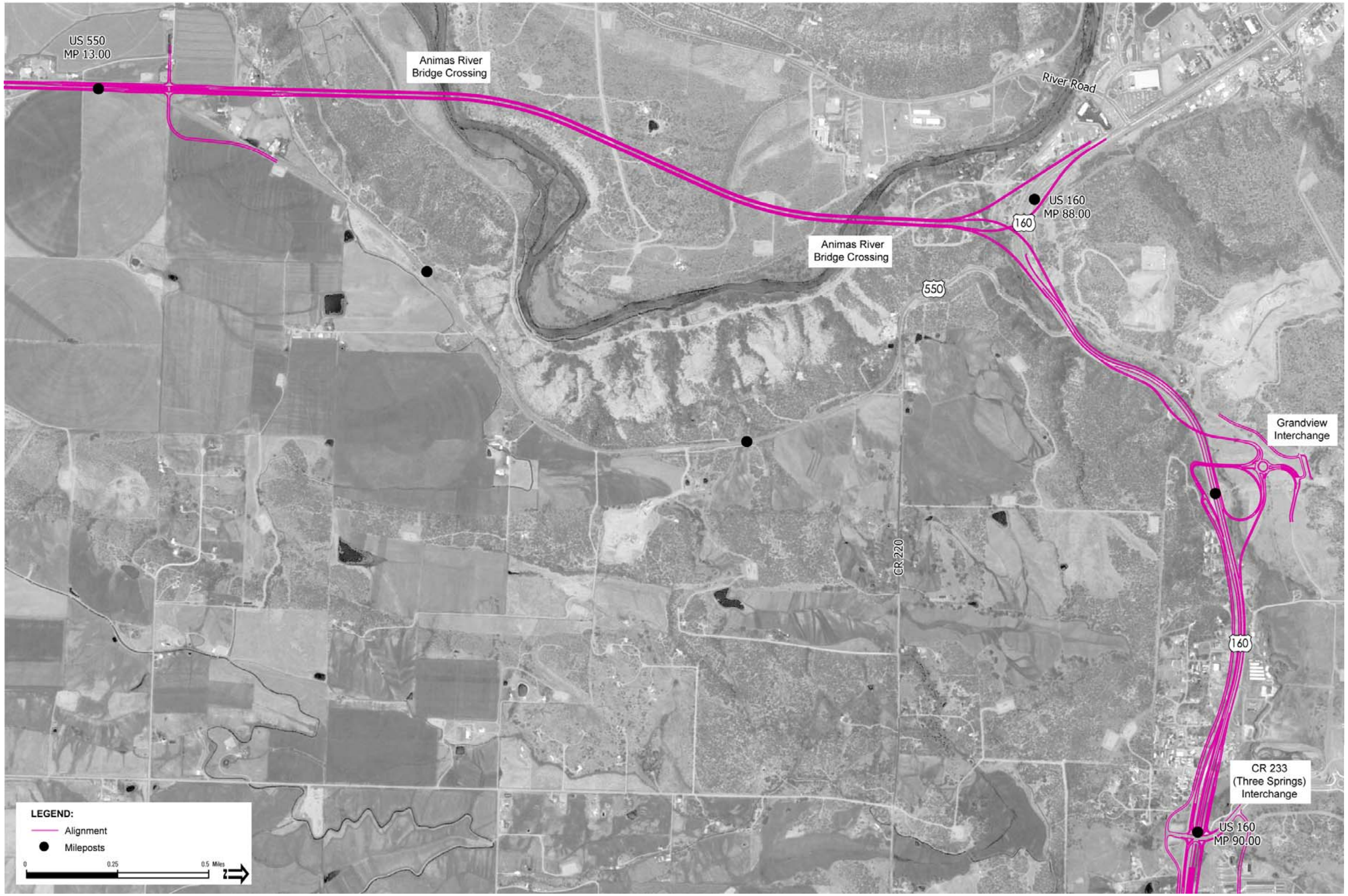


Figure 2-8. Western Realignment Alternative



2.5 Screening Process to Arrive at Alternatives Advanced for Detailed Study

2.5.1 Combining Requirements of the NEPA, Clean Water Act, and Section 4(f) of the Transportation Act of 1966

An EIS must rigorously explore and objectively evaluate all reasonable alternatives to the action, discuss the reasons why other alternatives are eliminated from detailed study, and identify a preferred alternative (40 CFR § 1502.14, 23 CFR § 771.123 and 23 CFR § 771.125). The screening process for NEPA therefore considers what is a "reasonable" alternative to be carried forward for detailed study. The NEPA screening process for the SDEIS considers what is a "reasonable" alternative and takes into consideration environmental impacts of reasonable alternatives. One of the main factors in determining if an alternative is reasonable is if it meets the purpose and need for the project; if it does not meet the purpose and need it is not considered to be reasonable. There are other factors that also are relevant in evaluating whether an alternative is reasonable such as cost, safety and the engineering difficulty for construction. These factors are similar, sometimes identical, to the factors in determining whether an alternative is considered a practicable alternative under the Clean Water Act's LEDPA analysis.

In the 2006 US 160 EIS screening process, requirements of NEPA and the Clean Water Act were merged. For the SDEIS, those same screening criteria are used with the addition of factors related to Section 4(f) of the Transportation Act of 1966, as amended [Section 4(f)]. Both the Clean Water Act and Section 4(f) are substantive laws in that they require specific outcomes. A brief description of the processes is described below.

The Clean Water Act requires approval from the US Army Corps of Engineers (USACE) for a discharge of dredged or fill material into waters of the United States. The USACE can only approve the alternative that has the least impact on aquatic systems, so long as that alternative is "practicable" and does not have other significant adverse environmental consequences. This alternative is known as the Least Environmentally Damaging Practicable Alternative (LEDPA). The guidelines for approving the LEDPA are found at 40 CFR 230 implementing Section 404(b)(1) of the Clean Water Act. These guidelines require that no discharge be permitted if there is a "practicable" alternative to the proposed discharge which would have less adverse impact on the aquatic ecosystem, so long as the alternative does not have other significant adverse environmental consequences. Furthermore, an alternative is only considered to be "practicable" if "it is available and capable of being done, taking into consideration cost, existing technology and logistics in light of overall project purposes." For Clean Water Act requirements, the screening process in the SDEIS, therefore considers alternatives and whether they are "practicable." This is intended to show that any alternative that is screened out as not being reasonable also is not practicable, and therefore could not be the LEDPA.

Section 4(f) is also considered in the screening process. Section 4(f) protects significant historic sites such as the historic ranches, residential property, and ditches discovered since completion of the 2006 US 160 ROD near the US 550 at US 160 connection. It requires avoidance of historic sites, except when there is "no prudent and feasible" avoidance alternative (23 CFR Part 774). Chapter 5 of this SDEIS describes criteria used to identify prudent and feasible avoidance alternatives. Based on information to date, there does not appear to be a prudent and feasible avoidance alternative. A "use" occurs when a project permanently incorporates land from a Section 4(f) property. The screening process considers "use" of the historic ranches, residential property, and ditches protected under Section 4(f) as well as other 4(f) properties and environmental factors.

2.5.2 Screening Levels

Alternatives were evaluated in a two-step process. The first step evaluated alternatives to determine if they are "reasonable" and therefore advanced for detailed study in the SDEIS. The first step evaluates the alternatives based on whether they meet the purpose and need or have other issues such as logistical problems or substantially greater costs. Alternatives screened out at this level are not considered reasonable under NEPA or practicable under the Clean Water Act. Criteria in the first step are described below.

In the second level screening, the alternatives were compared using criteria under NEPA and the Clean Water Act (CWA) to identify the Preferred Alternative. This level also considers use of the Section 4(f) properties discovered after the US 160 ROD.

2.5.3 Screening Level 1: Evaluation for Purpose and Need, Logistics and Cost

The alternatives in the SDEIS were first evaluated for whether they meet the purpose and need for the project and whether they have other issues such as logistical problems or substantially greater costs. This step considers what a reasonable alternative is under NEPA. The criteria for purpose and need, cost, and logistics are described in Table 2-1.

These same criteria can also be used to determine what a practicable alternative is for Section 404 of the Clean Water Act. One reason an alternative is unreasonable under NEPA if it does not meet the purpose and need. Likewise under the CWA, an alternative is practicable if it is "available and capable of being done after taking into consideration cost, existing technology, and logistics in light of overall project purposes." If an alternative does not meet the overall purpose and need it is not considered to be practicable. An alternative may also not be practicable based on cost, existing technology, or logistics. Cost and logistics are included in this screening level.

All the alternatives can be built with existing technology so this criteria is not included in this step.

Table 2-1. Criteria for Purpose and Need, Logistics and Cost

Criterion	Description
Purpose and Need	
Capacity	Provide a 2030 peak hour LOS D.
Safety	Improve existing design and safety deficiencies to current standards and not create an unsafe condition by increasing conflict opportunities between vehicles, vehicles and wildlife, or between vehicles and other objects.
Access control	Meet or exceed the minimum CDOT, FHWA, and AASHTO spacing, access, and operational requirements.
Other Criteria	
Logistics	Maintain access and provide mobility during construction and not have challenging technical issues for construction. Challenging technical issues include slope instability, or the need to remove large amounts of material compared to other alternatives.
Cost	Cost should not be substantially greater than other alternatives. Substantially greater costs are considered to be at least 200 percent higher or at least twice the cost compared to the lowest cost alternative

Alternatives that met the purpose and need and the cost and logistics requirements were advanced to the next stage of analysis. Alternatives not advanced were considered to be unreasonable under NEPA and not practicable under the Clean Water Act.

2.5.3.1. No Action Alternative

The No Action Alternative assumes completion of the US 160 project as defined in the 2006 US 160 ROD with the exception of the connection of US 550 to US 160. US 550 remains on its current alignment where poor geometry, low design speeds and two lane capacity, on a north facing steep grade presents capacity and safety issues. Therefore, the No Action Alternative does not meet the purpose and need for the project. The No Action Alternative, however, is assessed and used as a baseline for environmental analysis and represents what would exist if no action were taken as a result of this SDEIS. It is carried forward for detailed study as a basis of comparison with the other alternatives.

2.5.3.2. US 550 at US 160 At-Grade Intersection Alternative

This alternative includes an at-grade intersection at the existing location of US 550 to US 160. This alternative is evaluated first for whether it meets capacity, safety and access requirements of the purpose and need. For capacity, traffic analyses for the at-grade intersection alternatives, including design variations T.1.4, T.1.6, T.4.4, fail to meet the capacity requirements for the project purpose and need (see Appendix C). This alternative is expected to operate at LOS D during the morning peak period and LOS E during the evening peak period in 2030 which does not meet the requirement of a LOS D or better (see Appendix C). For safety, the alternative includes several design variations with different horizontal and vertical grades. The upper curve is the curve that creates the safety issues. All design variations, including the design with the flattest upper curve (T.4.4 with a 1000-foot horizontal radius and a four percent vertical grade), provide either a 30 mph or 35 mph design speed (see Appendix E). The design speed for US 550 south of this location is 70 mph consistent with the AASHTO Geometric Design of Highways and Streets (AASHTO, 2004). The large reduction in design speed from 70 mph to 30 mph or 35 mph creates an unsafe condition and is unacceptable for the design of roadways (AAHSTO, 2004). In addition to the sharp curves, this alternative includes an eight percent cross-slope as the roadway curves, four percent vertical grades and north facing steep slopes, all of which combine to produce unacceptable safety problems, particularly in the winter. All of these safety problems will continue to worsen as traffic volumes grow. This alternative does not sufficiently improve existing design and safety deficiencies to existing standards and, therefore, does not meet the safety requirement of purpose and need. For access, access control is included in the alternative and it therefore meets the access requirement of purpose and need.

Regarding the screening element of logistics, this alternative has challenging geotechnical issues with known subsurface water problems (springs) which create drainage and slope stability problems. This alignment requires the construction of retaining walls approximately 85 feet tall due to topography. Constructing the walls in these difficult conditions is technically challenging. It also has logistical issues related to constructability. Due to the existing narrow roadway and technical challenges associated with maintaining traffic while constructing the new roadway on such a steep slope, temporary detours during construction are required. Traffic would be rerouted from US 550 onto CR 220 for a period of two years. This forces Durango bound traffic, including emergency service providers, to travel nearly seven miles out of direction for each trip into or out of Durango. County Road 220 (CR 220) is a narrow county road with poor sight distance, no shoulders, and numerous access points for residential driveways. The two-year detour results in additional costs to drivers, access restrictions and disruptions to the residents and farming operations along CR 220, delays to the provision of emergency services, notable congestion at the CR 220/SH 172 intersection, SH 172/CR 234 Interchange, and CR 233 (Three Springs) Interchange, and safety problems along CR 220, which was not designed to carry large amounts of traffic. Additional details are found in Appendix E.

This alternative is not expected to result in costs substantially greater than other alternatives.

In summary, this alternative does not meet the capacity and safety requirements for the purpose and need. In addition, it has logistical problems that do not make it reasonable. For these reasons, it is not a reasonable alternative and is not carried forward to the next screening level. Likewise this alternative would not be the LEDPA as these problems make it not practicable under the CWA.

2.5.3.3. Partial Interchange at the Existing US 550/US 160 (South) Intersection Alternative

The Partial Interchange at the Existing US 550/US 160 (South) Intersection Alternative includes a partial interchange that connects US 550 to US 160 at the existing intersection location. Design variations T.2.4, T.2.6, T.3.4, and T.3.6 are included in this analysis. All these design variations have a tight upper curve with a 700-foot radius and either a four or six percent grade. This alternative is evaluated first for whether it meets capacity, safety and access requirements of the purpose and need. For capacity, traffic analyses show that this alternative meets the capacity requirements for the project purpose and need (see Appendix C). Overall, this intersection alternative is expected to operate at LOS A during the morning peak period and LOS A during the evening peak period in 2030 which meets the requirement of a LOS D or better. For safety, as discussed in Appendix E, this on-alignment alternative with a tight upper curve also requires a 35 mph reduction in speed in a short distance and has the same issues as described for the US 550 at US 160 At-Grade Intersection Alternative. US 550 would remain near its current alignment where in addition to the sharp curves, this alternative includes an eight percent cross-slope as the roadway curves, four percent vertical grades and north facing steep slopes, all of which combine to produce unacceptable safety problems, particularly in the winter so this alternative does not meet the safety requirement for purpose and need. For access, access control is included in the alternative and it therefore meets the access requirement of purpose and need.

Regarding the screening element of logistics, this alternative has the same geotechnical problems and constructability issues described for the US 550 at US 160 At-Grade Intersection Alternative. Because it is on the same alignment as the US 550 at US 160 At-Grade Intersection Alternative, it has subsurface water with drainage and slope stability issues. It also requires temporary detours during construction onto CR 220 as described for the US 550 at US 160 At-Grade Intersection alternative. Additional details are found in Appendix E.

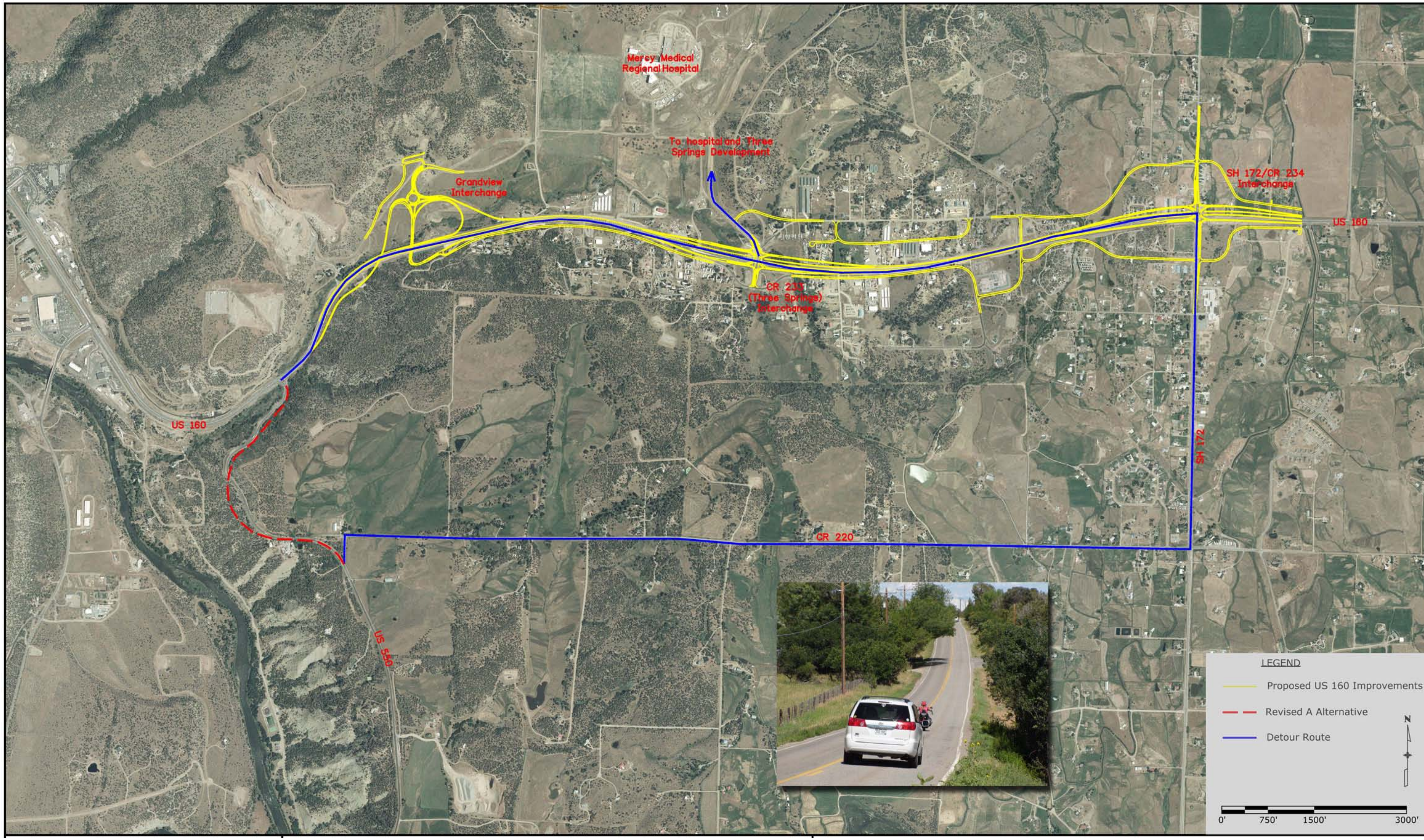
Additionally, cost is a relevant factor in determining whether an alternative is reasonable or practicable. The Partial Interchange at the Existing US 550/US 160 (South) Intersection Alternative is expected to cost $230,790,000. This compares to $77,598,000 for Revised G Modified, $77,429,000 for Revised F Modified, and $93,106,000 for the Eastern Realignment (see Table 2-3 in Section 2.5.4 and Appendix E). The Partial Interchange at the Existing US 550/US 160 (South) Intersection Alternative is more expensive than these alternatives because it requires building a new interchange whereas the Revised G Modified, Revised F Modified and the Eastern Realignment alternatives connect to interchanges already planned or built in Grandview. In addition, it requires upgrading and modifying CR 220 for use as a detour, which would not be required for Revised G Modified, Revised F Modified and the Eastern Realignment alternatives (see Figure 2-9). Other elements that increase costs for the Partial Interchange at the Existing US 550/US 160 (South) Intersection Alternative include large retaining walls of approximately 85 feet and the need to maintain access to businesses along US 160 near MP 88. For these reasons, the estimated cost for the Partial Interchange at the Existing US 550/US 160 (South) Intersection Alternative is about 3 times the cost of the least expensive alternative, Revised F Modified. Cost is therefore also a factor in why this alternative is not reasonable. Additional detail on the cost estimate for this alternative is included in Appendix E.

In summary, this alternative does not meet the safety requirements for purpose and need. In addition, it has logistical problems and substantially higher costs compared to other alternatives. For these reasons, it is not reasonable and is not carried forward for detailed analysis. Likewise this alternative would not be the LEDPA as these problems make it not practicable under the CWA.

2.5.3.4. Revised Preliminary Alternative A

Revised Preliminary Alternative A includes a grade separated trumpet interchange at the existing US 550/US 160 (south) intersection location. This alternative is on the same alignment as the US 550 at US 160 At-Grade Intersection Alternative and the Partial Interchange at the Existing US 550/US 160 (South) Intersection Alternative. This alternative is evaluated first for whether it meets capacity, safety and access requirements of the purpose and need. For capacity, traffic analyses show that this alternative meets the capacity requirements for the project purpose and need (see Appendix C). This alternative is expected to operate at LOS B during the morning peak period and LOS C during the evening peak period in 2030 which meets the requirement of a LOS D or better (see Appendix C). For safety, as discussed in Appendix E, this on-alignment alternative has the same issues described for the US 550 at US 160 At-Grade Intersection Alternative and the Partial Interchange at the Existing US 550/US 160 (South) Intersection. US 550 would remain near its current alignment where a large reduction in design speed from 70 mph to either 30 mph or 35 mph creates an unsafe condition and is unacceptable for designing roadways (Geometric Design of Highways and Streets, AAHSTO, 2004). In addition to the sharp curves, this alternative includes an eight percent cross-slope as the roadway curves, four percent vertical grades and north facing steep slopes, all of which combine to produce unacceptable safety problems, particularly in the winter so this alternative does not meet the safety requirement for purpose and need. This alternative is, however, safer than the Partial

Figure 2-9. Detour Route for Construction



Interchange at the Existing US 550/US 160 (South) intersection. The Partial Interchange at the Existing US 550/US 160 (South) Intersection requires the westbound US 160 to southbound US 550 traffic to make left turns across oncoming traffic with a signal. Revised Preliminary Alternative A eliminates the left-turning conflicts. For access, access control is included in the alternative. It therefore meets the access requirement of the purpose and need.

Regarding the screening element of logistics, this alternative has the same geotechnical problems and constructability issues as described for the US 550 at US 160 At-Grade Intersection Alternative and the Partial Interchange at the Existing US 550/US 160 (South) Intersection Alternative. Because it is on the same alignment, it has subsurface water with drainage and slope stability issues. It also requires temporary detours during construction onto CR 220 as described for the other two on-alignment alternatives. Additional details are found in Appendix E. For these reasons it is not a reasonable alternative.

As noted above, the criteria for cost is also relevant to whether an alternative is reasonable. The Revised Preliminary Alternative A is expected to cost $232,870,000. This compares to $77,598,000 for Revised G Modified, $77,429,000 for Revised F Modified, and $93,106,000 for the Eastern Realignment (see Table 2-3 in Section 2.5.4 and Appendix E). The Revised Preliminary Alternative A is more expensive than these alternatives because it requires building a new interchange whereas the Revised G Modified, Revised F Modified and the Eastern Realignment alternatives connect to interchanges already planned or built in Grandview. In addition, this alternative requires upgrading and modifying CR 220 for use as a detour which would not be required for Revised G Modified, Revised F Modified and the Eastern Realignment alternatives. Other elements that increase costs for Revised Preliminary Alternative A include large retaining walls of approximately 85 feet and the need to maintain access to businesses along US 160 near MP 88. For these reasons, the estimated cost for the Revised Preliminary Alternative A is about three times the cost of the least expensive alternative, Revised F Modified. This cost is substantially higher than other alternatives being considered. Therefore based upon the above factors, this alternative including the cost criteria, this is not a reasonable alternative. Additional detail on the cost estimate for this alternative is included in Appendix E.

In summary, this alternative does not meet the safety requirements for purpose and need. In addition, it has logistical problems and substantially higher costs compared to other alternatives. For these reasons, it is not reasonable and is not carried forward for detailed analysis. Likewise this alternative would not be the LEDPA as these problems make it not practicable under the CWA.

2.5.3.5. Revised G Modified Alternative

The Revised G Modified Alternative connects US 550 to US 160 via the Grandview Interchange. This alternative is evaluated first for whether it meets capacity, safety and access requirements of the purpose and need. For capacity, traffic analyses show that this alternative meets the capacity requirements for the project purpose and need (see Appendix C). This alternative is expected to operate at LOS A during the morning peak period and LOS A during the evening peak period in 2030 which meets the requirement of a LOS D or better (see Appendix C). For safety, it meets the criteria of improving the existing deficiencies to current standards and does not create an unsafe condition. In addition, it does not have the on-alignment issues described for the US 550 at US 160 At-Grade Intersection Alternative, the Partial Interchange at the Existing US 550/US 160 Intersection Alternative, or Revised Preliminary Alternative A. This alternative meets the safety requirements for purpose and need. For access, access control is included in the alternative. It therefore meets the access requirement of purpose and need.

This alternative meets the criteria for logistics. It does not have geotechnical or slope stability problems and does not require detouring of US 160 traffic onto CR 220 during construction. This alternative can be built with traffic maintained on the existing US 550 alignment until it is completed.

For the criteria for cost, the Revised G Modified is one of the lowest cost alternatives and is not expected to result in costs substantially greater than the other alternatives (see Table 2-3 in Section 2.5.4 and Appendix E).

In summary, this alternative meets all aspects of the purpose and need, and meets the requirements for logistics and cost. This alternative is reasonable and is carried forward for further analysis.

2.5.3.6. Revised F Modified Alternative

The Revised F Modified Alternative connects US 550 to US 160 via the SPUI interchange at CR 233 (Three Springs). This alternative is evaluated first for whether it meets capacity, safety and access requirements of the purpose and need. For capacity, traffic analyses show that this alternative meets the capacity requirements for the project purpose and need (see Appendix C). This alternative is expected to operate at LOS B during the morning peak period and LOS C during the evening peak period in 2030 which meets the requirement of a LOS D or better. For safety, this alternative meets the criteria of improving the existing deficiencies to current standards and does not create an unsafe condition. In addition, it does not have the on-alignment issues described for the US 550 at US 160 At-Grade Intersection Alternative, the Partial Interchange at the Existing US 550/US 160 Intersection Alternative, or Revised Preliminary Alternative A. This alternative meets the safety requirements for purpose and need. For access, access control is included in the alternative. It therefore meets the access requirement of purpose and need.

This alternative meets the criteria for logistics. It does not have geotechnical or slope stability problems and does not require detouring of US 160 traffic onto CR 220 during construction. This alternative can be built with traffic maintained on the existing US 550 alignment until it is completed.

For the criteria for cost, the Revised F Modified Alternative is the lowest cost alternative (see Table 2-3 in Section 2.5.4 and Appendix E).

In summary, Revised F Modified Alternative meets all aspects of the purpose and need, and meets requirements for logistics and cost. This alternative is reasonable and is carried forward for further analysis.

2.5.3.7. Eastern Realignment Alternative

The Eastern Realignment Alternative connects US 550 to US 160 via the SPUI at CR 233 (Three Springs). This alternative is evaluated first for whether it meets capacity, safety and access requirements of the purpose and need. For capacity, traffic analyses show that this alternative meets the capacity requirements for the project purpose and need (see Appendix C). This alternative is expected to operate at LOS B during the morning peak period and LOS C during the evening peak period in 2030 which meets the requirement of a LOS D or better. For safety, it meets the criteria of improving the existing deficiencies to current standards and does not create an unsafe condition. In addition, it does not have the on-alignment issues described for the US 550 at US 160 At-Grade Intersection Alternative, the Partial Interchange at the Existing US 550/US 160 Intersection Alternative, or Revised Preliminary Alternative A. This alternative meets the safety requirements for purpose and need. For access, access control is included in the alternative. It therefore meets the access requirement of purpose and need.

This alternative meets the criteria for logistics. It does not have geotechnical or slope stability problems and does not require detouring US 160 traffic onto CR 220 during construction. This alternative can be built with traffic maintained on the existing US 550 alignment until it is completed.

For the criteria for cost, the Eastern Realignment costs $93,106,000. This cost is approximately 20 percent higher than the lowest cost alternative, Revised F Modified Alternative which costs $77,429,000. It is not, however, several times higher like other alternatives being considered. It is, therefore, not expected to result in costs substantially greater than other alternatives (see Table 2-3 in Section 2.5.4 and Appendix E).

In summary, the Eastern Realignment Alternative meets all aspects of the purpose and need, and meets requirements for logistics and cost. This alternative is reasonable and is carried forward for further analysis.

2.5.3.8. Western Realignment Alternative

The Western Realignment Alternative diverges from the current US 550 at approximately milepost 13.17 on the top of Florida Mesa (approximately two miles south of where the Eastern Realignment Alternative diverges from US 550) before descending into the Animas Valley where it parallels the Animas River to the north and connects to US 160 at approximately milepost 88.0, approximately 0.5 mile west of the existing US 160/US 550 (south) intersection. Two new bridge crossings of the Animas River are required in addition to an interchange at the US 160 connection and an intersection or interchange at the US 550 South Connection. Two of the ramps from the interchange terminate approximately 700 feet from the existing River Road signalized intersection on US 160.

This alternative is evaluated first for whether it meets capacity, safety and access requirements of the purpose and need. The US 550 south connection to US 160 at approximately milepost 88.0 presents safety and operational problems that do not meet the capacity or safety requirements of the project purpose and need (*Year 2030 Traffic Operations Analysis for the US 550 at US 160 Alternatives*, SEH, 2010, in Appendix C). The proximity of the exiting intersection at River Road north of the proposed interchange creates queue conflicts, congestion, and backups on the northbound-to-westbound interchange ramp. River Road is the first intersection encountered when entering Durango from the south and east where Home Depot and a large subdivision along the Animas River already contribute to traffic conflicts. The interchange ramp would end very close (700 feet) from the River Road intersection. The addition of more conflicts in this already congested area would create unacceptable traffic and safety conditions inconsistent with the project purpose and need. A detailed explanation of traffic and safety problems associated with the Western Realignment Alternative is provided in Appendices C and E. The alternative does include access control and therefore meets the access requirement for purpose and need.

This alternative meets the criteria for logistics. It does not have geotechnical or slope stability problems and does not require detouring US 160 traffic onto CR 220 during construction. This alternative can be built with traffic maintained on the existing US 550 alignment until it is completed. However, the Western Realignment Alternative does have some logistical challenges. The Western Realignment Alternative will require a large amount of excavation and fill. This alignment cuts through the Florida Mesa where it has a drop in elevation of approximately 210 feet from the high point of the alignment on the mesa to the low point of the alignment near US 160. This compares to a drop in elevation from the high point of the alignment on the mesa to the low point of the alignment near US 160 of approximately 90 feet for the Revised G Modified Alternative and approximately 120 feet for Revised F Modified and Eastern Realignment Alternatives. The drop in elevation of approximately 210 feet for the Western Realignment Alternative occurs within less than a half of a mile (see Table 2-2).

Table 2-2. Comparison of Logistics

Alternative	Approximate Drop in Elevation	Estimated Earthwork (cubic yards)
Western Realignment	210 feet	3,541,000
Revised G Modified	90 feet	1,600,000
Revised F Modified	120 feet	2,247,000
Eastern Realignment	120 feet	2,742,000

The *American Association of State Highway and Transportation Officials Policy on Design* (AASHTO, 2004) discusses maximum grades for freeways. For a design speed of 70 mph, in rolling terrain, the maximum grade is four percent. However, in areas that are constrained by terrain, a 5 percent grade can be used (AASHTO, 2004). To achieve a grade of five percent, approximately 3,541,000 cubic yards of material would need to be removed from the hillside. This equates to approximately 236,084 truckloads of material at 15 cubic yards per truck. If it is assumed that the material is removed, and that the material could be moved at a rate of 10 truckloads per hour, at 8 hours per day for a 5-day workweek, it would take 197 workdays or 9.5 months to move all this material. This compares to approximately 1,600,000 cubic yards of material that would need to be removed for Revised G Modified Alternative, 2,247,000 cubic yards of material that would need to be removed for F Modified Alternative, and 2,742,000 cubic yards for the Eastern Realignment Alternative.

For the cost criteria, the Western Realignment Alternative is expected to cost $326,931,000 which is the highest cost for the alternatives being considered in this SDEIS. This compares to $77,598,000 for Revised G Modified, $77,429,000 for Revised F Modified, and $93,106,000 for the Eastern Realignment (see Table 2-3 in Section 2.5.4 and Appendix E). The Western Realignment Alternative is more expensive than these alternatives because it requires building a new interchange whereas the Revised G Modified, Revised F Modified and the Eastern Realignment alternatives connect to interchanges already planned or built in Grandview. In addition, this alternative requires two new river crossings, replacement of two gas wells, modification to the signal at River Road, and more acquisition of residential properties. For these reasons, the estimated cost for the Western Realignment Alternative is 4.2 times the cost of the least expensive alternative, Revised F Modified. This cost is substantially higher than the other alternatives being considered. Additional detail on the cost estimate for this alternative is included in Appendix E.

In summary, this alternative does not meet the capacity or safety requirements for purpose and need. In addition, it has logistical problems and substantially higher costs compared to other alternatives. For these reasons, it is not reasonable and is not carried forward for detailed analysis. It is also not practicable under the CWA.

2.5.4 Summary of Analysis for Purpose and Need, Logistics and Cost

Four alternatives were found not reasonable and therefore eliminated and not carried further for detailed study in the first screening level (see Table 2-3). These alternatives included US 550 at US 160 At-Grade Intersection Alternative, the Partial Interchange at the Existing US 550/US 160 (South) Intersection Alternative, Revised Preliminary Alternative A, and the Western Realignment. None of these alternatives meet the purpose and need for the project and they all also have other logistics problems. Additionally, three of the eliminated alternatives, the Partial Interchange at the Existing US 550/US 160 Intersection (South) Alternative, Revised Preliminary Alternative A, and the Western Realignment Alternative also have substantially greater costs as compared to the other alternatives. Based on the analysis, the No Action Alternative, Revised G Modified Alternative, Revised F Modified Alternative and the Eastern Realignment Alternative were carried forward for additional consideration.

Table 2-3. First Screening Level

Alternative	Meets Purpose and Need			Meets Other Criteria		Screening Result
	Capacity/ LOS	Safety	Access Control	Logistics	Cost (estimated cost in parentheses)	
No Action	No	No	No	Yes	Yes	Carried Forward*
US 550 at US 160 At-Grade Intersection Alternative	No	No	Yes	No	Yes**	Dismissed
Partial Interchange at the US 550/US 160 Existing Intersection Alternative	Yes	No	Yes	No	No ($230,790,0000)	Dismissed
Revised Preliminary Alternative A	Yes	No	Yes	No	No ($232,870,000)	Dismissed
Revised G Modified	Yes	Yes	Yes	Yes	Yes ($77,589,000)	Carried Forward
Revised F Modified	Yes	Yes	Yes	Yes	Yes ($77,429,000)	Carried Forward
Eastern Realignment	Yes	Yes	Yes	Yes	Yes ($93,106,000)	Carried Forward
Western Realignment	No	No	Yes	Yes	No ($326,931,000)	Dismissed

*For comparison purposes
**Cost not expected to be substantial compared to the other alternatives

The USACE provided concurrence on the project purpose and need in a letter dated September 8, 2011. A copy of the concurrence letter is included in Appendix A.

2.5.5 Screening Level 2: Evaluation for Clean Water Act and Section 4(f) Criteria

In the second level screening, the alternatives were further evaluated for criteria under the CWA and Section 4(f) to identify the Preferred Alternative. This step compares the alternatives based on environmental consequences such as impacts to wetlands and use of the Section 4(f) properties discovered after the 2006 US 160 ROD.

For the CWA requirements, the screening criteria in Table 2-4 were applied to those alternatives advanced from the first screening level. These screening criteria are the same as used in the 2006 US 160 EIS. The logistical criteria are expanded to include social feasibility. Logistics criteria considered in the first step are repeated here for comparative purposes.

Within each criterion, data for each alternative were collected to equally compare the alternatives. The impacts are compared for the US 550 south alignment to US 160 and do not include the three interchanges or four lanes and auxiliary lanes through Grandview. For construction mobility and technical challenges, the ease of traffic movement during construction was considered as well as slope instability or requirement to move large amounts of material. Construction mobility impacts were considered to be major or minor. For social feasibility, the number of residential and business relocations was estimated. Community cohesion, public input, and major constraints were also considered in this criterion. For cost, the cost was estimated and included for comparison. Additional details on how the costs were estimated in provided in Appendix E. For the aquatic ecosystem, the quantity of wetlands and waters of the US was estimated. This estimate included all potential wetlands and waters of the US, regardless of jurisdictional status. For the natural environment criterion, two different quantities, irrigated farmland and wildlife habitat, were used. These two quantities were selected because of their importance in the project corridor.

A summary of the Section 4(f) use is also compared. The screening criteria for Section 4(f) are included in Table 2-5. These criteria are newly applied since completion of the 2006 US 160 EIS process. This information includes the number of Section 4(f) properties used by the alternative, the type of property (i.e. historic ranch, residential property, or ditch), acres of impact to the historic ranches and residential property, and linear feet used of the historic ditches.

The USACE provided concurrence on the revised screening of alternatives in a letter dated September 8, 2011. A copy of the concurrence letter is included in Appendix A.

Table 2-4. Screening Criteria for Section 404 of the Clean Water Act

Screening Category	Criterion Description	Rationale/Basis for Screening Criterion
Practicability—Logistics		
L1	Construction mobility and technical challenges	Maintain access and provide mobility during construction and not have challenging technical issues for construction. Challenging technical issues include slope instability, or the need to remove large amounts of material compared to other alternatives.
L2	Social feasibility	Avoid and minimize impacts to minority and low-income households, community cohesion, residences, and businesses as compared to other alternatives.
Practicability—Cost		
C1	Estimated cost	Cost should not be substantially greater than other alternatives. Substantially greater costs are considered to be at least 200 percent higher or at least twice the cost compared to the lowest cost alternative.
Environmental Consequences		
EC2	Aquatic ecosystem	Avoid and minimize impacts to the aquatic ecosystem as compared to other alternatives. An alternative may be screened if there is a similar alternative that performs the same function but has a better opportunity to avoid and minimize direct and indirect impacts to the aquatic ecosystem.
EC3	Natural environment	Avoid and minimize impacts to the natural environment, such as drainage, native soils, or wildlife habitat. To advance, an alternative must not result in unacceptable environmental impacts to the natural environment as compared to other alternatives that perform the same function with fewer impacts to the environment.

Table 2-5. Screening Criteria for Section 4(f)

Criterion	Description
Number	The number of Section 4(f) properties.
Type	Identifies the type of Section 4(f) property which is a historic ranch, residential property, or historic ditch.
Total Acreage	The total acres of impact to the historic ranches and residential property.
Linear Feet of Use	The amount of feet used for the historic ditches.

2.5.6 Comparison of the Alternatives and Identification of the Preferred Alternative

A comparison of the three alternatives is shown in Table 2-6. All three alternatives are considered to be reasonable and are carried forward for detailed study in the SDEIS. These three alternatives include Revised G Modified Alternative, Revised F Modified Alternative, and the Eastern Realignment Alternative. Revised G Modified Alternative connects US 550 to US 160 via the Grandview Interchange. Revised F Modified and the Eastern Realignment alternatives connect US 550 to US 160 at the single-point urban interchange at CR 233 (Three Springs). For all three alternatives, US 160 is four lanes from the west project limit to the CR 233 (Three Springs) Interchange with auxiliary lanes. US 160 would remain on the existing alignment except near the SH 172/CR 234 intersection, where it would be shifted north to avoid Crestview Memorial Gardens.

Table 2-6. Summary of Second Level Screening

	Construction Mobility (L1)	Social Feasibility (L2)	Cost (C1)	Aquatic Ecosystems (EC2)	Environmental Consequences (EC3)		
Alternative	Impacts	Residential/ Business Relocations	Estimated Cost (millions)	Wetlands (acres)	Irrigated Farmland (acres)	Wildlife Habitat (acres)	Summary of Section 4(f) Use
No Action	None	None	None	None	None	None	None
Revised G Modified	Minor	0/0	$77,598,000	0.033	11.5	36.6	2 ranches Total acreage: 64.1 1 ditch Linear feet: 488
Revised F Modified	Minor	4/1	$77,429,000	0.53	31.1	39.3	3 ranches 1 residential property Total acreage: 95.4 2 ditches Linear feet: 3,007
Eastern Realignment	Minor	6/1	$92,106,000	3.2	35.1	49.1	2 ranches Total acres: 63.6 2 ditches Linear feet: 2,101

The main difference between the Revised F Modified Alternative, Revised G Modified Alternative, and the Eastern Realignment Alternative is the location of the US 550 alignment and where it connects to US 160. In the Revised F Modified Alternative, US 550 would cross the top of the Florida Mesa. The Eastern Realignment Alternative also crosses the top of Florida Mesa but has a different US 550 south alignment which is more to the east compared to the Revised F Modified Alternative. In Alternative G Modified, US 550 would skirt the western edge of the Florida Mesa. Of the three alternatives, the Eastern Realignment Alternative has the most impacts to residents and businesses, wetlands, wildlife habitat, irrigated farmlands and it also is the most costly (see Table 2-6). The Eastern Realignment Alternative also has more Section 4(f) use compared to the Revised G Modified Alternative. The Revised F Modified Alternative is the lowest cost alternative (although it is only slightly less costly), but compared to the

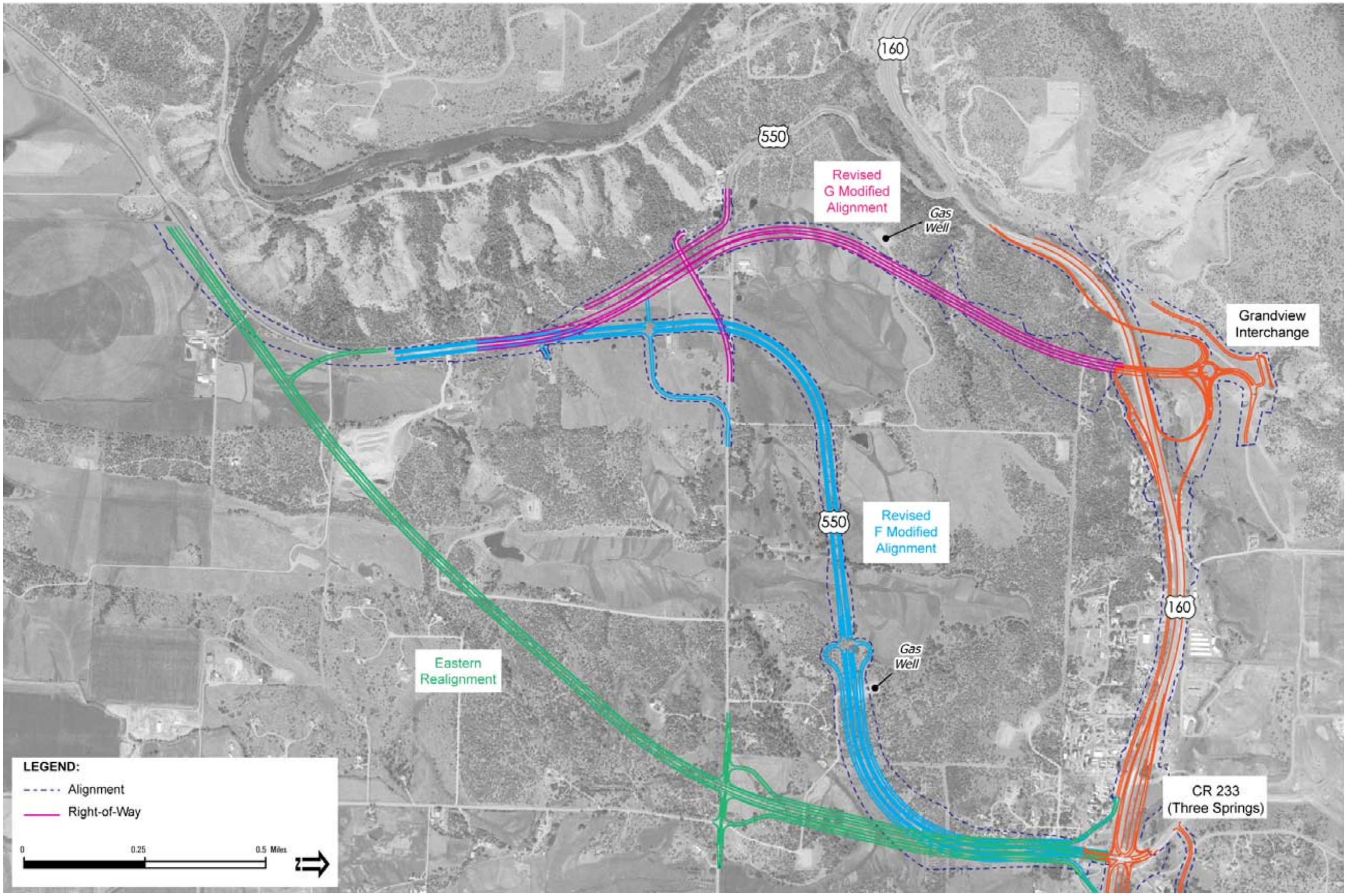
Revised G Modified Alternative, it has more impacts to residents and businesses, affects more Section 4(f) properties, has approximately 18 times the impact to wetlands (0.53 acre vs. 0.03 acre), and more impacts to wildlife habitat (see Table 2-6). Based on these reasons, Revised G Modified is the preferred alternative, appears to be the LEDPA and has less use of Section 4(f) properties compared to Revised F Modified Alternative and the Eastern Realignment Alternative. See Figure 2-10 for a graphical representation of the three reasonable alternatives considered for detailed study in the SDEIS.

The USACE provided concurrence that the Preferred Alternative appears to be the LEDPA in a letter dated September 8, 2011. A copy of the concurrence letter is included in Appendix A. Although a Preferred Alternative has been identified in this SDEIS, no final decision will be made until after comments have been received during the public and agency review period. The final decision will be documented in a Record of Decision.

2.6 Funding Status

The approximate cost for Revised G Modified Alternative (Preferred Alternative) for the US 550 south connection to US 160 is $77,429,000. The proposed improvements have been identified as a priority for funding in the State Transportation Improvement Program (STIP) and the Southwest Transportation Region (TPR) Preferred Plan (*Southwest TPR 2030 Transportation Plan*). In the STIP, $200,000 of funding is identified in 2012 for design and $2.54 million of funding is planned for right-of-way acquisition in 2017 for this project.

Figure 2-10. Reasonable Alternatives Considered for Detailed Study in the SDEIS



3.0 Affected Environment

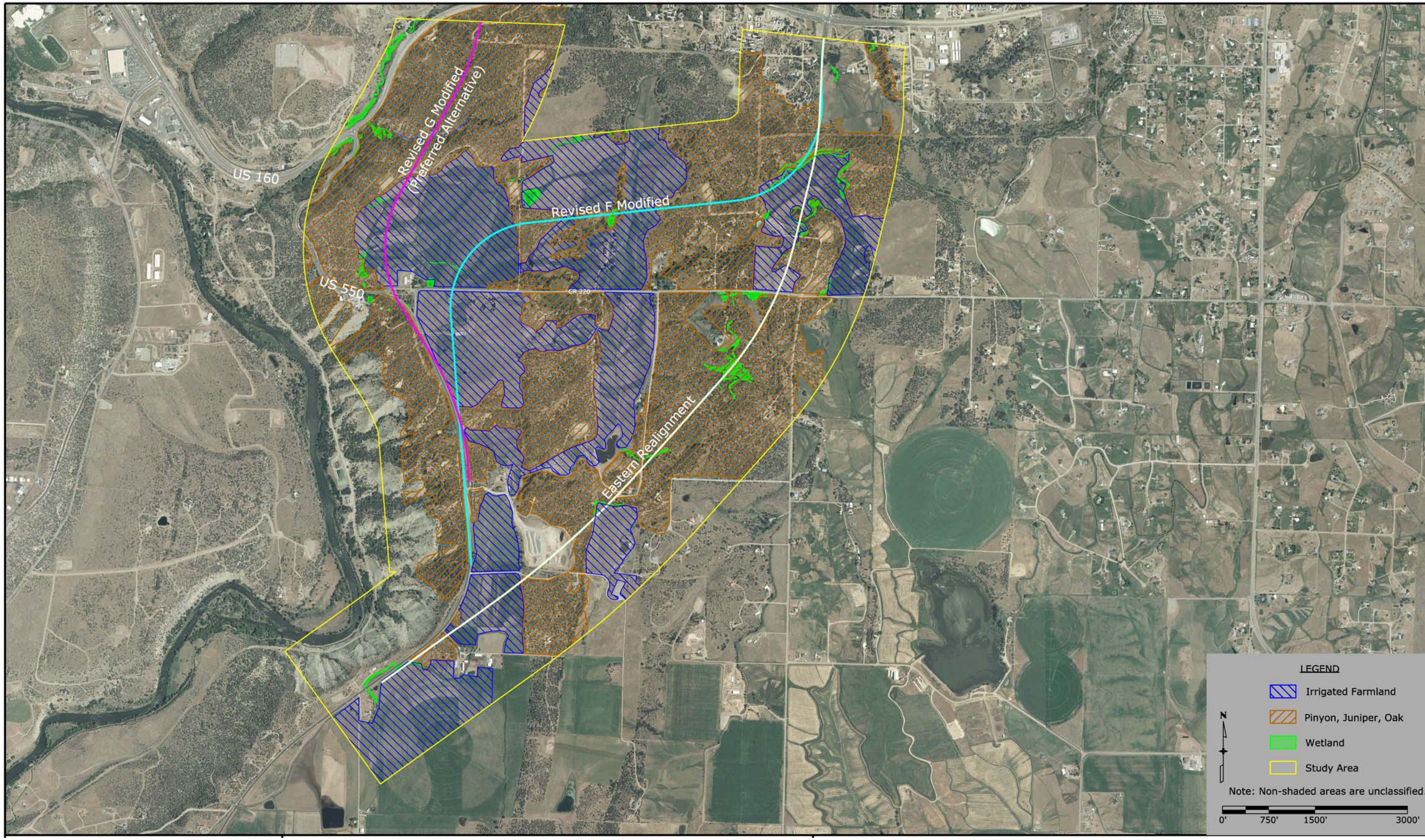
As discussed in Section 1.1, this Supplemental Draft Environmental Impact Statement (SDEIS) is being prepared to address impacts that were not previously evaluated or that have been changed based on revisions to the design since the 2006 US Highway 160 from Durango to Bayfield EIS (2006 US 160 EIS) and 2006 US Highway 160 from Durango to Bayfield Record of Decision (2006 US 160 ROD). The Grandview Section starts at milepost 88.0 on US 160 west of the US Highway 550 (US 550)/US 160 (south) intersection and ends approximately 3 miles east of the State Highway (SH) 172/ County Road (CR) 234 intersection. The study area in this SDEIS focuses on the affected environment and impacts along the US 550 alignment from where it diverges from US 550 south of CR 220 to where it connects to US 160. As discussed in the resource-specific methodologies in Chapter 3, the study area for the impact analyses generally consists of the US 550 south alignment footprint (for example, area of disturbance including temporary construction impacts) for each alternative. However, several resources require larger study areas and those are described for each resource. For example, the study area for noise impacts includes analysis for noise sensitive receptors located within 500 feet of the alternative footprints. The generalized study area for the majority of resources is shown on Figure 3-1. It includes an area that covers the three alternatives discussed in the following sections and encompasses an area approximately 1.8 miles wide by 2.3 miles in length. It does not include the Grandview and Three Springs Interchanges because these areas are included as part of the No Action Alternative. For certain resource impact assessments, such as wetlands, this area was decreased to address only the resources within 300 feet on either side of the alternative centerline that could be impacted by the alternative. For other resources such as noise and air quality, the study area was expanded to incorporate additional areas that are part of the No Action alternative but have a bearing on the resource impact assessment. See the Methodology sections below for resource-specific study areas.

This chapter describes the existing conditions of the human and natural environment that could be impacted, beneficially or adversely, by the No Action, Revised G Modified, Revised F Modified, and Eastern Realignment alternatives. The impacts and environmental consequences of the No Action and action alternatives are described in Chapter 4.

3.1 Land Use

The way land is developed and used for various activities (e.g., residential, commercial, industrial, parks and open space) affects quality of life and the environment. Land use topics include: designations created by a state, county or city through land use plans (General Plans, Comprehensive Plans, etc.), zoning, future land use and growth

Figure 3-1. Farmland in the Study Area



management areas, conservation easements, urban infrastructure service boundaries, annexation plans, and past, existing, and future development trends. The planning, design, and construction of roads and highways, as well as other transportation modes, is often based on land use development patterns and trends and affects existing land uses and plans and proposals for future development. Safe and efficient travel, whether by walking, public transportation, taking a car, an airplane, or a bike, is also influenced by the types and patterns of land uses.

3.1.1 Methodology

The study area for land use in the SDEIS affected environment section consists of the Grandview Area. The study area for the impacts analysis consists of the alternative footprints, including areas that would be impacted during any construction activities. There were no changes to the methodology used for land use since the 2006 US 160 EIS and 2006 US 160 ROD. See Section 3.1 of the 2006 US 160 EIS for more information.

3.1.2 Regulatory Update and Coordination

There have been no regulatory updates since the 2006 US 160 EIS and 2006 US 160 ROD. There was no coordination required or conducted for the SDEIS.

3.1.3 Current Conditions

Land use in the study area is continuing to develop with commercial and residential uses. The 2006 US 160 EIS described anticipated growth in the Grandview Area based on the *Grandview Area Plan* (City of Durango, 2004). The plan anticipated more than 5,467 new residential units, a regional retail center, three schools, a hospital, and a park. Since the 2006 US 160 ROD, the hospital was completed and approximately 116 housing units and 229,300 square feet of office and commercial buildings have been constructed consistent with the Grandview Area Plan. The development is expected to reach full build-out by 2030. In addition, approximately 1,700 housing units and commercial uses are planned over the next 20 years for Ewing Mesa, a large tract of undeveloped land about one mile north of Farmington Hill. This development largely affects traffic projections into and out of the Durango and Grandview Area even though it is outside the SDEIS study area.

The region is also a recreation destination and the number of recreational sites and resorts is increasing. These recreational areas include campgrounds, forest lands, and parks.

3.2 Farmland

The Natural Resources Conservation Service (NRCS) has established four different classifications of farmlands including: Prime Farmland, Unique Farmland, Farmland of Statewide Importance, and Farmlands of Local Importance as defined in the 2006

US 160 EIS. This section presents a description of the study area as it relates to these designations.

3.2.1 Methodology

The study area for farmlands in the SDEIS affected area extends approximately ¼ mile west of Revised G Modified and approximately ¼ mile east of the Eastern Realignment and includes the majority of areas between as shown on Figure 3-1. Impacts to this resource presented in Chapter 4 are based on the alternative footprints, including areas that would be impacted during any construction activities. Aerial photographs with 1:200 scale superimposed with each of the proposed alignments were used to inventory areas of irrigated farmland. The majority of agricultural lands on Florida Mesa are supported by irrigation water. Irrigation water is either derived from the Florida River that supplies a series of ditches, canals, and ponds or pumped groundwater. Water is generally delivered to crops through flood irrigation, sprinklers, center pivot, or wheel rolling irrigation systems. On aerial photographs, these areas are discerned by geometric patterns depending on the type of irrigation or crops, uniform coloration, and lack of trees indicative of cropland.

General knowledge of the area and terrain supplemented by aerial photographs and ground verification was utilized to quantify irrigated farmland. No attempt was made to differentiate between irrigated and non-irrigated farmland and both lands received equal consideration. Equal consideration was also given to types of crops grown. All agricultural lands that fall within the toes of slope of the proposed alignment are considered to be removed from production for purposes of estimating impacts. Impact areas were quantified using Global Information System (GIS) technology to calculate the size of the areas where mapped irrigated farmlands intersect with the proposed highway design. Impacts to irrigated farmlands are discussed in Section 4.2. Areas of mapped farmland are shown on Figure 3-1.

3.2.2 Regulatory Update and Coordination

The Farmland Protection Policy Act (FFPA) of 1981, as amended, is intended to minimize the extent to which Federal activities contribute to the conversion of agricultural land to non-agricultural uses. The NRCS is the coordinating agency for the FFPA on Federally funded projects, including the SDEIS.

The NRCS uses a land evaluation and site assessment system to establish a farmland conversion impact rating score on proposed areas of federally funded and assisted projects. The score is used as an indicator whether to consider alternative sites if the potential adverse impacts on farmlands exceed recommended allowable levels. The Colorado Department of Transportation (CDOT) coordinated with the NRCS utilizing Form AD-1006 Farmland Conversion Impact Rating to determine the significance of irrigated farmland impacts.

3.2.3 Current Conditions

The 2006 US 160 EIS identified 1.7 acres of prime farmland in the project corridor in Bayfield at the US 160/ CR 501 intersection. No additional prime farmlands within the study area have been designated since that time. The SDEIS study area does not contain any prime or unique farmlands as mapped by the NRCS. This includes irrigated lands on Florida Mesa for the US 160 at US 550 south connection along the Revised G Modified, Revised F Modified, and Eastern Realignment alternatives.

The NRCS identified a total of 339,831 acres of irrigated cropland and pasture in La Plata County (NRCS, 2011). Of this amount, 76,722 acres are within Government jurisdiction and 66,025 acres are irrigated and considered of local or statewide importance (NRCS, 2011).

Although the study area is not considered Prime Farmland, it includes farmland that is considered to be Farmland of Statewide Importance. This includes lands that are important for the production of food, feed, fiber, forage and oilseed crops. The study area on top of Florida Mesa has numerous ranch properties that are irrigated for purposes of providing crops. Irrigated farmlands have been identified on important ranch properties that are within the limits of disturbance for the Revised G Modified, Revised F Modified, and Eastern Realignment alternatives. Each of these ranches provides production of mostly forage for livestock feed. Areas off the top of the mesa are generally too steep and vegetated by piñon-juniper forest to be of value as farmland.

3.3 Socioeconomics

Socioeconomics addresses both social and economic resources. This includes population, housing, utilities, public services, and employment opportunities. More information on socioeconomics can be found in Section 3.3 of the 2006 US 160 EIS.

3.3.1 Methodology

For the affected environment, the study area for socioeconomics includes La Plata County as a whole. In the 2006 US 160 EIS, 2000 US Census data from the Colorado Demography Service (currently known as the State Demography Office [SDO]) was used to determine current and projected population and housing numbers, as well as average income of La Plata County residents. Since the time of the 2006 US 160 EIS a new census has been completed. For the SDEIS, all available 2010 US Census data from the SDO was used. This includes current populations, projected populations, and available housing units in La Plata County.

Impacts described for the action alternatives are based on a study area of 300 feet on either side of the centerline of each alignment and varies based on the location of the alternative and the topography. Residential impacts are based on the toes of slope intersecting with structures.

3.3.2 Regulatory Update or Coordination

There were no new Federal, state, or local regulations concerning socioeconomics since the time of the 2006 US 160 EIS. No agency coordination was required or conducted for the SDEIS.

3.3.3 Current Conditions

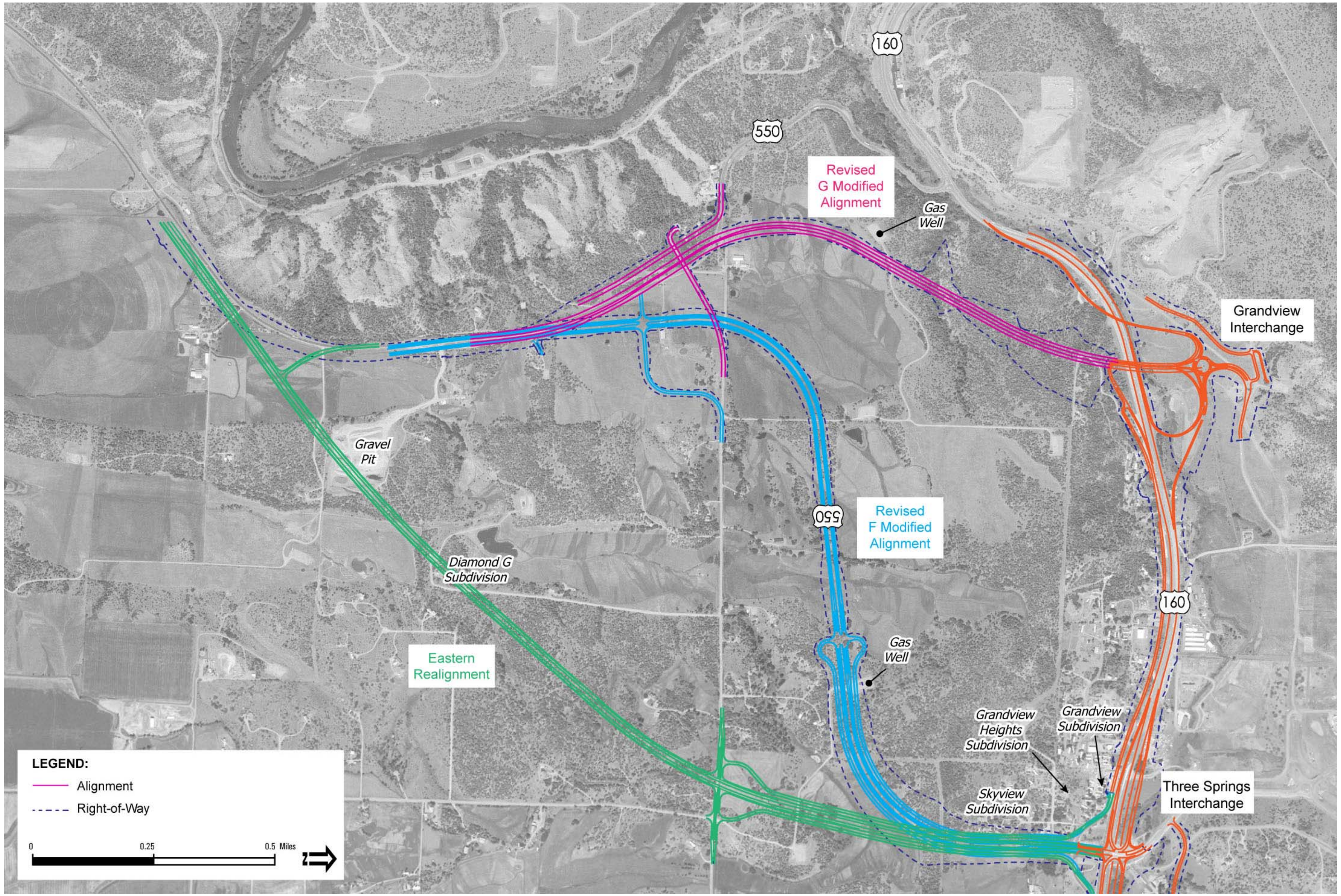
No community resources (sewer, water, school, churches, fire stations, police stations, and others) are located in the project area. The area south of US 160 consists primarily of large working ranches, with some residential properties, gas wells, and an operational gravel pit. Figure 3-2 shows the location of some of these features. The area north of US 160 is primarily developed. There are some businesses, residential and mixed use properties, as well as the Mercy Hospital complex (SDO, 2011).

According to 2010 US Census data from the SDO (SDO, 2011), the current population in La Plata County is 51,344 which is an increase of 7,393 or 16.82 percent from the 2000 Census. The projected population for La Plata County in 2030 is 79,762; while the 2000 Census projected the 2020 population to be 68,156. The SDO estimates there are 25,860 housing units in La Plata County which is an increase of 5,095 or 24.5 percent from 2000. The study area is comprised of large ranches where residences are spread out from one another, there are no public services (sewer, water, school, churches, fire stations, police stations, and others) located in the study area (SDO, 2011), and there are minority and low-income populations in the study area.

At the time of the SDEIS, the US Census had not released updated block group information including income, census tract, or estimated future housing data. Therefore, the data contained in Section 3.3.3 of the 2006 US 160 EIS is the most recent data available and is summarized below.

The study area is located in Block Group 4, Census Tract 9707.02. The Colorado Demography Service reported that the estimated per capita income in La Plata County in 2000 was $26,517. According to the 2000 US Census, the median household yearly income for Bock Group 4, Census Tract 9707.02 was $37,931. Although there were fewer persons in La Plata County below the state median poverty level, Block Group 4, Census Tract 9707.02 had higher percentages of people in poverty (9.5 percent) than the county (8.5 percent) and the state (9.3 percent). The 2000 low-income threshold for a family of four for La Plata County, based on 50 percent of area median income was $20,080; therefore, this block group would not be considered an environmental justice community.

Figure 3-2. Study Area Features



In 2000 approximately 89.3 percent of Block Group 4, Census Tract 9707.02 considered themselves to be Caucasian; therefore, there is a small percentage of the population that could be considered minority. For more information on low-income and minority populations in the study area, please see section 3.3.3.4 of the 2006 US 160 EIS.

3.4 Recreation

Recreation areas include places where people go to recreate. These areas can include places such as parks, lakes, and forest lands, among others. Recreational activities can include things such as fishing, hiking, and boating.

3.4.1 Methodology

The study area for the SDEIS affected environment section consists of the recreation options in the region. The study area for the impacts analysis consists of the alternative footprints, including areas that would be impacted during any construction activities. There were no changes to the methodology used for recreation since the 2006 US 160 EIS and 2006 US 160 ROD. Recreation plans and uses were verified for the study area. See Section 3.4 of the 2006 US 160 EIS for more information.

3.4.2 Regulatory Update and Coordination

There have been no regulatory updates since the 2006 US 160 EIS and 2006 US 160 ROD. There was no coordination required or conducted for the SDEIS.

3.4.3 Current Conditions

US 160 provides access to numerous recreational activities and recreation sites in the region. Year-round activities include hiking, fishing/ice fishing, ice climbing, snowmobiling, skiing, biking, kayaking, camping, and hunting. Tourism is anticipated to remain high during the summer months and would likely increase as the number of resort and recreational facilities increases in the region. There are no recreation sites in the study area.

3.5 Air Quality

The existing air quality conditions for the study area are assessed within the 2006 US 160 EIS, Section 3.5. This SDEIS presents the revised US Environmental Protection Agency (EPA) air quality standards (EPA, 2010) and Federal Highway Administration (FHWA) interim Mobile Source Air Toxic (MSAT) Guidance (FHWA, 2009) changes that have occurred since the 2006 US 160 EIS. Local ambient air quality monitoring information was updated to currently available data (Colorado Department of Public Health and Environment [CDPHE], 2009) and fugitive dust was added to the air quality analyses included in Section 4.5.

3.5.1 Methodology

For the affected environment, the study area for air quality includes a regional assessment for the overall Grandview Area. The analysis from the 2006 US 160 EIS was used to update the inventory analyses based upon linear trends in traffic and vehicle miles traveled (VMT) growth from year 2025 to 2030. Based on 2009 traffic data, the estimated daily VMT within the study area have decreased slightly (approximately two percent) from 2025 to the revised design year of 2030. The expected 2030 VMT for the study area action alternatives is 279,180 miles. Fugitive dust was not calculated for the 2006 US 160 EIS. The EPAs AP-42 formulae were used to calculated fugitive dust for the SDEIS.

Impacts described for the action alternatives are also based on a regional scale. No micro-scale dispersion analyses were conducted. As cited in the 2006 US 160 EIS, the findings from the US Forest Service's and Bureau of Land Management's (BLM's) Northern San Juan Basin Coal Bed Methane Project (ROD issued in 2007) show that concentrations of ozone are increasing as a result of oil and gas development, and thus impact analysis for this project includes analysis of ozone precursor emissions of volatile organic compounds (VOCs) and oxides of nitrogen (NOx). The MSAT formaldehyde has also been identified by recent studies as a pollutant increasing in the region and is included in this analysis. Fugitive dust was calculated based upon 2030 traffic projections for the US 160 and US 550 corridors within the study area.

3.5.2 Regulatory Update and Coordination

The study area continues to be classified by EPA as attainment or attainment/unclassified for all criteria pollutant National Ambient Air Quality Standards (NAAQS). Since the issuance of the 2006 US 160 EIS, the EPA has revised the NAAQS for the criteria pollutants of carbon monoxide, lead, nitrogen dioxide, particulate matter less than 10 microns in diameter and less than 2.5 microns in diameter (PM_{10} and $PM_{2.5}$, respectively), ozone, and sulfur dioxide to reflect the most current understanding of human health and environmental effects from pollutant emissions. Table 3-1 summarizes these new, more stringent NAAQS. Of these criteria pollutants, carbon monoxide, nitrogen dioxide, particulate matter, and ozone precursors are primarily related to mobile sources (vehicle tail pipe and evaporative emissions, brake and tire wear, etc.). Ozone is not directly generated from vehicle engine combustion like most pollutants. Ground level ozone is formed in the lower atmosphere by a photochemical process combining precursor emissions of VOCs and NO_x and intense sunlight.

Table 3-1. NAAQS Criteria Pollutants

Pollutant	Primary Standards		Secondary Standards	
	Level	Averaging Time	Level	Averaging Time
Carbon Monoxide	9 parts per million (ppm) (10 milligrams per cubic meter [mg/m^3])	8-hour[1]	None	
	35 ppm (40 milligrams per cubic meter [mg/m^3])	1-hour[1]		
Lead	0.15 micrograms per cubic meter ($\mu g/m^3$)[2]	Rolling 3-Month Average	Same as Primary	
	1.5 $\mu g/m^3$	Quarterly Average	Same as Primary	
Nitrogen Dioxide	53 parts per billion (ppb) [3]	Annual (Arithmetic Average)	Same as Primary	
	100 ppb	1-hour[4]	None	
PM_{10}	150 $\mu g/m^3$	24-hour[5]	Same as Primary	
$PM_{2.5}$	15.0 $\mu g/m^3$	Annual[6] (Arithmetic Average)	Same as Primary	
	35 $\mu g/m^3$	24-hour[7]	Same as Primary	
Ozone	0.075 ppm (2008 standard)	8-hour[8]	Same as Primary	
	0.08 ppm (1997 standard)	8-hour[9]	Same as Primary	
	0.12 ppm	1-hour[10]	Same as Primary	
Sulfur Dioxide	0.03 ppm	Annual (Arithmetic Average)	0.5 ppm	3-hour[1]
	0.14 ppm	24-hour[1]		
	75 ppb[11]	1-hour	None	

Source: EPA, 2010
(1) Not to be exceeded more than once per year.
(2) Final rule signed October 15, 2008.
(3) The official level of the annual NO2 standard is 0.053 ppm, equal to 53 ppb, which is shown here for the purpose of clearer comparison to the 1-hour standard
(4) To attain this standard, the 3-year average of the 98th percentile of the daily maximum 1-hour average at each monitor within an area must not exceed 100 ppb (effective January 22, 2010).
(5) Not to be exceeded more than once per year on average over 3 years.
(6) To attain this standard, the 3-year average of the weighted annual mean $PM_{2.5}$ concentrations from single or multiple community-oriented monitors must not exceed 15.0 $\mu g/m^3$.
(7) To attain this standard, the 3-year average of the 98th percentile of 24-hour concentrations at each population-oriented monitor within an area must not exceed 35 $\mu g/m^3$ (effective December 17, 2006).
(8) To attain this standard, the 3-year average of the fourth-highest daily maximum 8-hour average ozone concentrations measured at each monitor within an area over each year must not exceed 0.075 ppm (effective May 27, 2008).
(9) To attain this standard, the 3-year average of the fourth-highest daily maximum 8-hour average ozone concentrations measured at each monitor within an area over each year must not exceed 0.08 ppm. The 1997 standard—and the implementation rules for that standard—will remain in place for implementation purposes as EPA undertakes rulemaking to address the transition from the 1997 ozone standard to the 2008 ozone standard.EPA is in the process of reconsidering these standards (set in March 2008).
(10) EPA revoked the 1-hour ozone standard in all areas, although some areas have continuing obligations under that standard ("anti-backsliding"). (11) Final rule signed June 2, 2010. To attain this standard, the 3-year average of the 99th percentile of the daily maximum 1-hour average at each monitor within an area must not exceed 75 ppb.

3.5.3 Current Conditions

Particulate matter generated from unpaved gravel roads, re-entrained excess roadside sand from winter sanding operations, and wind entrained dust from agricultural, ranching and construction activities are the most common PM_{10} sources within the study area. In 2009, the average daily PM_{10} concentration from the nearest monitoring site in Durango was 23.2 $\mu g/m^3$; however, this site recorded a maximum concentration of 203 $\mu g/m^3$, exceeding the 150 $\mu g/m^3$ 24-hour standard. A violation of the standard did not occur because the NAAQS average the weighted 98th percentile values over a three-year interval.

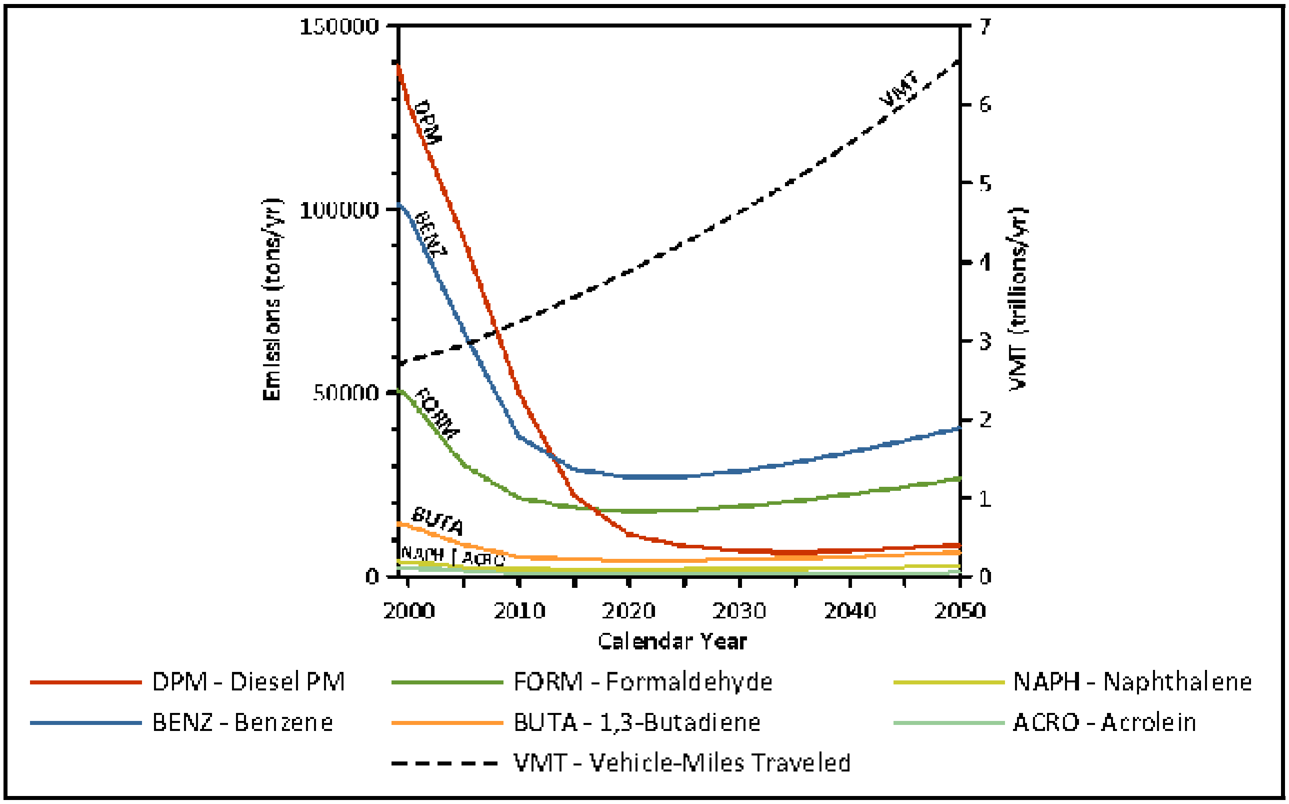
Eight-hour ozone levels have not violated the NAAQS at the two monitors within La Plata County since 1998. A monitor in La Plata County has recorded 2 single days (first maximum concentration) over the 8-hour ozone standard in 2006 and 2007. However, due to the formula used to calculate the NAAQS, which uses the fourth maximum concentration over a three-year averaging interval, no violation occurred. In 2013 revised primary and new secondary standards for ground-level 8-hour ozone may be announced.

New FHWA interim MSAT Guidance (FHWA, 2009) has been developed since the 2006 US 160 EIS and is as follows:

Controlling air toxic emissions became a national priority with the passage of the Clean Air Act Amendments (CAAA) of 1990, whereby Congress mandated that the EPA regulate 188 air toxics, also known as hazardous air pollutants. The EPA has assessed this expansive list in their latest rule on the Control of Hazardous Air Pollutants from Mobile Sources (Federal Register, Vol. 72, No. 37, page 8430, February 26, 2007) and identified a group of 93 compounds emitted from mobile sources that are listed in their Integrated Risk Information System (IRIS) (http://www.epa.gov/ncea/iris/index.html). In addition, EPA identified seven compounds with significant contributions from mobile sources that are among the national and regional-scale cancer risk drivers from their 1999 National Air Toxics Assessment (http://www.epa.gov/ttn/atw/nata1999/). These are acrolein, benzene, 1,3-butadiene, diesel particulate matter plus diesel exhaust organic gases (diesel PM), formaldehyde, naphthalene, and polycyclic organic matter. While FHWA considers these the priority MSATs, the list is subject to change and may be adjusted in consideration of future EPA rules.

The 2007 EPA rule mentioned above requires controls that will dramatically decrease MSAT emissions through cleaner fuels and cleaner engines. According to an FHWA analysis using EPA's MOBILE6.2 model, even if vehicle activity (VMT) increases by 145 percent as assumed, a combined reduction of 72 percent in the total annual emission rate for the priority MSAT is projected from 1999 to 2050, as shown on Figure 3-3.

Figure 3-3. National MSAT Emission Trends 1999 to 2050 for Vehicles Operating on Roadways Using EPA's Mobile6.2 Model



Source: US Environmental Protection Agency. MOBILE6.2 model run 20 August 2009.
Notes:
(1) Annual emissions of polycyclic organic matter are projected to be 561 tons/year for 1999, decreasing to 373 tons/year for 2050.
(2) Trends for specific locations may be different, depending on locally derived information representing vehicle-miles travelled, vehicle speeds, vehicle mix, fuels, emission control programs, meteorology, and other factors

Air toxics analysis is a continuing area of research. While much work has been done to assess the overall health risk of air toxics, many questions remain unanswered. In particular, the tools and techniques for assessing project-specific health outcomes as a result of lifetime MSAT exposure remain limited. These limitations impede the ability to evaluate how the potential health risks posed by MSAT exposure should be factored into project-level decision-making within the context of the National Environmental Policy Act (NEPA).

Nonetheless, air toxics concerns continue to be raised on highway projects during the NEPA process. Even as the science emerges, we are duly expected by the public and other agencies to address MSAT impacts in our environmental documents. The FHWA, EPA, the Health Effects Institute, and others have funded and conducted research studies to try to more clearly define potential risks from MSAT emissions associated with highway projects. The FHWA will continue to monitor the developing research in this emerging field.

3.6 Traffic Noise Analysis

A traffic noise impact is considered to occur when any noise sensitive receptor is subjected to either 1) existing or future noise levels that approach or exceed the noise abatement criteria (NAC), or 2) future noise levels that substantially exceed the existing noise levels (CDOT, 2011). Typically this interference occurs for various land uses at thresholds defined by NAC as summarized in Table 3-2. Traffic noise analysis methodology and NAC were described in Section 3.6 of the 2006 US 160 EIS.

Table 3-2. CDOT Noise Abatement Criteria (NAC)

Category	L_{eq}(h), dBA*	Description of Activity Category
A	56 (Exterior)	Lands on which serenity and quiet are of extraordinary significance and serve an important public need and where preservation of those qualities is essential if the area is to continue to serve its intended purpose.
B	66 (Exterior)	Residential.
C	66 (Exterior)	Active sports areas, amphitheaters, auditoriums, campgrounds, cemeteries, day care centers, hospitals, libraries, medical facilities, parks, picnic areas, places of worship, playgrounds, public meeting rooms, public or nonprofit institutional structures, radio studios, recording studios, recreational areas, Section 4(f) sites, schools, television studios, trails, and trail crossings.
D	51 (interior)	Auditoriums, day care centers, hospitals, libraries, medical facilities, places of worship, public meeting rooms, public or nonprofit institutional structures, radio studios, recording studios, schools, and television studios.
E	71 (Exterior)	Hotels, motels, offices, restaurants/bars, and other developed lands, properties or activities not included in A-D or F. .
F	NA	Agriculture, airport, bus yards, emergency services, industrial, logging, maintenance facilities, manufacturing, mining, rail yards, retail facilities, ship yards, utilities (water resources, water treatment, electrical), and warehousing.
G	NA	Undeveloped lands that are not permitted for development.

*Hourly A-Weighted Sound Level in Decibels, Reflecting a 1 dBA "Approach" Value from FHWA Noise Abatement Criteria, 23 Code of Federal Regulations (CFR) 772 (CDOT, 2011)

3.6.1 Methodology

For the affected environment, the study area for noise includes the footprint plus a distance outward that would include all reasonable expected noise impacts to occur (at least 500 feet on each side) for each of the action alternatives being considered in the SDEIS.

FHWA requires that Traffic Noise Model Version 2.5 (TNM2.5) software replace use of the previously endorsed noise modeling software, STAMINA2.0. The 2006 US 160 EIS noise analyses were completed in STAMINA2.0. Because the modeling technology has changed, the 2006 US 160 EIS existing noise conditions generated by the STAMINA2.0 software have been validated by re-modeling the original data using TNM2.5. The existing condition represents the noise levels present in the study area in the year 2001. The 2006 US 160 EIS STAMINA2.0 noise data input files were imported into TNM2.5. The data include major roadways, roadway-specific traffic volumes of automobiles and light trucks, medium trucks, and heavy trucks, noise-sensitive receptor locations, and feature elevations. All results are reported in hourly A-weighted decibels (dBA).

The noise level results of the 2006 US 160 EIS STAMINA2.0 model run were compared to those of the TNM2.5 model run. Any modeling sites with results differing by 3 dBA or less indicate that the noise levels generated by each model are considered representative and valid. The validation modeling incorporated 48 receptor locations. Of these, all but five compared locations were within the 3 dBA tolerance, a 90 percent agreement. The out-of-tolerance sites differed by between 3.1 and 5.6 dBA and involved isolated receptor locations with terrain changes. Because 90 percent of sites were within valid tolerance, the existing condition noise levels are considered to consistent between the 2006 US 160 EIS and the SDEIS and no further modeling adjustments are required.

Noise impacts were evaluated for noise sensitive receptors located within 500 feet of the proposed alternative footprints, concentrating on first and second row receptor locations fronting the primary roadway network, excluding local service roads.

3.6.2 Regulatory Updates and Agency Coordination

Effective on July 13, 2011, CDOT revised Noise Analysis and Abatement Guidelines (CDOT, 2011) will be implemented on new projects per the new 23 CFR 772 noise regulations. Because this is a supplemental evaluation that requires a new decision document, the new regulations apply. CDOT and FHWA have approved the use of the 2011 CDOT Noise Analysis and Abatement Guidelines (CDOT, 2011) in the SDEIS, which is a newer guidance than was used for analysis and mitigation in the 2006 US 160 EIS. Note: for portions of the 2006 US 160 EIS and ROD that are not covered by this SDEIS, the previous noise guidance will continue to apply.

3.6.3 Current Conditions

Existing 2001 Baseline noise levels range from 47.2 to 60.6 dBA, which are all below the NAC threshold considerations for impacts caused by traffic noise. The SDEIS evaluated 122 receptor locations in the study area, augmenting the receptors evaluated in the 2006 US 160 EIS. A list of individual receptor results are found in Section 4.6, Traffic Noise Analysis, and the *Noise Technical Addendum* (Appendix F).

3.7 Wetlands and Water Resources

The original Wetland Delineation completed for the 2006 US 160 EIS was completed in 1999 and 2000 (URS, July 2002). The report included a detailed assessment of corridor wide wetlands and waters of the US including an analysis of wetland functional values. The US Army Corps of Engineers (USACE) provided concurrence of the estimate of wetlands and waters of the US on November 26, 2002, subject to final verification as specific projects are designed and developed for construction.

3.7.1 Methodology

The wetland and waters of the US assessment for the 2006 US 160 EIS relied on the approved Wetland Delineation (URS, July 2002) for baseline data on existing wetlands for the Revised G Modified and Revised F Modified alternatives. The Eastern Realignment Alternative was not previously surveyed for the presence of wetlands and required an intensive pedestrian survey of the proposed alignment. Wetland surveys along the action alternative alignments were inspected during the spring of 2010 to confirm the current status of wetlands occurrence for previously surveyed wetlands and delineate new wetland areas not previously surveyed. Wetlands were identified in the field by conducting pedestrian surveys along each of the proposed alignments. Aerial photographs with superimposed alternative alignments were used to guide field surveys. A corridor approximately 300 feet on either side of the centerline of each alternative was inventoried for the presence of wetlands. All previously identified wetlands were verified to confirm that wetland areas still existed in similar extent. Wetland determinations and delineations were based on examination of vegetation, soils, and hydrology. The perimeters of wetland habitat areas were surveyed with a hand held Trimble Global Positioning System (GPS) unit capable of sub-meter accuracy following data correction. Surveyed control points from CDOT right-of-way (ROW) were used as spatial reference points. Figure 3-4 (a and b) and Figure 3-5 (a, b, and c) include the wetland and waters of the US study area and wetland features identified along each of the proposed alternative alignments. The action alternative alignments were subsequently overlaid on the study area wetlands and areas that fall within the toes of slope for the alternative are considered wetland impacts. These impacts are discussed in Chapter 4.

