

CONVERSION FACTORS

1 meter = 3.281 feet

1 kilometer = 0.622 miles

1 hectare = 2.471 acres

1 kilogram = 2.205 pounds

1 foot = 0.3048 meters

1 mile = 1.609 kilometers

1 acre = 0.405 hectares

1 pound = 0.454 kilograms

FHWA-CO-EIS-00-01-F

PROJECT IM 0252-317
SOUTH I-25 CORRIDOR AND US 85 CORRIDOR
DOUGLAS COUNTY, COLORADO

FINAL ENVIRONMENTAL IMPACT STATEMENT
SECTION 4(f) EVALUATION

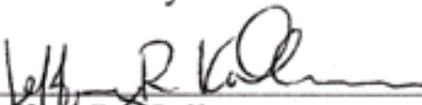
SUBMITTED PURSUANT TO 42 U.S.C. 4332 (2) (c), 23 U.S.C. 128 (a), AND
49 U.S.C. 303

BY
U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
AND
COLORADO DEPARTMENT OF TRANSPORTATION

COOPERATING AGENCIES

Federal Railroad Administration (FRA)
U.S. Army Corps of Engineers (USACE)

Submitted by:



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4-24-01
Date

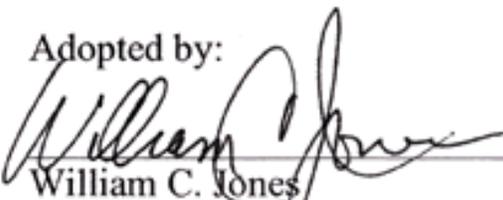
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ABSTRACT

This Final Environmental Impact Statement provides a detailed evaluation of the proposed improvements for the South I-25 Corridor and US 85 Corridor. The project corridors both lie within Douglas County, Colorado. The I-25 Corridor extends from C-470 at approximate milepost 195 to the southern limit of Castle Rock at approximate milepost 178 and the US 85 Corridor extends from C-470 at approximate milepost 200 to Castle Rock at approximate milepost 184. This Final Environmental Impact Statement includes an examination of the purpose and need, travel demand, alternatives under consideration, affected environment, environmental consequences, section 4(f) properties, and mitigation measures as a result of the proposed alternatives. Responses to the comments submitted for the Draft Environmental Impact Statement are included in Volume 2 of this Final Environmental Impact Statement.

Comments on this Final Environmental Impact Statement are due by June 11, 2001 and should be sent to Wes Goff, Colorado Department of Transportation at the address listed above.

Volume 2 and the technical reports are available for agency and public review at the following locations:

CDOT, Arapahoe Residency
359 Inverness Drive S.,
Suite K
Englewood, CO 80112

Douglas County Planning
Department
100 Third Street
Castle Rock, CO 80104

Parker Library
10851 S. Crossroads Drive
Parker, CO 80134-9081

CDOT,
Office of Environmental Services
1325 S Colorado Blvd.,
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Denver, CO 80222

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555 Zang Street, Room 250
Lakewood, CO 80228

Philip S. Miller Library
961 S Plum Creek Road
Castle Rock, CO 80104

CDOT, Region 1
18500 E Colfax Avenue
Aurora, CO 80010

Highlands Ranch Library
9292 West Ridgeline
Highlands Ranch, CO 80129

PBS&J
5500 Greenwood Plaza Blvd.,
Suite 150
Englewood, CO 80111

City of Lone Tree
6399 S Fiddlers Green Cr.,
Suite 102

Lone Tree Library
8827 Lone Tree Parkway
Lone Tree, CO 80124-8961

Town of Castle Rock
100 Wilcox Street
Castle Rock, CO 80104

Louviers Library

Greenwood Village, CO 80111

7885 Louviers Blvd.
Louviers, CO 80131-9900

TABLE OF CONTENTS

<u>Section</u>	<u>Page</u>
<u>S.0 SUMMARY</u>	S-1
<u>1.0 PURPOSE AND NEED</u>	1-1
<u>2.0 ALTERNATIVES</u>	2-1
<u>3.0 TRAVEL DEMAND</u>	3-1
<u>4.0 AFFECTED ENVIRONMENT</u>	4-1
<u>5.0 ENVIRONMENTAL CONSEQUENCES</u>	5-1
<u>6.0 SECTION 4(F) EVALUATION</u>	6-1
<u>7.0 MITIGATION</u>	7-1
<u>8.0 LIST OF PREPARERS</u>	8-1
<u>9.0 LIST OF RECIPIENTS</u>	9-1
<u>10.0 AVAILABILITY OF TECHNICAL REPORTS</u>	10-1
<u>11.0 INDEX</u>	11-1

LIST OF FIGURES

<u>Figure</u>	<u>Page</u>
S.1 South I-25 Corridor and US 85 Corridor Study Area	S.2
1.1 South I-25 Corridor and US 85 Corridor Vicinity Map	1-2
1.2 Early-Action Project Vicinity Map	1-8
1.3 1998 Average Daily Traffic Volumes	1-13
1.4 1998 Peak Hour Traffic Volumes	1-14
1.5 I-25 Corridor Daily Traffic Variation (1998)	1-15
1.6 US 85 Corridor Daily Traffic Variation (1998)	1-15
1.7 Projected 2020 Average Daily Traffic Volumes	1-19
1.8 Projected 2020 Peak Hour Traffic Volumes	1-20
1.9 I-25 Corridor Crash Types and Number (1995 - 1997)	1-24
1.10 US 85 Corridor Crash Types and Number (1995 - 1997)	1-24
1.11 Historic Douglas County Population and Average Daily Traffic Volumes	1-30
2.1 Alternative Evaluation Process	2-4
2.2 I-25 Corridor Typical Sections for the No-Action Alternative	2-9
2.3 US 85 Corridor Typical Sections for the No-Action Alternative	2-11
2.4 Preferred Alternative Schematic	2-13
2.5 Preferred Alternative I-25 Corridor	2-27
2.6 I-25 Corridor Typical Sections for the Preferred Alternative	2-16
2.7 Preferred Alternative US 85 Corridor	2-36
2.8 US 85 Corridor Typical Sections for the Preferred Alternative	2-22
2.9 Other Alternative Schematic	2-46
2.10 Other Alternative I-25 Corridor	2-61
2.11 I-25 Corridor Typical Sections for the Other Alternative	2-49
2.12 Other Alternative US 85 Corridor	2-70
2.13 US 85 Corridor Typical Sections for the Other Alternative	2-56
2.14 Bicycle/Pedestrian Facilities Considered for the Preferred Alternative and the Other Alternative	2-80
2.15 Detached Bicycle/Pedestrian Facility Photo Simulation	2-81
2.16 High Line Canal Recreation Trail Grade Separation	2-82
2.17 High Line Canal Trail Photo Simulation	2-83
2.18 Proposed Elk Crossing MP 195.1	2-85
2.19 Wildlife Crossing Photo Simulation	2-86
2.20 Proposed Elk Crossing MP 189.65	2-87

2.21 Variation 1	2-90
2.22 Variation 2	2-90
2.23 Variation 3	2-91
2.24 The Long-Term Vision Through 2020 and Beyond	2-92
2.25 Potential I-25 Fixed-Guideway	2-94
2.26 Potential I-25 Fixed-Guideway Typical Section	2-96
2.27a I-25 Alternatives Eliminated at Level 1	2-102
2.27b US 85 Alternatives Eliminated at Level 1	2-103
2.28a I-25 Alternatives Eliminated at Level 2	2-104
2.28b US 85 Alternatives Eliminated at Level 2	2-105
2.29a I-25 Alternatives Eliminated at Level 3	2-116
2.29b US 85 Alternatives Eliminated at Level 3	2-117
2.30 Railroad Relocation Alternatives	2-123
3.1 2020 No-Action Average Daily Traffic Volumes	3-4
3.2 2020 Forecasted Average Daily Traffic Model Comparisons	3-6
3.3 2020 Forecasted Average Daily Traffic Volumes	3-8
3.4 Existing (1998) Freeway Level of Service	3-12
3.5 Future 2020 Peak-Hour Level of Service	3-14
3.6 I-25 Corridor Projected Transit Ridership (2020)	3-17
3.7 US 85 Corridor Projected Transit Ridership (2020)	3-18
4.1a Douglas County Minority Population Distribution	4-4
4.1b Douglas County Hispanic Population Distribution	4-4
4.1c Douglas County Population Living Below Poverty Level	4-7
4.1d Douglas County Median Income	4-7
4.2a Recreation Resources along the I-25 Corridor	4-11
4.2b Recreation Resources along the US 85 Corridor	4-12
4.2c Recreation Resources within the I-25 Project Area	4-13
4.2d Recreation Resources within the US 85 Project Area	4-14
4.3a Land Use along the I-25 Corridor	4-17
4.3b Land Use along the US 85 Corridor	4-18
4.3c Zoning along the I-25 Corridor	4-19
4.3d Zoning along the US 85 Corridor	4-20
4.4a Wetlands and Other Waters of the US along the I-25 Corridor	4-34
4.4b Wetlands and Other Waters of the US along the US 85 Corridor	4-35
4.5a Wildlife Tracking Station Locations along the I-25 Corridor	4-54
4.5b Wildlife Tracking Station Locations along the US 85 Corridor	4-55

4.6a Floodplains along the I-25 Corridor	4-61
4.6b Floodplains along the US 85 Corridor	4-62
4.7a I-25 Corridor Preble's Meadow Jumping Mouse Impacts	4-67
4.7b I-25 Corridor Preble's Meadow Jumping Mouse Impacts	4-68
4.7c Black-Tailed Prairie Dog Colonies along the I-25 Corridor	4-69
4.7d Black-Tailed Prairie Dog Colonies along the US 85 Corridor	4-70
4.8a Historic Resources along the I-25 Corridor	4-74
4.8b Historic Resources along the US 85 Corridor	4-77
4.9a I-25 Visual Resources – Lincoln Avenue Interchange (facing south)	4-85
4.9b I-25 Visual Resources – View of Pikes Peak from Happy Canyon (facing west)	4-85
4.9c I-25 Visual Resources – View of the Rock, Castle Rock (facing south)	4-85
4.9d US 85 Visual Resources – Approaching C-470 Interchange (facing south)	4-87
4.9e US 85 Visual Resources – Sedalia Intersection (facing south)	4-87
4.9f US 85 Visual Resources – Railroad Tracks (facing north)	4-87
4.10a Recognized Hazardous Waste Sites along the I-25 Corridor	4-90
4.10b Potential Hazardous Waste Sites along the I-25 Corridor	4-91
4.10c Recognized Hazardous Waste Sites along the US 85 Corridor	4-92
4.10d Potential Hazardous Waste Sites along the US 85 Corridor	4-93
5.1 Potential Relocations	5-6
5.2 Recreation Impacts	5-8
5.3a I-25 Corridor Land Use	5-11
5.3b I-25 Corridor Zoning	5-12
5.3c US 85 Corridor Land Use	5-13
5.3d US 85 Corridor Zoning	5-14
5.4a I-25 Corridor Wetlands Impacts	5-37
5.4b US 85 Corridor Wetlands Impacts	5-38
5.5a I-25 Corridor Floodplain Impacts	5-48
5.5b US 85 Corridor Floodplain Impacts	5-49
5.6a I-25 Corridor Black-Tailed Prairie Dog Habitat Impacts	5-52
5.6b I-25 Corridor Preble's Meadow Jumping Mouse Impacts	5-55
5.6c I-25 Corridor Preble's Meadow Jumping Mouse Impacts	5-56
5.6d US 85 Corridor Black-Tailed Prairie Dog Habitat Impacts	5-57
5.7a Historic Resources within the I-25 Corridor and US 85 Corridor Area of Potential Effect	5-61
5.7b Preferred Alternative and Other Alternative Denver & Rio Grande Railroad	5-63
5.7c AT&SF Railway Potential Effects (Preferred Alternative and Other Alternative)	5-65
5.7d Cherokee Ranch Historic District (Preferred Alternative and Other Alternative)	5-67

5.8a I-25 Corridor Noise Receiver and Potential Barrier Locations	5-89
5.8b I-25 Corridor Noise Receiver and Potential Barrier Locations	5-90
5.8c I-25 Corridor Noise Receiver and Potential Barrier Locations	5-91
5.8d I-25 Corridor Noise Receiver and Potential Barrier Locations	5-92
5.8e I-25 Corridor Noise Receiver and Potential Barrier Locations	5-93
5.8f I-25 Corridor Noise Receiver and Potential Barrier Locations	5-94
5.8g I-25 Corridor Noise Receiver and Potential Barrier Locations	5-95
5.8h I-25 Corridor Noise Receiver and Potential Barrier Locations	5-96
5.8i I-25 Corridor Noise Receiver and Potential Barrier Locations	5-97
5.8j US 85 Corridor Noise Receiver and Potential Barrier Locations	5-98
5.8k US 85 Corridor Noise Receiver and Potential Barrier Locations	5-99
5.8l US 85 Corridor Noise Receiver and Potential Barrier Locations	5-100
5.8m US 85 Corridor Noise Receiver and Potential Barrier Locations	5-101
5.8n US 85 Corridor Noise Receiver and Potential Barrier Locations	5-102
5.8o US 85 Corridor Noise Receiver and Potential Barrier Locations	5-103
5.8p US 85 Corridor Noise Receiver and Potential Barrier Locations	5-104
5.8q US 85 Corridor Noise Receiver and Potential Barrier Locations	5-105
5.9 Existing and Proposed View of I-25 Corridor at Surrey Ridge (Other Alternative)	5-111
5.10 Existing and Proposed View of I-25 Corridor at Castle Pines Parkway (Preferred Alternative and Other Alternative)	5-113
5.11 Existing and Proposed View of Castle Pines Parkway Car Pool Lot (Preferred Alternative and Other Alternative)	5-114
5.12 Existing and Proposed View of I-25 Corridor at Happy Canyon Road (Preferred Alternative and Other Alternative)	5-115
5.13 Existing and Proposed View of I-25 Corridor at 5 th Street Overpass (Preferred Alternative and Other Alternative)	5-116
5.14 Existing and Proposed View of US 85 Corridor at Highlands Ranch Parkway (Other Alternative)	5-117
5.15 Existing and Proposed View of US 85 Corridor at Lakeside Drive (Preferred Alternative and Other Alternative)	5-118
5.16 Existing and Proposed View of US 85 Corridor at SH 67 (Preferred Alternative and Other Alternative)	5-119
5.17 Existing and Proposed View of US 85 Corridor at Meadows Parkway (Preferred Alternative and Other Alternative)	5-120
5.18a I-25 Corridor Recognized Hazardous Waste Impacted Sites	5-122
5.18b I-25 Corridor Potential Hazardous Waste Impacted Sites	5-124
5.19a US 85 Corridor Recognized Hazardous Waste Impacted Sites	5-125
5.19b US 85 Corridor Potential Hazardous Waste Impacted Sites	5-128

6.1 I-25 Corridor and US 85 Corridor Vicinity Map	6-3
6.2 Section 4(f) Properties within the I-25 Corridor and US 85 Corridor	6-7
6.3 Denver & Rio Grande Railroad	6-11
6.4 High Line Canal Potential Effects	6-12
6.5 Spring Gulch Equestrian Facility Potential Effects	6-13
6.6a Cherokee Ranch Conservation Easement and Historic District	6-15
6.6b Cherokee Ranch Conservation Easement and Historic District	6-16
6.6c Cherokee Ranch Conservation Easement and Historic District	6-17
6.6d Cherokee Ranch Conservation Easement and Historic District	6-18
6.6e Cherokee Ranch Conservation Easement and Historic District	6-19
6.7 Atchison, Topeka & Santa Fe Railway Potential Effects	6-20

LIST OF TABLES

<u>Table</u>	<u>Page</u>
S.1 Daily Hours of Congestion	S-8
S.2 Preferred Alternative Summary of Impacts	S-9
S.3 Other Alternative Summary of Impacts	S-10
S.4 Summary of Proposed Mitigation Measures	S-11
1.1 I-25 Corridor Existing (1998) Level of Service	1-17
1.2 US 85 Corridor Existing (1998) Level of Service	1-18
1.3 I-25 Corridor Future (2020) Freeway Segment Conditions	1-22
1.4 US 85 Corridor Future (2020) Roadway Segment Conditions	1-22
1.5 I-25 Corridor Average Crash Rate (1995 – 1997)	1-25
1.6 US 85 Corridor Average Crash Rate (1995 - 1997)	1-26
2.1 Alternative Evaluation Criteria	2-5
2.2 Cost Comparison	2-89
2.3 Responsibility of Elements	2-100
2.4a I-25 Placement of Alternatives for Packages in Level 3	2-110
2.4b US 85 Placement of Alternatives for Packages in Level 3	2-111
2.5a I-25 Corridor Package Summary	2-115
2.5b US 85 Corridor Package Summary	2-115
2.6 Railroad Relocation Analysis Results	2-122
3.1 South I-25 Corridor and US 85 Corridor and Douglas County Population Projections (2005-2020)	3-5
3.2 Existing (1998) Daily Hours of Congestion	3-11
3.3 2020 Daily Hours of Congestion	3-15
4.1 Douglas County Population Projections, 2005-2020	4-2
4.2 Douglas County Labor Force Data, 1999 Average	4-2
4.3 Minority Populations, 1990	4-3
4.4 Douglas County Per Capita Income	4-5
4.5 Poverty Level	4-5
4.6 Neighborhoods and Municipalities along the I-25 Corridor and US 85 Corridor	4-8
4.7 Trails and Recreation Areas within or Adjacent to the Project Area	4-10
4.8 Emission Inventories for the Denver Non-Attainment Area	4-24
4.9 Denver-Boulder Carbon Monoxide Non-Attainment Area	4-25