3.7.2 Regulatory Update and Coordination

Wetland Delineations under the 2006 US 160 EIS were prepared in accordance with the USACE Wetland Delineation Manual (USACE, 1987). In April 2008, the USACE issued the Interim Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Western Mountains, Valleys, and Coast Region which was finalized in May 2010. Wetland delineations completed in 2010 were conducted in accordance with the updated manual. The Regional Supplement was designed to improve the accuracy and efficiency of wetland delineation procedures and to bring the manual up to date with

Figure 3-4a. Wetland and Waters of the US Study Area, Revised F Modified and Revised G Modified

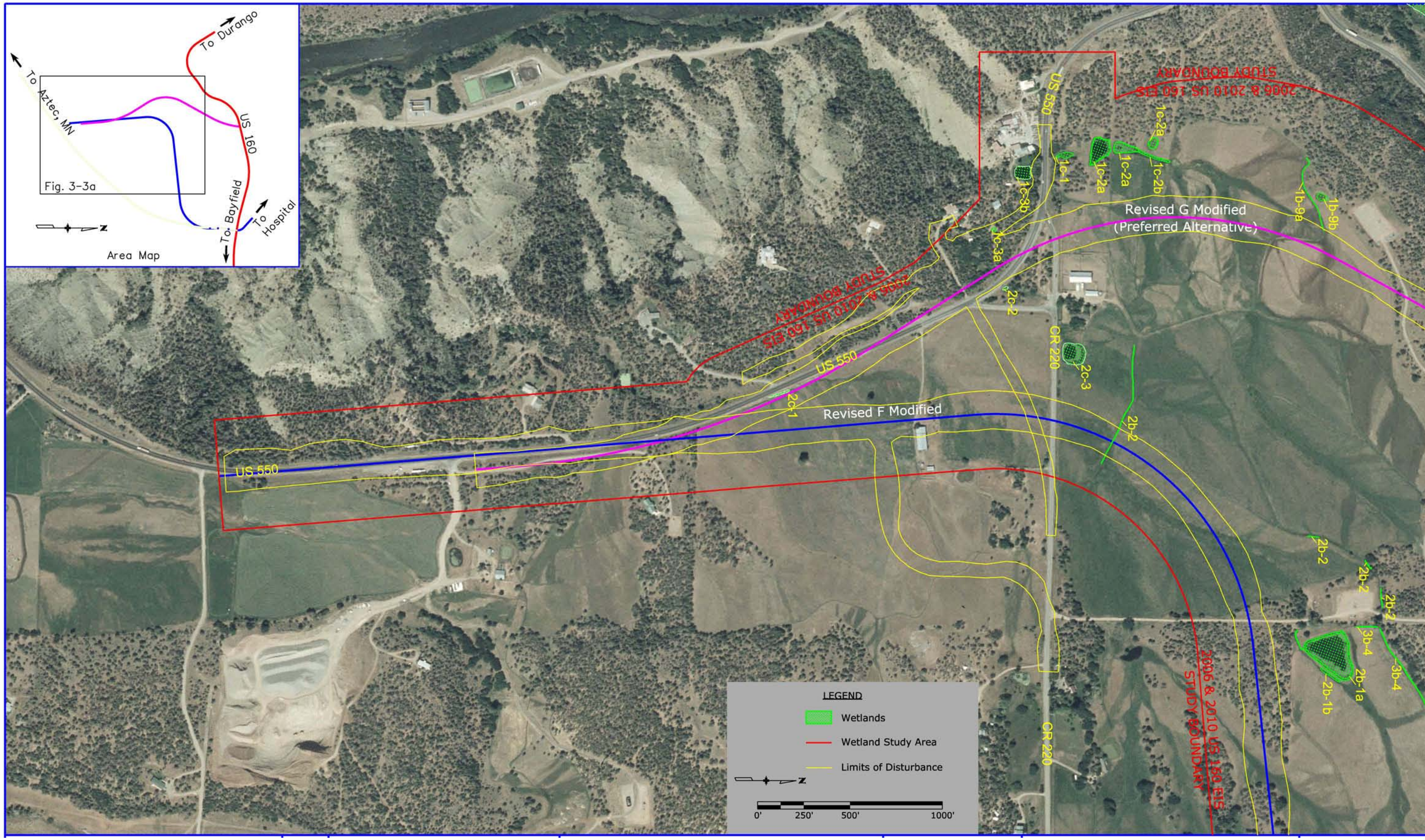


Figure 3-4b. Wetland and Waters of the US Study Area, Revised F Modified and Revised G Modified

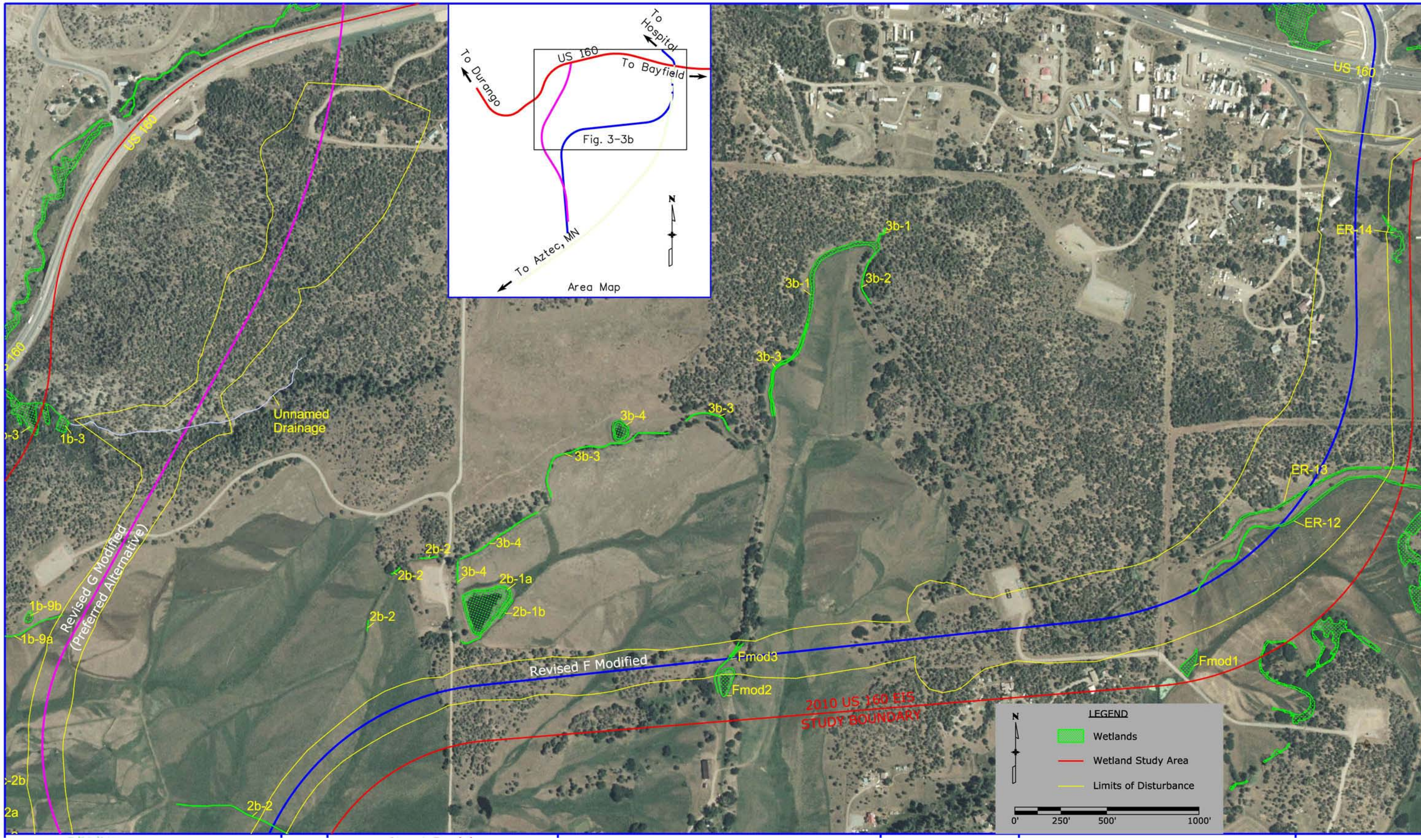


Figure 3-5a. Wetland and Waters of the US Study Area, Eastern Realignment

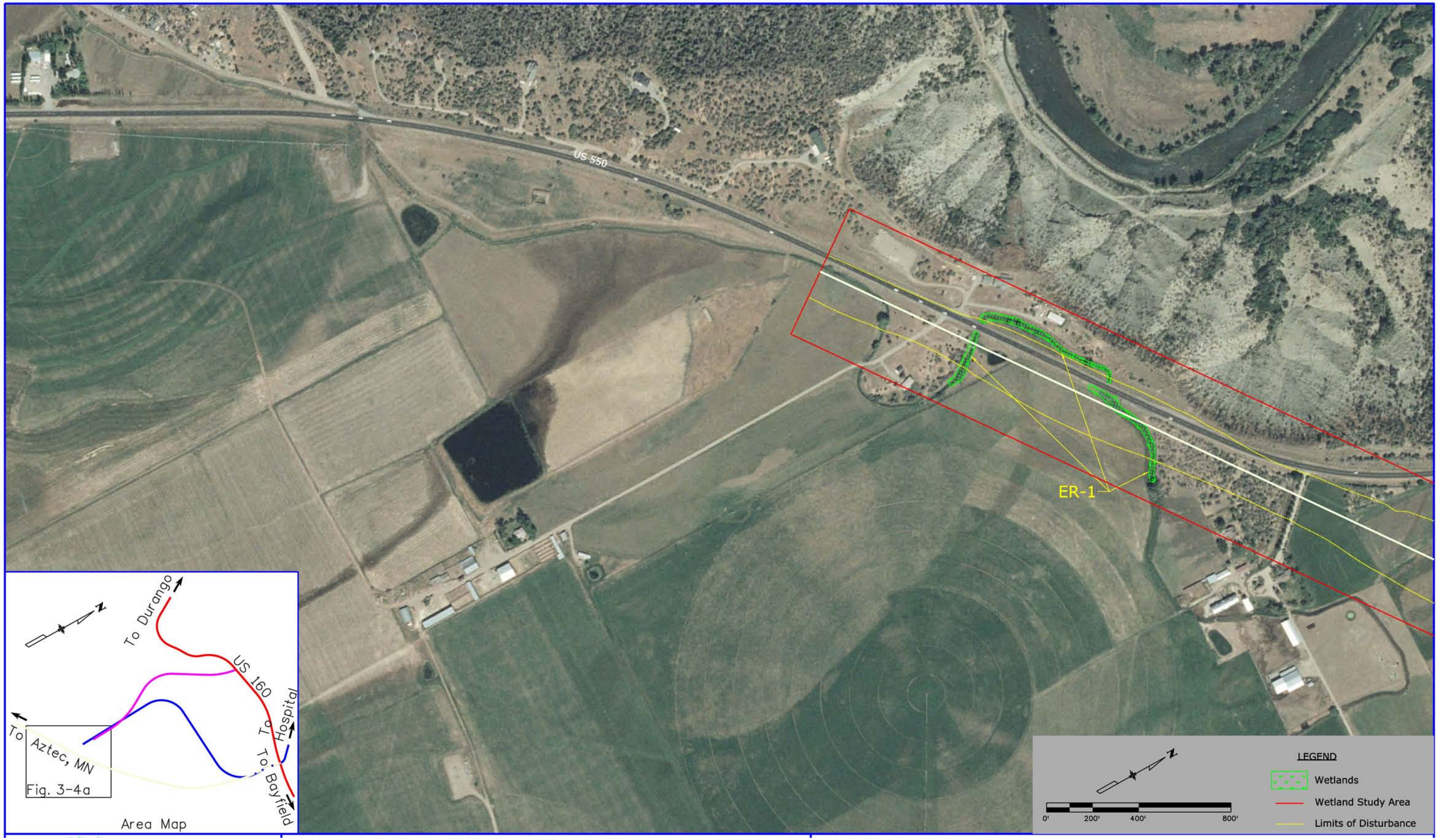


Figure 3-5b. Wetland and Waters of the US Study Area, Eastern Realignment

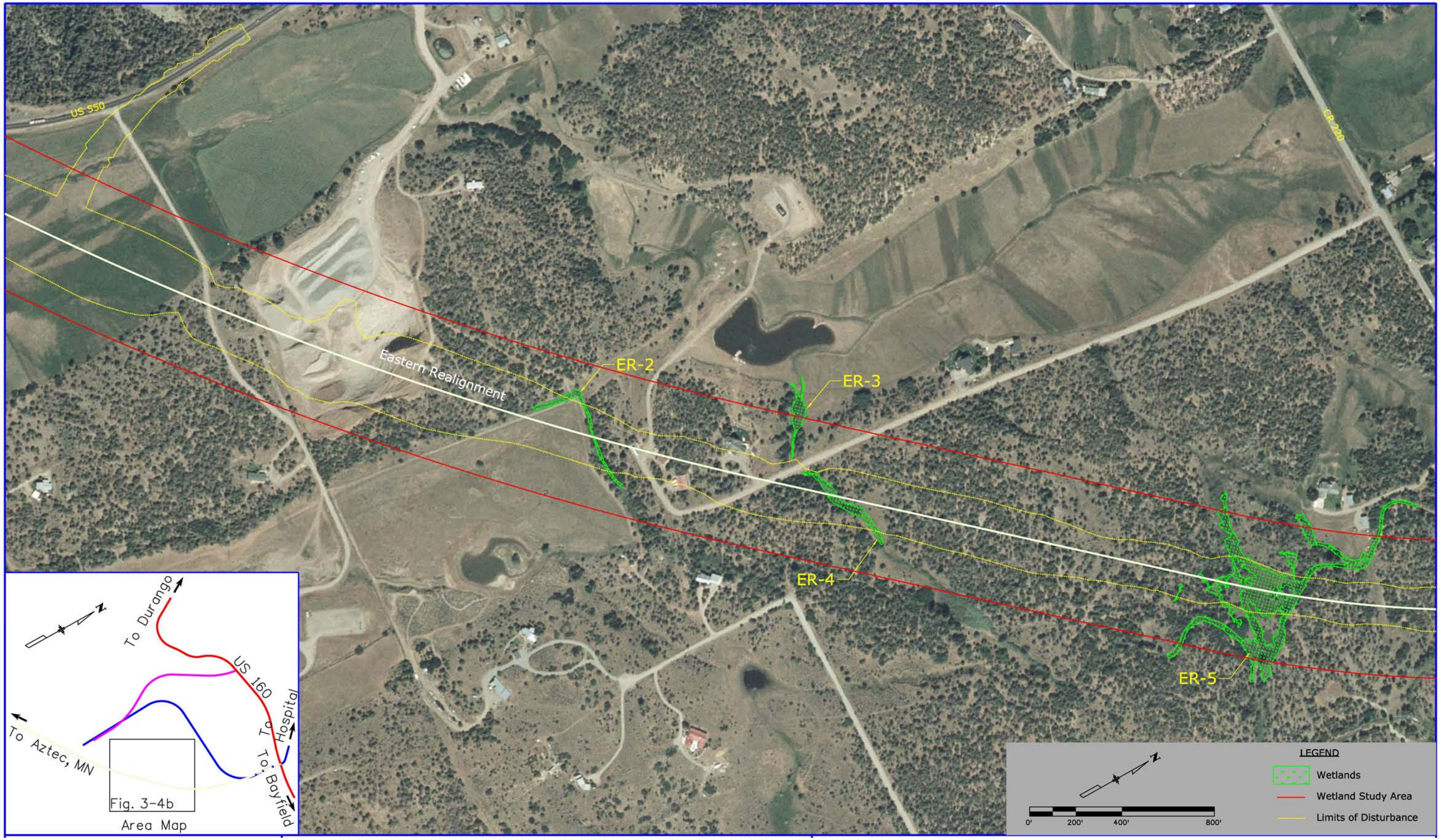
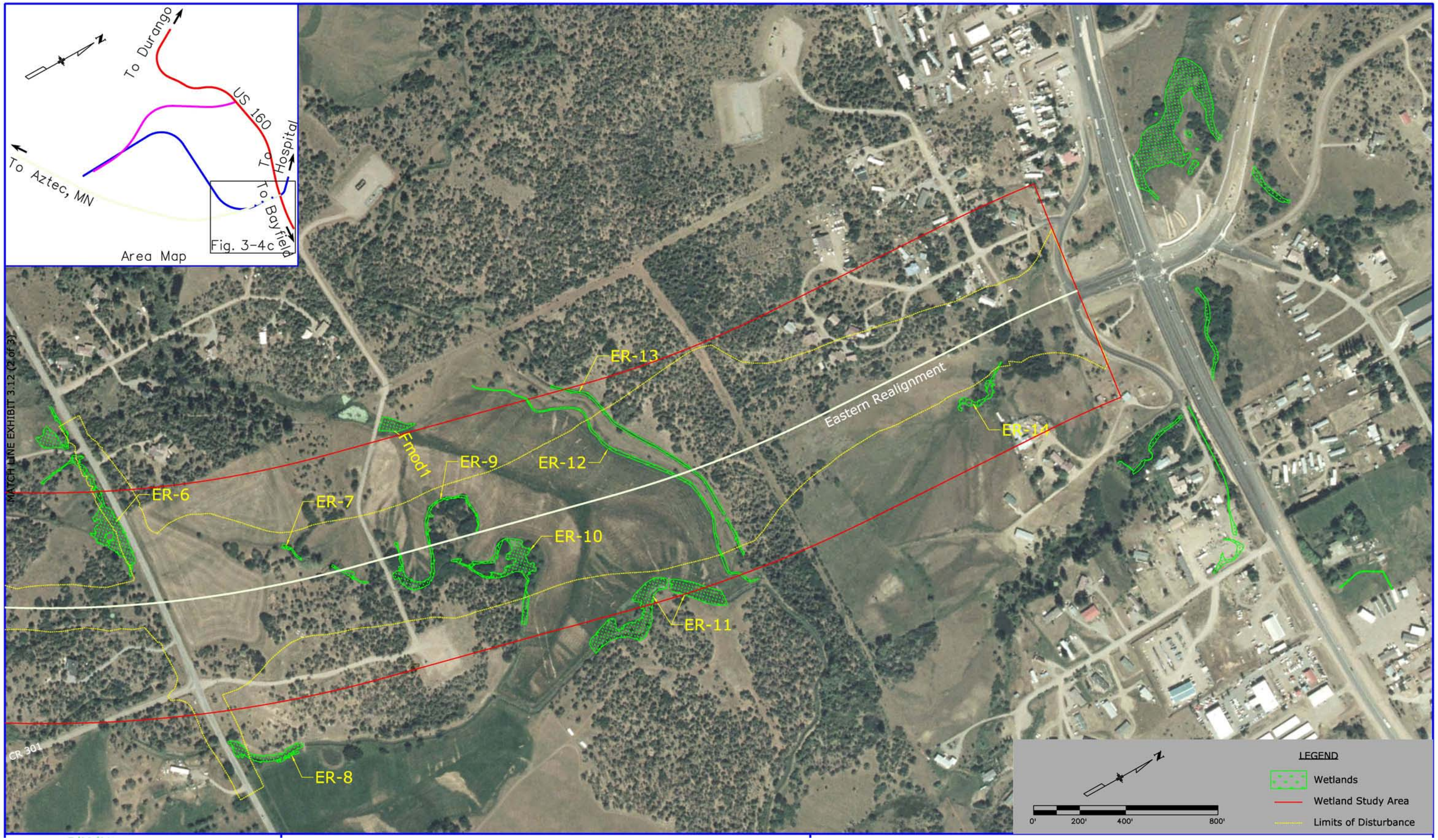


Figure 3-5c. Wetland and Waters of the US Study Area, Eastern Realignment



current knowledge and practice and not to change the way wetlands area defined or identified. Wetlands delineated under the 1987 manual are still classified as wetlands under the new manual.

Formal coordination with the USACE will occur for wetlands in a manner consistent with the approval letter for the 2002 Wetland Delineation. As plans are developed for specific projects, updated Wetland Delineations will be submitted for verification of boundaries and jurisdictional status and all applicable plan submittals will be provided to the USACE for approval prior to construction.

3.7.3 Current Conditions

Wetlands along the action alternative alignments were generally consistent with the approved Wetland Delineation Report prepared for the 2006 US 160 EIS with several minor exceptions.

- Wetlands G1 and G2 in the original 2006 US 160 EIS along the Revised F Modified Alternative alignment were originally estimated wetlands based on aerial photography interpretation. Due to limited access to the property at the time of the 2006 US 160 EIS, on the ground verification was never completed. In 2010 the original estimated areas were more accurately delineated based on examination of wetland parameters including vegetative, soils and hydrology indicators. Portions of the previously estimated irrigation related features did not possess the necessary characteristics over the original estimated area to qualify as wetlands and their extent has been redefined from the 2006 US 160 EIS. Specifically, G-1 was reduced in size (i.e. now renamed as wetlands ER-12 and ER-13), and G-2 was eliminated as a wetland. See Figure 3-4b.
- Six additional wetland areas (F Mod-1, F Mod-2, and F Mod-3, ER-12, ER-13 and ER-14) along the Revised F Modified Alternative alignment were delineated and are shown on Figure 3-3b. These wetlands appear to be irrigation related features including a small swale, several irrigation ditches, and a pond. All these features exhibited vegetation, soils, and hydrology parameters to qualify as wetlands.
- Wetlands along the Eastern Realignment Alternative were never previously delineated because this alternative was not analyzed in the 2006 US 160 EIS. In conjunction with the Section 4(f) Evaluation, wetlands along the entire Eastern Realignment Alternative were delineated and mapped as shown on Figure 3-5 (a, b, and c). A total of 14 wetland areas (ER-1 through ER-14) were mapped within the proposed alignment.

Within the three alternatives carried forward in the SDEIS, a total of 9.48 acres of wetlands have been delineated within the combined study areas for the alternatives. Updated wetland characterization data that identifies the recently delineated wetlands with respect to wetland types, classification, size, functional type, and a functional assessment are presented in Table 3-3 and Table 3-4. The tables include only wetlands that are in proximity to alternatives carried forward in the SDEIS.

The six additional delineated wetlands along the Revised F Modified Alternative (F Mod-1, F Mod-2, and F Mod-3, ER-12, ER-13, ER-14) are relatively minor irrigation features with associated wetlands that include a total combined area of 0.95 acres. Wetland F Mod-1 is a small swale dominated by cattails located on the Schaeferhoff-Cowan Ranch access road. Ponding of water at the culvert inlet provides supporting hydrology and soils are characterized by low chroma color and redox depression hydric indicators. The mapped soil unit is the Falfa clay loam three percent to eight percent slopes, which is a listed hydric soil under Criterion 2 in La Plata County that occurs in depressional landforms (NRCS, 2010). Soils listed under Criterion 2 require on-the-ground confirmation of hydric indicators to be considered a wetland soil.

Wetlands ER-12, and ER-13 (formerly identified as G-1 in the 2006 US 160 EIS) are located on an irrigation ditch that was refined in size from the 2006 US 160 EIS estimated area. During the site inspection the ditch was recently cleaned and repaired and much of the vegetation had been removed. The portion of the ditch that was mapped as wetlands had adequate vegetation remaining to be considered wetlands. The remaining vegetation consisted of sedges, rushes and small scattered willow patches supported by irrigation hydrology. Soils consisted of the mapped Falfa clay loam three percent to eight percent slopes with depleted matix hydric soil indicators.

Wetlands F Mod-2 and F Mod-3 include a small irrigation drainage feature on the Webb Ranch that drains to a small irrigation pond. The entire pond is mapped as wetland due the shallow depth and fluctuating water levels that influence the size of fringe wetlands. The ditch vegetation is dominated by sedges and rushes and the pond fringe by bulrushes. Both wetland area soils indicated depleted matix hydric soil indicators and are supported by irrigation drainage hydrology. The mapped soil unit is the Falfa clay loam three percent to eight percent slopes consistent with wetland F Mod-1.

Additional data on all other wetlands previously delineated in the study area and detailed soils data for the Falfa clay loam are provided in the 2006 US 160 EIS. Wetlands delineated along the Eastern Realignment Alternative were not previously addressed in the 2006 US 160 EIS and data summaries are included in Table 3-3 and Table 3-4. Several of the wetland complexes are relatively extensive and provide suitable habitat for threatened and endangered species. The vast majority of wetlands along the Eastern Realignment Alternative are a function of the large irrigation network on Florida Mesa. All of the preliminarily identified wetlands exhibited vegetation, soils, and hydrology parameters that meet the criteria for wetlands. For purposes of Section

Table 3-3. Summary of Wetlands in the Study area Associated with Alternatives Revised F Modified, Revised G Modified, and the Eastern Realignment (URS, 2002 and CDOT, 2010)

Wetland ID[1]	Size (sq. ft.)	Size (acres)	Cowardin Classification[2]	Wetland Type	Functional Type[3]	Notes and Observations
1b-3	15,648	0.36	PEM	Hillside seep	HS-3	Travertine like deposits, and dead junipers
1b-7	964	0.02	PEM	Roadside ditch	RD-2	Spring fed, probably rerouted natural drainage
1b-9a	880	0.02	PEM	In irrigation ditch	D-3	Small field ditch
1b-9b	1,846	0.04	PEM	Pond fringe	P-2	Stock pond
1c-1	1,878	0.04	PSS/PEM	Wet valley	WV-3	Stock pond drainage ponded at culvert inlet
1c-2a	2,299	0.05	PEM	Pond fringe	P-2	3 stock ponds in or adjacent to natural drainage
1c-2b	2,004	0.05	PEM	Wet valley	WV-5	Small drainage leading into middle stock pond (1c-2a) from irrigated field
1c-3a	407	0.01	PEM	Sewage lagoon	SL-2	Residential lagoon
1c-3b	382	0.01	PSS/PEM	Pond fringe	P-2	Recreational pond
2b-1a	8,614	0.20	PEM	Pond fringe	P-2	Stock pond in upland area
2b-1b	1,238	0.03	PEM	Wet valley	WV-5	Next to pond 2b-1b, linear depression
2b-2	2,823	0.06	PSS/PEM	In irrigation ditch	D-4	Portions of 3 ditches
2c-1	983	0.02	PEM	Roadside depression	RD-4	Part of natural drainage, dammed by US 550, isolated
2c-2	345	0.01	PEM	Roadside depression	RD-3	Small depression in wooded triangle at US 550/ CR 220
2c-3	3,127	0.07	PEM	Pond fringe	P-2	Stock pond shore unvegetated due to trampling
3b-1	13,653	0.31	PSS/PEM	Irrigation ditch and overflow	D-4	Wetland between and bordering 2 ditches, along seep area on edge of mesa
3b-2	1,218	0.03	PSS/PEM	In irrigation ditch	D-4	Ditch upstream of 3b-1
3b-3	9,408	0.22	PSS/PEM	In irrigation ditch	D-4	Ditch downstream of 3b-1
3b-4	5,400	0.12	PEM	Pond fringe	P-2	Stock pond, wetland on edge of pond
4-1b	815	0.02	PSS/PEM	Stream fringe	SF-4	Small reservoir upstream
F Mod 1	5,662	0.13	PEM	Roadside ditch	RD-3	Ponding area at culvert inlet

Table 3-3. Summary of Wetlands in the Study area Associated with Alternatives Revised F Modified, Revised G Modified, and the Eastern Realignment (URS, 2002 and CDOT, 2010)

Wetland ID[1]	Size (sq. ft.)	Size (acres)	Cowardin Classification[2]	Wetland Type	Functional Type[3]	Notes and Observations
F Mod 2	1,306	0.04	PEM	In irrigation ditch	D-3	Ditch upstream of pond F Mod 3
F Mod 3	5,880	0.14	PEM	Pond & pond fringe	P-2	Pond fringe and shallow manmade pond
ER-1	36,590	0.84	PSS	In irrigation ditch	RD-2	Willow habitat along Co-op ditch
ER-2	8,276	0.19	PSS	In irrigation ditch	RD-2	Willow habitat along lateral ditch
ER-3	8,276	0.19	PSS	In irrigation ditch	RD-2	Willow habitat along lateral ditch
ER-4	11,761	0.27	PEM/PSS	In irrigation ditch	RD-2	Willow habitat along lateral ditch
ER-5	108,900	2.5	PEM	Ditch seep	DS-1	Large wet meadow from ditch seepage
ER-6	34,848	0.80	PEM/PSS	Roadside ditch	RD-2	Mixed willow/emergent habitat along road ditch
ER-7	871	0.02	PEM	In irrigation ditch	D-3	Small lateral ditch with cottonwood overstory
ER-8	10,019	0.23	PSS	In irrigation ditch	RD-2	Willow habitat along Co-op ditch
ER-9	12,197	0.28	PEM	Ditch seep in wooded pasture	DS-1	Ditch seepage within scrub oak woodlands
ER-10	21,344	0.49	PEM	Ditch seep wooded pasture	DS-1	Ditch seepage within scrub oak woodlands
ER-11	46,173	1.06	PSS	In irrigation ditch	D-4	Willow habitat along Co-op ditch
ER-12	12,632	0.29	PEM/PSS	In irrigation ditch	D-3	Willow and emergent habitat along Webb-Hotter lateral
ER-13	9,148	0.21	PEM/PSS	In irrigation ditch	D-3	Willow and emergent habitat along Webb-Hotter lateral
ER-14	5,227	0.12	PEM	Hillside seep near residence	HS-4	Hillside seepage from irrigation or septic system
Total Area	413,042	9.49				

[1]See Figure 3-4 (a and b) and Figure 3-5 (a, b, and c) for wetland locations.
[2]Cowardin et. al. 1979
PSS—Palustrine scrub-shrub
PEM—Palustrine emergent
[3]Functional Wetland Types
WV-3 Small wet valley, some shrubs present
WF-3 Large >1 acre wetland along perennial stream, mixed/shrub emergent
WV-5 Small wet valleys, emergent vegetation only
D-3 Ditches in upland areas with emergent vegetation

Table 3-3. Summary of Wetlands in the Study area Associated with Alternatives Revised F Modified, Revised G Modified, and the Eastern Realignment (URS, 2002 and CDOT, 2010)

Wetland ID(1)	Size (sq. ft.)	Size (acres)	Cowardin Classification(2)	Wetland Type	Functional Type(3)	Notes and Observations

D-4 Ditches in upland areas with willow shrub, provides bird habitat
HS-4 Small seep, diverse vegetation structure
P-2 Farm or residential pond
RD-3 Standard roadside ditch
SF-4 Small streams with emergent fringe wetlands or drying scrub shrub
SL-2 Active sewage lagoon near residence
DS-1 Ditch seep in pastures, wet meadows. Shallow marsh vegetation
RD-2 Potential SWWF habitat
RD-4 Roadside ditch intersected by natural drainage
HS-3 Large travertine-like hillside seeps in wooded valley

Table 3-4. Summary of Wetland Functional Values for Revised F Modified, Revised G Modified, and the Eastern Realignment Alternatives (URS, 2002 and CDOT, 2010)

Wetland Functions	Functional Types and Value by Wetland													
	WV-3 1c-1	WV-5 1c-2b, 2b-1b	WF-3 1b-8	D-3 1b-9a, F Mod-2 ER-7 ER-12 ER-13	D-4 2b-2 3b-1 3b-2 3b-3 ER-11	P-2 1b-9b 1c-2a 1c-3b 2b-1a 2c-3 3b-4 F Mod-3	SL-2 1c-3a	RD-2 1b-7 ER-1 ER-2 ER-3 ER-4 ER-6 ER-8	RD-3 2c-2 F Mod-1	RD-4 2c-1	SF-4 4-1b	HS-3 1b-3	HS-4 ER-14	DS-1 ER-5 ER-9 ER-10
Threatened and Endangered Species Habitat	None	None	None	None	None	None	None	Mod	None	None	None	None	None	None
General Wildlife Habitat	Mod	Low	High	Low	Mod	Mod	Low	Low	Low	Low	Mod	Mod	Mod	Low
General Fish Habitat	NA	NA	Mod	NA	NA	Low/Mod	NA	NA	NA	NA	Low/M od	NA	NA	NA
Flood Attenuation and Storage	NA	NA	Low	Low	Low	NA	NA	NA	NA	NA	Low	NA	NA	NA
Sediment/Nutrient/ Toxicant Retention or Removal	Mod	Mod	Mod	Low	Low	Mod	High	Low	Low	Low	Mod	Low	Low	Mod
Shoreline Stabilization	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Production Export/Food Chain Support	Low	Low	High	Low	Low	Low	Low	Low	Low	Low	Mod	Low	Low	Low
Groundwater Discharge/Recharge	High	High	High	Low	Low	Low	Low	High	Low	Low	Low	High	High	Low
Uniqueness	Low	Low	Mod	Low	Low	Low	Low	Low	Low	Low	Low	High	Mod	Low
Recreation/Education Potential	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low	Mod	Low	Low

Table 3-4. Summary of Wetland Functional Values for Revised F Modified, Revised G Modified, and the Eastern Realignment Alternatives (URS, 2002 and CDOT, 2010)

Dynamic Surface Water Storage	Low	Low	NA	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low	NA

Functional Wetland Types:

WV-3 Small wet valley, some shrubs present
WF-3 Large >1 acre wetland along perennial stream, mixed/shrub emergent
D-4 Ditches in upland areas with willow shrub, provides bird habitat
HS-4 Small seep, diverse vegetation structure
P-2 Farm or residential pond
RD-3 Standard roadside ditch
SF-4 Small streams with emergent fringe wetlands or drying scrub shrub
WV-5 Small wet valleys, emergent vegetation only
D-3 Ditches in upland areas with emergent vegetation
SL-2 Active sewage lagoon near residence
DS-1 Ditch seep in pastures, wet meadows. Shallow marsh vegetation
RD-2 Potential SWWF habitat
RD-4 Roadside ditch intersected by natural drainage
HS-3 Large travertine-like hillside seeps in wooded valley

404 permitting and development along this alignment, a formal Wetland Delineation in accordance with USACE criteria will be required prior to construction activities.

3.7.4 Other Water Resources

With respect to natural drainage features, the study area includes one unnamed drainage feature tributary to Wilson Gulch that would be crossed by the Revised G Modified Alternative. This drainage feature is within a piñon-juniper forested mesa top and does not contain any wetland or riparian vegetation except for near the confluence with Wilson Gulch. Wetlands near the confluence of Wilson Gulch are not within the Revised F Modified and Revised G Modified alignments. This drainage feature is represented on United States Geological Survey (USGS) topographic maps with a dashed blue line indicating an intermittent or ephemeral drainage. This feature will be treated as a water of the US in conjunction with Section 404 permitting. Several other features within the study area are represented by dashed blue lines on the USGS topographic map that discharge to the Animas River, Cottonwood Gulch, or Wilson Gulch. These features appear to be associated with current irrigation features that convey water to agricultural fields. Extensive reworking of historic drainages within agricultural areas has modified drainage features to now function as irrigation conveyances. These irrigation features, which could be considered waters of the US if they discharge directly back to surface waters will be addressed in conjunction with wetland and waters of the US permitting.

3.8 Water Resources

The Water Resources section has been combined with the Wetlands section (see Section 3.7, Wetlands and Water Resources).

3.9 Vegetation

The 2006 US 160 EIS describes the types and occurrence of vegetation communities in the US 160 project corridor. These include riparian, wetlands, sagebrush shrublands, and piñon-juniper woodlands. Other vegetation communities associated with human activities described in the document include irrigated agricultural land and developed areas. The 2006 US 160 EIS includes a complete description of these vegetation community types, and Figure 3.9.1 in the 2006 US 160 EIS identifies native plant communities and wildlife habitats. The following sections address vegetation specific to the SDEIS.

3.9.1 Methodology

For the affected environment, the study area for vegetation includes the area that extends approximately ¼ mile west of Revised G Modified and approximately ¼ mile east of the Eastern Realignment and includes the majority of areas between as shown on Figure 3-5 (a, b, and c). Impacts to this resource presented in Chapter 4 are based on the alternative footprints, including areas that would be impacted during any construction activities. The information included in the 2006 US 160 EIS was obtained during wetland delineation and other field studies, and from aerial photographs and maps. Vegetation information relevant to the Revised G Modified, Revised F Modified, and Eastern Realignment alternatives was updated for the SDEIS by conducting additional wetland delineations and field studies, from aerial photographs and maps, and utilizing information recently made available from the Southwest Regional Gap Analysis Project (SWReGAP). The SWReGAP is an update of the Colorado Gap Analysis Program's assessment of biodiversity, which included vegetative land cover mapping within a five-state region, including Colorado.

3.9.2 Regulatory Update and Coordination

There were no regulatory updates since the 2006 US 160 EIS and 2006 US 160 ROD. Coordination was not required or conducted for the SDEIS.

3.9.3 Current Conditions

Vegetation communities within the study area are limited to three types: piñon-juniper woodlands, wetlands, and irrigated agricultural land as described below. Sagebrush shrubland and riparian vegetation communities are not present within the SDEIS study area.

3.9.3.1. Piñon-juniper Woodlands

Piñon pine (*Pinus edulis*) and juniper (*Juniperus osteosperma, J. scopulorum*) woodlands dominate hilly areas throughout the project corridor. Canopy cover is variable, ranging from less than five percent to 70 percent. This vegetation type includes a diverse understory of shrubs, forbs, and grasses; however, much of the ground surface is typically bare. Shrub species found in this habitat include big sagebrush (*Artemisia tridentata*), mountain mahogany (*Cercocarpus montanus*), and squaw-apple (*Peraphyllum ramosissimum*). Some areas, especially north-facing slopes, are dominated by a mixture of Gambel oak (*Quercus gambellii*), piñon pines, and Rocky mountain or Utah junipers. Forbs and succulent species include knotweed (*Polygonum spp*.), fleabane daisy (*Erigeron spp*.), banana yucca (*Yucca baccata*), pricklypear (*Opuntia spp*.), plateau cholla (*Opuntia whipplei*) and claret cup cactus (*Echinocerus triglochidiatus*). Common grasses in this community are blue grama (*Bouleloua gracilis*), Indian ricegrass (*Oryzopsis hymenoides*), mutton grass (*Poa fendleriana*) and western wheatgrass (*Elymus smithii*). Piñon pines and junipers can live for hundreds of years.

3.9.3.2. Wetlands

Wetlands are those areas that are inundated or saturated with water at or near the surface of the soil for a sufficient duration during the growing season to develop characteristic soils and vegetation. Most wetlands in the study area feature emergent meadows dominated by grasses and sedges, but smaller areas of marsh vegetation and scrub-shrub wetlands also occur. Wetlands are described in detail in Section 3.7, Wetlands and Water Resources.

3.9.3.3. Agricultural Lands

These areas primarily consist of irrigated hay meadows and pastures, dominated by introduced pasture grasses and grass/alfalfa mixtures.

The following observations related to vegetation types are applicable to the SDEIS.

- Piñon-juniper woodlands located within the current study area are consistent with what was described in the 2006 US 160 EIS, and encompass large areas within the Revised G Modified, Revised F Modified, and Eastern Realignment alternatives (see Figure 3-6).
- Wetland boundaries located within the current study area were generally consistent with what was described in the 2006 US 160 EIS, with addition of wetlands along the Eastern Realignment and other minor exceptions noted in Section 3.7. Wetlands delineated along the Revised G Modified, Revised F Modified, and Eastern Realignment alternative boundaries are shown on Figure 3-6).
- Irrigated agricultural lands located within the current study area are consistent with what was described in the 2006 US 160 EIS, and encompass large areas within the Revised G Modified, Revised F Modified, and Eastern Realignment alternatives (see Figure 3-6).

No other habitat types originally described with the 2006 US 160 EIS were identified within the boundaries of the alternative alignments presented within the SDEIS.

3.10 Noxious Weeds

The State of Colorado has designated a list of non-desirable plant species to the Noxious Weed Species List. The list was developed by individual Colorado counties as problem weeds or they were recommended for management through public testimony. Noxious weeds are not native to Colorado and have negative impacts on crops, native plant communities, livestock, wildlife, and management of natural or agricultural systems.

3.10.1 Methodology

For the affected environment, the study area for noxious weeds is the same as for vegetation and extends beyond the area of impact for construction. Impacts discussed in Chapter 4 address areas disturbed by construction activities.

Figure 3-6. Vegetation Communities Located Within The Current Study Area

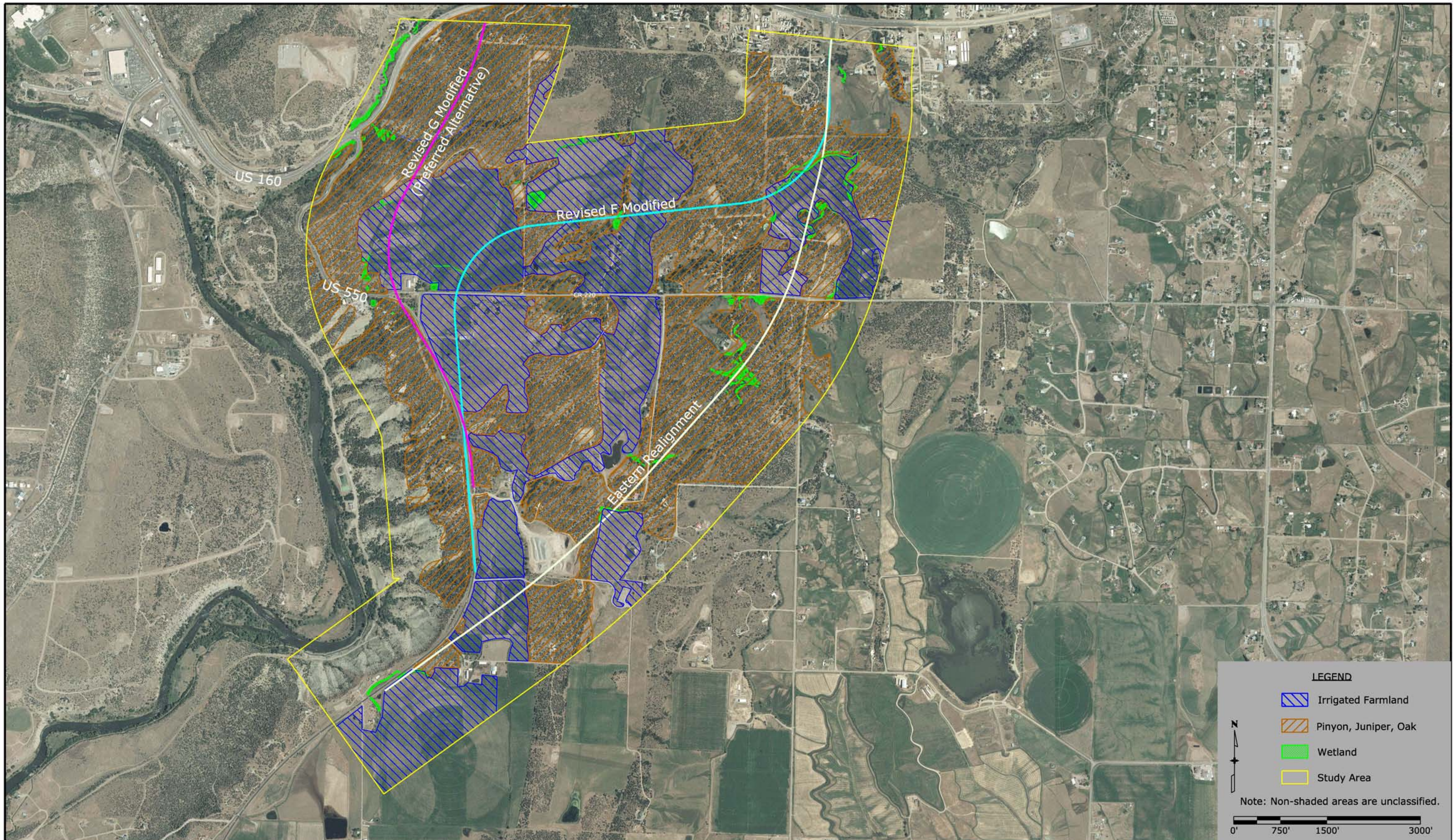


Table 3-5 provides the list of designated noxious weed species and their enforcement status in La Plata County. An enforceable status allows the County Weed Control Manager to require management by landowners if these species are identified or reported as a nuisance in the county. This list was developed with information provided on the La Plata County Weed Management Program Web page (La Plata County, 2011).

Table 3-5. State of Colorado and La Plata County Noxious Weed Species List

Plant Common Name	Scientific Name	Enforceable in La Plata County
List A Noxious Weed Species: In Colorado these species are designated by the Commissioner for eradication		
Absinth wormwood	*Artemisia absinthium*	Yes
African rue	*Peganum harmala*	No
Black henbane	*Hyoscyamus niger*	Yes
Camelthorn	*Alhagi pseudalhagi*	No
Common crupina	*Crupina vulgaris*	No
Cypress spurge	*Euphorbia cyparissias*	Yes
Diffuse knapweed	*Centaurea diffusa*	Yes
Dyer's woad	*Isatis tinctoria*	No
Giant salvinia	*Salvinia molesta*	No
Hydrilla	*Hydrilla verticillata*	No
Meadow knapweed	*Centaurea pratensis*	No
Mediterranean sage	*Salvia aethiopis*	No
Medusahead	*Taeniatherum caput-medusae*	No
Myrtle spurge	*Euphorbia myrsinites*	Yes
Perennial pepperweed	*Lepidium latifolium*	Yes
Plumeless thistle	*Carduus acanthoides*	Yes
Purple loosestrife	*Lythrum salicaria*	No
Rush skeletonweed	*Chondrilla juncea*	No
Sericea lespedeza	*Lespedeza cuneata*	No
Squarrose knapweed	*Centaurea virgat)*	No
Tansy ragwort	*Senecio jacobaea*	No
Yellow starthistle	*Centaurea solstitialis*	No
List B Noxious Weed Species: Have (or will have) a state noxious weed management plan developed to stop their spread		
Bouncingbet	*Saponaria officinalis*	No
Bull thistle	*Cirsium vulgare*	Yes
Canada thistle	*Cirsium arvense*	Yes
Chinese clematis	*Clematis orientalis*	No
Common tansy	*Tanacetum vulgare*	No
Common teasel	*Dipsacus fullonum*	No
Corn chamomile	*Anthemis arvensis*	No

Table 3-5. State of Colorado and La Plata County Noxious Weed Species List

Plant Common Name	Scientific Name	Enforceable in La Plata County
Cutleaf teasel	*Dipsacus laciniatus*	No
Dalmatian toadflax, broad-leaved	*Linaria dalmatica*	Yes
Dalmatian toadflax, narrow-leaved	*Linaria genistifolia*	No
Dame's rocket	*Hesperis matronalis*	No
Eurasian watermilfoil	*Myriophyllum spicatum*	No
Hoary cress	*Cardaria draba*	Yes
Houndstongue	*Cynoglossum officinale*	Yes
Jointed goatgrass	*Aegilops cylindrical*	No
Leafy spurge	*Euphorbia esula*	Yes
Mayweed chamomile	*Anthemis cotula*	No
Moth mullein	*Verbascum blattaria*	No
Musk thistle	*Carduus nutans*	Yes
Orange hawkweed	*Hieracium aurantiacum*	No
Oxeye daisy	*Chrysanthemum leucanthemum*	Yes
Quackgrass	*Elytrigia repens*	No
Russian knapweed	*Acroptilon repens*	Yes
Russian-olive	*Elaeagnus angustifolia*	No
Scentless chamomile	*Matricaria perforate*	Yes
Scotch thistle	*Onopordum acanthium L.*	Yes
Spotted knapweed	*Centaurea maculosa*	Yes
Spurred anoda	*Anoda cristata*	No
Sulfur cinquefoil	*Potentilla recta*	Yes
Tamarisk	*Tamarix chinensis, T.parviflora, and T. amosissima*	Yes
Venice mallow	*Hibiscus trionum*	No
Wild caraway	*Carum carvi*	No
Yellow nutsedge	*Cyperus esculentus*	No
Yellow toadflax	*Linaria vulgaris*	Yes
List C Noxious Weed Species: Resources will be provided to jurisdictions that choose to require management of these species		
Chicory	*Cichorium intybus*	No
Common burdock	*Arctium inus*	No
Common mullein	*Verbascum Thapsus*	No
Common St. Johnswort	*Hypericum perforatum*	No
Downy brome	*Bromus tectorum*	No
Field bindweed	*Convolvulus arvensis*	No
Halogeton	*Halogeton glomeratus*	No
Johnsongrass	*Sorghum halepense*	No
Perennial sowthistle	*Sonchus arvensis*	No

Table 3-5. State of Colorado and La Plata County Noxious Weed Species List

Plant Common Name	Scientific Name	Enforceable in La Plata County
Poison hemlock	*Conium maculatum*	No
Puncturevine	*Tribulus terrestris*	No
Redstem filaree	*Erodium cicutarium*	No
Velvetleaf	*Abutilon theophrasti*	No
Wild proso millet	*Panicum miliaceum*	No

3.10.2 Regulatory Update and Coordination

Management of noxious weeds is required under Federal Executive Order 13112–*Invasive Species, Federal Noxious Weed Act* (7 United States Code [USC] 2801), State of Colorado Executive Order D 006-99–*Development and Implementation of Noxious Weed Management Programs,* and the Colorado Noxious Weed Act (Colorado Regulatory Statutes (CRS) Title 35, Article 5.5).

3.10.3 Current Conditions

Many of the noxious weed species have been observed within the 2006 US 160 EIS project corridor based on information presented in Table 3.10.1 of the 2006 US 160 EIS. Some of the listed weeds are fairly common in the county while others are not yet widespread according to the La Plata County Extension Office Web page. Disturbed land surfaces such as agricultural lands and construction clearing and grading increase the potential for spread of noxious weeds by providing a seed bed for weed establishment. Once populations take hold, the spread of weeds can be rapid based on the large volume of seeds produced and their ability to outcompete with native plants. A focused weed study has not been conducted by CDOT within the proposed alternative alignments. CDOT Maintenance crews regularly monitor weed populations within CDOT ROW and typically employ a Weed Specialist to treat weeds or coordinate treatment with the La Plata County Extension Office.

3.11 Wildlife and Fisheries

All groups of wildlife species occur within the study area, including ungulates such as deer and elk, carnivores, small mammals, migratory birds, reptiles and amphibians. The 2006 US 160 EIS provides a detailed description of the wildlife species that are known or likely to occur in the project corridor, and subsequently within the study area presented within the SDEIS. As detailed in the 2006 US 160 EIS, species within these groups are generally associated with one or more of the plant communities located within the project corridor. Table 3.11.1 of the 2006 US 160 EIS lists acres of wildlife habitats in the study area. This table shows the four major natural vegetation communities and their corresponding value as wildlife habitat along with their relative amounts within the study area. Table 3-6 updates this information and shows the three major vegetation communities located within the SDEIS study area.

Table 3-6. Acres of Wildlife Habitat in the Study Area

Alternative Alignment	Vegetation Community	Acres
Revised G Modified	Piñon-juniper woodlands (*Pinus edulis/Juniperus spp.*)	247.2
	Wetlands (*Carex spp, Juncus spp, and wetland grasses*)	0.7
	Other (*irrigated farmland, residential etc.*)	144.7
Revised F Modified	Piñon-juniper woodlands (*Pinus edulis/Juniperus spp.*)	324.4
	Wetlands (*Carex spp, Juncus spp, and wetland grasses*)	1.74
	Other (*irrigated farmland, residential etc.*)	304.9
Eastern Realignment	Piñon-juniper woodlands (*Pinus edulis/Juniperus spp.*)	380.0
	Wetlands (*Carex spp, Juncus spp, and wetland grasses*)	7.99
	Other (*irrigated farmland, residential etc.*)	182.5

*Given the width of the study area for each alignment, habitat areas overlap for the differing alternatives.

As detailed within the 2006 US 160 EIS, and applicable to the project area discussed within this document, the following wildlife and aquatic species were considered:

3.11.1 Ungulates

Mule deer (*Odocoileus hemionus*) and elk (*Cervus elaphus*) are the only species of ungulates known to occur within the project corridor, and are frequently killed by collisions with vehicles when attempting to cross US 550 and US 160. Both species are considered economically important game species and utilize all of the wildlife habitats identified within the project corridor.

Both elk and deer require a variety of habitats to meet seasonal needs (i.e., forage, bed sites, and thermocover) and require access to migration routes from summer to winter ranges and to calving and fawning areas. Mule deer migration ranges may be regional or local within a few miles; herds return to the same summer and winter range each year. Portions of the project corridor bisect a major migration route for wintering elk and deer. Migratory elk and deer move into the project area from their northern summer range as early as late September and, depending on weather conditions, stay into April.

CDOW has identified both the north and south sides of the project corridor as severe winter range and winter concentration areas for deer and elk (NDIS 2011). Winter range is parallel to the severe winter range (see Figure 3-6) and winter concentration areas (see Figure 3-6). Winter range is considered a critical resource for deer and elk throughout the region. Winter concentration areas are defined as areas where deer and elk densities are at least 200 percent greater than the surrounding winter range during an average of five out of 10 winters, from the first heavy snowfall until spring green-up. Severe winter range is defined as the part of the range where 90 percent of deer or elk individuals are located when annual snowpack is at its maximum and/or temperatures are at their lowest in two out of 10 worst winters. As identified in the 2006 US 160 EIS, this situation causes frequent animal-vehicle collisons with deer and elk attempting road crossings within the project area and has created a significant safety hazard for motorists.

3.11.2 Carnivores

Several species of carnivores are known to occur or may potentially occur within the project corridor. They include black bears (*Ursus americanus*), mountain lions (*Felis concolor*), bobcats (*Lynx rufus*), coyote (*Canis latrans*), gray foxes (*Urocyon cinereoargenteus*), ringtail cats (*Bassariscus astutus*), raccoons (*Procyon lotor*), spotted skunks (*Spilogale gracilis*), and long-tailed weasels (*Mustela frenata nevadensis*).

Optimal bear habitat is located north of the project area, but black bears do forage within the oak and pinyon-juniper dominated plant communities. Coyotes, mountain lions and bobcats are most common in the rough terrain within pinyon-juniper woodlands. Racoons and long-tailed weasils utilize all habitat types with abundant prey or other food sources. Gray foxes, ringtail cats, and western spotted skunks utilize varied terrain including pinyon-juniper woodlands.

3.11.3 Small Mammals

A variety of small- and medium-sized mammals are likely or known to occur in the project corridor. Small mammals likely to be found in the project corridor include various mice in the genus *Peromyscus*, plains pocket mice (*Perognathus flavescens*), rock squirrels (*Spermophilus variegatus*), Gunnison's prairie dogs (*Cynomys gunnisoni*), black-tailed jackrabbits (*Lepus californicus*), and several bat species.

The primary wildlife habitat types within the project area utilized by these species are wetlands and pinyon-juniper woodlands. However, Gunnison's prairie dogs are found in open shrublands and grasslands and readily utilize irrigated agricultural areas.

3.11.4 Raptors

The pinyon-juniper woodland habitats located within the project area provide nesting habitat and winter roosts for several species of raptors. Table 3-7 lists the raptor species which may occur within the project corridor as migratory, breeding, and/or winter residents.

Table 3-7. Raptor Species Known or Likely to be Present in the Project Corridor

Species	Scientific Name	Species	Scientific Name
Bald eagle	*Haliaeetus leucocephalus*	Sharp-shinned hawk	*Accipiter striatus*
Golden eagle	*Aquila chryaetos*	Cooper's hawk	*Accipiter cooperii*
Red-tailed hawk	*Buteo jamaicensis*	American kestrel	*Falco sparverius*
Ferruginous hawk	*Buteo regalis*	American peregrine falcon	*Falco peregrinus anatum*
Swainson's hawk	*Buteo swainsoni*	Great horned owl	*Bubo virginianus*

Source: Andrews and Righter 1992; Kingery 1998.

3.11.5 Migratory Songbirds

The varied structure of the canopy and understory of pinyon-juniper habitat supports a diverse array of migratory songbirds. It is believed that up to 100 species of passerine species occur within proximity to the project corridor during nesting, migration, and/or winter.

3.11.6 Reptiles and Amphibians

As described in the 2006 US 160 EIS, there are several lizard and snake species that may occur within the project corridor, including collared lizard (*Crotaphytus colla*ris), short-horned lizard (*Phrynosoma douglassii*), eastern fence lizard (*Sceloporus undulates*), sagebrush lizard (*Sceloporus graciosus*), bull snake (*Pituophis melanoleucus*), western terrestrial garter snake (*Thamnophis elegans*), and the western rattlesnake (*Crotalus viridis*) (Hammerson 1999). One turtle species, painted turtle (*Chrysemys picta*), may occur in streams, rivers, and marshy wetlands within the project corridor (NDIS 2011). Pinyon-juniper woodlands provide habitat for most of these reptile species that may be present in the project corridor. However, reptiles, especially snakes, may occupy a number of different habitat types.

3.11.7 Fisheries

It is unlikely that any fisheries will be impacted by the alignments proposed within this document.

3.11.8 Methodology

For the affected environment, the study area for wildlife includes the area that covers the action alternatives being considered and extends approximately ¼ mile west of Revised G Modified and approximately ¼ mile east of the Eastern Realignment and includes the majority of areas between as shown on Figure 3-5 (a, b, and c). Impacts to this resource presented in Chapter 4 are based on the alternative footprints, including areas that would be impacted during any construction activities. Wildlife habitats were mapped during the vegetation community mapping effort, and were based on aerial photography and site observations during field reconnaissance. Specific information on the occurrence and distribution of wildlife and fisheries in the project corridor were obtained from Federal and state agencies. These included the United States Fish and Wildlife Service (USFWS),, Colorado Natural Heritage Program (CNHP, and the Colorado Division of Wildlife (CDOW), as well as published and unpublished literature and on-line sources, including the Natural Diversity Information Source (NDIS). Information regarding the occurrence and distribution of wildlife and fisheries for the alternatives presented within the SDEIS was updated by revisiting each information source utilized in the 2006 US 160 EIS including but not limited to those described above, as appropriate.

3.11.9 Regulatory Update and Coordination

Formal requests for updated information on the occurrence and distribution of wildlife and fisheries occurring within the study area were requested from the USFWS and the CDOW in April of 2011. CNHP and NDIS information accessible online was reviewed and updated with the modification that have occurred since the 2006 US 160 EIS. BLM property is not impacted by any of the alternative alignments; therefore, coordination with this agency was not required or conducted for the SDEIS.

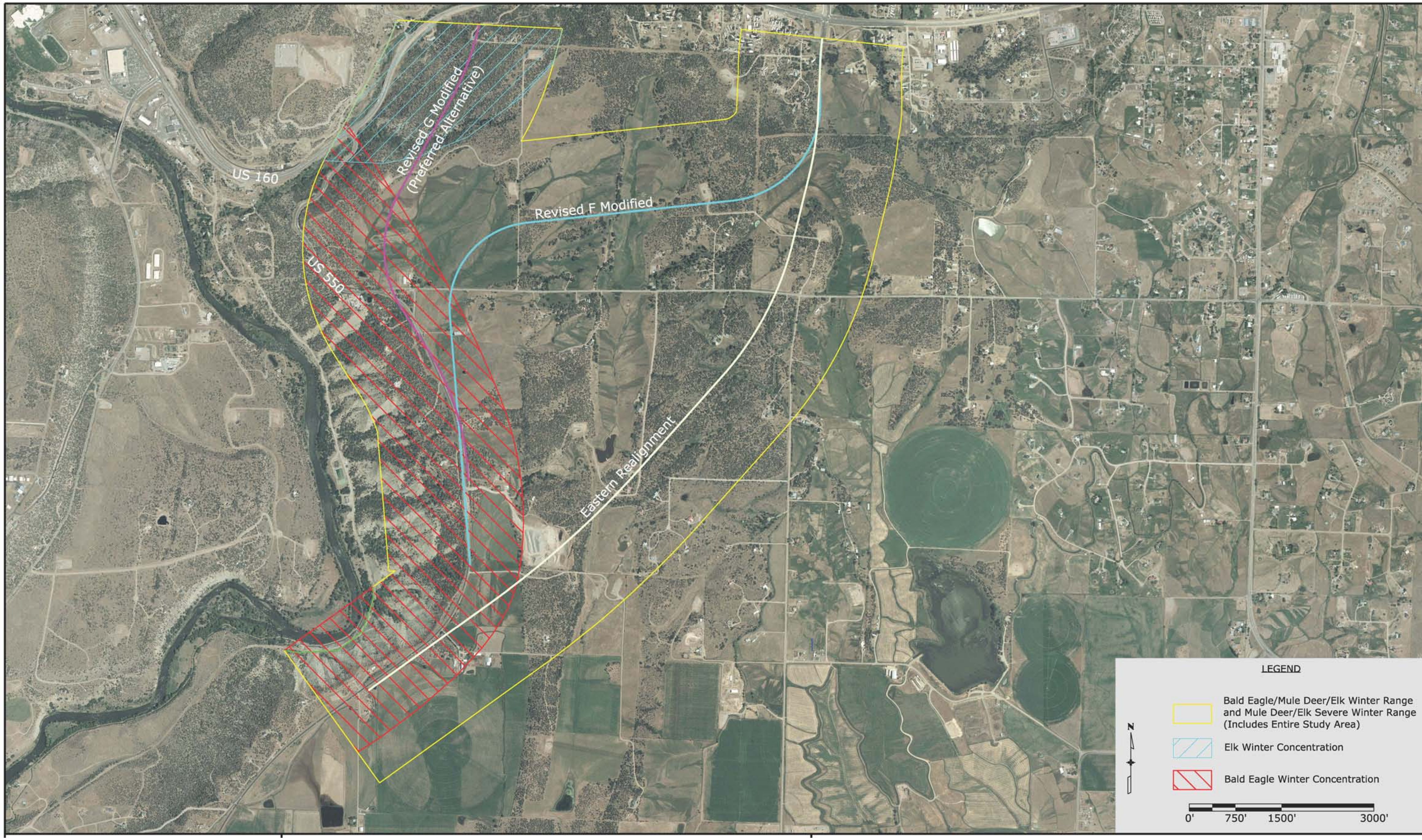
3.11.10 Current Conditions

Wildlife habitats within the study area are generally consistent with what was mapped and analyzed in the 2006 US 160 EIS, with the exception of fisheries which do not occur within the SDEIS study area. Updated mapping of natural vegetation community types with their corresponding value as wildlife habitat was conducted for this study and is provided as Figure 3-6. Piñon-juniper woodlands, wetlands, and “other” (irrigated agricultural lands and others) comprise the primary habitats of the study area. Updated maps of bald eagle winter range and winter concentration areas and deer and elk winter range, and severe winter range are provided in Figure 3-7. There are no mule deer winter concentration areas within the study area and only a small area of elk winter concentration area at the northern connection of Revised G Modified with US 160 as presented in Chapter 4. Detailed descriptions of each of the wildlife species addressed in this section are described in the 2006 US 160 EIS and are not repeated here.

3.12 Threatened, Endangered, and Sensitive Species

This section describes the occurrence and distribution of threatened, endangered, and sensitive species within the study area. Threatened and endangered species are afforded protection under the Endangered Species Act (ESA) and Colorado state law, while sensitive species receive no formal protection but are still considered when assessing project related impacts. The 2006 US 160 EIS describes, in detail, all species listed by the USFWS and the state of Colorado that may occur in and be affected by the proposed project.

Figure 3-7. Bald Eagle, Mule Deer and Elk Seasonal Ranges



3.12.1 Methodology

Surveys of special status species for the 2006 US 160 EIS were conducted in 1998, 1999 and 2002. Additional information was gathered through literature reviews and discussions with USFWS and CDOW staff. For the affected environment, the study area for special status species includes the area that covers the action alternatives being considered and extends approximately ¼ mile west of Revised G Modified and approximately ¼ mile east of the Eastern Realignment and includes the majority of areas between as shown on Figure 3-6. Impacts to this resource presented in Chapter 4 are based on the alternative footprints, including areas that would be impacted during any construction activities. Field surveys were conducted in the spring of 2010 to determine if habitat for special status species occurs within the study area presented within the SDEIS.

3.12.2 Regulatory Update and Coordination

Letters from the USFWS and the CDOW listing special status species likely to occur in the 2006 US 160 EIS corridor are included in Appendix G and Appendix I of that document. Formal requests for updated letters identifying listed species with the potential to occur within the current study area were requested from the USFWS and the CDOW in April 2011. Copies of agency responses are provided in Appendix A.

3.12.3 Current Conditions

3.12.3.1. Federal and State Listed Species

Species with the potential to occur within the study area were generally consistent with the species identified and discussed in the 2006 US 160 EIS. Species listed by the USFWS and the state of Colorado are shown in Table 3-8. Changes since the 2006 US 160 EIS are indicated in **bold**, and discussed further below as necessary.

New Mexico Meadow Jumping Mouse

In February 2009 the USFWS added the New Mexico meadow jumping mouse (*Zapus hudsonius luteus*) as a Candidate for listing under the ESA to the Colorado Field Office County List for Archuleta, Conejos, Costilla, La Plata, Las Animas, and Montezuma counties.

The meadow jumping mouse (*Zapus hudsonius*) is one of the most widely distributed mice in the subfamily Zapodinae. The New Mexico meadow jumping mouse (*Zapus hudsonius luteus*) is a small rodent with an extremely long tail, and long hind feet. The mouse can range in length from 180 millimeters (mm) to 240 mm, with its tail comprising up to 165 mm of its overall length. The New Mexico meadow jumping mouse a Federal Candidate species, is endemic to New Mexico, Arizona, and a small area of southern Colorado (Hafner et. al, 1981). The New Mexico meadow jumping mouse is a habitat specialist, relying on riparian areas that have perennially moist soils adjacent to free-flowing water, and tall, dense herbaceous vegetation typically comprised of sedges. The New Mexico meadow jumping mouse is generally nocturnal, and is typically only active during the growing season of the grasses and forbs which it depends upon. Recent trapping efforts solely found the New Mexico meadow jumping mouse in areas with 2 to 3 feet of vertical cover (Frey and Malaney, 2009). Of the 98 known historical localities of the species, 90 have been surveyed since the early to mid-1990s. Of those, only 11 are still existent, 10 in New Mexico (including 1 that is contiguous with a Las Animas County, Colorado locality) and 1 in Arizona (USFWS, 2007). Existing localities are separated from one another by anywhere from 4 to 200 miles (average of 35 miles). In addition to being widely separated, the areas are quite small being only a few acres in size (Frey 2005, 2006).

Table 3-8. Federal and State Listed Species

Species	Status	Potential for Occurrence	Comments
Mammals			
Canada lynx *(Lynx canadensis)*	LT	Not present	Inhabit contiguous areas of spruce/fir forests; no suitable habitat along US 160. Lynx reintroduced into region by CDOW in 1999 and 2000.
River otter (*Lutra canadensis*)	ST	Present in 2006 US 160 EIS corridor, not present in study area	Abundant in Los Pinos River.
Black-footed ferret (*Mustela nigripes*)	LE, SE	Not present	Historically inhabit prairie dog colonies in southwestern Colorado; no suitable habitat as no prairie dog colonies of sufficient size to support the species.
New Mexico Meadow Jumping Mouse (*Zapus hudsonius luteus*)	FC	Not Present	Inhabit riparian areas with tall dense herbaceous cover comprised of sedges that have perennially moist soils adjacent to free-flowing water.
Wolverine Gulo gulo	SE	Not Present	Extirpated in county, inhabit high elevation spruce-fir or boreal forests.
Birds			
Bald eagle (*Haliaeetus leucocephalus*)	SC	Present	Winter habitat, occasionally nests in region.
Mexican spotted owl (*Strix occidenalis lucida*)	LT, ST	Unlikely	Marginal winter habitat.
Southwestern willowflycatcher (*Empidonax trailii*)	LE, SE	Present in 2006 US 160 EIS corridor, habitat present in Eastern Realignment study area	Breeding activity observed in 1998 and 2002 at one survey location near Bayfield.
Western burrowing owl (*Athene cunicularia hypugaea*)	ST	May occur	Potential breeding habitat in Gunnison's prairie dog towns occurring along US 160.
Yellow-billed Cuckoo (*Coccyzus americanus occidentalis*)	FC	Potential to occur in 2006 US 160 EIS corridor, not present in study area	Suitable habitat in cottonwood-willow dominated riparian areas on Florida and Los Pinos rivers.

Table 3-8. Federal and State Listed Species

Species	Status	Potential for Occurrence	Comments
Fish			
Colorado pikeminnow (squawfish) (*Ptychocheilus lucius*)	LE, ST	Not present	Inhabit large rivers, pools, eddies, and other areas adjacent to the main current flows and feed in main channel. Rivers in project corridor are too shallow to provide suitable habitat and are far upstream of known habitat. Water depletions to Animas, Florida, or Los Pinos rivers would be detrimental to pikeminnow and razorback sucker inhabiting waters downstream of these rivers in the San Juan River Basin.
Razorback sucker (*Xyrauchen texanus*)	LE, SE	Not present	See Colorado pikeminnow (above).
Amphibians			
Boreal toad (mountain toad) (*Bufo boreas boreas*)	SE	Not present	Inhabit damp areas of lodgepole pine or spruce-fir forest habitat from 7,500 to 12,000 feet in elevation; documented in riparian habitats dominated by willow in lower elevations (USFWS 1997). The project corridor is below the elevation range of the species; no known breeding sites in project corridor.
Invertebrates			
Uncompahgre fritillary butterfly (*Boloria acrocnema*)	FE	Not present	Snow willow (*Salix nivalis*) patches in high-elevation alpine meadows at 10,000 to 14,000 feet in the San Juan Mountains. No suitable habitat in the project corridor.
Plants			
Knowlton's cactus (*Pediocactus knowltonii*)	LE	Not present	Alluvial deposits forming rolling gravelly hills in piñon-juniper and sagebrush habitats (Spackman et al. 1997; New Mexico Native Plant Protection Advisory Committee 1984). Suitable habitat is present in the project corridor but the species was not observed in the project corridor during 1998 field surveys.

Status:
FC = candidate for listing by Federal government
LE = listed as endangered by Federal government
LT = listed as threatened by Federal government
SE = listed as endangered by state of Colorado
ST = listed as threatened by state of Colorado
SC = listed as species of concern by state of Colorado

The loss and degradation of habitat is the primary cause for the decline in the New Mexico meadow jumping mouse population and distribution. Cattle grazing is the largest threat facing the New Mexico meadow jumping mouse. Cattle congregate in riparian areas which causes soil compaction and increased erosion, destroying both the vegetative and structural habitat of riparian areas and associated streams. Other factors that reduce and degrade the mouse's habitat include camping and off-road vehicle recreation, forest fires with subsequent erosion, flooding, and loss of beaver and the ecological functions they provide (USFWS, 2007).

Suitable habitat for the New Mexico meadow jumping mouse was not identified within the study area; therefore, it is assumed that this species does not occur within the study area.

Southwestern Willow Flycatcher

The southwestern willow flycatcher is one of five subspecies of the willow flycatcher (*Empidonax traillii*). Southwestern willow flycatchers nest primarily in willows along streams. These birds favor riparian thickets in the foothills and willow-dominated open valleys, usually distant from trees. Additionally, they often prefer shrubbery with two or three layers of shrub height. The presence of water around the willows increases the forage basis by producing an abundance of insects (Sedgwick, 1998; Andrews and Righter, 1992). Individuals are present in breeding territories by mid-May and nests are built and eggs laid in late May and early June. Young fledge the nest by early to mid-July and migrate to the wintering grounds in Mexico, Central America, and possibly northern South America by September (Sedgwick, 2000).

In 2002, 21 sites were identified as suitable habitat and surveyed along the entire length of the 2006 US 160 EIS project corridor. The determination of suitable habitat is based on information provided by USFWS regarding minimum patch size dimensions for willow carrs (i.e., patches) capable of supporting nesting southwestern willow flycatchers. In 2010 field reconnaissance identified additional sites meeting the minimum habitat requirements for this species within the SDEIS study area. In Colorado willow patches measuring 1.8 meters (6 feet) in height that total 0.25 acre are considered suitable habitat for the southwestern willow flycatcher. Additionally, linear patches wider than 4.5 meters (15 feet) that cover at least 900 square feet and that are closely associated with other willow patches totaling 0.25 acre are also considered potential flycatcher habitat (T. Ireland, personal communication, 2009). All identified habitat patches were associated with the Eastern Realignment Alternative, and are depicted on Figure 3-8 (a and b).

Bald Eagle

The bald eagle (*Haliaeetus leucocephalus*) was officially de-listed on August 8, 2007 in the lower 48 states from protection under the ESA, per Federal Register Volume 72, No. 130. However, bald eagles are still protected under the Migratory Bird Treaty Act (MBTA) (16 USC 703-711) and the Eagle Protection Act of 1940 (16 USC 668a-668b), and they are listed as a species of concern by the state of Colorado.

Figure 3-8a. Southwester Willow Flycatcher Habitat

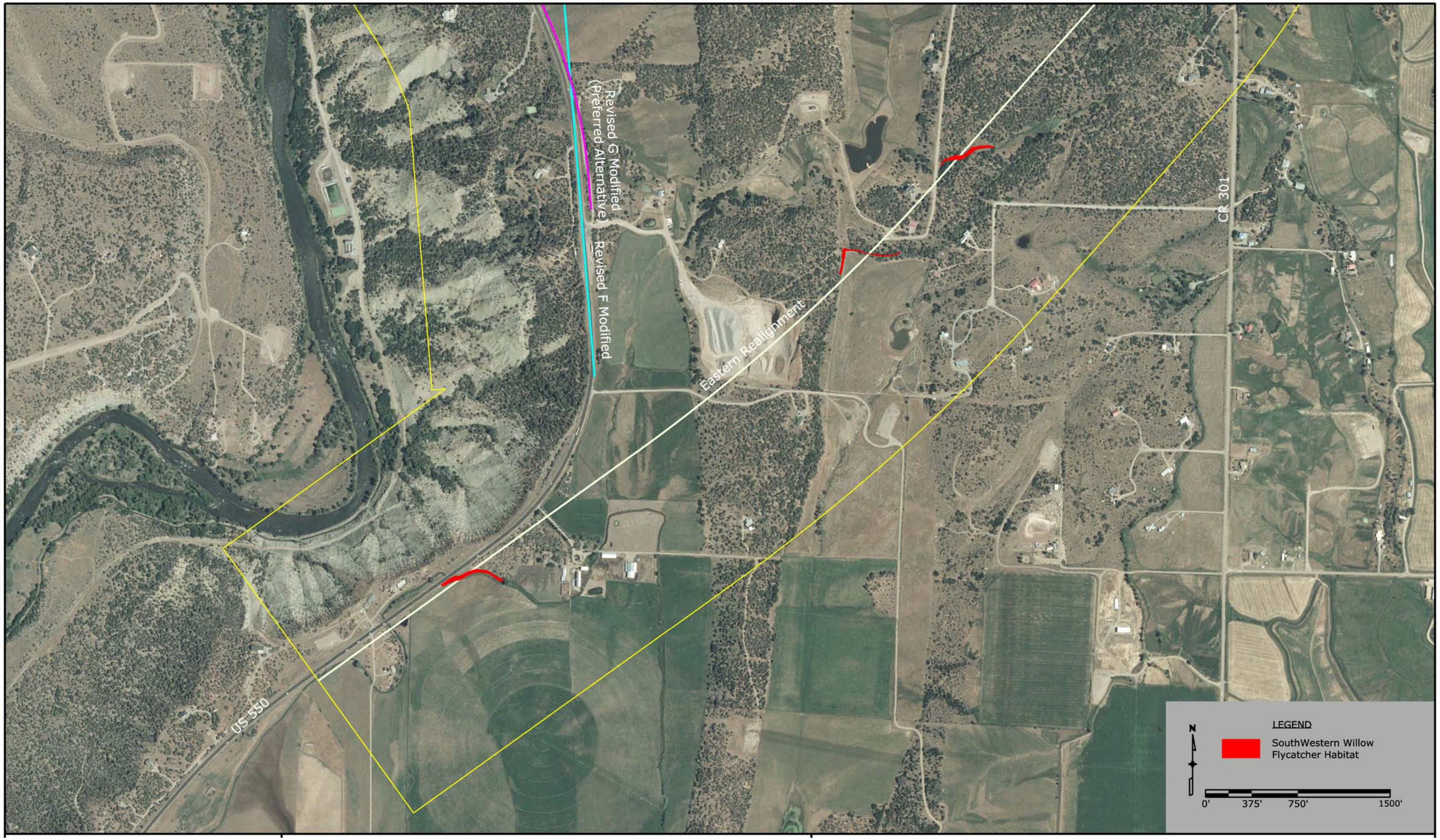
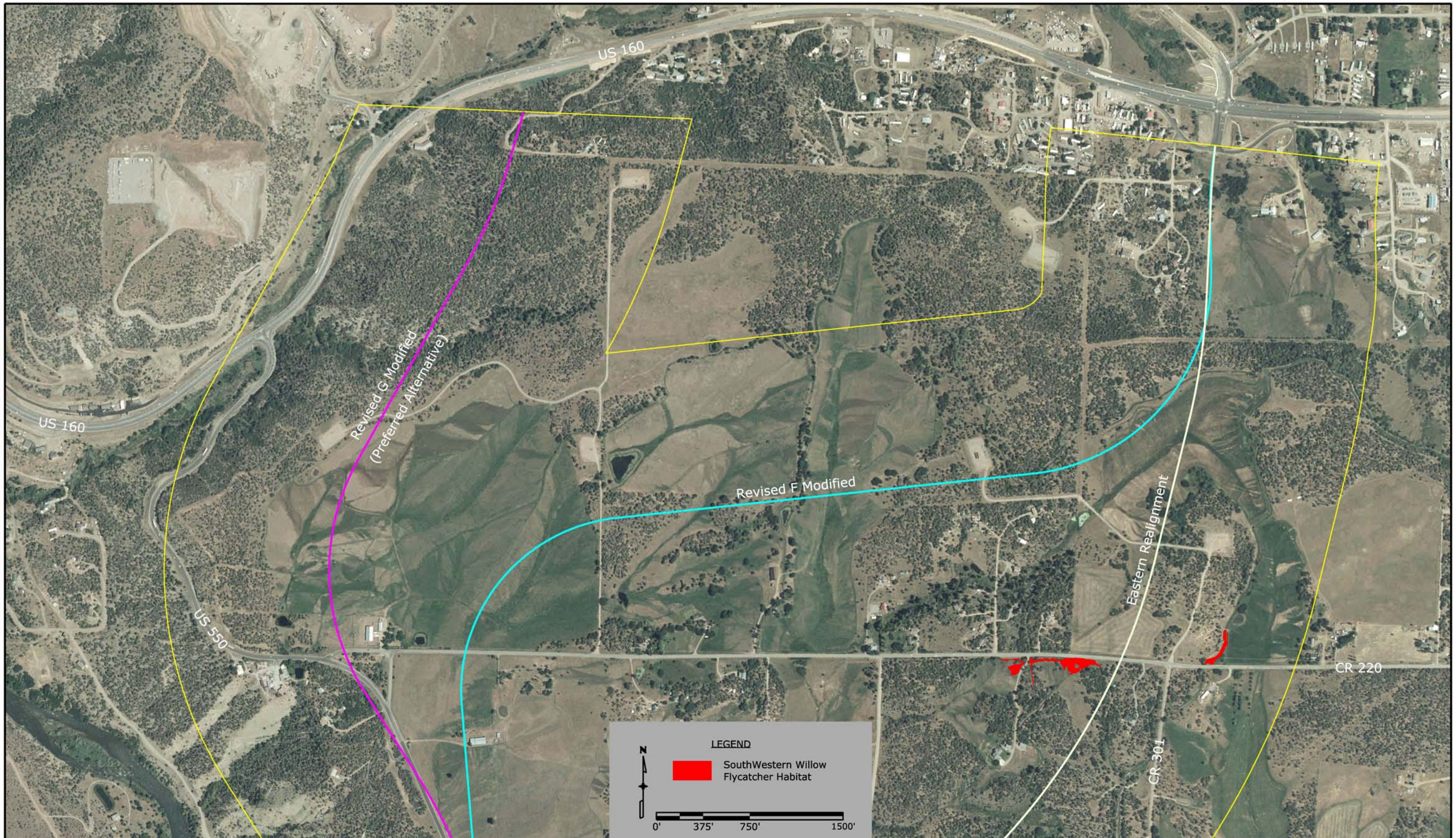


Figure 3-8b. Southwester Willow Flycatcher Habitat



The current condition of the bald eagle in the study area is that of a winter resident. The latest surveys for bald eagle nests were conducted in 2008. None were found at that time, and coordination with the CDOW has not identified any new breeding nests established within the study area. The closest known nest is approximately 1 mile from the study area.

3.12.3.2. Other Sensitive Species

Other species that have special status are listed by the state of Colorado as species of special concern, by the USFWS as Birds of Conservation Concern (BCC) or are tracked by the CNHP as rare or imperiled. The 2006 US 160 EIS provided a discussion for the species with a potential to occur within the study area in Table 3.12.2, Other Sensitive Species Occurrence in the US 160 Project Corridor, and Table 3.12.3, BLM San Juan Field Office Sensitive Species and Birds of Conservation Concern. This information has been updated for the SDEIS. Impacts to BLM lands not previously disclosed in 2006 US 160 EIS will not occur under any of the action alternatives presented within this document. Therefore, a re-assessment of BLM sensitive species was not warranted or included in this document.

Information regarding Colorado species of special concern, species tracked by the CNHP as rare or imperiled, and USFWS Birds of Conservation Concern (BCC) (2008) have been combined into Table 3-9, Other Sensitive Species. Changes since the 2006 US 160 EIS are indicated in **bold.** Species previously discussed in Table 3-8 are not repeated. Potential for occurrence is described as “present”(known to occur in the study area), “likely” (habitat occurs in study area, but individual have not been identified), “possible” (habitat is likely to occur in the study area although it has not been documented), “unlikely” (habitat is not known to occur in the study area and is not likely to occur), and “not present” (habitat for a species is known to not occur in the study area).

Table 3-9. Other Sensitive Species

Species	Status	Potential for Occurrence	Comments
Mammals			
Big free-tailed bat (*Nyctinomops macrotis*)	G5/S1	Possible	Associated with piñon-juniper woodlands and sagebrush shrubland. Night roosts on cliff faces; day roosts on buildings or tree cavities.
Brazilian free-tailed bat (*Tadarida brasiliensis*)	G5/S1	Possible	Occur in low-elevation piñon-juniper woodlands, arid grasslands, and semidesert shrublands. Roost in abandoned mines, caves, and attics.
Dwarf shrew (*Sorex nanus*)	G4/S2	Possible	Known to occur in piñon-juniper woodlands, stubble fields and short-grass prairie.
Fringed myotis (*Myotis thysanodes*)	G4G5/S3	Likely	Inhabits piñon-juniper woodlands and shrublands to 8,000 feet in elevation. May occur in suitable habitat in project corridor.
Townsend's big-eared bat (*Plecotus townsendii*)	SC, G4T4/S2	Likely	Inhabits semidesert shrublands, piñon-juniper woodlands, and open montane forests up to 9,500 feet in elevation.
Birds			
American peregrine falcon (*Falco peregrines*)	SC, G4T4/S2B, BCC	Likely	Study area contains winter and foraging habitat.
Black-necked Stilt (*Himantopus mexicanus*)	G5/S3B	Unlikely	Inhabits emergent wetlands, not known to occur in or near the project area..
Brown-capped Rosy-finch (*Leucosticte australis*)	G4/S3B,S4N	Unlikely	No suitable habitat; nests above timberline in high mountains.
Grace's Warbler (*Dendroica graciae*)	G5/S3B, BCC	Unlikely	No suitable nesting habitat; nests in ponderosa pine woodlands.
Ferruginous hawk (*Buteo regalis*)	SC, G4/S3B S4N, BCC	Unlikely	Habitat mostly unsuitable. May be present in winter.
Snowy Egret (*Egretta thula*)	G5/S2B	Unlikely	No suitable habitat; prefers marshes or edges of ponds or lakes.
Lewis's Woodpecker (*Melanerpes lewis*)	G4/S4, BCC	Possible	Suitable habitat. Primarily inhabits lowland riparian woodlands, also piñon-juniper woodlands.
Wilson's Phalarope (*Phalaropus tricolor*)	G5/S2B,S4N	Unlikely	No suitable habitat; prefers marches, shallow lakes, ponds, and mudflats.
Forster's Tern (*Sterna forsteri*)	G5/S2B,S4N	Unlikely	No suitable habitat; nests in large freshwater marshes and winter along coasts.
Columbian Sharp-tailed Grouse (*Tympanuchus phasianellus columbianus*)	SC, G4T3/S2	Not present	Oak/serviceberry shrubland, sagebrush, aspen forests, and irrigated pasture. Not known to occur near study area.
Gray Vireo (*Vireo vicinior*)	G4/S2B, BCC	Possible	Suitable habitat. Primarily inhabits piñon-juniper woodlands. No known nesting in vicinity of study area.

Table 3-9. Other Sensitive Species

Species	Status	Potential for Occurrence	Comments
American Bittern (*Botaurus lentiginosus)*	BCC	Unlikely	No suitable habitat; prefers marshes, and lakes with emergent wetlands.
Gunnison Sage Grouse (*Centrocercus minimus)*	BCC	Not present	Sagebrush grasslands. No known populations in vicinity of study area.
Golden Eagle *Aquila chrysaetos)*	BCC	Unlikely	Habitat unsuitable, nest sites usually on cliffs. May occur as forager only.
Prairie Falcon (*Falco mexicanus)*	BCC	Unlikely	Nest on cliffs or canyon walls. Possible as forager only.
Mountain Plover (*Charadrius montanus)*	SC, BCC	Unlikely	No suitable short-grass prairie habitat is present.
Long-billed Curloo (*Numenius americanus)*	SC, BCC	Unlikely	Inhabits grasslands and sagebrush prairies with wet meadows. This habitat is absent from the project area..
Flammulated Owl (*Otus flammeolus)*	BCC	Unlikely	No suitable nesting habitat. Primarily inhabit ponderosa pine and aspen woodlands. May occur as forager only.
Piñon Jay (*Gymnorhinus cyanocephalus)*	BCC	Possible	May occur; suitable piñon-juniper woodlands habitat but no known nesting in vicinity of study area.
Juniper Titmouse (*Baeolophus ridgwayi)*	BCC	Likely	Nests and forages in warm, dry piñon-juniper, juniper, and desert riparian woods.
Veery (*Catharus fuscescens)*	BCC	Unlikely	No suitable habitat; prefer dense forest understories near water.
Bendire's Thrasher (*Toxostoma bendirei)*	BCC	Possible	May occur; prefers brush and dryland areas.
Brewer's Sparrow (*Spizella breweri)*	BCC	Possible	Prefers sagebrush and other brushy grasslands, open woodlands or shrubby forest edges.
Grasshopper Sparrow (*Ammodramus savannarum)*	BCC	Possible	Prefers grasslands and prairies, but will use agricultural fields for foraging.
Chestnut-collared Longspur (*Calcarius ornatus)*	BCC	Unlikely	Suitable habitat not present; prefers short and mixed grass prairies, and not known to occur in project area..
Black Rosy Finch (*Leucosticte atrata)*	BCC	Unlikely	Suitable habitat not present; breeds in mountain areas above tree-line.
Cassin's Finch (*Carpodacus cassinii)*	BCC	Possible	Breeds in open coniferous forests in mountains, but winters in lower areas.
Western snowy plover *Charadrius alexandrinus nivosus)*	SC, G4T3/S1B, BCC	Unlikely	Habitat unsuitable; occasional spring or fall migrants but no breeding or resident birds.
White-faced ibis (*Plegadis chihi)*	G5/S2B	Unlikely	May occur only as rare spring/fall migrant in wet meadows and marshy wetlands.