4.10 Denver PM ₁₀ State Implementation Plan Modeling Domain	4-25
4.11 Area Estimates for Vegetation Types Adjacent to I-25 and US 85	4-31
4.12 Area Calculations, Wetland Classification, and Preliminary Jurisdictional Status for Wetlands within the I-25 Corridor Project Area	4-38
4.13 Area Calculations, Wetland Classification, and Preliminary Jurisdictional Status for Wetlands within the US 85 Corridor Project Area	4-39
4.14 Common Soil Types Found along the I-25 Corridor	4-44
4.15 Common Soil Types Found Along the US 85 Corridor	4-49
4.16 Summary of Wildlife Tracking Station Records for Culverts and Bridges Under I-25 and US 85 as of May 31, 2000	4-53
4.17 Station Number, Structure, Site Description, Openness Factor, and Potential Inhibiting Features to Wildlife Movement for Wildlife Tracking Stations	4-57
4.18 Intersection Widths of Identified 100-year Floodplains within the Area of Potential Effect	4-63
4.19 Status and Likelihood of Occurrence in the Area of Potential Effect for Threatened and Endangered Species, Candidates for Federal Listing, and State of Colorado Threatened, Endangered, or Species of Concern	4-64
4.20 Significant Historic Resources within the I-25 Corridor	4-75
4.21 Significant Historic Resources within the US 85 Corridor	4-76
4.22 Estimated Area of Farmland Soils of Statewide Importance within the I-25/US 85 Area of Potential Effect	4-82
4.23 Noise Abatement Criteria	4-83
5.1 Potential Relocation	5-5
5.2 Potential Right-of-Way Acquisition	5-7
5.3 Potential Recreation Impacts	5-9
5.4 I-25 Corridor Projected Air Quality Emission Levels	5-26
5.5 US 85 Corridor Projected Air Quality Emission Levels	5-26
5.6 I-25 Corridor "Hot-Spot" Modeling Analysis Results	5-27
5.7 US 85 Corridor "Hot-Spot" Modeling Analysis Results	5-27
5.8 Potential Water Quality Impacts	5-31
5.9 Potential Direct Impacts to Vegetation Cover Types	5-35
5.10 Potential Direct Impacts to Wetlands and Other Waters of the US	5-36
5.11 Wetland Impacts and Mitigation for Cumulative Transportation Projects Considered	5-40
5.12 Cumulative Vegetation Impacts for Residential Development Projects	5-45
5.13 Potential Direct Impacts to the Beneficial Uses of Floodplains	5-50
5.14 Potential Permanent, Direct Impacts to Special-Status Wildlife Species	5-51
5.15 Impacts to Preble's Meadow Jumping Mouse Habitat in Castle Rock, Colorado	5-60
5.16 Potential Historic Resource Impacts	5-64
5.17 Potential Statewide Important Farmland Impacts	5-74

5.18 I-25 Corridor Existing (1998) and Future (2020) Noise Levels	5-76
5.19 US 85 Corridor Existing (1998) and Future (2020) Noise Levels	5-79
5.20 Effectiveness of Mitigation Measures along the I-25 Corridor	5-82
5.21 Proposed Noise Barriers along the I-25 Corridor	5-83
5.22 Cost Effectiveness of Noise Barriers for the I-25 Corridor	5-84
5.23 Effectiveness of Mitigation Measures along the US 85 Corridor	5-85
5.24 Proposed Noise Barriers along the US 85 Corridor	5-85
5.25 Cost Effectiveness of Noise Barriers for the US 85 Corridor	5-86
5.26 Recognized Hazardous Waste Sites along the I-25 Corridor	5-121
5.27 Potential Hazardous Waste Sites along the I-25 Corridor	5-123
5.28 Recognized Hazardous Waste Sites along the US 85 Corridor	5-125
5.29 Potential Hazardous Waste Sites along the US 85 Corridor	5-125
5.30 Preferred Alternative Summary of Impacts	5-141
5.31 Other Alternative Summary of Impacts	5-142
6.1 Section 4(f) Properties Potentially Affected	6-6
6.1 Section 4(f) Properties Potentially Affected	6-6
6.2 Section 4(f) Properties Land Acquisition	6-10
6.3 Proposed Mitigation to Impacted Section 4(f) Properties within the I-25/US 85 Corridor Project Area	6-27

ACRONYMS AND ABBREVIATIONS

A	
ACHP	Advisory Council on Historic Preservation
ADT	Average daily traffic
APCD	Air Pollution Control Division
APE	Area of potential effect
amsl	Above mean sea level
ASPEN	Assessment System for Population Exposure Nationwide
AT&SF	Atchison, Topeka & Santa Fe
ATV	All-terrain vehicle
B	
BMP	Best management practices
BrB	Bresser sandy loam
C	
CAS	Corridor Assessment Study
CBD	Central Business District
CCBA	Cherry Creek Basin Authority
CDOT	Colorado Department of Transportation
CDOW	Colorado Division of Wildlife
CDPHE	Colorado Department of Public Health and Environment
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFS	Cubic feet per second
CO	Carbon monoxide
CO ₂	Carbon Dioxide
CMS	Congestion Management Systems
D	
dBA	Decibels – "A" weighted scale
Deg C	Degrees Celsius
DEIS	Draft Environmental Impact Statement
D&RG	Denver and Rio Grande
DMNS	Denver Museum of Nature and Science
DMU	Diesel multiple unit
DRCOG	Denver Regional Council of Governments

E	
EA	Environmental Assessment
EIS	Environmental Impact Statement
EPA	Environmental Protection Agency
ERTAC	Ecological Resources Technical Advisory Committee
ESA	Endangered Species Act
F	
FAC	Facultative
FACU	Facultative upland
FACW	Facultative wetland
FC	Federal Candidate for Listing
FE	Federal Endangered
FEIS	Final Environmental Impact Statement
FEMA	Federal Emergency Management Agency
FHWA	Federal Highway Administration
FIRM	Flood insurance rate maps
F-K	Fondis-Kutch Associates
FONSI	Finding of No Significant Impact
ft	Feet
FT	Federal Threatened
G	
GIS	Geographic Information Systems
H	
ha	Hectares
HC	Hydrocarbons
HCM	Highway Capacity Manual
HHS	Health and Human Services
HOT	High occupancy toll
HOV	High occupancy vehicle
HUC	Hydraulic unit code
I	
IPMP	Integrated pest management plan
IREA	Intermountain Rural Electric Association

ISA	Initial site assessment
ISTEA	Intermodal Surface Transportation Efficiency Act
ITS	Intelligent transportation system
K	
km/h	Kilometers per hour
L	
LAL-S	Loamy alluvial land – Sampson Associates
LOS	Level of service
LRT	Light rail transit
LUST	Leaking underground storage tank
M	
m	Meter
MESA	Modified environmental site assessment
MIS	Major Investment Study
mg/L	Milligrams/liter
MP	Milepost
mph	Miles per hour
MSAT	Mobile source air toxics
msl	Mean sea level
N	
NAAQS	National Ambient Air Quality Standards
NAC	Noise Abatement Criteria
NAFTA	North American Free Trade Agreement
NAWMA	North America Weed Management
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NLEV	National low-emissions vehicle
NO ₂	Nitrogen dioxide
NO _x	Nitrogen oxide
NPDES	National Pollutant Discharge Elimination System
N-RA	Non-Rural Principal Highway
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places

NWI	National Wetland Inventory
O	
O ₃	Ozone
OBL	Obligate
O&M	Operation and maintenance
OSCA	Open Space Conservation Area
P	
Pb	Lead
PEM	Palustrine emergent
PFO	Palustrine forested
PM ₁₀	Particulate matter 10 microns or smaller in diameter
PMJM	Preble's Meadow Jumping Mouse
ppm	Parts per million
PSI	Preliminary site investigation
PSS	Palustrine scrub-shrub
PUA	Primary urbanization area
PUC	Public Utilities Commission
R	
R-A	Regional Highway
RCRA	Resource Conservation and Recovery Act
R-D	Razor-Denver Associates
ROD	Record of Decision
ROW	Right-of-way
RTD	Regional Transportation District
RTP	Regional Transportation Plan
S	
Sa	Sampson sandy loam
SAIC	Science Applications International Corporation
SE	State Endangered
SEBD	Southeast Business District
SHPO	State Historic Preservation Officer
SH	State Highway
SIP	State Implementation Plan

SO ₂	Sulfur dioxide
SOV	Single occupant vehicle
SSOC	State Species of Concern
ST	State Threatened
Std. Dev.	Standard Deviation
SWMP	Stormwater Management Plan
T	
T&E	Threatened and Endangered
TAZ	Traffic analysis zone
TDM	Transportation demand management
TEA-21	Transportation Equity Act for the 21 st Century
TIP	Transportation Improvement Plan
TM	Transportation management
TRB	Transportation Research Board
TSM	Transportation system management
TSS	Total suspended solids
U	
UCM	University of Colorado Museum
UDFCD	Urban Drainage and Flood Control District
USACE	United States Army Corps of Engineers
USC	United States Code
USDA	United States Department of Agriculture
UPL	Upland
USDOT	United States Department of Transportation
USFWS	United States Fish & Wildlife Service
USGS	United States Geological Survey
V	
VMS	Variable message sign
VMT	Vehicle miles traveled
VOC	Volatile organic compound
W	
WBP	Warranted but Precluded
WQCC	Water Quality Control Commission

WQCD	Water Quality Control Division
WQCV	Water quality capture volume
WSRA	Wild and Scenic Rivers Act
WUS	Waters of the United States

S.0 SUMMARY

TABLE OF CONTENTS

<u>Section</u>	<u>Page</u>
<u>S.0 SUMMARY</u>	1
<u>S.1 INTRODUCTION</u>	1
<u>S.2 PURPOSE AND NEED</u>	1
<u>S.2.1 Problem Statement</u>	3
<u>S.2.2 Project Objectives</u>	3
<u>S.3 ALTERNATIVES</u>	4
<u>S.3.1 No-Action Alternative</u>	4
<u>S.3.2 Preferred Alternative</u>	4
<u>S.3.3 Other Alternative</u>	5
<u>S.3.4 Alternative Variations</u>	7
<u>S.4 TRAVEL DEMAND</u>	7
<u>S.5 ENVIRONMENTAL CONSEQUENCES AND SECTION 4(F) EVALUATION</u>	8
<u>S.6 MITIGATION</u>	11
<u>S.7 OTHER MAJOR GOVERNMENTAL ACTIONS</u>	12
<u>S.7.1 Southeast Corridor Improvements</u>	12
<u>S.7.2 Southwest Corridor Light Rail Transit Construction</u>	12
<u>S.7.3 Early-Action Projects</u>	13
<u>S.7.4 Douglas County Projects</u>	13
<u>S.7.5 Douglas Lane Interchange</u>	13
<u>S.7.6 Wilcox Street Bridge</u>	14
<u>S.7.7 Highlands Ranch Development (Private Developer Action)</u>	14
<u>S.7.8 Canyon Development (Private Developer Action)</u>	14
<u>S.7.9 Meridian Development (Private Developer Action)</u>	14
<u>S.7.10 Rampart Range Development (Private Developer Action)</u>	14
<u>S.7.11 Douglas Lane Developments (Private Developer Action)</u>	15
<u>S.7.12 Preservation of Land (Douglas County Action)</u>	15
<u>S.8 UNRESOLVED ISSUES</u>	15

S.1 INTRODUCTION

The South I-25 Corridor and US 85 Corridor Final Environmental Impact Statement (FEIS)/Section 4(f) Evaluation has been prepared by the Federal Highway Administration (FHWA) in conjunction with the Colorado

Department of Transportation (CDOT). This document evaluates transportation solutions that address the present and future transportation inadequacies in the project corridor. The format and organization of this FEIS follows FHWA and National Environmental Policy Act (NEPA) guidelines for preparing environmental and Section 4(f) documents. The project corridor, which lies entirely in Douglas County, Colorado, includes I-25 from C-470 (milepost [MP] 195) to MP 178 near the southern limit of Castle Rock and US 85 from C-470 (MP 200) to Castle Rock (MP 184). Figure S.1 shows the project corridor and study area.

The EIS process is used to determine and evaluate federally funded transportation improvements. This FEIS presents the alternatives previously considered and eliminated and the three alternatives and variations still under consideration for the Selected Alternative. A Selected Alternative will be presented in the Record of Decision (ROD). The Selected Alternative will likely be a combination of the three alternatives and variations.

This Summary highlights the major findings of this FEIS related to the different chapters:

- Purpose and Need
- Alternatives
- Travel Demand
- Affected Environment
- Environmental Consequences
- Section 4(f) Evaluation
- Mitigation

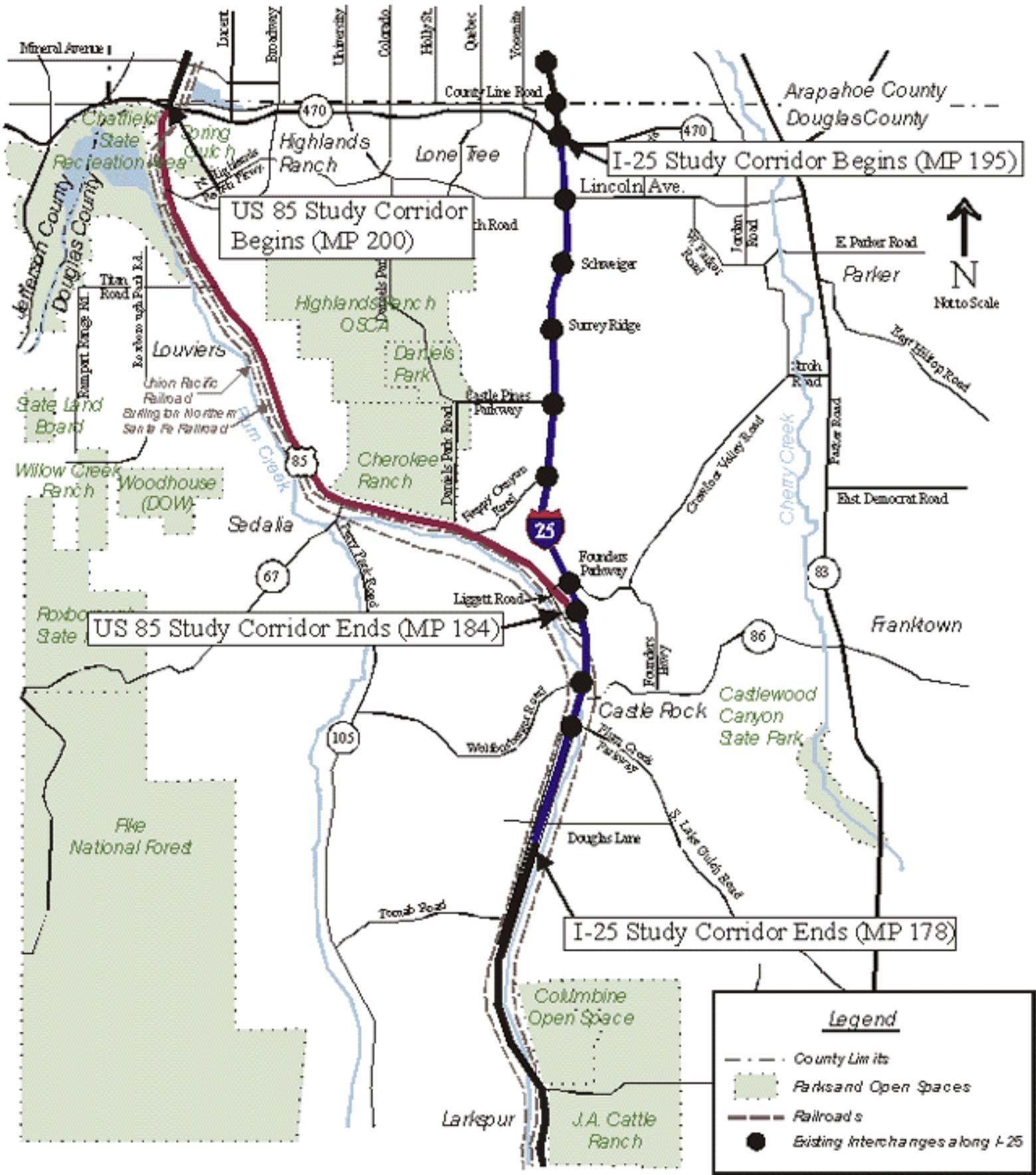
In addition to the chapter summaries, major governmental actions and any unresolved issues within the project corridor are also discussed.

S.2 PURPOSE AND NEED

The purpose of the South I-25 Corridor and US 85 Corridor EIS is to develop a transportation solution that addresses transportation capacity inadequacies and safety problems in the I-25 Corridor and the US 85 Corridor while avoiding or minimizing adverse environmental impacts.

The first step in this EIS process was to identify the project need. A problem statement was developed based on an extensive scoping process with input from the public and affected agencies. The project objectives were identified based on the need defined in the problem statement. These objectives determine the guidelines for measuring effectiveness of proposed improvements. The purpose and need is the foundation of the alternative evaluation process.

Figure S.1
South I-25 Corridor and US 85 Corridor Study Area



S.2.1 Problem Statement

The following problem statement was developed for the I-25 Corridor and US 85 Corridor.

The north/south peak travel demand in northern Douglas County has grown at a pace faster than the surrounding metropolitan area. These trips, primarily to jobs in the Denver Central Business District (CBD) and the Southeast Business District (SEBD), have overtaxed the existing infrastructure. North/south travel options beyond the use of automobiles on I-25 and US 85 are limited.

S.2.1.1 I-25 Corridor Problem Statement

Traffic volumes on I-25 exceed the design during the a.m. and p.m. peak hours. The result is congestion, delays, and crashes, exacerbated by adverse weather.

I-25 is the focus for inter-regional travel and the majority of commuter trips originating in Douglas County.

Forecasts of future demand show continued overtaking of the I-25 facility, resulting in more hours of congestion, longer delays, and more crashes.

S.2.1.2 US 85 Corridor Problem Statement

The US 85 Corridor has one lane in each direction. In many locations left- and right-turn lanes do not exist. This results in a high number of crashes and dangerous driving, such as passing slower vehicles on the shoulders.

US 85 provides for some short-distance regional trips and many local trips. US 85 is the local street for communities such as Sedalia and Louviers. Turning on to and off of US 85 is difficult because of the speed and volume of the mainline traffic.

Forecasts of future demand show increased driver frustration, resulting in increased crashes and reduced accessibility.

S.2.2 Project Objectives

The following project objectives were developed based on the problem statement.

The South I-25 Corridor and US 85 Corridor EIS project objective is to improve north/south mobility and travel safety in northern Douglas County in a manner that enhances efficient management and maintenance of transportation facilities and is sensitive to the environment, wildlife resources, and quality of life within Douglas County.

The I-25 Corridor should be maintained as the primary north/south travel corridor in northern Douglas County. I-25 improvements should reduce congestion during peak periods and improve safety on the interstate.

The US 85 Corridor improvements should provide enhanced mobility and safety while managing local access.

Based on the project objectives, more than 80 alternatives were identified for improvements to both corridors.

S.3 ALTERNATIVES

The alternatives presented in this FEIS are the result of a public and agency process combined with environmental and technical analysis. A three-step evaluation process was used to progressively eliminate alternatives from further consideration. From this evaluation process, the South I-25 Corridor and US 85 Corridor Long-Term Vision Through 2020 and Beyond was developed to meet the project objectives and community vision. Vision elements likely to be constructed over the next 20 years were presented as alternatives to be considered and were comparably evaluated and documented in the Draft EIS (DEIS). The alternatives presented in this FEIS were developed from the DEIS alternatives, and are based on public and agency comments and additional evaluation. These alternatives include mainline widening, interchange reconfigurations, minor realignments, and a car pool lot. Of the three alternatives developed for the FEIS, two build alternatives are being fully evaluated in this FEIS to allow for the flexibility of selecting different improvement options. Many of these elements are needed as a result of proposed development.

Three alternatives (and three variations of the alternatives) were developed and are evaluated in this FEIS. These alternatives include the No-Action Alternative, Preferred Alternative, and Other Alternative. The Selected Alternative presented in the ROD will likely be one of these alternatives or a combination of the alternatives. All elements of the Preferred Alternative are included in the 2020 Denver Regional Council of Governments (DRCOG) Regional Transportation Plan (RTP) and will be funded by CDOT. Not all elements included in the Other Alternative are in the RTP, or are not currently planned to be funded by CDOT. The DRCOG RTP outlines transportation improvements to be made in the Denver area. Those elements of the Other Alternative that are not in the 2020 RTP must be added to a future RTP (through the amendment process) before they can be constructed.

S.3.1 No-Action Alternative

The No-Action Alternative consists of no major improvements other than the Early-Action projects that have already been committed. The Early-Action projects are CDOT safety improvement projects already constructed or scheduled to be constructed within the next 5 to 10 years. The No-Action Alternative also includes minor safety and maintenance improvements along I-25 and US 85 and the Douglas Lane Interchange on I-25. A description of these projects is included in Section S.7, *Other Major Governmental/Group Actions*.

S.3.2 Preferred Alternative

The Preferred Alternative focuses on mainline I-25 and US 85 widening to add one general-purpose lane in each direction and improvements to the Schweiger Interchange and the Surrey Ridge Road Interchange along I-25 and the State Highway (SH) 67 Intersection along US 85. Existing accesses along US 85 are improved and managed as described in the *Final US 85 Access Management Plan*, February 2001. The Preferred Alternative is estimated to cost \$151.6 million.

In addition to the Early-Action projects and the Douglas Lane Interchange, the Preferred Alternative includes the following I-25 Corridor major improvements:

- Widening to eight lanes (six through lanes and two climbing lanes) between C-470 and Meadows/Founders Parkway
- Widening to six lanes between Meadows/Founders Parkway and Douglas Lane

- Reconstructing the Schweiger Interchange to a half diamond interchange (improving northern ramps and removing southern ramps)
- Reconstructing the Surrey Ridge Interchange to a three-quarter diamond interchange (improving southern ramps and northbound entrance ramp; removing southbound exit ramp)
- Constructing a car pool lot (accommodating 500 spaces) in northeast quadrant of the I-25 and Castle Pines Parkway Interchange
- Minor realignment of I-25 to the east between Wolfensberger Road and Liggett Road
- Constructing a new Union Pacific Railroad Bridge south of the existing bridge

Major components of the Preferred Alternative along the US 85 Corridor include:

- Widening to six lanes between C-470 and Highlands Ranch Parkway
- Widening to four lanes between Highlands Ranch Parkway and Meadows Parkway
- Reconfiguring of the US 85/SH 67 Intersection
- Constructing a frontage road in Sedalia
- Minor realignment of US 85 at Cook Ranch (MP 195.4)
- Constructing a bicycle/pedestrian facility
- Providing for a grade-separated crossing under US 85 for the High Line Canal Trail
- Developing enhanced wildlife crossings

The FHWA and CDOT have chosen the Preferred Alternative because it best meets the local communities needs and desires, fulfills the project objectives, and provides flexibility in future transportation needs.

S.3.3 Other Alternative

In addition to the Early-Action projects and the Douglas Lane Interchange, the Other Alternative includes mainline widening, major interchange reconfigurations, the addition of a new interchange, frontage road, and a car pool lot. The Other Alternative is estimated to cost \$177.5 million.

Major components of the Other Alternative along the I-25 Corridor include:

- Widening to eight lanes (six through lanes and two climbing lanes) between C-470 and Meadows/Founders Parkway

- Widening to six lanes between Meadows/Founders Parkway and Douglas Lane
- Constructing a diamond interchange at proposed Rampart Range Development
- Reconstructing the Surrey Ridge Road Interchange to a diamond interchange
- Removing the Schweiger Interchange ramps
- Constructing a frontage road on the east side of I-25 from Castle Pines Parkway to proposed Rampart Range Interchange
- Reconfiguring the Castle Pines Parkway Interchange with loop ramp in southeast quadrant
- Constructing a car pool lot (accommodating 500 spaces) in northeast quadrant of the I-25 and Castle Pines Parkway Interchange
- Widening of Happy Canyon Road Bridge
- Minor realignment of I-25 to the east between Wolfensberger Road and Liggett Road
- Constructing a new Union Pacific Railroad Bridge south of the existing bridge

Major components of the Other Alternative along the US 85 Corridor include:

- Widening to six lanes between C-470 and Titan Road
- Widening to four lanes between Titan Road and Meadows Parkway
- Reconfiguring the US 85/SH 67 Intersection
- Constructing a frontage road in Sedalia
- Minor realignment of US 85 at Cook Ranch (MP 195.4)
- Constructing a bicycle/pedestrian facility
- Providing a grade-separated crossing under US 85 for the High Line Canal Trail
- Developing enhanced wildlife crossings

Several improvements included in the Other Alternative were developed in response to proposed developments within the area. The Rampart Range Development proposes to construct the Rampart Range Interchange. If the Rampart Range Interchange is built, the Schweiger Interchange is no longer needed and the Surrey Ridge Interchange will be upgraded to a full diamond interchange. Before the Surrey Ridge Road diamond interchange

and frontage road are constructed, CDOT (or the project sponsor) will explore amending the RTP and will reflect the Other Alternative in the ROD. Funding for the Rampart Range Interchange is the responsibility of the local entities.

The Castle Pines Parkway loop ramp and the Happy Canyon Road widening are also needed as a result of the traffic generated from the proposed developments. Although CDOT will be participating in the funding of these improvements, local funds will also be required due to the development needs.

CDOT and Douglas County support the six-lane section between Highlands Ranch Parkway and Titan Road; however, funding is not currently identified for this improvement. If funding is identified, CDOT will explore amending the RTP and will reflect the Other Alternative in the ROD in order to construct this improvement.

S.3.4 Alternative Variations

Three variations of the alternatives along I-25 between Lincoln Avenue and Castle Pines Parkway are also evaluated. These variations differ in the Surrey Ridge Road Interchange configuration, Surrey Ridge Road Interchange configuration, and the addition of a frontage road.

S.4 TRAVEL DEMAND

Travel demand for both the I-25 Corridor and US 85 Corridor has been increasing continually during the last several years. Between 1997 and 1999, traffic volumes along the I-25 Corridor and US 85 Corridor have increased at an annual rate of 15 and 28 percent, respectively. These trends are expected to continue. By 2020, the traffic volumes are expected to increase between 90 and 142 percent for the I-25 Corridor and between 21 and 50 percent for the US 85 Corridor.

The existing (1998) peak hour levels-of-service (LOS) range from LOS A along the southern sections of I-25 to LOS E on the northern, more congested sections of I-25. US 85 existing peak-hour LOS ranges from LOS C to LOS E. In 2020, the LOS in both corridors is expected to deteriorate to LOS E or LOS F without improvements. The Preferred Alternative and the Other Alternative improve the peak hour LOS in most sections. On the northern section of I-25, the peak hour LOS does not improve from LOS F, but the hours of congestion (LOS E or LOS F) do improve. For additional information on LOS, see Section 3.4, *Existing (1998) and Future (2020) Traffic Operations*.

Table S.1 shows existing hours of congestion and future hours of congestion for each alternative along I-25 and US 85. A comparison between the existing hours of congestion and the future No-Action Alternative hours of congestion dramatically illustrates the impact that increased traffic volumes will have on each corridor. Without improvements, I-25 hours of congestion increase from a total of 1 hour to 20 hours a day and the US 85 hours of congestion increase from a total of 8 hours to 15.5 hours a day. The Preferred Alternative and the Other Alternative are shown together as the two have similar hours of congestion. Implementing either of the build alternatives (the Preferred Alternative or the Other Alternative) decrease the hours of congestion to a total of 9 hours of congestion on I-25 and 1.5 hours of congestion on US 85.

Table S.1
Daily Hours of Congestion

Alternative	Daily Hours of Congestion	
	Northbound	Southbound
I-25 Corridor		
Existing Conditions (1998)	0	1
No-Action (2020)	12.5	7.5
Preferred Alternative/Other Alternative (2020)	4	5
US 85 Corridor		
Existing Conditions (1998)	8*	
No-Action (2020)	7	8.5
Preferred Alternative/Other Alternative (2020)	1	0.5

I-25 hours of congestion measured south of Lincoln Avenue and US 85 hours of congestion measured south of Titan Road.

**US 85 is currently a two-lane highway south of Highlands Ranch Parkway and the LOS for a two-lane highway is analyzed as a whole, not by direction.*

S.5 ENVIRONMENTAL CONSEQUENCES AND SECTION 4(f) EVALUATION

Major adverse and beneficial environmental impacts include:

- No relocations are anticipated along the I-25 Corridor and nine relocations (three residential, six commercial) are anticipated along the US 85 Corridor as a result of the Preferred Alternative and the Other Alternative.
- Without mitigation, noise in the I-25 Corridor and US 85 Corridor increases with the No-Action Alternative, the Preferred Alternative, and the Other Alternative.
- The Preferred Alternative and the Other Alternative have an adverse effect on one historic property along I-25 and one historic property along US 85.
- The Preferred Alternative and the Other Alternative both increase roadway capacity, reducing the daily hours of congestion by up to 7.5 hours northbound and 2.5 hours southbound along I-25 and by up to 6 hours northbound and 8 hours southbound along US 85.
- The Preferred Alternative and the Other Alternative impact the Preble's Meadow Jumping Mouse (PMJM) habitat.
- The Preferred Alternative and the Other Alternative will require land from six Section 4(f) properties, this includes the two historic properties previously mentioned.
- The Preferred Alternative will impact approximately 0.12 hectares (0.30 acres) of jurisdictional wetlands, while the Other Alternative will impact approximately 0.17 hectares (0.43 acres) of jurisdictional wetlands.

Table S.2 and Table S.3 are summaries of the environmental impacts for the Preferred Alternative and the Other

Alternative.

Table S.2
Preferred Alternative Summary of Impacts

Resource	I-25 Corridor	US 85 Corridor
Neighborhood	None	None
Environmental Justice	None	None
Relocation	None	Nine relocations
Right-of-Way	10.1 ha (25.0 ac)	49.4 ha (122 ac)
Recreational Resources	None	Centennial Trail: 2 m (6.5 ft) High Line Canal Trail: 124 m (410 ft) Spring Gulch: 0.2 ha (0.6 ac)
Land Use	Changes to higher density use	Changes to higher density use
Air Quality	None	None
Water Quality and Quantity	Minimal impacts to water quality Impervious area: 1,048,801 m ² (11,285,096 ft ²)	Potential improvements to water quality Impervious Area: 711,452 m ² (7,655,223 ft ²)
Vegetation	73.6 ha (182 ac)	68 ha (169 ac)
Wetlands	0.10 ha (0.25 ac) wetlands 0.19 ha (0.48 ac) Other Waters of US	0.10 ha (0.25 ac) wetlands 0.46 ha (1.14 ac) Other Waters of the US
Geology	None	None
Wildlife	67.5 ha (166.8 ac) loss of habitat	61.0 ha (151 ac) loss of habitat
Wild and Scenic Rivers	None	None
Floodplains	Happy Canyon Creek #1 and #2, Tributary A, Tributary D, Hangman's Gulch, and East Plum Creek #1 and #2 are expected to be directly impacted	Marcy Gulch, No Name #1, No Name #2, No Name #3, Indian Creek, Tributary A, Tributary B, and Tributary C are expected to be directly impacted
Threatened, Endangered, and Other Special-Status Species	Black-tailed prairie dog: 0.10 ha (0.24 ac) PMJM: 1.76 ha (4.36 ac)	Black-tailed prairie Dog: 2.47 ha (6.1 ac)
Historic Resources	D&RG RR: 870 m (2,850 ft)	AT&SF Railway: 4.3 m (14 ft) Cherokee Ranch: 5.1 ha (12.5 ac)
Section 4(f) Properties	D&RG RR: 870 m (2,850 ft)	High Line Canal Trail: 124 m (410 ft) Spring Gulch: 0.2 ha (0.6 ac) AT&SF Railway: 4.3 m (14 ft) Cherokee Ranch: 5.1 ha (12.5 ac) Cherokee Ranch Conservation Easement: 6.5 ha (15.9 ac)
Archaeological Resources	Potential impacts to two sites	Potential impacts to one site
Paleontological Resources	Potential impacts to one site	Potential impacts to one site

Prime and Unique Farmland	No Prime and Unique Farmland impacts 1.34 ha (3.3 ac) of High Potential Dry Cropland	No Prime and Unique Farmland impacts 17.4 ha (43.0 ac) of High Potential Dry Cropland
Noise	25 receivers	7 receivers
Visual Character	Change in visual character	Change in visual character
Hazardous Waste Sites	Further investigation needed	Further investigation needed