Table 3-9. Other Sensitive Species

Species	Status	Potential for Occurrence	Comments
Amphibians, Fish, and Reptiles			
Colorado River Cutthroat Trout (*Oncorhynchus clarkii pleuriticus)*	SC, G4T3/S3	Not present	Suitable habitat not present; requires cool, clear water with well vegetated banks. Not known to occur in or near the project area..
Northern leopard frog (*Rana pipiens)*	SC, G5/S3	Likely	Suitable habitat present and within known range.
Painted turtle (*Chrysemys picta)*	G5/S5	Possible	Habitat potentially suitable
Roundtail chub (*Gila robusta)*	SC, G3/S2	Not present	Suitable habitat not present, prefers rocky runs, rapids and pools of creeks and large rivers.
Insects and Mollusks			
Great Basin silverspot butterfly (*Speyeria nokomis nokomis)*	G3T1/S1	Unlikely	Requires streamside meadows and seepage areas with bog violet communities. Habitat not likely present in project area, and not known to occur.
Mossy Valvata (*Valvata sincera)*	G5/S3	Not present	Fresh water mollusk associated with riverine systems.
Plants			
Altai chickweed (*Stellaria irrigua)*	G4/S2	Not present	Suitable habitat not present; requires alpine and subalpine scree fields.
Altai Cottongrass (*Eriophorum altaicum var. neogaeum)*	G4,T3T4/S3	Not present	Suitable habitat not present; associated with peat wetlands at high elevation.
American spikenard (*Aralia racemosa)*	G4G5/S1	Not present	Suitable habitat not present; found in rich woods and rocky ravines.
American yellow lady's-slipper (*Cypripedium parviflorum)*	G5/S2	Unlikely	Requires rick humus and decaying leaf litter in wooded areas or bluffs with loamy soils. Not know to occur in project area.
Autumn Willow (*Salix serissima)*	G4/S1	Not present	Suitable habitat is not present; found in fens and swamps in valley and foothills.
Arboles milkvetch (*Astragalus oocalysis)*	G4, S2S3	Possible	Not found during surveys but suitable habitat present and within known range.
Aztec milkvetch (*Astragalus proximus)*	G4, S2	Possible	Not found during surveys but suitable habitat present and within known range.
Birdbill day-flower (*Commelina dianthifolia)*	G5/S1	Possible	Not found during surveys, but prefers rocky soils.
Blue-eyed grass (*Sisyrinchium demissum)*	G5/S2	Unlikely	Prefers upper elevation meadows which are lacking in the project area.
Colorado Divide whitlow-grass (*Draba streptobrachia)*	G3/S3	Not present	Suitable habitat not present; requires rocky alpine areas in the San Juans.

Table 3-9. Other Sensitive Species

Species	Status	Potential for Occurrence	Comments
Colorado tansy-aster (*Machaeranthera coloradoensis)*	G3/S3	Unlikely	Prefers montane and alpine areas; not known to occur in project area.
Gray's townsend-daisy (*Townsendia glabella)*	G2/S2	Possible	Suitable habitat may be present; species grows on steeply sloping shale slopes.
Green sedge (*Carex viridula)* (= *C. oederi* spp *viridula*)	G5, S1	Possible	Suitable habitat may be present.
Hoary willow (*Salix candida)*	G5/S2	Unlikely	Occurs in bogs and swampy places, fens, or thickets at edges of ponds or rivers.
Naturita milkvetch (*Astragalus naturitensis)*	G2G3, S2S3	Unlikely	Habitat generally suitable but outside known range; not found during surveys.
New Mexico false carrot (*Aletes sessiliflorus)*	G3/S1	Possible	Suitable habitat may be present.
New Mexico cliff fern (*Woodsia neomexicana)*	G4/S2	Possible	Grows on shrubby hillsides and open habitats with rock soils.
Northern moonwort (*Botrychium pinnatum)*	G4/S1	Unlikely	Grows on wet grassy slopes, streambanks and roadside in mossy woods. Not known to occur in project area.
Pagosa phlox (*Phlox caryophylla)*	G4, S3	Possible	Not found during surveys but suitable habitat present and within known range.
Philadelphia fleabane (*Erigeron philedelphicus)*	G5, S1	Possible	Suitable habitat present.
Rothrock townsend-daisy (*Townsendia rothrockii)*	G2G3, S2S3	Not present	Suitable habitat not present; prefers exposed limestone, sandstone, volcanics in alpine, subalpine, montane environments.
San Juan Gilia *(Gilia haydenii)*	G3/S2	Possible	Occur from sagebrush or saltbrush plains up to oak and ponderosa pine zones and piñon-juniper communities.
San Juan whitlow-grass (*Draba graminea)*	G2/S2	Not present	Suitable habitat not present; grows above 10,000 feet on exposed ridges and slopes.
Showy collomia (*Collomia grandiflora)*	G5, S1	Possible	Not found during surveys but suitable habitat present and within known range.
Thorowax (*Bupleurum americanum)*	G5/S1	Possible	Suitable habitat may be present.
Variegated scouringrush (*Equisetum variegatum)*	G5/S1	Unlikely	Prefers wet meadows, alluvial thickets and sandy soils of ditches and riverbanks. Not known to occur in project area.
Violet milkvetch (*Astragalus iodopetalus)*	G2/S1	Possible	Prefers dry stony hillside often in oak, and oak-piñon forests.
Wood lily (Lilium philadelphicum)	G5/S3	Unlikely	Not found during wetland surveys.

Table 3-9. Other Sensitive Species

Species	Status	Potential for Occurrence	Comments
Western polypody (*Polypodium hesperium*)	G5/S1S2	Unlikely	Grows under rock ledges and on scree slopes to 9500 feet.

Status:
BCC = United States Fish and Wildlife Service Birds of Conservation Concern
SC = Colorado Division of Wildlife Special Concern
Colorado Natural Heritage Program Rankings:
G/S1 = critically imperiled globally/in state because of rarity or some factor of its biology making it especially vulnerable to extinction
G/S2 = imperiled globally/in state because of rarity or other factors making it very vulnerable to extinction
G/S3 = vulnerable through its range or found locally in a restricted range
G/S4 = apparently secure globally/in state, though it might be quite rare in parts of its range
G/S5 = demonstrably secure globally/in state, though it might be quite rare in parts of its range
S#B = refers to the breeding season imperilment of elements that are not permanent residents
G#T# = trinomial rank (T) is used for subspecies or varieties. These taxa are ranked on the same criteria as G1-G5.

3.13 Historic Preservation

Section 106 of the National Historic Preservation Act (NHPA) (16 USC 470, as amended) and its implementing regulations (36 CFR 800) require Federal agencies to evaluate the effects of a planned undertaking on historic properties. Historic properties consist of sites, buildings, structures, districts, or objects more than 50 years old that are eligible for or listed on the National Register of Historic Places (NRHP). It also includes archaeological resources or sites. Criteria for evaluating the significance of historic properties and other information about historic resources can be found in Section 3.13 of the 2006 US 160 EIS.

This section presents the results of archival research, field surveys and interagency coordination and compliance for historic properties conducted for the three action alternatives.

3.13.1 Methodology

For both the affected environment and impacts analysis, the Area of Potential Effects (APE) for archaeological and historic resources ranged from 200 to 300 feet on either side of the centerline for the entire length of each alignment being considered in the SDEIS. In order to include potential direct and indirect effects, however, the APE was expanded in some areas to include entire property boundaries, proposed intersections, and other potential or likely construction impacts. Portions of all three action alternatives overlapped with one another, and, therefore, some segments shared common APEs.

Prior to the initiation of field research, a site file search was conducted through the Colorado Office of Archaeology and Historic Preservation (OAHP), the CDOT

Archaeological and History Units, and the BLM General Land Office (GLO) Records. The records search was completed to determine if previously documented historic properties existed within or near the APEs of the alternatives being considered in the SDEIS. Several archaeological and historic sites were found to be located either within or in proximity to one or more of the alignments.

Historic properties investigations, as summarized in the 2006 US 160 EIS, were conducted for the G Modified and F Modified alternatives, both of which incorporated segments of the existing US 550 south alignment (Eckhardt and Mutaw, 2000a; 2000b). Additional identification of properties took place after the 2006 US 160 ROD was completed and the selected alignment was redesigned to avoid a newly constructed gas well. As part of that effort, CDOT documented a historic property (the Webb Ranch, 5LP8461) that was not evaluated as part of the earlier US 160 EIS. CDOT determined the Webb Ranch was eligible to the NRHP in 2007. Further archival research and field studies were conducted in 2009 and 2010 for each of the three alignment alternatives.

In 2008 and 2009 the owners of the Webb Ranch independently financed an archaeological consultant to perform an inventory of parcels through which portions of the Revised G Modified and Revised F Modified alternatives pass. A number of previously unknown archaeological sites within or near the APEs of those alignments were informally documented by the consultant (SEAS 2008, 2009), and that information was subsequently provided to FHWA and CDOT. Although that effort was not authorized, endorsed, or sanctioned by FHWA, the information obtained was used as baseline data by the agencies during the subsequent 2009 and 2010 field investigations.

3.13.2 Regulatory Updates and Agency Coordination

All historic property evaluations were completed in compliance with Section 106 of the NHPA and related Federal and state of Colorado regulations and statutes. As stipulated in 36 CFR 800.2(c), FHWA and CDOT provided consulting party status to the Colorado State Historic Preservation Officer (SHPO); three Native American tribal governments (discussed in more detail below); and representatives of three historic ranch properties and a residential property directly affected by one or more of the alternatives, per their request. The Advisory Council on Historic Preservation (ACHP) also elected to participate in the consultation process. The Section 106 compliance process with the SHPO, ACHP, and other consulting parties began in 2008 and is ongoing.

3.13.3 Current Conditions

3.13.3.1. Archaeological Resources

Note: Due to the sensitive nature of archaeological sites eligible for or listed on the NRHP and the possibility of artifact looting, their locations are exempt from the Freedom of Information Act (FOIA) and, therefore, are excluded from this document.

Revised G Modified Alternative

As noted above, the Revised G Modified Alternative was not subjected to intensive field inventory as part of the 2009-2010 alternatives analysis effort since it had been previously surveyed for the 2006 US 160 EIS. The privately financed archaeological inventory of portions of the Webb Ranch resulted in the informal documentation of a number of previously unknown archaeological sites within or near the Revised G Modified Alternative APE. Based on CDOT and private studies, eight sites located completely or partially within the Revised G Modified Alternative APE were ultimately determined NRHP eligible.

Table 3-10 presents a list of all NRHP eligible sites identified within the APE. Pertinent correspondence related to the Section 106 compliance process for the alignment alternatives subjected to intensive study is presented in Appendix A.

Table 3-10. NRHP Eligible Archaeological Sites by Alternative

Site No.	Site Type	Cultural Affiliation	Comments
Revised F Modified Alternative			
5LP6665	Prehistoric Habitation	Basketmaker III/Pueblo I	Common to all action alternatives
5LP9308	Prehistoric Artifact Scatter	Unknown Prehistoric	none
5LP9309	Prehistoric Habitation/ Historic Artifact Scatter	Pueblo I/Pueblo II/Historic	Only prehistoric component NRHP eligible
5LP9581	Prehistoric Artifact Scatter	Basketmaker III/Pueblo I	none
5LP9582	Prehistoric Artifact Scatter	Basketmaker III/Pueblo I	none
5LP9583	Prehistoric Artifact Scatter	Pueblo I	none
5LP9584	Prehistoric Habitation/ Historic Habitation	Basketmaker III/Pueblo I/ Historic	Both prehistoric and historic components NRHP eligible
Revised G Modified Alternative			
5LP2223	Prehistoric Artifact Scatter/ Habitation	Basketmaker III/Pueblo I	none
5LP6665	Prehistoric Habitation	Basketmaker III/Pueblo I	Common to all action alternatives
5LP9587	Prehistoric Artifact Scatter	Unknown Prehistoric	none
5LP9588	Prehistoric Artifact Scatter	Unknown Prehistoric	none
5LP9589	Prehistoric Artifact Scatter	Unknown Prehistoric	none
5LP9590	Prehistoric Artifact Scatter/ Habitation	Basketmaker III/Pueblo I/ Pueblo II	none

Table 3-10. NRHP Eligible Archaeological Sites by Alternative

Site No.	Site Type	Cultural Affiliation	Comments
Eastern Realignment Alternative			
5LP6665	Prehistoric Habitation	Basketmaker III/Pueblo I	Common to all action alternatives
5LP6671*	Prehistoric Artifact Scatter	Basketmaker III/Pueblo I	Common to all action alternatives
5LP6673*	Prehistoric Habitation	Basketmaker III/Pueblo I	Common to all action alternatives
5LP9236	Open Camp	Pueblo II	none
5LP9241	Prehistoric Artifact Scatter	Basketmaker III/Pueblo I	none
5LP9242	Prehistoric Artifact Scatter	Basketmaker III/Pueblo I	none
5LP9244	Prehistoric Artifact Scatter	Basketmaker III/Pueblo I	Only prehistoric component NRHP eligible
5LP9245	Prehistoric Artifact Scatter	Ancestral Puebloan	None

*Previously recorded sites; re-evaluated during the current project.

Revised F Modified Alternative

Survey of the Revised F Modified Alternative APE, conducted between July 2009 and June 2010 (Pfertsh, 2010), resulted in the identification and documentation of six archaeological sites and three isolated artifacts. Three previously recorded sites are also within the APE. All nine sites were determined NRHP eligible and all the isolates not eligible (see Table 3-10).

Eastern Realignment Alternative

Survey of the Eastern Realignment Alternative APE in 2009 resulted in the identification and documentation of 16 archaeological sites and 10 isolated artifacts (Pfertsh, 2009). Of that total, three previously documented sites and five newly recorded localities were determined eligible for the NRHP (see Table 3-10).

3.13.3.2. Native American Consultation

Section 106 of the NHPA (as amended) and the ACHP regulations (36 CFR 800.2[c][2][ii]) mandate that Federal agencies coordinate with interested Native American tribes in the planning process for Federal undertakings.

In 2002 FHWA solicited 28 regional tribal governments to be consulting parties for the 2006 US 160 EIS. Three tribes (Hopi Tribe, Pueblo of Laguna, and Southern Ute Indian Tribe) expressed the desire to be consulting parties. These tribes have been provided the opportunity to review and comment on all relevant Section 106, NEPA and Section 4(f) documents. FHWA and CDOT will continue to consult with the interested Native American communities and endeavor to effectively protect areas important to American Indian people throughout the life of this project. Copies of correspondence between the agencies and tribes are presented in Appendix A.

3.13.3.3. Historic Resources

Table 3-11 includes a summary of historic resources that were not identified in the 2006 US 160 EIS and Figure 3-9 shows these historic properties. In addition to these newly identified historic resources, another resource in the study area is the Denver and Rio Grande Railroad (5LP1131.8), which is described in Section 3.13.1 of the 2006 US 160 EIS. It is eligible for inclusion on the NRHP under Criterion A.

Table 3-11. Summary of Historic Resources Within the Area of Potential Effects

Resource Name and Site Number	Important Activities, Features, and Attributes
Clark Property 5LP9310	Important role as a social gathering place. Eligible under Criteria A and C.
Craig Limousin Ranch 5LP9307	Barn, loafing shed, silo, saddle shed, residence, and landscape convey the property's significance as a working ranch on Florida Mesa eligible under Criteria A and C.
Schaeferhoff-Cowan Ranch 5LP9306	Hay barn/milk shed are examples of ranching architecture common in this region of the state, granary is an example of a ranch-related outbuilding association with ranching on Florida Mesa eligible under Criteria A and C.
Webb Ranch 5LP8461	Integrity of barn, loafing sheds, corrals, and chutes represent an example of ranch architecture in La Plata County eligible under Criteria A and C.
Co-op Ditch (2 segments) 5LP9257.1/5LP9257.2	Important under Criterion A for its role in providing irrigation water to lands under the Desert Land Act and association with the settlement and irrigation of marginal lands on Florida Mesa eligible ; significant under Criterion C as a good example of an irrigation ditch that employed relatively simple technology in its design and construction
Hotter-Webb Lateral Ditch (2 segments) 5LP9256.1/5LP9256.2	Important role in the irrigation network on the Webb Ranch and Schaeferhoff-Cowan Ranch properties. Eligible under Criterion A.

More information about all of these historic resources is included in Appendix G, which includes the Section 106 survey reports and site forms.

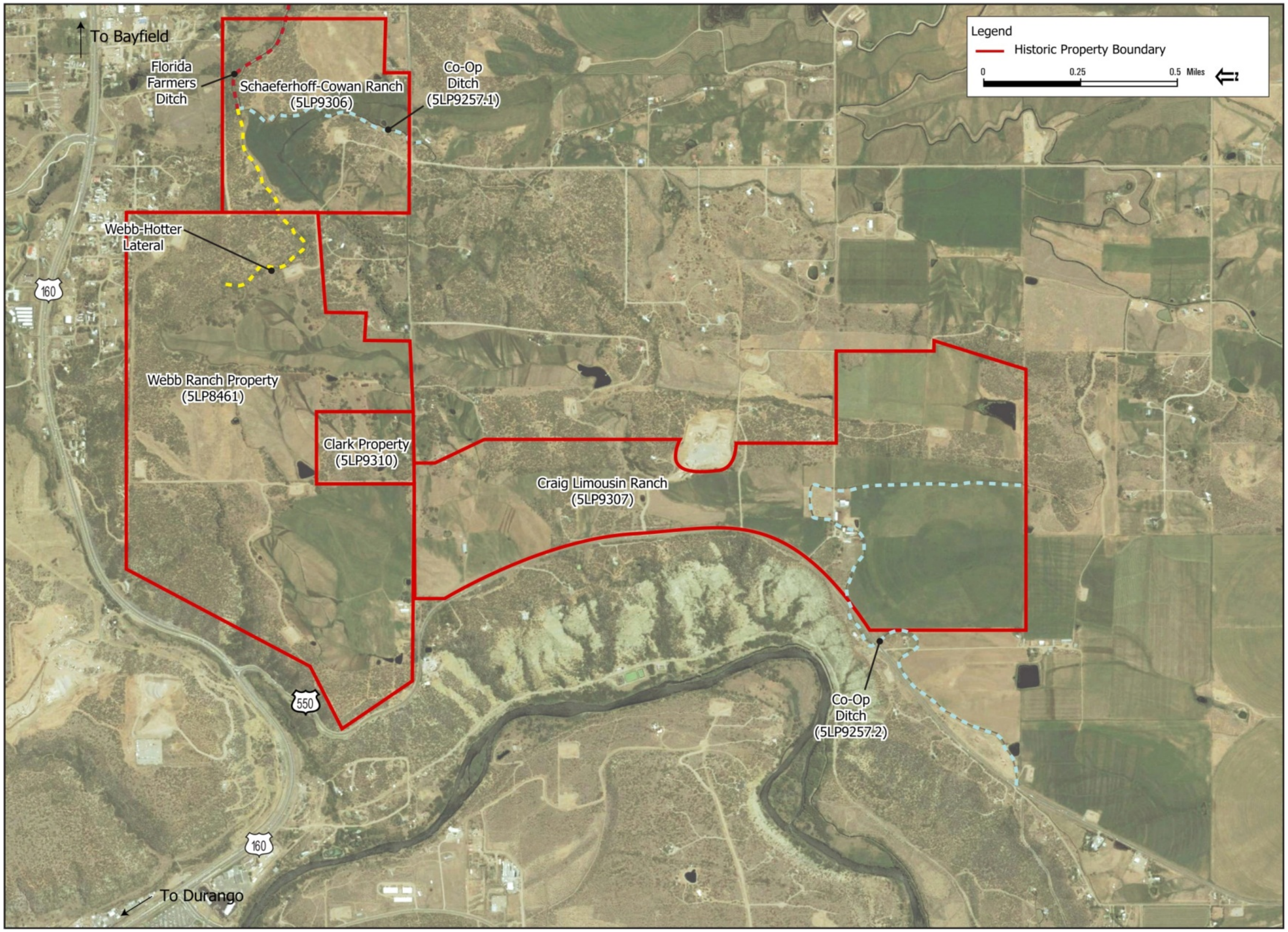
Historic Ranches and Residential Property

Three historic ranches and one residential property within the study area have been identified as eligible for the NRHP. These properties are described in the following sections, and more detailed information can be found in Appendix G. All of these properties are identified in Figure 3-9.

<u>Clark Property</u>

The Clark Property is eligible for inclusion on the NRHP under Criteria A and C. Under Criterion A, the property is significant as a important social gathering place for residents of Durango and Florida Mesa. Under Criterion C, the property is a good example of a residence modified for use as a social and recreational center on Florida Mesa.

Figure 3-9. Historic Properties Within the Area of Potential Effects



Craig Limousin Ranch

The Craig Limousin Ranch (5LP9307) is significant under NRHP Criterion A for its association with agricultural development in La Plata County in the early to mid-twentieth century. It is also significant under Criterion C for its good representative examples of early ranching architecture and for its excellent example of a dairy barn on Florida Mesa and in La Plata County.

Schaeferhoff-Cowan Ranch

The Schaeferhoff-Cowan Ranch (5LP9306) is significant under NRHP Criterion A for its association with ranching on Florida Mesa and under Criterion C for its examples of ranching architecture.

Webb Ranch

The Webb Ranch (5LP8461) is significant under NRHP Criterion A for its association with ranching on Florida Mesa and under Criterion C for representing ranch architecture in La Plata County.

Historic Linear Resources

Two historic ditches and a historic highway within the Area of Potential Effects have been recommended as eligible for the NRHP: the Co-op Ditch, the Webb Hotter Lateral, and US Highway 550. The locations of these resources are shown on Figure 3-9.

Co-op Ditch

Sites 5LP9257.1 and 5LP9257.2 represent two segments of the Co-op Ditch on private lands. Site 5LP9257.1 is a 1,295-foot-long segment of the Co-op Ditch that extends through the historic Craig Limousin Ranch (5LP9307). Site 5LP9257.2 is a 7,984-foot-long segment of the Co-op Ditch that extends through the historic Schaeferhoff-Cowan Ranch (5LP9306). The ditch runs roughly north to south along the western edge of a small valley south of the northwestern edge of Florida Mesa as shown on Figure 3-9.

The Co-op Ditch is significant under NRHP Criterion A for its role in providing irrigation water to lands under the Desert Land Act and for its association with the settlement and irrigation of marginal lands on Florida Mesa. It is also significant under Criterion C as a good example of an irrigation ditch that employed relatively simple technology in its design and construction.

Webb-Hotter Lateral

Site 5LP9256 is the Webb-Hotter Lateral, which is a lateral of the ditch that was referred to in the 2006 US 160 EIS as the Florida Farmers Ditch (Site 5LP5661). The ditch crosses the Area of Potential Effects east to west on the northern end of a hay field just south of the northwestern end of Florida Mesa as shown on Figure 3-9.

The lateral was documented as two segments. Segment 5LP9256.1 extends through the historic Schaeferhoff-Cowan Ranch (5LP9306) and Segment 5LP9256.2 extends through the historic Webb Ranch (5LP8461). The lateral is significant under NRHP Criterion A for its association with the two separate historic ranches through which it runs.

3.14 Paleontological Resources

In the 2006 US 160 EIS, the upper unnamed member of the Animas Formation was identified as a unit of particular interest as it crosses the boundary between the Cretaceous and Tertiary periods. This unit contained all the fossils observed and collected as part of the paleontological field survey conducted for the 2006 US 160 EIS (Britt et al., 1999). Two paleontological localities of importance were identified in the 2006 US 160 EIS: one locale west of Grandview and a second locale east of the Florida River.

3.14.1 Methodology

The study area for paleontological resources in the SDEIS affected environment and the impacts analysis consists of the alternative footprints on the Florida Mesa, including areas that would be impacted during any construction activities. Geologic maps of this area were reviewed to determine if there were outcrops of the Animas Formation and if important paleontological resources were likely to be present.

3.14.2 Regulatory Update and Coordination

There have been no regulatory updates since the 2006 US 160 EIS and 2006 US 160 ROD. No coordination was required or conducted for the SDEIS.

3.14.3 Current Conditions

According to field observations and a literature review (Steven et al., 1974), the study area is comprised mostly of terrace gravels and other surficial deposits. The study area does not include the two paleontological localities described in the 2006 US 160 EIS.

3.15 Hazardous Waste Sites

The potential for the existence of hazardous materials and hazardous waste in the US 160 project corridor was evaluated by conducting a Modified Environmental Site Assessment (MESA). This detailed study, included in the 2006 US 160 EIS, defines, identifies and describes "recognized environmental conditions" including potential impacts from known problems in the area surrounding the project. The MESA provides details on all evaluated sites, and provides details regarding additional issues of concern, including oil and gas facilities. Please refer to the 2006 US 160 EIS for specific details on the identified sites of concern.

3.15.1 Methodology

The MESA conducted for the 2006 US 160 EIS followed the procedures and format specified by CDOT's Statewide Hazardous Waste Services Contract and complied with the American Society for Testing and Materials (ASTM) standards for Phase 1 Environmental Site Assessments (ASTM E1527-00). A search radius of 0.5 mile from the existing US 160 and all action alternative alignments was used for high-risk facilities such as Superfund sites and leaking underground storage tank (LUST) sites, while a 0.25 mile search radius was used for low-risk facilities such as underground and above ground storage tanks, listed waste generators, etc. Information on potential hazardous materials or wastes within the given search radii were obtained through methods detailed in the MESA and the 2006 US 160 EIS, and dictated by ASTM E1527-00. Primary among these methodologies was a search of Federal, state, and local databases, including an environmental regulatory agency database search of the study area and adjoining properties that was ordered from VISTA Information Solutions (VISTA) and Satisfi Environmental Information (Satisfi). An updated search of all Federal, state, and local databases was conducted through the Environmental FirstSearch interactive Infomap program for the alternative alignments presented within the SDEIS.

3.15.2 Regulatory Update and Coordination

In 2006 the EPA put into effect a final ruling establishing specific regulatory requirements for conducting "All Appropriate Inquiry" (AAI) into the previous ownership, uses and environmental conditions of a property for the purposes of qualifying for Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) landowner liability protections. Since that date, all appropriate inquiries must be conducted in compliance with either ASTM E1527-05, or ASTM E2247-08. Given the reduced size and nature of the study area, and the fact that CDOT is not seeking to qualify for the innocent landowner defense under CERCLA, completing CDOT's standard Initial Site Assessment protocol was deemed sufficient.

3.15.3 Current Conditions

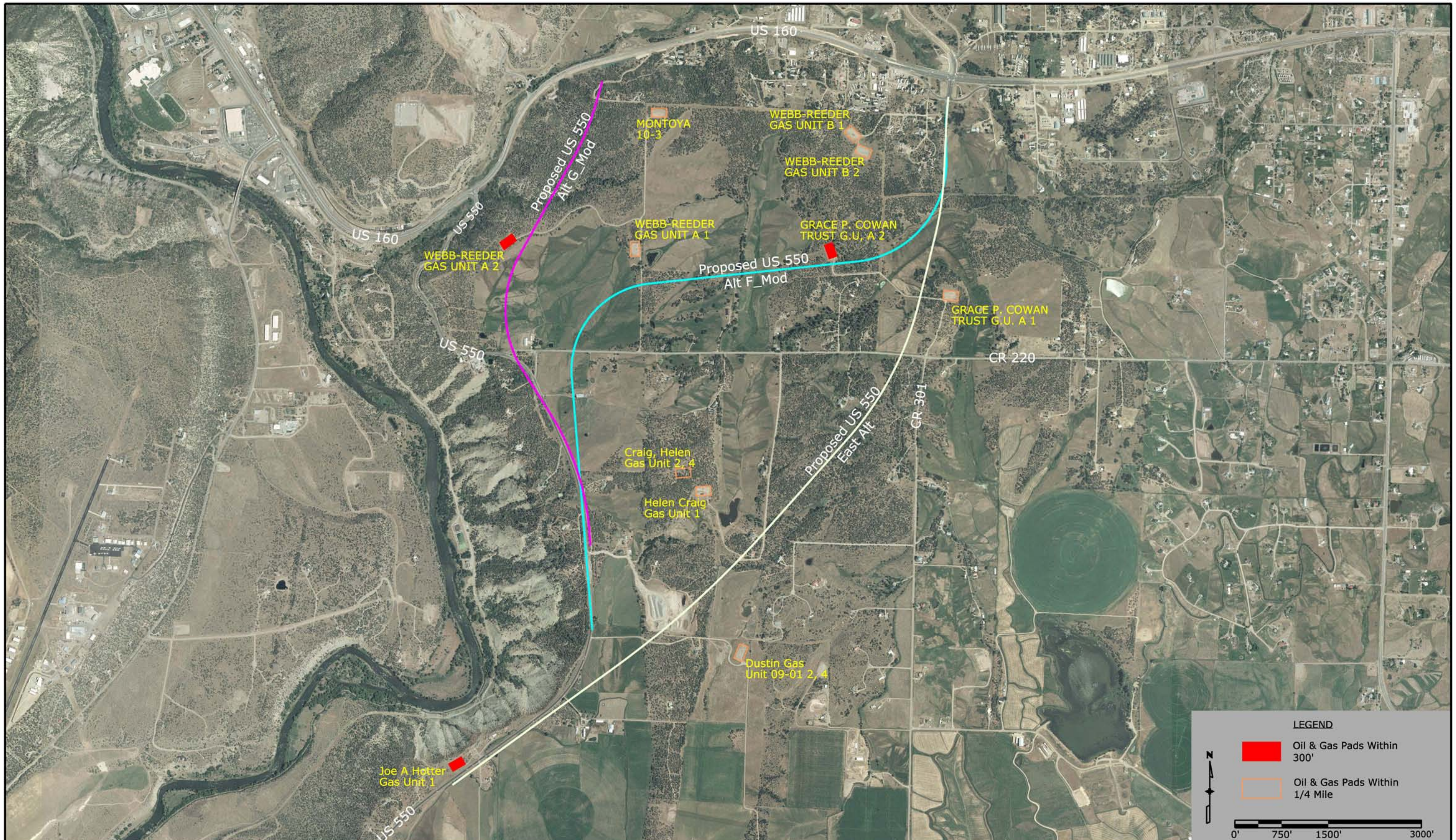
The Environmental FirstSearch database review conducted for the study area did not identify any previously unidentified sites that could be considered "recognized environmental conditions" under either ASTM E1527-00 or the newer ASTM E1527-05.

The 2006 US 160 EIS identifies oil and gas facilities as "Additional Issues of Concern", and lists nine oil and gas facilities of varying sizes within approximately 300 feet of US 160 in the project corridor. Those facilities are identified within that document in Table 3.15.2, Oil and Gas Facilities Potentially Impacted by the Project. In 2005, La Plata County approved infill drilling reducing the spacing from one well per 160 acres to one per 80 acres. According to a May 2011 search of the Colorado Oil and Gas Conservation Commission (COGCC) records, there are now 13 oil and gas facilities of varying sizes within proximity of the alignments presented within the SDEIS (COGCC, 2011). These are described in Table 3-12 and depicted on Figure 3-10.

Table 3-12. Oil and Gas Facilities in the Study Area

Owner	Facility Name	Distance from Alignment	Township, Range, Section	Alignment
BP America Production Company	05-067-08877 Webb-Reeder Gas Unit A2	164 feet	T34N R9W Section 10	Revised G Modified
Chevron Midcontinent LP	05-067-08845 Montoya #10-3	894 feet	T34N R9W Section 10	Revised G Modified
BP America Production Company	05-067-07424 Webb Reeder Gas Unit A#1	455 feet	T34N R9W Section10	Revised F Modified
BP America Production Company	05-067-07874 Webb Reeder Gas Unit B#1	1360 feet	T34N R9W Section 11	Revised F Modified, Eastern Realignment
BP America Production Company	05-067-08885 Webb Reeder Gas Unit B#2	1175 feet	T34N R9W Section 11	Revised F Modified, Eastern Realignment
BP America Production Company	05-067-08875 Grace P Cowan Trust GU A2	81 feet	T34N R9W Section 11	Revised F Modified
BP America Production Company	05-067-07418 Webb-Reeder Gas Unit A1	341 feet	T34N R9W Section 11	Eastern Realignment
BP America Production Company	05-067-09454 Craig, Helen Gas Unit 2	1530 feet	T34N R9W Section 9	Revised G Modified, Revised F Modified
BP America Production Company	05-067-09458 Craig, Helen Gas Unit 4	1540 feet	T34N R9W Section 9	Revised G Modified, Revised F Modified
BP America Production Company	05-067-06960 Craig, Helen Gas Unit 1	1045 feet	T34N R9W Section 9	Eastern Realignment
BP America Production Company	05-067-08484 Dustin Gas Unit 09-01 #2	1010 feet	T34N R9W Section 9	Eastern Realignment
BP America Production Company	05-067-09637 Dustin Gas Unit 09-01 #4	1050 feet	T34N R9W Section 9	Eastern Realignment
BP America Production Company	05-067-06964 Joe A Hotter Gas Unit #1	142 feet	T34N R9W Section 17	Eastern Realignment

Figure 3-10. Oil and Gas Facilities in the Study Area



Other "Additional Issues of Concern" include above ground storage tanks, underground storage tanks, transformers/polychlorinated biphenyls (PCBs), asbestos-containing building materials, lead-based paint, and hazardous materials spills. Please see the 2006 US 160 EIS for details concerning these items.

3.16 Visual Resources

Visual resources include those features that define the visual character of an area. These can be important natural features, vistas, or viewsheds, but can also include urban or community visual characteristics, including architecture, skylines, or other characteristics that create a visual definition for an area.

3.16.1 Methodology

Generally, the study area for both the affected environment and impacts analysis of visual resources includes the landscape surrounding the alternatives. Visual resources in the area can be described by evaluating certain factors that indicate the scenic quality or visual appeal of the landscape, the existing level of alteration or scenic integrity of the landscape, and the sensitivity to visual change in the landscape. The scenic quality of an area can be described by evaluating landscape features such as landform, vegetation, water features, color, adjacent scenery, scarcity, and cultural modifications, and comparing those features with those typically found within the region. For more information, see Section 3.16 of the US 160 EIS.

3.16.2 Regulatory Update and Coordination

There have been no regulatory updates since the 2006 US 160 EIS and 2006 US 160 ROD. No coordination was required or conducted for the SDEIS.

3.16.3 Current Conditions

Visual changes in the study area since the 2006 US 160 EIS include the surrounding residential and commercial developments as well as construction of the Grandview Interchange (see Chapter 1 of the SDEIS). For more information on the visual landscape features in the region, see Section 3.16 of the 2006 US 160 EIS.

3.17 Energy Consumption

Energy resources typically include liquid or gaseous fuels, petroleum products, or electricity. The term "energy" is used in a many other contexts and might be universally defined as "the potential for causing change." It is a conserved quantity, which means the total energy of the universe remains constant, but may be converted from one form into another. The efforts to conserve such energy sources are in part efforts to conserve currently available energy resources that can do useful work such as propel vehicles. Such efforts are also intended to minimize the consumption of energy resources, which contributes to air and water pollution.

3.17.1 Methodology

The study area for both the affected environment and impacts analysis for energy consumption includes the alternative footprints, including areas that would be impacted during any construction activities. Current energy consumption and energy consumption associated with any of the alternatives were considered.

3.17.2 Regulatory Update and Coordination

There have been no regulatory updates since the 2006 US 160 EIS and 2006 US 160 ROD. There was no coordination required or conducted for the SDEIS.

3.17.3 Current Conditions

Energy consumption currently includes vehicular fuel consumption associated with traffic on the existing roadways, production of materials used for road maintenance, and ranch vehicles and machinery.

3.18 Geology and Soils

Geologic features include outcrops; unique rock formations; and potential mining and energy resources. Mineral ores, petroleum, natural gas, sand, and gravel are resources related to geologic features. Geologic features that may impact a project include formations that are unstable or erode easily, extreme topography, areas of former or active underground mining, and faults or areas of seismic activity. Soil resources include soil types and mining resources such as sand and gravel. Soil features that may affect a project include soil erodability and permeability.

3.18.1 Methodology

The study area for the affected environment for geology includes the San Juan Basin while the study area for soils includes La Plata County. The study area for the impacts analysis consists of the alternative footprints, including areas that would be impacted during any construction activities. The methodology has not changed since the 2006 US 160 EIS. See Section 3.18 in the 2006 US 160 EIS for more information.

3.18.2 Regulatory Update and Coordination

There have been no regulatory updates since the 2006 US 160 EIS and 2006 US 160 ROD. There was no coordination required or conducted for the SDEIS.

3.18.3 Current Conditions

Current conditions have not changed since the 2006 US 160 EIS and 2006 US 160 ROD. Generally, the San Juan Basin is an elliptical asymmetric basin that is 100 miles long, north to south, 90 miles wide, east to west, and extends from southwestern Colorado into northwestern New Mexico. The San Juan Mountains form its border to the north and the Hogback Mountains border the basin to the west. The Continental Divide lies along the east and south sides. The San Juan Basin has been a site of marine and terrestrial deposition from early Paleozoic through Holocene times.

The area is located in a physiographic region that has high-yield natural gas and coalbed methane production. Based on geologic mapping information, the closest location of coal outcrops is approximately 1.5 miles northwest of the US 160/US 550 (south) intersection; therefore, gas seeps are not expected to impact potential design or construction activities. The area is susceptible to infrequent landslides and severe weather and there are no limestone formation (i.e., Karst) areas of significance (CDOT, 2006).

Soils in La Plata County are considered characteristic of soils in the study area for impact analysis. Soils in the general area occupy varying landforms and they range in depth from shallow to deep. Major uses of soils in the area include range and wildlife habitat, irrigated cropland, pasture, timber production, source of construction material, and home sites. See Section 3.18 of the 2006 US 160 EIS for more information.

4.0 Environmental Consequences and Mitigation

As discussed in Section 1.1, this Supplemental Draft Environmental Impact Statement (SDEIS) is being prepared to address impacts that were not previously evaluated or that have been changed based on revisions to the design since the 2006 US Highway 160 from Durango to Bayfield EIS (2006 US 160 EIS) and 2006 US Highway 160 from Durango to Bayfield Record of Decision (2006 US 160 ROD). The Grandview Section starts at milepost 88.0 on US 160 west of the US Highway 550 (US 550)/US 160 (south) intersection and ends approximately 3 miles east of the State Highway (SH) 172/County Road (CR) 234 intersection. The study area in this SDEIS focuses on the affected environment and impacts along the US 550 alignment from where it diverges from US 550 south of CR 220 to where it connects to US 160. As discussed in the resource-specific methodologies in Chapter 3, the study area for the impact analyses generally consists of the US 550 south alignment footprint (for example, area of disturbance including temporary construction impacts) for each alternative. However, several resources require larger study areas and those are described for each resource. For example, the study area for noise impacts includes analysis for noise sensitive receptors located within 500 feet of the alternative footprints.

This chapter describes the direct and indirect environmental consequences and associated mitigation measures for each evaluated environmental resource that could be expected for the No Action, Revised G Modified (Preferred), Revised F Modified, and Eastern Realignment alternatives. Cumulative impacts are discussed in Section 4.23.

The No Action Alternative is the same for all resources with the exception of air quality and noise as discussed in Sections 4.5 and 4.6, respectively. The No Action Alternative assumes that highway improvements in the 2006 US 160 EIS corridor will be implemented as described in the 2006 US 160 ROD with the exception of the US 550 and US 160 connection to the Grandview Interchange. Under the No Action Alternative, both the existing US 160/US 550 (south) intersection (i.e. Farmington Hill) and the Grandview Interchange would remain in their current locations and the interchange would continue to function for traffic movements north and south of US 160 without a US 550 connection.

The impacts evaluated in this chapter are based on the alternative designs contained in Chapter 2. These alternative designs have been developed with different southern termini along US 550, resulting in different lengths depending on where they deviate from US 550. These southern termini are different than those in Chapter 5, Section 4(f) Evaluation, which were developed with common southern termini in order to allow for equal comparison among alternatives as it relates to their uses of the Section 4(f) properties. As a result, some of the impact quantities contained in Chapter 4 are different than those contained in Chapter 5.

4.1 Land Use

This section discusses impacts to land use within the study area. More information on impacts to land use can be found in Section 4.1 of the 2006 US 160 EIS.

4.1.1 No Action

There would be no impacts to land use as a result of the No Action Alternative.

4.1.2 Direct and Indirect Impacts Common to All Action Alternatives

All action alternatives would impact adjacent land use to varying degrees. A connection between US 160 and US 550 may facilitate existing and planned commercial, mixed commercial and industrial, medium density residential, and mixed use land use development immediately adjacent, north, and south of the interchange (La Plata County, 2011). A connection between US 160 and US 550 would also facilitate direct access to the Mercy Hospital complex and other planned development north of US 160.

The basic character of land uses adjacent to the right-of-way (ROW) would be consistent with local zoning and land use plans.

Although improvements could induce growth in some areas by making them more accessible, reducing travel times, and improving safety, these improvements are not likely to induce additional county-wide growth beyond the levels forecast by the Colorado Demography Service (CDS, now the State Demography Office [SDO]). According to the CDS, failure of roads to keep pace with new development could act as a constraint on growth. With the implementation of any of the action alternatives, development in the Grandview Area could occur at a faster rate. See Section 4.1 of the 2006 US 160 EIS for more information.

4.1.3 Direct and Indirect Impacts for Revised G Modified (Preferred Alternative)

There have been no changes in land use impacts from the Revised G Modified (Preferred) Alternative since the 2006 US 160 EIS and 2006 US 160 ROD. The study area would continue to be mixed-use development. Relocations are discussed in Section 4.3 of the SDEIS. See Section 4.1 of the 2006 US 160 EIS for more information on land use impacts from the Revised G Modified (Preferred) Alternative.

4.1.4 Direct and Indirect Impacts for Revised F Modified

There have been no changes in land use impacts from the Revised F Modified Alternative since the 2006 US 160 EIS and 2006 US 160 ROD. The study area would continue to be mixed-use development. Relocations are discussed in Section 4.3 of the

SDEIS. See Section 4.1 of the 2006 US 160 EIS for more information on land use impacts from the Revised F Modified Alternative.

4.1.5 Direct and Indirect Impacts for Eastern Realignment

The Eastern Realignment Alternative would impact a commercial gravel pit operation, which would be a permanent loss due to the loss of functionality at the gravel pit and its specialized operations.

Relocations are discussed in Section 4.3 of the SDEIS.

4.1.6 Mitigation

Mitigation includes continued coordination with local entities to ensure consistency between roadway projects and land use plans in the area. CDOT will mitigate the loss of real property and physical relocations. See Section 4.1.7 of the 2006 US 160 EIS for more information on mitigation for loss of real property and physical relocations.

4.2 Farmland

4.2.1 No Action

There would be no impacts to farmland resources as a result of the No Action Alternative.

4.2.2 Direct and Indirect Impacts Common to All Action Alternatives

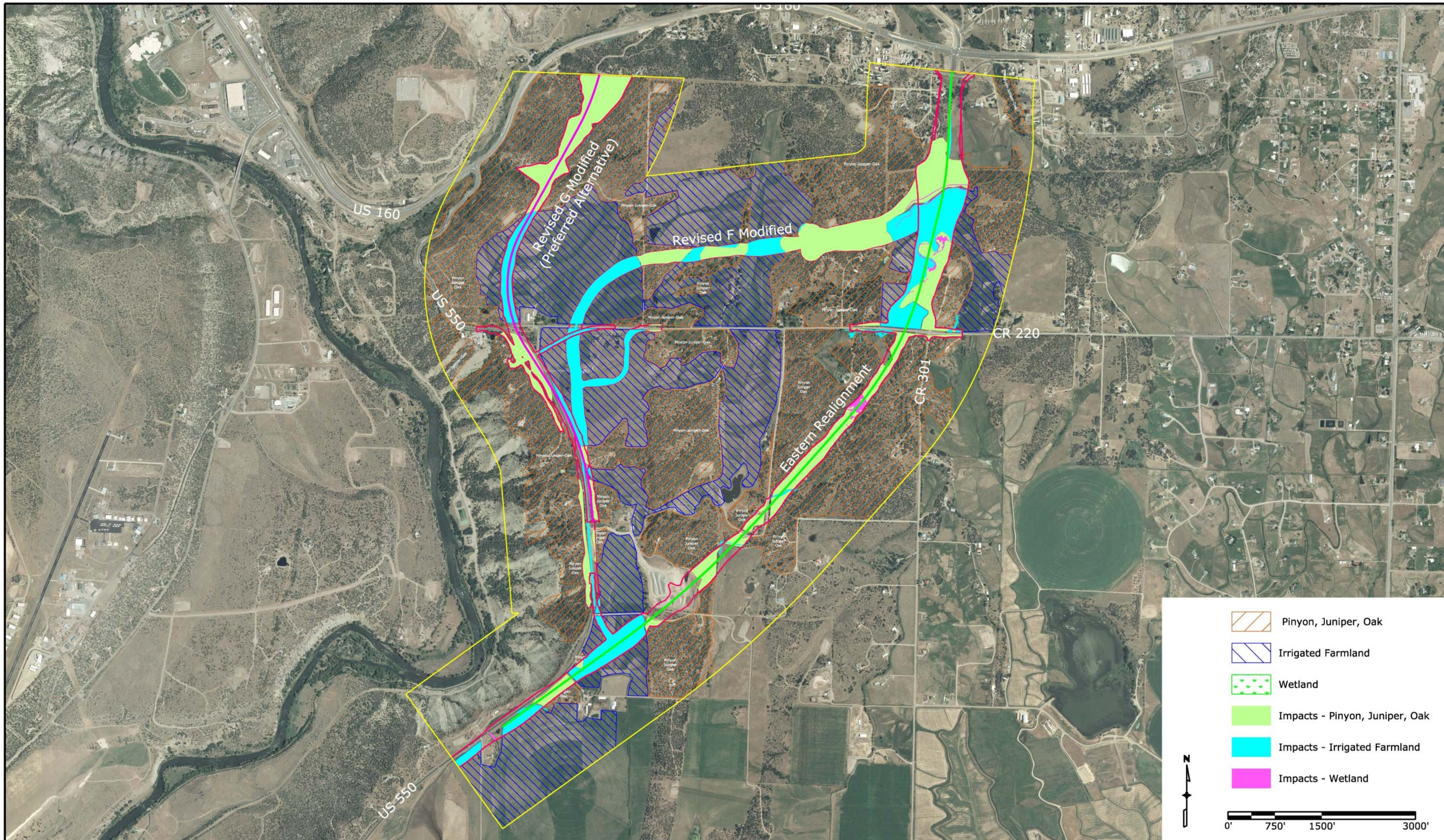
The common impact for the US 160/US 550 connection alternatives is the direct conversion of irrigated farmlands to transportation related facilities and the bisecting of ranching operations by the highway. All areas within the proposed ROW would be fenced and the production of irrigated crops within this area would be permanently lost. Farming and ranching activities adjacent to the transportation corridor may continue following the restoration and modification of the existing irrigation network.

There would be no permanent indirect impacts to the production of irrigated farmland following implementation of mitigation measures described below. The spread of noxious weeds, increased erosion and sedimentation may occur as a result of highway construction. These impacts are expected to diminish as the disturbance area is stabilized and restored to native vegetation.

4.2.3 Direct and Indirect Impacts for Revised G Modified (Preferred Alternative)

The Revised G Modified (Preferred) Alternative would impact 11.5 acres of irrigated farmlands. See Figure 4-1 for these impacts.

Figure 4-1. Farmland Impacts



Coordination with the Natural Resources Conservation Service (NRCS) has demonstrated through the completion of Form AD-1006 that the Revised G Modified (Preferred) Alternative will not have an adverse impact on the overall irrigated farmland in La Plata County that would warrant consideration of additional alternatives to avoid these impacts.

4.2.4 Direct and Indirect Impacts for Revised F Modified

The Revised F Modified Alternative would impact 31.1 acres of irrigated farmlands. See Figure 4-1 for these impacts.

4.2.5 Direct and Indirect Impacts for Eastern Realignment

The Eastern Realignment Alternative would impact 33.7 acres of irrigated farmlands. See Figure 4-1 for these impacts.

4.2.6 Mitigation

Final design of the Revised G Modified (Preferred) and the other action alternatives will incorporate measures to allow the continued use of land for irrigated farmland production. Final design details will address engineered facilities to transport irrigation water to areas that may be severed from primary production areas by the US 160/550 connection. This will be accomplished by piping water beneath any constructed highway facilities and providing for structures to distribute water appropriately. The action alternatives would also include two underpasses to allow passage of deer, elk, and other wildlife. One of the underpasses within irrigated pasture will accommodate farm equipment and a cattle crossing to allow continued access to seasonal calving areas, crop production and access to natural gas production operations on areas of the ranches. Where irrigated farmlands are permanently lost to production, CDOT will compensate landowners for the lost value of crops and production.

Appropriate measures to control the spread of noxious weeds will be addressed through measures discussed in Section 4.10, Noxious Weeds.

Erosion and sedimentation mitigation measures will be implemented in conjunction with stormwater best management practices (BMPs) required as described in Section 4.7, Wetlands and Water Resources.

Functional irrigation systems will be maintained during construction with no permanent interruption of service.

4.3 Socioeconomics and Relocations

This section discusses impacts to the population within the study area, including displacement of individuals and businesses, and changes in community cohesion and public services. More information on impacts to socioeconomic resources can be found in Section 4.3 of the 2006 US 160 EIS.

4.3.1 No Action

There would be no impacts to socioeconomic resources as a result of the No Action Alternative.

4.3.2 Direct and Indirect Impacts Common to All Action Alternatives

No community resources (sewer, water, school, churches, fire stations, police stations, and others) will be relocated or impeded due to any action alternative. Any action alternative would provide additional jobs during construction. Additionally, an improved connection between US 160 and US 550 may facilitate existing and planned commercial, mixed commercial and industrial, medium density residential, and mixed use land use development immediately adjacent, north and south, of the interchange (La Plata County, 2011). This could encourage growth and development, potentially creating new jobs.

All of the action alternatives transect more than one functional ranch and will cause permanent loss of land. All action alternatives will also cross irrigation ditches in the study area. After construction of any of the action alternatives all of the ranches would still be operational and all structures would be retained. More information on impacts to ranches and irrigation ditches can be found in Chapter 5.

The majority of the potentially impacted residences in the study area are single family homes and one is a mobile home. Since it was determined that more than half of all low-income families in La Plata County reside in mobile homes, there is a possibility that some of the impacted individuals are considered low-income.

4.3.3 Direct and Indirect Impacts for Revised G Modified (Preferred Alternative)

A total of 71.6 acres of right-of-way would be acquired. There would be no residential relocations in the study area due to the Revised G Modified (Preferred) Alternative. There will be no business relocations as a result of this alternative; therefore, no loss of employment opportunities.

4.3.4 Direct and Indirect Impacts for Revised F Modified

A total of 106.2 acres of right-of-way would be acquired. There would be four residential relocations in the study area due to the Revised F Modified Alternative in the Skyview, Grandview, and Grandview Heights subdivisions. The improved connection between US 160 and US 550 would facilitate direct access to the existing Mercy Hospital complex and other planned development north of US 160. One gas well would have to be replaced as a result of this alternative. There would be no loss of employment opportunities. See Figure 3-2 for general locations of affected residential subdivisions and the gas well.

4.3.5 Direct and Indirect Impacts for Eastern Realignment

A total of 133.0 acres of right-of-way would be acquired. There would be six residential relocations in the study area due to the Eastern Realignment Alternative in the Skyview, Grandview, Grandview Heights, and Diamond G subdivisions. The improved connection between US 160 and US 550 would facilitate direct access to the existing Mercy Hospital complex and other planned development north of US 160. There would also be one business, a commercial gravel pit, displaced due to construction of the Eastern Realignment Alternative. Due to the loss of functionality at the gravel pit and the specialized nature of this operation this impact would likely not be able to be mitigated and would result in the permanent loss of this business. See Figure 3-2 for general locations of displaced properties.

4.3.6 Mitigation

All relocations, residential and business, will be completed in accordance with the Uniform Relocation Assistance Act and CDOT will provide relocation benefits and assistance to all impacted individuals. More detailed information on mitigation for socioeconomic resources can be found in Section 4.3.2.7 of the 2006 US 160 EIS. No additional mitigation is required.

Functional irrigation systems will be maintained during construction with no permanent interruption of service. Any temporary inability to maintain irrigation service will be compensated for the lost value of the crops affected. A farm equipment/livestock underpass will be installed to provide passage for continued farming and ranching operations and livestock. More information on mitigation for ranches and ditches can be found in Section 5.10.2.1.

Where farmlands are permanently lost to production, CDOT will compensate landowners for the lost value of crops and production. More information on farmlands can be found in Section 4.2.

4.4 Recreation

This section discusses impacts to recreation within the study area. More information on impacts to recreation can be found in Section 4.4 of the 2006 US 160 EIS.

4.4.1 No Action

There would be no impacts to recreation as a result of the No Action Alternative.

4.4.2 Direct and Indirect Impacts Common to All Action Alternatives

There would be no direct impacts to recreation facilities by any of the action alternatives.

There could be temporary, indirect impacts from all action alternatives associated with construction to regional recreation facilities, including campgrounds, forest lands, and parks in the form of dust and traffic delays.

4.4.3 Direct and Indirect Impacts for Revised G Modified (Preferred Alternative)

There are no additional impacts beyond those described in Section 4.4.2 for the Revised G Modified (Preferred) Alternative.

4.4.4 Direct and Indirect Impacts for Revised F Modified

There are no additional impacts beyond those described in Section 4.4.2 for the Revised F Modified Alternative.

4.4.5 Direct and Indirect Impacts for Eastern Realignment

There are no additional impacts beyond those described in Section 4.4.2 for the Eastern Realignment Alternative.

4.4.6 Mitigation

Dust control and access management during construction will reduce potential indirect impacts to nearby recreation facilities. Additional mitigation information is discussed in Section 4.4 of the 2006 US 160 EIS.

4.5 Air Quality

The results of analyses conducted to assess the emission levels of ozone precursor and formaldehyde are described in Section 4.5 of the 2006 US 160 EIS. This section presents annual emission levels of formaldehyde, volatile organic compounds (VOCs), and nitrogen oxides (NOx) that have been updated to 2030, a new fugitive dust analysis, and analysis of Mobile Source Air Toxics (MSATs) based on updated FHWA Interim Guidance (FHWA, 2009).

4.5.1 Inventory Analyses

Traffic data for 2009 have been utilized to revise estimated study area vehicle miles traveled (VMT) to 2030, which resulted in VMT values approximately two percent less than 2025 VMT estimates (McVaugh, 2011). Therefore, the 2006 US 160 EIS emissions for the 2001 Baseline, No Action, Revised G Modified (Preferred), Revised F Modified, and Eastern Realignment alternatives represent higher ton per year values than would be expected based upon changes in VMT in 2030 and are retained as conservative estimates of emissions levels for 2030 (see Table 4-1). Because revised study area wide traffic volumes and VMT essentially are the same among action and No Action alternatives in 2030, there are no longer emissions inventory differences attributed to the No Action, Revised G Modified (Preferred), Revised F Modified, and Eastern Realignment alternatives.

Table 4-1. Emissions Results Estimated for 2030

	Formaldehyde (tons/year)			VOCs (tons/year)			NOx (tons/year)		
	Road-ways	Inter-sections	Total	Road-ways	Inter-sections	Total	Road-ways	Inter-sections	Total
2001 Baseline	0.99	0.02	1.01	71.2	3.5	74.7	278.0	1.2	279.2
2025 No Action	0.84	0.18	1.02	56.4	34.0	90.4	83.6	7.6	91.2
2025 Action Alternatives	0.69	0.01	0.70	45.2	1.6	46.8	89.7	0.4	90.1
2030 No Action & Action Alternatives	0.69	0.01	0.70	45.2	1.6	46.8	89.7	0.4	90.1

4.5.1.1. 2001 Baseline

The 2001 Baseline has the highest estimated emissions of formaldehyde, VOCs, and NOx compared to all action and No Action alternatives. Daily US 160 traffic volume during the 2001 peak season was approximately 49,400 vehicles per day. The 2001 Baseline emissions factors generated by the Air Pollution Control Division of the Colorado Department of Public Health and Environment (CDPHE) used to calculate for formaldehyde, VOCs, and NOx pollutants analyzed in Table 4-1 are much higher than emissions factors in the year 2030. The 2001 Baseline emissions factors do not reflect the tremendous emissions reductions resulting from light duty vehicle Corporate Average Fuel Economy (CAFE) standards for engine and exhaust emissions. Thus, the maximum pollutant emissions expected in the study area occurred in the year 2001.

4.5.1.2. No Action

The 2030 No Action Alternative has lower emissions than the 2001 Baseline (as shown in Table 4-1) for formaldehyde, VOCs and NOx, even with a 74 percent estimated increase in daily traffic volumes. VMT will increase to 279,180 by 2030. The No Action Alternative represents a 31 percent reduction in formaldehyde emissions, a 37 percent reduction in VOC emissions, and a 68 percent reduction in NOx emissions over 2001 Baseline levels.

4.5.1.3. Direct and Indirect Impacts Common to All Action Alternatives

The Revised G Modified (Preferred), Revised F Modified and Eastern Realignment alternatives have lower emissions than the 2001 Baseline (as shown in Table 4-1) for formaldehyde VOCs, and NOx even with 74 percent estimated increase in daily traffic volumes. VMT will increase to 279,180 by 2030. The action alternatives represent a 31 percent reduction in formaldehyde emissions, a 37 percent reduction in VOC emissions, and a 68 percent reduction in NOx emissions from 2001 Baseline levels.

4.5.1.4. Direct and Indirect Impacts for Revised G Modified (Preferred Alternative)

The Revised G Modified (Preferred) Alternative does not have additional impacts from the common impacts described in Section 4.5.1.2 for all action alternatives.

4.5.1.5. Direct and Indirect Impacts for Revised F Modified

The Revised F Modified Alternative does not have additional impacts from the common impacts described in Section 4.5.1.2 for all action alternatives.

4.5.1.6. Direct and Indirect Impacts for Eastern Realignment

The Eastern Realignment Alternative does not have additional impacts from the common impacts described in Section 4.5.1.2 for all action alternatives.

4.5.2 Fugitive Dust

4.5.2.1. 2001 Baseline

The 2001 Baseline particulate matter emissions in the form of fugitive dust generated from vehicle entrained roadside sand and windblown dust on the roadways are estimated at 135 tons per year based on estimated 2001 corridor traffic volumes.

4.5.2.2. No Action

Particulate matter in the form of re-entrained road dust is likely to increase as VMT increases. Additionally, fugitive dust emissions increase proportionately to VMT increases. The increase in daily traffic volumes, VMT and speed associated with the 2030 No Action Alternative will cause increased uncontrolled fugitive dust to increase to an estimated 234 tons per year in 2030.

4.5.2.3. Direct and Indirect Impacts Common to All Action Alternatives

Particulate matter in the form of re-entrained road dust is likely to increase as VMT increases. Additionally, fugitive dust emissions increase proportionately to VMT increases. The increase in daily traffic volumes, VMT and speed associated with the 2030 Revised G Modified (Preferred), Revised F Modified and Eastern Realignment alternatives will cause increased uncontrolled fugitive dust to an estimated 234 tons per year in 2030.

Increased particulate matter emissions would result from construction ground disturbances and related hauling activities for all action alternatives. However, particulate matter less than 10 microns in diameter (PM_{10}) emissions resulting from construction activities would be temporary, ending once roadway construction activities cease. Particulate matter resulting from construction activity is not expected to violate the National Ambient Air Quality Standards (NAAQS).

4.5.2.4. Direct and Indirect Impacts for Revised G Modified (Preferred Alternative)

The Revised G Modified (Preferred) Alternative does not have additional fugitive dust impacts from the common impacts described in Section 4.5.2.2 for all action alternatives.

4.5.2.5. Direct and Indirect Impacts for Revised F Modified

The Revised F Modified Alternative does not have additional fugitive dust impacts from the common impacts described in Section 4.5.2.2 for all action alternatives.

4.5.2.6. Direct and Indirect Impacts for Eastern Realignment

The Eastern Realignment Alternative does not have additional fugitive dust impacts from the common impacts described in Section 4.5.2.2 for all action alternatives.

4.5.3 Mobile Source Air Toxics (MSATs)

4.5.3.1. Direct and Indirect Impacts Common to All Alternatives

For each action alternative, the amount of MSATs emitted would be proportional to VMT, assuming that other variables such as fleet mix are the same for each alternative. The VMT estimated for the action alternatives is essentially the same as that for the No Action Alternative. Because the US 160 interchanges in the Revised G Modified (Preferred) Alternative improve the US 550 connection at Grandview and in the Revised F Modified and Eastern Realignment alternatives at CR 233 will focus more traffic at those respective interchanges, there may be new development that redistributes trips (without changing the overall corridorwide VMT) that would not otherwise occur in the respective interchange areas under 2001 Baseline conditions. An analysis (see Table 4-1) of formaldehyde estimated emissions levels to be 31 percent lower than the 2001 Baseline, in spite of increased VMT; these trends for the other MSATs and the differences between alternatives are expected to be similar. Therefore, it is likely that any of the action and No Action alternatives will result in lower MSAT emissions over the 2001 Baseline emissions.

Because the estimated 2030 VMT under each of the action alternatives is the same, it is expected there would be no difference in overall MSAT emissions between the three action alternatives. For all alternatives, emissions are virtually certain to be lower than present levels in the design year as a result of the US Environmental Protection Agency’s (EPA's) national control programs that are projected to reduce annual MSAT emissions by 72 percent from 1999 to 2050. Local conditions may differ from these national projections in terms of fleet mix and turnover, VMT growth rates, and local control measures. However, the magnitude of the EPA-projected reductions is so great (even after accounting for VMT growth) that MSAT emissions in the study area are likely to be lower in the future than they are today.

The travel lanes contemplated as part of the Revised G Modified (Preferred), Revised F Modified, and Eastern Realignment alternatives will have the effect of moving some traffic closer to nearby homes and businesses; therefore, under each alternative there may be localized areas where ambient concentrations of MSATs would be higher under certain alternatives than others. The localized differences in MSAT concentrations would likely be most pronounced along the new US 550 alignment and expanded US 160 roadway sections that would be built under the Revised G Modified (Preferred), Revised F Modified and Eastern Realignment alternatives where increased vehicle traffic (including an estimated two to five percent volume of medium and heavy duty diesel trucks) will be concentrated. However, the magnitude and the duration of these potential increases cannot be reliably quantified due to incomplete or unavailable information in forecasting project-specific MSAT health impacts. Further, under all alternatives, overall future MSATs are expected to be substantially lower than today due to implementation of EPA's vehicle and fuel regulations.

In sum, under all action alternatives in 2030, it is expected there would be no overall MSAT emissions level difference in the study area relative to the No Action Alternative due to no difference in VMT. There also could be localized increases in MSAT levels along the alternative alignments due to the location of the alternatives compared to each other and to the No Action Alternative.

4.5.3.2. Direct and Indirect Impacts for Revised G Modified (Preferred Alternative)

The Revised G Modified (Preferred) Alternative does not have additional MSAT impacts from the common impacts described in Section 4.5.3.1 for all action alternatives.

4.5.3.3. Direct and Indirect Impacts for Revised F Modified

The Revised F Modified Alternative does not have additional MSAT impacts from the common impacts described in Section 4.5.3.1 for all action alternatives.

4.5.3.4. Direct and Indirect Impacts for Eastern Realignment

The Eastern Realignment Alternative does not have additional MSAT impacts from the common impacts described in Section 4.5.3.1 for all action alternatives.

4.5.3.5. 1502.22 Incomplete or Unavailable Information

The Council on Environmental Quality (CEQ) Provisions Covering Incomplete or Unavailable Information (40 CFR 1502.22) includes a discussion of unavailable information for project-specific MSAT Health Impacts Analysis included in updated FHWA Interim MSAT Guidance which has been completed since the 2006 US 160 EIS and is as follows:

a. When an agency is evaluating reasonably foreseeable significant adverse effects on the human environment in an environmental impact statement and there is incomplete or unavailable information, the agency shall always make clear that such information is lacking.

b. If the incomplete information relevant to reasonably foreseeable significant adverse impacts is essential to a reasoned choice among alternatives and the overall costs of obtaining it are not exorbitant, the agency shall include the information in the environmental impact statement.

c. If the information relevant to reasonably foreseeable significant adverse impacts cannot be obtained because the overall costs of obtaining it are exorbitant or the means to obtain it are not known, the agency shall include within the environmental impact statement:

   1. A statement that such information is incomplete or unavailable.
   2. A statement of the relevance of the incomplete or unavailable information to evaluating reasonably foreseeable significant adverse impacts on the human environment.
   3. A summary of existing credible scientific evidence which is relevant to evaluating the reasonably foreseeable significant adverse impacts on the human environment.
   4. The agency's evaluation of such impacts based upon theoretical approaches or research methods generally accepted in the scientific community. For the purposes of this section, "reasonably foreseeable" includes impacts that have catastrophic consequences, even if their probability of occurrence is low, provided that the analysis of the impacts is supported by credible scientific evidence, is not based on pure conjecture, and is within the rule of reason.

d. The amended regulation will be applicable to all environmental impact statements for which a Notice to Intent (40 CFR 1508.22) is published in the Federal Register on or after May 27, 1986. For environmental impact statements in progress, agencies may choose to comply with the requirements of either the original or amended regulation.

Incomplete or Unavailable Information for Project-Specific MSAT Health Impacts Analysis:

In FHWA's view, information is incomplete or unavailable to credibly predict the project-specific health impacts due to changes in MSAT emissions associated with a proposed set of highway alternatives. The outcome of such an assessment, adverse or not, would be influenced more by the uncertainty introduced into the process through assumption and speculation rather than any genuine insight into the actual health impacts directly attributable to MSAT exposure associated with a proposed action.

The EPA is responsible for protecting the public health and welfare from any known or anticipated effect of an air pollutant. They are the lead authority for administering the Clean Air Act and its amendments and have specific statutory obligations with respect to hazardous air pollutants and MSATs. The EPA is in the continual process of assessing human health effects, exposures, and risks posed by air pollutants. They maintain the Integrated Risk Information System (IRIS), which is "a compilation of electronic reports on specific substances found in the environment and their potential to cause human health effects" (EPA, http://www.epa.gov/ncea/iris/index.html). Each report contains assessments of non-cancerous and cancerous effects for individual compounds and quantitative estimates of risk levels from lifetime oral and inhalation exposures with uncertainty spanning perhaps an order of magnitude.

Other organizations are also active in the research and analyses of the human health effects of MSAT, including the Health Effects Institute (HEI). Two HEI studies are summarized in Appendix D of FHWA's Interim Guidance Update on Mobile Source Air Toxic Analysis in NEPA documents. Among the adverse health effects linked to MSAT compounds at high exposures are cancer in humans in occupational settings; cancer in animals; and irritation to the respiratory tract, including the exacerbation of asthma. Less obvious is the adverse human health effects of MSAT compounds at current environmental concentrations (HEI, http://pubs.healtheffects.org/view.php?id=282) or in the future as vehicle emissions substantially decrease (HEI, http://pubs.healtheffects.org/view.php?id=306).

The methodologies for forecasting health impacts include emissions modeling; dispersion modeling; exposure modeling; and then final determination of health impacts - each step in the process building on the model predictions obtained in the previous step. All are encumbered by technical shortcomings or uncertain science that prevents a more complete differentiation of the MSAT health impacts among a set of project alternatives. These difficulties are magnified for lifetime (i.e., 70 year) assessments, particularly because unsupportable assumptions would have to be made regarding changes in travel patterns and vehicle technology (which affects emissions rates) over that time frame, since such information is unavailable. The results produced by the EPA's MOBILE6.2 model, the California EPA's Emfac2007 model, and the EPA's DraftMOVES2009 model in forecasting MSAT emissions are highly inconsistent. Indications from the development of the MOVES model are that MOBILE6.2 significantly underestimates diesel particulate matter (DPM) emissions and significantly overestimates benzene emissions.

Regarding air dispersion modeling, an extensive evaluation of EPA's guideline CAL3QHC model was conducted in an NCHRP study (http://www.epa.gov/scram001/dispersion_alt.htm#hyroad), which documents poor model performance at 10 sites across the country—three where intensive monitoring was conducted plus an additional 7 with less intensive monitoring. The study indicates a bias of the CAL3QHC model to overestimate concentrations near highly congested intersections and underestimate concentrations near uncongested intersections. The consequence of this is a tendency to overstate the air quality benefits of mitigating congestion at intersections. Such poor model performance is less difficult to manage for demonstrating compliance with NAAQS for relatively short time frames than it is for forecasting individual exposure over an entire lifetime, especially given that some information needed for estimating 70-year lifetime exposure is unavailable. It is particularly difficult to reliably forecast MSAT exposure near roadways, and to determine the portion of time that people are actually exposed at a specific location.

There are considerable uncertainties associated with the existing estimates of toxicity of the various MSATs, because of factors such as low-dose extrapolation and translation of occupational exposure data to the general population, a concern expressed by HEI (http://pubs.healtheffects.org/view.php?id=282). As a result, there is no national consensus on air dose-response values assumed to protect the public health and welfare for MSAT compounds, and in particular for diesel PM. The EPA (http://www.epa.gov/risk/basicinformation.htm#g) and the HEI (http://pubs.healtheffects.org/getfile.php?u=395) have not established a basis for quantitative risk assessment of DPM in ambient settings.

There is also the lack of a national consensus on an acceptable level of risk. The current context is the process used by the EPA as provided by the Clean Air Act to determine whether more stringent controls are required in order to provide an ample margin of safety to protect public health or to prevent an adverse environmental effect for industrial sources subject to the maximum achievable control technology standards, such as benzene emissions from refineries. The decision framework is a two-step process. The first step requires EPA to determine a "safe" or "acceptable" level of risk due to emissions from a source, which is generally no greater than approximately 100 in a million. Additional factors are considered in the second step, the goal of which is to maximize the number of people with risks less than 1 in a million due to emissions from a source. The results of this statutory two-step process do not guarantee that cancer risks from exposure to air toxics are less than 1 in a million; in some cases, the residual risk determination could result in maximum individual cancer risks that are as high as approximately 100 in a million. In a June 2008 decision, the US Court of Appeals for the District of Columbia Circuit upheld EPA's approach to addressing risk in its two step decision framework. Information is incomplete or unavailable to establish that even the largest of highway projects would result in levels of risk greater than safe or acceptable.

Because of the limitations in the methodologies for forecasting health impacts described, any predicted difference in health impacts between alternatives is likely to be much smaller than the uncertainties associated with predicting the impacts.

Consequently, the results of such assessments would not be useful to decision makers, who would need to weigh this information against project benefits, such as reducing traffic congestion, accident rates, and fatalities plus improved access for emergency response, that are better suited for quantitative analysis.

4.5.4 Mitigation

CDOT has developed a Draft Air Quality Action Plan to provide direction to implement programmatic mitigation solutions for unregulated mobile source and co-benefited criteria pollutants as directed by CDOT Policy Directive 1901. This includes programmatic mitigation under evaluation for DPM emissions reduction strategies for construction vehicles by retrofits and reduced engine idling.

Maintenance and management such as regularly scheduled road sweeping assist in reducing levels of re-entrained dust.

Particulate matter and dust emissions will be minimized during construction by implementation of BMPs to control dust, such as regular watering of construction disturbance areas and idling limitations for equipment. Fugitive dust permits and/or Air Pollutant Emission Notices for construction activities will be obtained where applicable from CDPHE.

4.6 Traffic Noise Analysis

A noise impact study was completed for the 2006 US 160 EIS, including the No Action, Revised G Modified (Preferred), Revised F Modified, and Eastern Realignment alternatives to determine noise impacts as a result of widening US 160 and modifying the US 550 alignment and US160 connection. Under CDOT noise guidance (CDOT, 2011) a noise impact occurs when the hourly A-weighted noise level calculated at a noise-sensitive receptor location meets or exceeds the CDOT NAC (see Table 3-2 in Chapter 3). A noise impact also occurs when calculated 2030 noise levels are substantially higher (10 A-weighted decibels [dBA] or more) than 2001 Baseline noise levels. In these analyses, the validated TNM2.5 modeled 2001 Baseline noise levels were used for comparison.

The No Action, Revised G Modified (Preferred), Revised F Modified, and Eastern Realignment alternatives were modeled and compared against 2001 Baseline conditions. In addition, potential noise abatement strategies were considered for abating traffic noise impacts. Noise impacts were calculated and the noise abatement analysis was performed in accordance with the standards outlined in the CDOT Noise Analysis and Abatement Guidelines (CDOT, 2011). All noise levels were modeled using the federally approved Traffic Noise Model Version 2.5 (TNM2.5) traffic noise model software. Noise impacts are summarized in Table 4-2.

Table 4-2. Summary of Noise Impacted Dwelling Units by Alternative

	Number of Impacts in 2030			
	No Action	Revised G Modified (Preferred)	Revised F Modified	Eastern Realignment
Number of dwelling units equal to or exceeding NAC	56	57	63	63
Number of dwelling units with 10 dBA or more increase	99	99	97	106
Total number of impacted dwelling units	99*	104*	108*	117*

*Some dwelling units experience both NAC and substantial noise increase impacts

4.6.1 No Action

The No Action Alternative includes several modifications to the Grandview Segment of US 160:

- Four through-traffic lanes
- Grandview grade-separated interchange
- CR 233 (Three Springs) grade-separated interchange
- An outside auxiliary lane along each direction connecting ramps between the Grandview and CR 233 (Three Springs) interchanges
- Local service road improvements

The 2006 US 160 EIS discussed these changes but analyzed 2025 noise impacts for the US 160 mainline only. This analysis includes the built and projected roadway and interchange configurations that are planned to be constructed before 2030 as actions that will occur regardless of the outcome of the SEIS process. 2030 traffic representing the noisiest hour traffic volumes associated with peak seasonal traffic volumes, have been averaged between daily morning and afternoon peak hours. Traffic data utilized in this analysis is summarized in the Traffic Noise Technical Addendum (Appendix F).

Under the No Action Alternative in 2030, 62 of the 122 total receptors (99 individual dwelling units) analyzed in this SDEIS would be impacted by traffic noise. Noise results are summarized in Table 4-3. Over half of all receptors will experience a substantial 10 dBA or more increase in noise over 2001 Baseline noise levels. Almost 29

Table 4-3. Summary of Traffic Noise Levels and Impacts

Receptor	DU	2001 Baseline	No Action	Revised G Modified (Preferred)	Impact Revised G Modified (Preferred)	Revised F Modified	Impact Revised F Modified	Eastern Realignment	Impact Eastern Realignment
R1	2	50.6	60.5	60.7	SI	60.6	SI	60.6	SI
R25	5	56	62.1	NA		62.3		62.3	
R29	3	53.2	63.6	60.3		60		60	
R29a	4	59.8	72.1	68.4	NAC	68.3	NAC	68.3	NAC
R30	2	53.9	63.8	60.1		60.1		60.1	
R34	2	54.8	59.8	58.9		58.3		58.3	
R37	1	53.7	67.1	65.154.2	SI	65.9	SI	65.9	SI
C38	1	54.2	68.4	65.1	SI	65.7	SI	65.7	SI
C42	2	51.9	64.2	57.7		58.2		58.2	
R42a	3	52.3	64.1	56.8		57.3		57.3	
R43	1	56.3	70.3	66.4	Both	62.1		62.1	
C39	1	60.2	73	72.7	Both	73.6	Both	73.6	Both
C40	1	55.9	69.9	68.8	SI	69	SI	69	SI
C41	1	53	66.1	64.9	SI	65.2	SI	65.2	SI
R44a	1	47.2	60	63.5	SI	66	Both	66	Both
R52	1	56.7	67.5	63.3		63.9		63.9	
R55	1	51.7	64.2	61.6		62.3	SI	62.3	SI
R56	3	50.1	63.6	62.5	SI	62.9	SI	62.9	SI
R56a	3	50.1	63.1	61.5	SI	62.1	SI	62.1	SI
C57	1	56.1	68.7	67.2	SI	67.5	SI	67.5	SI
R58	3	53	67.3	66	Both	66.5	Both	66.5	Both
R58a	2	52.1	66.6	65.8	SI	66.3	Both	66.3	Both
R58b	1	53.2	67.8	67.1	Both	67.6	Both	67.6	Both
R63	1	51.5	65.7	66.3	Both	67.5	Both	67.6	Both

Table 4-3. Summary of Traffic Noise Levels and Impacts

Receptor	DU	2001 Baseline	No Action	Revised G Modified (Preferred)	Impact Revised G Modified (Preferred)	Revised F Modified	Impact Revised F Modified	Eastern Realignment	Impact Eastern Realignment
R65	1	50.5	64.7	65.2	SI	69.1	Both	68.9	Both
R66	1	57.8	69.5	69.7	Both	70.8	Both	70.7	Both
R67	1	60	71.4	71.6	Both	72.3	Both	72.3	Both
R118	3	56	69.2	67.9	Both	68.3	Both	68.3	Both
R119	2	54.6	67.3	65.8	SI	66.3	Both	66.3	Both
R4	1	45	58.4	57.2	SI	57.9	SI	57.8	SI
R318	1	56.3	68.6	68.4	Both	69.2	Both	69.2	Both
R320	4	56.2	68.2	67.6	Both	68.4	Both	68.4	Both
R322	1	56.2	68.1	67.4	Both	67.9	Both	67.9	Both
R323	4	59.1	70.7	70.5	Both	71.3	Both	71.2	Both
R120 hotel		55.6	66.7	66.7	Both	66.9	Both	66.9	Both
R120b hotel		52.2	62.3	62.1		62.3	SI	62.3	SI
R122	1	47.2	57.5	56.9		58	SI	58	SI
R304	1	45.2	52.6	54.2		63.8	SI	65.6	SI
R305	1	44.8	52.3	NA		62.2	SI	64.2	SI
R306	1	46.1	53.8	NA		66.2	Both	67	Both
R307	1	45.5	52.9	NA		62.6	SI	64.8	SI
R309	1	48.5	57.5	NA		64.2	SI	64.9	SI
R310	1	49.5	59.4	NA		62.9	SI	63.3	SI
R311	1	45.3	59.3	NA		61.9	SI	61.9	SI
R312	1	50.4	60.3	NA		67.6	Both	67.4	Both
R312a	1	46.6	59.9	NA		NA		NA	
R315	1	51	62.1	NA		64.3	SI	64.5	SI

Table 4-3. Summary of Traffic Noise Levels and Impacts

Receptor	DU	2001 Baseline	No Action	Revised G Modified (Preferred)	Impact Revised G Modified (Preferred)	Revised F Modified	Impact Revised F Modified	Eastern Realignment	Impact Eastern Realignment
R70	6	56	66.2	66.2	Both	66.8	Both	66.8	Both
R72	3	57	69.9	69.4	Both	70.3	Both	70.3	Both
R73	2	49.9	63.2	63.3	SI	63.8	SI	63.8	SI
R71	4	50.9	66.3	66.4	Both	67.1	Both	67.1	Both
C121	1	49.2	64.3	64.1	SI	65.7	SI	65.7	SI
Grand2	0	52.4	52.4	69	SI	69.7	SI	69.7	SI
C89	1	61.1	74.2	74	Both	70.7		70.7	
C90	1	58.3	71.8	70.9	SI	67		67	
C91	1	55.3	55.3	63.7		60.3		60.3	
R81	2	57.8	69.1	69.5	Both	69.5	Both	69.5	Both
R81a	1	53.5	64.3	64.6	SI	64.5	SI	64.5	SI
R81b	1	50.8	61.9	62	SI	62.2	SI	62.2	SI
R82	1	60.3	70.5	70.6	Both	70.2	NAC	70.2	NAC
C116	1	53.8	53.8	64.6	SI	64.2	SI	64.2	SI
R83	1	54.6	64.7	69	Both	67.3	Both	67.3	Both
R84	1	58.9	67	69.1	Both	67	NAC	67	NAC
R86	1	55.4	66.1	68.5	SI	65.4	SI	65.4	SI
R85	1	60.8	60.8	67.3	NAC	64.4		64.4	
R87	1	59.7	59.7	70.4	Both	66.3	NAC	66.3	NAC
R88	1	60.4	60.4	71.9	Both	67.8	NAC	67.8	NAC
R92	2	62	73.9	74	Both	70.5	NAC	70.5	NAC
R93	1	54.4	63.5	63.9		60.1		60.1	
R93a	1	54.9	64.1	64.6		60.8		60.8	
R93b	1	50.5	60.2	60.7	SI	62.1	SI	62.1	SI
R93c	1	50.1	60	60.5	SI	60.7	SI	60.7	SI

Table 4-3. Summary of Traffic Noise Levels and Impacts

Receptor	DU	2001 Baseline	No Action	Revised G Modified (Preferred)	Impact Revised G Modified (Preferred)	Revised F Modified	Impact Revised F Modified	Eastern Realignment	Impact Eastern Realignment
C325	1	47.9	61.7	NA		63.6	SI	63.6	SI
C326	1	50	59.8	NA		63.9	SI	64.4	SI
R324	1	54.5	65.6	NA		67.7	Both	67.8	Both
R68	1	59.2	70.9	NA		71.8	Both	71.8	Both
R69	2	58.8	70.8	NA		71.6	Both	71.6	Both
R74	1	55.1	67.7	68.7	Both	69.2	Both	69.2	Both
C75	1	52.4	64.6	66.1	SI	66.4	SI	66.4	SI
R75d	1	52.1	64.5	66NA		66.3	Both	66.3	Both
R75a	1	51.3	63.7	NA		65.3	SI	65.3	SI
R75b	1	50.9	63.3	NA		64.8	SI	64.8	SI
R75c	1	51.6	63.7	64.9	SI	65.1	SI	65.1	SI
C79	1	53.8	64.5	65.8	SI	66.2	SI	66.2	SI
R150	1	50.1	53.2	56.3		NA		NA	
R151	1	49.5	52.2	54.6		51		46.6	
R152	1	51.3	54.4	53.9		50.8		48.7	
R153	1	53.3	58.4	52.4		50.2		53.3	
R154	1	48.3	50.5	56		52		50.5	
R155	1	51.5	56.3	65.7	SI	52.8		54.3	
R156	1	59.3	55.6	59.6		62.3		49.8	
R157	1	56.8	53.8	56.1		57		49.2	
R300	1	40.7	45.9	45.9		64.6	SI	49.4	
R301	1	43.5	48.2	48.2		65	SI	52.5	
R302	1	42.9	47.3	47.3		58.6	SI	51.8	
R1E	1	50.5	51	NA		48.6		52.9	

Table 4-3. Summary of Traffic Noise Levels and Impacts

Receptor	DU	2001 Baseline	No Action	Revised G Modified (Preferred)	Impact Revised G Modified (Preferred)	Revised F Modified	Impact Revised F Modified	Eastern Realignment	Impact Eastern Realignment
R2E	1	46.7	48.8	NA		50.8		53.8	
R3E	1	43.2	47.3	NA		56.5	SI	52.1	
R4E	1	42.9	45	NA		48		47	
R5E	1	44.1	47.2	NA		51.4		50.7	
R6E	1	50.4	50.6	NA		48.5		53.8	
R7E	1	51.8	50.9	NA		48		53.6	
R8E	1	41.9	41.8	NA		NA		56.2	SI
R9E	1	38.5	40.9	NA		NA		63.3	SI
R10E	1	44.8	44.5	NA		NA		65.6	SI
R11E	1	47.2	45.2	NA		NA		51.1	
R12E	1	36.4	49.6	NA		NA		49.2	SI
R13E	1	37	39.3	NA		NA		64.6	SI
R14E	1	36.5	38.5	NA		NA		56.2	SI
R15E	1	35.1	37.6	NA		NA		47.3	SI
R16E	1	35	37.4	NA		NA		45.8	SI
R17E	1	36.3	38.6	NA		NA		48.9	SI
R18E	1	37.1	39.4	NA		NA		53.4	SI
R19E	1	37.8	40.1	NA		NA		65.1	SI
R20E	1	44.6	46	NA		NA		48.6	
R21E	1	38.1	42.4	NA		NA		53.4	SI
R22E	1	38.9	40.9	NA		NA		49	SI

Table 4-3. Summary of Traffic Noise Levels and Impacts

Receptor	DU	2001 Baseline	No Action	Revised G Modified (Preferred)	Impact Revised G Modified (Preferred)	Revised F Modified	Impact Revised F Modified	Eastern Realignment	Impact Eastern Realignment
R23E	1	53.8	55.6	53.9		54.8		62.3	
R24E	1	61.4	63.2	59.2		61		66.8	NAC
R25E	1	60.5	62.6	63.6		66.8	NAC	56.8	
R26E	1	56.1	56.8	58.1		65.1		50.3	
R27E	1	49.2	52	51.4		56.1		46.6	

DU = Represents the number of dwelling units assigned to the receptor
SI = Impact due to substantial increase of 10 dBA or more over 2001 Baseline noise levels
NAC = Impact due to meeting or exceeding the CDOT NAC activity category threshold
Both = Impact due to both substantial increase and meeting or exceeding the CDOT NAC
NA = Not Applicable
Blank cell = No Impact

percent of receptors analyzed in the study area will also experience noise levels reaching or exceeding the NAC under No Action 2030 conditions.