Table S.3
Other Alternative Summary of Impacts

Resource	I-25 Corridor	US 85 Corridor
Neighborhood	None	None
Environmental Justice	None	None
Relocation	None	Nine relocations
Right-of-Way	28.9 ha (71.4 ac)	51.4 ha (127 ac)
Recreational Resources	None	Centennial Trail: 2 m (6.5 ft) High Line Canal Trail: 124 m (410 ft) Spring Gulch: 0.2 ha (0.6 ac)
Land Use	Changes to higher density use	Changes to higher density use
Air Quality	None	None
Water Quality and Quantity	Minimal impacts to water quality Impervious area: 1,191,194 m ² (12,817,247 ft ²)	Potential improvements to water quality Impervious Area: 732,544 m ² (7,882,178 ft ²)
Vegetation	104.1 ha (257.4 ac)	70.5 ha (174.2 ac)
Wetlands	0.15 ha (0.38 ac) wetlands 0.35 ha (0.85 ac) Other Waters of the US	0.10 ha (0.25 ac) wetlands 0.46 ha (1.14 ac) Other Waters of the US
Geology	None	None
Wildlife	98 ha (242.2 ac) loss of habitat	63.1 ha (156 ac) loss of habitat
Wild and Scenic Rivers	None	None
Floodplains	Happy Canyon Creek #1 and #2, Tributary A, Tributary D, Hangman's Gulch, and East Plum Creek #1 and #2 are expected to be directly impacted	Marcy Gulch, No Name #1, No Name #2, No Name #3, Indian Creek, Tributary A, Tributary B, and Tributary C are expected to be directly impacted
Threatened, Endangered, and Other Special-Status Species	Black-tailed prairie dog: 0.07 ha (0.18 ac) PMJM: 1.76 ha (4.36 ac)	Black-tailed prairie dog: 2.47 ha (6.1 ac)
Historic Resources	D&RG RR: 870 m (2,850 ft)	AT&SF Railway: 4.3 m (14 ft) Cherokee Ranch: 5.1 ha (12.5 ac)
Section 4(f) Properties	D&RG RR: 870 m (2,850 ft)	High Line Canal Trail: 124 m (410 ft) Spring Gulch: 0.2 ha (0.6 ac) AT&SF Railway: 4.3 m (14 ft) Cherokee Ranch: 5.1 ha (12.5 ac) Cherokee Ranch Conservation Easement: 6.5 ha (15.9 ac)

Archaeological Resources	Potential impacts to three sites	Potential impacts to one site
Paleontological Resources	Potential impacts to one site	Potential impacts to one site
Prime and Unique Farmland	No Prime and Unique Farmland impacts 1.34 ha (3.3 ac) of High Potential Dry Cropland	No Prime and Unique Farmland impacts 17.4 ha (43 ac) of High Potential Dry Cropland
Noise	25 receivers	7 receivers
Visual Character	Change in visual character	Change in visual character
Hazardous Waste Sites	Further investigation needed	Further investigation needed

S.6 MITIGATION

Mitigation measures detailed in Chapter 7.0, *Mitigation*, are summarized on Table S.4.

Table S.4
Summary of Proposed Mitigation Measures

Resource	Proposed Mitigation Measures
Recreational Resources	<p><u>Centennial Trail</u>: connect trail to the bicycle/pedestrian facility to encourage a crossing of US 85 at Blakeland Drive (signalized intersection), thereby avoiding C-470 Ramp traffic.</p> <p><u>High Line Canal Trail</u>: construct a grade-separated crossing with US 85</p> <p><u>Spring Gulch Equestrian</u>: pave entrance/exit providing safer in/out access for vehicles with horse trailers. Revegetation of entrance way, realignment of entrance gate, reposition of signs, and realignment of the Center's fence ensuring the appearance of the entry way is as good as the preconstruction status. Full range of access is also preserved.</p>
Water Quality and Quantity	Preparation of a SWMP, implementation of BMPs, improvement to drainage systems and construction of stormwater detention/infiltration facilities.
Vegetation	<p>Construction of retaining walls where steep slopes would be subject to erosion. Inventorying and mapping of state listed noxious weeds.</p> <p>Replacement of impacted shrubs and trees based upon water availability.</p>
Wetlands	<p>Preservation of water quality in wetlands through implementation of a SWMP.</p> <p>Restoration or creation of wetlands in (1) Newlin Gulch on I-25 and/or (2) Spring Gulch on US 85.</p> <p>Installation of 3 check dams in East Plum Creek near Castle Rock.</p> <p>Monitoring of the areas surrounding the check dam installations ensuring the restoration project is effectively reconnecting hydrophitic vegetation with the water table.</p>
Wildlife	<p>Replacement of Woody riparian vegetation (ratio of 1:1) where water requirements can be met for planting riparian vegetation.</p> <p>Enlarging US 85 wildlife crossings at tracking stations 1 and 3 (MP 195.2 and MP 189.7) to accommodate deer and elk movement across US 85.</p> <p>Installing signage in areas of known wildlife crossings.</p> <p>Resize and clean existing culverts along US 85 to allow for the potential movement of small wildlife.</p>
Floodplains	<p>Construction of detention basins, infiltration beds, or other structural controls to reduce and minimize the effects of increased runoff due to substantial increases in impervious surfaces.</p> <p>Preparation of a SWMP to eliminate dirty construction run-off.</p>

Threatened, Endangered, and Other Special-Status Species	Scheduling construction near PMJM habitat during the hibernation period (October 15 to April 30). Prohibiting evening construction adjacent to areas of known PMJM habitat. Installation of 3 check dams in East Plum Creek near Castle Rock enhancing PMJM habitat. Relocating black-tailed prairie dogs, where possible, to inactive colonies within the APE, or relocating a colony in accordance with Senate Bill 99-111 requirements. Purchasing or otherwise protecting (e.g. conservation easement) land, where possible, containing active black-tailed prairie dog colonies adjacent to undisturbed habitat. Contributing financially or in-kind services for the preservation of black-tailed prairie dog habitat equal in size to habitat lost from the Selected Alternative.
Historic Resources	<u>Cherokee Ranch Historic District</u> : Proper documentation of the Main Gate and Rattlesnake Road prior to construction. Relocation of the Main Gate, as well as the surrounding vegetation, to a permanently safe location on the property is also required. <u>D&RG Railroad</u> : Proper documentation of the RR prior to construction.
Section 4(f) Properties	<u>D&RG RR</u> : Proper documentation prior to construction. <u>High Line Canal Trail</u> : Separation of grade between the trail and US 85. <u>Spring Gulch Equestrian</u> : Pave entrance/exit providing safer in/out access for vehicles with horse trailers. Revegetation of entrance way, realignment of entrance gate, reposition of signs, and realignment of the Center's fence ensuring the appearance of the entry way is as good as the preconstruction status. Full range of access is also preserved. <u>AT&SF Railway</u> : Minimize take of property by constructing the alternative with the least amount of ROW width. <u>Cherokee Ranch</u> : Proper documentation of the Main Gate and Rattlesnake Road prior to construction. Relocation of the Main Gate, as well as the surrounding vegetation, to a permanently safe location on the property is also required. <u>Cherokee Ranch Conservation Easement</u> : Plant areas disturbed by construction with Douglas County's seed mix. Enhance wildlife crossings along US 85 and Cherokee Ranch.
Archaeological Resources	Recovery and proper categorizing of artifacts from any significant archaeological site discovered during construction.
Paleontological Resources	Salvage excavation of a statistically valid representative sample of the preserved paleoflora prior to construction.
Noise	One noise barrier (B3) on the east side of I-25 half way between Happy Canyon and Meadows/Founders Interchanges (Station 105+860) is proposed. The barrier's proposed dimensions are 4.2 m (14 ft) high by 185 m (607 ft) long and the barrier is proposed as an earthen berm. It provides an average insertion loss of 6.5 decibels to 3 residential receivers.

S.7 OTHER MAJOR GOVERNMENTAL ACTIONS

Several other major actions within or adjacent to the South I-25 Corridor and US 85 Corridor study area are proposed by CDOT, other governmental/group agencies, and private sectors. These include the following:

S.7.1 Southeast Corridor Improvements

CDOT is designing roadway improvements along I-25 from Broadway Avenue to C-470 and along I-225 from the I-25 Interchange to Parker Road. Light rail transit (LRT) is also being constructed along I-25, extending from the existing Broadway terminus to north of Lincoln Avenue and along I-225 from the I-25 Interchange to Parker Road. Construction is scheduled for 2001 through 2008.

S.7.2 Southwest Corridor Light Rail Transit Construction

LRT was constructed along Santa Fe Drive (US 85) from the intersection of I-25 and Broadway Avenue to Mineral Avenue. This project was completed in July 2000.

S.7.3 Early-Action Projects

Seven CDOT projects within the study area, consisting primarily of safety improvement projects, have been previously approved. These Early-Action projects include:

- *Climbing Lanes, Phase I.* This project reconstructs existing laneage and provides one additional lane in each direction along I-25 between Lincoln Avenue and Castle Pines Parkway designated (but not restricted) as climbing lanes for slow-moving vehicles. The final I-25 configuration is six lanes between Lincoln Avenue and Castle Pines Parkway. The project was completed in October 2000.
- *Climbing Lanes, Phase II.* This project extends the Climbing Lanes, Phase I, project to Meadows/Founders Parkway (i.e., complete reconstruction plus one additional lane in each direction). The project is currently under construction and is scheduled for completion in September 2002.
- *Meadows/Founders Parkway Interchange.* This project improved the existing diamond interchange deficiencies by constructing a partial cloverleaf interchange. This project was completed in 1999.
- *US 85/I-25 Interchange.* This project removes the existing US 85/I-25 Interchange ramps and reroutes traffic through the improved Meadows/Founders Parkway and I-25 Interchange. An overpass is constructed at the existing interchange location, connecting the east side of Castle Rock to the west side. This project is designed, but construction has been delayed due to a shortfall of funding.
- *Wolfensberger Interchange.* This project removes and replaces the older south half of the Wolfensberger Road bridges over I-25 and Plum Creek. This project is designed, but construction has been delayed due to a shortfall of funding.
- *5th Street Overpass.* This project reduces demand at the Wolfensberger Interchange and improves the local Castle Rock transportation network by providing an overpass from 5th Street on the east side of I-25 to Park Street on the west side of I-25. The project began construction in October 2000.
- *US 85 and Titan Road Grade-Separated Intersection.* This project improves existing safety deficiencies by constructing an interchange at US 85 and Titan Road and by providing grade-separations with Titan Road and the Burlington Northern Santa Fe Railroad and Union Pacific Railroad. With the proposed design, traffic crossing the existing Union Pacific Railroad tracks at the existing at-grade crossing will be limited to local business access. Construction is scheduled for October 2001.

S.7.4 Douglas County Projects

The following three Douglas County projects are within the study area:

- Improving Daniels Park Road (Daniels Park Road remains a two-lane roadway).
- Widening Titan Road starting at the Plum Creek Bridge and continuing west.
- Constructing a two-lane frontage road along I-25 on the west side of the Union Pacific Railroad and Burlington Northern Santa Fe Railroad tracks. Phase I is from Sinclaire Boulevard to Tomah Road and Phase II is from Tomah Road north into Castle Rock.

S.7.5 Douglas Lane Interchange

Douglas County, the Town of Castle Rock, and local developers plan to construct the Douglas Lane Interchange approximately 1,450 meters (4,750 feet) south of Plum Creek Parkway. The interchange design is a single-point urban interchange with a frontage road along the east side of I-25 between Plum Creek Parkway and Douglas Lane. A re-evaluation of environmental documents, a completion of the Colorado Procedural Directive 1601 Interchange Approval Process, and an amendment to the DRCOG RTP is required before the Douglas Lane Interchange can be constructed. The Douglas Lane Interchange is being proposed as a project funded by the Town of Castle Rock, Douglas County and developers.

S.7.6 Wilcox Street Bridge

This project replaces the existing two-lane bridge over East Plum Creek with a five-lane structure. The new bridge is a single-span structure with shoulders and attached sidewalks. Existing piers currently located in the East Plum Creek channel are removed as a result of the single-span structure. This project is being completed by the Town of Castle Rock and construction is scheduled to begin in Spring 2001.

S.7.7 Highlands Ranch Development (Private Developer Action)

Construction began on the Highlands Ranch Development in 1981. The development is located approximately 19 km (12 miles) south of Denver in northern Douglas County. Over 13,000 of the community's 8,900 hectares (22,000 acres) have been set aside as open space, parks and community facilities linked by a 35 km (22-mile) trail system - with an additional 32 km (20 miles) planned for walking, jogging and bicycling. More than 650 hectares (1,600 acres) of the master plan are designated for business properties. Currently, Highlands Ranch is has over 1,000 businesses ranging from corporate headquarters to research and development facilities, light industrial and commercial outlets.

S.7.8 Canyon Development (Private Developer Action)

The Canyons is a proposed development just east of I-25 and north of Castle Rock. The development is being constructed in two phases. There is a 1,420-hectare (3,500-acre) phase north of Crowfoot Valley Road and an 810-hectare (2,000-acre) phase south of Crowfoot Valley Road. The build out is proposed over the next 20 years with approximately 600 residential units being constructed in the next 5 years. The developer is also donating money and land for improvements to I-25 including: land donations for the light rail envelope, land donations for a park and ride lot at the Castle Pines Interchange, land for a frontage road near the Castle Pines Parkway Interchange, and approximately \$0.5 million for offsite future road improvements.

S.7.9 Meridian Development (Private Developer Action)

Meridian International Business Center totals approximately 580 hectares (1,430 acres) in size and is proposed primarily for business center purposes. The majority of the development is bounded by I-25, Lincoln Avenue, Peoria Street, and E-470.

S.7.10 Rampart Range Development (Private Developer Action)

The Rampart Range Development project covers 1,420 hectares (3,500 acres). Ten thousand housing units and 200 hectares (530 acres) of commercial space south of Lincoln Avenue on both sides of I-25 are proposed. Rampart Range would be similar to Lone Tree or Highlands Ranch along the edges, but include more densely-packed commercial, retail, and residential areas around a City Center area on the east-side of I-25. The property is scheduled for a 30 to 40-year build-out.

S.7.11 Douglas Lane Developments (Private Developer Action)

Crystal Valley Ranch Development

The Crystal Valley Ranch Development (approximately 590 hectares [1,455 acres]) is located 1.6 kilometers (1 mile) east of the proposed I-25/Douglas Lane Interchange. The scheduled build-out for this property is 15 years. As part of the build-out conditions, roadway connections between Douglas Lane and South Lake Gulch Road are proposed.

Lanterns Development

The Lanterns Development, comprised entirely of single-family homes, will be constructed immediately east of the proposed Douglas Lane/I-25 Interchange. The development size is approximately 345 hectares (850 acres) and will include 540 home sites. Construction is scheduled to commence in 2002 and finish in 2012.

Dawson Ridge

The Dawson Ridge Development is proposed for construction on the southwest side of the proposed Douglas Lane/I-25 Interchange. This approximately 765-hectare (1,900-acre) tract will contain approximately 6,700 single-family homes and 1200 multi-family units. Construction of this development will start in Spring 2002 with build-out in 20 to 30 years.

S.7.12 Preservation of Land (Douglas County Action)

The Douglas County Open Space Program was created in 1994 with the passage of one-sixth of a cent sales and use tax. Through revenues generated by the tax, the County seeks to improve the quality of life for its residents by protecting important wildlife habitats, agricultural lands, scenic vistas, community buffers, recreational opportunities, and other open space values.

Douglas County is working with the towns of Castle Rock, Parker, and Larkspur, the beneficiaries of a municipal share back incorporated into the sales and use tax, to implement the towns' parks, trails, and open space goals.

In addition, the County has and will continue to work with a wide range of partners to implement its conservation goals, including: American Farmland Trust, Cherokee Ranch and Castle Foundation, Colorado Cattlemen's Agricultural Land Trust, Colorado Division of Wildlife, Colorado Division of Parks and Outdoor Recreation, Colorado Open Lands, Douglas County Land Conservancy, Great Outdoors Colorado, South Suburban Parks and Recreation District, The Conservation Fund, The Trust for Public Land and United States Forest Service.

To date, Douglas County and its partners have successfully preserved over 15,000 hectares (37,000 acres) of land. The county has participated in land acquisition in each of its five priority areas.

S.8 UNRESOLVED ISSUES

There are no unresolved issues.

1.0 PURPOSE AND NEED

TABLE OF CONTENTS

<u>Section</u>	<u>Page</u>
<u>1.0 PURPOSE AND NEED</u>	1
<u>1.1 INTRODUCTION</u>	1
<u>1.2 PROBLEM STATEMENT/PROJECT OBJECTIVES</u>	1
<u>1.2.1 Problem Statement</u>	1
<u>1.2.2 Project Objectives</u>	3
<u>1.3 PROJECT HISTORY/STATUS</u>	3
<u>1.3.1 Project History</u>	4
<u>1.3.2 Ongoing Projects/Studies</u>	5
<u>1.4 TRAFFIC CHARACTERISTICS</u>	11
<u>1.4.1 Existing (1998) Conditions</u>	11
<u>1.4.2 Corridor Growth</u>	18
<u>1.5 SAFETY</u>	22
<u>1.5.1 Crash History</u>	23
<u>1.5.2 Roadway Deficiencies</u>	25
<u>1.6 MOBILITY</u>	28
<u>1.7 SYSTEM LINKAGES</u>	28
<u>1.7.1 Local Network</u>	28
<u>1.7.2 Light Rail Transit Connections</u>	29
<u>1.7.3 Bus Connections</u>	29
<u>1.7.4 Freight Rail</u>	29
<u>1.7.5 Bicycle Facilities</u>	29
<u>1.8 ECONOMIC DEVELOPMENT</u>	29
<u>1.8.1 Land Use</u>	30
<u>1.8.2 Transportation Plans</u>	31
<u>1.9 Summary of DEIS Comments</u>	33
<u>1.9.1 Bicycle/Pedestrian Facility</u>	33
<u>1.9.2 Wildlife Crossings</u>	34
<u>1.9.3 Surrey Ridge Road Interchange and Schweiger Interchange</u>	34

1.1 INTRODUCTION

The purpose of the South I-25 Corridor and US 85 Corridor Environmental Impact Statement (EIS) is to develop a transportation solution that addresses transportation capacity inadequacies and safety problems in the I-25 Corridor and US 85 Corridor while avoiding or minimizing adverse environmental impacts. The South I-25 Corridor and US 85 Corridor EIS is a Federal Highway Administration (FHWA) and Colorado Department of Transportation (CDOT) study.

The I-25 Corridor and US 85 Corridor are being evaluated together in this EIS as a north/south transportation system. To an extent, actions to one corridor change the operations of the other corridor (a crash on I-25 may cause vehicles to use US 85). Safety and capacity improvements to one corridor, however, do not solve deficiencies in the other corridor. Improvements, therefore, are needed on both corridors to improve north/south mobility within Douglas County.

The South I-25 Corridor and US 85 Corridor EIS focuses on intra-regional transportation needs along the I-25 Corridor and US 85 Corridor in northern Douglas County. The project area extends along I-25 from C-470 at approximately milepost (MP) 195 to MP 178 near the southern limit of Castle Rock and along US 85 from C-470 at MP 200 to Castle Rock at MP 184. The Burlington Northern Santa Fe Railroad and the Union Pacific Railroad are located within the project area. Both railroads follow along the west side of US 85 to a point south of the I-25/US 85 Interchange (approximately MP 182). At this point, the Burlington Northern Santa Fe Railroad continues along the west side of I-25, and the Union Pacific Railroad crosses over to the east side of I-25 and continues south through Castle Rock. The project area is shown on Figure 1.1.

1.2 PROBLEM STATEMENT/PROJECT OBJECTIVES

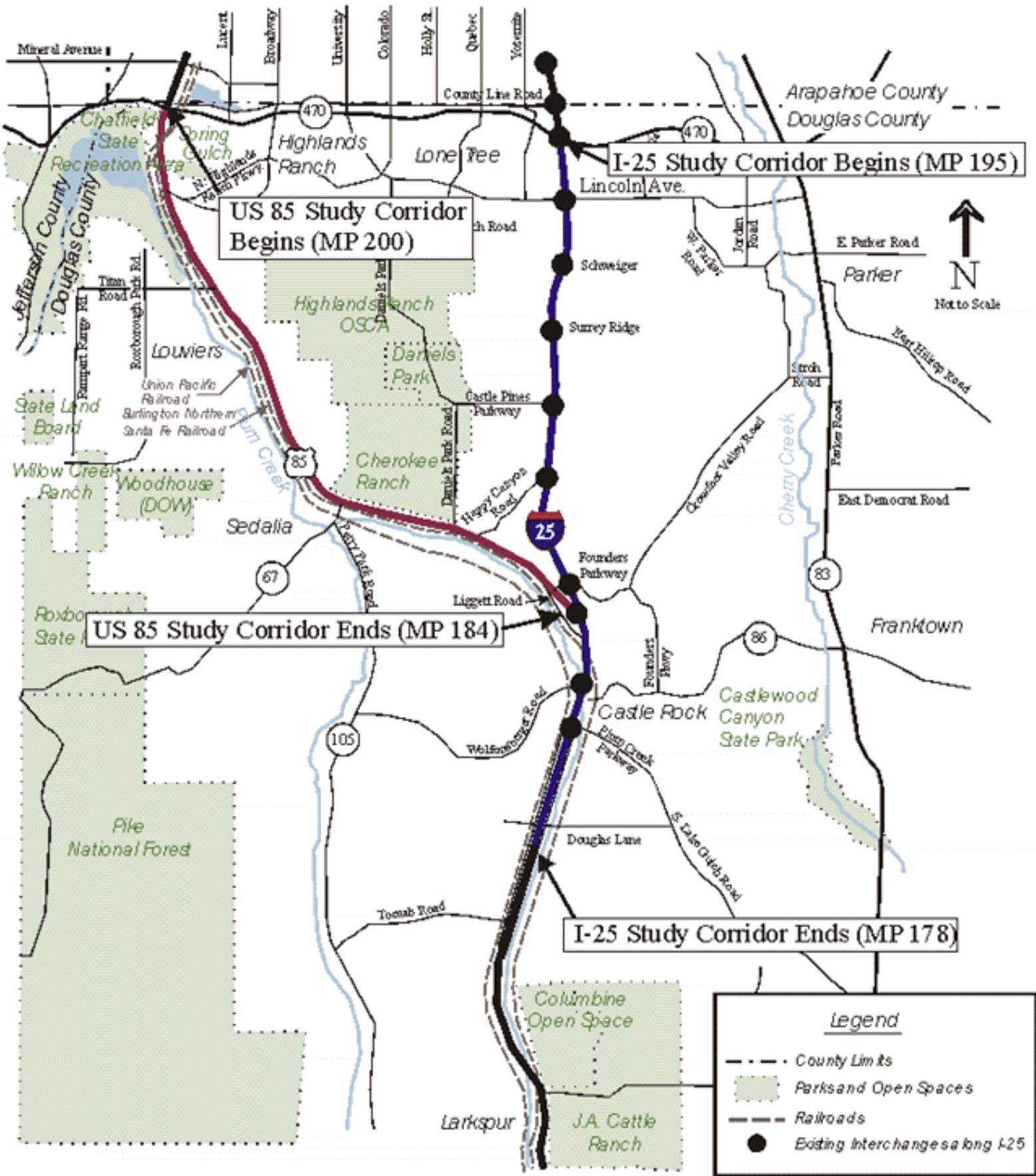
The first step in the South I-25 Corridor and US 85 Corridor EIS was to identify the need of the project. A problem statement was developed from an extensive scoping process, with input from the public and affected agencies. Based on the need, the project objectives were identified. The purpose and need are the foundation of the alternative evaluation process. They determine the guidelines for measuring the effectiveness of proposed improvements.

1.2.1 Problem Statement

The following problem statement was developed as a result of public and agency input from the Issues Team and Technical Committee (see Section 2.2, *Public/Agency Involvement Process*).

The north/south peak travel demand in northern Douglas County has grown at a pace faster than the surrounding metropolitan area. These trips, primarily to jobs in the Denver Central Business District (CBD) and the Southeast Business District, (SEBD) have overtaxed the existing infrastructure. North/south travel options beyond the use of automobiles on I-25 and US 85 are limited.

Figure 1.1
South I-25 Corridor and US 85 Corridor Vicinity Map



1.2.1.1 I-25 Corridor

Traffic volumes on I-25 exceed the design during the a.m. and p.m. peak hours. The result is congestion, delays, and crashes, exacerbated by adverse weather.

- *I-25 is the focus for the inter-regional travel and the majority of the commuter trips originating in Douglas County.*
- *Forecasts of future demand show continued overtaking of the I-25 facility, resulting in more hours of unacceptable congestion, longer delays, and more crashes.*

US 85 Corridor

The US 85 Corridor has one lane in each direction. In many locations left and right turn lanes do not exist. This results in a higher number of crashes and dangerous driving, such as passing slower vehicles on the shoulders.

- *US 85 provides for some short-distance regional trips and many local trips. US 85 is the local street for communities such as Sedalia and Louviers. Turning on to and off of US 85 is difficult because of the speed and volume of the mainline traffic.*
- *Forecasts of future demand show increased driver frustration, resulting in increased crashes and reduced accessibility.*

1.2.2 Project Objectives

Once the problem statement within the project corridor was identified and validated with data, project objectives were developed. These objectives were identified by the public and affected agencies.

The South I-25 Corridor and US 85 Corridor EIS project objective is to improve north/south mobility and travel safety in northern Douglas County in a manner that enhances efficient management and maintenance of transportation facilities and is sensitive to the environment, wildlife resources, and quality of life within Douglas County.

- *I-25 should be maintained as the primary north/south travel corridor in northern Douglas County. I-25 Corridor improvements should reduce congestion during peak periods and improve safety on the interstate.*
- *US 85 Corridor improvements should provide enhanced mobility and safety while managing local access.*

1.3 PROJECT HISTORY/STATUS

The South I-25 Corridor and US 85 Corridor have been previously studied and identified as needing improvements. Some of the improvements recommended in these studies are addressed in this EIS, whereas others are addressed in ongoing studies/projects.

1.3.1 Project History

The following studies have been completed and demonstrated a need for the South I-25 Corridor and US 85 Corridor EIS:

- South Front Range Corridor Assessment Study (CAS)
- US 85 Environmental Assessment (EA)
- I-25 through Castle Rock Feasibility Study

1.3.1.1 South Front Range Corridor Assessment Study

In the summer of 1998, CDOT completed the South Front Range CAS, a multi-modal study of the I-25 Corridor from Denver to Pueblo. The South Front Range CAS analyzed inter-regional travel demands (traffic traveling between Denver, Colorado Springs, and/or Pueblo) on I-25. The multi-modal study recommended the Castle Rock to Denver portion be studied independently to address intra-regional (Castle Rock to Denver) transportation demands. To address this, CDOT, with cooperation from the FHWA, is conducting the EIS between Denver and Castle Rock.

1.3.1.2 US 85 Environmental Assessment

In June 1994 CDOT completed the US 85 EA that evaluated transportation improvements along US 85 from C-470 to I-25 at Castle Rock. The primary element of the proposed improvements was to widen the existing highway. Improvements included the following recommendations:

- Widen the highway to six lanes between C-470 and Titan Road
- Widen the highway to four lanes between Titan Road and I-25
- Correct design deficiencies
- Improve the intersection at Titan Road (Titan Road Early-Action project)
- Add acceleration, deceleration, and turn lanes at appropriate locations
- Implement access control in the corridor
- Re-align the highway in two locations to provide necessary separation from the railroad tracks

Based on significant environmental impacts identified in the EA and due to community out-cry, FHWA and CDOT determined that the proposed project warranted preparation of an EIS. The South I-25 Corridor and US 85 Corridor EIS is being completed as the result of this determination.

1.3.1.3 I-25 through Castle Rock Feasibility Study

The I-25 through Castle Rock Feasibility Study was completed in 1995. This study evaluated transportation needs

and alternatives along I-25 from the Meadows/Founders Parkway Interchange to the proposed Douglas Lane Interchange.

Study results concluded with the following recommendations:

- Expand I-25 from four lanes (two in each direction) to six lanes (three in each direction)
- Reconfigure some existing interchanges
- Relocate the Plum Creek Interchange
- Add an overpass at 5th Street (5th Street Early-Action project)

In addition to these previous studies, several ongoing projects and studies are currently being completed within the South I-25 Corridor and US 85 Corridor EIS study area.

1.3.2 Ongoing Projects/Studies

Due to rapid growth within the study area and surrounding communities, transportation improvements are being evaluated within and adjacent to the study area. The following improvements are underway or have recently been completed in conjunction with the South I-25 Corridor and US 85 Corridor EIS:

- Southeast Corridor project (I-25 from Broadway to Lincoln Avenue and I-225 from I-25 to Parker Road).
- Southwest Corridor Light Rail Transit (LRT) construction (US 85 from Broadway to Mineral Avenue)
- Denver Regional Council of Governments (DRCOG) Congestion Management Systems (CMS)
- Early-Action projects
- I-25 Incident Management Program
- US 85 Access Management Plan
- Town of Castle Rock Railroad Relocation Study
- Wilcox Street Bridge
- I-25 Interchange Studies

1.3.2.1 Southeast Corridor Project

In the Denver metropolitan area, the Southeast Corridor Major Investment Study (MIS) was completed in July 1997. The corresponding EIS was completed with the Record of Decision (ROD) signed on March 16, 2000. The study corridor extends along I-25 from Broadway to Lincoln Avenue and along I-225 from I-25 to Parker Road.

Proposed construction elements include the following:

- Double-tracked LRT along I-25 between the existing Broadway station and Lincoln Avenue. This project is an extension of the existing LRT system currently circulating through downtown Denver. The Regional Transportation District (RTD) will operate the transit system. In addition to the LRT, a bus feeder system will circulate the adjacent areas, transporting riders to the park-and-ride stations.
- Double-tracked LRT along I-225 between I-25 and Parker Road
- Thirteen LRT stations along the corridor
- Highway improvements to I-25 and I-225 consisting of one additional lane in each direction on I-25 from Logan to I-225, two additional lanes in each direction on I-25 from I-225 to C-470, and one additional lane in each direction on I-225 from I-25 to Parker Road (There are three lanes in each direction at the location along I-25 where the South I-25 Corridor and US 85 Corridor project limits begin.)
- Collector/distributor roadway generally between Broadway Avenue and Emerson Street and between Evans Avenue and Colorado Boulevard
- Replacement of existing acceleration/deceleration lanes and provision for new acceleration/deceleration lanes
- Replacement of 13 roadway bridges

The Southeast Corridor Draft EIS (DEIS) was signed in August 1999, and the Final EIS (FEIS) was signed in December 1999. The I-25 improvements end at C-470, and transit improvements end at Lincoln Avenue. The South I-25 Corridor and US 85 Corridor EIS study corridor begins at these respective termini.

1.3.2.2 Southwest Corridor Light Rail Transit Construction

In the Denver metropolitan area, the Southwest Corridor project consists of LRT along Santa Fe Drive (US 85) from the intersection of I-25 and Broadway Avenue to Mineral Avenue. This project also includes transit supporting measures such as park and rides and bus transfer facilities. This project is an extension of the existing LRT system currently circulating through downtown Denver. RTD operates the transit system. In addition to the LRT, a bus feeder system circulates the adjacent areas, transporting riders to the park and ride stations. The project was completed July 2000.

1.3.2.3 DRCOG Congestion Management Systems

The DRCOG CMS was initiated as a federal requirement in the Intermodal Surface Transportation Efficiency Act (ISTEA) of 1991. The CMS provides information on transportation system performance and considers strategies to provide the most efficient and effective use of existing and future transportation facilities. It also defines parameters to measure the extent of congestion.

DRCOG implemented the project-level CMS in 1997. At the project level, to respond to federal requirements,

DRCOG identifies two objectives for CMS analysis. The first is to evaluate and compare a congestion alternative to the "build" alternatives to determine whether the need for additional capacity can be met by management strategies. The second objective is to identify the congestion management actions that would provide the most effective use of, and support to, the operation of the Preferred Alternative. This document presents both objectives.

1.3.2.4 Early-Action Projects

Seven Early-Action projects are within the EIS study area. These are primarily safety improvement or minor projects that have either been previously approved or are in the process of being approved. These Early-Action projects are being designed, are under construction, or have been completed. General corridor limits for each project are identified on Figure 1.2. A brief description of each project is provided.

Project 1: Climbing Lanes, Phase I. This project (completed October 2000) added one lane in each direction along I-25 between Lincoln Avenue and Castle Pines Parkway for (but not restricted to) slow-moving vehicles. The 3.6-meter (12-foot) climbing lanes are located on the outside edge of I-25. This project provided a concrete barrier along the middle of the highway dividing travel directions. Noise barriers, primarily in the form of earthen berms, were constructed where feasible and reasonable.

Project 2: Climbing Lanes, Phase II. This project is an extension of Climbing Lanes, Phase I. It provides one lane in each direction along I-25 between Castle Pines Parkway and Meadows/Founders Parkway for (but not restricted to) slow-moving vehicles. The 3.6-meter (12-foot) climbing lanes are located on the outside edge of I-25. This project provides a concrete barrier in the middle of the highway dividing travel directions. Noise barriers (earthen berms) are being constructed where feasible and reasonable. The project is currently under construction and is scheduled to be completed in September 2002.