An overall increase in background noise will be experienced at a greater distance away from the highway. Although not loud enough to be considered an impact by Federal or state standards, in 2030 the background noise caused by increased traffic volumes may be enough to change the character of the noise from what prior to 2001 was a predominantly rural noise setting to a more active noise environment close to the US 160 corridor and along the US 550 alternative corridor.

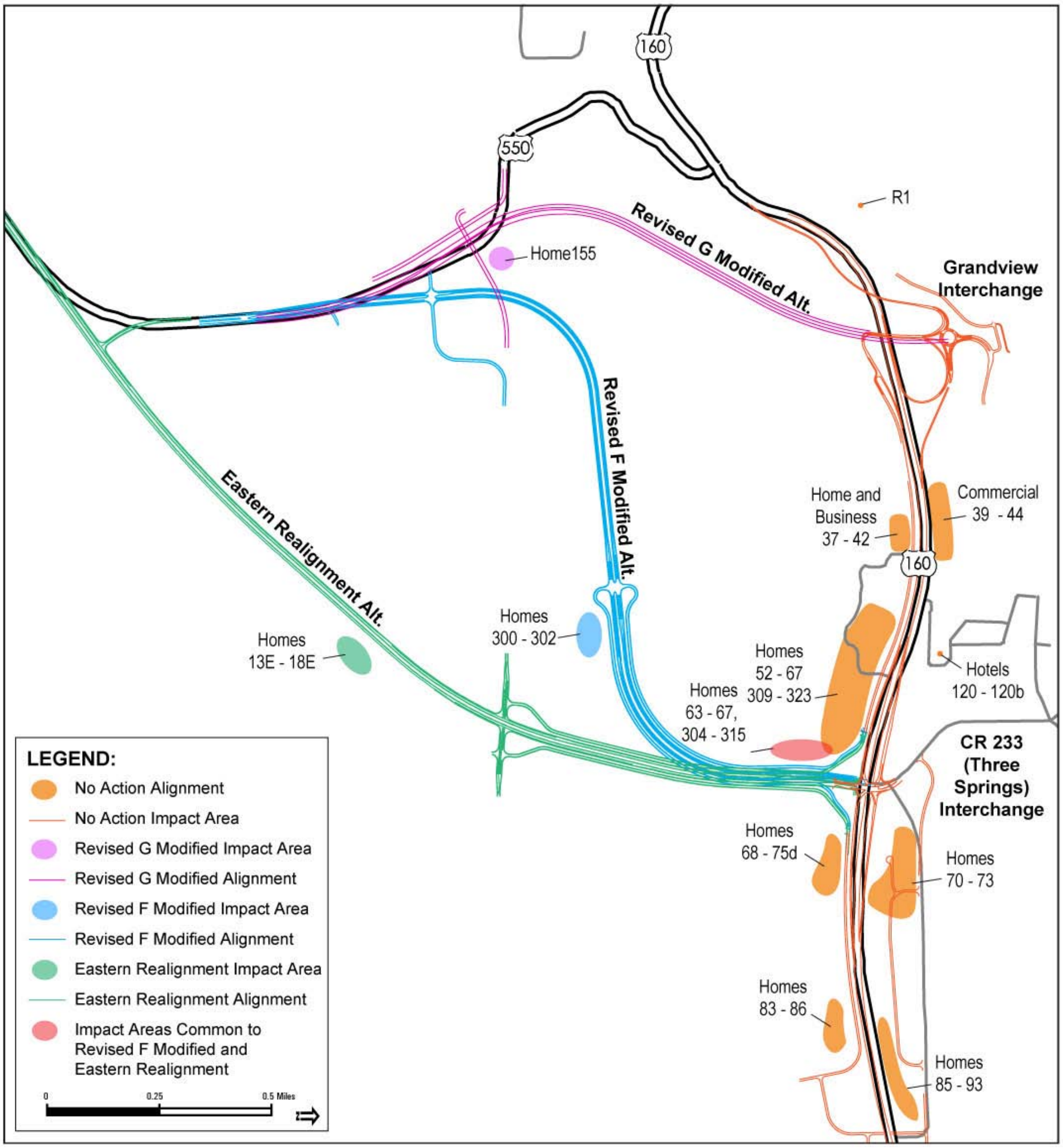
4.6.2 Direct and Indirect Impacts Common to All Action Alternatives

US 160 traffic noise between the Grandview Interchange and East CR 233 is similar among all action alternatives. Traffic noise levels are on average 1-2 dBA higher with the Revised F Modified and the Eastern Realignment alternatives. Common noise impacts occur at residential and commercial receptors along the US 160 alignment concentrated at the following localities. These are also illustrated on Figure 4-2.

- R37-C38, C39-C44 near the intersection with CR 232
- R52-R67, R310-R323 south of US 160 between CR 232 and the CR 233 (Three Springs) Interchange
- R324, R56-R75d south of US 160 between the CR 233 (Three Springs) Interchange and Silverview Lane
- R70-R73c north of US 160 just west of the CR 233 (Three Springs) Interchange and old CR 233
- R81-R93 mixed residential and commercial receptors located along US160 west of the East CR 233 intersection

Indirect impacts resulting from traffic noise will likely be an increase in overall background noise experienced at a greater distance away from the highway. Although not loud enough to be considered an impact by Federal or state standards, in 2030 the background noise caused by increased traffic volumes may be enough to change the character of the noise from what prior to 2001 was a predominantly rural noise setting to a more active noise environment close to the US 160 corridor and along the new US 550 alternative corridors. This change in rural noise character will likely occur with all action alternatives.

Figure 4-2. Noise Impacts at Residential and Commercial Receptors



4.6.3 Direct and Indirect Impacts for Revised G Modified (Preferred Alternative)

Noise generated from the Revised G Modified (Preferred) Alternative will impact a total of 70 residential and commercial receptors along US 160 and associated interchanges. Noise levels will range from 50.1 to 75.1 dBA in the study area. Most identified noise impacts are associated with traffic on US 160 as previously described in Section 4.6.2.

Many of the impacted sites in the study area are industrial sites and businesses. No businesses housing noise sensitive activities such as recording studios or theaters were identified in the study area.

The Revised G Modified (Preferred) Alternative is aligned west of most Grandview development on undeveloped ranchlands. Receptors R150-R155 located along the Revised G Modified (Preferred) Alternative alignment near CR 220 range from 56.0 to 65.7 dBA and will increase an average of 6 dBA from 2001 Baseline noise levels and an average of 1-2 dBA over No Action noise levels. The Revised G Modified (Preferred) Alternative will also result in a substantial noise increase impact at an isolated farm residence (R155). See Figure 4-2.

4.6.4 Direct and Indirect Impacts for Revised F Modified

Noise generated from the Revised F Modified Alternative will impact a total of 73 residential and commercial receptors in the study area as shown on Figure 4-2. Noise levels will range from 50.1 to 75.1 dBA in the study area. Most identified noise impacts are associated with traffic on US 160 as previously described in Section 4.6.2. Many of the impacted sites in the study area are industrial sites and businesses. No businesses housing noise sensitive activities such as recording studios or theaters were identified in the study area.

The Revised F Modified Alternative crosses the central portion of the study area and affects several residences south of US 160 and the CR 233 (Three Springs) Interchange. Noise levels at these neighborhoods range from 48 to 67.6 dBA and in most cases are more than 10 dBA over the 2001 Baseline noise levels. Although NAC thresholds have been met or exceeded at R306 and R312, additional substantial increases in noise levels at this area also constitute additional noise impacts.

Receptors 151-155 located along the Revised F Modified Alternative alignment near CR 220 will increase an average of 1 dBA over the 2001 Baseline noise levels, and will not result in future noise impacts. Receptor R150 is identified as needed for the Revised F Modified Alternative ROW requirements and was not analyzed.

The higher traffic volumes associated with 2030 Revised F Modified Alternative will result in a NAC noise impact at an isolated farm residence (R25E).

4.6.5 Direct and Indirect Impacts for Eastern Realignment

Noise generated from the Eastern Realignment Alternative will impact a total of 83 residential and commercial receptors in the study area shown on Figure 4-2. Noise levels will range from 56.6 to 73.9 dBA in the study area. Most identified noise impacts are associated with traffic on US 160 as described in Section 4.6.2. Many of the impacted sites in the study area are industrial sites and businesses. No businesses house noising sensitive activities such as recording studios or theaters were identified in the study area.

The Eastern Realignment Alternative crosses the central portion of the study area and affects several residences south of US 160 and the CR 233 (Three Springs) Interchange. Noise levels at these neighborhoods range from 47 to 67.4 dBA. Most receptors will experience 2030 noise levels more than 10 dBA over the 2001 Baseline noise levels. Although NAC thresholds have been met or exceeded at R306 and R312, the substantial increase in noise in this area also constitutes noise impacts.

The Eastern Realignment Alternative will run beside a neighborhood of seven receptors, R13E through R19E located in the central portion of the study area near Dreamy Draw and Craig Lane. This area will experience substantial increase impacts averaging 15 dBA over the 2001 Baseline noise levels. Noise levels for these receptors will remain below NAC thresholds. Several other isolated homes located along the Eastern Realignment Alternative will experience an average 5 dBA increase in noise levels over the 2001 Baseline while five isolated homes, R8E, R9E, R10E, R12E, and R21E will experience substantial impact increases over the 2001 Baseline of 10 dBA or more.

4.6.6 Mitigation

The CDOT Noise Analysis and Abatement Guidelines (CDOT, 2011) prescribes that all noise mitigation must meet feasibility and reasonableness criteria to be constructed. To summarize, feasibility requires that a substantial noise reduction of at least 5 dBA can be achieved by the abatement measure. In this analysis, only noise barriers, such as a wall or berm were considered for abatement because of the existing receptor distribution and available buffer land. Truck rerouting was not considered a viable mitigation because US 160 and US 550 are the primary regional freight facilities, and alternate routes are not present in the region. Noise barriers should be continuous without gaps, and the barrier must not cause safety or critical maintenance issues to be considered feasible. Examples of safety and maintenance concerns include chronic winter icing of travel lanes caused by a wall shadow or impairment of egress visibility from a driveway to the roadway.

Reasonableness noise barrier criteria are measures used to evaluate social and economic aspects of noise abatement and include the following:

- Minimum barrier noise reduction design goal of 7 dBA.
- Cost Benefit Index of cost per receiver per decibel of noise reduction less than $6,800.
- Benefited receptor's desire for noise barrier.

All three criteria must be met for an abatement measure to be considered reasonable.

The 2006 US 160 EIS discusses the possible types of abatement that can be considered for mitigation, but for the SDEIS only noise walls are considered due to terrain and ROW constraints.

Abatement considerations have been re-evaluated utilizing TNM2.5. Noise mitigation recommended in the SDEIS has been preliminarily optimized by assessment of varying wall lengths and heights, and variable siting. Most areas analyzed for abatement considered placing walls at multiple locations, such as adjacent to mainline, between mainline and ramps, and adjacent to frontage or service roads as terrain and access allow. The most effective noise barrier placement is represented in the noise abatement analysis summary in Table 4-4.

4.6.6.1. Mitigation Common to All Action Alternatives

Three areas (MIT 1, MIT 3 and MIT 4) along the US 160 corridor share common impacts among the three build alternatives and shared common evaluations for noise mitigation. Abatement analyses show that mitigation along US 160 is not considered feasible and reasonable, and no mitigation is recommended. Abatement analyses associated with mainline US 160 traffic impacts are included in the Traffic Noise Technical Addendum in Appendix F.

4.6.6.2. Mitigation for Revised G Modified (Preferred) Alternative

Abatement measures are only effective when designed to benefit multiple receptors that are situated closely together. Individual receptors that are widely separated from other receptors may require similar noise barrier lengths and heights as a local group of homes to achieve the noise reduction design goal for reasonable construction. The individual receptor cost benefit index for a wall of sufficient length and height to provide 7 dBA reasonable noise reduction design goal for isolated, single sites is greater than the maximum allowable $6800 cost-benefit reasonableness criteria. Thus, for isolated impacted receptor R155, no noise mitigation is recommended.

4.6.6.3. Mitigation for Revised F Modified Alternative

One area of mitigation consideration (MIT 2) results from construction of the Revised F Modified Alternative. Because the Revised F Modified and Eastern Realignment alternatives' traffic and alignment are the same just south of the CR 233 (Three Springs) Interchange, the mitigation consideration for this area is the same described in MIT2n and MIT2s. Farther south, noise levels at R300 to R302 range from 57.6 to 63.9 dBA in the Revised F Modified Alternative and 49.2 to 51.9 dBA in the Eastern Realignment Alternative, and are substantially higher than the 2001 Baseline noise levels. Noise barriers at the evaluated locations for MIT2n, MIT2s and MIT 2c could not meet the 7 dBA reasonable noise reduction design goal; therefore, no abatement is recommended

Table 4-4. Noise Abatement Analyses

Receptors Analyzed	Barrier ID	Feasible Noise Reduction?	Dwelling Units	Total Leq Reduction (dBA)	Barrier Height (feet)	Barrier Length (feet)	Barrier Unit Cost	Cost Benefit Index (CBI)	CBI Criteria Met?
Mitigation Common to Action Alternatives									
R52,R55,R56, C57,R58, R118, R119	MIT 1a,b,c	Yes	11	54.2	14	626	$45	$7,276	No
R318, R320, R322, R323, R62, R67	MIT 1c	Yes	11	28.4	13	490	$45	$10,093	No
R52,R55,R56, C57,R58, R118, R119, R318, R320, R322, R323, R62, R67	MIT 1d	Yes	18	56.7	18	1020	$45	$14,571	No
R324, R68, R69, R74, C75, R75a-d	MIT 3a	No	9	None	12	900	$45	NA	NA
R70, R71, R72, R73	MIT 3b	Yes	15	57.6	12	900	$45	$8,438	No
R83, R84, R86	MIT 4a	Yes	3	23.9	12	1110	$45	$25,079	No
R81, R81a-b, R82, C116	MIT 4b1	No	5	None	12	585	$45	NA	NA
R85, R87, R88, R92	MIT 4b2-4	Yes	5	7.3	12	475	$45	$35,157	No
Mitigation Revised F Modified Alternative									
R304, R305, R306, R307	MIT 2n	No	4	None	NA	NA	$45	NA	NA
R309, R310, R311, R312, R315	MIT 2s	No	5	None	NA	NA	$45	NA	NA
R300, R301, R302	MIT 2c	No	3	None	20	900	$45	NA	NA
Mitigation Eastern Realignment Alternative									
R13E-R18E	MIT 6	Yes	6	7.1	12	460	$45	$58,310	No

NA = Not Applicable

for these impacted receptors. Technical mitigation analyses and CDOT Noise Abatement Worksheets are found in the *Noise Technical Addendum* in Appendix F.

Receptors C325 and C326 are commercial properties located along the CR 233 (Three Springs) Interchange southeast service road and would be impacted by both Revised F Modified and Eastern Realignment alternatives due to substantial noise increase only; noise levels are far below NAC Category C threshold of 71 decibels. No outdoor human activities areas were observed by field inspection of these commercial sites, which are the normal focus of FHWA traffic noise impact concern. Additionally, the commercial enterprises are not characterized by NAC D qualifying activities. Therefore, C325 and C326 were not considered for noise abatement under this mitigation analysis.

Noise barriers evaluated in this study are only effective when designed to benefit multiple receptors that are situated closely together. Individual receptors that are widely separated from other receptors may require similar noise barrier lengths and heights as a local group of homes to achieve the noise reduction design goal to be reasonable for construction. The individual receptor cost benefit index for a wall of sufficient length and height to provide the 7 dBA reasonable noise reduction for isolated, single sites is greater than the maximum allowable $6800 reasonableness criteria. Thus, for isolated impacted receptor R25E, no noise mitigation is recommended.

4.6.6.4. Mitigation for the Eastern Realignment Alternative

In addition to the abatement analysis in common with Revised F Modified Alternative, abatement was analyzed for one area consisting of homes R13E – R18E near Dreamy Draw and Craig Lane (MIT 6). No noise abatement was recommended for these receptors. Although the design goal noise reduction could be achieved by the proposed barrier, the resulting cost-benefit index was unreasonable. Technical mitigation analyses and CDOT Noise Abatement Worksheets are found in the *Noise Technical Addendum* (Appendix F).

Abatement measures are only effective when designed to benefit multiple receptors that are situated closely together. Individual receptors that are widely separated from other receptors may require similar noise barrier lengths and heights as a local group of homes to achieve the 7 dBA noise reduction design goal to be reasonable for construction. The individual receptor cost benefit index for a wall of sufficient length and height to provide reasonable noise reduction for isolated, single sites is greater than the maximum allowable $6800 reasonableness criteria. Thus, for isolated impacted receptors R8E, R9E, R10E, R12E, R21E, no noise mitigation is recommended.

4.6.7 Recommendations

This SDEIS does not recommend construction of noise barriers for the Revised G Modified (Preferred), the Revised F Modified or the Eastern Realignment alternatives.

- Noise abatement evaluated at MIT 1, MIT2, MIT3, MIT4, and MIT6 sites were determined to not be feasible and reasonable under 2011 CDOT Analysis and Abatement Guidelines (CDOT, 2011) noise abatement criteria, and no mitigation is recommended for these sites.
- Isolated receptor locations were determined to not meet the cost-benefit index reasonableness criteria for feasible and reasonable abatement and no mitigation is recommended at these sites.

4.7 Wetlands and Water Resources

4.7.1 No Action

There would be no impacts to wetlands and water resources as a result of the No Action Alternative. Some temporary wetland impacts from Maintenance activities along ditch seeps at the base of Farmington Hill would still occur regardless of the proposed action.

4.7.2 Direct and Indirect Impacts Common to All Action Alternatives

In addition to direct and indirect impacts for each alternative discussed below, the following discussion describes impacts that would be incurred by any of the action alternatives. Temporary impacts will likely be incurred from the action alternatives during construction. In areas where portions of wetlands are filled for highway construction, a 10-foot buffer is generally provided adjacent to the permanent impact area for equipment operation to allow compaction of embankment slopes. Temporary impacts are determined during final design and cannot be estimated at this time. Provided the source of hydrology is not removed, these areas can generally be restored on location as described in Section 4.7.7, Mitigation. If the hydrology source is removed, these areas would be considered permanent wetland impacts.

Indirect impacts to wetlands may occur from sediment discharges associated with stormwater, erosion, hydrologic modifications, noxious weed establishment, and habitat degradation from litter, trash, noise, or diminished diversity. These indirect impact factors are discussed in greater depth in the 2006 US 160 EIS. The majority of these impacts can be reduced or eliminated through mitigation measures that are included in the 2006 US 160 EIS and presented below in Section 4.7.7, Mitigation.

Direct impacts to wetlands from any of the alternatives will occur from wetland fills for highway construction. The amount of wetland impacts associated with any of the action alternatives is relatively minor when compared to overall impacts for the entire

US 160 Durango to Bayfield corridor (20.9 acres) or the Grandview Section (7.32 acres). Efforts to further reduce these impacts will be addressed in conjunction with final design of phased projects.

The functional analysis of wetland impacts for the alternatives being considered indicate that moderate and high functions impacted by the Revised G Modified (Preferred) Alternative are fewer than for the Revised F Modified and Eastern Realignment alternatives, and total acres of wetlands impacted are also fewer for the Revised G Modified (Preferred) Alternative. Primary functions that would be impacted under the Revised G Modified (Preferred) Alternative are sediment/nutrient/toxicant retention or removal. The following summary addresses specific wetlands and functions that would be affected by the action alternatives.

4.7.3 Direct and Indirect Impacts for Revised G Modified (Preferred Alternative)

The Revised G Modified (Preferred) Alternative would have the following impacts to wetlands:

- Wetland 2c-1 is a small (0.02 acre) roadside depression formed within the US 550 highway right-of-way supported by drainage from the adjacent agricultural field. The feature is dominated by immature willows. This feature would be removed for widening of US 550 from two to four lanes.
- Wetland 1c-3a is a small (0.01 acre) septic lagoon associated with the adjacent property. These features are typically non-jurisdictional and are not regulated under the Clean Water Act although they do support wetland vegetation and perform wetland functions. Removal of this feature would require replacement at another location or modification of the septic system to restore its function.
- Wetland 1b-9a includes a small portion of an irrigation ditch dominated by Barnyard grass, a wetland forb. Highway construction would remove a portion (0.001 acre) of the overall ditch area (0.02 acre) characterized as wetlands. The ditch would be restored on location and would continue to function for irrigation purposes.

Table 4-5 provides a summary of wetland and functional impacts for the Revised G Modified Alternative. See Figure 4-3 (a and b) for additional information.

Table 4-5. Summary of Wetland and Functional Impact Assessment—Revised G Modified

Alternatives	Wetland Impacts	Wetlands Impacted	High/Moderate Function Impacts
Revised G Modified	0.03 acre	2c-1, 1c-3a, 1b-9a	Sediment/Nutrient/Toxicant Retention or Removal (0.01 ac)

Figure 4-3a. Revised G Modified (Preferred) Wetland Impacts

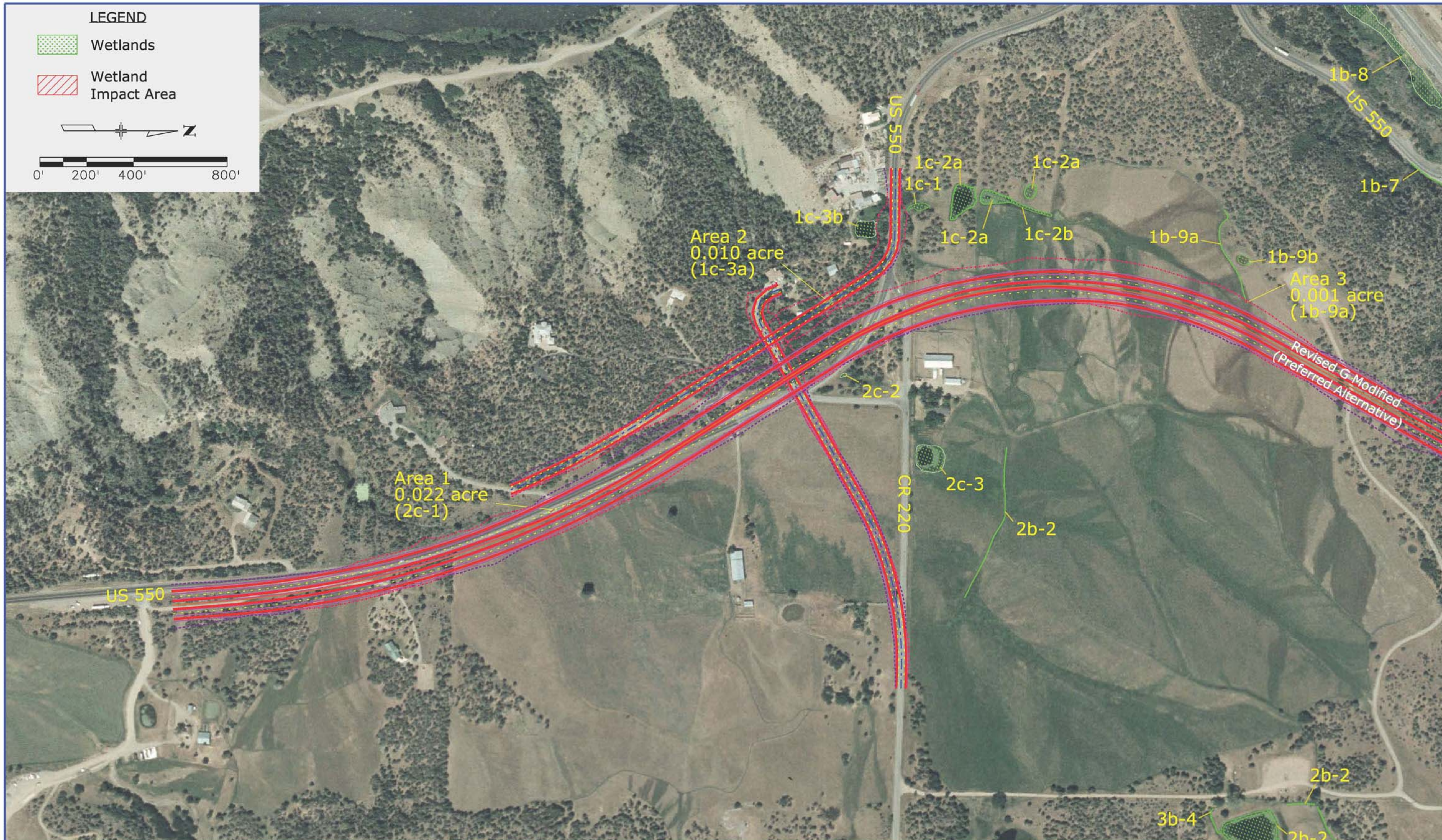
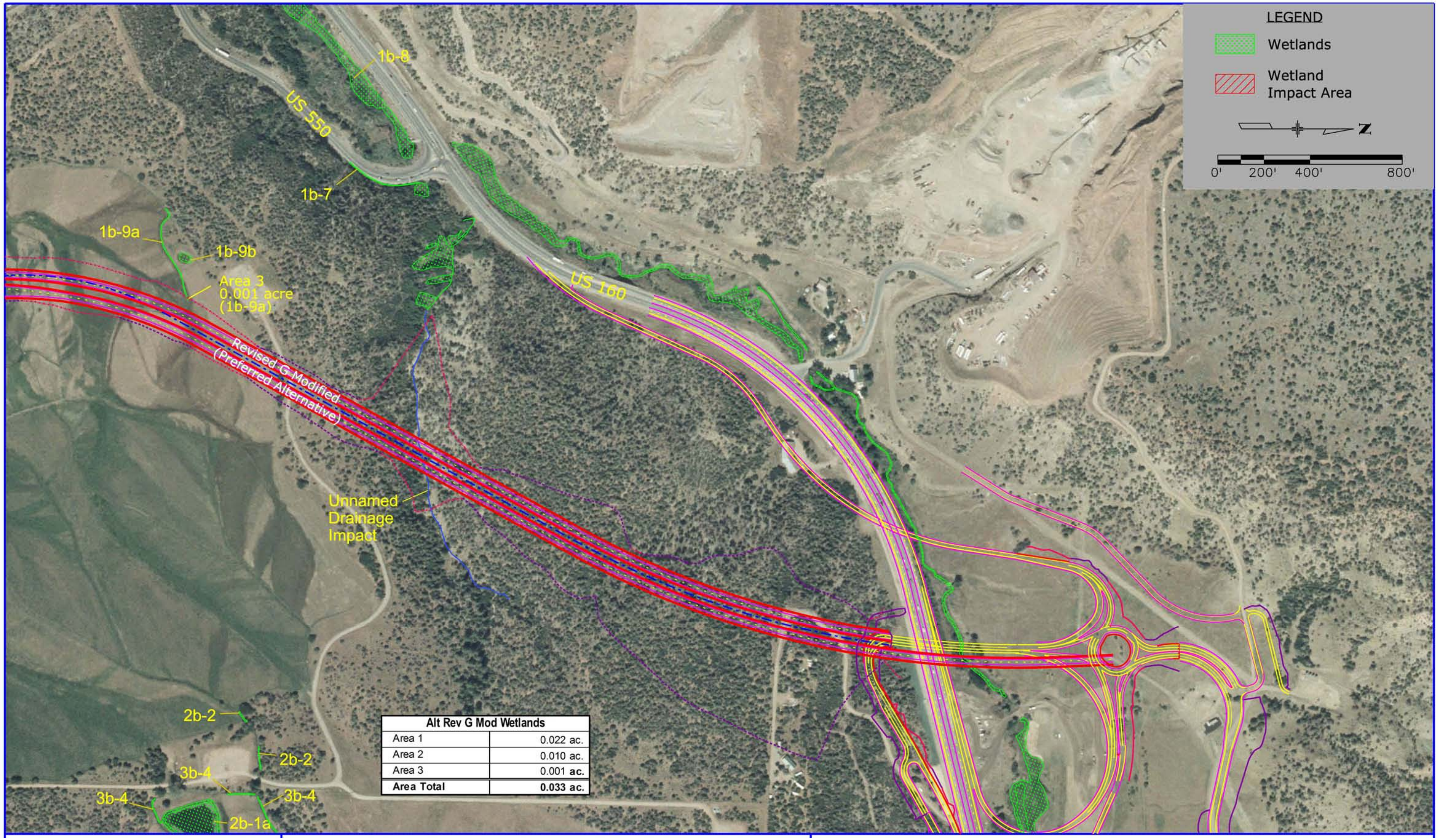


Figure 4-3b. Revised G Modified (Preferred) Wetland Impacts



4.7.4 Direct and Indirect Impacts for Revised F Modified

Wetland and functional impacts for the Revised F Modified Alternative are summarized in Table 4-6 and described in detail below.

Table 4-6. Summary of Wetland and Functional Impact Assessment—Revised F Modified

Alternatives	Wetland Impacts	Wetlands Impacted	High/Moderate Function Impacts
Revised F Modified	0.53 acres	2b-2, F Mod 2, F Mod 3, G-1, ER-12, ER-13	General Wildlife Habitat (0.074 ac) General Fish Habitat (0.064 ac) Sediment/Nutrient/Toxicant Retention or Removal (0.064 ac)

- Wetlands 2b-2, F Mod 2, and G-1 are each linear irrigation ditch features that would be partially removed by highway construction. A total area of 0.084 acre would be displaced by highway construction. The ditches would be restored on location and would continue to function for irrigation purposes.
- Wetland F Mod 3 is an irrigation pond fed by irrigation feature F Mod 2. The pond has a variable fringe of wetland vegetation depending on water levels and is dominated by Bull rushes. It provides functional benefits for fish and wildlife. An area of 0.052 acre of the total pond area (0.135 acre) would be removed by highway widening. The landowner may elect to expand the pond on location or move the entire pond to another location.

See Figure 4-4 (a and b) for more information.

Figure 4-4a. Revised F Modified Wetland Impacts

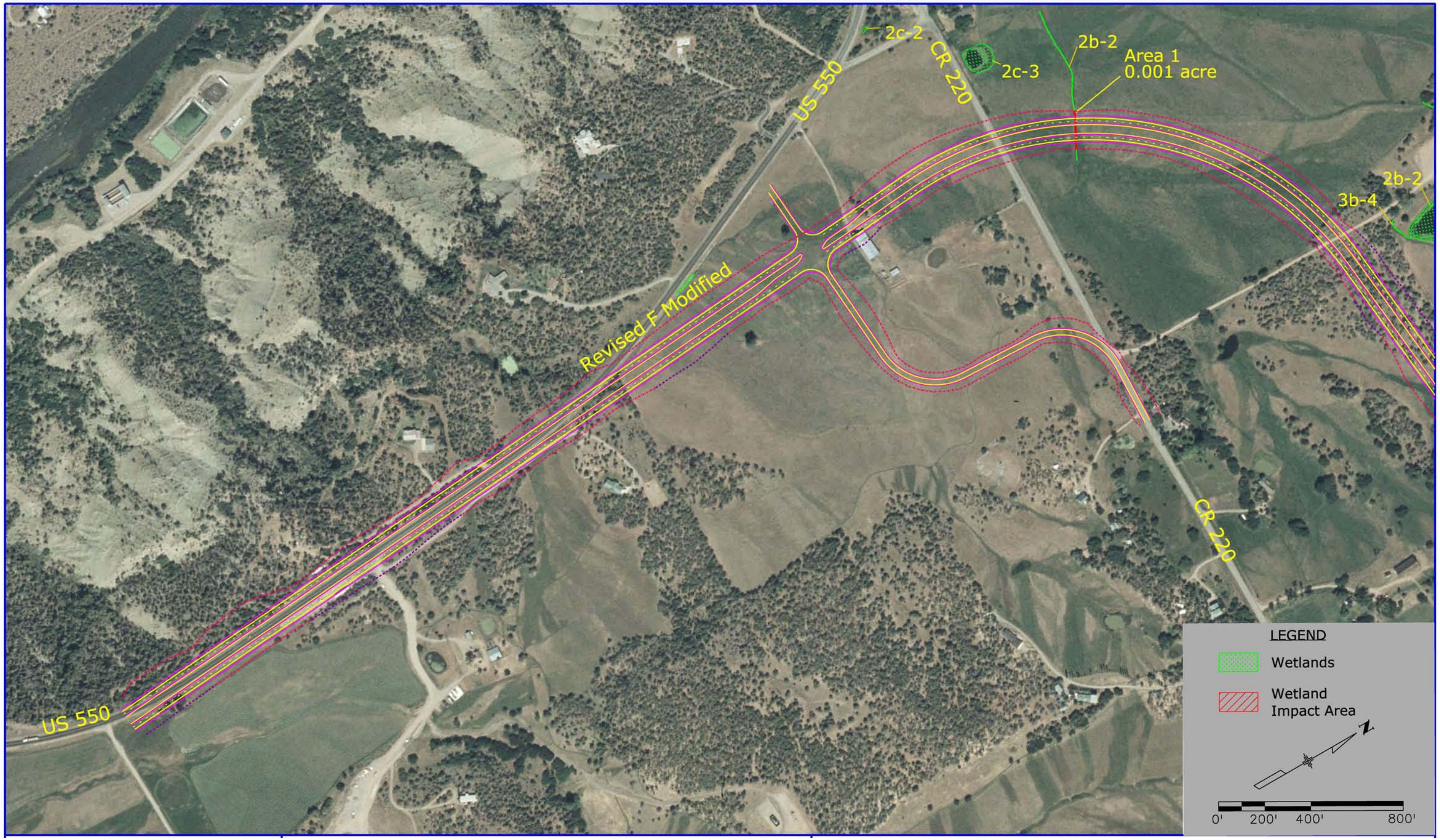
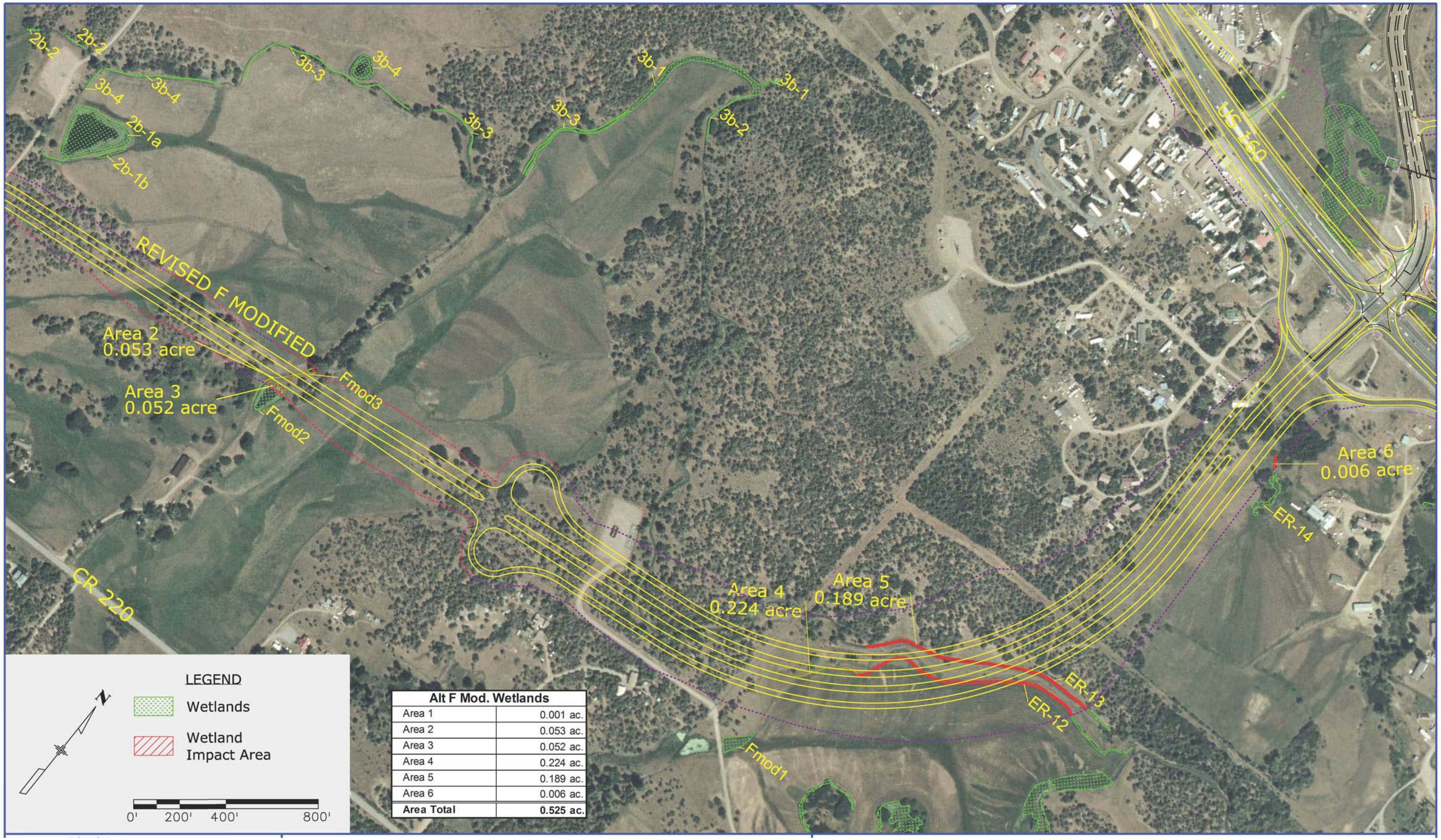


Figure 4-4b. Revised F Modified Wetland Impacts



Alt F Mod. Wetlands	
Area 1	0.001 ac.
Area 2	0.053 ac.
Area 3	0.052 ac.
Area 4	0.224 ac.
Area 5	0.189 ac.
Area 6	0.006 ac.
Area Total	**0.525 ac.**

4.7.5 Direct and Indirect Impacts for Eastern Realignment

Wetland and functional impacts for the Eastern Realignment Alternative are summarized in Table 4-7 and described in detail below.

Table 4-7. Summary of Wetland and Functional Impact—Eastern Realignment

Alternatives	Wetland Impacts	Wetlands Impacted	High/Moderate Function Impacts
Eastern Realignment	3.2 acres	ER-1, ER-2, ER-4, ER-5, ER-6, ER-7, ER-8, ER-9, ER-10, ER-12, ER-13, ER-14	General Wildlife Habitat (0.835 ac), Threatened & Endangered Species Habitat (1.1 ac), Groundwater Discharge/Recharge (1.1 ac), Uniqueness (0.002 ac), Sediment/Nutrient/Toxicant Retention or Removal (1.79 ac)

- Wetlands ER-7, ER-12, and ER-13 are wetlands that have formed within irrigation ditches constructed in upland areas that are supported by irrigation hydrology. Vegetation is a mix of immature willow and emergent vegetation consisting of rushes and sedges. These features are maintained and periodically cleaned by excavation to improve irrigation. Highway construction would most likely require piping of these ditches to maintain their irrigation function and 0.39 acres of wetlands would be permanently lost.
- Wetlands ER-1, ER-2, ER-4, ER-6, and ER-8 are also irrigation or roadside ditches constructed in uplands and supported by irrigation hydrology. Vegetation is dominated by willows and the wetlands meet the minimum habitat size to be considered suitable for southwestern willow flycatcher habitat. Highway construction would require realignment or piping of the ditches and mitigation for habitat loss of 1.07 acres would be required.
- Wetland ER-14 originates as a hillside slope seep in an otherwise upland area. The vegetation structure consists of willows, cattails, rushes and sedges. The hydrology source may be related to irrigation or seepage from artificial recharge such as a septic system, or water lines. A small portion of this wetland would be removed by highway construction and the majority of the wetland area could be maintained on location with the exception of 0.002 acres. Its location is isolated and does not have a connection to other surface waters.
- Wetlands ER-5, ER-9, and ER-10 are wet meadow complexes that have formed as a result of irrigation seepage into adjacent low lying areas. All three wetlands areas are located adjacent to prominent irrigation features. Predominant vegetation is generally emergent rushes and sedges that perform valuable water quality functions. The relatively large size of these combined wetlands and modification of the supporting hydrology would likely remove the majority of

these wetlands from production and require off site mitigation. A total area of 1.75 acres would require removal from production.

See Figure 4-5 (a, b, and c) for more information.

4.7.6 Other Water Resource Impacts

Other waters of the US within the project area include an unnamed ephemeral drainage feature tributary to Wilson Gulch and various irrigation ditches that are crossed by the alternatives. The unnamed drainage feature is a tributary to Wilson Gulch and is likely considered a jurisdictional water of the US. Approximately 250 linear feet of the unnamed drainage feature would be impacted by the Revised G Modified (Preferred) Alternative whereas the Revised F Modified and the Eastern Realignment alternatives miss this feature. For irrigation ditches to be considered waters of the US, they must have a surface connection to a jurisdictional stream, creek or river. Some irrigation ditches within the project area have return or wastewater flows that eventually return to the Animas River and may be considered jurisdictional waters of the US. Highway construction that affects these other waters of the US features is covered in the Section 404 Permit that has been issued for the 2006 US 160 EIS corridor. Wetlands associated with these features (if any) are already addressed in the quantification of wetland impacts.

4.7.7 Mitigation

The Section 404 Permit for the project corridor (Permit No. 200275568) provides the specific details regarding required submittals that shall be approved prior to each phase of project construction. Design variations from the 2006 US 160 EIS, for which the Section 404 Permit was developed, would be addressed in the Corps required submittals prior to project advertisement. Minor differences in wetland impacts between Alternatives G Modified and Revised G Modified provide an example of where impacts could possibly change from what was permitted under the 2006 US 160 EIS and what may eventually be constructed. In this example, fewer wetland impacts would be viewed as favorable by the Corps and this design variation could be permitted in conjunction with the preconstruction submittal to the Corps. Selection of a different alternative than what was permitted under the 2006 US 160 EIS such as what is being considered in the SDEIS will require greater coordination with the Corps due to the likely increase in wetland impacts compared to what was permitted under the 2006 US 160 EIS. An increase in wetland impacts over what was permitted would require a revision of the Section 404 Permit prior to signing of the Supplemental ROD and following a demonstration and determination that the selected Alternative is still the Least Environmentally Damaging Practicable Alternative (LEDPA).

Figure 4-5a. Eastern Realignment Wetland Impacts

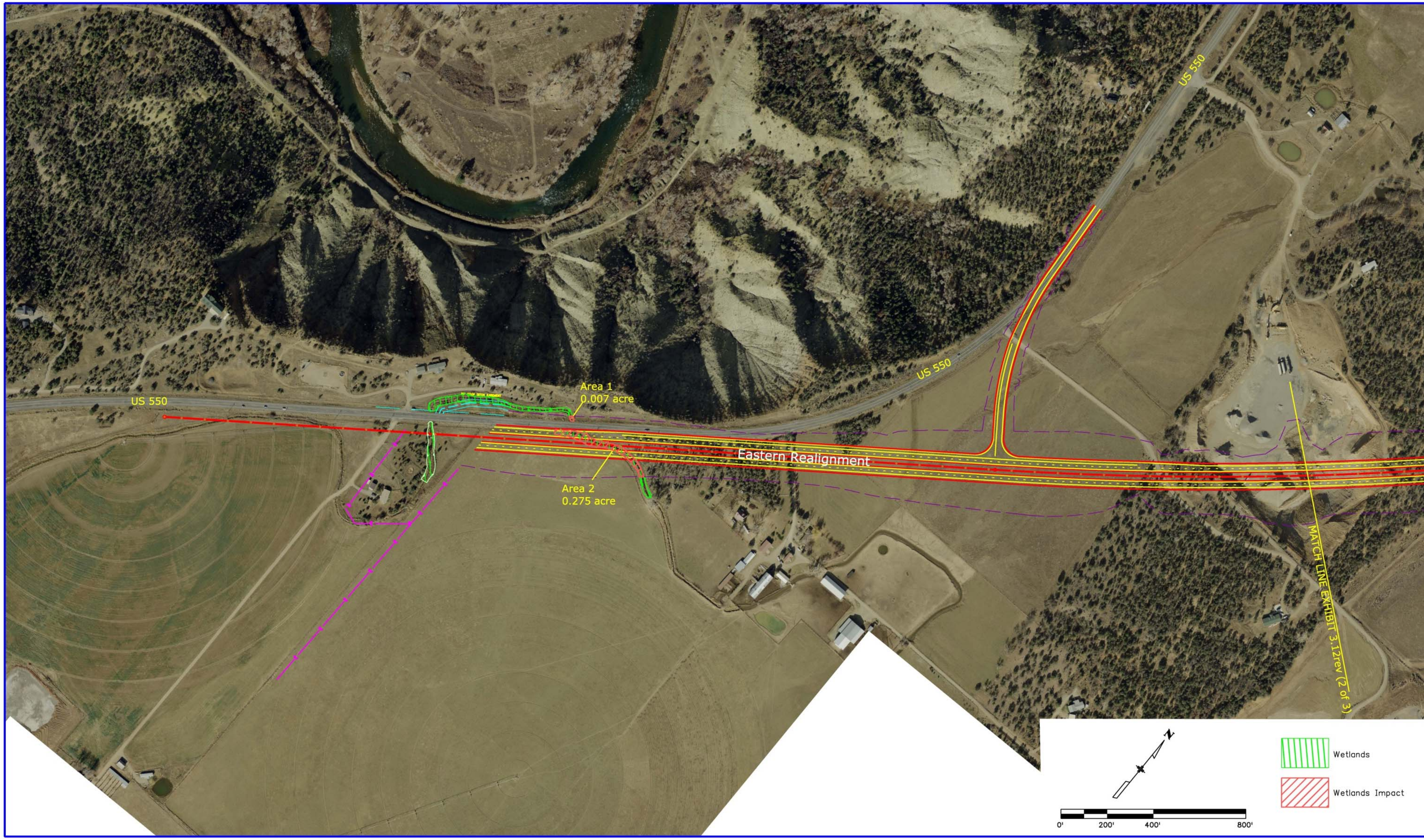


Figure 4-5b. Eastern Realignment Wetland Impacts

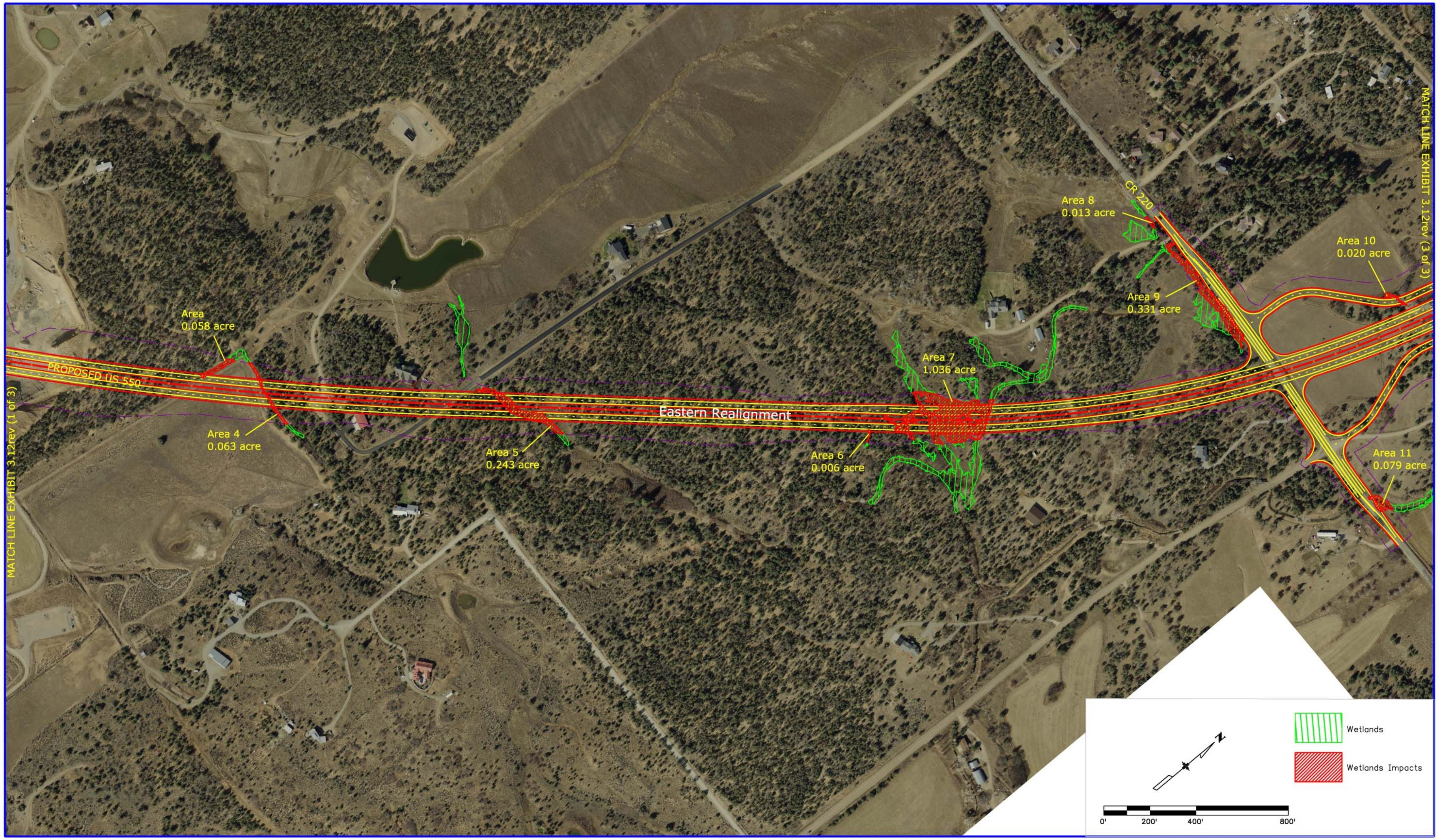
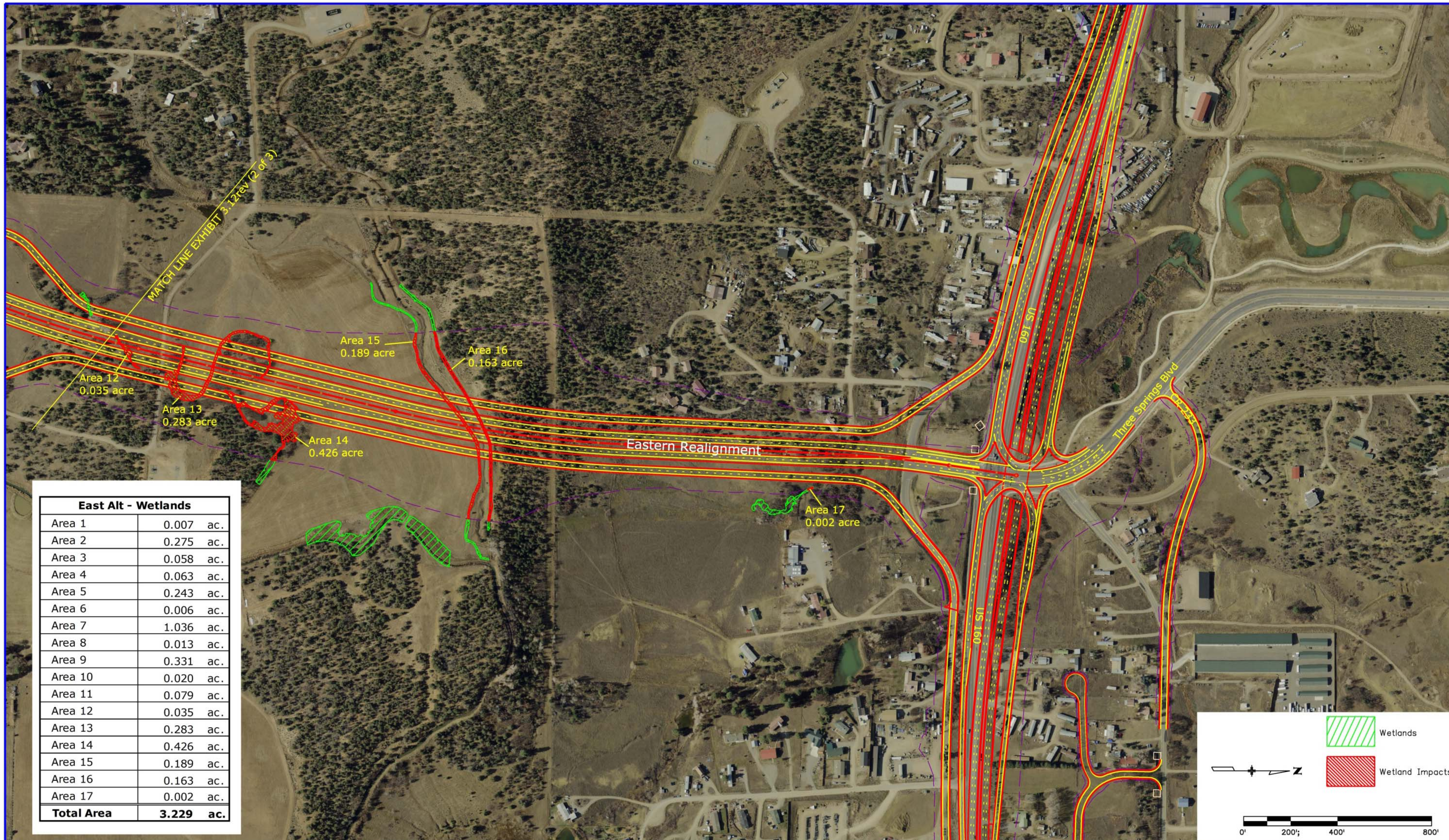


Figure 4-5c. Eastern Realignment Wetland Impacts



East Alt - Wetlands	
Area 1	0.007 ac.
Area 2	0.275 ac.
Area 3	0.058 ac.
Area 4	0.063 ac.
Area 5	0.243 ac.
Area 6	0.006 ac.
Area 7	1.036 ac.
Area 8	0.013 ac.
Area 9	0.331 ac.
Area 10	0.020 ac.
Area 11	0.079 ac.
Area 12	0.035 ac.
Area 13	0.283 ac.
Area 14	0.426 ac.
Area 15	0.189 ac.
Area 16	0.163 ac.
Area 17	0.002 ac.
Total Area	**3.229 ac.**

The Section 404 required submittals address jurisdictional status, wetland boundaries, project impacts, proposed mitigation, avoidance and minimization, indirect impacts, drainage, and erosion control. The 2006 US 160 EIS includes a discussion of avoidance, minimization, and mitigation measures and the preference for applying these measures in the stated order for both jurisdictional and non-jurisdictional wetlands in compliance with Executive Order 11990. The avoidance and minimization measures presented in the 2006 US 160 EIS are applicable to future phased projects and are also a condition of the Section 404 Individual Permit for the corridor. Section 404 Permit submittals for US 160 phased projects require a description of the methods taken to further avoid and minimize impacts to waters of the US taking into considerations cost, existing technology, and logistics in light of the overall project purpose.

Compensatory mitigation for unavoidable wetland and waters of the US impacts requires preparation of a comprehensive mitigation and monitoring plan approved by the USACE in the format of the Sacramento District's Habitat Mitigation and Monitoring Proposal Guidelines (USACE, 2004). The USACE also requires that wetland mitigation sites be protected by an instrument such as deed restriction or conservation easement to limit future impacts to mitigation sites. Temporary impacts are generally restored on location without the need for a formal protection instrument. Provided the supporting hydrology is not modified, temporary impact areas generally recover within the following growing season. Monitoring of temporary impacts is conducted to assure areas are restored to wetland habitat. Temporary impacts that do not recover are tracked in the Monitoring Reports and compensated by restoring wetland parameters on location or identifying alternate mitigation sites. Compensation for other waters of the US including irrigation and drainage features includes a requirement to maintain preconstruction flows and capacity consistent with preconstruction conditions and restoration of disturbances along riparian areas.

To assure that temporary impacts are restored following construction, temporary impact areas are protected using a geofabric membrane spread over the temporary impact area followed by two feet of straw and one foot of soil embankment material. This approach allows equipment operation within temporary impact areas while protecting native soils and vegetation from compaction. Upon completion of construction, fabric, straw, and soils are removed and the area allowed to revert back to wetlands following gentle scarification with a toothless backhoe.

Jurisdictional and non-jurisdictional wetlands such as those associated with irrigation features are generally restored at a 1:1 ratio based on CDOT's Programmatic Agreement with FHWA (*MOA Between the FHWA and CDOT Regarding the Programmatic Approval of Certain Wetland Findings*, 1991). Waters of the US features without associated wetlands will be restored to maintain their course, condition, hydraulic flow capacity, and location to the extent practicable. Vegetation including riparian and upland trees will be restored in accordance with vegetation mitigation commitments in the Vegetation, Wildlife, and Threatened and Endangered Species sections of the SDEIS. This generally includes tree replacement at a minimum 1:1 ratio and shrub replacement at a 1:1 ratio based on area.

Based on the relatively minor impacts associated with the US 160/US 550 connection, mitigation would likely be combined with other mitigation commitments from other projects at a protected site concurrently or in advance of project impacts. Wetland and waters of the US impacts discussed in this document are within the Tier 1 service area of the Animas River Wetland Mitigation (Zink) Bank. The Tier 1 designation allows for purchase of wetland credits from the bank at a 1:1 ratio for project impacts. The impacts are also within the same watershed as the Animas River Wetland Mitigation (Sugnet) creation site where CDOT has created 1.0 acre of wetlands on private property that can be used to compensate for impacts on the 2006 US 160 EIS corridor. Both of these sites have pre-approved Mitigation and Monitoring Plans that address success and performance criteria for the site. The limited wetland impacts for construction of the US 160/550 connection would most likely utilize one of the Animas River mitigation sites to account for permanent impacts on the project.

Additional measures to limit and reduce direct and indirect impacts to wetlands to the extent practicable will be accomplished through implementation of the following measures.

Measures applicable to the SDEIS include the following:

- Precautions will be taken when working in areas with shallow groundwater or areas that frequently carry surface water flows to avoid inadvertent hydrologic modifications.
- Unnecessary temporary impacts will be avoided by fencing the limits of disturbance during construction.
- BMPs will be used during all phases of construction to reduce impacts from sedimentation and erosion. BMPs will include the use of berms, brush barriers, checkdams, erosion control blankets, filter strips, sandbag barriers, sediment basins, silt fences, straw-bale barriers, surface roughening, and/or diversion channels.
- Specific permanent BMPs, including infiltration basins, trenches, wet ponds, and other practices will be evaluated during final design.
- No equipment staging or storage of construction materials will occur within 50 feet of wetlands or other waters.

- The use of chemicals, such as soil stabilizers, dust inhibitors, and fertilizers within 50 feet of wetlands and other waters will be restricted.
- Equipment will be refueled in designated contained areas, at least 50 feet away from wetlands and other waters.
- Where practicable, work will be performed during low flows or dry periods. If flowing water is present, it will be diverted around active construction areas.
- No discharge of effluent into wetlands or other waters will occur without appropriate discharge permits.
- Temporary fill material will not be stored within wetlands or other waters.
- All areas of exposed soil will be seeded and/or planted and mulched throughout construction (following the completion of each section). When seeding and/or planting cannot occur due to seasonal constraints, mulch and mulch tackifier will be placed for temporary erosion control.
- Upland seed mixes will not be used within wetlands.
- During design, wetland hydrology sources will be evaluated and connections to wetlands will be maintained if possible. If it is determined that construction would cut off the hydrological connection to a wetland, the impacts to that wetland will be mitigated.
- Any wetland areas used for construction access will be covered with a layer of geotextile, straw, and soil prior to use to minimize impacts and facilitate reclamation after use. The materials would be removed upon completion of use.
- Concrete washout structures will be constructed in designated areas at least 50 feet from wetlands and other waters of the US.
- Clearing and grubbing will include the conditions of the Migratory Bird Treaty Act, Endangered Species Act, Municipal Separate Storm Sewer System (MS4) permit, and Section 404 permit.
- CDOT will obtain access control lines along the entire corridor where possible. Access control lines designate where individual properties can be accessed along highways. An access point cannot be placed across an access control line. In this instance, access control lines would be used to limit impacts to wetlands; however, they are used for many other reasons.

Based upon the above considerations, it is determined that there is no practicable alternative to the proposed construction in wetlands and that the proposed action includes all practicable measures to minimize harm to wetlands that may result from such use.

4.8 Water Resources

This section has been combined with the Wetlands Section (see 4.7, Wetlands and Water Resources).

4.9 Vegetation

4.9.1 No Action

There would be no impacts to vegetation resources as a result of the No Action Alternative.

4.9.2 Direct and Indirect Impacts Common to All Action Alternatives

All action alternatives would directly affect vegetation communities through the removal of existing vegetation during construction, and through the long-term operation and maintenance of the highway. Additionally, impacts to native vegetation communities may also occur from the spread of noxious weeds and from erosion and sedimentation. Noxious weeds are likely to invade areas disturbed during construction, and may spread into adjacent native habitats and agricultural lands. Impacts and proposed mitigation measures for noxious weeds are described separately in Section 4.10, Noxious Weeds. Clearing and grading would remove vegetation and soil crusts that stabilize the soil surface, leading to increased erosion within and adjacent to the construction area, and deposition on downstream vegetation. Soil erosion and sedimentation reduces vegetation cover and productivity, and can have long-term effects on vegetation structure and composition in affected areas. Erosion and sedimentation would be controlled by erosion control practices required by CDOT's Colorado Discharge Permit System (CDPS) permit and project-specific stormwater management plan (SWMP).

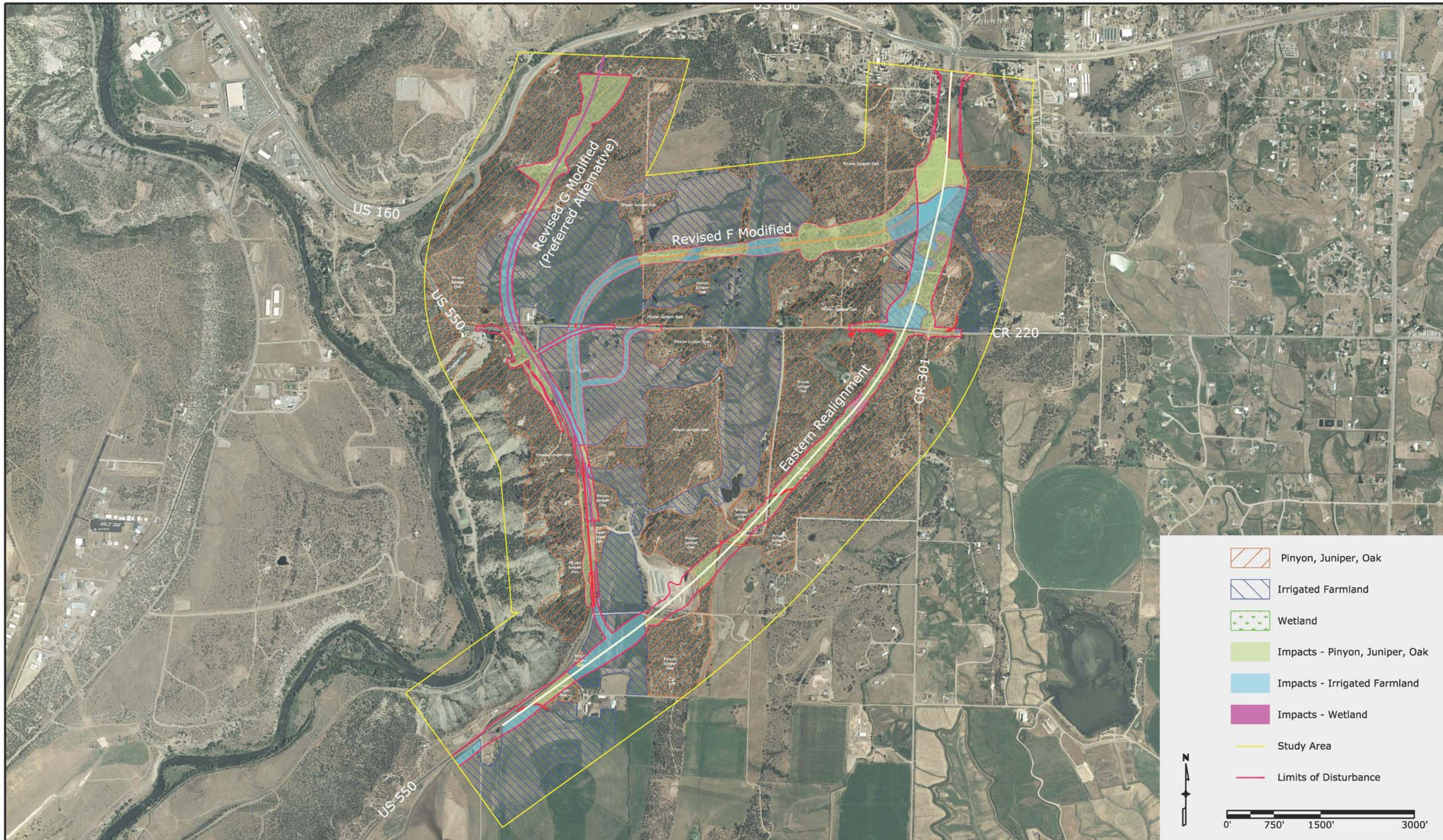
4.9.3 Direct and Indirect Impacts for Revised G Modified (Preferred Alternative)

Construction of this alternative would remove approximately 36.6 acres of piñon-juniper woodlands, 11.5 acres of irrigated agricultural lands, and 0.03 acre of wetlands (see Figure 4-6). The revision of the alternative to avoid the gas well discussed in Section 2.4.5 reduced impacts to piñon-juniper woodlands by 4.0 acres, increased impacts to irrigated agricultural lands by 0.46 acre, and reduced wetland impacts by 0.11 acre. No indirect impacts to vegetation are anticipated with the exception of an increased potential for the spread of noxious weeds. Implementation of mitigation measures discussed below will limit the potential for the spread of weeds.

4.9.4 Direct and Indirect Impacts for Revised F Modified

Construction of this alternative would remove approximately 39.3 acres of piñon-juniper woodlands (6.3 acres more than the Revised G Modified [Preferred] Alternative), 31.1 acres of irrigated agricultural lands (19.6 acres more than the Revised

Figure 4-6. Impacts to Vegetation Communities



G Modified [Preferred] Alternative), and 0.53 acres of wetlands (0.5 acres more than the Revised G Modified [Preferred] Alternative) (see Figure 4-6). No indirect impacts to vegetation are anticipated with the exception of an increased potential for the spread of noxious weeds. Implementation of mitigation measures discussed below will limit the potential for the spread of weeds.

4.9.5 Direct and Indirect Impacts for Eastern Realignment

Construction of this alternative would remove approximately 49.2 acres of piñon-juniper woodlands (12.6 acres more than the Revised G Modified [Preferred] Alternative), 33.7 acres of irrigated agricultural lands (22.2 acres more than the Revised G Modified [Preferred] Alternative), and 3.2 acres of wetlands (3.1 acres more than the Revised G Modified [Preferred] Alternative) (see Figure 4-6). No indirect impacts to vegetation are anticipated with the exception of an increased potential for the spread of noxious weeds. Implementation of mitigation measures discussed below will limit the potential for the spread of weeds.

4.9.6 Mitigation

Temporary disturbances in upland areas would be seeded with grasses, trees, and shrubs for soil stabilization, and likely would not be restored to the pre-project vegetation type. Therefore, with the exception of discrete wetlands that can be restored on-site, all affected upland vegetation communities within the construction footprint are considered to be permanent impacts to vegetation. Impacts to wetland areas are generally avoided or minimized to the extent practicable and are treated differently that upland vegetation communities.

Approximately 50 percent of the construction footprint would be occupied by the new roadway, shoulder, and other permanent facilities. The other half would be temporarily disturbed and revegetated following construction activities. Impacts to wetlands and replacement through compensatory mitigation are described in detail in Section 4.7, Wetlands and Water Resources.

Mitigation for vegetation impacts presented in the 2006 US 160 EIS and pertinent to the activities discussed within this document include:

- Silt fencing and other BMPs will be used to prevent degradation of habitats adjacent to the construction area by preventing transport of eroded sediment.
- Construction impacts will be minimized. The construction ROW will be fenced where it passes through sensitive areas to prevent temporary disturbance outside the construction limits.
- Trees removed during construction will be replaced at a 1:1 ratio based on a stem count of all trees with diameter at breast height of 2 inches or greater. Shrubs will

be replaced at a 1:1 ratio based on their pre-construction distribution. All replacement trees and shrubs will be native species.

- The abandoned and reclaimed road and ROW on Farmington Hill will be revegetated with native vegetation.
- Areas of piñon-juniper that will be impacted during construction but that are not needed as part of the permanent facilities (road and shoulder) will be revegetated with an appropriate mixture of native upland forbs, grasses, and low-growing shrubs. Taller vegetation (piñon pines, piñon-junipers, tall shrubs) will also be planted where the road is adjacent to piñon-juniper woodland and where planting of taller vegetation will not interfere with safety (sightlines and animal crossings).

Noxious weeds will be controlled during construction and habitat restoration (Section 4.10, Noxious Weeds). Mitigation measures for wetland impacts are detailed in Section 4.7, Wetlands and Water Resources.

4.10 Noxious Weeds

4.10.1 No Action

The No Action Alternative would maintain the trend related to the spread of noxious weeds. Infrastructure improvements (including transportation improvements to US 160) included in the No Action Alternative would likely result in some increase of noxious weeds.

4.10.2 Direct and Indirect Impacts Common to All Action Alternatives

All three action alternatives will directly and indirectly increase the spread of noxious weeds on lands currently occupied by wetlands, irrigated farmland and piñon juniper forested hillsides. Disturbance of native vegetation cover followed by grading and excavation will encourage the spread of weeds from airborne seeds and provide seed beds to allow establishment of weed species. Left unchecked, weed populations that become established within the disturbed areas are capable of spreading to adjacent lands resulting in degradation of wildlife habitat, wetlands, irrigated farmland, and habitat for threatened and endangered species. Infestation of lands by noxious weeds can have dramatic effects on land values and management costs to control the spread weeds.

The potential impacts from the spread of noxious weeds can be correlated to the area of disturbance. The larger the disturbance area the greater the potential is for noxious weed establishment. The actual areas that may establish populations of noxious weeds varies based on soil types, proximity of established weed populations, timing of moisture, competition by desirable species, and other unquantifiable variables.

4.10.3 Direct and Indirect Impacts for Revised G Modified (Preferred Alternative)

The Revised G Modified (Preferred) Alternative includes up to 65.1 acres of new disturbance on lands previously occupied by other uses including farming and piñon/juniper forest.

4.10.4 Direct and Indirect Impacts for Revised F Modified

The Revised F Modified Alternative includes 106.2 acres of new disturbance across lands previously occupied by other uses including farming and piñon/juniper forest.

4.10.5 Direct and Indirect Impacts for Eastern Realignment

The Eastern Realignment Alternative has the greatest level of new disturbance at 133 acres and has the greatest potential for the spread of noxious weeds.

4.10.6 Mitigation

Prior to the start of construction phases, CDOT will develop a project-specific noxious weed management plan that will be implemented during construction. The plan will include the results of an on the ground noxious weed inventory, weed management goals and objectives and preventative control measures including the following:

- Project plans will include pay items or a Force Account for herbicide treatment by the Contractor to address noxious weeds in conjunction with construction activities. Treatment measures will be identified in the Noxious Weed Management Plan and will be specifically tailored to seasonal timing and specific target species.
- Contractor vehicles arriving from other construction sites will be cleaned prior to any phased projects to ensure that soils, seeds, or debris capable of transporting noxious weeds are not brought on location.
- Periodic surveys will take place during construction to identify and treat noxious weed populations that may become established.
- Topsoil used in reclamation will be free of noxious weeds or will be treated prior to use per the Weed Free Forage Act (CRS, Title 35, Article 27.5).
- Disturbed areas will be reclaimed as soon as construction is finished and seeded using temporary cover or a permanent seed mixture of native grasses and forbs, depending on the season.
- Fertilizer will not be used in wetland seeded areas because it could enhance the growth of noxious weeds at the expense of desired vegetation.
- Certified weed free mulch will be used for reclamation, and weed-free straw bales will be used for sediment barriers per the Weed Free Forage Act (CRS, Title 35, Article 27.5).

- Herbicides will not be used within wetland areas that are considered habitat of the southwestern willow flycatcher or the New Mexico meadow jumping mouse unless otherwise allowed by USFWS. Spot treatment of non-habitat wetlands may be allowed using only aquatic-use herbicides, where mechanical means are unsuitable.

Weed control will use the principles of integrated pest management to treat target weed species efficiently and effectively by using a combination of two or more management techniques (biological, chemical, mechanical, and/or cultural [i.e. changing the typical or normal way of doing operations]). Weed control methods will be selected based on the management goal for the species, the nature of the existing environment, and methods recommended by the La Plata County Weed Supervisor, and other weed experts. The plan will avoid adverse impacts from herbicides, and management recommendations will be developed based on factors such as high groundwater and presence of riparian vegetation that would preclude the use of certain herbicides. Monitoring will be used to identify new weed infestations and to evaluate the effectiveness of weed control methods. Monitoring and weed controls will be implemented during construction and continued by CDOT maintenance personnel after the end of construction.

4.11 Wildlife and Fisheries

Highways impact terrestrial and aquatic animals through habitat fragmentation, direct and indirect habitat loss, temporary disturbance and displacement, and direct mortality. All animals are vulnerable to mortality from vehicle collisions. However, larger animals such as deer and elk also create a serious safety risk due to the amount of vehicular damage and injury or death collisions with these animals can cause.

Because of their migratory patterns, deer and elk utilize winter concentration areas and severe winter concentration areas in the vicinity of the project area and to the south of US 160 and US 550, and they must cross US 160 to move between summer and winter range. Existing characteristics of US 160 including the lack of wildlife exclusionary fencing and wildlife crossings, poor sight distance, and minimal shoulders contribute to the high frequency of wildlife-related accidents along the corridor.

4.11.1 No Action

There would be no impacts to wildlife and fisheries resources as a result of the No Action Alternative. Some mitigation components including fencing and the two large-mammal crossings shown on Figure 2.5.4 of the 2006 US 160 EIS would not be implemented.

4.11.2 Direct and Indirect Impacts Common to All Action Alternatives

Implementation of any action alternative would impact wildlife resources. Impacts common to all wildlife that utilize the study from large, medium and small mammals, heretofauna, reptors to songbirds will result from habitat fragmentation, alteration, loss, through the creation of physical barriers and potentially through vehicle collisions. Brief summaries of the potential wildlife impacts are presented below:

- Short-term, localized impacts to wildlife are expected during construction of any of the action alternatives. Removal (and restoration) of vegetation and increased noise and activity from the highway construction could cause temporary and permanent displacement of individuals from these areas.
- Construction activities have the potential to alter breeding behavior and destroy nests of bird species protected under the Migratory Bird Treaty Act (MBTA), including raptors.
- Wildlife would incur adverse impacts from loss of habitat due to expansion of the existing highway and its appurtenant features.
- The highway improvements would accommodate high traffic densities with an associated increase in mortality from vehicle collisions and/or avoidance of the highway.
- Increases in traffic volume and speed are positively correlated to increases in vehicle-wildlife collisions. The highway itself can create a physical barrier to the movements of small, medium and large animal species. Traffic densities and speeds, as well as the width of US 160, would increase as a result of the project and would increase the potential for conflicts.

4.11.3 Direct and Indirect Impacts for Revised G Modified (Preferred Alternative)

The implementation of the Revised G Modified (Preferred) Alternative would result in direct impacts to wildlife from the loss of approximately 36.6 acres of piñon-juniper woodlands, 0.03 acre of wetlands, and 11.5 acres of irrigated farmland that can serve as wildlife habitat. The project area serves as range for deer, elk, and bald eagles. Table 4-8 and Figure 4-7 through Figure 4-9 provide details for impacts to these resources.

The design carried forward in the 2006 US 160 EIS identified three locations for wildlife crossings in the Grandview Section. Two of these crossings will be included along the Revised G Modified (Preferred) Alternative alignment along the US 550 and US 160 south connection. These wildlife crossing locations have been moved east with the Revised G Modified (Preferred) Alternative alignment design, and will be situated in the same general locations along the alignment as what was originally proposed. Deer exclusionary fencing system, with deer guards at accesses and road intersections and fence-end treatments, will be placed along the entire length of the Revised G Modified (Preferred) Alternative to funnel animals into the proposed wildlife crossing locations.

Table 4-8. Impacts to Wildlife Habitat and Range (acres)

Habitat and Range	Impacts		
	Revised G Modified (Preferred)	Revised F Modified	Eastern Realignment
Wildlife Habitat*	48.1	70.9	86.0
Elk Winter Range	57.0	91.4	114.4
Elk Severe Winter Range	57.0	91.4	114.4
Elk Winter Concentration Area	26.2	0.0	0.0
Mule Deer Winter Range	57.0	91.4	114.4
Mule Deer Severe Winter Range	57.0	91.4	114.4
Bald Eagle Winter Range	57.0	91.4	114.4
Bald Eagle Winter Concentration Area	26.8	20.6	19.6

*Wildlife Habitat includes all mapped piñon -juniper woodlands, wetlands, and irrigated farmlands. Irrigated farmlands are included in this category as this vegetation community provides cover and forage for many wildlife species inhabiting the study area.

4.11.4 Direct and Indirect Impacts for Revised F Modified

Construction of the Revised F Modified Alternative would result in impacts of approximately 39.3 acres of piñon-juniper woodlands, 0.53 acres of wetlands, and 31.1 acres of irrigated farmland which can serve as wildlife habitat. The project area serves as range for deer, elk, and bald eagles. Table 4-8 and Figure 4-7 through Figure 4-9 provide details for impacts to these resources.

The original Revised F Modified Alternative design carried forward in the 2006 US 160 EIS identified 3 wildlife crossings in the Grandview Section, with 2 of the crossing locations to be determined (TBD) under final design. The two TBD crossings were situated along the US 550 and US 160 south connection. These wildlife crossings would be included in the Revised F Modified Alternative design being analyzed within the SDEIS. Deer exclusionary fencing will be placed along the entire length of the Revised F Modified Alternative alignment to funnel animals into the proposed wildlife crossing locations.

Figure 4-7. Impacts to Wildlife Range—Bald Eagle

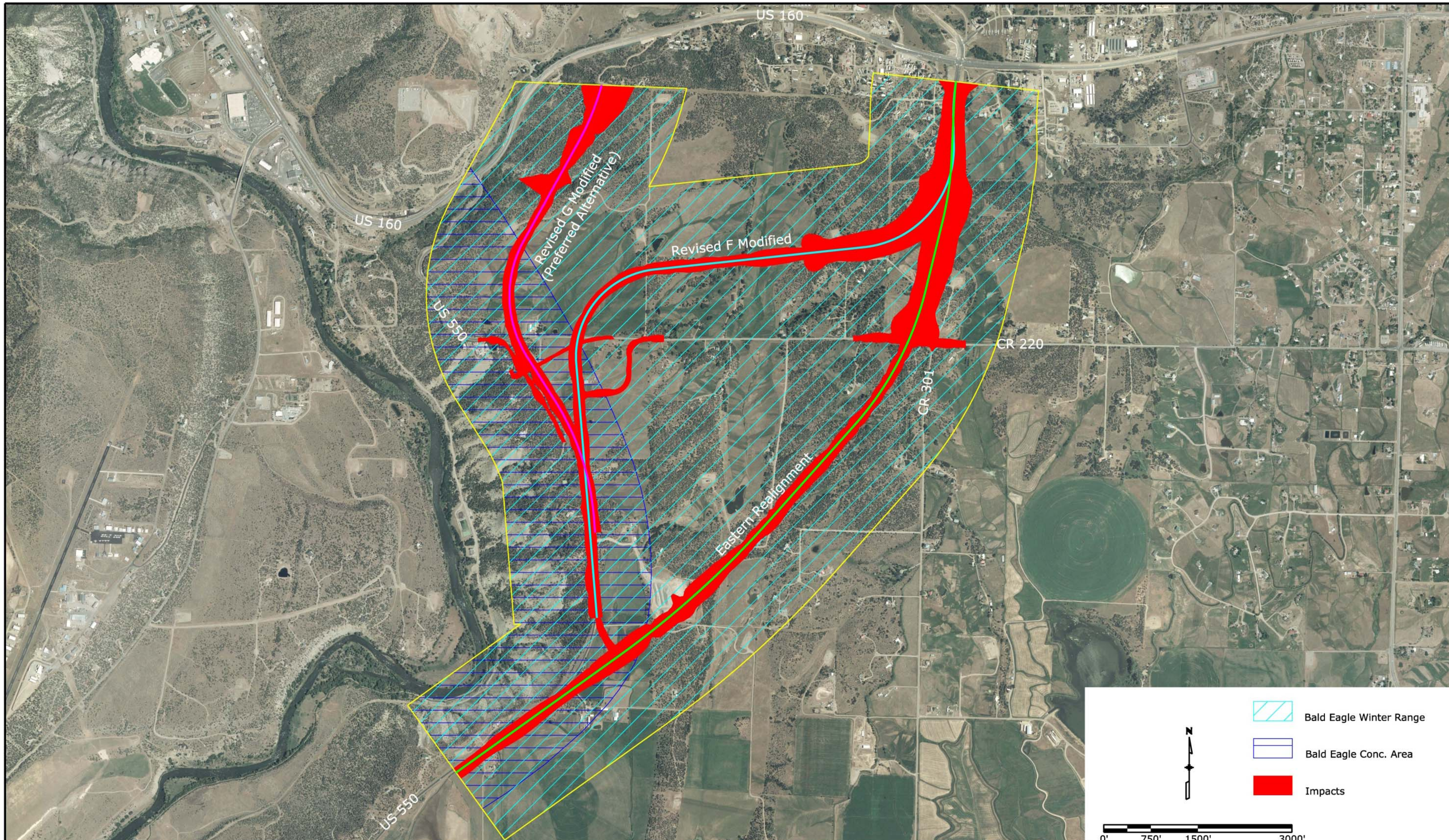


Figure 4-8 Impacts to Wildlife Range—Deer

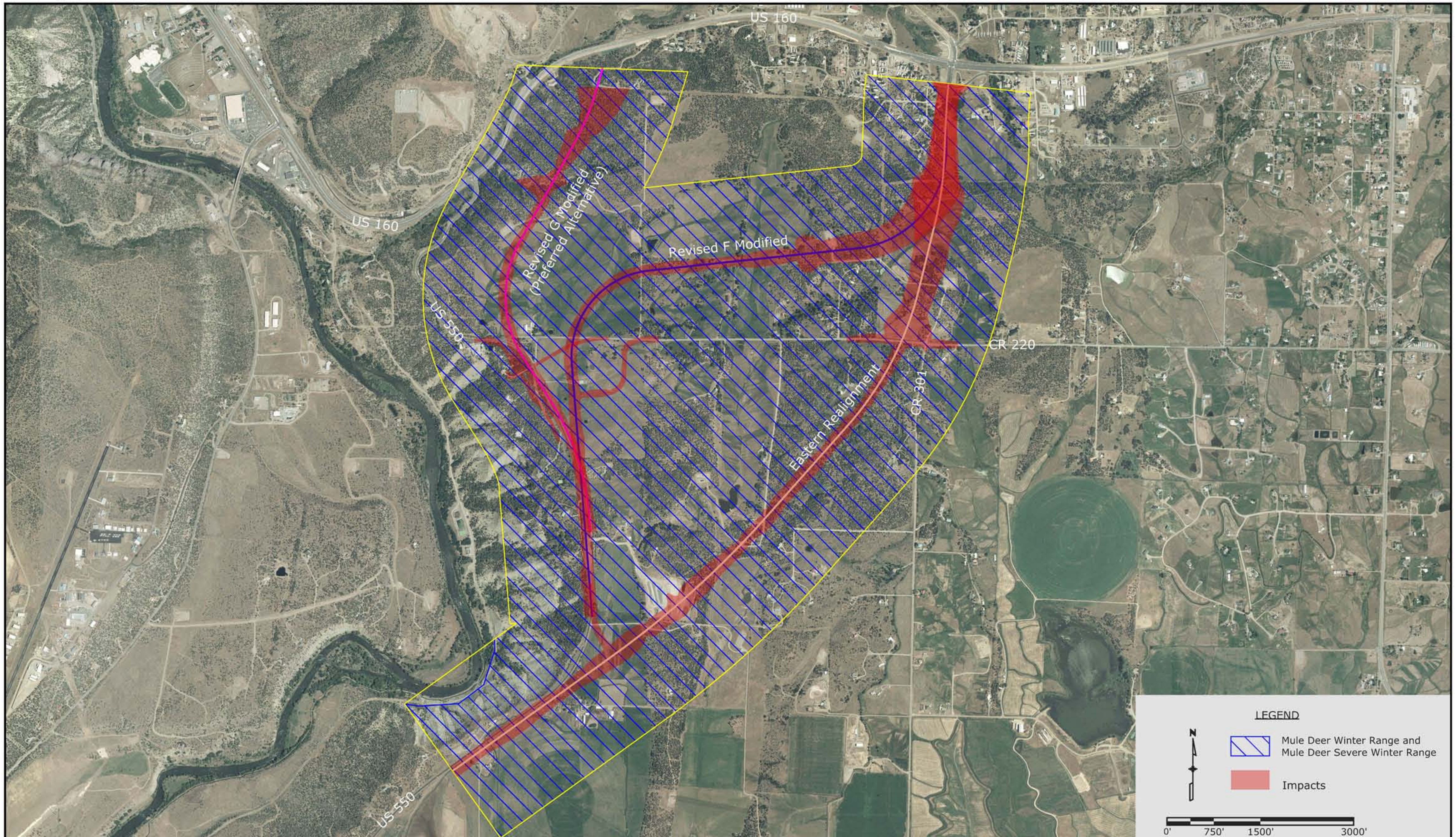
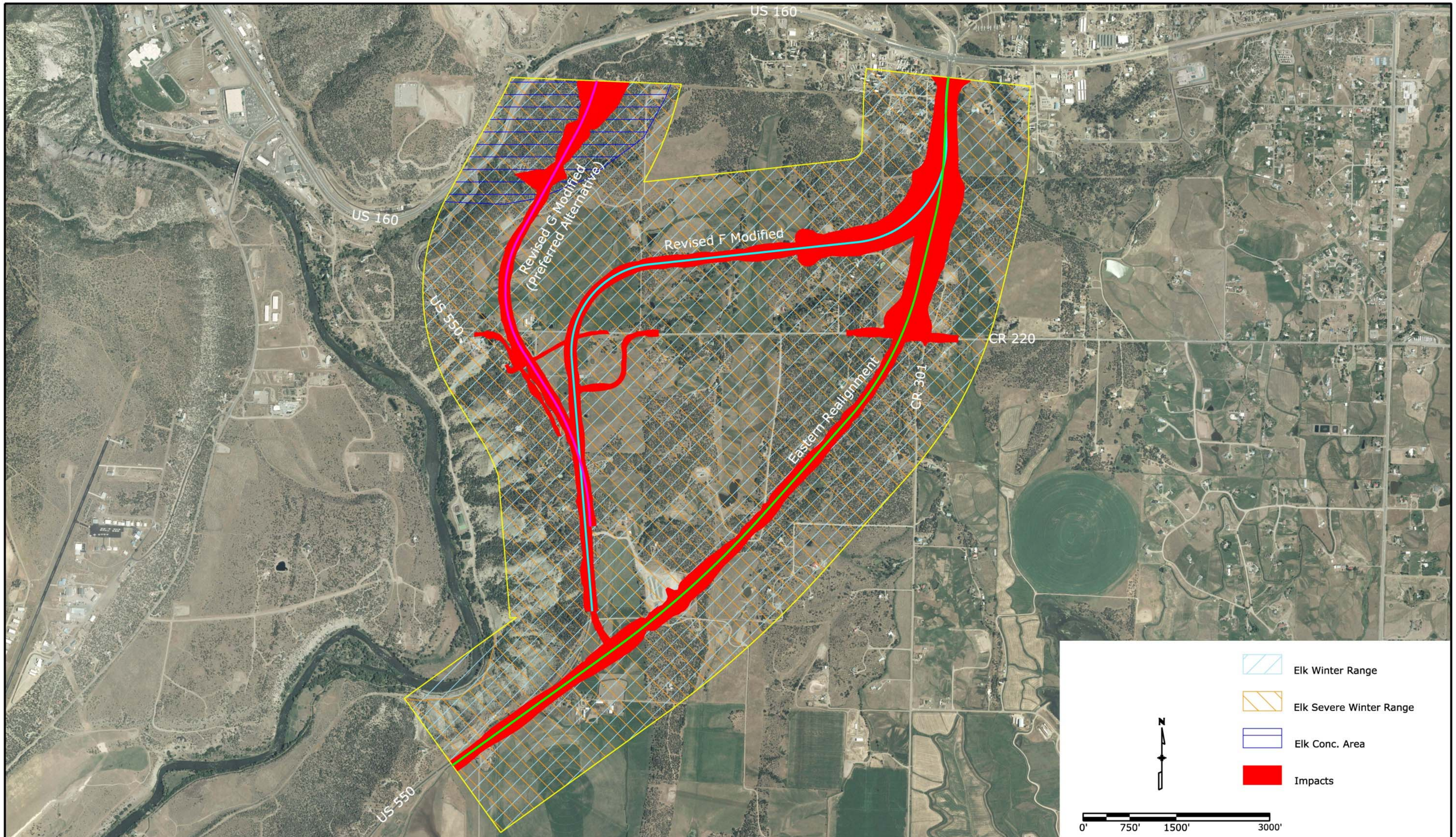


Figure 4-9. Impacts to Wildlife Range—Elk



4.11.5 Direct and Indirect Impacts for Eastern Realignment

Construction of the Eastern Realignment Alternative would result in approximately 49.1 acres of piñon-juniper woodlands, 3.2 acres of wetlands, and 33.7 acres of irrigated farmland which can serve as wildlife habitat. The study area serves as range for deer, elk, and bald eagles. Table 4-8 and Figure 4-7 through Figure 4-9 provide details for impacts to these resources.