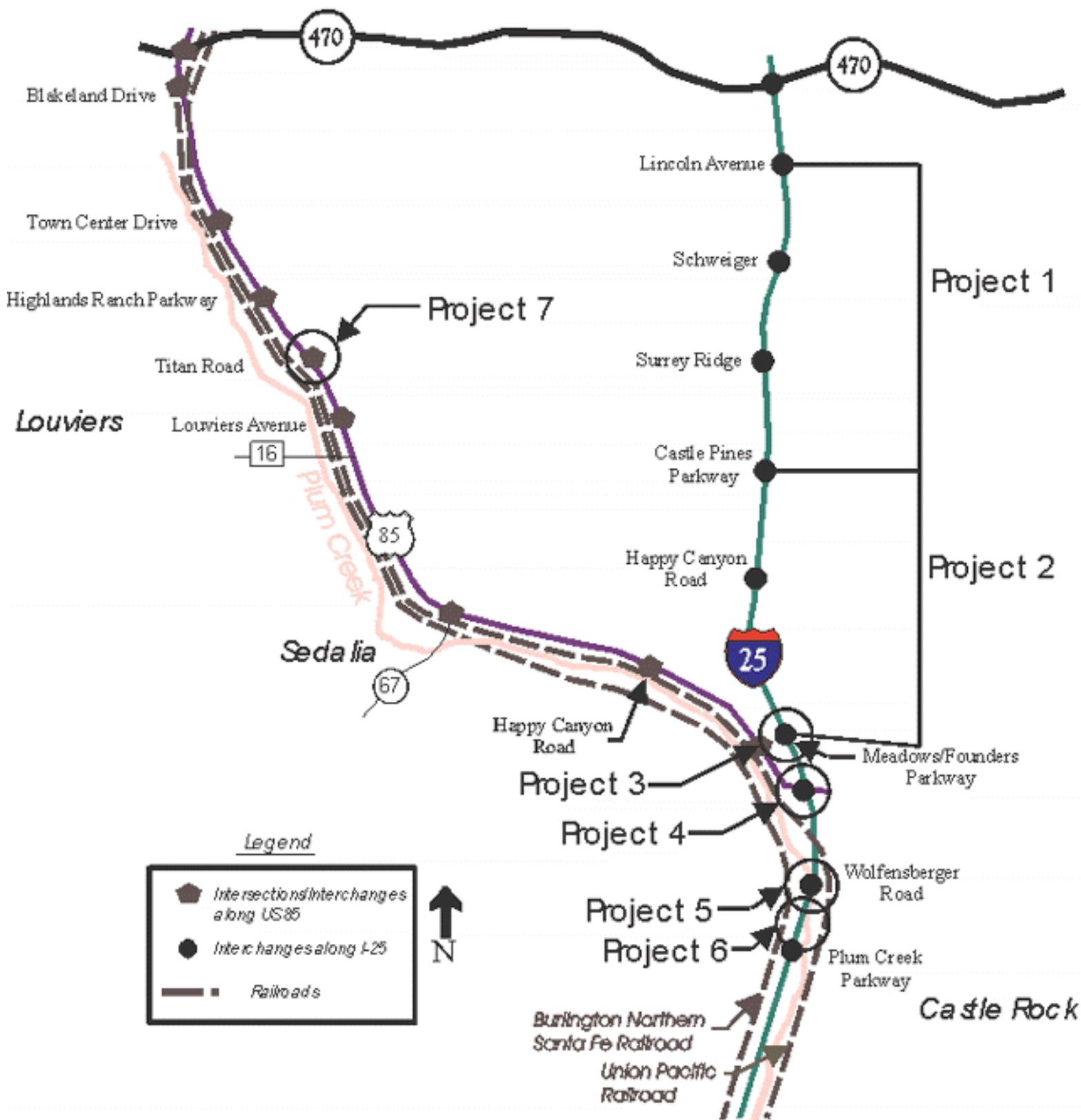
Project 3: Meadows/Founders Interchange. This project (completed in 1999) improved the former diamond interchange deficiencies by constructing a partial cloverleaf interchange. The former interchange was a typical diamond with two entrance ramps and two exit ramps. The new interchange has four diamond ramps with two loop ramps. The two new loop entrance ramps eliminate left turns from Meadows/Founders Parkway to I-25. The new exit ramps consist of double left turns off the I-25 ramps. This project was partially funded privately.

Project 4: US 85/I-25 Interchange. This project removes the existing deficient US 85/I-25 Interchange and re-routes traffic through the improved Meadows/Founders/I-25 Interchange. The existing overpass and entrance and exit ramps are replaced with a grade-separated crossing of US 85 connecting to Crowfoot Valley Road. This project is scheduled to begin construction in Summer 2001 and be completed in Fall 2002.

Project 5: Wolfensberger Interchange. This project improves existing roadway deficiencies by removing and replacing the southern half of the Wolfensberger Road Bridge over I-25 and Plum Creek. Two left-turn lanes are added for traffic on Wolfensberger Road turning to northbound I-25. This project is scheduled to begin construction in Fall 2001 and be completed in Fall 2002.

Project 6: 5th Street Overpass. This project improves the local Castle Rock transportation network and reduces the traffic demand in the Wolfensberger Interchange area by providing an overpass from 5th Street on the east side of I-25 to Park Street on the west side of I-25. The project began construction in October 2000. The town of Castle Rock is contributing funding to this project.

Figure 1.2
Early-Action Project Vicinity Map



Project 7: US 85 and Titan Road Interchange. This project improves existing safety deficiencies of the railroad crossings by constructing an interchange at US 85 and Titan Road and by providing grade separations with Titan

Road and the Burlington Northern Santa Fe Railroad and Union Pacific Railroad. With the proposed design, traffic crossing the existing Union Pacific Railroad tracks at the existing at-grade crossing will be limited to local business access. Construction is scheduled for October 2001.

1.3.2.5 I-25 Incident Management Program

CDOT and Douglas County are working together to develop an I-25 Incident Management Plan that evaluates I-25 throughout Douglas County. This plan will help manage incidents (i.e., crashes, breakdowns) by reducing the time it takes between detecting an incident, responding to the incident, managing the incident, and clearing the incident. This plan will help reduce the hours of congestion along the I-25 Corridor. Specifically, the plan will evaluate:

- Providing real-time information to travelers
- Creating diversion routes during lane closures
- Coordinating emergency service providers

Incidents (any non-recurring disruption of traffic flow) impact congestion and delay on the highway, tax resources of responding agencies, and negatively affect the safety of the public and emergency responders. Incidents such as crashes, spilled loads, vehicle breakdowns, and environmental events contribute to as much as 60 percent of congestion in urbanized areas, and often more for smaller urban and rural areas. Not only is capacity reduced, but incidents can result in congestion for a considerable time after it is cleared. For this corridor, it has been estimated that approximately \$2.2 million per year is lost as a result of time spent in incident congestion. Incidents can also lead to secondary accidents, further compounding and affecting safety. Examples of incident management improvements include the following:

- Encouraging motorists to use cell phones to report highway incidents
- Using volunteer spotters to detect incidents
- Expanding current dispatch operations
- Developing closure and alternate route policies

1.3.2.6 US 85 Access Management Plan

The US 85 Access Management Plan is being developed concurrently with the South I-25 Corridor and US 85 Corridor EIS. This plan includes the evaluation of existing and proposed access points along US 85 between C-470 and Meadows Parkway.

The purpose of the access management plan is to:

- Improve traffic flow
- Improve traffic safety

- Reduce traffic conflicts
- Provide appropriate access to adjacent land uses

Examples of access management improvements include:

- Consolidating accesses
- Controlling accesses (adding a traffic signal)
- Reducing the number of full-movement accesses

The proposed US 85 accesses are being developed using the *State of Colorado State Highway Access Code*, August 1998. Guidelines being followed include:

- The category Regional Highway (R-A) is used to classify the majority of US 85; Non-Rural Principal Highway (NR-A) is used to classify the northern section between the railroad bridges and C-470.
- Where two accesses are close together, a continuous auxiliary lane is used between the accesses to improve roadway consistency and safety, and to maintain edge of pavement continuity.
- Where higher left-turning volumes, safety, or traffic operations necessitate, a double left-turn lane is used.

The *US 85 Corridor Access Management Plan* developed by this study, in conjunction with the *State Highway Access Code*, will provide guidance for agency review and decisions regarding access permit applications and may eventually become a control plan. For more information, see the *Final US 85 Access Management Plan*, February 2001. The final plan was revised based on public and agency comment to the *Draft US 85 Access Management Plan* and the alternative designs.

1.3.2.7 Town of Castle Rock Railroad Relocation Study

The Town of Castle Rock is coordinating with CDOT, Douglas County, the Union Pacific Railroad, and the Burlington Northern Santa Fe Railroad to determine the feasibility of relocating the railroad out of Castle Rock. The three alternatives under consideration relocate the railroad from the east side of I-25 to the west side of I-25 from Sedalia to Larkspur. Funding sources are being determined to implement study findings.

1.3.2.8 I-25 Interchange Studies

Two new I-25 Interchanges are being proposed by developers, the Town of Castle Rock, and Douglas County. These interchanges are the Rampart Range Interchange and the Douglas Lane Interchange and both are within the I-25 Corridor study area.

Rampart Range Interchange

Rampart Range is a commercial and residential development being proposed in Douglas County, adjacent to I-25 and south of Lincoln Avenue (see Section 1.8.1, *Land Use*). The Rampart Range Development was annexed into the City of Lone Tree in August 2000. To accommodate the traffic generated by this development, an interchange is being proposed along I-25 approximately 1,460 meters (4,800 feet) south of Lincoln Avenue. The City of Lone Tree is completing the Colorado Procedural Directive 1601 Interchange Approval Process. The requirements of this directive must be met before the interchange can be constructed. For the state to approve a new interchange, it must be concluded that the interchange will not negatively impact the overall transportation system. A diamond interchange at this location is being evaluated as part of the Other Alternative in this FEIS (see Chapter 2.0 *Alternatives*). Exit and entrance ramps are designed to accommodate future loop ramps to eliminate left-turn movements on Rampart Range Boulevard. The design takes into consideration the future widening of I-25 to four 3.6-meter (12-foot) lanes in each direction with 3.6-meter (12-foot) outside shoulders, 3.0-meter (10-foot) inside shoulders, and a 0.6-meter (2-foot) center concrete barrier. The Rampart Range Interchange is being proposed as a privately funded interchange.

Douglas Lane Interchange

Three residential development projects are being planned in southern Douglas County. To accommodate traffic volumes generated by these developments, the Douglas Lane Interchange, along I-25 and approximately 1,450 meters (4,750 feet) south of Plum Creek Parkway, is being proposed. The Douglas Lane Interchange will provide access to commuter routes and a potential incident management route for State Highway (SH) 83 (Parker Road) along South Lake Gulch Road. This interchange will also provide the only grade separation with the railroad tracks south of Castle Rock for those west of I-25. An EA was completed and released in 1986, and the Finding of No Significant Impact (FONSI) was completed and released in 1987 for the Douglas Lane Interchange. A re-evaluation of the environmental documents, the Colorado Procedural Directive 1601 Interchange Approval Process, and an amendment of the 2025 RTP is required for the Douglas Lane Interchange. The design of the interchange is a single-point urban interchange with a frontage road running along the east side of I-25 between Plum Creek Parkway and Douglas Lane. This interchange is assumed to have been constructed prior to the EIS improvements and is considered as part of the No-Action Alternative. Douglas County, the Town of Castle Rock, and private sectors are funding the Douglas Lane Interchange.

1.4 TRAFFIC CHARACTERISTICS

Existing (1998) and future (2020) traffic characteristics were examined within the South I-25 Corridor and US 85 Corridor to identify operational deficiencies.

1.4.1 Existing (1998) Conditions

Existing (1998) traffic volumes, traffic volume variations, vehicle classification, and the quality of traffic operations are discussed in the following sections.

1.4.1.1 Traffic Volumes

Traffic is measured in daily and peak-hour volumes. Daily traffic volumes consist of 24-hour periods, while peak-hour volumes include the highest volume within a one-hour period (typically the morning and evening rush hour).

Average daily traffic (ADT) is the volume of traffic traveling on a roadway during a typical (or average) day.

ADT volumes were collected during May, August, November, and December 1998. Figure 1.3 shows the 1998 ADT for both the I-25 Corridor and US 85 Corridor. Peak hours represent the worst traffic conditions on an average day and are used in the design of a roadway in terms of required laneage (capacity). Figure 1.4 shows 1998 peak-hour volumes for both the I-25 Corridor and US 85 Corridor.

I-25 Corridor Existing Traffic Volumes

As shown on Figure 1.3, traffic volumes were greater on the northern end of the I-25 project area. In 1998 the average number of vehicles per day on I-25 between Plum Creek Parkway and Wolfensberger Road was 60,250 (approximately 72,300 person trips, assuming 1.2 persons per vehicle), while 85,100 vehicles (approximately 102,120 person trips) traveled the segment between Lincoln Avenue and C-470.

Peak-hour volumes occur during hours having the largest volume of traffic on a given roadway segment and were determined for a.m. and p.m. peak hours. The 1998 peak hour typically occurred between 6:00 a.m. and 8:00 a.m. and 3:00 p.m. and 6:00 p.m. on I-25. On average, the p.m. peak hour had the higher traffic volumes along I-25, reaching approximately 5,670 vehicles (6,800 person trips) per hour (2,270 vehicles northbound; 3,400 vehicles southbound) between Lincoln Avenue and Schweiger.

US 85 Corridor Existing Traffic Volumes

As with I-25, traffic volumes were greater on the northern end of the US 85 project area than on the southern end. The average number of vehicles per day driving on US 85 between Meadows Parkway and Happy Canyon Road was 13,200 (approximately 15,840 person trips); whereas 37,600 vehicles (approximately 45,120 person trips) traveled the segment between Town Center Drive and Blakeland Drive.

Peak hours on US 85 occurred between 8:00 a.m. and 10:00 a.m. and between 4:00 p.m. and 6:00 p.m. As shown on Figure 1.4, the US 85 p.m. peak hour had the higher traffic volume than the a.m. peak hour, reaching approximately 2,700 vehicles (approximately 3,240 person trips) per hour (1,483 vehicles northbound, 1,214 vehicles southbound) between Blakeland Drive and C-470.

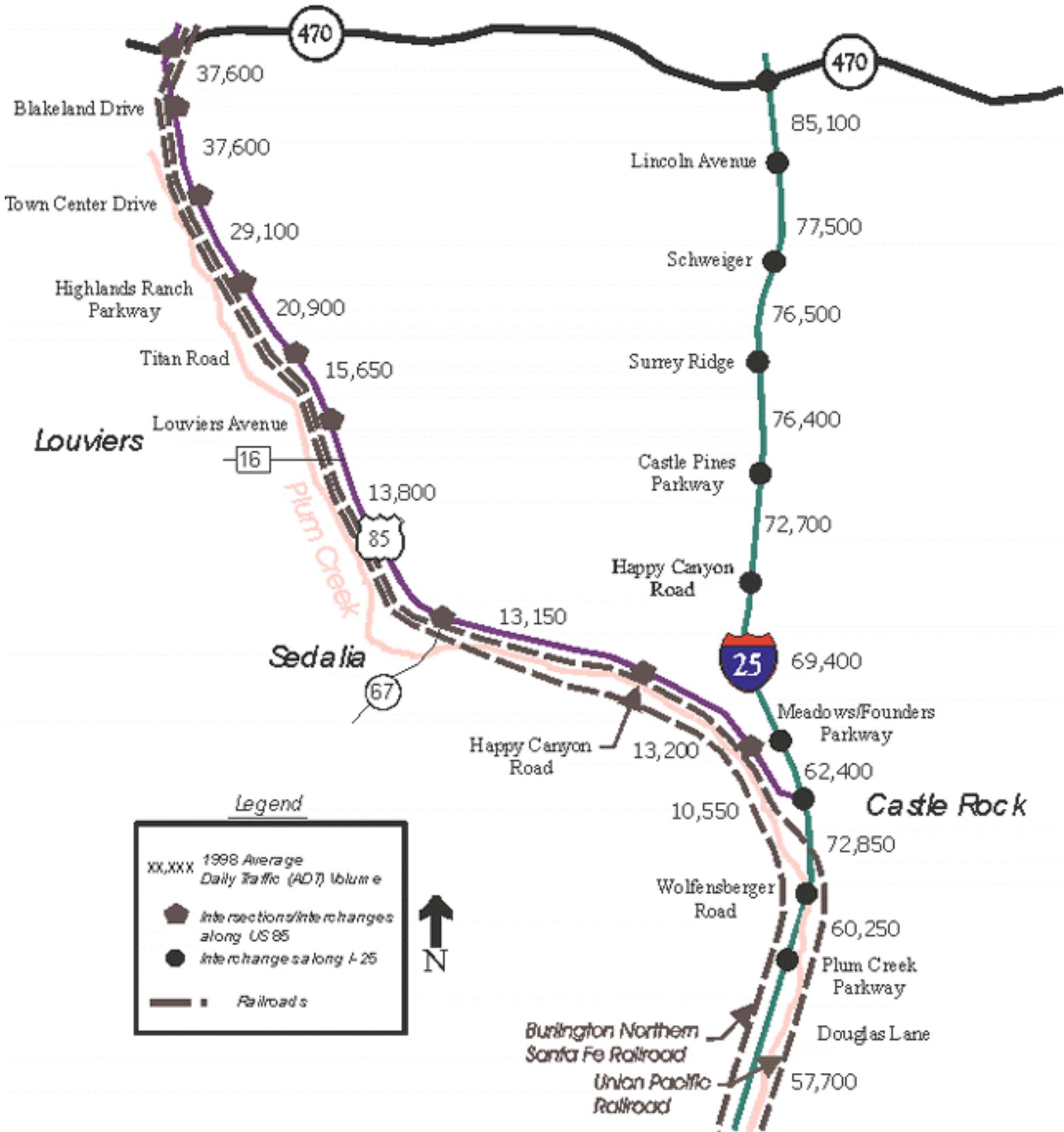
1.4.1.2 Traffic Volume Variations

Daily and peak-hour traffic volumes for 1998 existing conditions varied in magnitude and direction by time of day, as shown on Figure 1.5 and Figure 1.6. Traffic volume variations were calculated south of Meadows/Founders Parkway.

Figure 1.5 shows that during the a.m. peak period, I-25 northbound traffic was heavier, while southbound traffic was heavier during the p.m. peak period. The figure also shows that overall traffic volume was greater during the p.m. peak period. This trend was generally a result of the primary purpose of travel during the a.m. peak period, which was driving to work. During the p.m. peak period, people not only drove home from work, but also ran errands and drove to other activities.

Figure 1.6 shows that the overall 1998 traffic volumes on US 85 gradually increased throughout the day, reaching a peak around 5:00 p.m. The figure also shows that southbound traffic was slightly heavier than northbound traffic during the p.m. peak period.

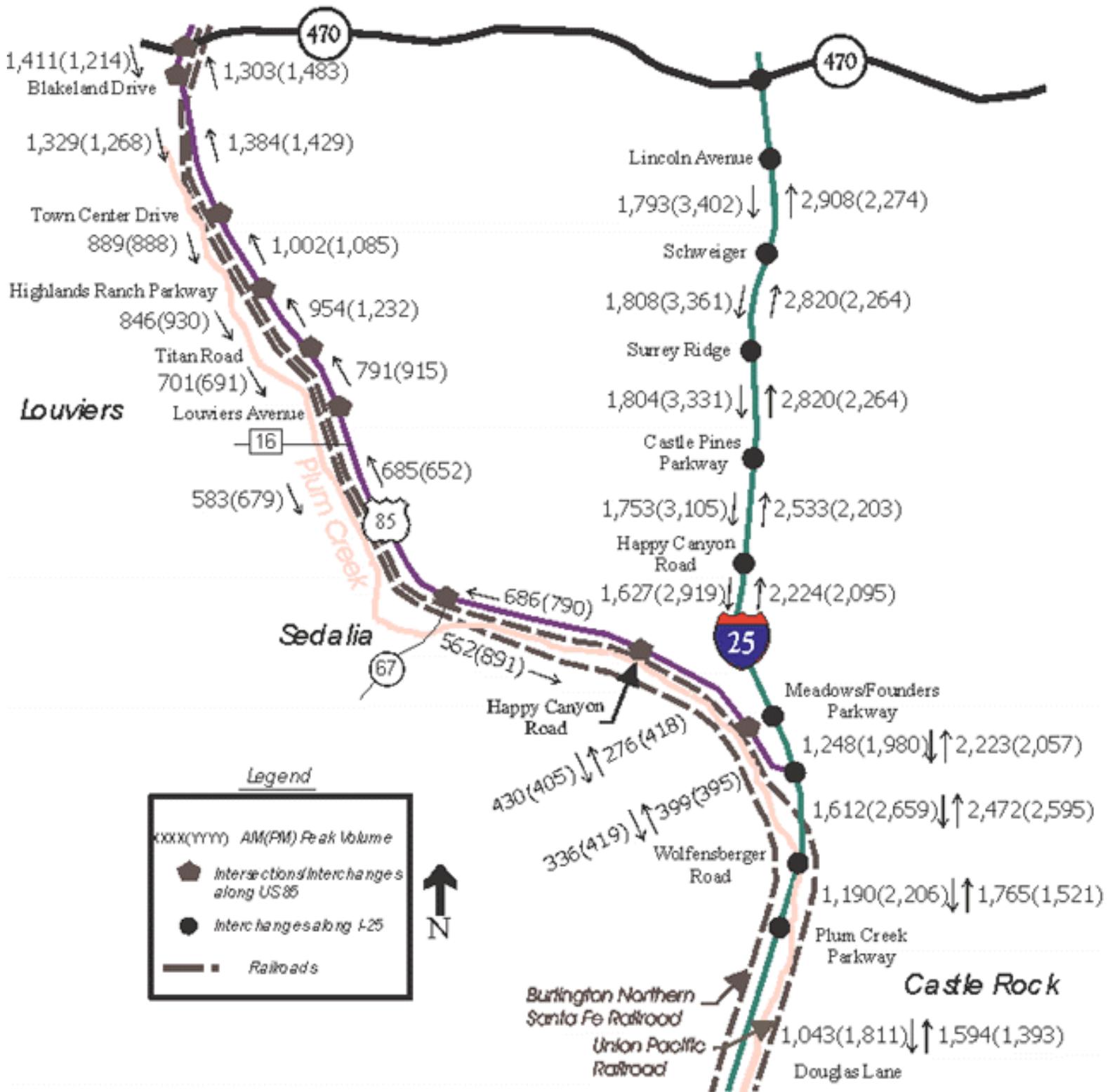
Figure 1.3
1998 Average Daily Traffic Volumes



Source: CDOT

Figure 1.4

1998 Peak-Hour Traffic Volumes



Source: CDOT

Figure 1.5
I-25 Corridor Daily Traffic Variation (1998)

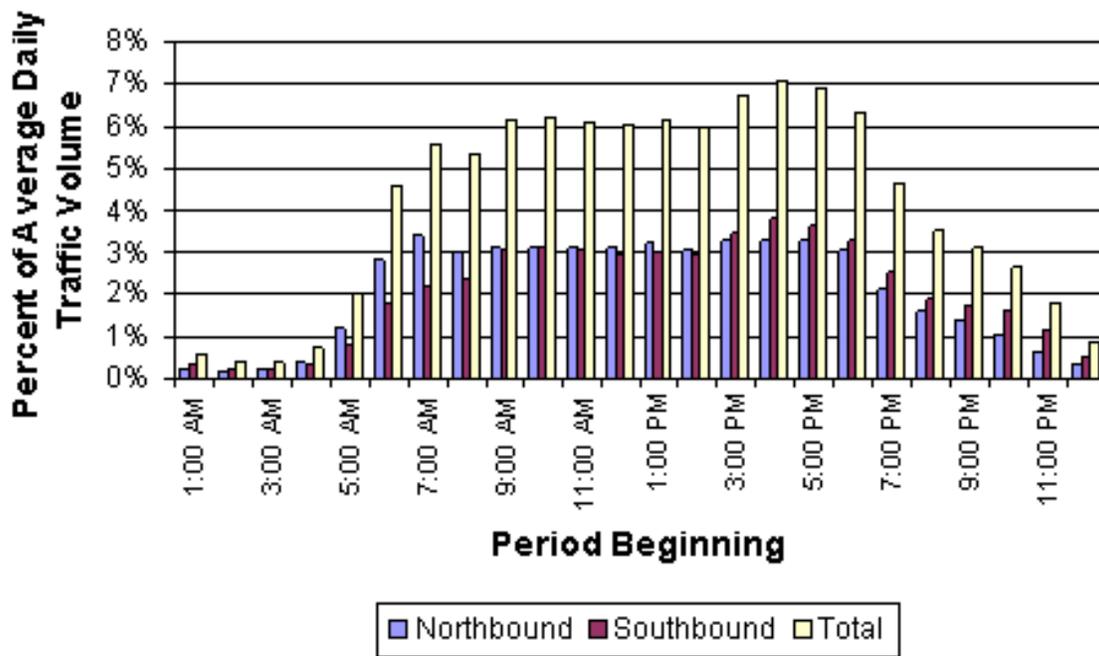
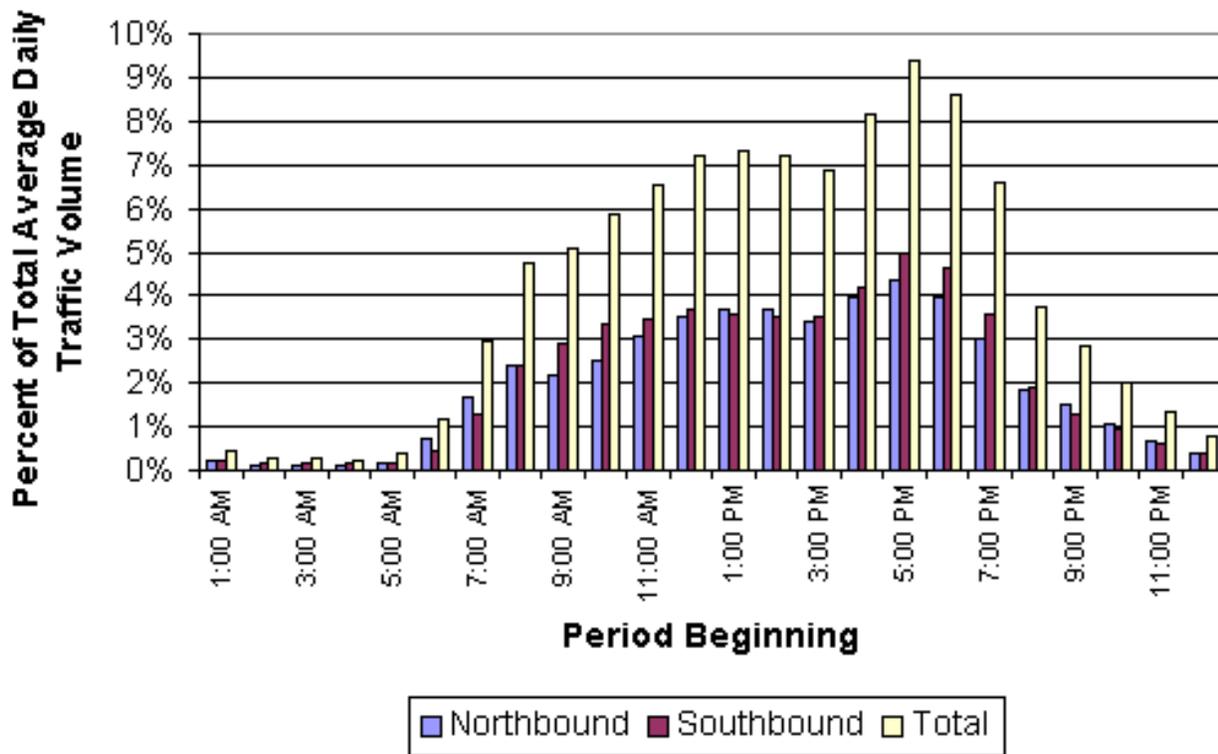


Figure 1.6
US 85 Corridor Daily Traffic Variation (1998)



1.4.1.3 Vehicle Classifications

In 1998 both the I-25 Corridor and US 85 Corridor had a high percentage of heavy and medium truck traffic along their entire lengths. Single-unit and tractor/trailer combinations made up between 8 and 12 percent of total traffic on both I-25 and US 85. Heavy and medium vehicles tended to affect operations along the corridors. The I-25 Corridor has steep grades (up to 4.7 percent), thus making it difficult for heavy vehicles to maintain constant speeds.

1.4.1.4 Quality of Traffic Operations

Traffic operations were analyzed for 1998 volumes for mainline freeway segments along I-25 and mainline roadway segments along US 85, as well as at intersections/interchanges along both corridors. Mainline traffic operations were affected by the classification of roadway (i.e., controlled access, principal arterial), geometry of the roadway (i.e., curves, shoulder width), number of vehicles on the roadway, ability of vehicles to pass other slow-moving vehicles, percentage of trucks on the roadway, vehicle speeds, terrain type, and weather.

Highway traffic congestion is expressed in terms of level of service (LOS) as defined by the *Highway Capacity Manual* (HCM). LOS is a letter code ranging from A for excellent conditions to F for failing conditions. Complete free-flow operations with no restrictions caused by traffic conditions are described as LOS A. LOS F represents forced operations or breakdown of the traffic stream characterized by the familiar traffic jam. LOS B through LOS E describe progressively worse traffic conditions. CDOT defines LOS C as unacceptable operations for rural highways and LOS D as unacceptable for urban highways. Conditions defining the LOS for a highway (from the HCM) are summarized.

- LOS A represents the best operating conditions and is considered free flow. Individual users are unaffected by the presence of others in the traffic stream.
- LOS B represents reasonably free-flowing conditions but with some influence by others.
- LOS C represents a constrained constant flow below speed limits, with additional attention required by drivers to maintain safe operations. Comfort and convenience levels of the driver decline noticeably. LOS C is CDOT's design service level (design capacity) for rural highways (Portions of US 85 and I-25 are rural facilities).
- LOS D represents traffic operations approaching unstable flow with high passing demand and passing capacity near zero, characterized by drivers being severely restricted in maneuverability. LOS D is CDOT's design service level for urban highways (Portions of I-25 and US 85 are urban highways).
- LOS E represents unstable flow near capacity. LOS E often quickly changes to LOS F because of disturbances (road conditions, crashes, etc.) in traffic flow.
- LOS F represents the worst conditions with heavily congested flow and traffic demand exceeding capacity, characterized by stop-and-go waves, poor travel time, low comfort and convenience, and increased crash exposure.

LOS is calculated differently based on the roadway classification. A two-lane highway LOS is dependent on the two-way traffic volume (US 85 between Meadows Parkway and Highlands Ranch Parkway) because operations worsen if a vehicle cannot pass another vehicle. The LOS of an arterial is dependent on the delay at traffic signals, overall travel time, and travel speed. The LOS of an interstate is dependent on the free-flow speed.

I-25 Corridor Existing Traffic Operations

As summarized on Table 1.1, I-25 freeway segments (in 1998) operated at LOS E or better with the addition of

the climbing lanes. Traffic volumes will continue to increase as growth occurs in Douglas County. Without improvements, operations will continue to deteriorate.

US 85 Corridor Existing Traffic Operations

Most US 85 roadway segments operated at a poor LOS in 1998, as summarized on Table 1.2. Poor traffic operations on US 85 warrant improvements under existing volumes. Traffic volumes will continue to increase, and without improvements, operations will continue to deteriorate.

Detailed information regarding existing (1998) traffic conditions within the study area is contained in the *I-25/US 85 Corridor Existing Traffic Operations Technical Report*, September 1999 and *I-25/US 85 Corridor Existing Traffic Operations Addendum*, May 2000.

Table 1.1
I-25 Corridor Existing (1998) Level of Service

I-25 Roadway Segment	Northbound				Southbound			
	a.m.		p.m.		a.m.		p.m.	
	Peak Hour Volume (veh/hr)	LOS						
C-470 to Lincoln Ave	4,550	D	3,100	B	2,740	B	4,460	C
Lincoln Ave to Schweiger	2,908	C	2,274	C	1,793	C	3,402	D/E
Schweiger to Surrey Ridge	2,820	C	2,264	C	1,808	B	3,361	D
Surrey Ridge to Castle Pines Pkwy	2,820	C	2,264	C	1,804	C	3,331	D/E
Castle Pines Pkwy to Happy Canyon Rd	2,533	C	2,203	C	1,753	B	3,105	C
Happy Canyon Rd to Meadows/Founders Pkwy	2,224	C	2,095	C	1,627	B	2,919	C
Meadows/ Founders Pkwy to US 85	2,223	C	2,057	C	1,248	B	1,980	C
US 85 to Wolfensberger Rd	2,472	C	2,595	C	1,612	B	2,659	C
Wolfensberger Rd to Plum Creek Pkwy	1,765	B	1,521	B	1,190	A	2,206	C
Plum Creek Pkwy to Douglas Ln	1,594	B	1,393	B	1,043	A	1,811	B

veh/hr - vehicles per hour

Table 1.2
US 85 Corridor Existing (1998) Level of Service

US 85 Roadway Segment	Northbound				Southbound			
	a.m.		p.m.		a.m.		p.m.	
	Peak-Hour Volume (veh/hr)	LOS						
C-470 to Blakeland Dr	1,303	C	1,483	D	1,411	C	1,214	C
Blakeland Dr to Highlands Ranch Pkwy	1,384	D	1,429	D	1,329	D	1,268	D
Northbound and Southbound Combined								
a.m.								
p.m.								
US 85 Roadway Segment *	Peak-Hour Volume (veh/hr)	LOS						
Highlands Ranch Pkwy to Titan Rd	1,800	E	2,162	E	2,162	E	1,800	E
Titan Rd to Louviers Ave	1,492	E	1,606	E	1,606	E	1,492	E
Louviers Ave to SH 67 (Sedalia)	1,268	E	1,331	E	1,331	E	1,268	E
SH 67 (Sedalia) to Happy Canyon Rd	1,248	E	1,681	E	1,681	E	1,248	E
Happy Canyon Rd to north of Meadows Pkwy	706	E	823	E	823	E	706	E

veh/hr - vehicles per hour

*- These segments were analyzed as two-lane highways (northbound and southbound were not separated for calculations)

1.4.2 Corridor Growth

Traffic volumes within the I-25 Corridor and US 85 Corridor are projected to continue increasing. Future 2020 traffic volumes are projected using the DRCOG regional travel demand model. The only improvements assumed within the study corridor for this analysis are the Early-Action projects and the Douglas Lane Interchange, as previously discussed. For more information on the DRCOG model see Chapter 3.0, *Travel Demand*.