Several drainages and varying topography would allow for the inclusion of multiple wildlife crossings in the Eastern Realignment Alternative design. These would be situated and further analyzed under final design. Additionally, deer exclusionary fencing would be placed along the entire length of the Eastern Realignment Alternative alignment to funnel animals into the proposed wildlife crossing locations.

4.11.6 Mitigation

Final design of the Revised G Modified (Preferred) Alternative will follow the multi-species approach presented in the 2006 US 160 EIS. This approach will help increase habitat connectivity and maintain permeability across the highway for ungulates, carnivores, and small- and medium-sized mammals. Please refer to Section 4.11.7 of the 2006 US 160 EIS for details of the mitigation strategy that will be carried forward in the SDEIS. Brief summaries of these mitigation strategies are included below.

4.11.6.1. Ungulates Including Deer and Elk

Proposed design features for wildlife exclusion fencing and multi-species crossing designs originally proposed and discussed in the 2006 US 160 EIS would be carried forward and implemented for the Revised G Modified (Preferred) Alternative analyzed in the SDEIS.

The construction of wildlife exclusion fencing and adequate numbers of wildlife crossings provide animals the opportunity to safely cross under the highway. Eight-foot high wildlife exclusionary fencing in conjunction with large-mammal underpasses will be used to reduce vehicle-wildlife collisions and provide road crossing opportunities. Fencing will incorporate deer guards at access points and earthen escape ramps, and fence end treatments. Underpasses will be sized with an openness ratio of 2.65 feet or more and minimum dimensions of 8 feet high and 20 feet wide.

To ensure that locations of wildlife crossings will be suitable, CDOT will continually collect data on roadkilled wildlife to identify trends in locations of vehicle-wildlife collisions. The specific crossing type that will be constructed and final locations may be modified during the final design to account for new information. Information, such as continued CDOT vehicle collision mortality records, track surveys, and local development trends that affect habitat linkages along the roadside will provide sufficient information to install the proposed wildlife crossings.

4.11.6.2. Small- to Medium-Sized Mammals Reptiles, and Amphibians

Culverts 3 to 5 feet in diameter will be installed to increase habitat connectivity and access across the highway for small mammals (rodents and lagomorphs such as rabbits and hares), medium-sized mammals (coyotes and foxes), reptiles and amphibians (turtles, toads, frogs). Culvert placement should occur in uplands with herbaceous cover, as well as drainages, and should be spaced every 500 to 1,000 feet in appropriate habitat to promote animal utilization. The numbers and site-specific locations of culverts will be determined in consultation with CDOW as part of final design. Appropriate fencing will be installed in these crossing areas to guide small mammals, reptiles and amphibians to the culvert openings.

4.11.6.3. Raptors

All raptor species are protected under the MBTA, which prohibits removing or disturbing active nests except under permit from USFWS. Raptor nest surveys will be completed prior to start of construction to identify active nests and potential areas where seasonal restrictions on construction may be required. If nests are located in the study area, protective seasonal buffer zones in compliance with those recommended by the CDOW will be established around active nests during construction to avoid disturbance to individual birds while nesting.

4.11.6.4. Migratory Bird Treaty Act

To the extent possible, vegetation removal activities will be timed to avoid the migratory bird breeding season (April 1 through August 31). Areas that must be scheduled for vegetation removal between April 1 and August 31 shall be surveyed for nests and approved by a qualified biologist prior to the initiation of work. Work buffers and work exclusion zones will be implemented as necessary to avoid impacts to nesting birds. Appropriate inactive nest removal and hazing/exclusion measures shall be incorporated into the work to avoid the need to disturb active migratory bird nests.

4.11.6.5. Fisheries

It is unlikely that any fisheries will be impacted by the alignments proposed within this SDEIS. BMPs for sediment control and sediment reduction techniques will be incorporated into the alternatives. These measures will ensure that sedimentation and siltation caused during the construction phase is reduced and water quality impacts are limited. These mitigation measures are described in the Wetlands and Water Resources section.

4.12 Threatened, Endangered and Sensitive Species

A Biological Assessment (BA), including the species identified in Section 3.12, was submitted to the USFWS in conjunction with the 2006 US 160 EIS to comply with Section 7 of the ESA requirements regarding impacts to federally threatened, endangered, or candidate species in the project corridor. This BA also addressed impacts to other special status species, like those listed by the State of Colorado as threatened, endangered, or species of concern. Likewise, updated consultation with the USFWS will occur with all future projects that occur after one year has lapsed since the most recent consultation, new species have been listed for protection, or if design variations have the potential to create new impacts to listed species.

As with the work performed under the 2006 US 160 EIS, species descriptions and biology were determined through literature searches. Appropriate agency representatives, field guides, and on-line resources provided information on the distribution and occurrences of listed species in La Plata County, the US 160 corridor, and the current study area.

4.12.1 No Action

There would be no impacts to threatened, endangered and sensitive species resources as a result of the No Action Alternative.

Additionally, the current project area contains bald eagle winter range and bald eagle winter concentration area. Impacts to these habitats would be avoided under the No Action Alternative.

4.12.2 Direct and Indirect Impacts Common to All Alternatives

Species with the potential to occur and be impacted by the action alternatives presented within this document are discussed below.

Federally Listed Species

Mexican Spotted Owl

Habitats preferred by the Mexican spotted owl (listed as threatened), including large, steep canyons with old-growth mixed conifer forests and shady, cool canyons with piñon-juniper and old-growth Douglas fir, do not occur in project corridor. Although Mexican spotted owls may use the periphery of the study area for foraging, no effects to this species are anticipated with implementation of any of the action alternatives.

State Listed Species

Bald Eagle

The bald eagle is listed as a species of concern by the state of Colorado. Bald eagles may be attracted by roadkilled wildlife, which makes them vulnerable to injury or death from vehicle collisions. The potential for vehicle collisions with bald eagles would decrease under all action alternatives, as wildlife exclusionary fencing will be included in the highway design. This has been proven to effectively decrease animal vehicle collisions, and thereby the potential for bald eagles to feed on roadside carrion.

Western Burrowing Owl

Implementation of any of the action alternatives may impact burrowing owls (state listed as threatened) by eliminating nesting habitat or disturbing nesting activity if individuals are present in the project corridor during construction. Gunnison's prairie dog towns or other burrows are considered potential habitat for burrowing owls, and a pre-construction survey will have to be completed to determine if any are located in proximity to the project area.

Sensitive Mammals

Piñon-juniper woodland impacts would occur as a result of all action alternatives. The removal of this habitat could potentially affect big free-tailed bats, Brazilian free-tailed bats, dwarf shrews, fringed myotis, and Townsend's big-eared bats (state listed species of special concern), if present in the study area. Impacts to these species from habitat loss would not affect populations as a whole, although loss of habitat may change distributions of individuals in localized areas where habitat is replaced by roadway features.

Sensitive Birds

Adverse impacts to peregrine falcon (state listed species of special concern) are unlikely under all action alternatives. Construction would not occur near nesting sites and would have minimal effects on prey base and hunting habitat within the study area.

Ferruginous hawks (state listed species of special concern) are unlikely to incur adverse impacts under any of the action alternatives. Construction of any of the action alternatives would cause only minimal habitat loss resulting in a reduction of potential hunting habitat and prey populations.

Columbian sharp-tailed grouse, Mountain Plovers, and long-billed curloos are not known to occur in the study area, and should not incur adverse impacts under any of the action alternatives.

Impacts to western snowy plover (state listed as a species of special concern) and white-faced ibis, as a result of construction, are unlikely, as these species are rare migrants in the study area.

All other sensitive bird species with potential to occur in the study area could be displaced during and after construction. Vegetation clearing, earth-moving, and other construction activities have the potential to alter breeding behavior and destroy nests of bird species.

Sensitive Amphibians, Fish and Reptiles

Construction of any of the action alternatives would have minor adverse effects on the northern leopard frog (state listed species of concern) and painted turtle, if present in the study area. The New Mexico spadefoot toad was identified as a state listed species of concern in the 2006 US 160 EIS, but has since been removed from that list. Leopard frogs and painted turtles may occur near areas with perennial water including wetlands and ponds throughout the entire highway corridor. Construction activities would eliminate some potential habitat and could cause injury or death to frogs in the construction zone. The reduction in potential habitat and population would be minor compared to the amount of habitat available, and wetland mitigation would replace the lost habitat.

Sensitive Plant Species

Implementation of any of the action alternatives may adversely impact sensitive plant species by eliminating individuals and local populations, if they are present within the construction zone. Field surveys concluded there was a potential for occurrence of these species, even though they were not observed. Therefore, additional surveys should be completed during final design and appropriate mitigation should be developed if sensitive plant species are located in the project ROW.

4.12.3 Direct and Indirect Impacts for Revised G Modified (Preferred Alternative)

Habitat for federally listed threatened, endangered, or candidate species was not identified within the Revised G Modified (Preferred) Alternative alignment study area. Therefore, selection of this alternative would have *No Effect* on listed species.

Construction of the Revised G Modified (Preferred) Alternative may impact, but is unlikely to significantly impact bald eagles. No known nests or communal roost sites would be impacted. As seen in Table 4-9, Impacts to Mapped Bald Eagle Habitat, approximately 57.0 acres bald eagle winter range/foraging, and approximately 26.8 acres of bald eagle winter concentration area would be removed as a result of this alternative. Given the amount of available habitat in the area, this would not reduce the size or overall distribution of the wintering population.

Table 4-9. Impacts to Mapped Bald Eagle Habitat

Alternative	Bald Eagle Winter Range	Bald Eagle Winter Concentration Area
Revised G Modified (Preferred)	57.0	26.8
Revised F Modified	91.4	20.6
Eastern Realignment	114.4	19.6

4.12.4 Direct and Indirect Impacts for Revised F Modified

Habitat for federally listed threatened, endangered, or candidate species was not identified within the Revised F Modified Alternative alignment study area. Therefore, selection of this alternative would have *No Effect* on listed species. Alternative Revised F Modified would have similar impacts to bald eagles as the Revised G Modified (Preferred) Alternative. This alternative would not impact any known nests or communal roost sites, but would remove approximately 91.4 acres of bald eagle winter range/foraging and 20.6 acres of bald eagle winter concentration area (see Table 4-9, Impacts to Mapped Bald Eagle Habitat). Given the amount of available habitat in the area, this would not reduce the size or overall distribution of the wintering population.

4.12.5 Direct and Indirect Impacts for Eastern Realignment

In 2010, CDOT conducted additional field reconnaissance within the Revised G Modified (Preferred), Revised F Modified, and Eastern Realignment alternatives. This work identified numerous sites meeting the minimum habitat requirements for southwestern willow flycatchers within the Eastern Realignment study area [depicted on Figure 3-8 (a and b) in Chapter 3]. As shown on Figure 4-10 (a and b), construction of the Eastern Realignment Alternative would impact 1.1 acres of suitable southwestern flycatcher habitat. Presence/absence surveys in these sites has not occurred, but would be conducted for the two years preceding the implementation of this alternative. Even if presence/absence surveys do not identify southwestern willow flycatchers utilizing the identified areas, it is probable that the removal of portions of or all of these patches from the construction and operation of the highway system *May Affect, but is Not Likely to Adversely Affect* this species. If survey efforts indicate the identified habitat patches are occupied, then it is probable that these impacts would likely be determined to *May Affect, and is Likely to Adversely Affect* the southwestern willow flycatcher. Consultation with USFWS would establish and formalize the determination of effects for this species.

The Eastern Realignment would have similar impacts to bald eagles as the Preferred Alternative. This alternative would not impact any known nests or communal roost sites, but would remove approximately 114.4 acres of bald eagle winter range/foraging and 19.6 acres of bald eagle winter concentration area (see Table 4-9, Impacts to

Figure 4-10a. Southwestern Willow Flycatcher Habitat

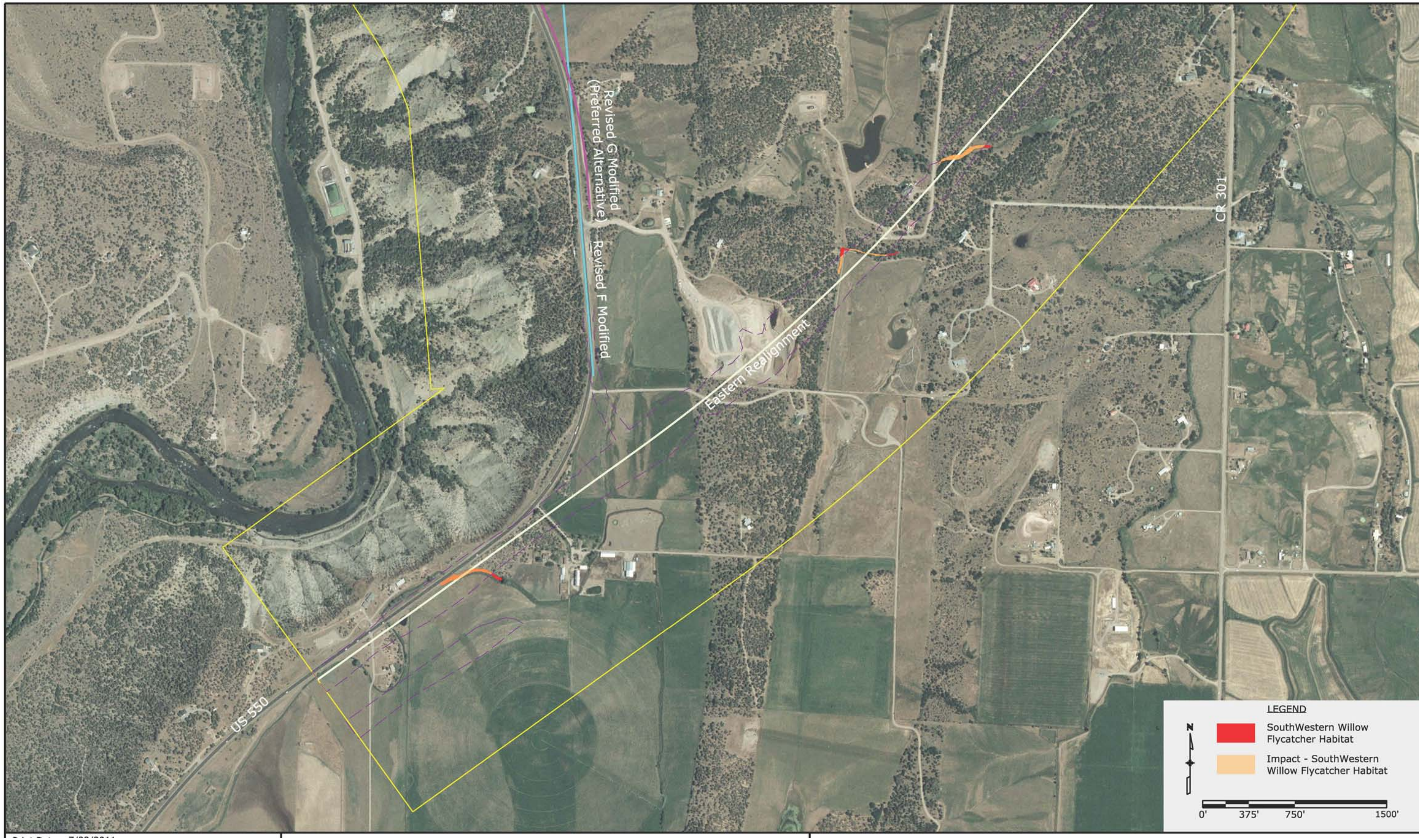
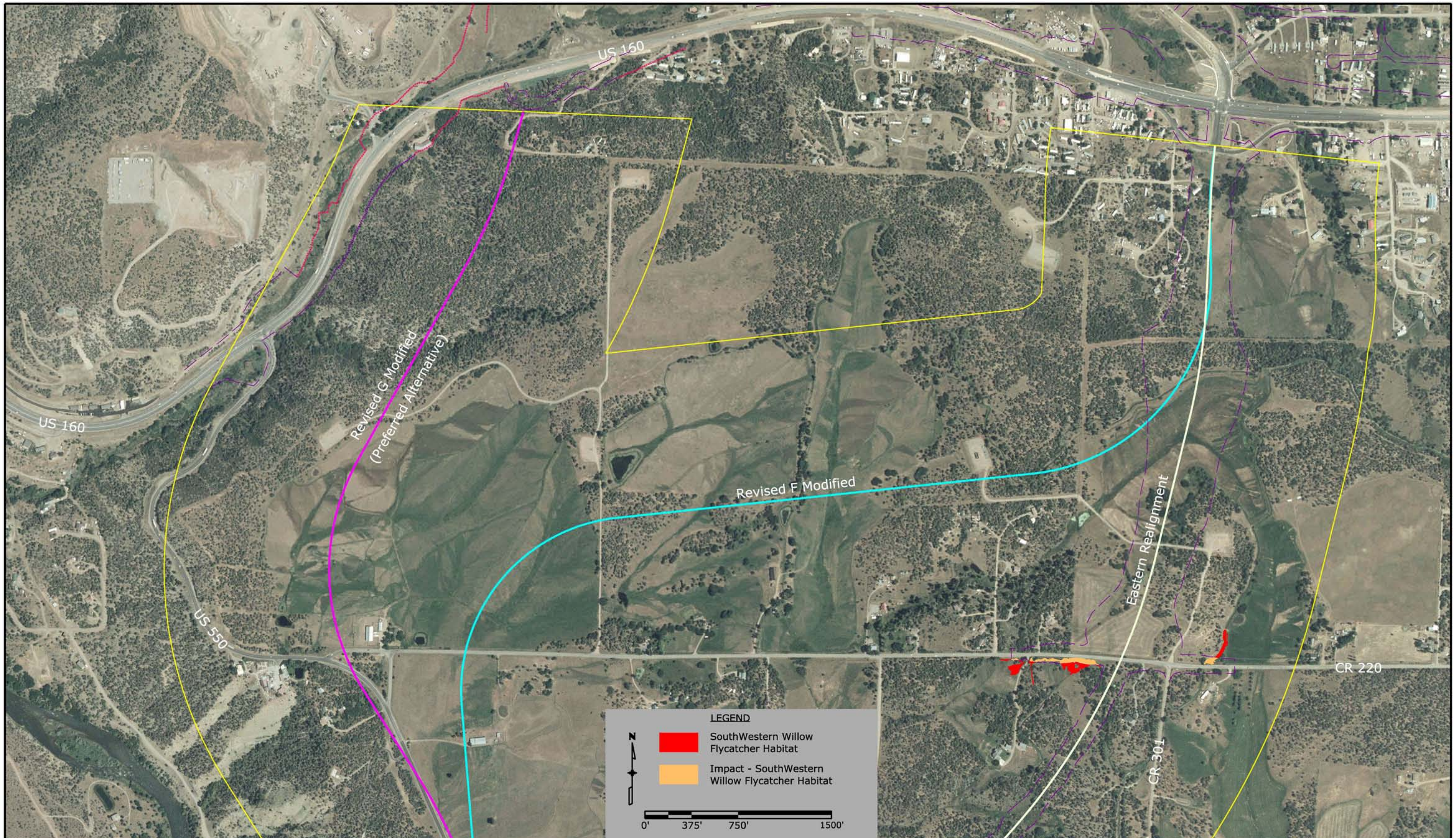


Figure 4-10b. Southwestern Willow Flycatcher Habitat



Mapped Bald Eagle Habitat). Given the amount of available habitat in the area, this would not reduce the size or overall distribution of the wintering population.

4.12.6 Mitigation

4.12.6.1. Southwestern Willow Flycatcher

Surveys for presence/absence of southwestern willow flycatchers will be conducted annually on all potential habitat patches prior to constructing specific highway segments. Willow patches measuring 6 feet in height that total 0.25 acres, and linear patches wider than 15 feet that cover at least 900 square feet that are closely associated with other willow patches totaling 0.25 acres will be surveyed.

Surveys will be required to determine presence or absence of southwestern willow flycatchers in habitat that will be affected or when construction will occur within 1,000 feet of affected habitat.

Seasonal restrictions will be implemented on construction activities to avoid taking any southwestern willow flycatcher habitat between May 1 and August 15 unless authorized through coordination with the USFWS. Buffers will be required around active nest areas or within 1,000 feet of an occupied habitat. During and after construction, CDOT will delineate sensitive habitats to avoid direct impacts from maintenance activities. Construction activities that begin in an area prior to May 1 in documented previously unoccupied habitat will not adversely affects Southwestern willow flycatcher nesting location choice. Direct impacts to any identified occupied southwestern willow flycatcher habitat will be avoided. If occupied habitat is discovered and will be impacted, habitat enhancement or other mitigation as determined through consultation with USFWS will be implemented.

4.12.6.2. Raptors

Raptor nest surveys will be conducted within 0.5 mile of the project area prior to starting construction. If an active or inactive nest is identified, a 0.5-mile buffer will be required around the nest, and seasonal restrictions on construction in the area will be implemented. Seasonal restrictions will coincide with the Raptor Buffer Guidelines established by the CDOW.

If bald eagle nocturnal roosts are identified, construction activity will be restricted within 0.25 mile of active nocturnal roost sites between November 15 and March 15, if bald eagles are present.

Perch and roost trees removed during construction will be replaced at a 2:1 ratio with an appropriate tree species, such as cottonwood.

4.13 Historic Preservation

This section provides information about the types of impacts anticipated for historic properties, including both archaeological and historic resources.

Section 106 of the National Historic Preservation Act (NHPA) (16 USC 470, as amended) and its implementing regulations (36 CFR 800) require Federal agencies to evaluate the effects of a planned undertaking on historic properties. Historic properties consist of sites, buildings, structures, districts, or objects generally more than 50 years old that are eligible for or listed on the National Register of Historic Places (NRHP). It also includes archaeological resources or sites. Criteria for evaluating the significance of historic properties and other information about historic resources can be found in Section 3.13 of the 2006 US 160 EIS.

4.13.1 Archaeological Resources

4.13.1.1. No Action Alternative

The No Action Alternative would have no impacts to any National Register of Historic Places (NRHP) eligible archaeological sites.

4.13.1.2. Direct and Indirect Impacts Common to All Action Alternatives

One archaeological site (5LP6665) common to all the action alternatives would be directly affected by earth-moving activities. The site is located adjacent to the existing alignment of US 550 near the differing south terminus of the action alternatives. 5LP6665 is NRHP eligible under Criterion D for its documented potential to contain significant intact subsurface cultural remains related to a variety of regional research themes. No indirect effects to archaeological sites are anticipated given the subsurface nature of all the localities. Table 4-10 provides a numerical comparison of impacts to archaeological sites.

Table 4-10. Direct Effects to NRHP-Eligible Archaeological Sites by Alternative

Alternative	Number of Sites Directly Impacted
Revised G Modified (Preferred)	4sites (5LP6665, , 5LP9588, 5LP9589 and 5LP9590)
Revised F Modified	7sites (5LP6665, 5LP9308, 5LP9309, 5LP9581, 5LP9582, 5LP9583 and 5LP9584)
Eastern Realignment	8 sites (5LP6665, 5LP6671, 5LP6673, 5LP9236, 5LP9241, 5LP9242, 5LP9244, 5LP9245)

4.13.1.3. Direct and Indirect Impacts for Revised G Modified (Preferred Alternative)

Based on conceptual design (including the proposed limits of construction), four archaeological sites (5LP6665, 5LP9588, 5LP9589 and 5LP9590) would be directly affected by construction activities for the Revised G Modified (Preferred) Alternative (see Table 4-10).

No indirect effects to archaeological sites are anticipated given the subsurface nature of all the localities.

4.13.1.4. Direct and Indirect Impacts for Revised F Modified

Seven archaeological sites (5LP6665, 5LP9308, 5LP9309, 5LP9581, 5LP9582, 5LP9583 and 5LP9584) would be directly affected by construction activities associated with implementation of the Revised F Modified Alternative (see Table 4-10).

No indirect effects to archaeological sites are anticipated given the subsurface nature of all the localities.

4.13.1.5. Direct and Indirect Impacts for Eastern Realignment Alternative

Eight archaeological sites (5LP6665, 5LP6671, 5LP6673, 5LP9236, 5LP9241, 5LP9242, 5LP9244, 5LP9245) would be directly affected by earth moving activities associated with implementation of the Eastern Realignment Alternative (see Table 4-10).

No indirect effects to archaeological sites are anticipated given the subsurface nature of all the localities.

4.13.2 Historic Resources

4.13.2.1. No Action Alternative

There are no impacts to historic resources as a result of the No Action Alternative, other than those already identified in the 2006 US 160 EIS.

4.13.2.2. Direct and Indirect Impacts for Revised G Modified (Preferred Alternative)

Craig Limousin Ranch (5LP9307): The highway realignment extends through the historic boundary of the ranch and introduces a new visual element to the setting. A total of 3.43 acres will be acquired of the Craig Limousin Ranch along the far western edge for widening of US 550. Minor impacts also occur to accommodate improvements to CR 220. CDOT has determined that the project results in an *adverse effect* to the entire Craig Limousin property. The State Historic Preservation Officer (SHPO) has concurred with this determination (see Appendix A).

Webb Ranch (5LP8461): The Revised G Modified (Preferred) Alternative enters the Webb Ranch approximately 115 feet from the toe of slope to the main barn, then proceeds along the western edge of Florida Mesa along a northerly track through mostly forested land before leaving the Webb Ranch and descending the mesa to connect with the Grandview Interchange. Some minor improvements to CR 220 are also needed and impact the ranch property. Approximately 41.5 acres of ROW is required for the Revised G Modified (Preferred) Alternative. Although the Revised G Modified (Preferred) Alternative would avoid the buildings on the Webb Ranch, the highway realignment extends through the historic boundary of the ranch and introduces a new visual element to the setting. CDOT has determined that this alternative results in an *adverse effect* to the entire Webb Ranch property. The SHPO has concurred with this finding (see Appendix A).

Co-op Ditch (5LP9257): This alternative will have a direct impact on 488 feet of segment 5LP9257.2 of the ditch as a result of widening the highway from two to four lanes. The ditch will likely be placed in a siphon. Given the overall length of the segment (7,984 feet), and the fact that the segment to be affected currently extends through two culverts where it crosses the highway, CDOT determined there was *no adverse effect*.

4.13.2.3. Direct and Indirect Impacts for Revised F Modified

Clark Property (5LP9310) The Revised F Modified Alternative extends through the northern edge of the Clark Property boundary. The main house on the Clark Property is about 725 feet south of the conceptual ROW for US 550 and about 190 feet north of any improvements associated with CR 220. A total of 6.5 acres of ROW is required on the Clark property. As a result, this property could potentially have a new highway alignment within its boundaries, which could compromise the setting, feeling, and association of the property and result in an *adverse effect.* The SHPO has concurred with this determination (see Appendix A).

Craig Limousin Ranch (5LP9307): The Revised F Modified Alternative impacts the western boundary along an expanded US 550 and the northwest corner of the Craig Limousin Ranch, requiring approximately 29.5 acres of right-of-way. Some minor improvements to CR 220 also require some right-of-way from the Craig Limousin Ranch. This impact occurs well away from the main complex of buildings. Part of this alignment may also cross a small area of the original homestead site (now in ruins), which is a contributing element to the overall ranch property. This results in an *adverse effect* to the ranch.

Schaeferhoff-Cowan Ranch (5LP9306) The Revised F Modified Alternative extends through approximately 20.7 acres of the northern portion of the Schaeferhoff-Cowan Ranch boundary. The presence of this alignment through the open land within the historic ranch boundary compromises the setting, feeling, and association of the property. Because the project would extend through open land that contributes to the significance of the Schaeferhoff-Cowan Ranch property, it would result in an *adverse effect* to the Schaeferhoff-Cowan Ranch. The SHPO has concurred with this determination (see Appendix A).

Webb Ranch (5LP8461): The Revised F Modified Alternative enters the historic boundary of the Webb Ranch approximately 400 feet east of the ranch building and structures. The structures would not be physically impacted. The alignment curves toward the east and stays on the ranch property for a distance of approximately three miles, requiring approximately 32.6 acres of right-of-way. Although the Revised F Modified Alternative would avoid the buildings on the Webb Ranch, the highway realignment extends through the historic boundary of the ranch and introduces a new visual element to the setting. CDOT has determined that this alternative results in an *adverse effect* to the entire Webb Ranch property. The SHPO has concurred with this finding (see Appendix A).

Webb-Hotter Lateral (5LP9256): The Revised F Modified Alternative would directly impact both segments of the Webb-Hotter Lateral Ditch. The conceptual centerline curves through the northwest quadrant of the Schaeferhoff-Cowan Ranch and will impact 1,423 feet of Segment 5LP9256.1. The alternative centerline also curves through the eastern portion of the Webb Ranch and impacts 1,096 feet of Segment 5LP9256.2. Portions of these segments will likely be placed in siphon structures. CDOT has determined that this alternative would result in an *adverse effect* to the Webb-Hotter Lateral Ditch, because a significant percentage of the overall lateral length will be impacted by these alignments. The SHPO has concurred with this finding (see Appendix A).

Co-op Ditch (5LP9257): This alternative will have a direct impact on 488 feet of segment 5LP9257.2 of the ditch as a result of widening the highway from two to four lanes. The ditch will likely be placed in a siphon. Given the overall length of the segment (7,984 feet), and the fact that the segment to be affected currently extends through two culverts where it crosses the highway, CDOT determined there was *no adverse effect*.

4.13.2.4. Direct and Indirect Impacts for Eastern Realignment

Craig Limousin Ranch (5LP9307): The Eastern Realignment Alternative enters the Craig Limousin Ranch property at the point where it diverges from US 550. It separates the main ranch complex (including the dairy barn and outbuildings) from the saddle shop and barn in the northern section of the ranch. It brings the new highway alignment closer to the building complex and introduces a significant visual element to the property. This alternative would impact approximately 21.0 acres of the Craig Limousin Ranch.

Schaeferhoff-Cowan Ranch (5LP9306): The Eastern Realignment Alternative traverses through the western half of the Schaeferhoff-Cowan Ranch property and includes some improvements along CR 220. None of the buildings are directly affected, but the new highway alignment extends through open agricultural land which contributes to the significance of this ranch property. Approximately 42.7 acres of ranch property are impacted. Because the project would extend through open land that contributes to the significance of the Schaeferhoff-Cowan Ranch property, it would result in an *adverse effect* to the Schaeferhoff-Cowan Ranch. The SHPO has concurred with this determination (see Appendix A).

Co-op Ditch (5LP9257): The Eastern Realignment Alternative impacts segments of the Co-op Ditch located on the Schaeferhoff-Cowan Ranch. Approximately 190 feet of 5LP9257.1 is directly impacted, including a 30-foot existing structure under CR 220. Due to the angle of the pipe in this location, the water will likely be placed in a new longer pipe and not in an extension of the existing pipe. In addition, approximately 488 feet of segment 5LP9257.2 is impacted where the Co-op ditch crosses under US 550 near the southern terminus of the Eastern Realignment Alternative. CDOT has determined and the SHPO has agreed that this impact is a *no adverse effect* (see Appendix A).

Webb-Hotter Lateral (5LP9256): The Eastern Realignment Alternative directly impacts approximately 870 feet of segment 5LP9256.1 of the Webb-Hotter Lateral Ditch on the Schaeferhoff-Cowan Ranch. The water in this section of the ditch will be relocated to a siphon structure. Because the impacts to this portion of the ditch lateral are minor, CDOT has determined that this alternative would result in *no adverse effect*. The SHPO has concurred with this determination (see Appendix A).

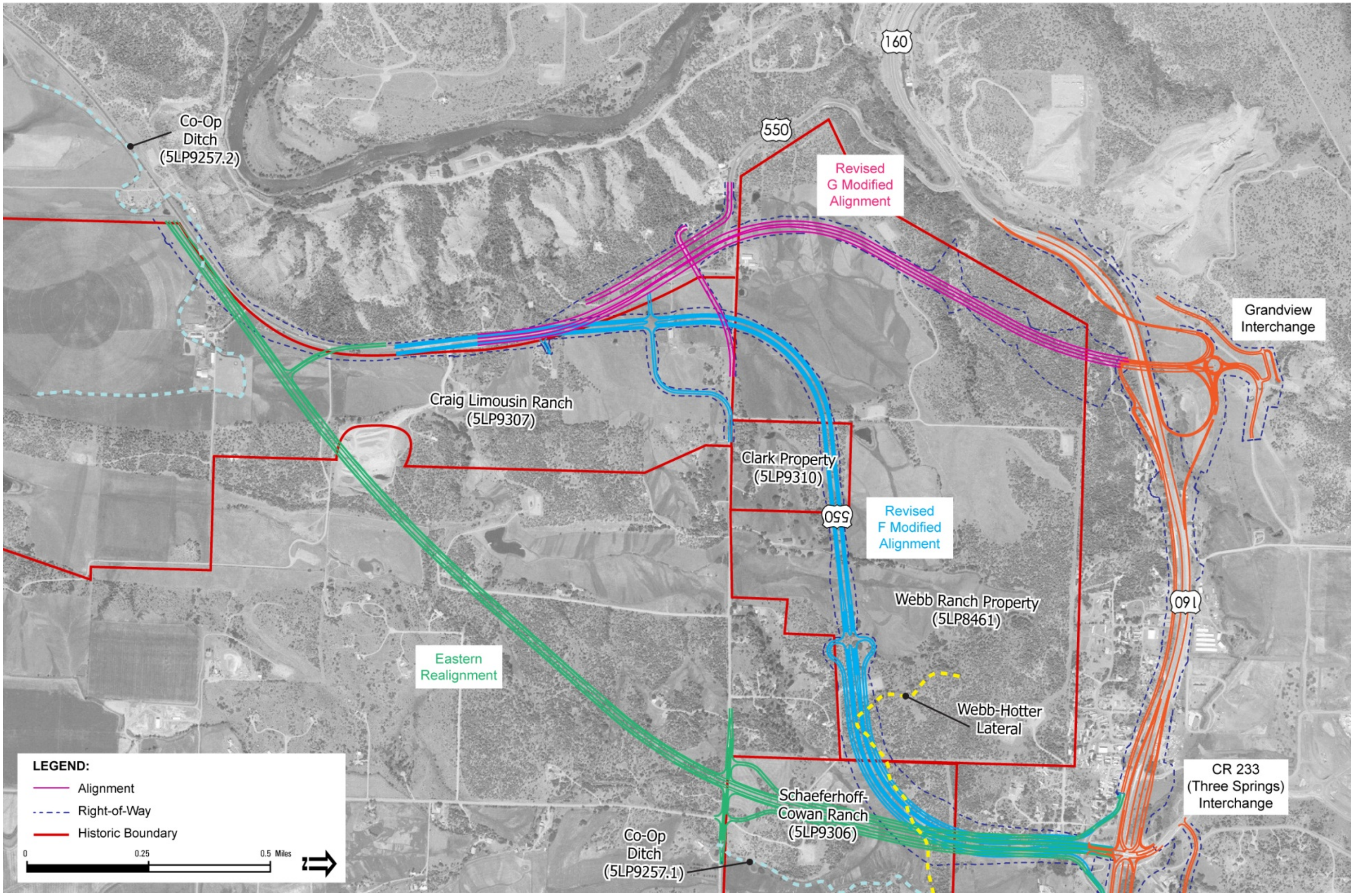
4.13.2.5. Direct and Indirect Impacts Common to All Action Alternatives

All action alternatives would result in an adverse effect to the Craig Limousin Ranch, and no adverse effect to the Co-op Ditch. The effects to these properties vary by alternative as discussed below and as shown on Figure 4-11. Table 4-11 summarizes the impacts to these properties.

Table 4-11. Historic Resources Impact Summary

Alternatives	Historic Resource Impacts with Official Section 106 Determinations					
	Clark Ranch	Craig Limousin Ranch	Schaeferhoff-Cowan Ranch	Webb Ranch	Co-op Ditch	Webb-Hotter Lateral Ditch
Revised G Modified (Preferred) Alternative	None	Adverse Effect	None	Adverse Effect	No Adverse Effect	None
Revised F Modified Alternative	Adverse Effect	Adverse Effect	Adverse Effect	Adverse Effect	No Adverse Effect	Adverse Effect
Eastern Realignment Alternative	None	Adverse Effect	Adverse Effect	None	No Adverse Effect	No Adverse Effect

Figure 4-11. Historic Property Impacts



4.13.3 Mitigation

4.13.3.1. Archaeological Resources

FHWA has determined that the NRHP eligible archaeological sites are significant chiefly because of what can be learned by data recovery, and therefore they have minimal value for preservation in place. The SHPO did not object to this determination. Consequently, controlled data recovery excavations at each site will effectively mitigate the adverse effect. This action is stipulated in the Draft Section 106 Memorandum of Agreement executed for the project, which is included in Appendix H.

At such time as one or more NRHP eligible archaeological sites referenced above is within the limits of a planned and funded construction project and therefore in danger from earth-moving activities, an Archaeological Data Recovery Plan defining the methodology and goals for excavation will be completed. The plan will meet all criteria outlined in the Secretary of the Interior's Standards and Guidelines for Archaeological Documentation, in addition to the procedures and protocols developed by the Colorado Office of Archaeology and Historic Preservation. The Data Recovery Plan(s) will be reviewed and approved by the SHPO prior to issuance of an excavation permit and initiation of controlled excavations. The consulting parties and tribal governments will also be provided the opportunity to review and comment on the excavation plan(s) prior to implementation.

To the best of our knowledge and belief, no human remains, associated or unassociated funerary objects or sacred objects, or objects of cultural patrimony as defined in the Native American Graves Protection and Repatriation Act (25 United States Code [U.S.C.] 3001), are expected to be encountered in the archaeological work. If such items are discovered, work will cease in the vicinity of the find and all appropriate coordination will ensue with the SHPO, consulting parties and tribal governments, and other involved entities, as necessary.

4.13.3.2. Historic Resources

The following mitigation measures have been identified to mitigate impacts to the historic resources. Additional mitigation measures may be identified in consultation with SHPO and the consulting parties. Once FWHA, CDOT, SHPO, and the consulting parties reach agreement on appropriate mitigation, these measures will be included in a Memorandum of Agreement (MOA) that has been reviewed by all parties and outlines FHWA and CDOT's commitment to fulfilling the mitigation. A draft of the MOA is included in Appendix H.

1. Archival Documentation
    a. CDOT shall ensure that the Webb Ranch (5LP8461) and Craig Limousin Ranch (5LP9307) shall be documented in accordance with Level II documentation as outlined in Colorado Office of Archaeology and Historic Preservation Form #1595, *Historical Resource Documentation: Standards for Level I, II, and III Documentation*.
    b. CDOT shall ensure that all documentation activities will be performed or directly supervised by architects, historians, photographers and/or other professionals meeting the qualification standards in their field as stipulated in the *Secretary of Interior's Professional Qualifications Standards* (36 Code of Federal Regulations [CFR] 61, Appendix A).
   c. CDOT shall provide originals of all documents resulting from the documentation to the SHPO, the La Plata County Historical Society, the property owners, and a local library or archive designated by the SHPO.
2. Interpretive Mitigation
    a. Interpretive mitigation will be created that focuses on the development and importance of historic ranching on Florida Mesa. Options include, but are not necessarily limited to, signage, brochures, pamphlets, historic contexts, or other printed material. Content, design, materials, location, distribution and other details will be determined in consultation with SHPO and the consulting parties.
    b. Other creative mitigation options that arise as the project progresses that further the education or understanding of the importance of the ranching resources shall also be considered
3. Data Recovery Excavations
   a. At such time as one or more of the NRHP eligible archaeological sites referenced above is within the limits of a planned and funded construction project and therefore in danger from earth-moving activities, an Archaeological Data Recovery Plan defining the methodology and goals for excavation will be completed. The Plan will meet all criteria outlined in the *Secretary of the Interior's Standards and Guidelines for Archaeological Documentation*, in addition to the procedures and protocols developed by the Colorado OAHP. The Data Recovery Plan(s) will be reviewed and approved by the SHPO prior to issuance of an excavation permit and initiation of controlled excavations. The consulting parties and tribal governments will also be provided the opportunity to review and comment on the excavation plan(s) prior to implementation.
   b. To the best of our knowledge and belief, no human remains, associated or unassociated funerary objects or sacred objects, or objects of cultural patrimony

as defined in the Native American Graves Protection and Repatriation Act (25 U.S.C. 3001), are expected to be encountered in the archaeological work. If such items are discovered, work will cease in the vicinity of the find and all appropriate coordination will ensue with the SHPO, consulting parties and tribal governments, and other involved entities, as necessary.

4. Design and Construction
    a. Efforts to minimize harm to historic and archaeological properties will be assessed during the final design phase for the preferred alternative and may include, but not be limited to, narrower roadway width, use of retaining walls, steeper slopes, and creative underpass and irrigation design, as applicable. Contributing features of historic properties will be protected during construction and avoided to the extent practicable.

4.14 Paleontological Resources

This section discusses impacts to paleontological resources within the study area. More information on impacts to paleontological resources can be found in Section 4.14 of the 2006 US 160 EIS.

4.14.1 No Action

There would be no impacts to paleontological resources as a result of the No Action Alternative.

4.14.2 Direct and Indirect Impacts Common to All Action Alternatives

There was only one paleontological site identified in the US 160 corridor in the 2006 US 160 EIS and it is not in the SDEIS study area. Therefore, the action alternatives are not expected to have impacts to paleontological resources.

4.14.3 Direct and Indirect Impacts for Revised G Modified (Preferred Alternative)

The Revised G Modified (Preferred) Alternative is not expected to have paleontological localities that would be scientifically important. Therefore, there would be no direct and indirect impacts for this alternative.

4.14.4 Direct and Indirect Impacts for Revised F Modified

The Revised F Modified Alternative is not expected to have paleontological localities that would be scientifically important. Therefore, there would be no direct and indirect impacts for this alternative.

4.14.5 Direct and Indirect Impacts for Eastern Realignment

The Eastern Realignment Alternative is not expected to have paleontological localities that would be scientifically important. Therefore, there would be no direct and indirect impacts for this alternative.

4.14.6 Mitigation

Upon completion of final design for and prior to construction, ground reconnaissance for paleontological resources will be conducted. If any scientifically important fossil localities are discovered, mitigation measures will be developed for and implemented at those locations, as appropriate.

Excavation during construction could expose new fossils. If fossils materials are exposed during any construction activities, work will stop in the area of discovery, and a CDOT paleontologist will be notified.

4.15 Hazardous Waste Sites

Known "Recognized Environmental Conditions" (REC) were not identified in or near the study area.

4.15.1 No Action

With the exception of several oil and gas wells that lay within the US 550 to US 160 south connection project area, all RECs or sites identified as "additional issues of concern" are located in or adjacent to areas which would still be constructed under the No Action Alternative. Therefore, the No Action Alternative will not significantly avoid or reduce the potential for hazardous materials or waste involvement.

4.15.2 Indirect and Direct Impacts Common to All Alternatives

All of the action alternatives presented in the SDEIS have the potential to cause a release of hazardous materials during construction activities. Hazardous materials would be brought into the study area and stored or used for construction activities, including bulk fuel storage. There is the potential for accidental release of these materials into the environment during normal construction activities.

Additionally, the project may encounter previously unidentified RECs or any of the "additional issues of concern" identified in the 2006 US 160 EIS, including but not limited to: above ground storage tanks, underground storage tanks, transformers/polychlorinated biphenyls (PCBs), asbestos-containing building materials, lead-based paint, and hazardous materials spills. Appropriate steps would be taken prior to construction to remediate contamination that is found and ensure that contaminated material is not re-deposited at another location.

4.15.3 Direct and Indirect Impacts for Revised G Modified (Preferred Alternative)

There are no known properties containing hazardous materials or hazardous wastes located within the Revised G Modified (Preferred) Alternative alignment that are expected to impact construction activities.

As identified in Table 3-12, Oil and Gas Facilities in the Study Area, and depicted on Figure 3-10 in Chapter 3, several oil and gas facilities are located near this alignment. Although no observable leaks or odors have been observed from the surface at these oil and gas facilities, there is the potential for subsurface releases with no observable indications at the surface. Chronic minor leaks that would not be detected by inventory control can result over time in subsurface releases.

There would be no acquisition of residential properties under this alternative where the potential for encountering hazardous materials left behind by the owners is generally higher than for undeveloped or agricultural properties.

4.15.4 Direct and Indirect Impacts for Revised F Modified

There are no known properties containing hazardous materials or hazardous wastes located within the Revised F Modified Alternative alignment that are expected to impact construction activities.

As identified in Table 3-12 and depicted on Figure 3-10 in Chapter 3, several oil and gas facilities are located near this alignment and at least one gas well would require replacement at an alternate location. This would require a plug and abandonment of the existing well in accordance with Colorado Oil and Gas Conservation Commission (COGCC) regulations and redrilling of a replacement well. Although no observable leaks or odors have been observed from the surface at the nearby oil and gas facilities, there is the potential for subsurface releases with no observable indications at the surface. Chronic minor leaks that would not be detected by inventory control can result over time in subsurface releases.

Under Alternative Revised F Modified, an estimated four residential properties would be acquired to construct this alternative. Prior to property acquisition, an assessment for the presence of potentially hazardous materials would be conducted and any wastes or reusable products would be managed in accordance with applicable State and Federal regulations prior to demolition of the structures.

4.15.5 Direct and Indirect Impacts for Eastern Realignment

There are no known properties containing hazardous materials or hazardous wastes located within the Eastern Realignment Alternative that are expected to impact construction activities. The alternative alignment crosses an active gravel pit that would be assessed prior to construction for the presence of any industrial wastes or RECs that may remain on the property.

Under the Eastern Realignment Alternative, an estimated six residential properties would be acquired to construct this alternative. Prior to property acquisition, an assessment for the presence of potentially hazardous materials would be conducted and any wastes or reusable products would be managed in accordance with applicable State and Federal regulations prior to demolition of the structures.

4.15.6 Mitigation

The following general mitigation measures will be applied, as appropriate:

- Any required hazardous materials management plans (HMMP) will include safety measures developed for protection of workers and the public while doing this work and during construction if hazardous materials/waste are encountered. The need for a HMMP will be developed during project scoping and design and will be the responsibility of the Contractor as specified in Section 250 of the Standard Specifications.
- BMPs would be used to offset accidental release of hazardous materials into the environment during normal construction activities such events. The Contractor shall prepare a Spill Prevention, Control, and Countermeasure (SPCC) Plan in accordance with Standard Specification 107.25.
- Equipment staging and bulk fuel storage areas would be compliant with the Colorado Petroleum Storage Tank Regulations (7 Colorado Code of Regulations [CCR] 1101-14) requirements, which include security, secondary containment, pressure relief, and a spill prevention control and countermeasure plan.
- Potential mitigation measures are dependent on the type of contamination, exposure pathways, and receptors that may exist and may include, but are not limited to, excavation and removal, in-situ and ex-situ treatment, and enhanced natural attenuation/bioremediation.
- Disposal of roadway and residential structures potentially coated with lead-based paint will be performed according to CDOT standard specifications.
- Fill materials derived from areas that could be impacted by hazardous materials sites or are suspect of being contaminated will be tested as necessary to ensure that contaminated materials are not redeposited within the project right-of-way.

4.16 Visual Resources

This section discusses impacts to visual resources within the study area. More information on impacts to visual resources can be found in Section 4.16 of the 2006 US 160 EIS.

4.16.1 No Action

There would be no impacts to visual resources as a result of the No Action Alternative.

4.16.2 Direct and Indirect Impacts Common to All Action Alternatives

Visual impacts that could occur from any of the action alternatives include:

- Short-term and temporary construction impacts including dust, noise, and traffic delays that can affect the visual quality of the surroundings for both travelers on the roadway and for nearby viewers who have views of the roadway.
- Slope cuts and fills that can change the characteristic landscape in the study area by disrupting the continuity of natural landforms and vegetation and by creating areas with a high degree of color and form contrasts.
- Expansion of the width of paved surfaces and associated median, shoulder, and clear areas, which increases the overall visual scale and dominance of the roadway in the viewshed.
- Expansion of existing right-of-way, which may necessitate the removal of trees and other vegetation that may be providing a positive element to the existing landscape quality.
- Additional design features and structures, such as overpasses, access roads, guardrails, and retaining walls, which add more modifications and potentially more discordant elements to the area.
- Road realignment, which can impact previously intact, undisturbed landscapes.

Visual contrasts created by any of the action alternatives would be additive to the existing condition. See Section 4.16 of the 2006 US 160 EIS for more information.

4.16.3 Direct and Indirect Impacts for Revised G Modified (Preferred Alternative)

The Revised G Modified (Preferred) Alternative would relocate US 550 from the west face of Farmington Hill to the top of Florida Mesa, eventually descending the north side of Farmington Hill approximately 3,200 feet east of the existing intersection. On the relocated alignment, impacts to visual resources would occur from large areas of cut-and-fill that will be necessary, by enlarging the roadway in areas to accommodate access roads and expanded intersection features, widening the roadway from two to four lanes, and by moving traffic closer to residences.

4.16.4 Direct and Indirect Impacts for Revised F Modified

The Revised F Modified Alternative passes through a landscape that appears mostly natural, with scattered rural residences. Building the roadway in this area would introduce a major built-up feature that would impact the existing scenery and would impact the views of many residences on Farmington Hill and developments in Grandview. This alternative also requires access roads on both sides of the roadway, increasing the area of disturbance to the landscape. Scenic integrity would be heavily altered and would impact more local residences than the Revised G Modified (Preferred) Alternative.

4.16.5 Direct and Indirect Impacts for Eastern Realignment

Impacts from the Eastern Realignment Alternative are similar to those described in Section 4.16.4 for the Revised F Modified Alternative. The Eastern Realignment Alternative passes through a landscape that appears mostly natural, with scattered rural residences. Building the roadway in this area would introduce a major built-up feature that would impact the existing scenery and would impact the views of many residences on Farmington Hill and developments in Grandview. The Eastern Realignment Alternative is a longer roadway that requires frontage roads along the northern portion of the alignment to provide local access to the properties south of US 160. This alternative would have the most residences and rural landscape with visual impacts.

4.16.6 Mitigation

Mitigation measures to reduce visual resource impacts include the following:

- Construction of cut-and-fill slopes will be minimized and the cut line will be blended into the existing terrain.
- Revegetation will occur as soon as possible after construction to stabilize soils and reduce visual contrasts.
- Retaining walls and bridge structures will include design features to add to the scenic quality of the built area. Architectural design guidelines will be developed to maintain consistent architectural and aesthetic treatments throughout the study area.
- Removal of adjacent roadside vegetation will be minimized, where possible. Areas that will lose vegetation that provides important visual screens will be revegetated with taller plan species (trees and shrubs) that can serve the same function. These areas will be determined in final construction plans.
- The original US 550 alignment at Farmington Hill will be obliterated and revegetated with native species, including shrubs and trees.

4.17 Energy Consumption

This section discusses impacts to energy within the study area. More information on impacts to energy can be found in Section 4.17 of the 2006 US 160 EIS.

4.17.1 No Action

There would be no impacts to energy consumption as a result of the No Action Alternative.

4.17.2 Direct and Indirect Impacts Common to All Action Alternatives

Energy would be consumed in the production of materials used for the construction of any of the action alternatives. The amount of energy associated with the production of these materials would vary due to the different lengths of the three action alternatives.

Energy consumption would increase temporarily with the use of heavy equipment during construction and would be primarily in the form of petroleum hydrocarbons. A small amount of energy would result from electricity usage at field offices for lighting, computers, etc. There would also be temporary energy consumption during periodic maintenance or rehabilitation in the future.

Long-term energy savings are expected to offset energy consumptive impacts by improving highway conditions by reducing congestion and turning movement delays. Automobile fuel efficiency standards are also increasing, which will reduce energy consumption.

For more information, see Section 4.17 of the 2006 US 160 EIS.

4.17.3 Direct and Indirect Impacts for Revised G Modified (Preferred Alternative)

There would be no additional impacts other than those discussed in Section 4.17.2 for the Revised G Modified (Preferred) Alternative.

4.17.4 Direct and Indirect Impacts for Revised F Modified

There would be no additional impacts other than those discussed in Section 4.17.2 for the Revised F Modified Alternative.

4.17.5 Direct and Indirect Impacts for Eastern Realignment

There would be no additional impacts other than those discussed in Section 4.17.2 for the Eastern Realignment Alternative.

4.17.6 Mitigation

Mitigation to reduce energy consumption during construction activities includes the following:

1. Maximum use of on-site material to reduce hauling.
2. Adequate vehicle maintenance.
3. Design of construction access roads and location of staging areas to minimize distance traveled.

4.18 Geology and Soils

This section discusses impacts to geology and soils within the study area. More information on impacts to geology and soils can be found in Section 4.18 of the 2006 US 160 EIS.

4.18.1 No Action

There would be no impacts to geology and soils as a result of the No Action Alternative.

4.18.2 Direct and Indirect Impacts Common to All Action Alternatives

The action alternatives would impact soils to varying degrees depending on the extent of ground disturbance. Permanent impacts to surficial geology and soils would result from roadway expansion and placement of impervious surfaces. Actual amounts of surficial geology disturbance would require a geotechnical investigation.

Impacts from roadway activities would include:

- Clearing, excavating, scraping, blasting, leveling, and compacting.
- Increased erosion potential from cut-and-fill slopes.
- Wind and runoff erosion due to loss of vegetative cover in construction area.
- Slope stability in areas where the groundwater table may be shallow.

See Section 4.18 of the 2006 US 160 EIS for more information.

4.18.3 Direct and Indirect Impacts for Revised G Modified (Preferred Alternative)

There would be no additional impacts other than those discussed in Section 4.18.2 for the Revised G Modified (Preferred) Alternative.

4.18.4 Direct and Indirect Impacts for Revised F Modified

There would be no additional impacts other than those discussed in Section 4.18.2 for the Revised F Modified Alternative.

4.18.5 Direct and Indirect Impacts for Eastern Realignment

There would be no additional impacts other than those discussed in Section 4.18.2 for the Eastern Realignment Alternative.

4.18.6 Mitigation

Erosion impacts will be mitigated through installation of vegetative cover and use of best management practices during construction. Unstable slopes will be mitigated through use of structural controls, such as mechanically stabilized earth walls or other engineering techniques. Also, a geotechnical investigation and analysis will be completed to optimize the engineering design of the roadway and to assess the geologic resources that will be encountered prior to commencing design activities.

The following mitigation measures will help reduce the amount of impacts to the geologic and soil resources in the study area:

- Soils or materials excavated from one area will be stockpiled and used in other areas, if possible, so as to disturb less ground area.
- On-site soils of similar or same type will be used to the appropriate depth for fill areas in cropland and temporarily impacted wetlands, so native topsoils will be replaced.
- Retaining structures and other engineering controls will be incorporated to increase slope stability.
- Engineered grading controls will be implemented in fill stockpile and cut-and-fill areas.
- Expansive soils and bedrock will be mitigated at structure locations by designing deep foundation systems.
- Structural retaining walls will be built to stabilize slopes when cut or fill slopes require steep gradients, when gradients exceed the allowable placement properties of the soil, or where potential slope failures may occur due to the presence of water or loose material.
- A SWMP that prescribes BMPs to minimize soil erosion and includes prescriptions for monitoring conditions before, during, and after the construction activities will be developed and implemented.

See Section 4.18 of the 2006 US 160 for more information.

4.19 Construction

This section discusses impacts that would occur as the result of project implementation following identification of funding and design. These construction impacts are within the study area. Construction impacts are generally temporary during a defined period. More detailed information can be found in Section 4.19 of the 2006 US 160 EIS.

4.19.1 No Action

There would be no impacts associated with construction as a result of the No Action Alternative.

4.19.2 Direct and Indirect Impacts Common to All Action Alternatives

Temporary impacts associated with construction of any action alternative would occur, including additional noise and dust in the study area. Blasting may be necessary and would likely cause the greatest temporary noise impacts. Exhaust and particulate (dust) emissions would increase as a result of construction vehicle activity, lower traffic speeds, and earth excavation activities.

Business, residents, and emergency vehicles would retain access to properties at all times during construction; however, access may be seen as inconvenient at times and local and transient traffic may choose to take alternate routes. This could mean an increase in traffic on local roads and potentially an increase in emergency response times. Traffic impacts during construction would be less than for a typical construction project because these alternatives are on a new alignment.

Transportation systems also facilitate the spread of invasive species outside their natural range. Invasive species, primarily state-listed noxious weeds, that are likely to harm the environment, human health, and economy would be analyzed and then managed during design and construction.

See Section 4.19 of the 2006 US 160 EIS for more information.

4.19.3 Direct and Indirect Impacts for Revised G Modified (Preferred Alternative)

There would be no additional impacts other than those discussed in Section 4.19.2 for the Revised G Modified (Preferred) Alternative.

4.19.4 Direct and Indirect Impacts for Revised F Modified

There would be no additional impacts other than those discussed in Section 4.19.2 for the Revised F Modified Alternative.

4.19.5 Direct and Indirect Impacts for Eastern Realignment

There would be no additional impacts other than those discussed in Section 4.19.2 for the Eastern Realignment Alternative.

4.19.6 Mitigation

Mitigation activities that will be implemented during construction include:

- Follow all FHWA and CDOT regulations and guidance regarding worker and public safety in effect at the time of construction.
- Maintain access to businesses and residences at all times.
- Coordinate with emergency service providers to minimize delays and ensure access to properties.

- Use and maintain BMPs to control sediment and erosion. These BMPs will include, but are not limited to, use of silt fence, erosion logs, straw bales, and any other new technologies. An Erosion Control Supervisor is also required for construction projects.
- Implement dust abatement as necessary by using water trucks.
- Perform construction vehicle maintenance and refueling operations at a designated area away from sensitive wildlife habitat, wetlands, and waters of the US.
- Coordinate with public and private entities in a public information effort to minimize inconveniences of users. This could include public notices in newspapers and locals signs to warn motorists of future detours and closures.
- Provide temporary signage to business entrances.
- Plan the shortest, most direct detours with adequate signing to limit additional travel to the extent possible.
- Limit any major traffic disruption to the off-peak hours as much as possible.
- Keep average delay times to a minimum.
- Place flaggers immediately adjacent to work areas to optimize traffic flow.
- Develop a project-specific noxious weed management plan (see Section 4.10, Noxious Weeds).
- Native plant material will be used and existing native plan material will be protected.

See Section 4.19 of the 2006 US 160 EIS for more information.

4.20 Impacts to BLM Land

This section discusses impacts to BLM land within the study area. More information on impacts to BLM land can be found in Section 4.20 of the 2006 US 160 EIS.

4.20.1 No Action

There would be no impacts to BLM land as a result of the No Action Alternative.

4.20.2 Direct and Indirect Impacts Common to All Action Alternatives

None of the action alternatives being considered under the SDEIS would directly or indirectly impact BLM lands.

4.20.3 Direct and Indirect Impacts for Revised G Modified (Preferred Alternative)

There would be no impacts to BLM land from the Revised G Modified (Preferred) Alternative.

4.20.4 Direct and Indirect Impacts for Revised F Modified

There would be no impacts to BLM land from the Revised F Modified Alternative.

4.20.5 Direct and Indirect Impacts for Eastern Realignment

There would be no impacts to BLM land from the Eastern Realignment Alternative.

4.20.6 Mitigation

There is no mitigation necessary for impacts to BLM land.

4.21 Relationship of Local Short-Term Uses vs. Long-Term Productivity

This section compares short-term gains with the long-term expense that may result from a loss of future productivity. While it is assumed that there will be benefits resulting from the proposed project, all projects involve costs, side effects and potential loss of natural resources that have long-term productive value. This section discusses the relationship of local short-term uses and long-term productivity within the study area.

4.21.1 No Action

There would be no local short-term uses or improvements in long-term productivity as a result of the No Action Alternative.

4.21.2 Direct and Indirect Impacts Common to All Action Alternatives

All action alternatives would have similar short-term impacts, or uses of the environment. Local short-term uses would include:

- Temporary disruptions in traffic during construction.
- Temporary degradation of air quality due to reduced traffic speed through construction zones.
- Temporary impacts on businesses and residents as a result of detours or modifications of access and emergency vehicle response time.
- Temporary impacts to water resources as a result of increased run-off, chemical compounds, or disturbance of geological substrate during construction.
- Increased energy consumption during construction.
- Temporary visual impacts associated with construction as seen by travelers and nearby viewers.
- Potential for light and noise pollution affecting nearby residential areas during construction.
- Temporary noise and/or vibration impacts due to construction.
- Temporary use of land for construction staging.

Long-term benefits of the action alternatives would include:

- Improved safety.
- Improved travel efficiency.
- Improved use of energy for vehicular fuel consumption.
- Enhancement of traffic capacity.
- Replacement of wetland values lost.
- Reduced wildlife/vehicle collisions.

4.21.3 Direct and Indirect Impacts for Revised G Modified (Preferred Alternative)

There would be no additional impacts other than those discussed in Section 4.21.2 for the Revised G Modified (Preferred) Alternative.

4.21.4 Direct and Indirect Impacts for Revised F Modified

There would be no additional impacts other than those discussed in Section 4.21.2 for the Revised F Modified Alternative.

4.21.5 Direct and Indirect Impacts for Eastern Realignment

There would be no additional impacts other than those discussed in Section 4.21.2 for the Eastern Realignment Alternative.

4.21.6 Mitigation

Mitigation measures for short-term and long-term impacts are described in the resource-specific sections of this chapter. Mitigation measures are also summarized in 4.25.

4.22 Irreversible and Irretrievable Commitment of Resources

The following sections discuss the loss of resources resulting from construction of the alternatives under consideration.

An irreversible commitment of a resource is one that cannot be reversed (e.g., fossil fuels, labor, and materials used during the construction of a project). An irretrievable commitment of a resource is one in which the resource or its use is lost for a period of time (e.g., land used in the construction of a project). This section discusses the irreversible and irretrievable commitment of resources within the study area.

4.22.1 No Action

There would be no irreversible and irretrievable commitment of resources as a result of the No Action Alternative.

4.22.2 Direct and Indirect Impacts Common to All Action Alternatives

Implementation of any of the action alternatives involves a commitment of a range of natural, physical, human, and fiscal resources as previously described. A summary is as follows:

- Land used in the construction of the transportation improvements is considered an irreversible commitment of resources because it is unlikely that this land could ever be committed to another use.
- Fossil fuels are irretrievably expended in several ways. Fossil fuels are consumed during the construction of transportation improvements during grading, material movement, and other activities. The fuel and electricity used in the process are dedicated to the improvements.
- Construction materials (such as aggregate for concrete and petroleum products used in asphalt and operation of construction materials) are not retrievable. The materials (including, but not limited to, asphalt, steel, aggregates, sand, gravel, and cement) are dedicated to improving the facility and are not available for other uses.
- Water resources could also be consumed during construction in relatively small quantities (less than 100 acre feet for the entire corridor), largely limited to on-site concrete mixing and dust abatement activities.
- Irretrievable losses of vegetation and associated animal habitat could occur during construction. Individual animals may also experience impacts during project construction and operation.
- Historic, cultural, and paleontological resources are nonrenewable, and disturbance of these resources constitutes an irreversible and irretrievable commitment of resources. Access to previously inaccessible areas could lead to vandalism of both known and unknown cultural, historic, and paleontological resources, thereby rendering them irretrievable.
- Wetland impacts are considered irreversible because the given resource is covered by the transportation facility (such as additional impervious surface area).
- Impacts on visual resources could constitute an irreversible and irretrievable commitment of resources.
- Fiscal resources (such as state and Federal funds required for implementation of any of the action alternatives) are consumed and unavailable for other projects in the state of Colorado. Human resources are also required. During construction, members of the labor force (including construction crews, government staff, and engineers) are dedicated to the project.

The irreversible and irretrievable commitment of resources is offset by short- and long-term improvements to achieve goals to meet the purpose and need.

4.22.3 Direct and Indirect Impacts for Revised G Modified (Preferred Alternative)

There would be no additional impacts other than those discussed in Section 4.22.2 for the Revised G Modified (Preferred) Alternative.

4.22.4 Direct and Indirect Impacts for Revised F Modified

There would be no additional impacts other than those discussed in Section 4.22.2for the Revised F Modified Alternative.

4.22.5 Direct and Indirect Impacts for Eastern Realignment

There would be no additional impacts other than those discussed in Section 4.22.2for the Eastern Realignment Alternative.

4.22.6 Mitigation

Certain resource loss in unavoidable, but can be mitigated to the extent practical by employing BMPs as described in individual resource sections of this chapter. Mitigation measures are also summarized in Section 4.25.

4.23 Cumulative Impacts

Cumulative impacts are defined by the Council on Environmental Quality (CEQ) as "… the impacts on the environment which result from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions and regardless of what agency (federal or non-federal) undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time."

A discussion of cumulative impacts can be found in the 2006 US 160 EIS in Section 4.23, pages 4-158 through 4-200.

The methodology for cumulative impacts used in this document varies from that used in the 2006 US 160 EIS. In addition to providing an update on past projects and an update related to reasonably foreseeable future projects, this document provides information related to each resource for which there would be direct or indirect impacts, to be consistent with changed industry standards since 2006.

4.23.1 Past Projects

Three transportation projects have either been built or are planned in the US 550 corridor consistent with the US 550 Environmental Assessment (EA)/Finding of No Significant Impact (FONSI). One project, US 550 State Line North Phase II, extended four lanes of US 550 from near the New Mexico state line from milepost (MP) 0.5 to MP

2.75. The project, completed in 2009, also included two bridges, drainage work and wildlife fencing. A second project, US 550 at CR 302, will be constructed in 2011 and 2012. This project is from MP 11.17 to MP 12.79, which is approximately 2.3 miles south of the US 550 connection to US 160 and will include safety improvements to the intersection of US 550 and CR 302 and construction of a four-lane section. The project will also include widened shoulders, consolidated accesses, deer fencing and drainage improvements. A third project is planned for 2015 near the Sunnyside Elementary School on US 550 from MP 8.5 to MP 10.2. This project will include earthwork for four lanes on US 550, paving of two lanes, a pedestrian overpass and intersection improvements at CR 215 and CR 218.

Improvements to US 160 that have been constructed include construction of the Grandview Interchange and the CR 222/CR 223 intersection improvements described in Section 2.3. An additional project planned in the US 160 corridor is a passing lane from MP 95 to MP 98. This project, located east of the current CR 222/223 intersection will include east and westbound passing lanes and a wildlife crossing. It will be built consistent with improvements described in the 2006 US 160 EIS. Funding for design of this project is identified for 2017.

4.23.2 Present and Reasonably Foreseeable Future Projects

Changes in present and reasonably foreseeable future projects since the 2006 US 160 EIS include the following:

- The Animas-La Plata Project is nearly complete. The dam and reservoir have been constructed and the remaining pipelines are scheduled to be complete in fall of 2011.
- The findings of the Southern Ute Indian Tribe EIS have been updated in the *Programmatic Environmental Assessment for 80 Acre Infill Oil and Gas Development on the Southern Ute Indian Reservation*, August 2009.
- The findings of the Northern San Juan Basin Coal Bed Methane Project are still valid and a Record of Decision was issued in 2007.
- According to the La Plata County Planning Department, as of May 2011, four minor oil and gas facilities on an existing well pad have been approved within the study area. They include the Weaselskin #4, Weaselskin GU #3, Clary #4, and Craig #3 oil and gas facilities.
- The Mercy Medical Center has been built and is open.
- The Three Springs Development is a master planned community located at US 160 and Three Springs Boulevard, four miles east of downtown Durango. The development is currently underway, with construction completed on some phases. Full buildout may occur over the next 20 to 30 years.

- The shared use trail/path planned from Durango to Bayfield has been built from just north of the Bayfield Center Drive roundabout on County Road 501 to just south of the Dove Ranch Subdivision, a distance of 0.75 miles. On July 2, 2010, the Town of Bayfield was awarded a Transportation Enhancement Grant to extend the trail north to connect to the Dove Ranch subdivision and Pine Valley Foursquare Church. The trail extension project will commence in 2011.
- The La Plata County Multi-Event Center project is conceptual and is very speculative. It is proposed in phases to accommodate new fairgrounds and variety of motorized and non-motorized recreational opportunities. The area being studied as a possible location is a gravel pit located on multiple parcels owned by La Plata County and BLM.

Table 4-12 lists updated reasonably foreseeable future projects.

Table 4-12. Reasonably Foreseeable Future Projects

Project	Description	Resources Affected
Wilson Gulch Drive/US 160 Interchange Connection	Connect Wilson Gulch Dr. to the newly constructed US 160 interchange. Wilson Gulch Drive is located north of the Three Springs interchange. Permit type and project status is unavailable from County.	Vegetation, socio-economics, land use, air quality, noise geology and soils
Buffalo Arena Seasonal Use	Proposal for a Seasonal Riding Arena (plans to expand the use in the future to a recreational vehicle (RV) park and horse events center). Permit Type: Seasonal Use (SEAS), project no. 2011-0050-SEAS. Project status: open. Project is located northwest of the Mercy Medical Center north of US 160.	Recreation, vegetation
Oaks Subdivision Preliminary Plat	Proposal for 62 residential lots and a multifamily lot (10 units). Project status: Open. Project is located north of US 160 near the Three Springs interchange.	Socio-economics, land use, air quality, visual, vegetation, noise, wildlife and fisheries, historic
Willyard CL II— 2nd Dwelling. Permit Type Class II (CL-II), project no. 2010-0050-CL-II.	Project approved for a second dwelling; some project aspects are currently under appeal. Project status: open. Project is located north of US 160 approximately 0.5 mile east of Three Springs interchange.	Socio-economics, land use, air quality, visual, vegetation, noise, wildlife and fisheries, historic
Weaselskin #4 Minor Oil & Gas Facility	Minor oil and gas facility on an existing well pad located at 12995 US 550 South. Project status: approved. Project is located on the west side of US 550 approximately 4 miles south of the existing US 550/US 160 intersection,	Air quality, mitigation, noise
Weaselskin GU #3 Minor Oil & Gas Facility	Minor oil and gas facility on an existing well pad located at 12995 US 550 South. Project No. 2009-0126-OG-MN. Project is located on the same parcel as Weaselskin #4 above, located on the west side of US 550 approximately 4 miles south of the existing US 550/US 160 intersection.	Air quality, mitigation, noise
Clary #4 Minor Oil & Gas Facility	Minor oil and gas facility on an existing well pad. Project status: approved. Project is located on the west side of US 550	Air quality, mitigation, noise

Table 4-12. Reasonably Foreseeable Future Projects

Project	Description	Resources Affected
	approximately 3.5 miles south of the existing US 550/US 160 intersection,	
Craig #3 Minor Oil & Gas Facility	Minor oil and gas facility on an existing well pad. Project status: approved. Project is located on the east side of US 550 approximately 2.5 miles south of the existing US 550/US 160 intersection,	Air quality, mitigation, noise
Outlook Conceptual Development Plan (CDP)	Proposal for 122 residential lots and 134 total residential units at 29162 US 160 East. Project status: open. Project is located south of US 160 near the Three Springs interchange.	Socio-economics, land use, air quality, visual, vegetation, noise, wildlife and fisheries, historic
Three Springs Development	An approximate 680 acre, master planned community located at US 160 and Three Springs Boulevard. Approximately 2,000 residential homes and 360,000 square feet of retail space are planned. Will include schools, parks, and open space. Construction on initial phases is complete; full build-out anticipated over next 20 to 30 years. Project is located north of US 160 at the Three Springs interchange.	Wetlands, socio-economics, land use, air quality, visual, vegetation, noise, wildlife and fisheries, historic
Shared use trail/path from Durango to Bayfield	Extension of 0.25 mile from current terminus just south of Dove Ranch Subdivision to Pine Valley Foursquare church planned to commence in 2011. Project is located in the Town of Bayfield east of Durango on US 160.	Recreation, vegetation

4.23.3 Land Use Impacts

The primary change in land use cumulative impacts as described in Section 4.23.6.3 of the 2006 US 160 EIS includes a partial build-out of various projects in the Grandview Area and a slight countywide slowing of development trends. However, by 2030, future land use is anticipated to be greater than what was projected for 2020 in the 2006 US 160 EIS. The cumulative impacts of reasonably foreseeable future projects, including increased development associated with the Animas-La Plata Water Storage Project and ongoing oil and gas development, would be unchanged from those documented in the 2006 US 160 EIS.

Induced growth associated with the US 550 and US 160 projects would be expected as documented in Section 4.23.6.2 of the 2006 US 160 EIS, including the likelihood of faster growth occurring along the two improved highways. The added impacts to land use associated with the US 550 South Connection to US 160 would not result in substantial changes to cumulative land use impacts from those documented in the 2006 US 160 EIS. Although some land currently being used by residential, agricultural or commercial uses would be converted to a transportation use, this acreage (approximately 133 acres for the Eastern Realignment Alternative), as presented in Section 4.3.5 of this document is much less than the amount of available land in the area. In addition, the future land use impacts of other reasonably foreseeable future projects would be much more pronounced than those of the US 550 South Connection to US 160 Project.

When combined with other past, present and reasonably foreseeable future actions, the US 550 South Connection to US 160 does not substantially contribute to cumulative land use impacts.

4.23.4 Farmland Impacts

Farmland impacts were not evaluated for cumulative impacts in the 2006 US 160 EIS because no significant impacts (as defined by NRCS) were anticipated to farmlands.

Anticipated cumulative impacts to farmland would be similar to those documented for land use, because the conversion of farmland to another use would be expected as a result of ongoing residential and commercial development in La Plata County, the Animas–La Plata Water Storage Project, the US 160 and US 550 projects, and oil and gas development. The amount of farmland directly or indirectly(temporarily) impacted by the US 550 South Connection to US 160 project would be increased over that included in the 2006 US 160 EIS only if the Eastern Realignment Alternative is implemented, because the farmland impacts would be greatest with this alternative. However, because much of the overall future land use in La Plata County is anticipated to remain as farmland, as indicated in the May 2011 *La Plata County Comprehensive Community Plan* map; the overall health of the resource is strong, and so cumulative impacts to farmland (including the cumulative land use impacts of accelerating growth along the improved highway corridors) are not anticipated to be substantial and the US 550 South Connection to US 160 Project's contribution to this conversion would be minimal.

When combined with other past, present and reasonably foreseeable future actions, the US 550 South Connection to US 160 does not substantially contribute to cumulative farmland impacts.

4.23.5 Socioeconomics and Relocations

Population projections for 2030 are 79,762 for La Plata County, 11,606 greater than what was predicted for 2020 of 68,156. These data show a continuation of the general population and employment growth trend in the study area. There are no substantial threats to the health of the population or the socio-economic conditions in the study area. Most of this, as documented in Section 4.23.7.2 of the 2006 US 160 EIS, would be associated with other reasonably foreseeable future projects such as ongoing county residential and commercial development, the Animas-La Plata Project and oil and gas development. The US 550 South Connection to US 160 Project would displace some residences and businesses but the social impact associated with these impacts would be minimal compared to those associated with the other reasonably foreseeable future projects..

When combined with other past, present and reasonably foreseeable future actions, the US 550 South Connection to US 160 does not substantially contribute to cumulative impacts on socioeconomics and relocations.

4.23.6 Recreation Impacts

Minimal change is anticipated in recreation cumulative impacts as described in Section 4.23.8.3 of the 2006 US 160 EIS. These primarily consist of the long-term boost to tourism associated with improvements to the two primary highways providing access to area tourist attractions and recreational features, including fishing, camping, and sightseeing. Tourism remains a healthy contributor to the area's economy. Because improvements associated with US 160 would occur with or without the improvements associated with the US 550 South Connection to US 160 Project, the cumulative recreation-/tourism-related impacts associated with this project would be similar to those documented in the 2006 US 160 EIS..

When combined with other past, present and reasonably foreseeable future actions, the US 550 South Connection to US 160 does not substantially contribute to cumulative impacts on recreation resources.

4.23.7 Air Quality (Including Greenhouse Gas) Impacts

The study area continues to be classified as an attainment area for all pollutants. Concentrations of ozone and formaldehyde (a mobile source air toxic) are increasing in the area due in part to oil and gas development and regional transport from coal-fired power plants, as discussed in the 2006 US 160 EIS, Section 4.23.9.3. From an air quality standpoint, the health of the area into the future will remain good and present no expected health concerns. However, anticipated 2014 changes in health and environmentally based NAAQS may tighten 8-hour ozone standards to a level where this area could become involved in ozone nonattainment management.

The following discussion of global climate change is new since the 2006 US 160 EIS.

4.23.7.1. Global Climate Change Cumulative Effects Discussion

The issue of global climate change is an important national and global concern that is being addressed in several ways by the Federal government. The transportation sector is the second largest source of total greenhouse gases (GHGs) in the US, and the greatest source of carbon dioxide (CO_2) emissions—the predominant GHG. In 2004 the transportation sector was responsible for 31 percent of all US CO_2 emissions. The principal anthropogenic (human-made) source of carbon emissions is the combustion of fossil fuels, which account for approximately 80 percent of anthropogenic emissions of carbon worldwide. Almost all (98 percent) of the transportation sector emissions result from the consumption of petroleum products, such as gasoline, diesel fuel, and aviation fuel.

Recognizing this concern, FHWA is working nationally with other modal administrations through the DOT Center for Climate Change and Environmental Forecasting to develop strategies to reduce transportation's contribution to greenhouse gases—particularly CO_2 emissions—and to assess the risks to transportation systems and services from climate changes.

At the state level, there are also several programs underway in Colorado to address transportation GHGs. The Governor's Climate Action Plan, adopted in November 2007, includes measures to adopt vehicle CO_2 emissions standards and to reduce vehicle travel through transit, flex time, telecommuting, ridesharing, and broadband communications. CDOT issued a policy Directive on Air Quality in May 2009. This Policy Directive was developed with input from a number of agencies, including the State of Colorado's Department of Public Health and Environment (CDPHE), the US Environmental Protection Agency (EPA), the Federal Highway Administration (FHWA), the Federal Transit Administration (FTA), the Denver Regional Transportation District (RTD), the Denver Regional Air Quality Council (RAQC). This Policy Directive addresses unregulated mobile source air toxics (MSAT) and greenhouse gases (GHG) produced from Colorado's state highways, interstates, and construction activities.

As a part of CDOT's commitment to addressing MSATs and GHGs, some of CDOT's programwide activities include:

1. Developing truck routes/restrictions with the goal of limiting truck traffic in proximity to facilities, including schools, with sensitive receptor populations.
2. Continue researching pavement durability opportunities with the goal of reducing the frequency of resurfacing and/or reconstruction projects.
3. Developing air quality educational materials, specific to transportation issues, for citizens, elected officials, and schools.
4. Offering outreach to communities to integrate land use and transportation decisions to reduce growth in vehicle miles traveled (VMT), such as smart growth techniques, buffer zones, transit-oriented development, walkable communities, access management plans, etc.
5. Committing to research additional concrete additives that would reduce the demand for cement.

6. Expanding Transportation Demand Management (TDM) efforts statewide to better utilize the existing transportation mobility network.
7. Continuing to diversify the CDOT fleet by retrofitting diesel vehicles, specifying the types of vehicles and equipment contractors may use, purchasing low-emission vehicles, such as hybrids, and purchasing cleaner burning fuels through bidding incentives where feasible. Incentivizing is the likely vehicle for this.
8. Exploring congestion and/or right-lane only restrictions for motor carriers.
9. Funding truck parking electrification (note: mostly via exploring external grant opportunities).
10. Researching additional ways to improve freight movement and efficiency statewide.
11. CDOT uses ultra-low sulfur diesel (ULSD) and biodiesel where available for on-road and non-road equipment statewide.
12. Developing a low-VOC-emitting tree landscaping specification.

Because climate change is a global issue, and the emissions changes due to action alternatives are very small compared to global totals, the GHG emissions associated with the alternatives were not calculated. Because GHGs are directly related to energy use, the changes in GHG emissions would be similar to the changes in energy consumption presented in Section 4.17of this document. The relationship of current and projected Colorado highway emissions to total global CO_2 emissions is presented in the table below. Colorado highway emissions are expected to increase by 4.7 percent between now and 2035. The benefits of the fuel economy and renewable fuels programs in the 2007 Energy Bill are offset by growth in VMT; the draft 2035 statewide transportation plan predicts that Colorado VMT will double between 2000 and 2035. Table 4-13 illustrates the size of the study area relative to total Colorado travel activity.

Table 4-13. Colorado Highway Emissions Growth Projections

Global CO2 emissions, 2005, million metric tons (MMT)[1]	Colorado highway CO2 emissions, 2005, MMT[2]	Projected Colorado 2035 highway CO_2 emissions, MMT[2]	Colorado highway emissions, % of global total (2005)[2]	Project corridor VMT, % of statewide VMT (2005)
27,700	29.9	31.3	0.108%	0.57%

[1]EIA, International Energy Outlook 2007
[2]Calculated by FHWA Resource Center
MMT=million metric tons

4.23.7.2. Summary of Air Quality Cumulative Impacts

A primary contributor to regional air pollution in La Plata County is ongoing oil and gas development, which is anticipated to result in increased in nitrogen oxides and carbon monoxide emissions. (See Section 4.23.9.3 of the 2006 US 160 EIS.) The minimal effect of the US 550 South Connection to US 160 Project (increased VMT which increases most pollutants, but also decreased congestion and thus carbon monoxide) would not contribute to future cumulative air quality issues in the overall Four Corners Area.

When combined with other past, present and reasonably foreseeable future actions, the US 550 South Connection to US 160 does not substantially contribute to cumulative air quality impacts.

4.23.8 Noise Impacts

Cumulative noise impacts were not fully evaluated in the 2006 US 160 EIS because only minimal impacts would occur.

Past projects in the study area have been minimal and except for receptors located immediately adjacent to area roadways, oil and gas development or land use development such as the Three Springs Development, noise has not been an issue. This is demonstrated by the generally low existing noise levels (in the 40 to 60 decibel range) monitored throughout the study area.

Cumulative noise impacts in the study area would result from general county development, from that anticipated as a result of the Animas-La Plata Project and from oil and gas development. The increase in population and development (residential, commercial, and oil and gas) would result in more traffic on all roadway systems; noise generated by this traffic is included in the analysis for direct impacts in Section 4.6. Noise associated with the three alternatives evaluated as a part of this US 550 South Connection to US 160 Project would be localized to the areas relatively close to the new alignments. Cumulative impacts may occur where there is additional noise-generating development (such as oil and gas development or some types of commercial development) in close proximity to the roadway, but these impacts will be very localized and would not be a substantial contributor to the overall cumulative noise environment.

Therefore, when combined with past, present, and reasonably foreseeable future actions, the US 550 South Connection to US 160 has a minimal contribution to cumulative noise impacts.

4.23.9 Wetlands and Water Resources Impacts

Wetlands

The estimated 1,250 to 1,350 acres of wetland impacts that could occur as a result of past, present, and reasonably foreseeable future projects (as documented in Section 4.23.10.3 of the 2006 US 160 EIS) is not anticipated to change. The Eastern Realignment Alternative, with its impacts to 3.2 acres of wetlands (compared to 0.03 acre with the

Revised G Modified Alternative and 0.53 acre with the Revised F Modified Alternative) would increase total wetland impacts over that documented in the 2006 US 160 EIS, but because these impacts would be fully mitigated, the US 550 South Connection to US 160 Project would not substantially contribute to cumulative wetland impacts.

For this reason, when combined with other past, present and reasonably foreseeable future actions, the US 550 South Connection to US 160 does not substantially contribute to cumulative wetland impacts.

Water Resources Impacts

The water resources impacts associated with the US 550 South Connection to US 160 Project, including mitigation by temporary and permanent Best Management Practices, would contribute minimally to cumulative water resources impacts in La Plata County. According to Section 4.23.11.2 and 4.23.12.2 of the 2006 US 160 EIS, the amount of surface disturbance associated with oil and gas development (anticipated to be more than 2,000 acres) and ongoing La Plata County development (over 800 acres for the Three Springs development alone) would be much greater and occur over a longer period of time than the construction disturbance associated with the US 550 South Connection to US 160 project. By comparison, the surface disturbance estimated for the US 550 South Connection to US 160 Project varies from 65 acres to 125 acres, as presented in Section 4.10 of this SDEIS.

For these reasons, when combined with the past, present and reasonably foreseeable future actions, the US 550 South Connection to US 160 project does not substantially contribute to cumulative impacts to water resources.

4.23.10 Vegetation Impacts

The US 550 South Connection to US 160 Project is expected to cause between 36.6 and 49.2 acres of piñon-juniper woodlands to be removed, depending on the alternative. As presented in Section 4.23.12.2 of the 2006 US 160 EIS, this acreage of native piñon-juniper vegetation which will be removed is much less than the anticipated acreage lost from other reasonably foreseeable future projects, including the Animas-La Plata Project (anticipated to lose 221 acres), oil and gas development (future loss of 2,604 acres), the Three Springs Development project which could impact up to 800 acres and other highway projects (which could result in a loss of approximately 130 acres).

Since most of the overall native vegetation communities in La Plata County would remain as relatively undisturbed, the health of the existing resource is strong, so when combined with the past, present and reasonably foreseeable future actions, the US 550 South Connection to US 160 project does not substantially contribute to cumulative impacts to vegetation.

4.23.11 Noxious Weed Impacts

In accordance with the Colorado Weed Management Act, CDOT is responsible for managing weeds in the CDOT ROW, and CDOT implements control measures for noxious weeds as necessary. These control measures, plus the implementation of weed control measures for the US 160 Project, would limit the spread of weeds within the project corridor. Thus, consideration of this project's action alternatives is not expected to contribute to cumulative noxious weed impacts in La Plata County as indicated in Section 4.23.2.3 of the 2006 US 160 EIS.

4.23.12 Wildlife and Fisheries Impacts

Cumulative impacts associated with past, present, and reasonably foreseeable future projects, including US 160 widening, US 550 widening, oil and gas development and ongoing La Plata County residential and commercial development would all contribute to long-term and severe impacts on wildlife habitat. The long-term cumulative impacts are expected to cause increased stress and mortality for wintering elk and deer, threatening the overall health of the elk and deer populations. Populations may decline in the future, or animals may be displaced to other area due to permanent loss of habitat. The overall cumulative impact of wildlife habitat loss is estimated at 77,460 acres or greater in La Plata County in the next 20 to 25 years.

The contribution to this cumulative impact associated with the US 550 South Connection to US 160 Project is anticipated to range from 48.1 acres with the Revised G Modified Alternative to 86.0 acres with the Eastern Realignment Alternative. The addition of wildlife crossings and wildlife exclusionary fencing associated with all three alternatives would help to alleviate the long-term impacts associated with habitat fragmentation and wildlife mortality due to vehicle-wildlife collisions. And although exclusionary fencing increases habitat fragmentation, the addition of wildlife crossings helps reduce that effect. This amount of wildlife habitat impact is not anticipated to materially increase the overall long term and severe impact already occurring as a result of past, present, and reasonably foreseeable future impacts and thus, the US 550 South Connection to US 160 project would not cause a substantial cumulative impact.

4.23.13 Threatened, Endangered and Sensitive Species Impacts

The only federally listed threatened, endangered or candidate species habitat which could be impacted by the US 550 South Connection to US 160 Project would be the southwestern willow flycatcher. Only the Eastern Realignment Alternative could impact this habitat, with an estimated impact of 1.1 acres.

The principal activity that has and may in the future result in cumulative effects on the southwestern willow flycatcher is continued community expansion, as documented in Section 4.23.14.2 of the 2006 US 160 EIS. Continued community expansion includes growth in the residential population and related development of commercial operations and roads, and results in habitat loss from direct removal of habitat, water management activities, and changes in land use practices. The increased number of rural residences would likely lead to an increase in predation on songbirds, including southwestern willow flycatchers, by domestic cats, as well as improve conditions for nest parasitism by cowbirds, by increasing the number of bird feeders, amount of mowed grass and horse corrals. Regardless of these pressures, the health of the southwestern willow flycatcher population is anticipated to remain strong. Since the US 550 South Connection to US 160 Project would only accelerate the rate of growth, rather than increasing growth overall, as documented in Section 4.1.2.2 of the 2006 US 160 EIS, cumulative impacts to these species associated with this project are not anticipated.

To summarize, when combined with past, present and reasonably foreseeable future actions, the cumulative effects to the southwestern willow flycatcher associated with the US 550 South Connection to US 160 Project would be minimal.

4.23.14 Historic and Archaeological Resource Impacts

Ongoing residential, commercial and industrial development in the area, combined with oil and gas development will continue to have a negative effect on historic and archaeological resources in the area, especially since the NHPA only protects these resources from a federally funded project or a Federal action, and most development is not connected to a Federal action. See Section 4.23.15.3 of the 2006 US 160 EIS for more information.

The US 550 South Connection to US 160 Project will add incrementally to a removal of archaeological sites. The project will also add incrementally to impacts upon historic sites, including impacts to historic ranches, a residential property, and irrigation ditches, depending on alternative. Several mitigation measures, developed in conjunction with SHPO, will be implemented to minimize impacts. See Section 3.13.3 for more information on proposed mitigation.

4.23.15 Paleontological Resource Impacts

The US 550 South Connection to US 160 Project has no impacts to paleontological resources and thus no cumulative impacts would occur due to this project. This was also found to be the case in the analysis done for the 2006 EIS, Section 4.23.2.4.

4.23.16 Hazardous Waste Impacts

Hazardous waste impacts were not evaluated as a part of the cumulative impact assessment done for the 2006 US 160 EIS because facilities along the US 160 corridor that were determined to have hazardous waste or materials contamination could either be avoided or remediated prior to highway construction, thus resulting in either no environmental impact or a positive impact. (See Section 4.23.2.6 of the 2006 US 160 EIS.) Since that time, additional oil and gas development has occurred in the project area.

There are thirteen oil and gas facilities in the vicinity of the alternative alignments for the US 550 South Connection to US 160 Project. The Eastern Realignment Alternative would have the potential to impact the most number of these. All potential hazardous materials sites would be avoided or remediated prior to construction. No cumulative impacts would be expected due to this project.

When combined with other past, present, and reasonably foreseeable future actions, the US 550 South Connection to US 160 Project is not expected to have a noticeably negative impact on hazardous waste sites because they will be remediated prior to construction.

4.23.17 Visual Impacts

The changes to visual character associated with the US 550 South Connection to US 160 Project would be most noticeable with the Eastern Realignment Alternative because it is located in a landscape that appears mostly natural, it is the longest alternative that traverses through this area, and it is adjacent to the most number of residences and rural landscapes that would be affected by this change.

Visual mitigation will be implemented along with the US 550 South Connection to US 160 Project, including revegetation and incorporation of design features that blend with the existing terrain or add to the scenic quality of the built area.

Section 4.23.16.3 of the 2006 US 160 EIS provides information on the mostly positive visual impacts anticipated as a part of the Animas-La Plata Project, the moderate to major cumulative visual impacts occurring in La Plata County as a result of community development, including continued commercial/industrial development, such as gravel mines and the effects to viewsheds occurring as a result of ongoing oil and gas development.

The impacts of the US 550 South Connection to US 160 Project , when combined with the other visual cumulative impacts of past, present and reasonably foreseeable future projects would not result in cumulative impacts to visual resources.

4.23.18 Energy Impacts

Energy would be consumed in the production of construction materials, with the most energy consumed by the Eastern Realignment Alternative because it is the longest. Energy consumption would increase temporarily with the use of heavy equipment for construction, but there would be long-term energy savings due to the decrease of traffic congestion.

Energy would be consumed for construction of all of the present and reasonably foreseeable future projects. The magnitude of some of these projects, especially large projects such as the Animas-La Plata Project or the Three Springs Development, is such that large amounts of energy would be needed for construction and operation of these facilities. Because the US 550 South Connection to US 160 Project would be expected to offset energy consumptive impacts by improving highway operational conditions, as discussed in Section 4.17.2 of this document, it would not contribute substantially to overall cumulative impacts.

The US 550 South Connection to US 160 Project, when combined with past, present and reasonably foreseeable future actions, is not anticipated to cause cumulative impacts to energy consumption.

4.23.19 Geology and Soils

The US 550 South Connection to US 160 Project would result in impacts to soils from clearing, excavating, blasting, increased erosion, including wind and runoff erosion and temporary decreases in slope stability. Project-related impacts to soils and geology are limited to areas directly disturbed by construction activities and those areas immediately adjacent to directly disturbed areas. The other past, present and reasonably foreseeable future actions are geographically distinct from this action. Although these other projects would have their own impacts to soils and geology from surface-disturbing activities, the impacts to soils and geology from these projects are geographically distinct from US 160 and are not expected to have any measurable additive cumulative impacts to soils and geology as indicated in Section 4.23.2.1 of the 2006 US 160 EIS.

4.23.20 Mitigation

Mitigation measures to minimize harm for historic properties include design options, such as narrower roadway width, retaining walls, underpass and irrigation designs, and steeper slopes, will be considered during final design of the roadway. See Section 4.13.3 for more detail on mitigation for impacts to historic and archaeological resources.

In addition to the mitigation measures listed in Section 4.23.17 of the 2006 US 160 EIS, the following mitigation measures could be used by local governments to minimize cumulative environmental impacts in the study area:

- New technologies and operational practices for mitigating MSAT emissions during construction—CDOT has developed a Draft Air Quality Action Plan to provide direction to implement programmatic mitigation solutions for unregulated mobile source and co-benefited criteria pollutants, which could be used as a guide for local governments. One such programmatic mitigation under evaluation is a demonstration diesel retrofit project on selected off-road CDOT

Maintenance equipment, to assess the potential feasibility of applying this DPM emissions reduction strategy to CDOT fleets statewide. Additionally, CDOT has initiated a statewide engine idling reduction program called Engines Off! Colorado. This program provides web-based idling reduction education, strategies and ordinance information for local communities and governments.

- Mitigating for Construction MSAT Emissions—Construction activity may generate a temporary increase in MSAT emissions. Project-level assessments that render a decision to pursue construction emission mitigation will benefit from a number of technologies and operational practices that should help lower short-term MSAT. In addition, the SAFETEA-LU has emphasized a host of diesel retrofit technologies in the Congestion Mitigation and Air Quality Improvement (CMAQ) Program provisions—technologies that are designed to lessen a number of MSATs (SAFETEA-LU, Public Law 109-59, August 10, 2005).

  Construction mitigation includes strategies that reduce engine activity or reduce emissions per unit of operating time, such as reducing the numbers of trips and reducing time spent idling. CDOT will develop construction operational plans that reduce or redirect work or shift times to avoid community exposures can have positive benefits when sites are near populated areas. For example, agreements that stress work activity outside normal hours of an adjacent school campus would be operations-oriented mitigation. CDOT will encourage the use of verified emissions control technology retrofits or fleet modernization of engines for construction equipment on construction equipment. Technology retrofits could include particulate matter traps, oxidation catalysts, and other devices that provide an after-treatment of exhaust emissions. Implementing maintenance programs per manufacturers' specifications to ensure engines perform at EPA certification levels, as applicable, and to ensure retrofit technologies perform at verified standards, as applicable, could also be deemed appropriate. CDOT will use clean fuels, such as ultra-low sulfur diesel, biodiesel, or natural gas, which can be a very cost-beneficial strategy.

- The EPA has listed a number of approved diesel retrofit technologies; many of these can be deployed as emissions mitigation measures for equipment used in construction. This listing can be found at: http://epa.gov/cleandiesel/verification/.

- Travel demand management strategies and techniques—These strategies and techniques could reduce overall vehicle-mile of travel; reduce a particular type of travel, such as long-haul freight or commuter travel; or improve the transportation system's efficiency can also mitigate MSAT emissions. Examples of such strategies include congestion pricing, commuter incentive programs, and increases in truck weight or length limits. Operational strategies that focus on speed limit enforcement or traffic management policies may help reduce MSAT emissions even beyond the benefits of fleet turnover. Well-traveled highways with high proportions of heavy-duty diesel truck activity may benefit from active Intelligent Transportation System programs, such as traffic management centers or incident management systems. Similarly, anti-idling strategies, such as truck-stop electrification can complement projects that focus on new or increased freight activity.

- Local planners also may want to consider the benefits of establishing buffer zones between new or expanded highway alignments and populated areas. Modifications of local zoning or the development of guidelines that are more protective also may be useful in separating emissions and receptors and in reducing noise impacts to sensitive receptors.

4.24 Permits

There have been no changes in Permits since the 2006 US 160 EIS and 2006 US 160 ROD. Several project specific submittals for the Section 404 Permit were made for projects that impacted wetlands. These projects are described in Section 1.4. Projects with wetland impacts included the Grandview 4th Lane, and CR 222/223 projects Future project development will require project specific submittals to the Corps and authorization of individual projects. See Section 4.24 of the 2006 US 160 EIS for more information.

4.25 Summary of Mitigation Measures

See Table 4-14, Summary of Mitigation Measures, for a summary of mitigation measures for the SDEIS.

Table 4-14. Summary of Mitigation Measures

Category	Principal Mitigation Measures
Land Use (Section 4.1)	Mitigation includes continued coordination with local entities to ensure consistency between roadway projects and land use plans in the area. CDOT will mitigate the loss of real property and physical relocations per the Uniform Relocation Assistance Act.
Farmland (Section 4.2)	Final design of the Revised G Modified (Preferred) Alternative will incorporate measures to allow the continued use of land for irrigated farmland production. Final design details will address engineered facilities to transport irrigation water to areas that may be severed from primary production areas by the US 160/550 connection. This will be accomplished by piping water beneath any constructed highway facilities and providing for structures to distribute water appropriately. The Revised G Modified (Preferred) Alternative includes two underpasses to allow passage of deer, elk, and other wildlife. One of the underpasses within irrigated pasture will accommodate farm equipment and a cattle crossing to allow continued access to seasonal calving areas, crop production and access to natural gas production operations on western areas of the ranch. Where irrigated farmlands are permanently lost to production, CDOT will compensate landowners for the lost value of crops and production. Appropriate measures to control the spread of noxious weeds will be addressed through measures discussed in Section 4.10, Noxious Weeds. Erosion and sedimentation mitigation measures will be implemented in conjunction with stormwater

Table 4-14. Summary of Mitigation Measures

Category	Principal Mitigation Measures
	best management practices (BMPs) required as described in Section 4.7, Wetlands and Water Resources. Functional irrigation systems will be maintained during construction with no permanent interruption of service.
Socioeconomics and Relocations (Section 4.3)	All relocations, residential and business, will be completed in accordance with the Uniform Relocation Assistance Act and CDOT will provide relocation benefits and assistance to all impacted individuals. No additional mitigation is required. Functional irrigation systems will be restored during construction with no permanent interruption of service. Any temporary inability to maintain irrigation service will be compensated for the lost value of the crops affected. A farm equipment/livestock underpass will be installed to provide passage for continued farming and ranching operations and livestock. More information on mitigation for ranches and ditches can be found in Section 5.10.2.1 in Chapter 5. Where farmlands are permanently lost to production, CDOT will compensate landowners for the lost value of crops and production. More information on farmlands can be found in Section 4.2.
Recreation (Section 4.4)	Dust control and access management during construction will reduce potential indirect impacts to nearby recreation facilities.
Air Quality (Section 4.5)	CDOT has developed a Draft Air Quality Action Plan to provide direction to implement programmatic mitigation solutions for unregulated mobile source and co-benefited criteria pollutants as directed by CDOT Policy Directive 1901. This includes programmatic mitigation under evaluation for DPM emissions reduction strategies for construction vehicles by retrofits and reduced engine idling. Maintenance and management, such as regularly scheduled road sweeping assist in reducing levels of re-entrained dust. Particulate matter and dust emissions will be minimized during construction by implementation of BMPs to control dust, such as regular watering of construction disturbance areas and idling limitations for equipment. Fugitive dust permits and/or Air Pollutant Emission Notices for construction activities will be obtained where applicable from CDPHE.
Traffic Noise Analysis (Section 4.6)	Mitigation Common to All Action Alternatives Three areas (MIT 1, MIT 3 and MIT 4) along the US 160 corridor share common impacts among the three build alternatives and shared common evaluations for noise mitigation. Abatement analyses show that mitigation along US 160 is not considered feasible and reasonable, and no mitigation is recommended. Abatement analyses associated with mainline US 160 traffic impacts are included in the Traffic Noise Technical Addendum in Appendix F. Mitigation for Revised G Modified (Preferred) Alternative Abatement measures are only effective when designed to benefit multiple receptors that are situated closely together. Individual receptors that are widely separated from other receptors may require similar noise barrier lengths and heights as a local group of homes to achieve the noise reduction design goal for reasonable construction. The individual receptor cost benefit index for a wall of sufficient length and height to provide 7 dBA reasonable noise reduction design goal for isolated, single sites is greater than the maximum allowable $6800 cost-benefit reasonableness criteria. Thus, for isolated impacted receptor R155, no noise mitigation is recommended. Mitigation for Revised F Modified Alternative One area of mitigation consideration (MIT 2) results from construction of the Revised F Modified Alternative. Because the Revised F Modified and Eastern Realignment alternatives' traffic and alignment are the same just south of the CR 233 (Three Springs) Interchange, the mitigation consideration for this area is the same described in MIT2n and MIT2s. Farther south, noise levels at R300 to R302 range from 57.6 to 63.9 dBA in the Revised F Modified Alternative and 49.2 to 51.9 dBA in the Eastern Realignment Alternative, and are substantially higher than the 2001 Baseline noise

Table 4-14. Summary of Mitigation Measures

Category	Principal Mitigation Measures
	levels. Noise barriers at the evaluated locations for MIT2n, MIT2s and MIT 2c could not meet the 7 dBA reasonable noise reduction design goal, therefore no abatement is recommended for these impacted receptors. Technical mitigation analyses and CDOT Noise Abatement Worksheets are found in the Noise Technical Addendum (Appendix F. Receptors C325 and C326 are commercial properties located along the CR 233 (Three Springs) Interchange southeast service road and would be impacted by both Revised F Modified and Eastern Realignment alternatives due to substantial noise increase only; noise levels are far below NAC Category C threshold of 71 decibels. There are no identified outdoor human activities areas associated with commercial sites, which are the normal focus of FHWA traffic noise impact concern. Therefore, C325 and C326 were not considered for noise abatement under this mitigation analysis. Abatement measures are only effective when designed to benefit multiple receptors that are situated closely together. Individual receptors that are widely separated from other receptors may require similar noise barrier lengths and heights as a local group of homes to achieve the noise reduction design goal to be reasonable for construction. The individual receptor cost benefit index for a wall of sufficient length and height to provide the 7 dBA reasonable noise reduction for isolated, single sites is greater than the maximum allowable $6800 reasonableness criteria. Thus, for isolated impacted receptor R25E, no noise mitigation is recommended. Mitigation for the Eastern Realignment Alternative In addition to the abatement analysis in common with Revised F Modified Alternative, abatement was analyzed for one area consisting of homes R13E – R18E near Dreamy Draw and Craig Lane (MIT 6). No noise abatement was recommended for these receptors. Although the design goal noise reduction could be achieved by the proposed barrier, the resulting cost-benefit index was unreasonable. Technical mitigation analyses and CDOT Noise Abatement Worksheets are found in the Noise Technical Addendum (Appendix F). Abatement measures are only effective when designed to benefit multiple receptors that are situated closely together. Individual receptors that are widely separated from other receptors may require similar noise barrier lengths and heights as a local group of homes to achieve the 7 dBA noise reduction design goal to be reasonable for construction. The individual receptor cost benefit index for a wall of sufficient length and height to provide reasonable noise reduction for isolated, single sites is greater than the maximum allowable $6800 reasonableness criteria. Thus, for isolated impacted receptors R8E, R9E, R10E, R12E, R21E, no noise mitigation is recommended. This SDEIS does not recommend construction of noise barriers for the Revised G Modified (Preferred), the Revised F Modified or the Eastern Realignment alternatives. ▪ Noise abatement evaluated at MIT 1, MIT2, MIT3, MIT4, and MIT6 sites were determined to not be feasible and reasonable under 2011 CDOT Analysis and Abatement Guidelines (CDOT, 2011) noise abatement criteria, and no mitigation is recommended for these sites. ▪ Isolated receptor locations were determined to not meet the cost-benefit index reasonableness criteria for feasible and reasonable abatement and no mitigation is recommended at these sites.
Wetlands and Water Resources (Section 4.7)	The Section 404 Permit for the project corridor (Permit No. 200275568) provides the specific details regarding required submittals that shall be approved prior to project construction. The Section 404 required submittals address jurisdictional status, wetland boundaries, project impacts, proposed mitigation, avoidance and minimization, indirect impacts, drainage, and erosion control. The 2006 US 160 EIS includes a discussion of avoidance, minimization, and mitigation measures and the preference for applying these measures in the stated order for both jurisdictional and non-jurisdictional wetlands in compliance with Executive Order 11990. The avoidance and minimization measures presented in the 2006 US 160 EIS are applicable to future phased projects and are also a condition of the Section 404 Individual Permit for the corridor. Section 404 Permit submittals for US 160 phased projects require a description of the methods taken to further avoid and minimize impacts to waters of the US taking into considerations cost, existing technology, and logistics in light of the overall project

Table 4-14. Summary of Mitigation Measures

Category	Principal Mitigation Measures
	purpose. Compensatory mitigation for unavoidable wetland and waters of the US impacts requires preparation of a comprehensive mitigation and monitoring plan approved by the USACE in the format of the Sacramento District's Habitat Mitigation and Monitoring Proposal Guidelines (USACE, 2004). The USACE also requires that wetland mitigation sites be protected by an instrument such as deed restriction or conservation easement to limit future impacts to mitigation sites. Temporary impacts are generally restored on location without the need for a formal protection instrument. Provided the supporting hydrology is not modified, temporary impact areas generally recover within the following growing season. Monitoring of temporary impacts is conducted to assure areas are restored to wetland habitat. Temporary impacts that do not recover are tracked in the Monitoring Reports and compensated by restoring wetland parameters on location or identifying alternate mitigation sites. Compensation for other waters of the US, including irrigation and drainage features includes a requirement to maintain preconstruction flows and capacity consistent with preconstruction conditions and restoration of disturbances along riparian areas. To assure that temporary impacts are restored following construction, temporary impact areas are protected using a geofabric membrane spread over the temporary impact area followed by two feet of straw and one foot of soil embankment material. This approach allows equipment operation within temporary impact areas while protecting native soils and vegetation from compaction. Upon completion of construction, fabric, straw, and soils are removed and the area is allowed to revert back to wetlands following gentle scarification with a toothless backhoe. Jurisdictional and non-jurisdictional wetlands such as those associated with irrigation features are generally restored at a 1:1 ratio based on CDOT's Programmatic Agreement with FHWA (MOA Between the FHWA and CDOT Regarding the Programmatic Approval of Certain Wetland Findings, 1991). Waters of the US features without associated wetlands will be restored to maintain their course, condition, hydraulic flow capacity, and location to the extent practicable. Vegetation including riparian and upland trees will be restored in accordance with vegetation mitigation commitments in the Vegetation, Wildlife, and Threatened and Endangered Species sections of the SDEIS. This generally includes tree replacement at a minimum 1:1 ratio and shrub replacement at a 1:1 ratio based on aerial coverage. Based on the relatively minor impacts associated with the US 160/US 550 connection, mitigation would likely be combined with other mitigation commitments from other projects at a protected site concurrently or in advance of project impacts. Wetland and waters of the US impacts discussed in this document are within the Tier 1 service area of the Animas River Wetland Mitigation (Zink) Bank. The Tier 1 designation allows for purchase of wetland credits from the bank at a 1:1 ratio for project impacts. The impacts are also within the same watershed as the Animas River Wetland Mitigation (Sugnet) creation site where CDOT has created 1.0 acre of wetlands on private property that can be used to compensate for impacts on the 2006 US 160 EIS corridor. Both of these sites have pre-approved Mitigation and Monitoring Plans that address success and performance criteria for the site. The limited wetland impacts for construction of the US 160/550 connection would most likely utilize one of the Animas River mitigation sites to account for permanent impacts on the project. Additional measures to limit and reduce direct and indirect impacts to wetlands to the extent practicable will be accomplished through implementation of the following measures. Measures applicable to the SDEIS include the following: ▪ Precautions will be taken when working in areas with shallow groundwater or areas that frequently carry surface water flows to avoid inadvertent hydrologic modifications. ▪ Unnecessary temporary impacts will be avoided by fencing the limits of disturbance during construction. ▪ BMPs will be used during all phases of construction to reduce impacts from sedimentation and erosion. BMPs will include the use of berms, brush barriers, checkdams, erosion control blankets,

Table 4-14. Summary of Mitigation Measures

Category	Principal Mitigation Measures
	filter strips, sandbag barriers, sediment basins, silt fences, straw-bale barriers, surface roughening, and/or diversion channels. ▪ Specific permanent BMPs, including infiltration basins, trenches, wet ponds, and other practices will be evaluated during final design. ▪ No equipment staging or storage of construction materials will occur within 50 feet of wetlands or other waters. ▪ The use of chemicals, such as soil stabilizers, dust inhibitors, and fertilizers within 50 feet of wetlands and other waters will be restricted. ▪ Equipment will be refueled in designated contained areas, at least 50 feet away from wetlands and other waters. ▪ Where practicable, work will be performed during low flows or dry periods. If flowing water is present, it will be diverted around active construction areas. ▪ No discharge of effluent into wetlands or other waters will occur. ▪ Temporary fill material will not be stored within wetlands or other waters. ▪ All areas of exposed soil will be seeded and/or planted and mulched throughout construction (following the completion of each section). When seeding and/or planting cannot occur due to seasonal constraints, mulch and mulch tackifier will be placed for temporary erosion control. ▪ Upland seed mixes will not be used within wetlands. ▪ During design, wetland hydrology sources will be evaluated and connections to wetlands will be maintained if possible. If it is determined that construction would cut off the hydrological connection to a wetland, the impacts to that wetland will be mitigated. ▪ Any wetland areas used for construction access will be covered with a layer of geotextile, straw, and soil prior to use to minimize impacts and facilitate reclamation after use. The materials would be removed upon completion of use. ▪ Concrete washout structures will be constructed in designated areas at least 50 feet from wetlands and other waters of the US. ▪ Clearing and grubbing will include the conditions of the Migratory Bird Treaty Act, Endangered Species Act, Municipal Separate Storm Sewer System (MS4) permit, and Section 404 permit. ▪ CDOT will obtain access control lines along the entire corridor. Access control lines designate where individual properties can be accessed along highways. An access point cannot be placed across an access control line. In this instance, access control lines would be used to limit impacts to wetlands; however, they are used for many other reasons.
Water Resources (Section 4.8)	Note: This section is combined with the Wetland and Water Resources section (Section 4.7) above.
Vegetation (Section 4.9)	Mitigation for vegetation impacts presented in the 2006 US 160 EIS and pertinent to the activities discussed within this document include: ▪ Temporary disturbances in upland areas would be seeded with grasses for soil stabilization. ▪ Silt fencing and other BMPs will be used to prevent degradation of habitats adjacent to the construction area by preventing transport of eroded sediment. ▪ Construction impacts will be minimized. The construction ROW will be fenced where it passes through sensitive areas to prevent temporary disturbance outside the construction limits. ▪ Trees removed from riparian areas (SB40) during construction will be replaced at a 1:1 ratio based on a stem count of all trees with diameter at breast height of 2 inches or greater. Shrubs will be replaced based on their pre-construction aerial coverage. All replacement trees and shrubs will be native species. ▪ The abandoned and reclaimed road and ROW on Farmington Hill will be revegetated with native

Table 4-14. Summary of Mitigation Measures

Category	Principal Mitigation Measures
	vegetation. ▪ Areas of piñon-juniper that will be impacted during construction but that are not needed as part of the permanent facilities (road and shoulder) will be revegetated with an appropriate mixture of native upland forbs, grasses, and low-growing shrubs. Taller vegetation (piñon pines, piñon-junipers, tall shrubs) will also be planted where the road is adjacent to piñon-juniper woodland and where planting of taller vegetation will not interfere with safety (sightlines and animal crossings). ▪ Noxious weeds will be controlled during construction and habitat restoration (Section 4.10, Noxious Weeds). Mitigation measures for wetland impacts are detailed in Section 4.7, Wetlands and Water Resources.
Noxious Weeds (Section 4.10)	Prior to the start of construction phases, CDOT will develop a project-specific noxious weed management plan that will be implemented during construction. The plan will include the results of noxious weed inventory, weed management goals and objectives and preventative control measures, including the following: ▪ Project plans will include pay items or a Force Account for herbicide treatment by the Contractor to address noxious weeds in conjunction with construction activities. Treatment measures will be identified in the Noxious Weed Management Plan and will be specifically tailored to seasonal timing and specific target species. ▪ Contractor vehicles arriving from other construction sites will be cleaned prior to any phased projects to ensure that soils, seeds, or debris capable of transporting noxious weeds are not brought on location. ▪ Periodic surveys will take place during construction to identify and treat noxious weed populations that may become established. ▪ Topsoil used in reclamation will be free of noxious weeds or will be treated prior to use per the Weed Free Forage Act (CRS, Title 35, Article 27.5). ▪ Disturbed areas will be reclaimed as soon as construction is finished and seeded using temporary cover or a permanent seed mixture of native grasses and forbs, depending on the season. ▪ Fertilizer will not be used in wetland seeded areas because it could enhance the growth of noxious weeds at the expense of desired vegetation. ▪ Certified weed free mulch will be used for reclamation, and weed-free straw bales will be used for sediment barriers per the Weed Free Forage Act (CRS, Title 35, Article 27.5). ▪ Herbicides will not be used within wetland areas that are considered habitat of the southwestern willow flycatcher or the New Mexico meadow jumping mouse. Spot treatment of non-habitat wetlands may be allowed using aquatic-use only herbicides, where mechanical means are unsuitable. ▪ Weed control will use the principles of integrated pest management to treat target weed species efficiently and effectively by using a combination of two or more management techniques (biological, chemical, mechanical, and/or cultural). Weed control methods will be selected based on the management goal for the species, the nature of the existing environment, and methods recommended by the La Plata County Weed Supervisor, and other weed experts. The plan will avoid adverse impacts from herbicides, and management recommendations will be developed based on factors such as high groundwater and presence of riparian vegetation that would preclude the use of certain herbicides. Monitoring will be used to identify new weed infestations and to evaluate the effectiveness of weed control methods. Monitoring and weed controls will be implemented during construction and continued by CDOT maintenance personnel after the end of construction.
Wildlife and Fisheries (Section 4.11)	Final design of the Revised G Modified (Preferred) Alternative will follow the multi-species approach presented in the 2006 US 160 EIS. This approach will help increase habitat connectivity and barrier

Table 4-14. Summary of Mitigation Measures

Category	Principal Mitigation Measures
	permeability across the highway for ungulates, carnivores, and small- and medium-sized mammals. Please refer to Section 4.11.7 of the 2006 US 160 EIS for details of the mitigation strategy that will be carried forward in the SDEIS. Brief summaries of these mitigation strategies are included below: Ungulates Including Deer and Elk ▪ Proposed design features for wildlife exclusion fencing and multi-species crossing designs originally proposed and discussed in the 2006 US 160 EIS would be carried forward and implemented for the Revised G Modified (Preferred) Alternative analyzed in the SDEIS. ▪ The construction of wildlife exclusion fencing and adequate numbers of wildlife crossings provide animals the opportunity to safely cross under the highway. Eight-foot high wildlife exclusionary fencing in conjunction with large-mammal underpasses will be used to reduce vehicle-wildlife collisions and provide road crossing opportunities. Fencing will incorporate deer guards at access points and earthen escape ramps, and fence end treatments. Underpasses will be sized with an openness ratio of 2.65 feet or more and minimum dimensions of 8 feet high and 20 feet wide. ▪ To ensure that locations of wildlife crossings will be suitable, CDOT will continually collect data on roadkilled wildlife to identify trends in locations of vehicle-wildlife collisions. The specific crossing type that will be constructed and final locations may be modified during the final design to account for new information. Information, such as continued CDOT vehicle collision mortality records, track surveys, and local development trends that affect habitat linkages along the roadside will provide sufficient information to install the proposed wildlife crossings. Small- to Medium-Sized Mammals, Reptiles, and Amphibians ▪ Culverts 3 to 5 feet in diameter will be installed to increase habitat connectivity and access across the highway for small mammal (rodents and lagomorphs), medium-sized mammals (coyotes and foxes), and reptiles and amphibians (turtles, toads, frogs). Culvert placement should include uplands with herbaceous cover, as well as drainages, and should be spaced every 500 to 1,000 feet in appropriate habitat to promote animal utilization. The numbers and site-specific locations of culverts will be determined in consultation with CDOW as part of final design. Appropriate fencing will be installed in these crossing areas to guide small mammals, reptiles and amphibians to the culvert openings. Raptors ▪ All raptor species are protected under the MBTA, which prohibits removing or disturbing active nests except under permit from USFWS. Raptor nest surveys will be completed prior to start of construction to identify active nests and potential areas where seasonal restrictions on construction may be required. If nests are located in the study area, protective seasonal buffer zones in compliance with those recommended by the CDOW will be established around active nests during construction to avoid disturbance to individual birds while nesting. Migratory Bird Treaty Act ▪ To the extent possible, vegetation removal activities will be timed to avoid the migratory bird breeding season (April 1 through August 31). Areas that must be scheduled for vegetation removal between April 1 and August 31 shall be surveyed for nests and approved by a qualified biologist prior to the initiation of work. Appropriate inactive nest removal and hazing/exclusion measures shall be incorporated into the work to avoid the need to disturb active migratory bird nests. Fisheries ▪ It is unlikely that any fisheries will be impacted by the alignments proposed within this document. BMPs for sediment control and sediment reduction techniques will be incorporated into the alternatives. These measures will ensure that sedimentation and siltation caused during the construction phase is reduced and water quality impacts are limited. These mitigation measures are described in the Wetlands and Water Resources section.

Table 4-14. Summary of Mitigation Measures

Category	Principal Mitigation Measures
Threatened, Endangered, and Sensitive Species (Section 4.12)	Southwestern Willow Flycatcher ▪ Surveys for presence/absence of southwestern willow flycatchers will be conducted annually on all potential habitat patches prior to constructing specific highway segments. Willow patches measuring 6 feet in height that total 0.25 acres, and linear patches wider than 15 feet that cover at least 900 square feet that are closely associated with other willow patches totaling 0.25 acres will be surveyed. ▪ Surveys will be required to determine presence or absence of southwestern willow flycatchers in habitat that will be affected or when construction will occur within 1,000 feet of affected habitat. ▪ Seasonal restrictions will be implemented on construction activities to avoid taking habitat between May 1 and August 15. Buffers will be required around active nest areas or within 1,000 feet of an occupied habitat. During and after construction, CDOT will delineate sensitive habitats to avoid direct impacts from maintenance activities. ▪ Construction activities that begin in an area prior to May 1 in documented previously unoccupied habitat will not adversely affects Southwestern willow flycatcher nesting location choice. To minimize potential impacts to breeding birds, USFWS requires removal of documented previously unoccupied suitable willow nesting habitats located within proposed disturbance areas outside of the breeding season (between May 1 and August 15). ▪ Direct impacts to any identified occupied southwestern willow flycatcher habitat will be avoided. If occupied habitat is discovered and will be impacted, habitat enhancement or other mitigation as determined through consultation with USFWS will be implemented. Raptors ▪ Raptor nest surveys will be conducted within 0.5 mile of the study area prior to starting construction. If an active or inactive nest is identified, a 0.5-mile buffer will be required around the nest, and seasonal restrictions on construction in the area will be implemented. Seasonal restrictions will follow CDOW standoff distance for nesting seasons for the species of raptor. ▪ If bald eagle nocturnal roosts are identified, construction activity will be restricted within 0.25 mile of active nocturnal roost sites between November 15 and March 15, if bald eagles are present. ▪ Perch and roost trees removed during construction will be replaced at a 2:1 ratio with an appropriate tree species, such as cottonwood.
Historic Preservation (Section 4.13)	Archaeological Resources FHWA has determined that the NRHP eligible archaeological sites are significant chiefly because of what can be learned by data recovery, and therefore they have minimal value for preservation in place. The SHPO did not object to this determination. Consequently, controlled data recovery excavations at each site will effectively mitigate the adverse effect. This action is stipulated in Section I(C)(1) of the Draft Section 106 Memorandum of Agreement executed for the project, which is included in Appendix A. At such time as one or more NRHP eligible archaeological sites referenced above is within the limits of a planned and funded construction project and therefore in danger from earth-moving activities, an Archaeological Data Recovery Plan defining the methodology and goals for excavation will be completed. The plan will meet all criteria outlined in the Secretary of the Interior's Standards and Guidelines for Archaeological Documentation, in addition to the procedures and protocols developed by the Colorado Office of Archaeology and Historic Preservation. The Data Recovery Plan(s) will be reviewed and approved by the SHPO prior to issuance of an excavation permit and initiation of controlled excavations. The consulting parties and tribal governments will also be provided the opportunity to review and comment on the excavation plan(s) prior to implementation. To the best of our knowledge and belief, no human remains, associated or unassociated funerary objects or sacred objects, or objects of cultural patrimony as defined in the Native American Graves

Table 4-14. Summary of Mitigation Measures

Category	Principal Mitigation Measures
	Protection and Repatriation Act (25 United States Code [U.S.C.] 3001), are expected to be encountered in the archaeological work. If such items are discovered, work will cease in the vicinity of the find and all appropriate coordination will ensue with the SHPO, consulting parties and tribal governments, and other involved entities, as necessary. Historic Resources The following mitigation measures will be undertaken to mitigate impacts to the historic resources: 1. Archival Documentation a. CDOT shall ensure that the Webb Ranch (5LP8461) and Craig Limousin Ranch (5LP9307) shall be documented in accordance with Level II documentation as outlined in Colorado Office of Archaeology and Historic Preservation Form #1595, *Historical Resource Documentation: Standards for Level I, II, and III Documentation* i. b. CDOT shall ensure that all documentation activities will be performed or directly supervised by architects, historians, photographers and/or other professionals meeting the qualification standards in their field as stipulated in the *Secretary of Interior's Professional Qualifications Standards* (36 Code of Federal Regulations [CFR] 61, Appendix A). c. CDOT shall provide originals of all documents resulting from the documentation to the SHPO, the La Plata County Historical Society, the property owners, and a local library or archive designated by the SHPO. 2. Interpretive Mitigation a. Interpretive mitigation will be created that focuses on the development and importance of historic ranching on Florida Mesa. Options include, but are not necessarily limited to, signage, brochures, pamphlets, historic contexts, or other printed material. Content, design, materials, location, distribution and other details will be determined in consultation with SHPO and the consulting parties. b. Other creative mitigation options that arise as the project progresses that further the education or understanding of the importance of the ranching resources shall also be considered. 3. Data Recovery Excavations a. At such time as one or more of the NRHP eligible archaeological sites referenced above is within the limits of a planned and funded construction project and therefore in danger from earth-moving activities, an Archaeological Data Recovery Plan defining the methodology and goals for excavation will be completed. The Plan will meet all criteria outlined in the Secretary of the Interior's Standards and Guidelines for Archaeological Documentation, in addition to the procedures and protocols developed by the Colorado OAHP. The Data Recovery Plan(s) will be reviewed and approved by the SHPO prior to issuance of an excavation permit and initiation of controlled excavations. The consulting parties and tribal governments will also be provided the opportunity to review and comment on the excavation plan(s) prior to implementation. b. To the best of our knowledge and belief, no human remains, associated or unassociated funerary objects or sacred objects, or objects of cultural patrimony as defined in the Native American Graves Protection and Repatriation Act (25 U.S.C. 3001), are expected to be encountered in the archaeological work. If such items are discovered, work will cease in the vicinity of the find and all appropriate coordination will ensue with the SHPO, consulting parties and tribal governments, and other involved entities, as necessary. 4. Design and Construction a. Efforts to minimize harm to historic and archaeological properties will be assessed during

Table 4-14. Summary of Mitigation Measures

Category	Principal Mitigation Measures
	the final design phase for the for the preferred alternative and may include, but not be limited to, narrower roadway width, use of retaining walls, steeper slopes, and creative underpass and irrigation design, as applicable. Contributing features of historic properties will be protected during construction and avoided to the extent practicable.
Paleontological Resources (Section 4.14)	Upon completion of final design for and prior to construction, ground reconnaissance for paleontological resources will be conducted. If any scientifically important fossil localities are discovered, mitigation measures will be developed for and implemented at those locations, as appropriate. Excavation during construction could expose new fossils. If fossils materials are exposed during any construction activities, work will stop in the area of discovery, and a CDOT paleontologist will be notified.
Hazardous Waste Sites (Section 4.15)	The following general mitigation measures will be applied, as appropriate: ▪ Any required hazardous waste management plans will include safety measures developed for protection of workers and the public while doing this work and during construction if hazardous materials/waste are encountered. ▪ BMPs would be used to offset accidental release of hazardous materials into the environment during normal construction activities such events. The Contractor shall prepare a Spill Prevention, Control, and Countermeasure (SPCC) Plan in accordance with Standard Specification 107.25. ▪ Equipment staging and bulk fuel storage areas would be compliant with the Colorado Petroleum Storage Tank Regulations (7 Colorado Code of Regulations [CCR] 1101-14) requirements, which include security, secondary containment, pressure relief, and a spill prevention control and countermeasure plan. ▪ Potential mitigation measures may include, but are not limited to, excavation and removal, in-situ and ex-situ treatment, and enhanced natural attenuation/bioremediation. ▪ Disposal of roadway structures potentially coated with lead-based paint will be performed according to CDOT standard specifications. ▪ Fill materials derived from areas that could be impacted by hazardous materials sites or are suspect of being contaminated will be tested as necessary to ensure that contaminated materials are not redeposited within the project right-of-way.
Visual Resources (Section 4.16)	Mitigation measures to reduce visual resource impacts include the following: ▪ Construction of cut-and-fill slopes will be minimized and the cut line will be blended into the existing terrain. ▪ Revegetation will occur as soon as possible after construction to stabilize soils and reduce visual contrasts. ▪ Retaining walls and bridge structures will include design features to add to the scenic quality of the built area. Architectural design guidelines will be developed to maintain consistent architectural and aesthetic treatments throughout the study area. ▪ Removal of adjacent roadside vegetation will be minimized, where possible. Areas that will lose vegetation that provides important visual screens will be revegetated with taller plan species (trees and shrubs) that can serve the same function. These areas will be determined in final construction plans. ▪ The original US 550 alignment at Farmington Hill will be obliterated and revegetated with native species, including shrubs and trees.
Energy Consumption (Section 4.17)	Mitigation to reduce energy consumption during construction activities includes the following: ▪ Maximum use of on-site material to reduce hauling ▪ Adequate vehicle maintenance

Table 4-14. Summary of Mitigation Measures

Category	Principal Mitigation Measures
	▪ Design of construction access roads and location of staging areas to minimize distance traveled
Geology and Soils (Section 4.18)	Mitigation of the various geologic and soil impacts can generally be accomplished through implementation of engineering controls, which may include things such as placing physical barriers on top of or around soil to prevent it from eroding. Also, a geotechnical investigation and analysis will be completed to optimize the engineering design of the roadway and to assess the geologic resources that will be encountered prior to commencing design activities. The following mitigation measures will help reduce the amount of impacts to the geologic and soil resources in the study area: ▪ Soils or materials excavated from one area will be used in other areas, if possible, so as to disturb less ground area. ▪ On-site soils of similar or same type will be used to the appropriate depth for fill areas in cropland and wetlands, so native topsoils will be replaced. ▪ Retaining structures and other engineering controls will be incorporated to increase slope stability. ▪ Engineered grading controls will be implemented in fill stockpile and cut-and-fill areas. ▪ Expansive soils and bedrock will be mitigated at structure locations by designing deep foundation systems. ▪ Structural retaining walls will be built to stabilize slopes when cut or fill slopes require steep gradients, when gradients exceed the allowable placement properties of the soil, or where potential slope failures may occur due to the presence of water or loose material. ▪ A SWMP that prescribes BMPs to minimize soil erosion and includes prescriptions for monitoring conditions before, during, and after the construction activities will be developed and implemented.
Construction (Section 4.19)	Mitigation activities that will be implemented during construction include: ▪ Follow all FHWA and CDOT regulations and guidance regarding worker and public safety in effect at the time of construction. ▪ Maintain access to businesses and residences at all times. ▪ Coordinate with emergency service providers to minimize delays and ensure access to properties. ▪ Use and maintain BMPs to control sediment and erosion. These BMPs will include, but are not limited to, use of silt fence, erosion logs, straw bales, and any other new technologies. An Erosion Control Supervisor is also required for construction projects. ▪ Implement dust abatement as necessary by using water trucks. ▪ Perform construction vehicle maintenance and refueling operations at a designated area away from sensitive wildlife habitat, wetlands, and waters of the US. ▪ Coordinate with public and private entities in a public information effort to minimize inconveniences of users. This could include public notices in newspapers and locals signs to warn motorists of future detours and closures. ▪ Provide temporary signage to business entrances. ▪ Plan the shortest, most direct detours with adequate signing to limit additional travel to the extent possible. ▪ Limit any major traffic disruption to the off-peak hours as much as possible. ▪ Keep average delay times to a minimum. ▪ Place flaggers immediately adjacent to work areas to optimize traffic flow. ▪ Develop a project-specific noxious weed management plan (see Section 4.10, Noxious Weeds). ▪ Native plant material will be used and existing native plan material will be protected.

Table 4-14. Summary of Mitigation Measures

Category	Principal Mitigation Measures
Impacts to BLM Land (Section 4.20)	There is no mitigation necessary for impacts to BLM land. There are no impacts to BLM lands in the SDEIS.
Relationship of Local Short-Term Uses vs. Long-Term Productivity (Section 4.21)	Mitigation measures for short-term and long-term impacts are described in the resource-specific sections of this chapter.
Irreversible and Irretrievable Commitment of Resources (Section 4.22)	Certain resource loss in unavoidable, but can be mitigated to the extent practical by employing BMPs as described in individual resource sections of this chapter.
Cumulative Impacts (Section 4.23)	In addition to the mitigation measures listed in Section 4.23.17 of the 2006 US 160 EIS, the following mitigation measures could be used by local governments to minimize environmental impacts in the area: ▪ New technologies and operational practices for mitigating MSAT emissions during construction—CDOT has developed a Draft Air Quality Action Plan to provide direction to implement programmatic mitigation solutions for unregulated mobile source and co-benefited criteria pollutants, which could be used as a guide for local governments. One such programmatic mitigation under evaluation is a demonstration diesel retrofit project on selected off-road CDOT Maintenance equipment, to assess the potential feasibility of applying this DPM emissions reduction strategy to CDOT fleets statewide. Additionally, CDOT has initiated a statewide engine idling reduction program called Engines Off! Colorado. This program provides web-based idling reduction education, strategies and ordinance information for local communities and governments. ▪ The initial decision to pursue MSAT emissions mitigation should be the result of interagency consultation at the earliest juncture. Options available to project sponsors should be identified through careful information gathering and the required level of deliberation to assure an effective course of action. Such options may include local programs, whether voluntary or with incentives, to replace or rebuild older diesel engines with updated emissions controls. Information on EPA diesel collaborative around the country can be found at http://www.epa.gov/otaq/diesel/whereyoulive.htm. ▪ Travel demand management strategies and techniques – These strategies and techniques could reduce overall vehicle-mile of travel; reduce a particular type of travel, such as long-haul freight or commuter travel; or improve the transportation system's efficiency can also mitigate MSAT emissions. Examples of such strategies include congestion pricing, commuter incentive programs, and increases in truck weight or length limits. Operational strategies that focus on speed limit enforcement or traffic management policies may help reduce MSAT emissions even beyond the benefits of fleet turnover. Well-traveled highways with high proportions of heavy-duty diesel truck activity may benefit from active Intelligent Transportation System programs, such as traffic management centers or incident management systems. Similarly, anti-idling strategies, such as truck-stop electrification can complement projects that focus on new or increased freight activity. ▪ Local planners also may want to consider the benefits of establishing buffer zones between new or expanded highway alignments and populated areas. Modifications of local zoning or the development of guidelines that are more protective also may be useful in separating emissions and receptors. ▪ Mitigation measures to minimize harm for historic properties include design options, such as narrower roadway width, retaining walls, underpass and irrigation designs, and steeper slopes will be considered during final design of the roadway.

5.0 Section 4(f) Evaluation

5.1 Introduction

Section 4(f) was created when the United States Department of Transportation (USDOT) was formed in 1966. It is codified at Title 49 United States Code (U.S.C.) Section 303 (Section 4(f) of the USDOT Act of 1966) and Title 23 U.S.C. Section 138, and in the implementing regulations 23 CFR 774. It states:

> *"The Secretary shall not approve any program or project (other than any project for a park road or parkway under Section 204 of this title) which requires the use of any publicly owned land from a public park, recreation area, or wildlife and waterfowl refuge of national, State, or local significance as determined by the Federal, State, or local officials having jurisdiction thereof, or any land from an historic site of national, State, or local significance as so determined by such officials unless (1) there is no feasible and prudent alternative to the use of such land, and (2) such program includes all possible planning to minimize harm to such park, recreational area, wildlife and waterfowl refuge, or historic site resulting from such use."*

A Section 4(f) "use" occurs when:

1. Land from a Section 4(f) property is permanently incorporated into a transportation facility; land will be considered permanently incorporated into a transportation project when it has been purchased as right-of-way or sufficient property interests have been otherwise acquired for the purpose of project implementation; or.

2. There is a temporary occupancy of land that is adverse in terms of the Section 4(f) statute's preservation purposes. Under the FHWA/FTA regulations, a temporary occupancy of property *does not* constitute a use of a Section 4(f) property when the following conditions are satisfied:

    - The occupancy must be of temporary duration (i.e., shorter than the period of construction) and not involve a change in ownership of the property.
    - The scope of work must be minor, with only minimal changes to the protected resource.
    - There are no permanent adverse physical effects to the protected resource, nor will there be temporary or permanent interference with activities, features or attributes of the property.
    - The land being used must be fully restored to a condition that is at least as good as that which existed prior to the proposed project.

- There must be documented agreement of the officials with jurisdiction over the Section 4(f) resource regarding the above conditions; or

3. There is no permanent incorporation of land from a Section 4(f) property, but the project's proximity impacts are so severe that the protected activities, features, or attributes that qualify the property for protection are substantially impaired. This is called a constructive use of the property.

Section 4(f) further requires consultation with the Department of the Interior and, as appropriate, the offices of the Departments of Agriculture and Housing and Urban Development in developing transportation projects and programs which use lands protected by Section 4(f). Section 4(f) applies only to the actions of agencies within the USDOT. The USDOT is responsible for applicability determinations, evaluations, findings and overall compliance.

This chapter addresses the potential uses of Section 4(f) properties that occur as a result of improvements to the US 550 connection to US 160 east of Durango, Colorado. It includes the purpose and need for the proposed project, a discussion of alternatives including avoidance alternatives, a description of the Section 4(f) use that occurs with each alternative considered, and a least overall harm analysis if all the alternatives use Section 4(f) properties. This chapter provides information and supporting documentation for a final Section 4(f) evaluation within which the Federal Highway Administration (FHWA) will make a determination of whether there are feasible and prudent avoidance alternatives, and if not, approve the alternative that causes the least overall harm in light of the statute's preservation purpose.

A stand-alone Draft Section 4(f) Evaluation was prepared in March 2011 (*US 550 Connection to US 160 at Farmington Hill Draft Section 4(f) Evaluation*). This was an earlier draft of what is presented here, in this chapter. This was circulated to the Department of the Interior for review, and was submitted to the Colorado State Historic Preservation Officer (SHPO), the Advisory Council on Historic Preservation (ACHP) and the Section 106 consulting parties for informational purposes. Comments received are included in Appendix A. This Section 4(f) Evaluation includes revisions to address these comments

5.2 Project Background

This Section 4(f) evaluation has been prepared because a reassessment of environmental conditions during the design process for the US Highway 160, Durango to Bayfield, project identified an eligible historic property, the Webb Ranch, that would be impacted. A brief history of the project is provided in the following discussion.

A Feasibility Study that included the US 160 corridor from Durango to Bayfield and US 550 from the New Mexico Stateline to Durango was completed in 1999. The Feasibility Study was a planning level study that identified broad recommendations and strategies. The Feasibility Study recommended widening US 160 between Durango and Bayfield from two lanes to four lanes, and constructing an interchange for the connection of US 550 to US 160. The study recommended the interchange be constructed generally near the existing location of the US 160/US 550 (south) intersection also known as Farmington Hill. These recommendations were carried into the subsequent National Environmental Policy Act (NEPA) processes for US 160 between Durango and Bayfield, and US 550 south of Durango for further evaluation and study.

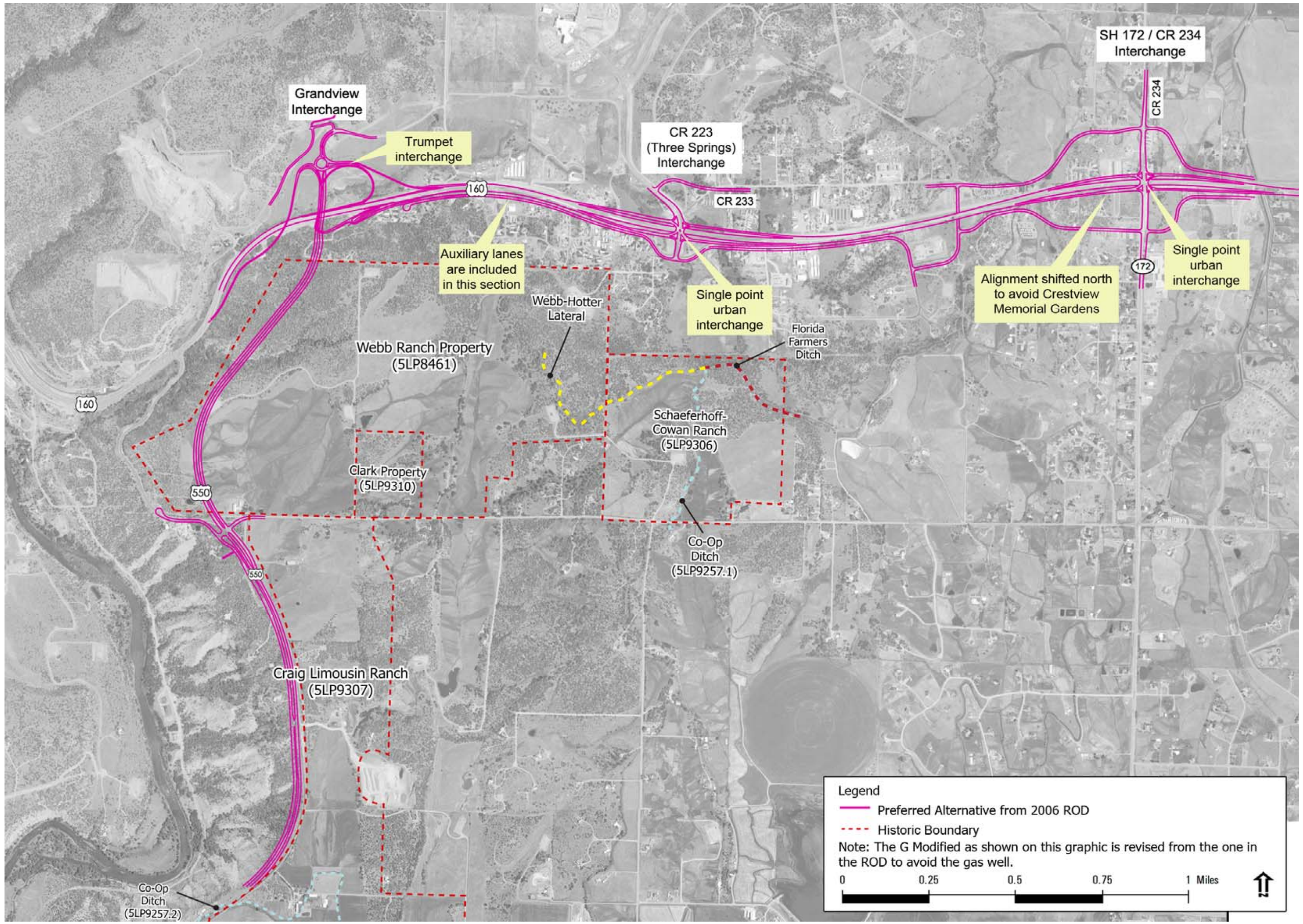
The NEPA process for US 550 south of Durango was an Environmental Assessment (EA) completed to a Finding of No Significant Impact (FONSI) in 2005. Improvements to US 550 included widening from two to four lanes along the existing highway from the New Mexico state line to MP 15.4.

For the US 160 project between Durango and Bayfield, a preliminary Environmental Assessment (EA) was prepared between February 1999 and January 2002. The study area for this corridor included the connection of US 550 to US 160 east of Durango. Based on the preliminary EA and the environmental impacts, the Federal Highway Administration (FHWA) determined that an Environmental Impact Statement (EIS) was the appropriate level of NEPA documentation for this project.

The EIS process commenced with publication of the notice of intent to prepare an EIS in the Federal Register on December 24, 2002. A public and agency scoping meeting was held on March 5, 2003 to identify public and agency issues. On September 23, 2005, the Draft EIS/Draft Section 4(f) evaluation was made available to the public. A public hearing was held on the Draft EIS/Draft Section 4(f) evaluation on October 13, 2005. The *US Highway 160 Durango to Bayfield Final Environmental Impact Statement /Final Section 4(f) Evaluation* (2006 US 160 EIS) was signed in May 2006. The 2006 US 160 EIS was made available for public review on May 26, 2006 with a public hearing on June 7, 2006. The *US Highway 160 Durango to Bayfield Record of Decision* (2006 US 160 ROD) was signed by FHWA on November 7, 2006. The 2006 US 160 EIS and 2006 US 160 ROD are available at http://www.coloradodot.info/projects/us160eis. The US 160 ROD limitation on claims notice was published in the Federal Register on May 14, 2007 and was not legally challenged within the 180-day statute of limitations timeframe.

Based on the approved 2006 US 160 ROD, the US 160 corridor will receive phased improvements to a 16.2 mile segment of US 160 between Durango and Bayfield in La Plata County, Colorado (see Figure 5-1). The Preferred Alternative in the 2006 US 160 ROD included four lanes on US 160 between Durango and Bayfield and in the US 550

Figure 5-1. Preferred Alternative from the 2006 US 160 EIS, Grandview Section



south alignment, generally along the existing roadway. The corridor was divided into four sections: Grandview, Florida Mesa and Valley, Dry Creek and Gem Village, and Bayfield.

The Grandview Section is located in the western part of the corridor on US 160 from MP 88.0 west of the Farmington Hill intersection to SH 172/CR 234 (i.e. Elmore's Corner) including a segment of US 550 that extends from just south of CR 220 to US 160 (i.e., US 550/US160 connection). The Preferred Alternative in the Grandview Section, G Modified, includes a trumpet interchange of US 160 and US 550 approximately 0.6 mile east of the current US 160/US 550 (south) intersection, and single-point urban Interchanges (SPUIs) at CR 233 (Three Springs) and SH 172/CR 234 (see Figure 5-1).

After the 2006 US 160 ROD was completed, CDOT began design and construction of the trumpet interchange approximately 0.6 mile east of Farmington Hill on US 160. This interchange was planned in phases. During project development for the connection of US 550 to US 160, a gas well was discovered within the alignment selected in the ROD. The US 550 connection was redesigned to avoid this gas well.

As part of the design for the US 550 connection to US 160, CDOT re-assessed environmental impacts and conditions. In 2008, a portion of the Marie J. Webb Ranch (Webb Ranch) was identified as an eligible historic resource under Section 106 of the National Historic Preservation Act (NHPA) (Appendix A). In addition, an independent cultural resources inventory was conducted on behalf of the Webb family on the western portion of the ranch that identified a number of previously unrecorded archaeological sites (SEAS, 2008). Based on the SEAS Report, a formal inventory of these sites was conducted, as described in Section 5.6. Under the selected alternative for the 2006 US 160 ROD, the historic Webb Ranch is crossed by the US 550 connection to US 160, which is a use of the property and triggered the requirement to prepare a Section 4(f) evaluation. In consultation with the SHPO, CDOT determined that the selected alternative would result in an adverse effect to the Webb Ranch as defined in 36 CFR 800.5. Because of this new information, the selected alternative (at the US 550 Connection) from the US 160 EIS is being reevaluated along with other alternatives in the vicinity of the US 550 connection to US 160.

Construction on the interchange located approximately 0.6 mile east of the existing US 160/US 550 (south) intersection is expected to be completed in 2012. The interchange ("Grandview Interchange") is being completed to provide safe and direct access to existing and planned development (including a regional retail center, three schools, a 5,467 unit residential development, and a park) to the north. It does not have a connection to US 550. It also accommodates future projected traffic volumes on US 160 (of 87,000 vehicles a day), facilitates east-west travel and provides safe and direct access to current and future development (including two banks and a several-hundred unit residential development) south of US 160 at Three Springs Boulevard signal (as well as north of US 160). Documentation of the need for the Grandview Interchange even without a US 550 connection is provided in an FHWA memorandum from Doug Bennett to Karla Petty dated December 12, 2008 (in Appendix B) and in the *Year 2030 Traffic Operations Analysis for Alternatives of the US 160 FEIS* (SEH, 2010) provided in Appendix C. This analysis makes it clear that completion of the Grandview Interchange can proceed without a connection to US 550 South and that the US 550 South Connection to US 160 can proceed in an independent manner from the Grandview Interchange. Each has independent utility from the other.

This Section 4(f) evaluation has been prepared to analyze whether there are feasible and prudent avoidance alternatives to the use of the Webb Ranch and other Section 4(f) properties in the vicinity of the US 550/US 160 connection, develop measures to minimize and mitigate impacts to Section 4(f) properties, and identify an alternative that causes the least overall harm to Section 4(f) properties. Uses defined in the 2006 US 160 Section 4(f) Evaluation for previously identified Section 4(f) properties have not changed. This evaluation is intended to analyze all alternatives in light of and in the vicinity of the newly identified Section 4(f) properties. .

Each of the alternatives being evaluated in this Section 4(f) evaluation can be built and can operate with the Grandview Interchange in its form as described in the September 3, 2008, memo in Appendix B. Two of the alternatives would not connect to this interchange but would connect to the Three Springs Interchange instead. Most other elements of the US 160 project can be substantially completed without limiting the alternatives carried forward for further consideration before this Section 4(f) evaluation has been completed. The US 550 South Connection to US 160 has independent utility.

5.3 Purpose and Need

Proposed improvements to the US 160 Durango to Bayfield corridor were analyzed in the EIS in accordance with FHWA regulations (23 CFR §771) as a means to improve conditions for the traveling public within the corridor. The purpose of the project is to:

- Increase travel efficiency/capacity to meet current and future needs.
- Improve safety for the traveling public by reducing the number and severity of accidents.
- Control access for safety and mobility flow improvements.

Specific elements of project need as defined fully in Chapter 1 of this document include:

- Historical, existing and future demands placed on highway capacity and efficiency as a result of growth in La Plata County and growth in tourist travel to the Four Corners Region. Traffic volumes along the US 160 corridor are expected to more than double over the next twenty years. These volumes exceed the capacity of the highway and intersections along the corridor.

- A higher than average number and severity of accidents in the state, compared to other similar highways in the state. This higher number and severity of accidents is attributed to a lack of highway shoulders, turning lanes, clear zones and wildlife crossings—and steep grades with insufficient lanes for passing. In addition, many of the intersections include steep grades, limited sight distance, sharp angles and lack of left turn storage lanes and acceleration/deceleration lanes. The accident data from the EIS have been updated as documented in Appendix C. The same safety issues and trends have occurred in the last few years (2005 to 2009) as were the case between 1996 and 2001.
- Uncontrolled access as a result of a high density of undefined business and private accesses, terrain features that affect sight distance, areas with poorly defined accesses and anticipated future density of development along the corridor. All of these features contribute to the accident rates.

Supporting documentation and detailed descriptions of the purpose and need for the corridor project are found in Chapter 1 of the 2006 US 160 EIS and Chapter 1 of the SDEIS.

Since the 2006 US 160 EIS was completed, traffic volumes and analyses have been updated. These are documented in Appendix C. Traffic analyses were conducted to determine the following: (1) confirm traffic modeling results for Grandview Section alternatives evaluated in the EIS to the year 2025; (2) evaluate alternatives from the EIS in the Grandview Section and determine if they meet the capacity requirement for the purpose and need in the year 2030; (3) determine if three interchanges are necessary in the Grandview Section based on 2030 traffic volumes; and (4) evaluate alternatives being considered for the Section 4(f) evaluation to determine if they meet the capacity requirement of the purpose and need in the year 2030. Traffic analyses and results are included in Appendix C.

Traffic analyses indicate that the No Action Alternative in the Grandview Section requires auxiliary lanes in each direction to extend from the west limit of the Grandview Section to the CR 233 (Three Springs) Interchange (see Appendix C). The auxiliary lanes can be added within the right-of-way and identified footprint of the alternatives in the 2006 US 160 EIS and do not create additional impacts that have not been disclosed in the 2006 US 160 EIS.

Traffic and engineering analyses also demonstrate the need for three interchanges in the Grandview Section regardless of the location of the US 550/US 160 connection (see

Appendix C and Appendix E). In the EIS, interchanges were identified at SH 172/CR 234 (Elmore's Corner Interchange), US 160/CR 233 [CR 233 (Three Springs Interchange)], and the US 550/US 160 connection (now titled the Grandview Interchange without the US 550 connection). The location of these interchanges is shown on Figure 5-1.

5.4 Project Alternatives

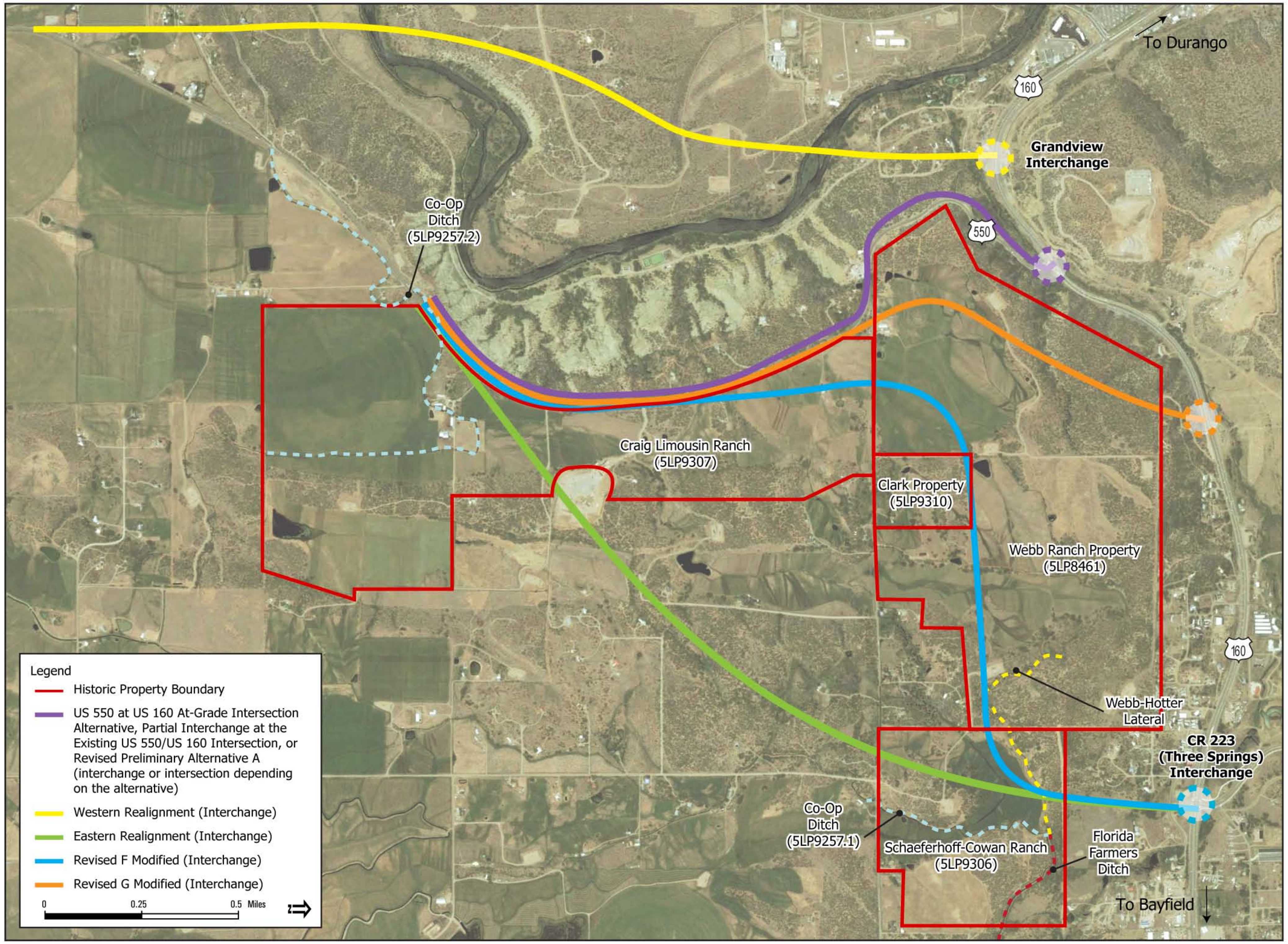
The connection of US 550 to US 160 is in the Grandview Section. The Grandview Section includes US 160 from the west project limit at approximately mile marker 88 west of the US 160/ US 550 (south) intersection to the SH 172/CR 234 intersection, and US 550 from south of CR 220 to US 160 (see Figure 5-1). For this SDEIS, all the alternatives in the Grandview Section include four lanes on US 160 with auxiliary lanes between the west project limit and the interchange at CR 233 (Three Springs). The additional auxiliary lanes were not included in the alternatives described in the 2006 US 160 EIS. US 160 remains on the existing alignment except near the SH 172/CR 234 intersection, where it is shifted north to avoid Crestview Memorial Gardens. US 550 will be four lanes throughout the entire project area addressed in this evaluation. All of the alternatives include the existing Grandview Interchange, a trumpet interchange approximately 0.6 mile east of the existing US 160/US 550 (south) intersection and approximately 600 feet north of US 160, and SPUIs at CR 233 (Three Springs) and SH 172/CR 234.

The Section 4(f) evaluation focuses only on the connection of US 550 to US 160. The following describes the alternatives being considered for the Section 4(f) analysis with a focus on the US 550 to US 160 connection.

Alternatives considered in this evaluation include those advanced for consideration in the 2006 US 160 EIS, as well as other alternatives that avoid or minimize the use of the newly identified Section 4(f) properties. In a letter from FHWA to the ACHP dated April 27, 2009, FHWA identified alternatives subject to further study including alignments designed to avoid the historic Webb Ranch. During development of these alternatives, additional Section 4(f) properties were identified that fall within the alignments being considered. Figure 5-2 shows alternatives being considered for the location of the US 550/US 160 connection and the Section 4(f) properties in the vicinity of this connection.

The alternatives in this chapter were developed with a common southern terminus, as illustrated on Figure 5-2. The reason this was done is to allow for equal comparison among alternatives as it relates to their uses of the Section 4(f) properties. In particular, the Craig Limousin Ranch is situated along US 550, and the southern termini of the various alternatives considered in this SDEIS occur just north of or within the boundary of the property. Because US 550 will be widened to four lanes (as analyzed in the US 550 EA), and therefore will have impacts on the Craig Limousin Ranch regardless of

Figure 5-2. Alignment Alternatives and Section 4(f) Properties in the Grandview Section



the alternative selected in the SDEIS, it was decided to include that widening in the Section 4(f) analysis so that the alternatives that end in the northern portion of the Craig Limousin Ranch do not artificially appear to have fewer Section 4(f) impacts than the alternatives that end farther south. Due to the common southern termini, some of the impact quantities contained in this chapter are different than the impact quantities contained in Chapter 4.0.

The following project alternatives are being considered for the Grandview Section:

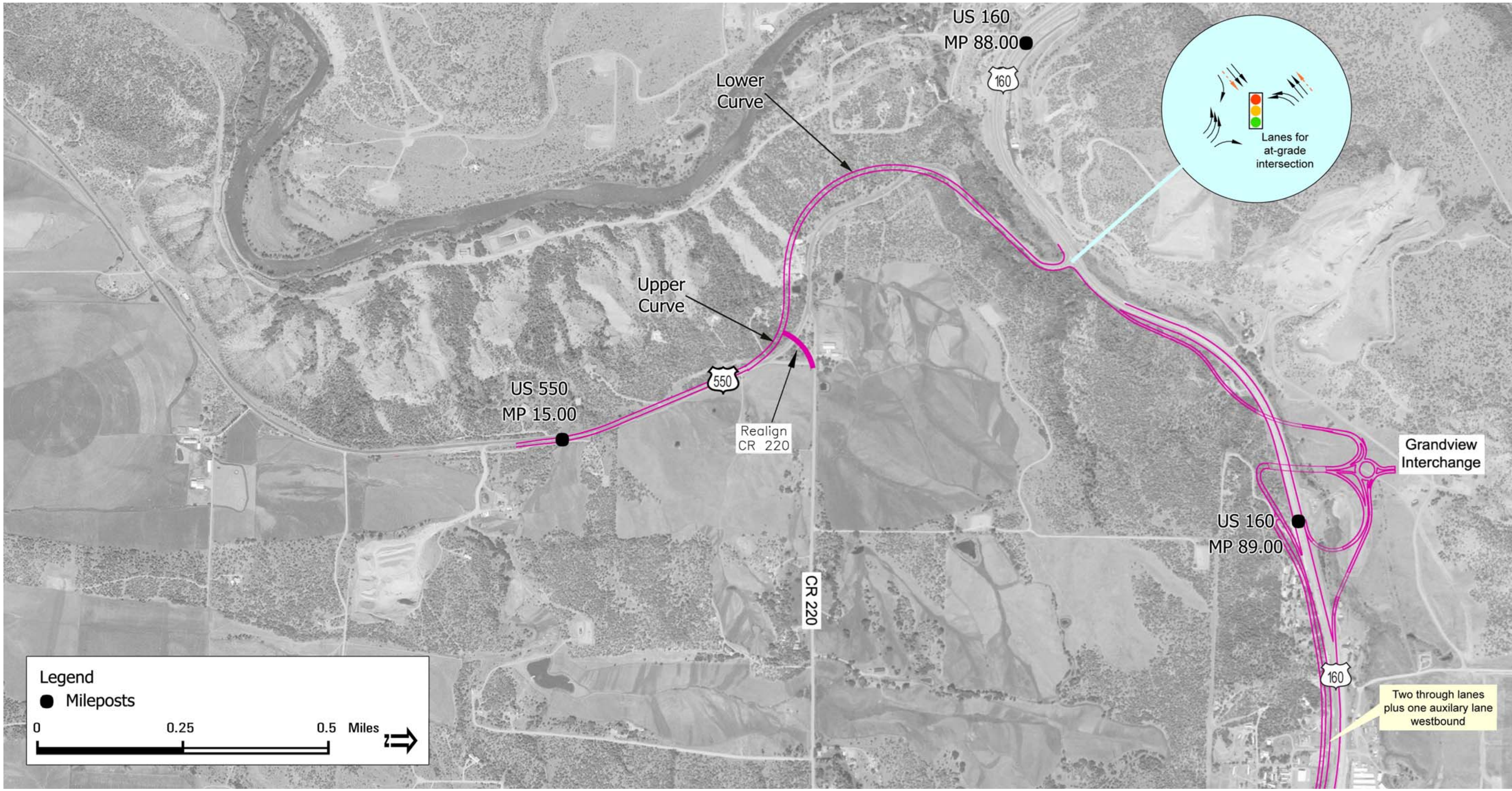
US 550 at US 160 At-Grade Intersection Alternative. This alternative includes a revised US 550 at US 160 signalized intersection at its current location in the year 2030 (Feasibility Alternative 1B in the FEIS) with the Grandview Interchange east of the intersection and SPUIs at CR 233 (Three Springs) and SH 172/CR 234. The intersection includes double turn lanes from US 160 westbound to US 550 southbound, triple turn lanes from US 550 northbound to US 160 westbound and single turn lanes from US 160 eastbound to US 550 southbound and US 550 northbound to US 160 eastbound (see Figure 5-3).

This alternative is being reexamined in light of new information, including proposals submitted by attorney Thomas McNeill on behalf of the Webb Ranch owners. In particular, a October 28, 2008 letter to FHWA from Mr. McNeill provided seven design variations along the existing US 550 alignment with several of them including at-grade intersections.

This alternative includes these at-grade design variations: T.1.4, T.1.6, and T.4.4. Each design variation illustrates US 550 intersecting US 160 as an at-grade intersection at the existing US 550/US 160 intersection location. The intersection geometry is also the same for T.1.4, T.1.6 and T.4.4 as illustrated on Figure 5-3. The differences occur in the percent grade and radius for 2 curves: one approximately 500 feet away from the US 550/US 160 (south) intersection where the horizontal curvature and grade varies (the lower curve) and the other at the top of the mesa where the highway first starts descending the hillside (the upper curve). The design variations are described as follows:

- **Design Variation T.1.4** includes a 1050-foot radius for the lower curve and a 700-foot radius for the upper curve, with a four percent uniform grade throughout both curves.
- **Design Variation T.1.6** includes a 925-foot radius for the lower curve and a 700-foot radius for the upper curve, with a six percent uniform grade throughout both curves.

Figure 5-3. **US 550 at US 160 At-Grade Intersection Alternative**



- **Design Variation T.4.4** includes a 1,250-foot radius for the lower curve and a 1000-foot radius for the upper curve, with a four percent uniform grade throughout both curves.

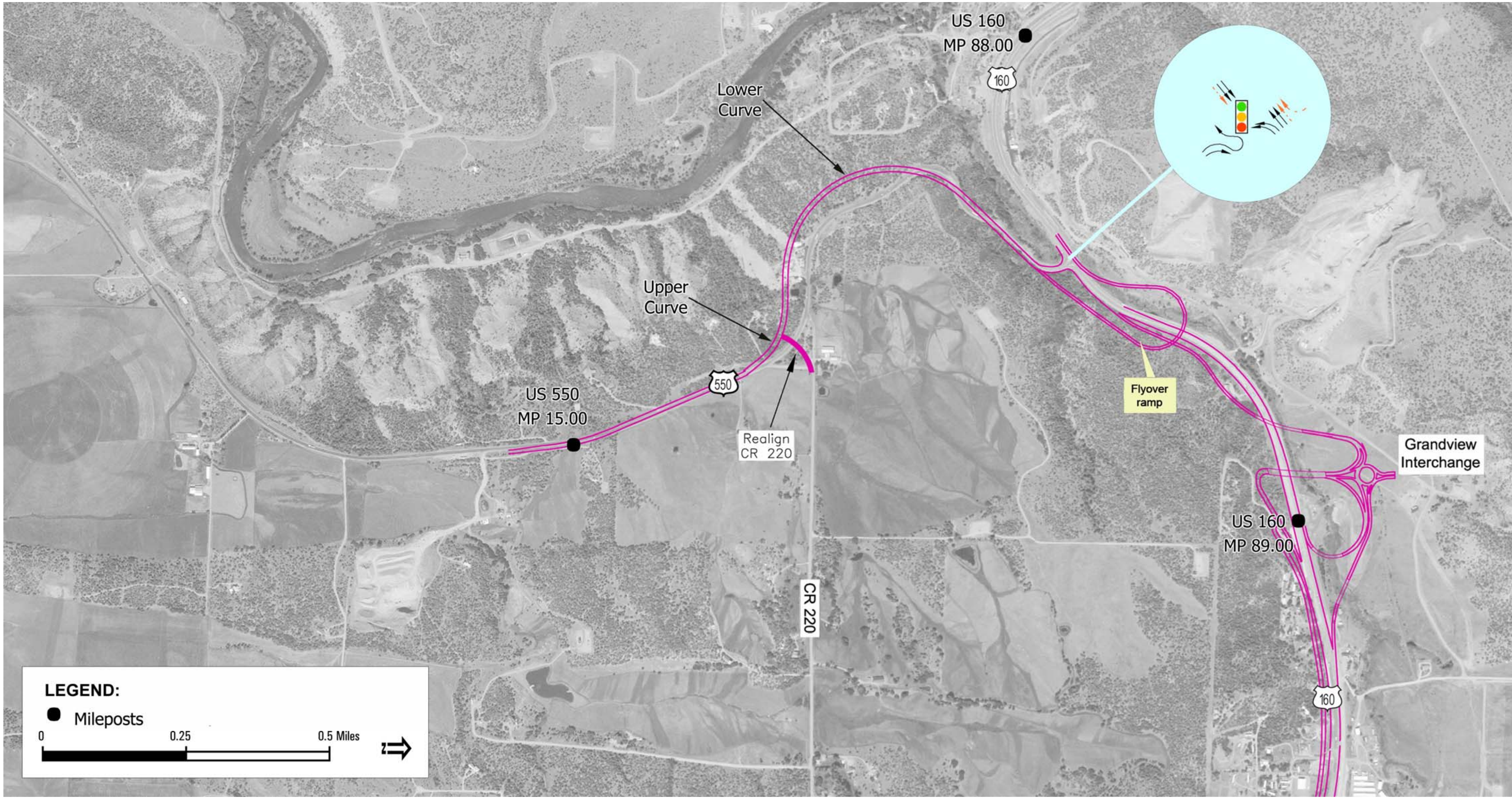
More details about the alternatives are contained in the technical memoranda in Appendix C.

Partial Interchange at the Existing US 550/US 160 Intersection. This alternative includes a partial interchange at the existing US 550/US 160 location, the Grandview Interchange east of the partial interchange and SPUIs at CR 233 (Three Springs) and SH 172/CR 234. This alternative proposes to modify the signalized intersection at US 160/US 550 by eliminating the left turn movement from northbound US 550 to westbound US 160 and replacing it with a loop ramp to service the left turn volumes at the intersection. To accommodate the through volumes, US 160 has two through lanes and one auxiliary lane westbound from the CR 233 (Three Springs) interchange through the US 550 intersection. US 160 eastbound has two through lanes and one climbing lane from west of the US 550 intersection to the CR 233/ Three Springs interchange.

This alternative (illustrated on Figure 5-4) includes several design variations submitted to FHWA on behalf of the Webb Ranch: T.2.4, T.2.6, T.3.4, and T.3.6. Each design variation illustrates US 550 intersecting US 160 as an at-grade intersection at the existing US 550/US 160 intersection location but with a flyover to accommodate the northbound left turn movement. The differences in the "T" design variations occur in the percent grade and radius for 2 curves: one approximately 500 feet away from the US 550/US 160 (south) intersection where the horizontal curvature and grade varies (the lower curve) and the other at the top of the mesa where the highway first starts descending the hillside (the upper curve). The design variations are described as follows:

- **Design Variation T.2.4** includes a 1050-foot radius for the lower curve and a 700-foot radius for the upper curve, with a four percent uniform grade throughout both curves. The location of the flyover has half of the loop on each the north and south side of US 160 and traffic flow is in a counterclockwise direction with the flyover crossing US 160 approximately 1,300 feet (1/4 mile) east of the US 550/US 160 intersection.
- **Design Variation T.2.6** includes a 925-foot radius curve for the lower curve and 700-foot radius for the upper curve, with a four percent uniform grade throughout both curves. The location of the flyover has half of the loop on each the north and south side of US 160 and traffic flow is in a counterclockwise direction with the flyover crossing US 160 approximately 1,300 feet (1/4 mile) east of the US 550/US 160 intersection.

Figure 5-4. Partial Interchange at the Existing US 550/US 160 Intersection Alternative



- **Design Variation T.3.4** includes a 1,050-foot radius curve for the lower curve and a 700-foot radius for the upper curve, with a four percent uniform grade throughout both curves. The location of the flyover loop is entirely on the north side of US 160 and traffic flow is in a clockwise direction with the flyover crossing US 160 approximately 500 feet east of the US 550/US 160 intersection.
- **Design Variation T.3.6** includes a 925-foot radius curve and a six percent grade for the lower curve and a 700-foot radius and six percent grade for the upper curve. The location of the flyover loop is entirely on the north side of US 160 and traffic flow is in a clockwise direction with the flyover crossing US 160 approximately 500 feet east of the US 550/US 160 intersection.

Revised Preliminary Alternative A. The Revised Preliminary Alternative A is illustrated on Figure 5-5. It contains SPUIs at SH 172/CR 234 and CR 233 (Three Springs) with a grade separated trumpet interchange at the existing US 550/US 160 connection and a trumpet interchange (Grandview Interchange) east of the existing US 550/US 160 intersection. To accommodate the through volumes, US 160 has two through lanes. US 160 eastbound has two through lanes and one climbing lane from west of the US 550 interchange to the CR 233 (Three Springs) interchange.

Revised Preliminary Alternative A is the same as in the 2006 US 160 EIS except it includes the Grandview Interchange. For these reasons, "Revised" has been added to the title of this alternative.

Revised G Modified Alternative. This alternative is illustrated on Figure 5-6. It connects US 550 to US 160 via the Grandview Interchange (which is approximately 0.6 mile east of the existing US 160/US 550 (south) intersection), and CR 233 (Three Springs) and SH 172/CR 234 are SPUI interchanges. This alternative includes two through lanes in each direction through the Grandview Section. The alignment of US 550 for Revised G Modified has been revised slightly from the alternative in the 2006 US 160 EIS to avoid a natural gas well installed after preliminary alignment designs were completed.

Figure 5-5. Revised Preliminary Alternative A

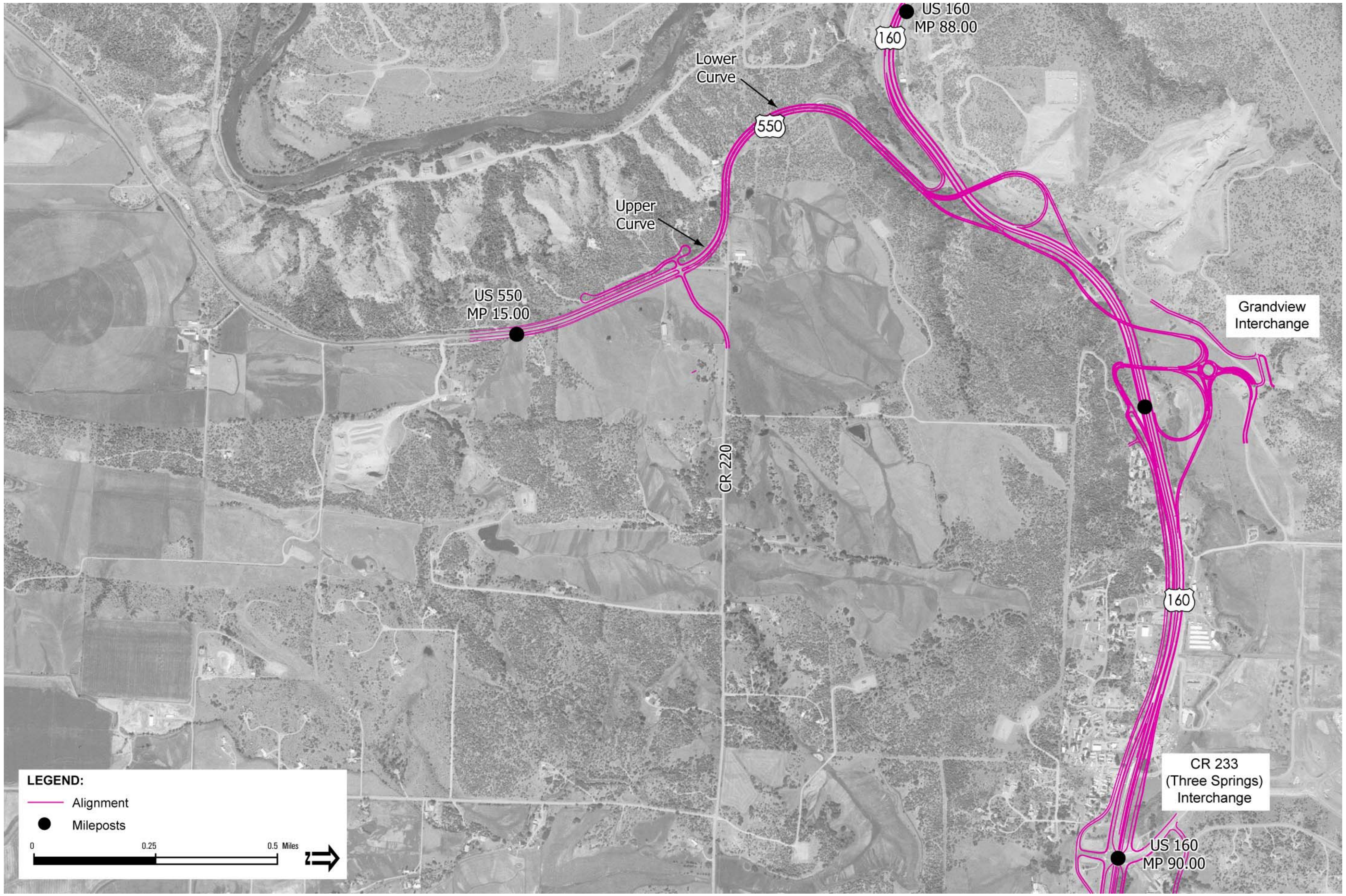
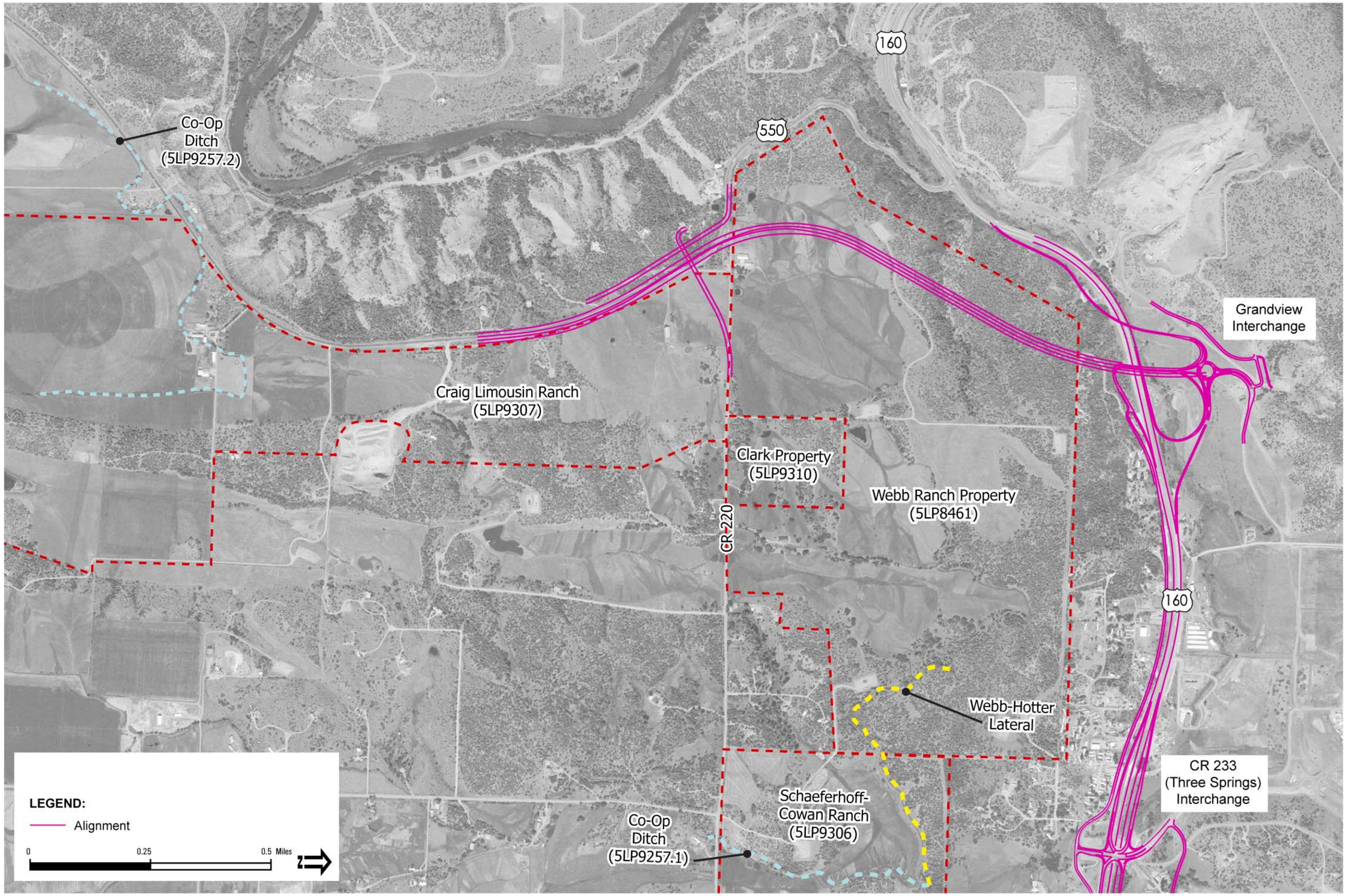


Figure 5-6. Revised G Modified Alternative



Revised F Modified Alternative. The Revised F Modified Alternative is illustrated on Figure 5-7. It includes an additional trumpet interchange at the Grandview Interchange, and SPUI interchanges at CR 233 (Three Springs) and SH 172/CR 234. US 550 connects to US 160 at CR 233 (Three Springs) interchange. Frontage roads parallel the alignment from US 160 to CR 220. These roads provide local access to the properties south of US 160. US 160 has two through lanes.

Revised F Modified Alternative is the same as in the 2006 US 160 EIS except it includes the Grandview Interchange. For these reasons, "Revised" has been added to the title of this alternative.

The following alternatives were developed specifically for this Section 4(f) evaluation:

Eastern Realignment Alternative. The Eastern Realignment Alternative is shown on Figure 5-8. It includes a trumpet interchange at the Grandview Interchange, and SPUI interchanges at CR 233 (Three Springs) and SH 172/CR 234. US 550 connects to US 160 at CR 233 (Three Springs) interchange but has a different US 550 alignment when compared to the Revised F Modified Alternative. Frontage roads parallels the alignment from US 160 to CR 220. These roads provide local access to the properties south of US 160 along the new US 550 alignment. US 160 has two through lanes.

Western Realignment Alternative. This alternative, as shown on Figure 5-9, relocates the existing US 550/ US 160 intersection to the west where it currently intersects US 160 with a directional interchange. This alternative diverges from the current US 550 at approximately milepost 13.17 on the top of Florida Mesa before descending into the Animas Valley where it parallels the Animas River to the north and connects to US 160 at approximately milepost 88.0, approximately 0.5 mile west of the existing US 160/ US 550 (south) intersection. This alternative includes the Grandview Interchange and SPUIs at CR 233 (Three Springs) and SH 172/CR 234.

Figure 5-7. Revised F Modified Alternative

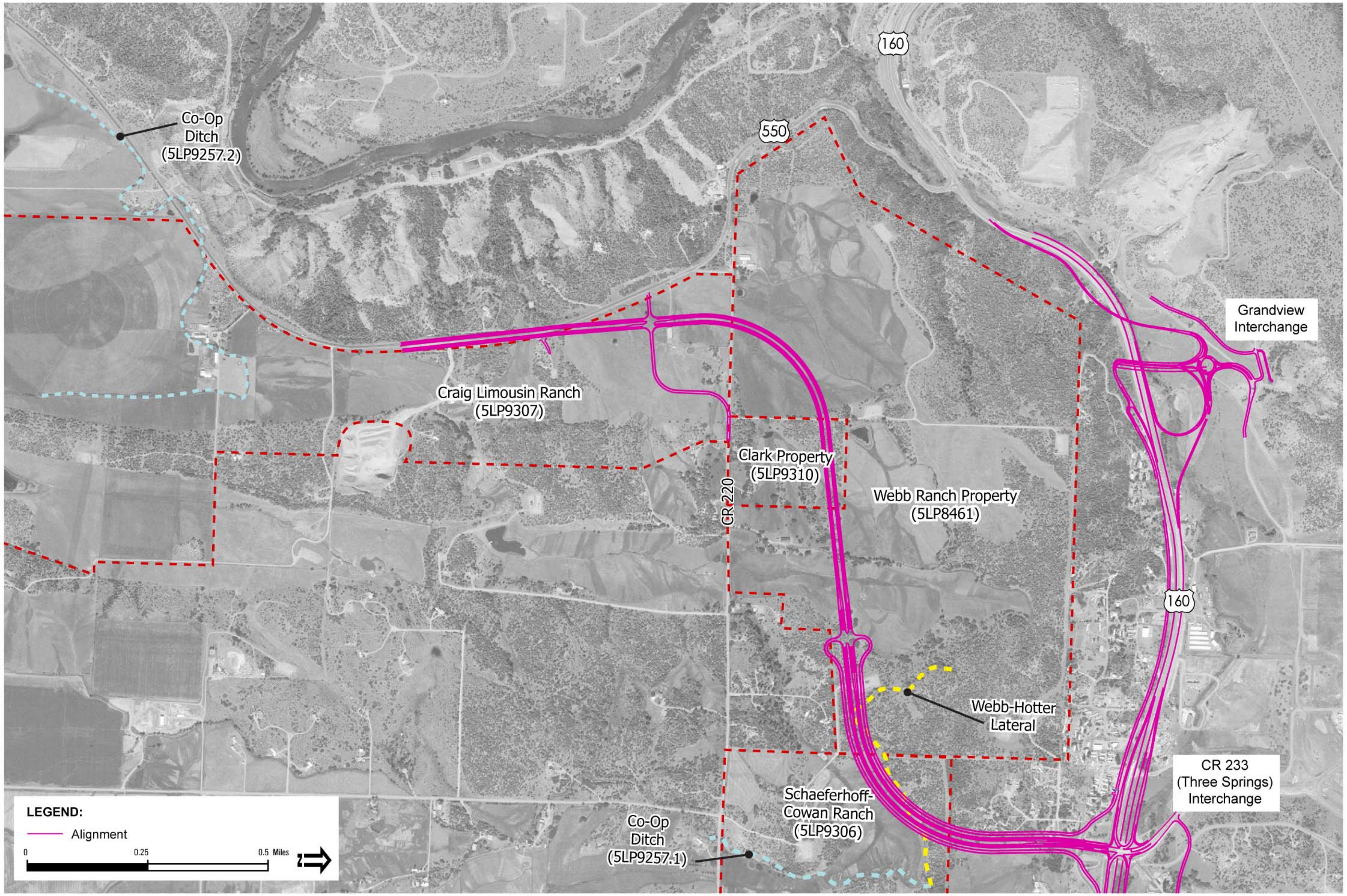


Figure 5-8. Eastern Realignment Alternative

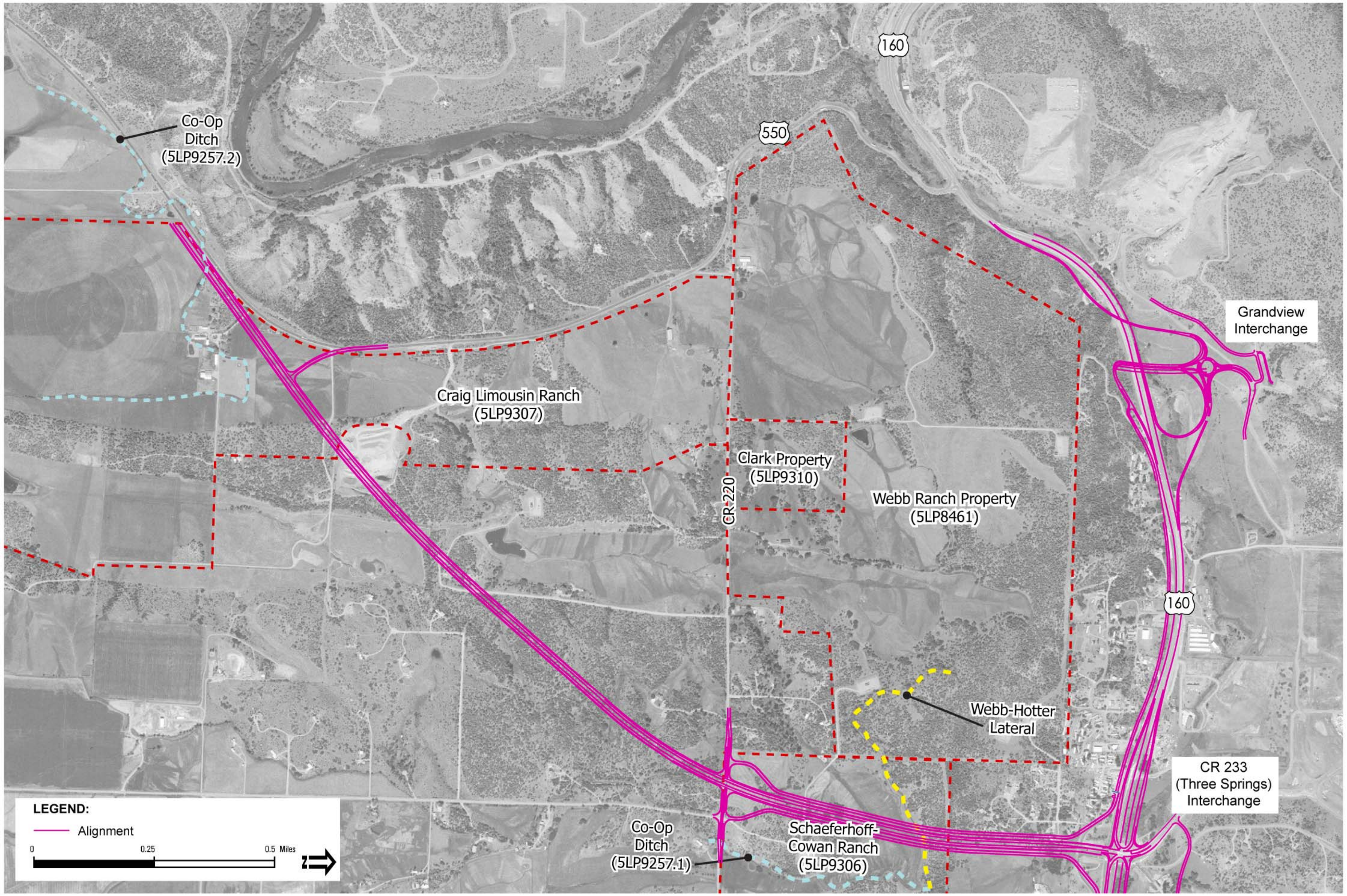
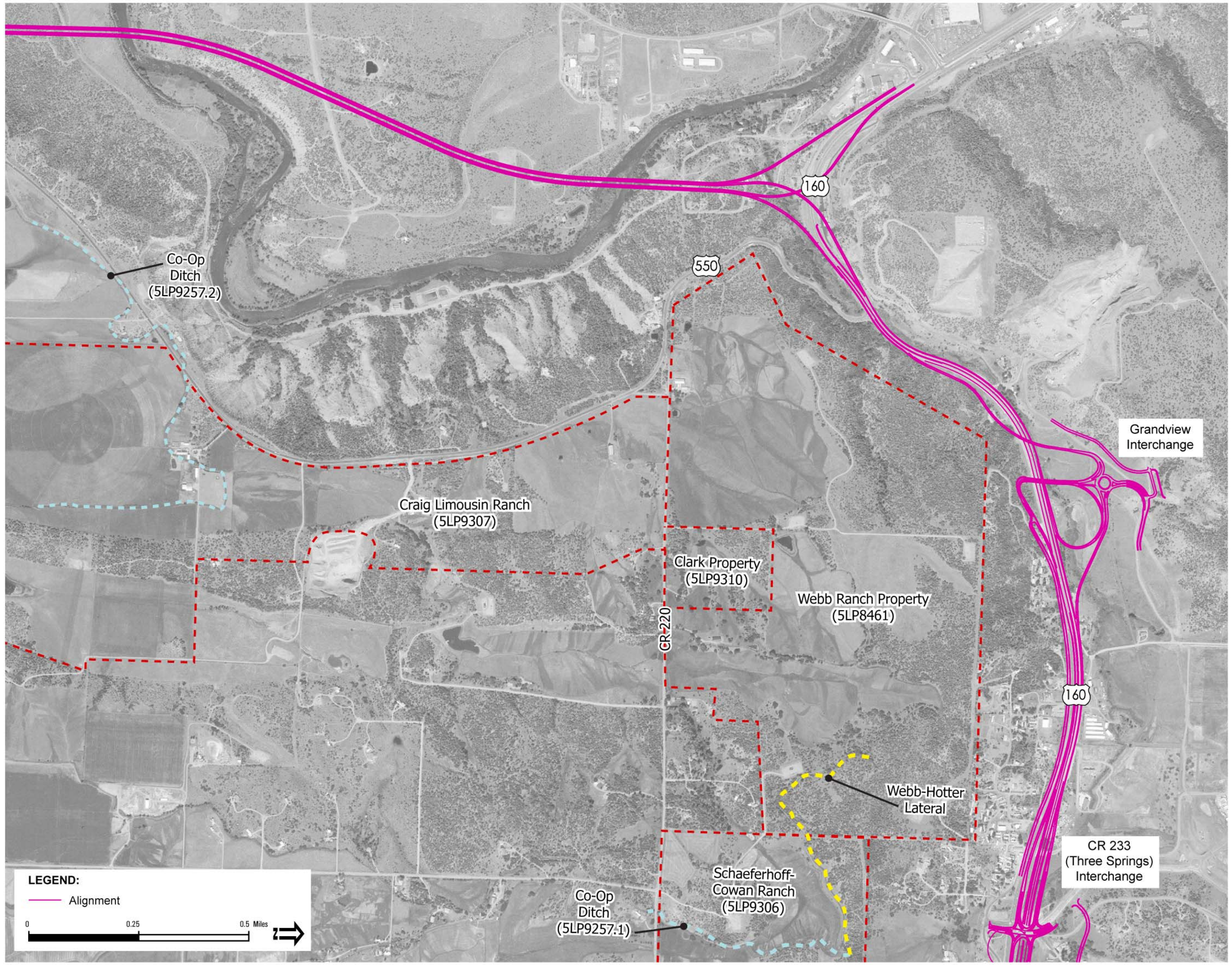


Figure 5-9. Western Realignment Alternative



5.5 Description of Section 4(f) Properties

The Section 4(f) properties for this evaluation include historic ranches, historic residential property, and historic ditches. Archaeological sites are not considered Section 4(f) properties where a determination has been made that their importance is chiefly because of what can be learned by data recovery and have minimal value for preservation in place (23 CFR 774.13(b)(1)). All of the archaeological sites within the project area fall into this category, so none of them are considered Section 4(f) properties. [See letters dated November 9, 2009 and August 6, 2010 from CDOT and response letters from SHPO dated December 1 and 11, 2009 and August 25, 2010 documenting this finding (see Appendix A)].

The Section 4(f) properties described below fall within the alternative alignments in the project area identified on Figure 3-9. A summary of Section 4(f) properties within the project area is provided in Table 5-1.

Table 5-1. Summary of Section 4(f) Properties Within the Area of Potential Effects

Resource Name and Number*	Basis for Section 4(f) Eligibility	Important Activities, Features, and Attributes
Clark Property 5LP9310	Historic	Important role as a social gathering place. Eligible under Criteria A and C.
Craig Limousin Ranch 5LP9307	Historic	Barn, loafing shed, silo, saddle shed, residence, and landscape convey the property's significance as a working ranch on Florida Mesa eligible under Criteria A and C
Schaeferhoff-Cowan Ranch 5LP9306	Historic	Hay barn/milk shed are examples of ranching architecture common in this region of the state, granary is an example of a ranch-related outbuilding association with ranching on Florida Mesa eligible under Criteria A and C.
Webb Ranch 5LP8461	Historic	Integrity of barn, loafing sheds, corrals, and chutes represent an example of ranch architecture in La Plata County eligible under Criteria A and C.
Co-op Ditch (2 segments) 5LP9257.1/5LP9257.2	Historic	Important under Criterion A for its role in providing irrigation water to lands under the Desert Land Act and association with the settlement and irrigation of marginal lands on Florida Mesa, significant under Criterion C as a good example of an irrigation ditch that employed relatively simple technology in its design and construction.
Hotter-Webb Lateral Ditch (2 segments) 5LP9256.1/5LP9256.2	Historic	Important role in the irrigation network on the Webb Ranch and Schaeferhoff-Cowan Ranch properties. Eligible under Criterion A.

*The resource number is an identification number (called a Smithsonian number) assigned by the Office of Archaeology and Historic Preservation.

5.5.1 Historic Ranches

Three historic ranches and one historic residential property within the project area have been identified as eligible for the NRHP. These are described in the following sections.

5.5.1.1. Webb Ranch

Site 5LP8461 is the historic Webb Ranch complex on private land at an elevation of 6,800 feet (2,073 meters) as shown on Figure 5-10. It is approximately 515 acres in size. The ranch is located northeast of the intersection of US 550 and County Road 220. Growing from a patchwork compilation of ranch properties, the Webb Ranch's period of significance ranges from 1910-1957. The land where the ranch buildings sit was originally patented by Gamaliel Hoskinson in 1891 as a cash sale entry. The property that now comprises the ranch was owned by several different people over time. Portions of the property were patented in 1891, 1892 and 1911 while others were not patented until 1916 and 1956. In the mid-1900s, the ranch property passed through several family owners, eventually coming into the hands of the Webb's in 1963. The Webb family still maintains ownership today.

The Webb Ranch is eligible under NRHP Criterion A and C for representing ranch architecture in La Plata County. The large barn with (Feature 1) is an unmodified, excellent example of a ranching barn. The barn retains character-defining features such as the built-in loafing sheds, and qualifies for inclusion on the NRHP. The associated corrals (Feature 2) and chutes (Feature 3) also retain excellent integrity and contribute to the site's architectural significance. The other historic outbuildings and residence are nondescript or have been altered to a degree that they no longer contribute to the site's architectural significance.

5.5.1.2. Craig Limousin Ranch

Site 5LP9307 is the historic Craig Limousin Ranch complex on private land at an elevation of 6,660 feet (2,030 meters) as shown on Figure 5-11. It is approximately 378 acres in size. The site is southwest of Highway 550 on a level to slightly sloping area on the western edge of Florida Mesa. The site soils are a reddish brown silty loam supporting stands of piñon and juniper mainly along the rim of the mesa. Much of the complex grounds have been cleared, leaving sparse trees along the western edge of the complex and the occasional tree that is part of the ornamental landscaping. The ranching complex consists of several buildings, of which only three of the structures (Structures 1 through 3) are known to meet the 50-year age criterion. Two additional structures (Structures 4 and 5) are possibly 50 years old. The period of significance for the Craig Limousin Ranch was 1929-1959.

The Craig Limousin Ranch was originally documented in 2009 during the inventory of the Eastern Realignment Alternative. At the time, several buildings (Structures 1-5) at the Craig Limousin Ranch headquarters were recorded, including a large barn, a shed, a

Figure 5-10. Webb Ranch

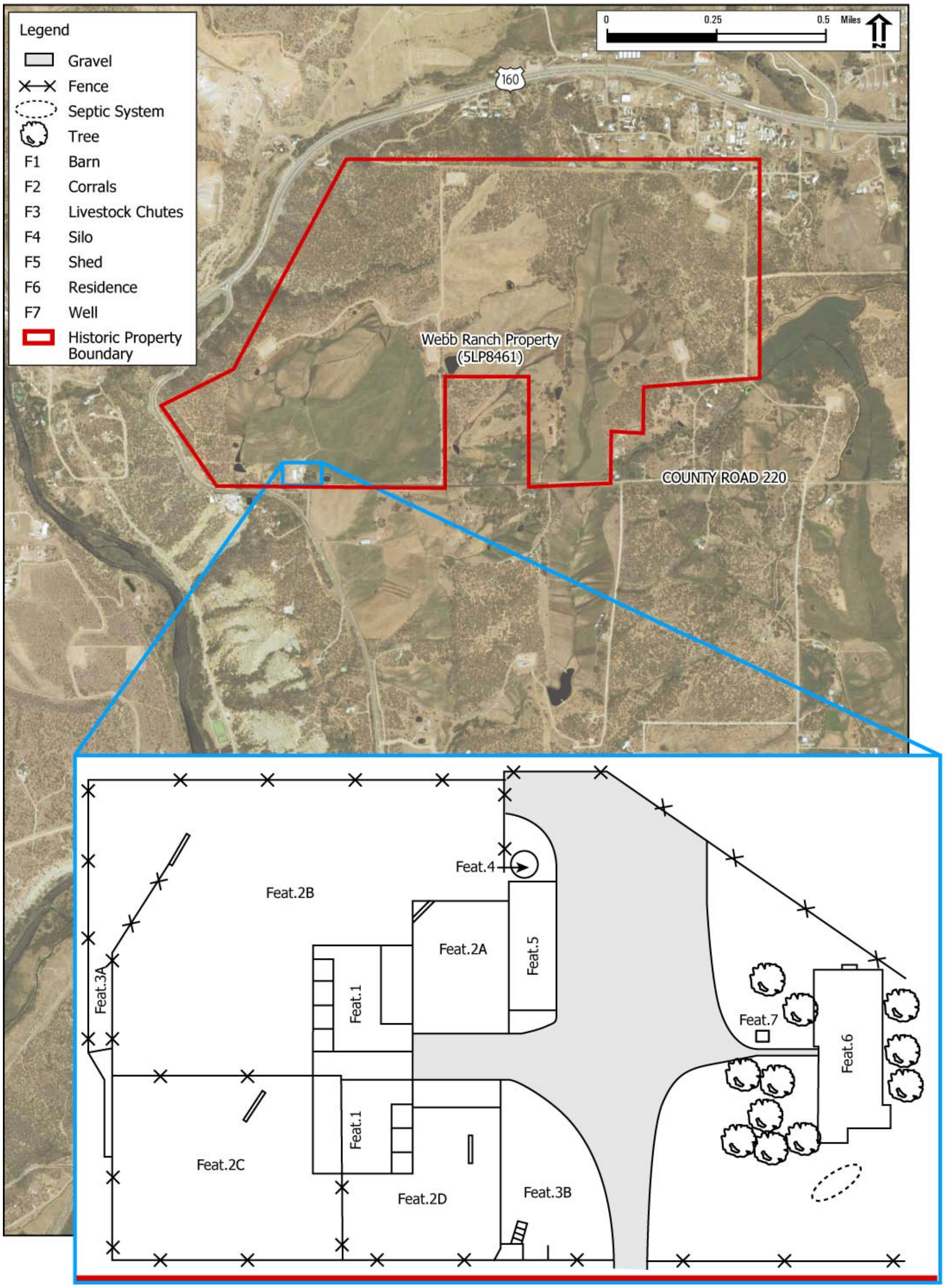
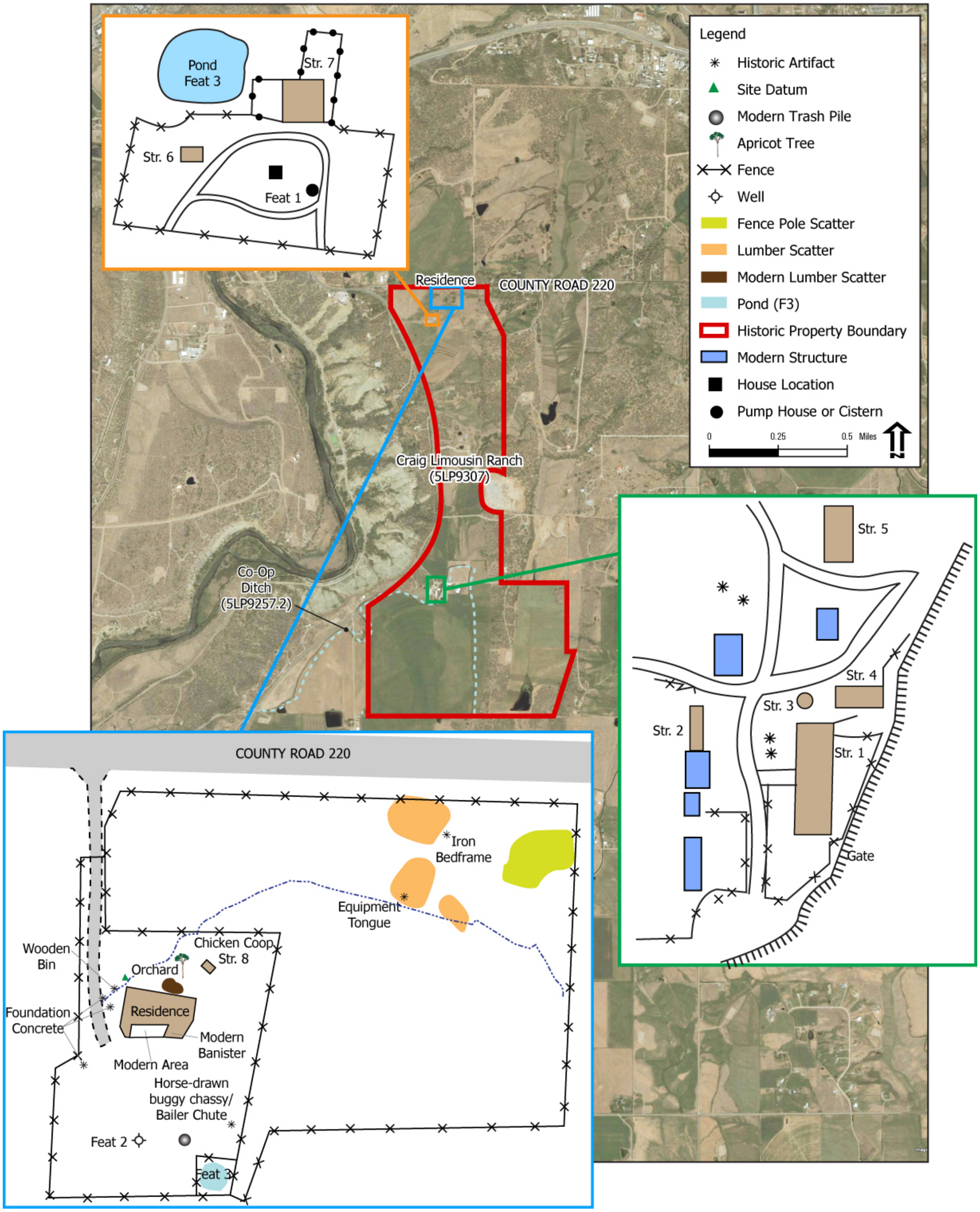


Figure 5-11. Craig Limousin Ranch



grain silo, a milk shed, and a stucco-clad residence. Additionally, another building complex located to the north of the ranch headquarters was also recorded. As a result of the recording, two structures (Structures 6 and 7) and one feature, including a saddle shed, a post-and-beam barn, and a pump house, were documented. Structures 1 through 5 at the Craig Limousin Ranch retain the integrity to convey the property's significance under Criteria A and C.

The barn (Structure 1) is in good structural condition and has remained largely unmodified. It still conveys its original function. It has been part of the ranching landscape of Florida Mesa since it was built in the late 1920s or early 1930s and is highly visible from US 550, making it an important and recognizable symbol of past ranching activities on the mesa. Although the silo (Structure 3) has been modified, it still has the integrity to convey the significance of the property under Criteria A and C. The loafing shed (Structure 2) is a good example of ranching architecture. The structural integrity of the shed is considered good with no visible modifications made to the structure. Considering its integrity and function, the shed also conveys the significance of the property under Criteria A and C. The cinderblock milk shed (Structure 4) and the ranch style residence (Structure 5) appear to be over 50 years old and are being treated as contributing elements to the overall ranch. The saddle shed (Structure 6) and barn (Structure 7) also retain sufficient integrity to convey the significance of the Craig Limousin Ranch. The landscape features, including the open agricultural fields, also retain integrity and convey the property's significance as a working ranch.

An additional complex associated with the ranch was identified in 2010 during the inventory for the Revised F Modified Alternative alignment. The complex is not on land owned by the Craig family, but is within the original historic boundary of the Craig Limousin Ranch. The complex was the site of the original homestead structure for the ranch, which burned down in 1974. The remains of the site are minimal, consisting of a chicken coop (Structure 8), a well (Feature 2), a small irrigation pond (Feature 3), a sparse scatter of historic artifacts and implements, and a level area where the house was once located, all within a fenced enclosure. After the house burned, a trailer house was put in the same place as the house. The second occupation of the site dates from the late 1970s to 2001, when the trailer was removed (Phillip Craig, personal communication to Jack Pfertsh, May 23, 2010). A moderate density of modern artifacts is present on the site from this later occupation but was not documented as part of the site recording. An orchard is also considered part of the complex and is to the east. It is within a fenced pasture with several apple and apricot trees still present and is watered by an irrigation ditch.

In 2009 the Craig Limousin Ranch as a whole was evaluated as eligible for inclusion on the NRHP under Criteria A and C for its importance to the ranching landscape of Florida Mesa. Although the above described complex is not currently part of the Craig

Limousin Ranch, it was the original homestead for the property and is, therefore, considered part of the ranch's historic boundary. Structure 8 (chicken coop), Feature 2 (well), and Feature 3 (irrigation pond) at the Craig Limousin Ranch retain the integrity to convey the property's significance. The chicken coop (Structure 8) is in good structural condition and has remained largely unmodified. It still conveys its original function. The structural integrity of the coop is considered good, with no visible modifications made to the structure. Considering its integrity and function, it also conveys the significance of the property under Criteria A and C. The well was purportedly dug in 1902 and is one of the first wells dug on the mesa. It is associated with the early history of the ranch and is a contributing element to the overall ranch. The orchard is a landscape feature of the complex and also retains integrity and conveys the property's significance as a working ranch. These features and property together with the currently owned Craig Limousin ranching property are included in the historic ranch boundary.

5.5.1.3. Schaeferhoff-Cowan Ranch

Site 5LP9306 is the historic Schaeferhoff-Cowan Ranch complex on private land at an elevation of 6,930 feet (2,112 meters) as shown on Figure 5-12. It is approximately 160 acres in size. The complex is located north of County Road 220 on a southwest-facing slope of a low hill that is along the eastern edge of a shallow drainage valley. The complex of ranch buildings is within a fenced-in area demarking it from the adjacent and more recent structures to the east. The complex encompasses a 336- by 271-foot area with several pieces of farm equipment in the fenced compound. Many of these are haying equipment, including tractors, balers, and a hay elevator. Other implements noted in the compound were plows, generators, wooden wagons, and various implement parts. One of the wagons is the only implement in the compound that appears to have antiquity. It is a hay wagon with a wood-plank deck and wooden-spoke wheels from a 1930s model Hudson automobile. The period of significance for the Schaeferhoff-Cowan Ranch was 1900-1959.

Six standing structures (Structure 1-6) and three features were recorded as part of the ranch compound. Site 5LP9306 is recommended as eligible for inclusion on the NRHP under Criteria A and C. The Schaeferhoff-Cowan Ranch is significant under Criterion A for its association with ranching on Florida Mesa and under Criterion C for its examples of ranching architecture in La Plata County. In particular, the hay barn/milk shed (Structure 2) is a good example of a barn type that appears to be common in this region of the state, and the grain shed (Structure 1) is also a good example of a ranch-related outbuilding.

5.5.1.4. Clark Property

Site 5LP9310 is the historic Clark Property on private land at an elevation of 6,805 feet (2,074 meters), as shown on Figure 5-13. The property fronts County Road 220 along its

Figure 5-12. Schaeferhoff-Cowan Ranch

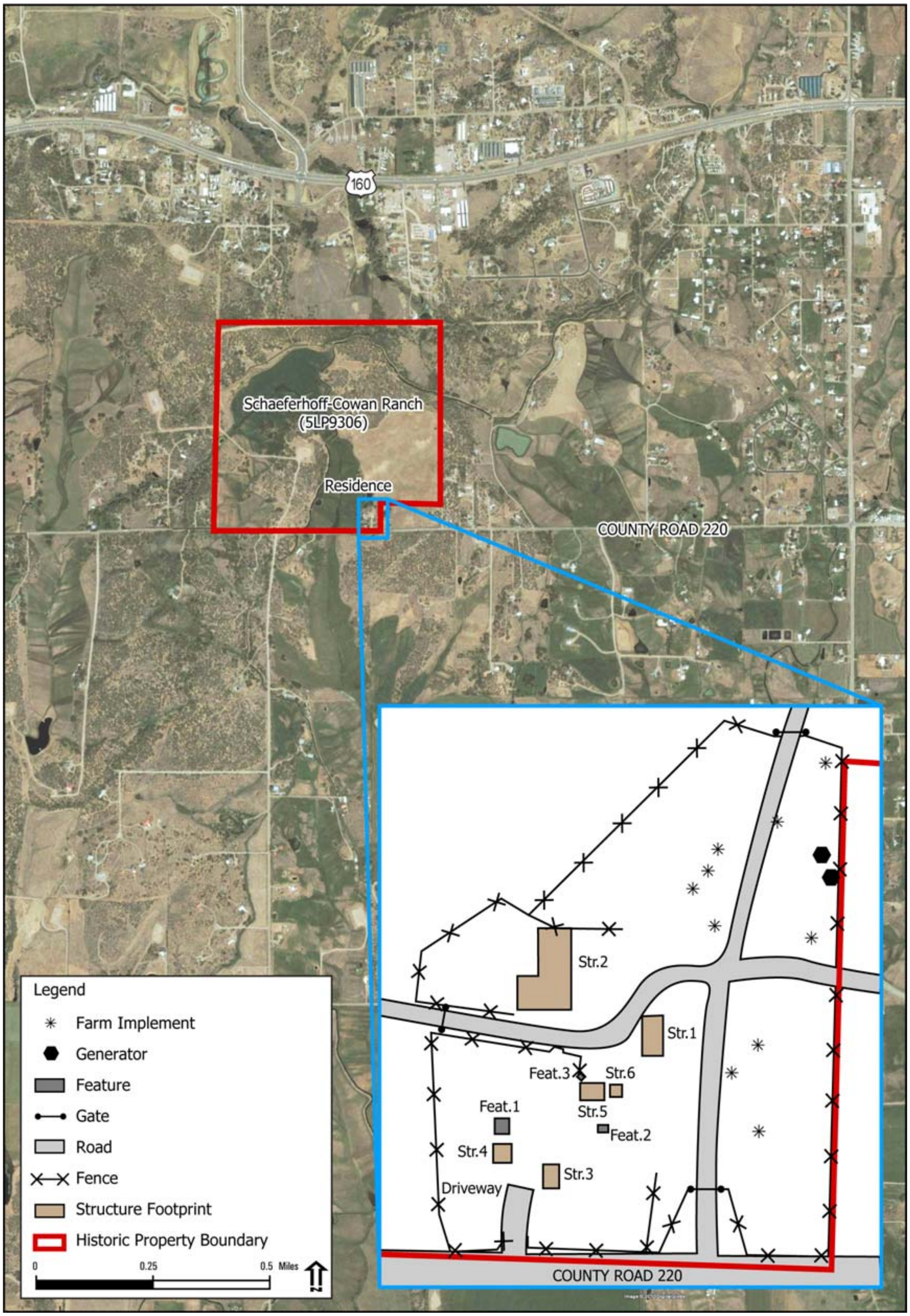
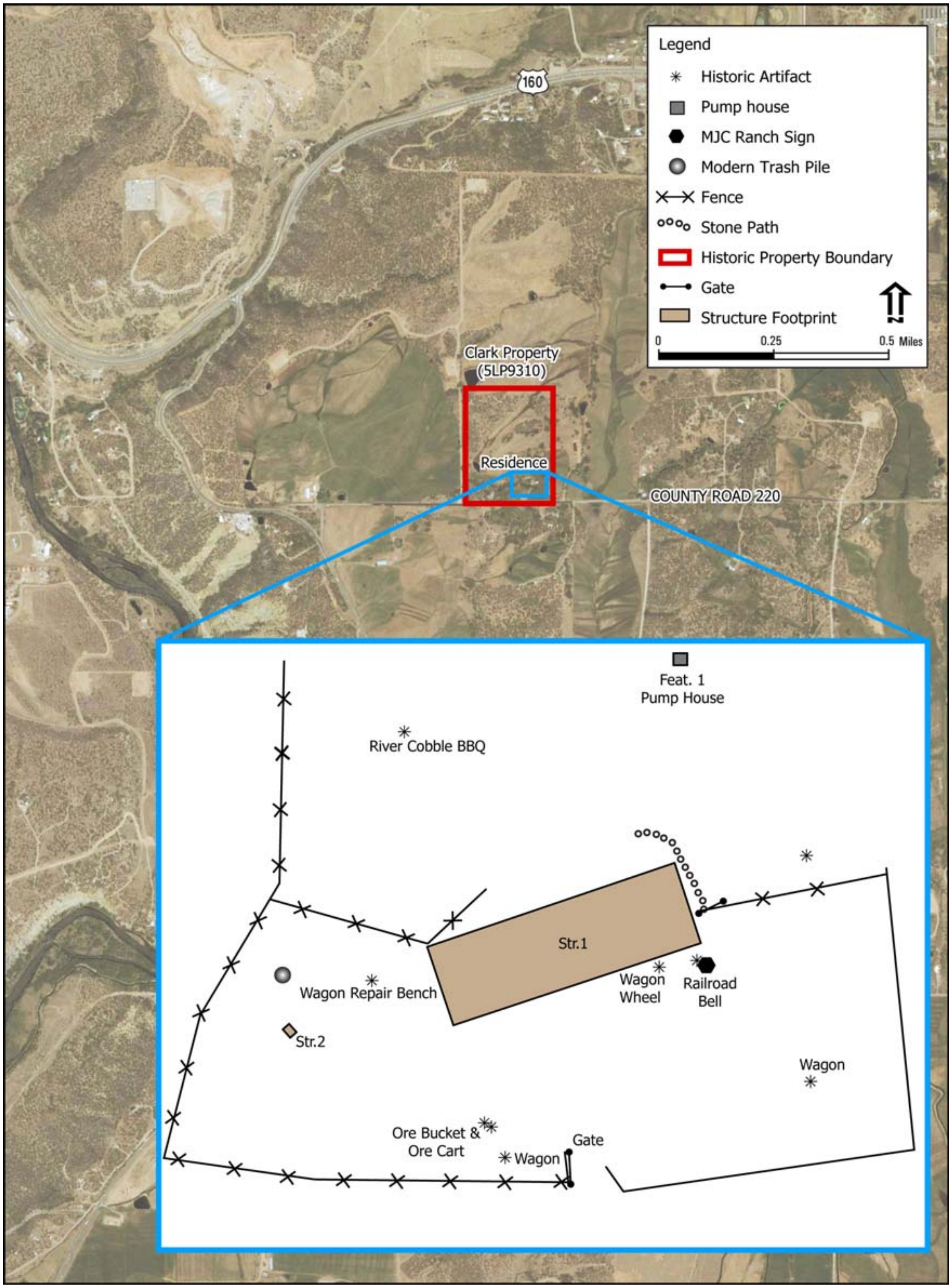


Figure 5-13. Clark Property



southern boundary and extends north where the fence boundaries of the property encompass a moderately dense piñon and juniper woodland. The Clark Property consists of two standing structures (Structures 1 and 2), a pump house, wagon parts, two wagons, a train bell and an ore cart.

The Clark Property is on land originally acquired as a 160-acre homestead entry patent by Henry Sheldon on March 26, 1892. However, the property's period of significance begins when the property was purchased in 1947 by Marguerite Jackson Clark. Its current historic boundary encompasses 29 acres. Shortly after moving to her new home, Marguerite added the Big Room, which became legendary to the people of Durango and Florida Mesa as the entertainment and social center of the valley, when Marguerite threw parties at her house with most of the valley in attendance. By way of a guest book, many of Marguerite's guests signed their names in lipstick on the white walls in her kitchen.

The Clark Property is eligible for inclusion on the NRHP under Criteria A and C. Under Criterion A, the Clark home functioned as a social gathering place for the residences of Durango and Florida Mesa with a period of significance from 1947 to 1960. The Clark property appears as it did during its period of significance and continues to convey its significance through integrity of design, materials, workmanship, location, setting and feeling. Under Criterion C, the property is a good example of a residence modified for use as a social and recreational center. The house fronts the county road with landscaping that is aesthetically pleasing, utilizing elements of the old west, such as wagons, ore carts and a locomotive bell. The design and overall layout of the property convey its function as a social center. Additionally, the recreational function of the house is reflected in the architecture with the addition of the "Big Room" where social gatherings were held. The integrity of the property is good and continues to be maintained as it was originally designed and constructed during its period of significance.

5.5.2 Historic Linear Resources

Two historic ditches within the Area of Potential Effects have been recommended as eligible for NRHP: the Co-op Ditch and the Webb Hotter Lateral. These resources are described below.

5.5.2.1. Webb-Hotter Lateral

5LP9256 is the Webb/Hotter Lateral, which is significant for its association with two separate historic ranches. This is a lateral of the ditch that was referred to in the 2006 US 160 EIS as the Florida Farmers Ditch (5LP5661). The recorded segments of the lateral extend across private lands at an elevation of 6,900 feet (2,103 meters). The ditch crosses the Area of Potential Effects east to west on the northern end of a hay field just south of the northwestern end of Florida Mesa as shown on Figure 5-14. The vegetation along the recorded segment of the ditch includes a variety of grasses and willow.

The Webb/Hotter Lateral extends westward from the intersection of the Florida Farmers Ditch and the Co-op Ditch (Charlie McCoy, Florida Farmers and Cooperative Ditch Company, personal communication to Jack Pfertsh, September 3, 2009). The lateral was documented as two segments. Segment 5LP9256.1 is a 1,643-foot-long segment that extends from its intersection with the Co-op ditch through the Schaeferhoff-Cowan Ranch (5LP9306). Segment 5LP9256.2 extends from the west boundary of the Schaeferhoff-Cowan Ranch into the historic Webb Ranch for 1,786 feet before it is split by a diversion structure into two sublateral ditches—one that flows to the east and irrigates the middle and western ranch pastures, and one that flows to the west and irrigates the eastern pastures. These two sublateral ditches are connected to an elaborate 11-mile irrigation network that contains laterals, diversion structures, and storage ponds.

It is not clear when the Webb/Hotter Lateral was built, who was responsible for its construction, or when it was first used to irrigate the Schaeferhoff-Cowan or Webb Ranch properties. Based on a November 3, 2010 contact with Peggy Cooley, who grew up on the Schaeferhoff-Cowan Ranch, the ditch is at least 65 years old.

The Webb/Hotter Lateral is significant under NRHP Criterion A for its association with the two separate historic ranches through which it runs.

5.5.2.2. Co-op Ditch

Sites 5LP9257.1 and 5LP9257.2 represent two segments of the Co-op Ditch on private lands between elevations of 6,670 feet (2,060 meters) and 6,660 feet (2,012 meters) as shown on Figure 5-15. The ditch runs roughly north to south along the western edge of a small valley south of the northwestern edge of Florida Mesa. The ditch passes along the eastern edge of a piñon and juniper forest with a variety of grasses growing along its length and willow growing along its banks.

Site 5LP9257.1 is a 1,295-foot-long (395-meters) segment of the Co-op Ditch that extends through the historic Craig Limousin Ranch (Site RLP9307). The segment begins at County Road 220 on its southern end and continues north to a pronounced bend in the ditch. The ditch is an unlined, earthen ditch with sloping walls and an overall U-shaped cross section. From bank crest to bank crest, the ditch measures just under 22 feet, and from wall to wall it has a width of just over 14 feet. From the base of the ditch to the top of the bank it is just under 4 feet deep, but from the base of the ditch to its high-water mark the depth is just over 2 feet. The only features recorded as part of the ditch segment are a modern culvert with concrete headwalls, which serves as an access route over the ditch, and an additional modern culvert that passes under the county road.

Figure 5-14. Webb-Hotter Lateral Ditch

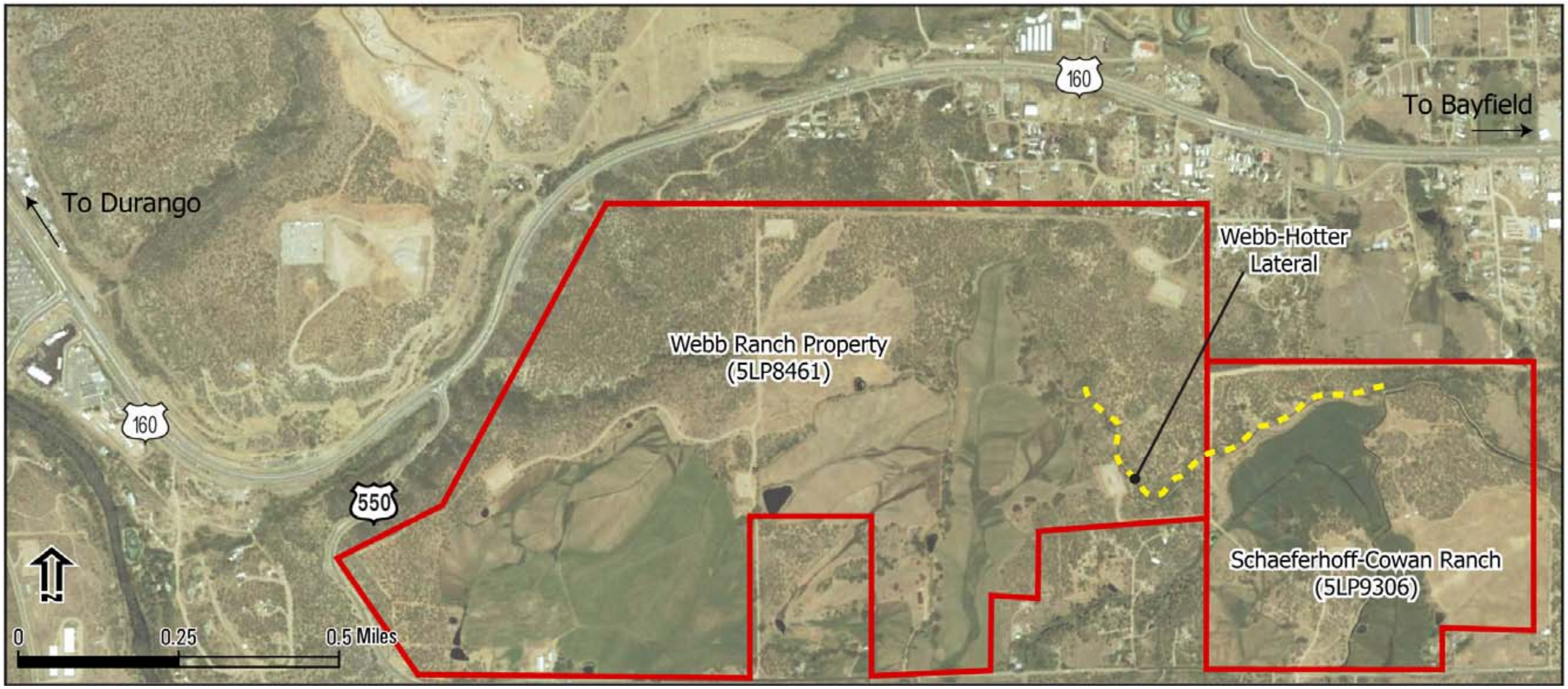
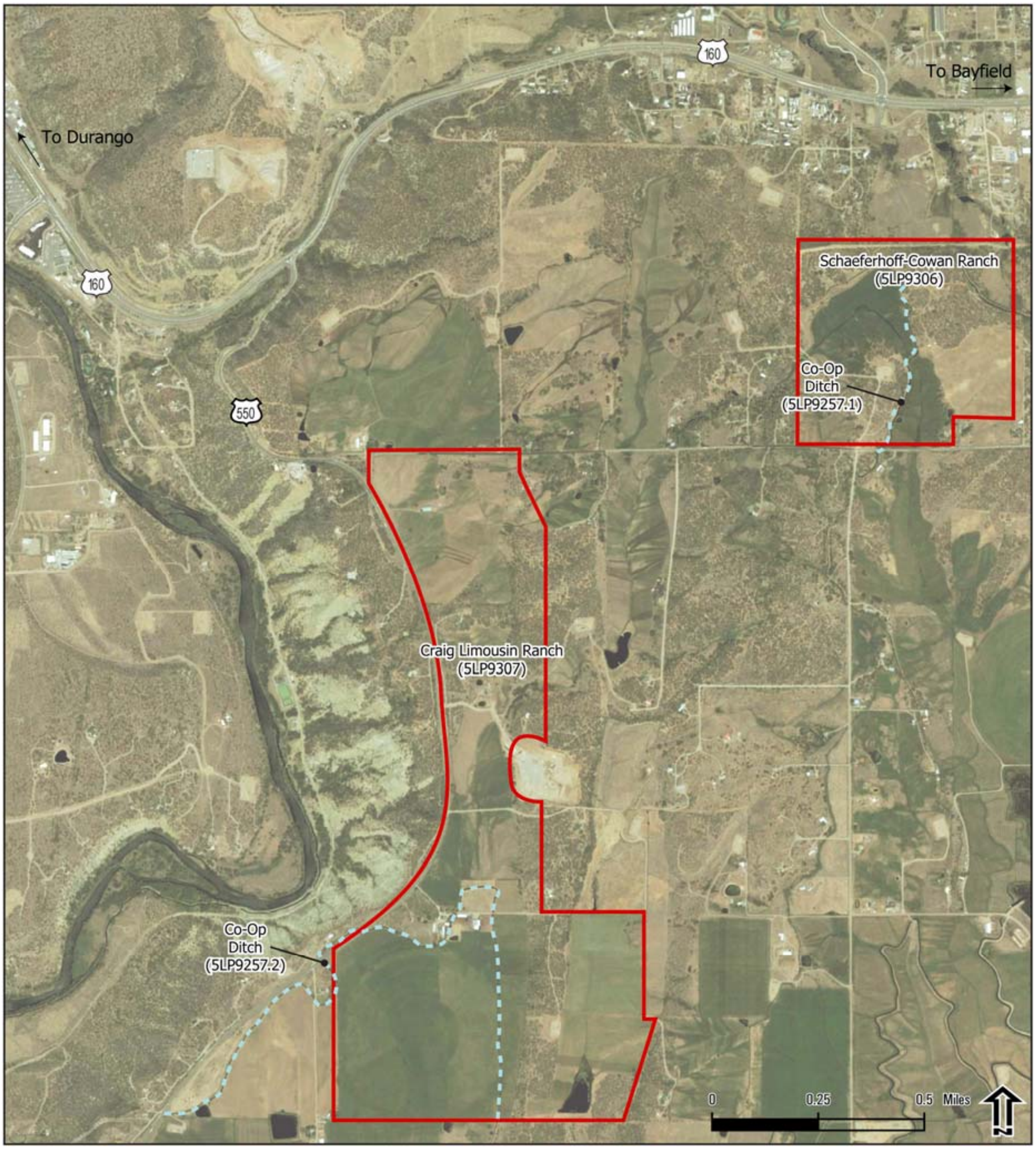


Figure 5-15. Co-op Ditch location



Also recorded as part of the Co-op Ditch in this section was a narrow, shallow linear depression that parallels the length of the recorded segment of the ditch on its west side. The linear depression appears to be another smaller ditch that is no longer in use. The abandoned ditch continues south of County Road 220 and is far more visible as it continues south of the road.

On average, the abandoned ditch is four feet to six feet wide and approximately five inches deep. It is suspected that the abandoned ditch represents an informal, secondary irrigation ditch that once carried irrigation water southwestward from the Co-op Ditch. The historic research for the Co-op Ditch was completed at the La Plata County Courthouse and through water rights data obtained from the Colorado Division of Water Resources website. Additional research was carried out through an oral interview with the Co-op Ditch rider, Charlie McCoy, who also provided historic documents concerning the ditch.

Segment 5LP9257.2 is a 7,984-foot-long segment of the Co-op Ditch that extends through the historic Schaeferhoff-Cowan Ranch (RLP9306). The segment enters the Craig Limousin Ranch at its southeast boundary and flows north along the base of a low ridge on the eastern edge of the ranch's hay fields. As it flows north, the ditch enters the livestock corrals on the eastern extent of the ranch complex before making a sharp turn west and again south, passing next to the barn. Once the ditch exits the ranch complex, it follows along the north end of the hay fields and passes under U.S. Highway 550 at the west boundary of the ranch. On the west side of the highway, the ditch parallels the highway, crossing it again as it follows the western contour of Florida Mesa. On average, the width of the ditch is 6 feet, but it increases to a width of nearly 10 feet to 12 feet in the livestock corrals. The depth varies from just over 1 foot to nearly 2½ feet in some places. Four galvanized culverts and one headgate were also noted along the ditch. Two of the culverts were encountered at points where the ditch crosses under the highway. The remaining two culverts were on the Craig Limousin Ranch crossing under a gravel road. The single headgate was also on the Craig Limousin Ranch. The culverts and the headgate appear to be modern.

The Co-op Ditch was constructed by the Florida Co-operative Ditch Company after its incorporation in October 1910. The purpose of the company's formation was to enlarge the Florida Farmers Ditch and build the Co-op Ditch south from the end of the Florida Farmers Ditch (1912 Certificate of Incorporation for the Florida Co-operative Ditch Company, on file at the Florida Cooperative Ditch Company). Based on the Colorado Division of Water Resources water rights data, a substantial increase in the volume of water passing through the Florida Farmers Ditch occurred in November 1910, suggesting that the construction of the Co-op Ditch had been completed by that time. Research performed on the GLO website suggests that ditch may have been constructed to provide water to several Desert Land Entries that were being patented south of the terminus of the Florida Farmers Ditch on the interior portion of Florida Mesa about 1910. Desert Land Entries were prompted by the Desert Land Act passed by Congress in 1877. The intent of the act was to promote the development of arid and semiarid public lands. Under the act, individuals were allowed to apply for large tracts of land with a promise to irrigate and cultivate the lands within a three year period. Once proof of irrigation was provided, the individual could purchase the land at a nominal cost per acre.

It also appears, based on the water rights data, that a second substantial increase to the water volume also occurred in June 1946. This increase might coincide with the enlargement of the Co-op Ditch as it is currently built.

The Co-op Ditch is significant under NRHP Criterion A for its role in providing irrigation water to lands under the Desert Land Act and for its association with the settlement and irrigation of marginal lands on Florida Mesa. It is also significant under Criterion C as a good example of an irrigation ditch that employed relatively simple technology in its design and construction.

5.6 Archaeological Sites

Note: Due to the sensitive nature of archaeological sites eligible for or listed on the NRHP and the possibility of artifact looting, their locations are exempt from the Freedom of Information Act (FOIA) and, therefore, are excluded from this document.

Numerous archaeological sites are located in the Area of Potential Effects. Information about these sites is included in this evaluation because they were evaluated for their possible Section 4(f) status.

The first step in determining their possible Section 4(f) status was to evaluate their eligibility for the NRHP. Eligible sites are listed in Table 5-2, Table 5-3, and Table 5-4. The sites identified in Table 5-4 include some of those identified in the SEAS 2008 Report that fall within the proposed alignments being considered under the Section 4(f) evaluation. Data for the Revised G Modified Alternative relied on previous inventories conducted for the US 160 EIS and the SEAS Report. Data for the Revised F Modified Alternative were derived from field inventories conducted for the US 160 EIS and additional supplemental studies. Archaeological resources are included in this evaluation and provide information relative to Section 5.10 (Least Overall Harm Analysis for Alternatives Considered in the Section 4(f) Evaluation).

Table 5-2. Previously Recorded Sites in Close Proximity of the Survey Corridor

Site No.	Site Type	Cultural Affiliation	NRHP Status
5LP6670	Prehistoric Artifact Scatter/ Historic Sweat Lodge	Basketmaker III/Pueblo I/ Historic Native American	Officially Eligible
5LP6671*	Prehistoric Artifact Scatter	Basketmaker III/Pueblo I	Site form indicated Officially Not Eligible, Compass database indicates Officially Eligible
5LP6673*	Prehistoric Artifact Scatter	Basketmaker III/Pueblo I	Officially Eligible

*Sites within the Eastern Realignment Alternative APE and re-evaluated during the current project.

Table 5-3. NRHP Eligible Archaeological Sites Within the Eastern Realignment Alternative Project Area

Site No.	Temporary Site No.	Site Type	Cultural Affiliation	NRHP Status
5LP6665	—	Prehistoric Artifact Scatter	Basketmaker III/Pueblo I	Officially Eligible
5LP6671	—	Prehistoric Artifact Scatter	Basketmaker III/Pueblo I	Officially Eligible
5LP6673	—	Prehistoric Artifact Scatter	Basketmaker III/Pueblo I	Officially Eligible
5LP9236	AAC-1062	Open Camp	Pueblo II	Officially Eligible
5LP9241	AAC-557	Prehistoric Artifact Scatter	Basketmaker III/Pueblo I	Officially Eligible
5LP9242	AAC-556	Prehistoric Artifact Scatter	Basketmaker III/Pueblo I	Officially Eligible
5LP9244	AAC-4000	Prehistoric Artifact Scatter	Basketmaker III/Pueblo I	Prehistoric Officially Eligible/Historic Not Eligible
5LP9245	AAC-500	Prehistoric Artifact Scatter	Ancestral Puebloan	Officially Eligible

Table 5-4. NRHP Eligible Archaeological Sites Within the Western Portion Webb Ranch Complex

Site No.	Site Type	Cultural Affiliation	NRHP Status
Revised F Modified Alternative			
5LP9308	Prehistoric Artifact Scatter	Unknown Prehistoric	Officially Eligible
5LP9309	Prehistoric Habitation/Historic Artifact Scatter	Pueblo I/Pueblo II/Historic	Officially Eligible (prehistoric component only)
5LP9581	Prehistoric Artifact Scatter	Basketmaker III/Pueblo I	Officially Eligible
5LP9582	Prehistoric Artifact Scatter	Basketmaker III/Pueblo I	Officially Eligible
5LP9583	Prehistoric Artifact Scatter	Pueblo I	Officially Eligible
5LP9584	Prehistoric Habitation/Historic Habitation	Basketmaker III/Pueblo I/Historic	Officially Eligible
Revised G Modified Alternative			
5LP2223	Prehistoric Artifact Scatter/Habitation	Basketmaker III/Pueblo I	Officially Eligible (2000)
5LP9587	Prehistoric Artifact Scatter	Unknown Prehistoric	Officially Eligible
5LP9588	Prehistoric Artifact Scatter	Unknown Prehistoric	Officially Eligible
5LP9589	Prehistoric Artifact Scatter	Unknown Prehistoric	Officially Eligible
5LP9590	Prehistoric Artifact Scatter/Habitation	Basketmaker III/Pueblo I/Pueblo II	Officially Eligible

The final step in determining their possible Section 4(f) status is to identify their value or importance for preservation in place. The archaeological sites listed below (in all three tables) are not considered Section 4(f) properties because FHWA has determined that their importance is chiefly because of what can be learned by data recovery, and they have minimal value for preservation in place. The SHPO was notified of this determination and they did not object. For this reason, these sites fit within the category of an exception to Section 4(f) protection, as defined in 23 CFR 774.13(b)(1).(See Appendix A for details.)

5.7 Avoidance Alternatives Analysis

The six Section 4(f) properties illustrated on Figure 5-2 could be used by the alternatives described in Section 5.4. These Section 4(f) properties are described in more detail in Section 5.5. The intent of Section 4(f) is to avoid use of these properties unless there is no feasible and prudent alternative to the use of the land. Therefore, the first step is to determine whether there are feasible and prudent alternatives that avoid these properties. According to 23 CFR 774.17, an alternative is not feasible if it cannot be constructed as a matter of sound engineering judgment. An alternative is not prudent if:

1. It compromises the project to a degree that it is unreasonable to proceed with the project in light of the stated purpose and need.
2. It results in unacceptable safety or operational problems.
3. After reasonable mitigation it still causes:
    a. Severe social, economic, or environmental impacts.
    b. Severe disruption to established communities.
    c. Severe disproportionate impacts to minority or low income populations.
    d. Severe impacts to environmental resources protected under other federal statutes.
4. It results in additional construction, maintenance, or operational costs of an extraordinary magnitude.
5. It causes other unique problems or unusual factors.
6. It involves multiple factors (listed above) that while individually minor, collectively cause unique problems or impacts of extraordinary magnitude.

The avoidance alternatives in this evaluation survived the alternatives screening in the 2006 US 160 EIS and are being analyzed as part of this Section 4(f) evaluation. In the 2006 US 160 EIS, several screening levels were used to arrive at the advanced alternatives including a Corridor Screening level, a Feasibility Alternatives Screening level and a Preliminary Alternatives screening level. The criteria used to screen these alternatives are documented in Chapter 2 of the 2006 US 160 EIS. Alternatives in these screening levels were evaluated for whether they avoid the Section 4(f) properties in the vicinity of the US 550/US 160 connection and if they are prudent and feasible. In addition, the advanced alternatives in the 2006 US 160 EIS were evaluated for whether they avoid 4(f) properties in the vicinity of the US 550/US 160 connection and whether they are prudent and feasible. Two additional alternatives developed to avoid the

Webb Ranch, the Western Realignment Alternative and Eastern Realignment Alternative are also considered. A discussion of avoidance alternatives and whether they are prudent and feasible is provided below.

5.7.1 Corridor Avoidance Alternatives

This section describes corridor alternatives that avoid the use of the Section 4(f) properties identified in this evaluation. None of these alternatives are feasible and prudent avoidance alternatives, as described below.

Alternatives that avoid the Section 4(f) properties in the vicinity of the US 550/US 160 connection corridor include the No Action Alternative, Transportation System Management and Transportation Demand Management Alternatives, and a Western Corridor Alignment shift. These are the same alternatives as those considered in the EIS except that alignment shifts for this evaluation focus on shifting the US 550 connection to the west instead of the US 160 north or south alignment shift. A west shift of US 550 is evaluated because it is the alignment of US 550 that could avoid a use of the Section 4(f) properties near the connection with US 160.

5.7.1.1. No Action Alternative

The No Action Alternative avoids use of all six Section 4(f) properties. The No Action Alternative assumes completion of the US 160 project as defined in the Record of Decision with the exception of the connection of US 550 to US 160. The Grandview Interchange addresses development along US 160 without the connection of US 550. The No Action Alternative does not address the capacity or safety components of the project purpose and need as it relates to the connection to US 550. US 550 remains on its current alignment where poor geometry, low design speeds and two lane capacity, on a north facing steep grade presents capacity and safety issues. This alternative is not prudent.

5.7.1.2. Transportation System Management Alternative

The 2006 EIS identified Transportation System Management (TSM) strategies that would minimize the capital investment along US 160 by implementation of strategies to smooth traffic flow and make efficient use of existing transportation facilities, such as signal coordination, intersection improvements, and access control.

Intersection improvements that were considered in the Grandview Section included improvements at CR 220, US 550, CR 232, CR 233, and SH 172/CR 234. At these intersections minor improvements were considered, such as right or left turn lanes, signalization and side road approach reconstruction. Other intersection improvements assumed grade-separated interchanges.

Access control strategies were developed, including constructing access or frontage roads parallel to US 160, regulating the location, spacing and design of driveways, limiting the number of driveways per lot, locating driveways away from intersections, connecting parking lots and consolidating driveways, providing residential access through neighborhood streets, increasing minimum lot frontage on major streets, promoting a connected street system and encouraging internal access to parcels not located on major streets.

Future projected traffic volumes on US 160 warrant a four lane roadway to achieve an acceptable level of flow. As such, capacity improvements along US 160 are required even with the most optimistic assumptions for trip diversion due to TSM implementation.

These strategies avoid use of the six Section 4(f) properties addressed in this evaluation. These strategies provide modest improvements in traffic flow and safety along the US 160 corridor. Additional capacity improvements would still be needed in order to meet the purpose and need for the project. They do not address the purpose and need requirements of increasing capacity nor do they address the primary safety issues of narrow shoulders, insufficient clear zones, poor sight distance or steep grades. Intersection improvements and access control features have been incorporated into the Feasibility and Preliminary Alternatives discussion in Section 5.7.2 and the Alternatives Considered discussion in Section 5.7.3, as appropriate. By themselves, TSM strategies are not prudent because they do not meet the project purpose and need.

5.7.1.3. Transportation Demand Management Alternative

The 2006 US 160 EIS identified several Transportation Demand Management (TDM) strategies, intended to reduce peak hour demand on US 160 by altering the time or means by which trips occur. These strategies include promoting transit and rideshare programs, creating multi-modal routes, encouraging staggered work hours, and creating high occupancy vehicle (HOV) lanes.

Transit improvements included adding or improving bus service, providing bus stop amenities, providing park-n-ride facilities and offering reduced rate bus passes. Bus service in the corridor is provided by the City of Durango and the Southern Ute Community Action Program.

Rideshare programs that were evaluated include promoting car and vanpooling through a joint City of Durango/La Plata County marketing program, involving major local employers in a ridesharing program, establishing park-n-ride lots at key locations, establishing computer kiosks at park-n-ride lots for individuals to seek carpooling matches and encouraging employers to establish an employer-based and financed ridesharing program.

Multi-modal routes are paved paths that can be used by a variety of non-motorized users. They may be constructed as separate facilities or as part of the US 160 reconstruction.

Staggered work hours reduce peak hour demand by distributing the vehicles over a longer time period. Incentives such as tax benefits and reduced overhead costs for equipment, office space and parking could be provided to area employers.

HOV lanes increase vehicle occupancy by requiring at least two people in a vehicle and thereby reducing the number of vehicles on US 160. The lanes could be constructed in the median or outside the existing lanes on US 160.

Future projected traffic volumes on US 160 warrant a four lane roadway to achieve an acceptable level of flow. As such, capacity improvements along US 160 are required even with the most optimistic assumptions for trip diversion due to TDM implementation.

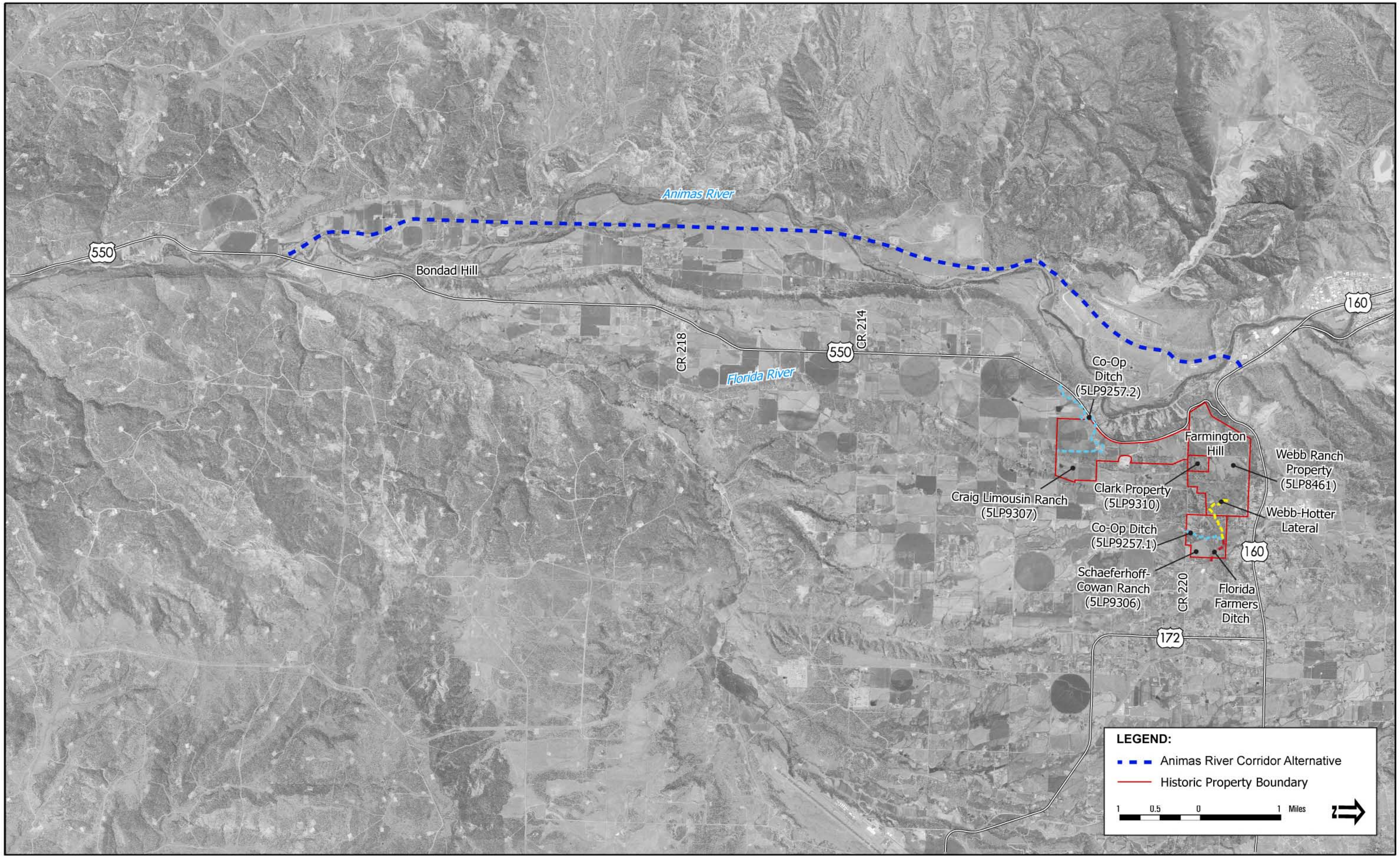
These TDM strategies avoid use of the six Section 4(f) properties addressed in this evaluation. They do not address the purpose and need requirements of increasing capacity nor do they address the primary safety issues of narrow shoulders, insufficient clear zones, poor sight distance or steep grades. They are also difficult to implement to achieve consistent results. TDM strategies are not prudent because they do not meet the project purpose and need.

5.7.1.4. Alignment Shift of the US 550 Corridor

The six Section 4(f) properties in the vicinity of the US 550/US 160 connection could be avoided if the US 550 corridor was located to the west of these properties. An entire corridor shift of US 550 to the west was considered in the *US 550 Environmental Assessment* (EA) (CDOT, July 2005). This corridor shift is illustrated on Figure 5-16. It is approximately 13 miles long, would be much more costly than widening the existing US 550, ($125 million compared to $90 million) and would use another likely historic property, the abandoned Farmington Branch of the Denver & Rio Grande Western railroad grade. (For more detail about the likely eligibility of this property, see February 24, 2011, memo from Lisa Schoch in Appendix A.) This alternative, the Animas River Corridor, does not meet the purpose and need because the existing US 550 roadway still needs to be maintained (to provide access to existing properties), and therefore the safety and access issues remain.

In addition, this alternative requires three crossings of the Animas River, has much greater impacts to wetlands, impacts habitat for the southwestern willow flycatcher, an endangered species, other cultural resources, and wildlife habitat compared to keeping

Figure 5-16. Animas River Corridor Alternative



the alignment along the existing US 550 corridor (*US 550 Corridor Scoping Memo*, URS 2002). It was eliminated during the US 550 Environmental Assessment process, and based on this decision to widen US 550 on the existing alignment, property acquisition, corridor preservation, and US 550 widening construction have been underway. For these multiple factors, this is not a prudent avoidance alternative.

5.7.2 Feasibility and Preliminary Alternatives

Feasibility Alternatives is a term used to denote alternatives that were identified during the Feasibility Study and were defined and evaluated as "Feasibility Alternatives" during the NEPA process for the 2006 EIS. The project corridor was divided into 12 numbered sections to address the wide range of conditions along the US 160 roadway. Section 1 includes the US 550 alignment north of CR 220 and the connection of US 550 to US 160. Eight Feasibility Alternatives were considered for the US 550 alignment and connection to US 160: 1A, 1B, 1C, 1D, 1F and 1G. These alternatives cross the Webb Ranch at various locations and connect to US 160 at or east of the current US 160/US 550 (south) intersection. The Feasibility Alternatives are not complete corridor avoidance alternatives because they would use portions of the Webb Ranch, Craig Limousin Ranch and Co-op Ditch. Except for 1F, these alternatives would avoid use of the Schaeferhoff-Cowan Ranch. Because these alternatives are an avoidance alternative for the Schaeferhoff-Cowan Ranch, they are evaluated further to determine if they are feasible and prudent.

Feasibility Alternatives 1A and 1B would remain on the existing US 550 alignment with 1A being an interchange and 1B being an intersection. These alternatives were not advanced for detailed consideration in the EIS and are not complete corridor avoidance alternatives. Additional design information for these alternatives, however, was submitted by Mr. Thomas McNeill on behalf of the Webb Ranch owners in an October 28, 2008 letter to FHWA. Because of this new information, these alternatives have been retained for further consideration and included as the "Revised Preliminary Alternative A" and "At Grade Intersection Alternative" in Section 4.3.

Feasibility Alternatives 1C, 1D, and 1F do not meet the safety requirements of the purpose and need because they place the US 550/US 160 interchange in a location that conflicts with the CR 233 (Three Springs) intersection, where conflicting vehicle movements from the US 550 eastbound ramp, the Three Springs intersection, and traffic exiting to Grandview create an unsafe condition. These Feasibility Alternatives are not prudent alternatives because they do not meet the capacity or safety requirements of the project purpose and need.

Alternatives 1F and 1G were modified with better approach grades, a safer alignment and to minimize impacts. These modifications allowed Alternative 1F to meet the safety requirement of the purpose and need. These alternatives were carried forward in the EIS as G Modified and F Modified and included in the preliminary and advanced alternatives for the Grandview Section.

5.7.3 Alternatives Considered

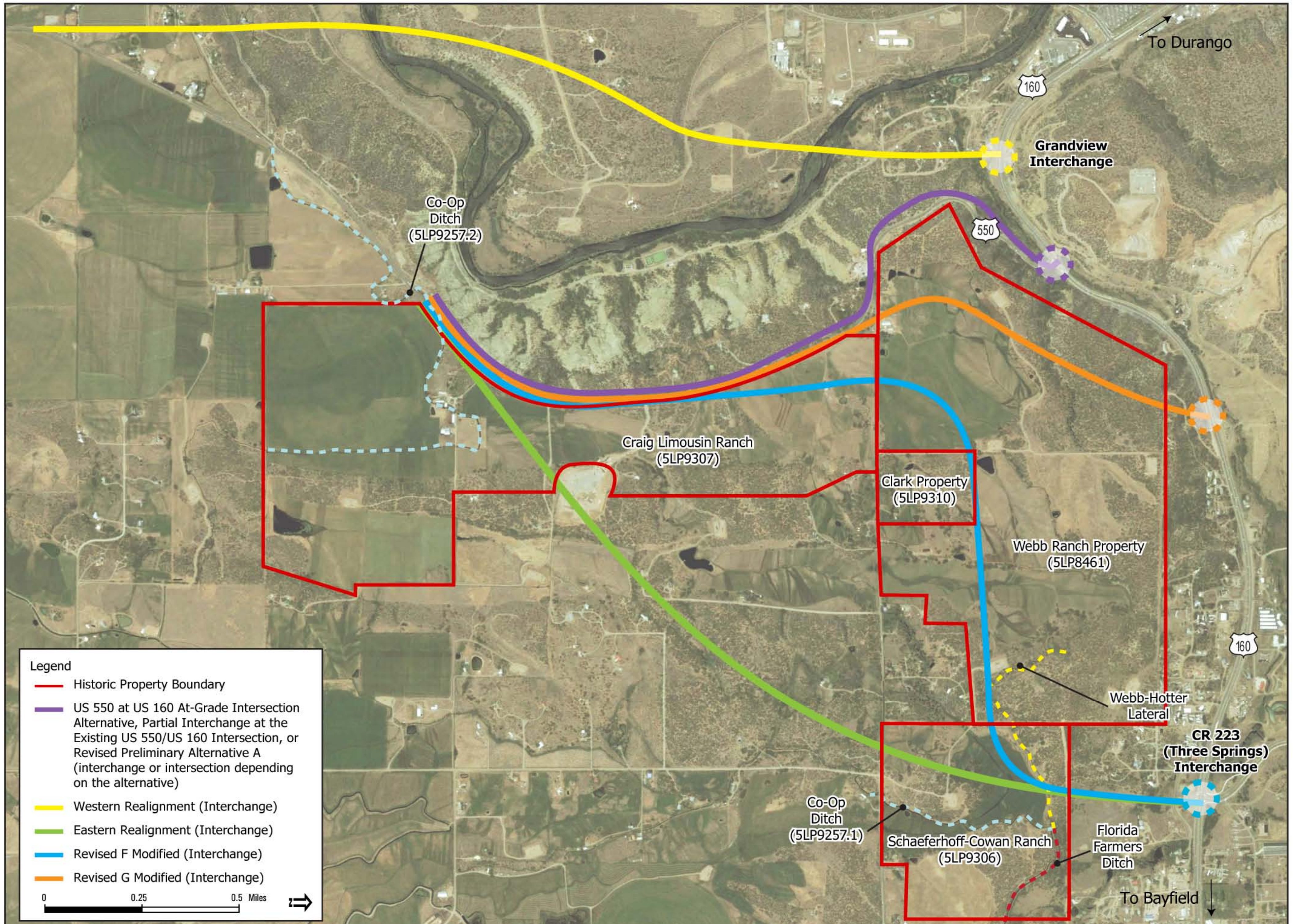
Section 5.4 describes the project alternatives including those considered in the 2006 US 160 EIS as well as those that have been developed specifically to avoid or minimize the use of Section 4(f) properties in the vicinity of the US 550/US 160 connection. The project alternatives advanced in the 2006 US 160 EIS include the US 550 at US 160 At-Grade Intersection Alternative, the Partial Interchange at the Existing US 550/US 160 Intersection Alternative, Revised Preliminary Alternative A, Revised G Modified Alternative, and the Revised F Modified Alternative. Alternatives developed for the resources identified in vicinity of the US550/US160 connection include the Eastern Realignment Alternative and the Western Realignment Alternative. These are all illustrated on Figure 5-17. This section evaluates each of these alternatives to assess whether they are prudent and feasible.

None of these avoid all six Section 4(f) properties.

5.7.3.1. US 550 at US 160 At-Grade Intersection Alternative

This alternative includes an at-grade intersection at the existing location of US 550 to US 160. This alternative is evaluated first for whether it meets capacity, safety and access requirements of the purpose and need. For capacity, traffic analyses for the at-grade intersection alternatives, including design variations T.1.4, T.1.6, T.4.4, fail to meet the capacity requirements for the project purpose and need (see Appendix C). This alternative is expected to operate at LOS D during the morning peak period and LOS E during the evening peak period in 2030 which does not meet the requirement of a LOS D or better (see Appendix C). For safety, the alternative includes several design variations with different horizontal and vertical grades. The upper curve is the curve that creates the safety issues. All design variations including the design with the flattest upper curve (T.4.4 with a 1000-foot horizontal radius and a four percent vertical grade) provide a 35 mph design (see Appendix E). The design speed for US 550 south of this location is 70 mph consistent with the AASHTO Geometric Design of Highways and Streets (AASHTO, 2004). The large reduction in design speed from 70 mph to either 30 mph or 35 mph creates an unsafe condition and is unacceptable for the design of roadways (AAHSTO, 2004). In addition to the sharp curves, this alternative includes an eight percent cross-slope as the roadway curves, four percent vertical grades and north facing steep slopes, all of which combine to produce unacceptable safety problems, particularly in the winter. All of these safety problems will continue to worsen as traffic volumes grow. This alternative does not sufficiently improve design and safety deficiencies to existing standards and therefore, does not meet the safety requirement of purpose and need. For access, access control is included in the alternative and it therefore meets the access requirement of purpose and need.

Figure 5-17. Alignment Alternatives



This alternative has challenging geotechnical issues with known subsurface water problems (springs) which create drainage and slope stability problems. This alignment requires the construction of retaining walls approximately 85 feet tall due to topography. Constructing the walls in these difficult conditions is technically challenging. It also has logistical issues related to constructability. Due to the existing narrow roadway and technical challenges associated with maintaining traffic while constructing the new roadway on such a steep slope, temporary detours during construction are required. Traffic would be rerouted from US 550 onto CR 220 for a period of two years (see Figure 2-9 in Chapter 2). This forces Durango bound traffic, including emergency service providers, to travel nearly seven miles out of direction for each trip into or out of Durango. County Road 220 (CR 220) is a narrow county road with poor sight distance, no shoulders, and numerous access points for residential driveways. The two-year detour results in additional costs to drivers, access restrictions and disruptions to the residents and farming operations along CR 220, delays to the provision of emergency services, notable congestion at the CR 233 (Three Springs) Interchange, and safety problems along CR 220, which was not designed to carry large amounts of traffic. CR 220 could be improved to more easily handle this additional traffic, but such improvements would be costly and would result in Section 4(f) uses to the Webb Ranch, the Clark Property, the Craig Limousin Ranch, and the Schaeferhoff-Cowan Ranch. Additional details are found in Appendix E.

This alternative is not expected to result in costs substantially greater than other alternatives.

Because of unacceptable safety and operational problems and inability to meet the project purpose and need, these at-grade intersection alternatives are not prudent.

5.7.3.2. Partial Interchange at the Existing US 550/US 160 (South) Intersection Alternative

The Partial Interchange at the Existing US 550/US 160 (South) Intersection Alternative includes a partial interchange that connects US 550 to US 160 at the existing intersection location. Design variations T.2.4, T.2.6, T.3.4, and T.3.6 are included in this analysis. All these design variations have a tight upper curve with a 700-foot radius and either a four or six percent grade. This alternative is evaluated first for whether it meets capacity, safety and access requirements of the purpose and need. For capacity, traffic analyses show that this alternative meets the capacity requirements for the project purpose and need (see Appendix C). Overall, this intersection alternative is expected to operate at LOS A during the morning peak period and LOS A during the evening peak period in 2030 which meets the requirement of a LOS D or better. For safety, as discussed in Appendix E, this on- alignment alternative with a tight upper curve also requires a 35 mph reduction in speed in a short distance and has the same issues as described for the US 550 at US 160 At-Grade Intersection Alternative. US 550 would remain near its current alignment where in addition to the sharp curves, this alternative includes an eight percent cross-slope as the roadway curves, four percent vertical grades and north facing steep slopes, all of which combine to produce unacceptable safety problems, particularly in the winter so this alternative does not meet the safety requirements for purpose and need. For access, access control is included in the alternative and it therefore meets the access requirement of purpose and need.

This alternative has the same geotechnical problems and constructability issues described for the US 550 at US 160 At-Grade Intersection Alternative. Because it is on the same alignment, it has subsurface water with drainage and slope stability issues. It also requires temporary detours during construction onto CR 220 as described for the US 550 at US 160 At-Grade Intersection alternative. Additional details are found in Appendix E.

Additionally, the Partial Interchange at the Existing US 550/US 160 (South) Intersection Alternative is expected to cost $230,790,000. This compares to $77,598,000 for Revised G Modified, $77,429,000 for Revised F Modified, and $93,106,000 for the Eastern Realignment (see Appendix E). The Partial Interchange at the Existing US 550/US 160 (South) Intersection Alternative is more expensive than these alternatives because it requires building a new interchange whereas the Revised G Modified, Revised F Modified and the Eastern Realignment alternatives connect to interchanges already planned or built in Grandview. In addition, it requires upgrading and modifying CR 220 for use as a detour which would not be required for Revised G Modified, Revised F Modified and the Eastern Realignment alternatives. Other elements that increase costs for the Partial Interchange at the Existing US 550/US 160 (South) Intersection Alternative include large retaining walls of approximately 85 feet and the need to maintain access to businesses along US 160 near MP 88. For these reasons, the estimated cost for the Partial Interchange at the Existing US 550/US 160 (South) Intersection Alternative is about 3 times the cost of the least expensive alternative, Revised F Modified. Cost is therefore also a factor in why this alternative is not reasonable. Additional detail on the cost estimate for this alternative is included in Appendix E.

In summary, this alternative does not meet the safety requirements for purpose and need. It has substantially higher costs compared to other alternatives. These multiple factors (unacceptable safety problems, disruption to established communities because of the access difficulties along CR 220 during construction, unique and challenging geotechnical issues with springs and unstable slopes) cumulatively cause unique problems and impacts of extraordinary magnitude. For these reasons, the Partial Interchange Alternative is not prudent.

5.7.3.3. Revised Preliminary Alternative A

Revised Preliminary Alternative A includes a grade separated trumpet interchange at the existing US 550/US 160 intersection location. This alternative is not a complete corridor avoidance alternative because it uses portions of the Webb Ranch, Craig Limousin Ranch and the Co-op Ditch. It is, however, an avoidance alternative for Schaeferhoff-Cowan Ranch and Clark property. The reasons this alternative is not prudent are identical to the Partial Interchange Alternative because they are both on the same alignment. For these reasons, Revised Preliminary Alternative A is not prudent.

5.7.3.4. Revised G Modified Alternative

The Revised G Modified Alternative connects US 550 to US 160 via the Grandview Interchange. The Revised G Modified Alternative is not a corridor avoidance alternative because it uses portions of the Webb Ranch, Craig Limousin Ranch and Co-op Ditch. This alternative, however, avoids use of the Schaeferhoff-Cowan Ranch and the Clark Property. This alternative has been revised several times to minimize impacts. During the 2006 US 160 EIS process, the alternative was modified to follow the western edge of the Webb Ranch to minimize impacts to the ranch. Additionally, it was revised after completion of the 2006 US 160 ROD to avoid a gas well installed in the alignment. The modified alignment ("Revised G Modified Alternative") has fewer resource impacts to wetlands, wildlife habitat, and irrigated farmlands compared to G Modified from the 2006 US 160 EIS while managing to avoid the natural gas well. This alternative is carried forward for further analysis in this evaluation.

5.7.3.5. Revised F Modified Alternative

The Revised F Modified Alternative connects US 550 to US 160 via the SPUI interchange at CR 233 (Three Springs). The Revised F Modified Alternative is not a corridor avoidance alternative because it uses portions of all the Section 4(f) properties in the vicinity of the US 550/US 160 connection. Like G Modified, Revised F Modified Alternative also impacts a gas well on the Webb Ranch so design adjustments to avoid the gas well were considered. The feasibility of avoiding the gas well was explored and not incorporated into this alternative because a shift to the north results in the acquisition of four additional residences and a shift to the south requires acquisition of two additional residences. This alternative is carried forward for further analysis in this evaluation.

5.7.3.6. Eastern Realignment Alternative

The Eastern Realignment Alternative connects US 550 to US 160 via the SPUI at CR 233 (Three Springs). The Eastern Realignment Alternative is not a corridor avoidance alternative as it uses portions of the Craig Limousin Ranch, Schaeferhoff-Cowan Ranch, the Co-op Ditch and the Webb-Hotter Lateral. This alternative does, however, diverge from US 550 south of CR 220 and avoids the Webb Ranch and Clark property. The Traffic Operations Memorandum in Appendix C concludes that the Eastern

Realignment Alternative meets the capacity requirements for 2030 traffic projections. This alternative is carried forward for further analysis in this evaluation.

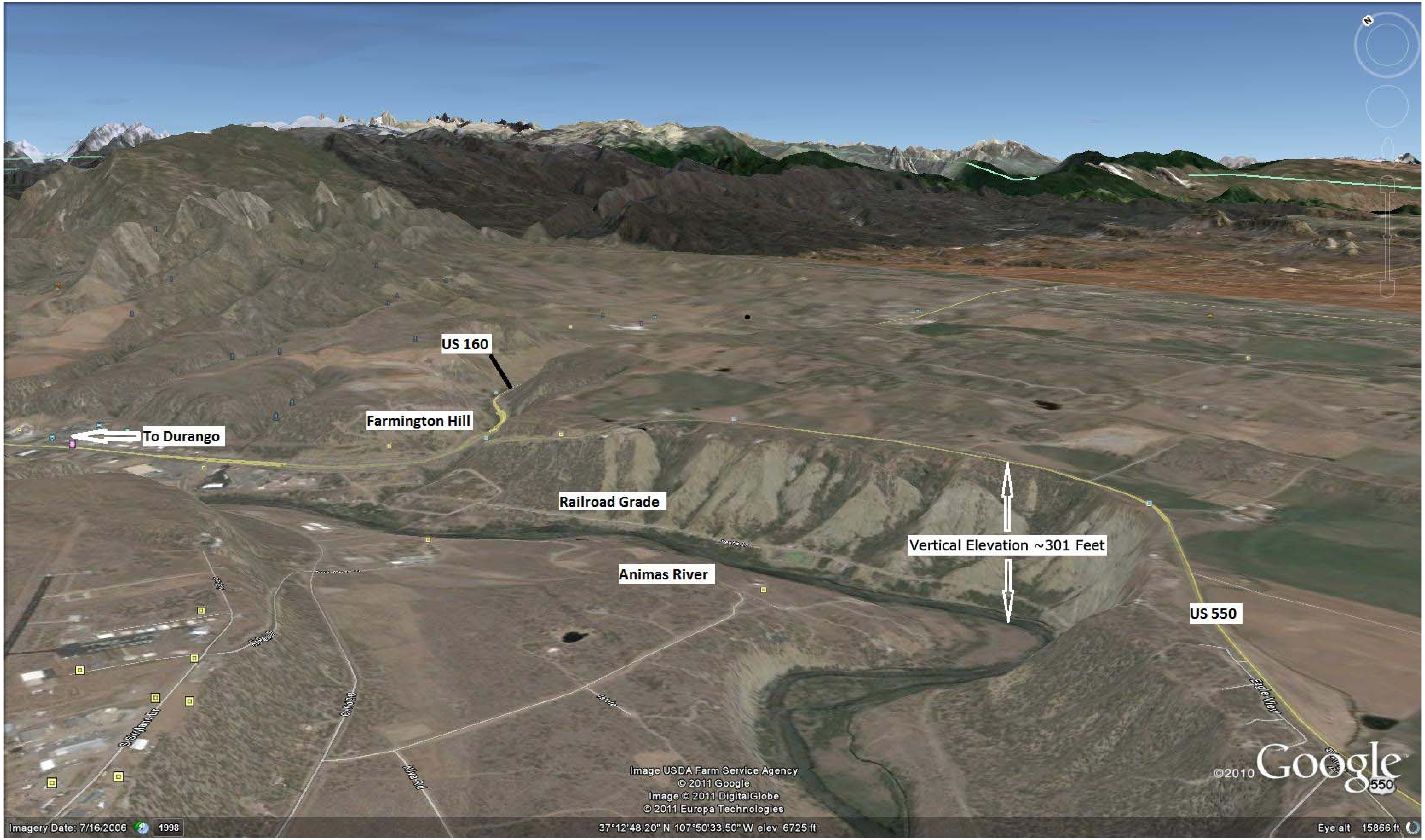
5.7.3.7. Western Realignment Alternative

The Western Realignment Alternative diverges from the current US 550 at approximately milepost 13.17 on the top of Florida Mesa (approximately two miles south of where the Eastern Realignment Alternative diverges from US 550) before descending into the Animas Valley where it parallels the Animas River to the north and connects to US 160 at approximately milepost 88.0, approximately 0.5 mile west of the existing US 160/US 550 (south) intersection. This alternative avoids the six Section 4(f) properties described in this evaluation but is not considered to be an avoidance alternative because it would use the Farmington Branch of the Denver & Rio Grande Western Railroad. (For more detail about the likely eligibility of this property, see email dated February 24, 2011 in Appendix A) Figure 5-18 illustrates the severe topographic constraints associated with this alternative. Two new bridge crossings of the Animas River (see Figure 5-16) are required in addition to an interchange at the US 160 connection and an intersection or interchange at the US 550 South Connection. Two of the ramps from the interchange terminate approximately 700 feet from the existing River Road signalized intersection on US 160.

The US 550 connection to US 160 presents safety and operational problems that do not meet the project purpose and need (*Year 2030 Traffic Operations Analysis for the US 550 at US 160 Section 4(f) Alternatives*, SEH, 2010, Appendix C). The proximity of the existing intersection at River Road north of the proposed interchange creates queue conflicts, congestion, and backups on the northbound-to-westbound interchange ramp. River Road is the first intersection encountered when entering Durango from the south and east where Home Depot and a large subdivision along the Animas River already contribute to traffic conflicts. The interchange would end very close (700 feet) from the River Road intersection. The addition of more conflicts in this already congested area would create unacceptable traffic and safety conditions inconsistent with the project purpose and need. A detailed explanation of traffic and safety problems associated with the Western Realignment Alternative is provided in Appendix C and Appendix E (see *Year 2030 Traffic Operations Analysis for the US 550 at US 160 Section 4(f) Alternatives Memorandum* (SEH, 2010).

The US 550 Western Realignment Alternative will require a large amount of excavation and fill. This alignment cuts through the Florida Mesa where it has a drop in elevation of approximately 210 feet from the high point of the alignment on the mesa to the low point of the alignment near US 160. This compares to a drop in elevation from the high point of the alignment on the mesa to the low point of the alignment near US 160 of approximately 90 feet for the Revised G Modified Alternative and approximately 120 feet for Revised F Modified and Eastern Realignment Alternatives. The drop in

Figure 5-18. Florida Mesa's Severe Topographic Constraint



elevation of approximately 210 feet for the Western Realignment Alternative occurs within less than a half of a mile.

The *American Association of State Highway and Transportation Officials Policy on Design* (AASHTO, 2004) discusses maximum grades for freeways. For a design speed of 70 mph, in rolling terrain, the maximum grade is four percent. However, in areas that are constrained by terrain, a 5 percent grade can be used (AASHTO, 2004).To achieve a grade of five percent, approximately 3,541,000 cubic yards would need to be removed from the hillside. This equates to approximately 236,000 truck equivalents at 15 cubic yards per truck. If it is assumed that the material is removed and placed in the fill section, and that the material could be moved at a rate of 10 truckloads per hour, at 8 hours per day for a 5-day workweek, it would take 197 workdays or 9.5 months to move all this material. This compares to approximately 1,600,000 cubic yards of material that would need to be removed for Revised G Modified Alternative, 2,247,000 cubic yards of material that would need to be removed for F Modified Alternative, and 2,742,000 cubic yards for the Eastern Realignment Alternative.

In addition to the large amount of excavation and fill required for this alternative, it requires more bridge structures than any of the other alternatives being considered. This alternative requires three bridges with a total bridge deck area of 287,000 square feet. In comparison, Revised G Modified Alternative has a total bridge deck are of 85,990 square feet and the Revised Eastern Realignment Alternative has no bridges. The longest bridge structure required for the US 550 Western Realignment Alternative is 1,750 feet, which is 3.3 times longer than the bridge recently constructed across US 160 as part of the Grandview Interchange. The three structures do not include those structures needed for the interchange connection at US 160.

The Western Realignment Alternative is the most costly of all the alternatives evaluated. Its cost is estimated at $326,931,000 compared to $97,680,000for Revised G Modified, $78,394,000 for Revised F Modified, and $92,753,000 for the Eastern Realignment Alternative.

Based on the unacceptable safety and operational problems, construction challenges and costs described above and further supported in Appendix C and Appendix E, the Western Realignment Alternative does not meet purpose and need and is not a prudent alternative.

5.8 Section 4(f) Avoidance Alternatives Summary

For the US 550 connection to US 160 there are no feasible and prudent corridor avoidance alternatives. Corridor avoidance alternatives in this location include the No Action Alternative, Corridor Alternatives including TSM, TDM and alignment shifts, and the Western Realignment Alternative. None of these alternatives are feasible and prudent. Table 5-5 provides a summary of alternatives that were considered and how each has been evaluated against the prudent and feasible criteria.

Table 5-5. Summary of Prudent and Feasible Screening Criteria

Alternative	Section 4(f) Property Use	Prudent and Feasible	Explanation
No Action	No	No	Not feasible and prudent, does not meet Purpose and Need (see Section 5.7.1.1).
Transportation System Management and Transportation Demand Management	No	No	Not feasible and prudent; does not meet purpose and need (see Section 5.7.1.2 and Section 5.7.1.3).
Alignment Shift of the US 550 Corridor to the west	No	No	Not feasible and prudent, does not meet Purpose and Need (see Section 5.7.1.4).
Feasibility and Preliminary Avoidance Alternatives 1C, 1D and 1F	Yes	No	Not feasible and prudent, does not meet safety requirements of the purpose and need (see Section 5.7.2).
US 550 at US 160 At-Grade Intersections (Alternative 1B) (including T.1.4, T.1.6, and T.4.4)	Yes	No	Not feasible and prudent; does not meet capacity requirement to maintain LOS D in evening peak hour (see Appendix C memorandum)
Partial interchange at the US 550/US 160 Existing Intersection Alternative (including T.2.4, T.2.6, T.3.4, and T.3.6)	Yes	No	Unacceptable safety and operational problems due to dramatic decreases in design speeds, sharp curves and north facing slopes which are subject to icing problems in the winter. For this reason, partial interchange alternatives are not feasible and prudent (see Appendix E).
Revised Preliminary Alternative A	Yes	No	Not feasible and prudent because of unacceptable safety and operational problems, community disruption along CR 220 during construction, greater wetland impacts and unusual problems with springs and unstable slopes. It has low design speeds, sharp curves, 8 percent super elevation, 4 percent vertical grades, north facing steep slopes, geotechnical issues with springs and unstable slopes, constructability and out of direction travel (see Appendix E memorandum).
Revised G Modified Alternative	Yes	Yes	Feasible and prudent, but results in a use of Webb Ranch, Craig Limousin Ranch and the Co-op Ditch.
Revised F Modified Alternative	Yes	Yes	Feasible and prudent, but results in a use of Webb Ranch, Craig Limousin Ranch, the Clark Property, the Schaeferhoff-Cowan Ranch, the Webb-Hotter Lateral, and the Co-op Ditch.
Eastern Realignment Alternative	Yes	Yes	Feasible and prudent, but intersects the Craig Limousin Ranch, Schaeferhoff-Cowan Ranch, the Co-op Ditch and the Webb-Hotter Lateral (See Figure 5-2).
Western Realignment Alternative	No	No	Not feasible and prudent because of unacceptable safety and operational, construction challenges and costs. (See Appendix E, Western Alignment Memorandum).

Alternatives that are carried forward for further analysis under this Section 4(f) evaluation include the following:

- Eastern Realignment Alternative
- Revised F Modified Alternative
- Revised G Modified Alternative

5.9 Use of Section 4(f) Properties

As defined in 23 CFR Part 774.17, the use of a Section 4(f) property occurs when:

- Land is permanently incorporated into a transportation facility.
- There is a temporary occupancy of the land that is adverse in terms of the statute's preservation purposes.
- There is no permanent incorporation of land from a Section 4(f) property, but the project's proximity impacts are so severe that the protected activities, features or attributes that quality the property for protection are substantially impaired. This type of use is called a constructive use.

The following section describes each Section 4(f) property, the use by alternative associated with each property and which alternatives constitute avoidance alternatives. All uses described for the Section 4(f) properties are considered to be direct uses. There are no additional temporary occupancies of land in the project area that are expected to be adverse in terms of the preservation purpose of Section 4(f). Similarly, there are no additional proximity impacts that are so severe that the attributes or features that qualify the Section 4(f) property for protection are substantially impaired. In all cases, if an alternative does not have a direct use of a particular Section 4(f) property, that alternative is located far enough away from that property so that the alternative's noise, visual or access impacts are not severe and would not affect the features or attributes that made that property eligible for inclusion on the NRHP, thus qualifying it for Section 4(f) protection.

Table 5-6 provides a summary of Section 4(f) property use by alternative.

5.9.1 Description of Use, Webb Ranch (5LP6481)

Webb Ranch is used by two of the Section 4(f) alternatives.

5.9.1.1. Revised G Modified Alternative

This alternative enters the Webb Ranch property approximately 115 feet from the toe of slope to the main barn, then proceeds along the western edge of Florida Mesa along a northerly track through mostly forested land before leaving the Webb property and descending the mesa to connect with the Grandview Interchange. Some minor improvements to CR 220 also result in a use. Approximately 41.5 acres of right-of-way is transferred to a transportation use for Revised G Modified Alternative.

5.9.1.2. Revised F Modified Alternative

This alternative enters the historic boundary of the Webb Ranch around 400 feet east of the ranch building and structures. The structures are not physically impacted. The alignment curves toward the east and remains on the ranch property for a distance of approximately three miles, requiring that approximately 32.6 acres of right-of-way be transferred to a transportation use.

5.9.1.3. Eastern Realignment Alternative

No use of the Webb Ranch occurs as a result of the Eastern Realignment Alternative.

5.9.1.4. Avoidance Alternatives

Avoidance alternatives include the No-Action Alternative, which does not meet the purpose and need for the project and is thus not feasible and prudent and the Eastern Realignment Alternative, which avoids use of the Webb Ranch but uses four other Section 4(f) properties as indicated in Table 5-6.

Table 5-6. Direct Uses (and Section 106 Effects) of Section 4(f) Properties

Alternatives	Section 4(f) Properties: Direct Uses/Section 106 Effect Determination					
	Webb Ranch	Craig Limousin Ranch	Schaeferhoff-Cowan Ranch	Clark Property	Webb-Hotter Lateral Ditch	Co-op Ditch
Revised G Modified Alternative	Yes/Adverse	Yes/Adverse	No	No	No	Yes/Not Adverse
Revised F Modified Alternative	Yes/Adverse	Yes/Adverse	Yes/Adverse	Yes/Adverse	Yes/Adverse	Yes/Not Adverse
Eastern Realignment Alternative	No	Yes/Adverse	Yes/Adverse	No	Yes/Not Adverse	Yes/Not Adverse

5.9.2 Description of Use, Craig Limousin Ranch (5LP9307)

The Craig Limousin Ranch is used by all three of the Section 4(f) alternatives.

5.9.2.1. Revised G Modified Alternative

This alternative uses 22.7 acres of Craig Limousin Ranch along the far western edge because it requires widening of US 550. Minor use also occurs to accommodate minor improvements to CR 220.

5.9.2.2. Revised F Modified Alternative

This alternative uses the western boundary along an expanded US 550 and the northwest corner of the Craig Limousin Ranch, resulting in the need to convert 35.6 acres to a transportation use. Some minor improvements to CR 220 also result in a use. This use occurs well away from the main complex of buildings. Part of this alignment may also cross a small area of the original homestead site (now in ruins) which is a contributing element to the overall ranch property.

5.9.2.3. Eastern Realignment Alternative

This alternative enters the Craig Limousin Ranch property at the point where it diverges from US 550. It separates the main ranch complex (including the dairy barn and outbuildings) from the saddle shop and barn in the northern section of the ranch. It brings the new highway alignment closer to the building complex and introduces a significant visual element to the property. Approximately 21.0 acres of Craig Limousin Ranch is converted to a transportation use.

5.9.2.4. Avoidance Alternatives

Avoidance alternatives include the No-Action Alternative and the Western Realignment Alternative, neither of which meets the project purpose and need and thus are not feasible and prudent.

5.9.3 Description of Use, Schaeferhoff-Cowan Ranch (5LP9306)

The Schaeferhoff-Cowan Ranch is used by two of the Section 4(f) alternatives.

5.9.3.1. Revised G Modified Alternative

No use of the Schaeferhoff-Cowan Ranch occurs as a result of the Revised G Modified Alternative.

5.9.3.2. Revised F Modified Alternative

This alternative enters the ranch property on its western edge and then turns north. Approximately 20.7 acres of ranch property are converted to a transportation use.

5.9.3.3. Eastern Realignment Alternative

This alternative traverses through the western half of the property and includes some improvements along CR 220. None of the buildings are directly affected, but the new highway alignment extends through open agricultural land which contributes to the significance of this ranch property. Approximately 42.7 acres of ranch property are converted to a transportation use.

5.9.3.4. Avoidance Alternatives

Avoidance alternatives for the Schaeferhoff-Cowan Ranch include the No-Action Alternative and the Revised G Modified Alternative. The No-Action Alternative does not meet the project purpose and need so is thus not feasible and prudent. The Revised G Modified Alternative uses three other Section 4(f) properties, as indicated in Table 5-6.

5.9.4 Description of Use, Clark Property (5LP9310)

The Clark Property is used by one of the Section 4(f) alternatives.

5.9.4.1. Revised G Modified Alternative

No use of the Clark Property occurs as a result of the Revised G Modified Alternative.

5.9.4.2. Revised F Modified Alternative

This alternative extends through the northern end of the Clark Property boundary. The main house on the Clark Property is approximately 725 feet south of the conceptual right-of-way for US 550 and about 190 feet north of the improvements associated with CR 220. Approximately 2.0 acres of historic Clark Property are converted to a transportation use with this alternative.

5.9.4.3. Eastern Realignment Alternative

No use of the Clark Property occurs as a result of the Eastern Realignment Alternative.

5.9.4.4. Avoidance Alternatives

Avoidance alternatives include the No-Action Alternative, the Eastern Realignment Alternative and the Revised G Modified Alternative. The No-Action Alternative does not meet the project purpose and need and is thus not feasible and prudent. The Eastern Realignment Alternative uses four other Section 4(f) properties. The Revised G Modified Alternative uses three other Section 4(f) properties.

5.9.5 Description of Use, Webb-Hotter Lateral Ditch (5LP9256.1 and 5LP9256.2)

The Webb-Hotter Lateral Ditch is used by two alternatives. Revised G Modified Alternative does not impact the Webb-Hotter Lateral.

5.9.5.1. Revised G Modified Alternative

No use of the Webb-Hotter Lateral Ditch occurs as a result of the Revised G Modified Alternative.

5.9.5.2. Revised F Modified Alternative

This alternative touches or crosses the ditch in two locations. There is a use of 1,423 feet of segment 5LP9256.1, which crosses the Schaeferhoff-Cowan Ranch, and a use of 1,096 feet of segment 5LP9256.2, which extends onto the Webb Ranch. Portions of the ditch will likely be placed in a siphon structure (a closed conduit placed underground).

5.9.5.3. Eastern Realignment Alternative

This alternative directly impacts approximately 1,423 feet of segment 5LP9256.1 of the lateral on the Schaeferhoff-Cowan Ranch. The water in this section of the ditch will be relocated to a siphon structure.

5.9.5.4. Avoidance Alternatives

Avoidance alternatives include the No-Action Alternative, and the Revised G Modified Alternative. The No-Action Alternative is not feasible and prudent because it does not address the project purpose and need. The Revised G Modified Alternative uses three other Section 4(f) properties: the Webb Ranch, the Craig Limousin Ranch, and the Co-op Ditch.

5.9.6 Description of Use, Co-op Ditch (5LP9257)

The Co-op Ditch is used by all three alternatives that require widening of US 550 as shown on Figure 5-19 (on page 5-58): Revised G Modified Alternative, Revised F Modified Alternative and the Eastern Realignment Alternative.

5.9.6.1. Revised G Modified Alternative

Revised F Modified Alternative and Revised G Modified Alternative use the same amount, which is 488 lineal feet. The 488 feet of Co-Op Ditch (5LP9257.2) will be destroyed for the Revised G, Revised F, and Eastern Alignment Alternatives. The irrigation ditch will be redirected in the 645 feet of new irrigation ditch and piped in either a pipe or a siphon under US 550.

5.9.6.2. Revised F Modified Alternative

Refer to Section 5.9.6.1.

5.9.6.3. Eastern Realignment Alternative

The Eastern Realignment Alternative uses the most lineal feet of the Co-op Ditch: 678. Approximately 190 feet of the Co-op ditch (5LP9257.1) on the Schaeferhoff-Cowan Ranch is directly impacted, including a 3-30-foot existing structure under CR 220. Due to the angle of the pipe in this location, the water will likely be placed in a new longer pipe and not in an extension of the existing pipe. In addition, approximately 488 feet of the Co-op ditch (5LP9257.2) on the Craig Limousin Ranch is impacted where there are two existing structures that run beneath US 550. These are replaced with longer structures, and 645 feet of ditch will need to be re-graded to address issues with slopes. The 645 feet is a new irrigation ditch that would have to be constructed to get the ditch to work at Co-op Ditch (5LP9257.2). The 678 feet is the total impact of the existing ditch at both Co-op Ditch (5LP9257.2 and 5LP9257.1).

5.9.6.4. Avoidance Alternatives

Avoidance alternatives include the No-Action Alternative, which is not feasible and prudent because it does not address the project purpose and need. The Western Realignment Alternative is an avoidance alternative which is not feasible and prudent because of unacceptable safety and operational problems, construction challenges and cost.

5.10 Least Overall Harm Analysis for Alternatives Considered in the Section 4(f) Evaluation

As demonstrated in Section 5.7 there are no feasible and prudent avoidance alternatives to the use of land from the Section 4(f) properties in the vicinity of the US 550/US 160 connection. Therefore, FHWA may approve only the alternative that causes the least overall harm in accordance with 23 CFR §774.3(c)(1). Three alternatives identified in the Section 5.8 Summary are compared in the least harm analysis. The least overall harm is determined by balancing the following factors in light of the statute's preservation purpose:

- The ability to mitigate adverse impacts to each Section 4(f) property.
- The relative severity of the remaining harm, after mitigation, to the protected activities, attributes, or features that qualify each Section 4(f) property for protection.
- The relative significance of each Section 4(f) property.
- The views of the officials with jurisdiction of each Section 4(f) property.
- The degree to which each alternative meets the purpose and need for the project.
- The magnitude, after reasonable mitigation, of any adverse impacts to resources not protected by Section 4(f).
- Substantial differences in costs among the alternatives.

A discussion of each alternative being considered with respect to the least harm factors is provided in the following sections.

5.10.1 Quantitative Impact Assessment for Section 4(f) Alternatives

The following subsections provide a description by alternative of the use of the various Section 4(f) properties. These quantified impacts provide the basis for subsequent least overall harm discussions in Sections 5.10.2, 5.10.3, and 5.10.5 that assess the various factors considered to determine least overall harm. Section 5.10.3 discusses additional information relative to balancing factors for selecting the least overall harm alternative, including social and environmental impacts and relative costs.

Table 5-7 provides a quantitative assessment of uses to Section 4(f) properties for each alternative. More detailed engineering layouts of the three build alternatives are provided on Figure 5-19.

Table 5-7. Quantitative Impact Summary

Alternatives	Section 4(f) Properties Impacts					
	Webb Ranch (~ 515 acres) (acres)	Craig Limousin Ranch (~ 378 acres) (acres)	Schaeferhoff-Cowan Ranch (~ 160 acres) (acres)	Clark Property (29 acres) (acres)	Webb-Hotter Lateral Ditch (3429 linear feet)	Co-op Ditch (9279 linear feet)
Eastern Realignment Alternative	0.0	21.0	42.7	0.0	1,423	678
Revised F Modified Alternative	32.6	35.6	20.7	6.5	2519	488
Revised G Modified Alternative	41.5	22.7	0.0	0.0	0	488

5.10.1.1. Eastern Realignment Alternative Use of Section 4(f) Properties

This alternative uses four Section 4(f) properties, including the historic Craig Limousin and Schaeferhoff-Cowan Ranches and the Co-op and Webb-Hotter Lateral ditches. Quantities of land required are greatest from the Schaeferhoff-Cowan Ranch. Total acreage used from the two ranches is 63.6 acres. Lineal feet of ditches used is 2,101.

5.10.1.2. Revised F Modified Alternative Uses of Section 4(f) Properties

This alternative uses 95.4 acres of 3 historic ranches and historic residential property, and 3,007 lineal feet of two historic ditches. This alternative uses the most acreage from the Craig Limousin Ranch and is the only alternative to use the Clark Property.

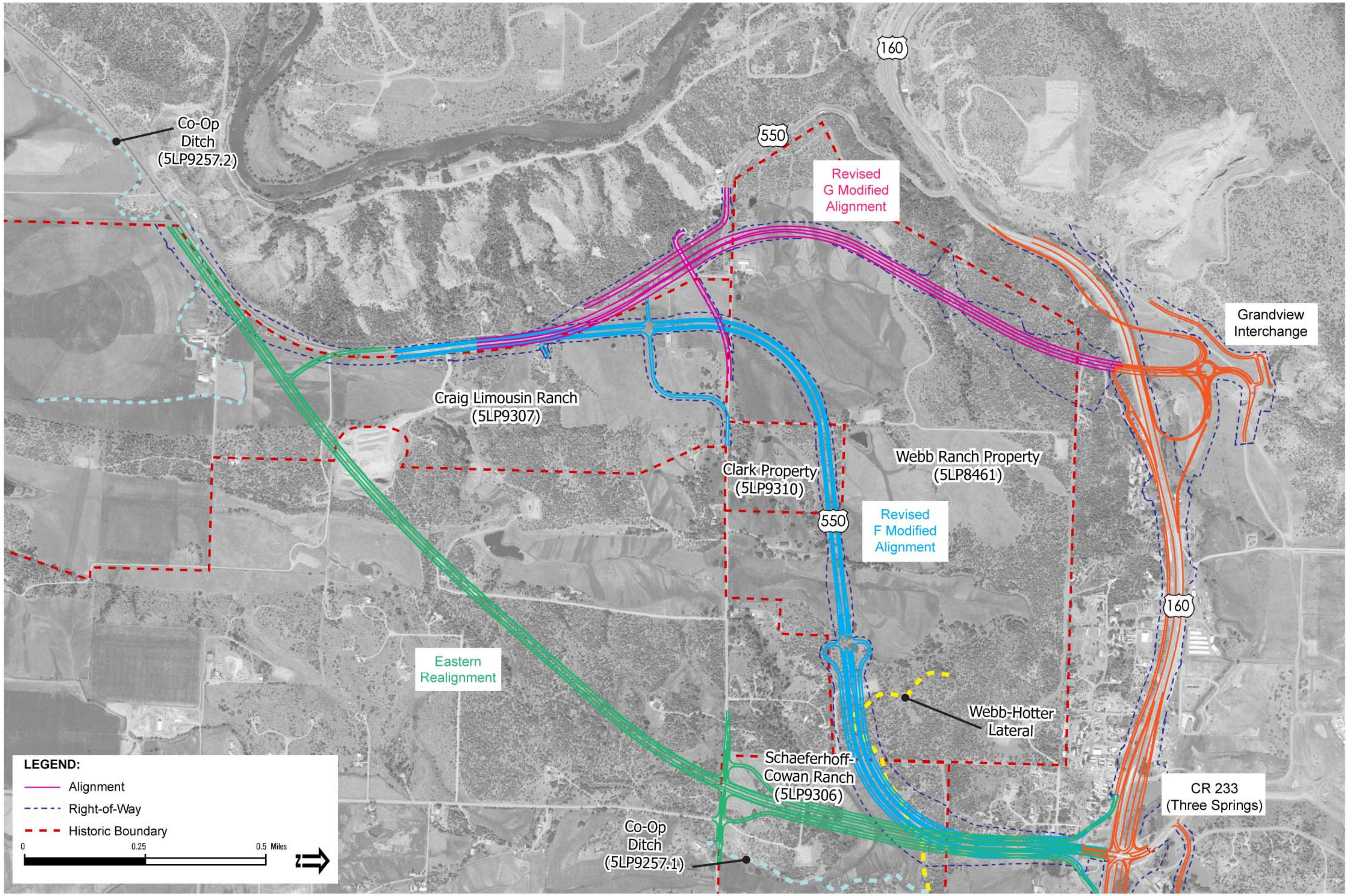
5.10.1.3. Revised G Modified Alternative Uses of Section 4(f) Properties

This alternative uses three Section 4(f) properties: the Webb Ranch, the Craig Limousin Ranch and the Co-op Ditch. This alternative uses the most acreage from the Webb Ranch. Total acreage used from the Webb Ranch and the Craig Limousin Ranch is 64.13 acres. Lineal feet of the Co-op Ditch used is 488.

5.10.2 Summary of Least Harm Factors for Ability to Mitigate, Severity, Significance, and Views of the Officials with Jurisdiction

The historic features of the Clark Property, and the Webb, Craig, Clark Limousin, and Schaeferhoff-Cowan Ranches, including the historic buildings and structures, the functional irrigation systems, and the majority of the properties' acreage remain intact regardless of the alternative selected. The character, setting, feeling, and association

Figure 5-19. Detailed Engineering Layouts of the Three Section 4(f) Alternatives



that contributes to the residential property and each ranch's historic eligibility would, however, be compromised by aligning the US 550/US 160 highway connection through any of these historic properties, as described below.

5.10.2.1. Ability to Mitigate

The following information describes the ability of each of the alternatives to mitigate adverse impacts to the various Section 4(f) properties that are used by that particular alternative. It also discusses benefits that result from implementation of that particular alternative.

Mitigation for the ranches, residential property, and ditches includes measures to be taken during final design, such as possible retaining walls, underpass and irrigation design, and steeper slopes. Functional irrigation systems will be restored during construction with no interruption of service. The irrigation system is important to the historic function of the ranch. Any temporary inability to maintain irrigation service will be compensated for the lost value of the crops affected. A farm equipment/livestock underpass will be installed to provide passage for continued farming and ranching operations and livestock.

Revised G Modified Alternative

Revised G Modified Alternative results in uses to three Section 4(f) properties: two ranches and the Co-op Ditch. For the two ranches (Webb Ranch and Craig Limousin Ranch) the ability to mitigate is difficult, due to the permanency of the loss, which is 41.5 acres for Webb Ranch and 22.7 acres for Craig Limousin Ranch. The ranches could still function and the buildings and other structures are retained, but some of the historic attributes, including integrity of setting, feeling and association, are permanently lost. Mitigation of impacts to the Co-op Ditch is easier, because ditch functions can be restored and a small percentage of the overall resource is impacted.

The Revised G Modified alternative would improve mobility and safety for the owners and managers of the Webb Ranch and the Craig Limousin Ranch.

Revised F Modified Alternative

Revised F Modified Alternative results in uses to six Section 4(f) properties: three ranches, one residential property, and two ditches. As with Revised G Modified Alternative, the ability of this alternative to mitigate the impact to the three ranches and residential property is difficult, due to the permanency of the loss. The loss amounts to 32.6 acres for Webb Ranch, 35.6 acres for Craig Limousin Ranch, 20.7 acres to Schaeferhoff-Cowan Ranch, and 6.5 acres to the Clark Property. Each of these properties (Webb Ranch, Craig Limousin Ranch, Schaeferhoff-Cowan Ranch, and the Clark Property) could continue to function and the buildings and other structures are retained, but some of the historic attributes, including their integrity of setting, feeling and association, are permanently lost. Mitigation of the impacts to the Co-op Ditch are identical to those of Revised G Modified Alternative, since the lineal feet impacted is identical, as are the portions and locations of the impacted ditches. Mitigation of impacts to the Webb-Hotter Lateral are more difficult since Revised F Modified Alternative touches or crosses the ditch in two locations, one location as it crosses the Webb Ranch and a second as it crosses the Schaeferhoff- Cowan Ranch. Ditch functions can be restored, but the historic attributes are difficult to restore because over 3,000 lineal feet (of both ditches) are impacted.

The Revised F Modified Alternative would improve mobility and safety for the owners and managers of the four ranches.

Eastern Realignment Alternative

The Eastern Realignment Alternative uses four Section 4(f) properties: two ranches and the two ditches. As with Revised G Modified Alternative and Revised F Modified Alternative, the ability to mitigate the impact to the ranch properties (Craig Limousin Ranch and Schaeferhoff-Cowan Ranch) is difficult. The amount of property used is 21.0 acres from the Craig Limousin Ranch and 42.7 acres from the Schaeferhoff-Cowan Ranch. These two ranches would continue to function, but some of their historic attributes, including the integrity of setting, feeling and association, are permanently lost. Mitigation of impacts to the Co-op Ditch are similar to the other two alternatives, even though the lineal feet impacted by this alternative is greater. Mitigation of impacts to the Webb-Hotter Lateral are easier with this alternative than with the Revised F Modified Alternative since only one segment is impacted, on the Schaeferhoff-Cowan Ranch. Ditch functions can be restored, but historic attributes are difficult to restore.

The Eastern Realignment Alternative would improve mobility and safety for the owners and managers of the two ranches.

5.10.2.2. Relative Severity of the Remaining Harm

Information is included below, for each alternative, describing the relative severity of the remaining harm, after mitigation, to the protected activities, attributes or features that qualify each Section 4(f) property for protection.

Revised G Modified Alternative

The relative severity of the remaining harm to the two ranches (Webb Ranch and Craig Limousin Ranch) is similar to each other and similar to those of the Eastern Realignment Alternative, which also uses two ranches. Some of their historic attributes, including setting, feeling and association, are permanently lost. This alternative and the Eastern Realignment Alternative also are similar in the relative severity of remaining harm to the Co-op Ditch. In both cases, ditch functions can be restored and historic attributes are retained. Compared to the other two alternatives, this alternative results in the least relative severity of remaining harm to the Webb-Hotter Lateral, since it has no effect to this Section 4(f) property.

Revised F Modified Alternative

The relative severity of remaining harm to the affected ranches (Craig Limousin Ranch and Schaeferhoff-Cowan Ranch) is similar as a result of this alternative, when compared to the other two alternatives. However, since this alternative uses the most ranches: three instead of two, the relative severity is greater because some of the historic attributes, including setting, feeling and association of the three ranches are permanently lost. This alternative is also the only alternative that results in a use of the Clark Property.

The relative severity of remaining harm to the Co-op Ditch is similar to the other alternatives. This alternative has the greatest relative severity of remaining harm to the two Webb-Hotter Lateral segments, since it touches or crosses the ditch in two locations. Although ditch functions can be restored, the historic attributes of the stand-alone segment are difficult to restore.

Eastern Realignment Alternative

The relative severity of the remaining harm to the two ranches is similar to each other and similar to the Revised G Modified Alternative, which also uses two ranches. Some of their historic attributes, including setting, feeling and association, are permanently lost. This alternative and the Revised G Modified Alternative also are similar in the relative severity of remaining harm to the Co-op Ditch. In both cases, ditch functions can be restored and historic attributes are retained. Compared to the other two alternatives, this alternative results in the least relative severity of remaining harm to the stand-alone segment of the Webb-Hotter Lateral, since it has no effect to this Section 4(f) property.

5.10.2.3. Relative Significance of Each Section 4(f) Property

The six Section 4(f) properties that are evaluated in this document are not noticeably different from each other in terms of their relative significance. Each of the three ranches has similar importance in terms of their historic associations with ranching in the Florida Mesa area and their intact examples of ranching-related architecture and other features. Similarly, the two ditches are similar in relative significance to each other: each was important in the development of the historical ranching communities on Florida Mesa. The residential property is important because it historically served as a social gathering place for the residences of Durango and Florida Mesa.

5.10.2.4. Views of the Officials with Jurisdiction over the Section 4(f) Properties

The SHPO has concurred with the effect determinations of adverse for all ranches and the residential property, and of not adverse for the Co-op Ditch and Webb-Hotter

Lateral. The SHPO has not indicated any differing opinion relative to the significance of any of the properties or the significance of the use associated with any particular alternative.

5.10.3 Degree to Which Each Alternative Meets Project Purpose and Need

The following information describes the degree to which each of the three alternatives evaluated for least harm meets the project purpose and need. To summarize, all three alternatives satisfactorily meet project purpose and need and are able to meet the projected 2030 traffic volumes at Level of Service D or better. In order to determine which alternative best meets the project purpose and need, various factors were compared to identify how well each alternative achieves this criteria. Access, safety, and capacity components of the purpose and need are each addressed in the following sections. Additional analyses and documentation are provided in Appendix C, Traffic Memoranda and Analyses.

5.10.3.1. Access

Access control was evaluated to determine which alternative better promotes an access management system that meets the expectations of a high-speed, high volume highway through appropriate control of access frequency and spacing.

All three alternatives include two through lanes in each direction through the Grandview Section with interchanges at the Grandview location, CR 233 (Three Springs) and SH 172/CR 234. Local access within this corridor will be managed with a local frontage road system to limit direct access to the highway only at the interchanges. Additionally, each alternative includes establishing an access line along the corridor to preclude future additional accesses. Within the Grandview Section, there are no other accesses proposed other than the three interchanges. The approximate distances between the interchanges are tabulated below:

- Between Grandview Interchange and Three Springs Interchange = 5,600 feet
- Between Three Springs Interchange and SH 172/CR 234 = 7,150 feet

The analysis shows that access for the three alternatives exhibit the same frequency and spacing between interchanges. Regardless of where US 550 connects to US 160, local access to US 160 is managed by a frontage road system to minimize access to US 160 only at the planned interchanges. Therefore, the degree with which the alternatives meet purpose and need for access is the same for all three alternatives.

5.10.3.2. Safety

Safety was evaluated to determine which alternative more safely accommodates the traffic volumes associated with the connection of US 550 to US 160.

Revised G Modified Alternative connects US 550 to US 160 via the Grandview Interchange and traffic on US 550 is accommodated at its intersection with US 160 by a roundabout that is expected to operate at an acceptable level of service in the year 2030.

Alternatives Revised F Modified Alternative and the Eastern Realignment Alternative connect US 550 to US 160 via the Three Springs SPUI interchange. Traffic on US 550 is accommodated at its intersection with US 160 by a SPUI and controlled by a traffic signal that is expected to operate at an acceptable level of service in the year 2030.

Roundabouts have specific benefits over intersections from a safety standpoint including the following:

- Lower speeds and lower speed differential. Lower speeds associated with roundabouts allow drivers more time to react to potential conflicts.
- Fewer number of driver decisions. Drivers only need to be aware of vehicles to their left at entry of roundabouts. Drivers at traffic signals need to be aware of traffic coming from as many as three directions at any time. In addition the driver must remain aware of the signal indication while monitoring the vehicle movements through the intersection.
- Less severe crashes. Severity of crashes is based on the relative speed and angle of the conflicting streams. Most vehicles travel at similar speeds through roundabouts with a small angle between the vehicle paths. The potential for hazardous conflicts, such as right angle and left turn head-on crashes is eliminated in roundabout use.

The analysis shows that a roundabout controlled intersection is more likely to provide safer operations than a conventional traffic signal due to the lower speeds, fewer conflicting movements and the elimination of head-on and broad-side crashes that are typically associated with injury crashes. Based on these factors, the Revised G Modified Alternative has a higher degree of safety benefit compared to Revised F Modified Alternative and the Eastern Realignment Alternative.

5.10.3.3. Capacity

The capacity analysis evaluates the connection of US 550 to US 160 to determine which alternative can accommodate more future traffic volume growth beyond the year 2030 forecasted volumes. The year 2030 volumes and traffic represent the basis for which the reserve capacity is measured in the additional analysis. The procedure involved in evaluating the alternatives consists of:

- Begin with the Year 2030 traffic volumes and report results.
- Inflate the traffic volumes at the intersection of US 550/US 160 in two percent increments until an intersection or individual movement for an alternative fails.
- For the traffic signal operations, the signal phasing and cycle length is then optimized to see if a timing solution could extend the capability of the traffic operations to have capacity for more volume.
- After optimization of the signal phasing and cycle length, the volumes are increased to the point where a movement cannot meet LOS D or better, the alternative is considered to fail.
- The last alternative that continues to meet the purpose and need for capacity is considered to have the most reserve capacity.

Under Revised G Modified Alternative for the Year 2030, the roundabout overall and each approach are expected to operate well at LOS A during the morning and evening peak periods. The merge from Ramp C is expected to operate at LOS B during the morning peak period and LOS C during the evening peak period. Inflating the traffic volumes by two percent, the roundabout as well as each approach is expected to operate well at LOS A during the morning and evening peak periods. The merge from Ramp C is expected to operate at LOS B during the morning peak period and LOS C during the evening peak period.

Under Revised F Modified Alternative and the Eastern Realignment Alternative for the year 2030, the signalized intersection at the Three Springs SPUI is expected to operate at LOS C during the morning and evening peak periods and all of individual movements are expected to operate at LOS D or better during both peak periods. Inflating the traffic volumes by two percent to determine if the intersection is able to absorb this level of volume increase beyond the year 2030, the signalized intersection at Three Springs is expected to operate at acceptable LOS C during the morning and evening peak periods, but the northbound left turn is expected to operate at LOS E during the evening peak period due to a failing northbound left turn movement.

The analysis shows that for Revised F Modified Alternative and the Eastern Realignment Alternative, a traffic signal at Three Springs intersection fails if traffic volumes were increased by two percent beyond the year 2030 projected traffic volumes. Increasing traffic volumes by two percent beyond the year 2030 for Revised G Modified Alternative results in a LOS A with more reserve capacity for the roundabout. Based on these projections, the roundabout at the Grandview Interchange (Revised G Modified Alternative) has more reserve capacity and a better LOS beyond year 2030 demonstrating a higher degree of meeting the purpose and need for capacity than a signalized intersection at the Three Springs Interchange (Revised F Modified Alternative and Eastern Realignment Alternative).

5.10.4 Magnitude, After Reasonable Mitigation of Adverse Impacts to Resources not Protected by Section 4(f)

Impacts to environmental and social resources were quantified for each alternative using a combination of on-the-ground reconnaissance, aerial photography interpretation, and available mapping data from agency GIS files. Archaeological resource surveys were completed for the Eastern Realignment Alternative, Revised F Modified Alternative, and Revised G Modified Alternative alignments. Table 5-8 provides a summary of impacts to social and environmental resources by alternative. Agreements to mitigate the Section 106 properties are outlined in the Draft Memorandum of Agreement.

The Revised G Modified Alternative has the least amount of impact to twelve of the fifteen environmental resources: irrigated farmlands, deer and elk winter and severe winter range, southwestern willow flycatcher habitat, Bald eagle winter range, wetlands, eligible archaeological sites, number of residences, total right-of-way needed, and commercial use impacts. Quantities of impact are noticeably lower for irrigated farmland, elk winter range, elk severe winter range, deer winter range, deer severe winter range and bald eagle winter range. For the southwestern willow flycatcher habitat, Revised F Modified also has no impact, along with the Revised G Modified Alternative.

The Revised G Modified Alternative has noticeably fewer wetland impacts compared to the other alternatives. Approximately 0.327 acre of wetlands is likely impacted by Revised G Modified Alternative, which is an order of magnitude lower in impacts compared to Revised F Modified Alternative (0.823 acre) and the Eastern Realignment Alternative (3.22 acres). This impact will be mitigated on a 1:1 basis.

The Revised G Modified Alternative results in adverse effect determinations to only six archaeological sites. The Revised F Modified Alternative results in adverse effect determinations to the most archaeological sites (nine). The Eastern Realignment Alternative results in adverse effect determinations to eight archaeological sites. None of these archaeological sites are afforded protection under Section 4(f); however, they are all eligible properties and protected under Section 106 of the National Historic Preservation Act. Agreements to mitigate the Section 106 properties are outlined in the Draft Memorandum of Agreement.

Table 5-8. Commercial Business Impacts and Environmental Resources by Alternative

Alternative	Irrigated Farmland (acres)	Wildlife Habitat (acres)	Elk Winter Range (acres)	Elk Severe Winter Range (acres)	Elk Winter Conc. Area (acres)	Deer Winter Range (acres)	Deer Severe Winter Range (acres)	SWWF Habitat (acres)	Bald Eagle Winter Range (acres)	Bald Eagle Winter Conc. Area (acres)	Wetlands (acres)	Eligible Archaeo-logical Sites	ROW Impacts No. of Residences	ROW Impacts Total Acres	Commercial Use Impacts
Eastern Realignment Alternative	33.7	49.1	114.4	114.4	0.0	114.4	114.4	1.1	114.4	19.6	3.22	8 sites	6	133.0	Gravel pit
Revised F Modified Alternative	38.2	42.2	109.2	109.2	0.0	109.2	109.2	0.0	109.2	38.5	0.823	9 sites	4	106.2	Gas well
Revised G Modified Alternative	18.4	42.5	81.4	81.4	26.2	81.4	81.4	0.0	81.4	51.3	0.327	6 sites	0	71.6	None

Abbreviations:
SWWF = Southwestern willow flycatcher

Impacts to elk and bald eagle winter concentration areas are highest for the Revised G Modified Alternative. Within winter concentration areas for elk, Revised G Modified Alternative impacts approximately 26 acres of habitat while alternatives further to the east (Eastern Realignment Alternative and Revised F Modified Alternative) do not impact this habitat. Bald eagle winter concentration area impacts are higher for Revised G Modified Alternative compared to Revised F Modified Alternative and the Eastern Realignment Alternative, with the Eastern Realignment Alternative having the least impact of approximately 19.6 acres versus 51.3 acres for Revised G Modified Alternative and 38.5 acres for the Revised F Modified Alternative. A reasonable effort will be made to mitigate these impacts.

None of the alternatives would restrict the continuation of commercial ranching operations on the four historic ranches. Both Revised F Modified Alternative and Eastern Realignment Alternative have other commercial impacts, namely the replacement of a gas well and removal from production of a gravel pit, respectively. All effects to commercial properties will be mitigated pursuant to the Uniform Relocation Act, as amended.

5.10.5 Cost Comparison Among Section 4(f) Alternatives

Estimated costs for all alternatives considered under the Section 4(f) evaluation are documented in Appendix E. Estimated costs for alternatives included in the Section 4(f) evaluation are presented in Table 5-9.

Table 5-9. Relative Costs for US 550/US 160 Connection Alternatives

Alternative	Estimated Cost	Comments
Eastern Realignment Alternative	$92,753,000	ROW estimated at $20,000/acre residential and $100,000/acre commercial; does not include costs for Grandview, Three Springs, and Elmore's Corner Interchange
Revised F Modified Alternative	$78,394,000	ROW estimated at $14,000/acre of agricultural land; includes farm access, wildlife crossings, bridges and ramps at Grandview Interchange; does not include costs for Grandview, Three Springs, and Elmore's Corner Interchange
Revised G Modified Alternative	$79,680,000	ROW estimated at $14,000/acre of agricultural land; includes additional ramps and bridges at Grandview Interchange for US 550 connection; does not include costs for the Three Springs and Elmore's Corner Interchanges

Alternatives evaluated in the least harm analysis have comparable costs with a 20 percent disparity between the lowest cost (Revised F Modified Alternative) and highest cost (Eastern Realignment Alternative).

The relative difference in costs among the alternatives that were eliminated as not feasible and prudent range from approximately 250 to 400 percent higher than the least harm alternatives. Although costs were not considered in the prudent and feasible determination because of other outstanding factors that rendered certain alternatives not feasible and prudent, the large discrepancy in costs between the least harm alternatives compared to the eliminated alternative is substantial enough to warrant additional support for their elimination.

5.10.6 Summary of Least Overall Harm Analysis

Revised G Modified Alternative has less overall harm to Section 4(f) properties because it uses three Section 4(f) properties: the Webb Ranch, Craig Limousin Ranch and Co-op Ditch. Revised F Modified Alternative uses the Webb, Craig Limousin and Schaeferhoff-Cowan Ranches, the Clark Property and the Webb-Hotter Lateral ditch at three locations. The Eastern Realignment Alternative results in a use of two historic ranches including the Schaeferhoff-Cowan Ranch and the Craig Limousin Ranch Property, as well as uses to segments of the Webb-Hotter Lateral and Co-op ditches.

Quantitative comparison of impacts provided in Table 5-7 shows the relative magnitude of associated impacts to the ranches and ditches for consideration. Revised G Modified Alternative and Revised F Modified Alternative have the least impacts to the Co-op Ditch, and Revised G Modified Alternative has no impacts to the Webb-Hotter Lateral Ditch.

Use of historic ranches and the historic residential property weighs heavily in the least harm analysis because the magnitude of impacts from highway construction cannot be easily mitigated. The severity of harm cannot be directly compared based on acreages of impact alone due to the inability to mitigate the character, setting, feeling, and association that contributes to the historic eligibility of each of these properties. . For example, the relatively smaller size of the Schaeferhoff-Cowan Ranch, or the lower percentage of use of land on the Webb Ranch does not necessarily justify any of these three alternatives as having the least harm.

The relative severity of remaining harm to the two segments of the Webb-Hotter Lateral is worse with the Eastern Realignment Alternative and with Revised F Modified Alternative, simply because Revised G Modified Alternative does not affect this property.

For the least harm analysis, all three ranches are considered to be similarly important as historic properties based on their historic associations with ranching in the Florida Mesa area and their intact examples of ranching-related architecture and other features. Protection of structures and aligning the highway along the property boundaries would provide a measure of separation for continued ranching operations thus lessening the harm. However, these measures provide only minor considerations in the least harm analysis because the historic integrity of any of the ranches would be irreparably harmed by highway construction. Revised F Modified Alternative uses three ranches and one residential property. The residential property is considered important as a historic property because it historically served as a social gathering place and is a good example of a residence modified for use as a social and recreational center. The Eastern Realignment Alternative and Revised G Modified Alternative each use only two ranches.

Revised G Modified Alternative better responds to both the safety and capacity components of the project purpose and need.

Comparison of impacts to environmental and social resources for the three alternatives on the Webb Ranch provides additional factors to consider in the least harm analysis. Fewer impacts to irrigated farmland, deer and elk winter and severe winter range, bald eagle winter range, wetlands, eligible archaeological sites, residential, commercial and total right-of way-use provide support for Revised G Modified Alternative as the least harm alternative. Lower relative costs for Revised F Modified Alternative is more favorable over the other alternatives.

In summary, Revised G Modified Alternative is considered to be the least overall harm alternative based on the following:

- This alternative uses three Section 4(f) properties; all other feasible and prudent alternatives use more than three Section 4(f) properties.
- This alternative better responds to both the safety and the capacity elements of the project purpose and need.
- This alternative results in adverse effect determinations to three archaeological sites. Revised F Modified Alternative results in adverse effect determinations to six archaeological sites. The Eastern Realignment Alternative results in adverse effect determinations to the most archaeological sites (eight).
- This alternative has noticeably fewer wetland impacts compared to the other alternatives.
- This alternative has the least impacts to irrigated farmlands, elk winter range, elk severe winter range, deer winter range, deer severe winter range, south western willow flycatcher habitat, and bald eagle winter range.
- This alternative has the least impacts to existing land uses: number of residences, number of commercial uses, and total right-of-way required.

Table 5-10 provides a summary of the three alternatives and their relative responsiveness to the seven least overall harm factors.

Table 5-10. Summary of Least Overall Harm by Alternative

Alternative	Summary of Section 4(f) Use	Ability to Mitigate	Severity of Remaining Harm	Significance of Properties	Views of Officials with Jurisdiction	Purpose and Need Responsiveness	Impacts to other Resources	Substantial Differences in Cost
Eastern Realignment	2 ranches Total acreage: 63.6 2 ditches Total lineal feet: 2,101	Easier to mitigate than Revised F Modified.	Remaining harm is not as severe.	Neutral	Neutral	Not as responsive to safety and capacity elements.	Most impact to 12 of 15 resources evaluated. Least impact to 1 resource.	Most costly
Revised F Modified	3 ranches and 1 residential property Total acreage: 95.4 2 ditches Lineal feet: 3,007	Most difficult to mitigate.	Greatest remaining harm.	Neutral	Neutral	Not as responsive to safety and capacity elements.	Most impact to 2 resources. Moderate impacts to 10 resources. Least impact to 3 resources.	Lowest cost
Revised G Modified	2 ranches Total acreage: 64.13 1 ditch Lineal feet: 488	Easier to mitigate than Revised F Modified.	Remaining harm is not as severe.	Neutral	Neutral	Most responsive to safety and capacity elements.	Least impact to 12 of 15 resources evaluated. Most impact to 2 resources.	Moderate costs

5.11 All Possible Planning to Minimize Harm

Section 4(f) requires all possible planning to minimize harm as defined in CFR 774.3(a)(2). In addition to the mitigation measures discussed in Section 5.10.2, other measures to minimize harm include design options, such as narrower roadway width, retaining walls, underpass and irrigation designs, and steeper slopes will be considered during final design of the roadway. Mitigation measures as outlined in the draft MOA (see Appendix H) include:

1. Archival Documentation
    a. CDOT shall ensure that the Webb Ranch (5LP8461) and Craig Limousin Ranch (5LP9307) shall be documented in accordance with Level II documentation as outlined in Colorado Office of Archaeology and Historic Preservation Form #1595, *Historical Resource Documentation: Standards for Level I, II, and III Documentation*.
    b. CDOT shall ensure that all documentation activities will be performed or directly supervised by architects, historians, photographers and/or other professionals meeting the qualification standards in their field as stipulated in the *Secretary of Interior's Professional Qualifications Standards* (36 Code of Federal Regulations [CFR] 61, Appendix A).
    c. CDOT shall provide originals of all documents resulting from the documentation to the SHPO, the La Plata County Historical Society, the property owners, and a local library or archive designated by the SHPO.
2. Interpretive Mitigation
    a. Interpretive mitigation will be created that focuses on the development and importance of historic ranching on Florida Mesa. Options include, but are not necessarily limited to, signage, brochures, pamphlets, historic contexts, or other printed material. Content, design, materials, location, distribution and other details will be determined in consultation with SHPO and the consulting parties.
    b. Other creative mitigation options that arise as the project progresses that further the education or understanding of the importance of the ranching resources shall also be considered
3. Data Recovery Excavations
    a. At such time as one or more of the NRHP eligible archaeological sites referenced above is within the limits of a planned and funded construction project and therefore in danger from earth-moving activities, an Archaeological Data Recovery Plan defining the methodology and goals for excavation will be

completed. The Plan will meet all criteria outlined in the *Secretary of the Interior's Standards and Guidelines for Archaeological Documentation*, in addition to the procedures and protocols developed by the Colorado OAHP. The Data Recovery Plan(s) will be reviewed and approved by the SHPO prior to issuance of an excavation permit and initiation of controlled excavations. The consulting parties and tribal governments will also be provided the opportunity to review and comment on the excavation plan(s) prior to implementation.

b. To the best of our knowledge and belief, no human remains, associated or unassociated funerary objects or sacred objects, or objects of cultural patrimony as defined in the Native American Graves Protection and Repatriation Act (25 U.S.C. 3001), are expected to be encountered in the archaeological work. If such items are discovered, work will cease in the vicinity of the find and all appropriate coordination will ensue with the SHPO, consulting parties and tribal governments, and other involved entities, as necessary.

4. Design and Construction

    a. Efforts to minimize harm to historic and archaeological properties will be assessed during the final design phase for the preferred alternative and may include, but not be limited to, narrower roadway width, use of retaining walls, steeper slopes, and creative underpass and irrigation design, as applicable. Contributing features of historic properties will be protected during construction and avoided to the extent practicable.

5.12 Record of Coordination

Coordination with the appropriate agencies for eligibility and determination of effects has occurred. The coordination effort included submittal of site forms, recommendation of eligibility and effects, and the mitigation measures to the SHPO and La Plata County Historical Society on January 4, 2008, and again on November 9, 2009 and August 6, 2010, with written concurrence from the SHPO dated January 18, 2008, December 1 and 11, 2009, and August 25, 2010 (see Appendix A). Supplemental correspondence with the SHPO occurred on December 8, 2010 with concurrence received on December 16, 2010. SHPO will be included in future coordination with the local government agency as requested in the concurrence letters.

In addition, six Section 106 consulting parties have received the letters with recommendations of eligibility and effects. These consulting parties include the Webb Ranch/family, Peggy Cooley (Cowan Ranch), Shannon Bennett (Clark Property), the Southern Ute Indian Tribe, the Pueblo of Laguna and the Hopi Tribe. Letters received from the consulting parties are in Appendix A.

The Advisory Council on Historic Preservation has elected to participate in the project and has been provided with the Section 106 consultation documentation.

6.0 Public Involvement

6.1 Public Involvement Plan

A Public Involvement Plan (Colorado Department of Transportation [CDOT], 2011), has been developed in accordance with public involvement procedures described in Chapter 7 of CDOT's National Environmental Policy Act Manual, Version 2 (December, 2008). This Public Involvement Plan defines objectives and describes tools and techniques intended to be used to meet those objectives. It also includes a timeline demonstrating when particular public involvement activities will take place and how they relate to the project development process.

6.2 Public Involvement Process

When the Supplemental Environmental Impact Statement (SEIS) process began in April 2011, CDOT initiated public outreach efforts. These efforts have included the following, also detailed in CDOT's Public Involvement Plan (CDOT, 2011):

- Meeting with the *Durango Herald*, April 15, 2011 (a subsequent article was published in the paper on April 25, 2011).
- Distribution of press release to all regional media, towns, counties, and elected officials.
- Development of a SEIS web page in May 2011 with updated information on the SEIS process (http://www.coloradodot.info/projects/us550-at-160).
- A brief presentation to stakeholders at La Plata County Alliance meeting on May 10, 2011.
- Distribution of a newsletter on May 23, 2011 explaining the SEIS process and timeline to over 900 people (the distribution list was altered from the original US 160 EIS list to focus on those who own property along US 160, between US 550 and SH 172, and south along US 550).
- A second presentation to La Plata County Alliance on June 14, 2011.

Public comment was logged following these initial outreach efforts. CDOT received four phone calls/e-mails after the *Durango Herald* article ran—two involved right-of-way questions; one involved a concern about CDOT changing the US 550 alignment from what had been selected in the 2006 US 160 ROD; and one was from an anonymous caller who was displeased with the interchange project and did not feel an interchange was necessary.

6.3 Future Public Outreach

Planned future public outreach activities include:

- Sending a postcard announcement of the public hearing for the Supplemental Draft Environmental Impact Statement (SDEIS) to 900 property owners and other interested public members at least 15 days prior to the public hearing.
- Updating the project web site with the public hearing date and location and the SDEIS.
- Sending a press release announcing the Notice of Availability (NOA) of the SDEIS. The release will include the public hearing date and location and will be distributed to all regional media, towns, counties, and elected officials.
- Hosting a public hearing for the SDEIS, at a location within the Grandview community. A Spanish translator will be provided.
- Providing the public an opportunity to comment on the project. Written comments will be accepted for at least 45 days from when the NOA for the SDEIS is published in the *Federal Register*.
- Providing the public an opportunity to comment on the Supplemental Final Environmental Impact Statement (SFEIS).
- Sending a final newsletter announcing the selected alternative and the next steps.
- Updating the project Web site and sending a press release.

After receipt and full consideration of public and agency comments, the final Preferred Alternative will be selected. The alternative, the basis for its selection, and the response to agency and public comments will be documented in the Record of Decision (ROD).

6.4 Agency and Tribal Coordination

Coordination with Federal and state agencies and Native American tribal governments has been ongoing throughout this process. Under Section 106 of the National Historic Preservation Act (NHPA), the Federal Highway Administration (FHWA) and CDOT have consulted with the Colorado State Historic Preservation Officer (SHPO); the Hopi Tribe, Pueblo of Laguna, and Southern Ute Indian Tribe; and representatives of three historic ranch properties and one historic residential property directly affected by one or more of the alternatives. The Advisory Council on Historic Preservation (ACHP) also elected to participate in the consultation process. Correspondence with these agencies and tribes is documented in Appendix A.

The U.S. Army Corps of Engineers (USACE) was a Cooperating Agency on the 2006 US 160 EIS and FHWA and CDOT are coordinating with the USACE on the SEIS. An initial meeting was held with the USACE on April 29, 2011 to determine how to coordinate on the SDEIS. FHWA and CDOT will request concurrence from the USACE on the process leading to the Preferred Alternative and that the Preferred Alternative appears to be the Least Environmentally Damaging Practicable Alternative.

Other agencies such as the U.S. Fish and Wildlife Service (USFWS) and the National Resources Conservation Service (NRCS) have been consulted with regarding updated information for special status species and prime farmlands. Correspondence with these agencies is included in Appendix A. State and federal agencies will be consulted with throughout the process as needed.

7.0 List of Preparers

Table 7-1 lists the representatives of the agencies and firms responsible for the preparation of this Supplemental EIS, with their project responsibility, education, and experience.

Table 7-1. List of Preparers

Name and Title	SEIS Responsibility	Education and Certification	Experience
Colorado Department of Transportation			
Ed Archuleta, PE Resident Engineer, Region 5	Engineering memoranda	B.S, Civil Engineering P.E., State of Colorado	23 years of experience in road and bridge construction
Tony Cady Biologist, Region 5	Vegetation, wildlife and fisheries, threatened and endangered species, hazardous waste	B.S., Biology	15 years
Vanessa Henderson Environmental Policy and Planning Section Manager	Reviewer	B.S, Geological Engineering	12 years
Paul A. Jankowski Environmental Specialist, Region 5	SEIS project coordination, resource section author, EIS reviewer	B.S, Water Resources	25 years of experience in water resources management, permitting, and compliance
Dan Jepson Senior Staff Archaeologist/ Cultural Resource Section Manager	Archaeological resources, Native American consultation	B.A. and M.A., Anthropology (Archaeology emphasis)	27 years of experience in cultural resource management
Nicolle F. Kord NEPA Specialist	Land use and socioeconomics	B.S., Rangeland Ecology and Management	8 years
Michael D. McVaugh Traffic and Safety Engineer, Region 5	Traffic operations and traffic projections analysis	B.S., Civil Engineering P.E., State of Colorado	19 years
Kerrie E. Neet Region 5 Planning and Environmental Manager	Chapters 1 and 2; overall reviewer	M.S., Geology B.S., Geology	22 years of experience in environmental management and compliance
Keith E Powers, PE Program Engineer, Region 5	Engineering documentation reviewer	B.S., Civil Engineering P.E., State of Colorado	27 years
Jill Schlaefer Air Quality and Noise Programs Manager	Air quality and noise	B.S., Geology M.S., Geology TNM Certified	33 years of experience in analytical and project development; including 10 years in environmental, NEPA, air quality, and noise analyses

Table 7-1. List of Preparers

Name and Title	SEIS Responsibility	Education and Certification	Experience
Federal Highway Administration, Colorado Division			
Stephanie Gibson Environmental Program Manager	Reviewer	B.S., Civil Engineering	18 years of experience in transportation, 14 of which is in environmental project management and NEPA and Section 4(f) analysis and review
Jacobs Engineering			
Keith Borsheim Transportation Planner	Cumulative impacts	B.A., Environmental Design	10 years of experience in NEPA analysis and documentation
Lorena Jones Project Coordinator	Document production	B.S., Education	14 years
Gina McAfee, AICP Senior Project Manager	Historic resources, cumulative impacts, Section 4(f)	B.S., Landscape Architecture American Institute of Certified Planners	34 years of experience in NEPA and Section 4(f) analysis and documentation
Karen Rhea Graphics Designer	Graphics Designer	B. A., Concentration in Commercial Art	16 years
SEH			
Charles Huffine, PE Senior Traffic Engineer	Support traffic engineer; traffic document preparer; QC reviewer	B.S., Civil Engineering M.B.A. P.E., State of Colorado Certified Professional Traffic Operations Engineer American Institute of Certified Planners	25 Years
Jon E. Larson, PE Traffic Engineer	Primary traffic engineer; traffic document preparer; QC manager	B.S., Civil Engineering P.E., State of Colorado	8 Years
Philip T. Weisbach, PE Principal, Senior Project Manager	Primary traffic document reviewer; QA manager	B.S., Civil Engineering B.A., Psychology, Spanish P.E., State of Colorado	34 Years

8.0 References

AAHSTO. Geometric Design of Highways and Streets, 2004.

Alpine Archaeological Consultants. Cultural Resource Inventory CDOT US Highways 160/550 Connection Alternative Alignments Project: East Alternative, La Plata County, Colorado, September 2009.

Alpine Archaeological Consultants. Cultural Resource Inventory, Site Documentation and Test Excavations for the CDOT US Highways 160/550 Connection: Revised F Modified Alternative and Revised G Modified Alternative, La Plata County, Colorado, July 2010.

American Society for Testing and Materials (ASTM). 2005. Standard E 1527-05, “Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process.” Philadelphia.

American Society for Testing and Materials (ASTM). 2008. Standard E 1527-05, “Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process for Forestland or Rural Property.” Philadelphia.

Andrews, R., and R. Righter. Colorado Birds: A Reference to the Distribution and Habitat. Denver Museum of Natural History Press. Denver, 1992.

Bikis Water Consultants, LLC. Webb Ranch Historic Irrigation Evaluation, July 2008.

Britt, B.B., W.D. Tidwell and R. Scheetz. Paleontological Literature and Field Survey for State Highway 160 between the Intersection with State Highway 550 and the East End of Bayfield, Colorado. Prepared for the US Highway 160 Durango to Bayfield EIS, 1999.

City of Durango. Grandview Area Plan. 2004.

Centennial Archaeology. Level II Documentation of the Webb Ranch (5LP8461) in La Plata County, June 2008.

Charlie McCoy, Florida Farmers and Cooperative Ditch Company, personal communication to Jack Pfertsh, September 3, 2009.

Colorado Department of Transportation. US 550 at US 160 Re-Evaluation, Cost Estimates for Section 4(f) Alternatives, September 20, 2010.

Colorado Department of Transportation. US 550 at US 160 Re-Evaluation—Revised Preliminary Alternative A and Partial Interchange, September 20, 2010.

Colorado Department of Transportation. US 550 at US 160 Re-Evaluation, Cost Estimates for Section 4(f) Alternatives Addendum, December 22, 2010.

Colorado Department of Transportation. US 550 at US 160 Section 4(f) Evaluation, US 550 Western Realignment Alternative, September 20, 2010.

Colorado Department of Transportation. Noise Analysis and Abatement Guidelines, July 2011.

Colorado Department of Transportation. Traffic Noise Analysis and Abatement Guidelines, December, 2002.

Colorado Department of Transportation. US 160 and US 550 Supplemental Environmental Impact Statement, Traffic Noise Technical Addendum, June, 2011.Colorado Department of Transportation. Transportation Data Set Traffic Data. 2011. <http://internal/App_DTD_DataAccess/Traffic/index.cfm?fuseaction=TrafficMain>. Retrieved June 20, 2011.

Colorado Department of Public Health and Environment, Air Pollution Control Division. Colorado 2009 Air Quality Data Report, August 2010.

Colorado Division of Water Resources Web site <http://water.state.co.us>

Colorado Natural Diversity Information Source (CNDIS). 2011. Colorado Division of Wildlife. <http://ndis.nrel.colostate.edu>. Accessed June 1, 2011.

Colorado Natural Heritage Program (CNHP). 2010. Conservation Status Handbook (Tracking Lists). Updated 7/23/2010. <http://ndis.nrel.colostate.edu/ftp/ftp_response.asp>. Retrieved December 14, 2011.

Colorado Oil and Gas Conservation Commission (COGCC). 2011. COGCC GIS Online Well Database. < http://oil-gas.state.co.us>. Last accessed June 2, 2011.

Colorado Oil and Gas Conservation Commission (COGCC). 2005. COGCC GIS Online Well Database. < http://oil-gas.state.co.us>. Retrieved May 13, 2005.

Eckhardt, Cheryl and Robert J. Mutaw. 2000a. US 160: Durango to Bayfield Corridor Final Archaeological Resources Inventory, La Plata County, Colorado. Prepared by URS Greiner Woodward Clyde, Denver, Colorado, for the Colorado Department of Transportation, Denver.

Eckhardt, Cheryl and Robert J. Mutaw. 2000b. US 160: Durango to Bayfield Corridor Final Historic Resources Inventory, La Plata County, Colorado. Prepared by URS Greiner Woodward Clyde, Denver, Colorado, for the Colorado Department of Transportation, Denver.

Environmental FirstSearch. 2011. Report 060211. June 2, 2011.

Federal Highway Administration. Interim Guidance Update on Mobile Source Air Toxic Analysis in NEPA, 2009.

Federal Highway Administration and Colorado Department of Transportation. Final Environmental Impact Statement/Section 4(f) Evaluation for US Highway 160 from Durango to Bayfield La Plata County, Colorado, May 2006.

Federal Highway Administration. Record of Decision, US Highway 160 from Durango to Bayfield La Plata County, Colorado: FHWA-CO-EIS-05-02-F, October 2006. <http://www.dot.state.co.us/US160/EIS/rod_october_2006.pdf>, 2006.

Federal Highway Administration. Noise Abatement Criteria, 23 Code of Federal Regulations (CFR) 772, CDOT, 2002.Frey, J. K. Status assessment of montane populations of the New Mexico meadow jumping mouse (*Zapus hudsonius luteus*) in New Mexico. Final Report Professional Services Contract number 05-516.57, submitted to Conservation Services Division, New Mexico Department of Game and Fish, Santa Fe, New Mexico, 74 pp, 2005.

Frey, J. K. Status of the New Mexico meadow jumping mouse (Zapus hudsonius luteus) in the Sangre de Cristo Mountains, New Mexico. Final Report Professional Services Contract number 06-516.0000.0049, submitted to Conservation Services Division, New Mexico Department of Game and Fish, Santa Fe, New Mexico, 2006: 78 pp.

Frey, J. K., J. L. Malaney. Decline of the Meadow Jumping Mouse (Zapus hudsonius luteus) i n two Mountain Ranges in New Mexico. The Southwestern Naturalist 54(1):31- 44, 2009.

Hafner, D.J., K.E. Petersen, and T.L. Yates. Evolutionary Relationships of Jumping Mice (*Genus Zapus*) of the Southwestern United States. J. Mamm., 1981: 62:501-512.

Health Effects Institute (HEI), http://pubs.healtheffects.org/view.php?id=282) or in the future as vehicle emissions substantially decrease (HEI, http://pubs.healtheffects.org/view.php?id=306

Ireland, T., personal communication to Tony Cady, September 14, 2009.

La Plata County Courthouse, Statement of the Florida Farmer's Ditch and Certificate of Incorporation of the Florida Cooperative Ditch Company.

La Plata County GIS. Land Use Plans. 2011. <http://arcims.laplata.co.us/laplataWEBSITE>. Accessed on June 6, 2011.

La Plata County. Weed Management Program. 2011. <http:// co.laplata.co.us/ departments_and_elected_officials/general_services/weed_management_office/noxous_weed_list>. Retrieved May, 2011.

McVaugh. Colorado Department of Transportation corridor VMT and traffic volume data, 2011.

National Park Service, Title 36–Parks, Forests, and Public Property, Chapter I–National Park Service, Department of the Interior, Section 60.4.

Natural Diversity Information Service (NDIS). Biological Map and Data Resource. 2011. <http://ndis.nrel.colostate.edu>. Retrieved April 15, 2011.

National Resource Conservation Service (NRCS). URS Personal Communication with Dan Lynn. 2001.

National Resource Conservation Service (NRCS). CDOT Personal Communication with Sterling Moss. 2011.

Peggy Cooley, Telephone communication to Lisa Schoch, November 3, 2010.

Phillip Craig, personal communication to Jack Pfertsh, May 23, 2010.

Philip Craig, Florida Farmers Ditch Board, personal communication to Jack Pfertsh, September 24, 2009.

Pfertsh, Jack E. Cultural Resource Inventory, CDOT US Highway 160/550 Connection Alternative Alignments Project: East Alternative, La Plata County, Colorado. Prepared by Alpine Archaeological Consultants, Inc., Montrose, Colorado, for the Colorado Department of Transportation, Denver, 2009.

Pfertsh, Jack E. Cultural Resource Inventory, Site Documentation and Test Excavations for the CDOT US Highway 160/550 Connection: Revised F Modified and Revised G Modified Alternatives, La Plata County, Colorado. Prepared by Alpine Archaeological Consultants, Inc., Montrose, Colorado, for the Colorado Department of Transportation, Denver, 2010.

SAFETEA-LU, Public Law 109-59, August 10, 2005.

Satisfi Environmental Information (Satisfi). Report Number S300592, March 11, 2005.

SEAS. Preliminary Cultural Resources Inventory of the Western Portion of the Webb Ranch in La Plata County, Colorado. Prepared by Stratified Environmental & Archaeological Services, LLC, Ignacio, Colorado, for Four Corners Planning & Permitting, LLC, Durango, Colorado, 2008.

SEAS. Preliminary Cultural Resources Inventory of the Grandview F Modified Alternative Within the Webb Ranch, La Plata County, Colorado. Prepared by Stratified Environmental & Archaeological Services, LLC, Ignacio, Colorado, for Dickenson Wright, PLCC, Detroit, Michigan, 2009.

State Demography Office. 2010 Census Data. 2011. <http://dola.colorado.gov/dlg/demog/2010censusdata.html. Retrieved May 18, 2011.

Sedgewick, J.A. "Willow Flycatcher" in Colorado Breeding Bird Atlas. Kingery, HughnE., ed. Colorado Bird Atlas Partnership and Colorado Division of Wildlife, 1998.

Sedgewick, J.A. "Willow Flycatcher (*Empidonax traillii*)" in The Birds of North Americal, No. 533 (A. Pool and F.Gill, eds.). The Birds of North Amercia, Inc., Philadelphia, 2000.

SEH. US 160 FEIS Grandview Section—Year 2025 Traffic Analysis Memorandum, September 17, 2010.

SEH. Year 2030 Traffic Operations Analysis for Alternatives of the US 160 FEIS. September 17, 2010.

SEH. Year 2030 Traffic Operations Analysis for the US 550 at US 160 Section 4(f) Alternatives. December 23, 2010.

SEH. US 160 Section 4(f) Alternatives Considered in the Least Harm Analysis—The Degree to Which Each Alternative Meets the Purpose and Need for the Project, January 5, 2011.

Southwest Regional Gap Analysis Project. USGS GAP Analysis Project, Southwest Region, Colorado Dataset. May, 25, 2005.

Steven, T.A., Lipman, P.W., Hail, W.J., Jr., Barker, Fred and Luedke, R.G. Geologic Map of the Durango Quadrangle, southwestern Colorado, 1974.

URS Corporation. US 160: Durango to Bayfield Corridor Revised Draft Wetlands Delineation Report, July 2002.

URS Greiner Woodward-Clyde (URSGWC). 2000c. US Highway 160: Farmington Hill to Bayfield, Final Modified Environmental Site Assessment. La Plata County, Colorado, July.

US Army Corp of Engineers. Wetland Delineation Manual,1987.

US Army Corp of Engineers. Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Western Mountains, Valleys and Coast Region, May 2010.

US Army Corp of Engineers. Sacramento District's Habitat Mitigation and Monitoring Proposal Guidelines, 2004.

US Fish & Wildlife Service. Species Assessment and Listing Priority Assignment Form: *Zapus hudsonius luteus*, New Mexico meadow jumping mouse. New Mexico Ecological Services Field Office. Albuquerque, New Mexico, 2007.

US Fish & Wildlife Service. Threatened, Endangered, Candidate and Proposed Species by County, Updated July, 2010. <http://www.fws.gov/mountain-prairie/endspp/CountyLists/Colorado.pdf> Last accessed on June 1, 2011.

US Fish and Wildlife Service. Birds of conservation concern. Division of Migratory Bird Management, Arlington, Virginia. 2008: 99 pp. http://www.fws.gov/migratorybirds/NewReportsPublications/SpecialTopics/BCC2008/BCC2008.pdf.

United States Environmental Protection Agency. National Ambient Air Quality Standards. 2010. < http://www.epa.gov/air/criteria.html>. Retrieved April 8, 2011.

United States Environmental Protection Agency. MOBILE6.2 model run, August 20, 2009.VISTA Information Solutions. Report ID 293050001. December 17, 1999.