1.4.2.1 2020 Traffic Volumes

Projected weekday ADT and peak-hour traffic volumes without improvements to the corridors are shown on Figure 1.7 and Figure 1.8. Projected volumes are used to estimate needed corridor capacity. Traffic volumes were projected using the 2020 DRCOG Transportation Model, an updated version of the one used to project volumes in the DEIS. Since different models were used to project volumes, numbers in this FEIS differ from the DEIS numbers.

I-25 Corridor 2020 Traffic Volumes

Traffic volumes along the I-25 Corridor are projected to increase between 90 and 142 percent (depending on location) by 2020. As shown on Figure 1.7, the average number of vehicles driving on I-25 in 2020 between Plum Creek Parkway and Wolfensberger Road is 114,600 (137,500 people, assuming 1.2 persons per vehicle), while 206,200 vehicles (247,400 people) drive on the segment between Lincoln Avenue and C-470. These volumes can be compared to the 1998 volumes of 60,250 (90 percent increase) and 85,100 (142 percent increase), respectively. The projected 2020 p.m. peak-hour volume between Schweiger and Lincoln Avenue is 17,800 vehicles (21,400 people) per hour (8,500 northbound and 9,300 southbound).

**Figure 1.7
Projected 2020 Average Daily Traffic Volumes**

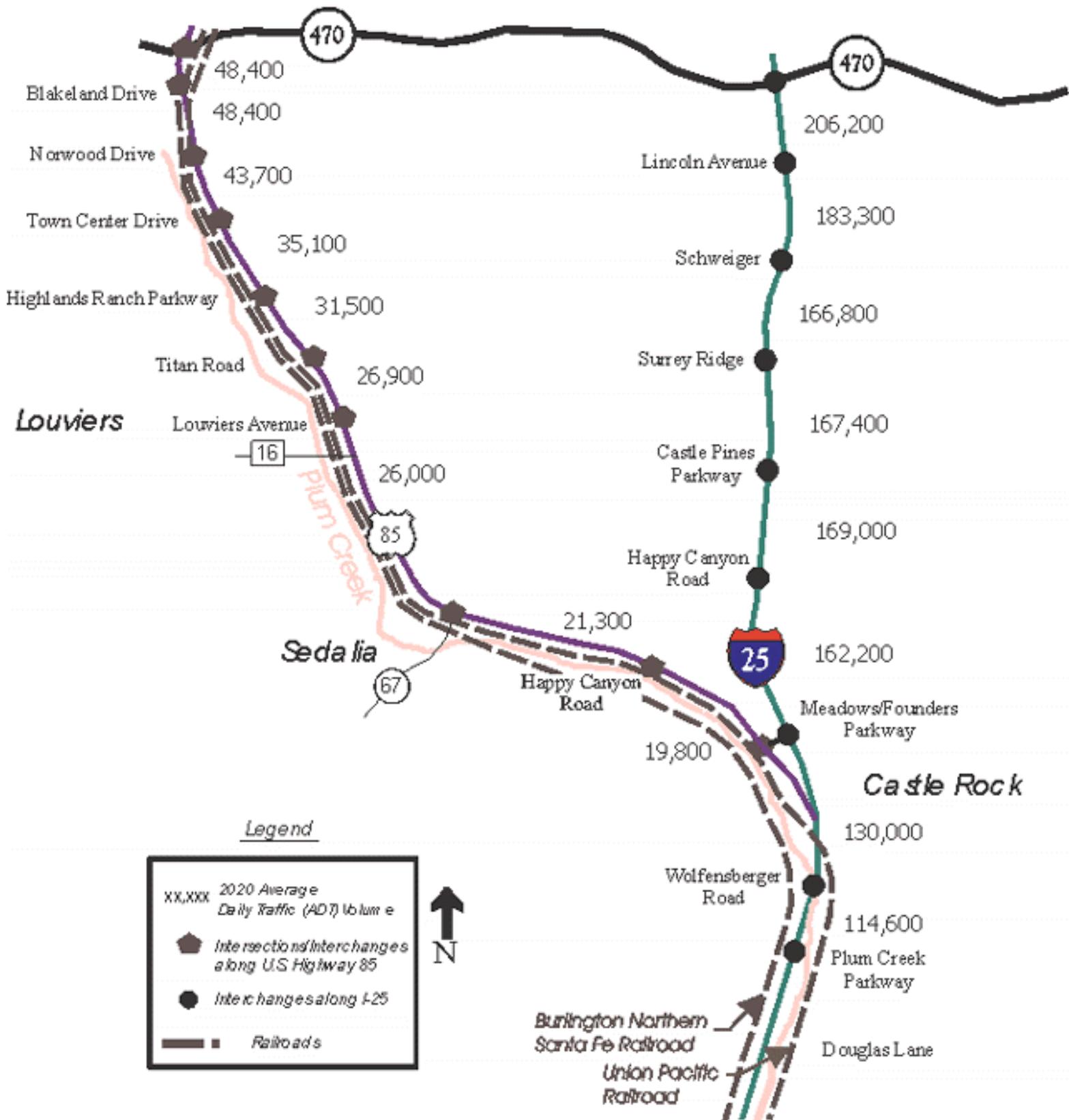
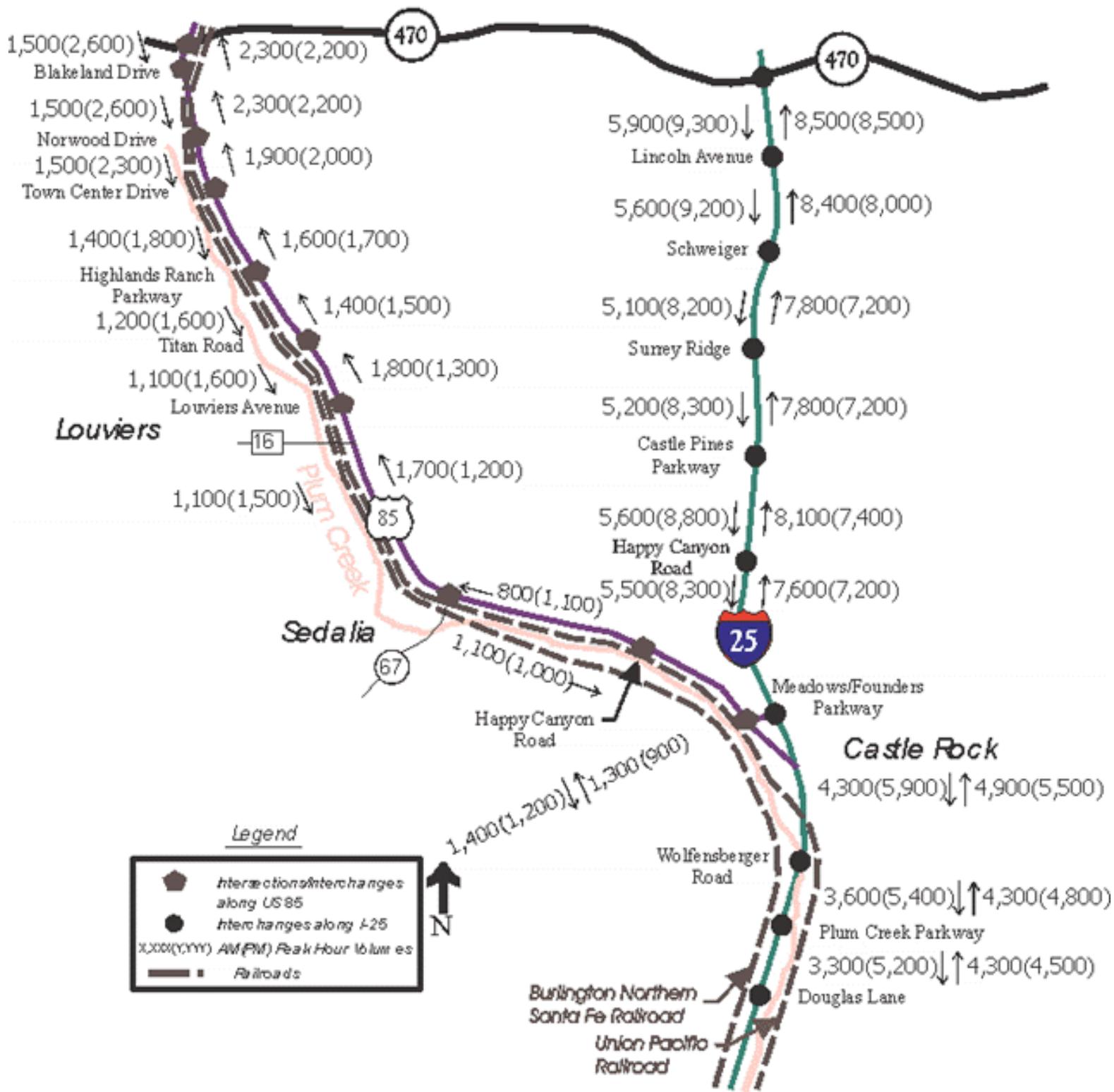


Figure 1.8
Projected 2020 Peak-Hour Traffic Volumes



This traffic can be compared to the existing (1998) peak-hour traffic volume of 5,700 vehicles (6,800 people) per hour (2,300 northbound and 3,400 southbound), an increase of approximately 212 percent.

US 85 Corridor 2020 Traffic Volumes

Traffic volumes along US 85 are projected to increase between 29 and 50 percent by 2020. The weekday ADT volume between Meadows Parkway and Happy Canyon Road is 19,800 vehicles (23,800 people), whereas 48,400 vehicles (58,100 people) are projected on the segment between Blakeland Drive and Norwood Drive. These

volumes can be compared to 13,200 (50 percent increase) and 37,600 (29 percent increase) vehicles that traveled the corridor in 1998. The projected p.m. peak-hour traffic volume between C-470 and Blakeland Drive is 4,800 vehicles (5,800 people) per hour (2,200 northbound and 2,600 southbound). This volume is a 78 percent increase from the 1998 p.m. peak-hour traffic volume of 2,700 vehicles (3,200 people) per hour (1,480 northbound and 1,200 southbound).

Traffic Volume Variations

Similar to the existing traffic variation, future traffic also varies by time of day. The variation may be slightly different. As traffic volumes grow, peak periods expand. Without additional capacity, the current three-hour p.m. peak period will more than double by 2020.

1.4.2.3 Vehicle Classification

It is anticipated that the current level of heavy and medium vehicles using both corridors will either remain the same or increase in 2020, compared to existing levels (between 8 percent and 12 percent of total traffic).

1.4.2.4 Traffic Operations

Peak-hour LOS was analyzed for the existing and committed roadway network (Early-Action projects and Douglas Lane Interchange) with projected 2020 traffic volumes. As summarized on Table 1.3 and Table 1.4, traffic operations on the I-25 Corridor and US 85 Corridor are projected to deteriorate to poor levels for every freeway and roadway segment in the study area.

I-25 Corridor 2020 Traffic Operations

Without improvements, the peak-hour LOS for I-25 deteriorates from a majority of LOS B and LOS C in 1998 to a majority of LOS E and LOS F in 2020. Freeway segments from Surrey Ridge Road north to C-470 are projected to fail during the northbound a.m. peak period and southbound p.m. peak period. In addition to poor LOS in 2020, the failing LOS is projected to last for more hours than the current peak period. The existing peak period along I-25 lasts approximately 3 hours. Without improvements, the peak period is expected to more than double by 2020.

US 85 Corridor 2020 Traffic Operations

The peak-hour LOS for US 85 deteriorates to failing conditions for almost all segments during the peak period in 2020. As previously discussed, not only is the operation worse during the peak period, but it also lasts longer in 2020.

Table 1.3
I-25 Corridor Future (2020) Freeway Segment Conditions

I-25 Roadway Segment	Northbound				Southbound			
	a.m.		p.m.		a.m.		p.m.	
	Peak-Hour Volume	Peak-Hour LOS						
C-470 to Lincoln Ave	8,500	F	8,500	E	5,900	E	9,300	F
Lincoln Ave to Schweiger	8,400	F	8,000	F	5,600	E	9,200	F
Schweiger to Surrey Ridge	7,800	F	7,200	F	5,100	E	8,200	F
Surrey Ridge to Castle Pines Pkwy	7,800	F	7,200	F	5,200	F	8,300	F
Castle Pines Pkwy to Happy Canyon Rd	8,100	F	7,400	F	5,600	E	8,800	F
Happy Canyon Rd to Meadows/Founders Pkwy	7,600	F	7,200	F	5,500	D	8,300	F
Meadows/ Founders Pkwy to Wolfensberger Rd	4,900	F	5,500	F	4,300	E	5,900	F
Wolfensberger Rd to Plum Creek Pkwy	4,300	E	4,800	F	3,600	D	5,400	F
Plum Creek Pkwy to Douglas Ln	4,300	E	4,500	F	3,300	D	5,200	F

veh/hr - vehicles per hour

**Table 1.4
US 85 Corridor Future (2020) Roadway Segment Conditions**

US 85 Roadway Segment	Northbound				Southbound			
	a.m.		p.m.		a.m.		p.m.	
	Peak-Hour Volume (veh/hr)	Peak-Hour LOS						
C-470 to Blakeland Dr	2,300	F	2,200	F	1,500	E	2,600	E
Blakeland Dr to Highlands Ranch Pkwy	1,900	F	2,000	F	1,500	F	2,300	F
Northbound And Southbound Combined								
	a.m.				p.m.			
	Peak-Hour Volume (veh/hr)		Peak-Hour LOS		Peak-Hour Volume (veh/hr)		Peak-Hour LOS	
US 85 Roadway Segment*								
Highlands Ranch Pkwy to Titan Rd	2,600		F		3,100		F	
Titan Rd to Louviers Ave	2,900		F		2,900		F	
Louviers Ave to SH 67 (Sedalia)	2,800		F		2,700		F	
SH 67 (Sedalia) to Happy Canyon Rd	1,900		F		2,100		F	
Happy Canyon Rd to north of Meadows Pkwy	2,700		F		2,100		F	

veh/hr vehicles per hour

These segments were analyzed as two-lane highways (northbound and southbound were not separated for calculations).

1.5 SAFETY

Crashes and roadway deficiencies along I-25 and US 85 were identified to determine the need for safety improvements along the corridors.

1.5.1 Crash History

1.5.1.1 Number of Crashes

Safety conditions along the I-25 Corridor and US 85 Corridor were quantified by examining CDOT crash records for the years 1995, 1996, and 1997. Types and number of crashes on I-25 and US 85 are shown on Figure 1.9 and Figure 1.10.

I-25 Corridor Number of Crashes

The largest number of crashes (greater than 150 during the three-year period) occurred between Schweiger (MP 191) and Surrey Ridge (MP 190), and the same frequency also occurred between Happy Canyon Road (MP 187) and Meadows/Founders Parkway (MP 184). The highest percentage of crashes (51 percent) along I-25 resulted from either a rear-end crash or fixed-object crash.

US 85 Corridor Number of Crashes

The largest number of crashes (47 during the three-year period) along US 85 occurred between Titan Road (MP 196) and Louviers Avenue (MP 194). The highest percentage of crashes (36 percent) along US 85 were rear-end crashes.

1.5.1.2 Crash Rates

While number of crashes within a roadway segment is important, the crash rate is used to determine safety deficiencies. More vehicles using a particular road create more opportunity for a crash. Crash rates take the number of vehicles traveling in a particular section into consideration to allow for a comparison between different sections of roadway for a given roadway type. Crash rate is defined as the number of total crashes per million vehicle miles of travel.

I-25 Corridor Crash Rates

The 1996 state average crash rate for urban interstates (I-25 near Castle Rock) was 1.92 and 0.90 for rural interstates (I-25 north of Castle Rock to C-470). Crash rates for each segment of I-25 are compared to the statewide average crash rate, as shown on Table 1.5. Bold and underlined numbers indicate segments where the crash rate is higher than the 1996 statewide average.

Between 1995 and 1997, segments of I-25 between Lincoln Avenue and Meadows/Founders Parkway had a crash rate greater than the statewide average. The addition of climbing lanes in each direction should reduce the number of rear-end collisions caused by slowing vehicles or slow-moving heavy vehicles. CDOT has completed construction of the climbing lanes from Lincoln Avenue to Castle Pines Parkway and is currently constructing the climbing lanes from Castle Pines Parkway to Meadows/Founders Parkway as part of the Early-Action projects.

Figure 1.9
I-25 Corridor Crash Types and Number (1995 - 1997)

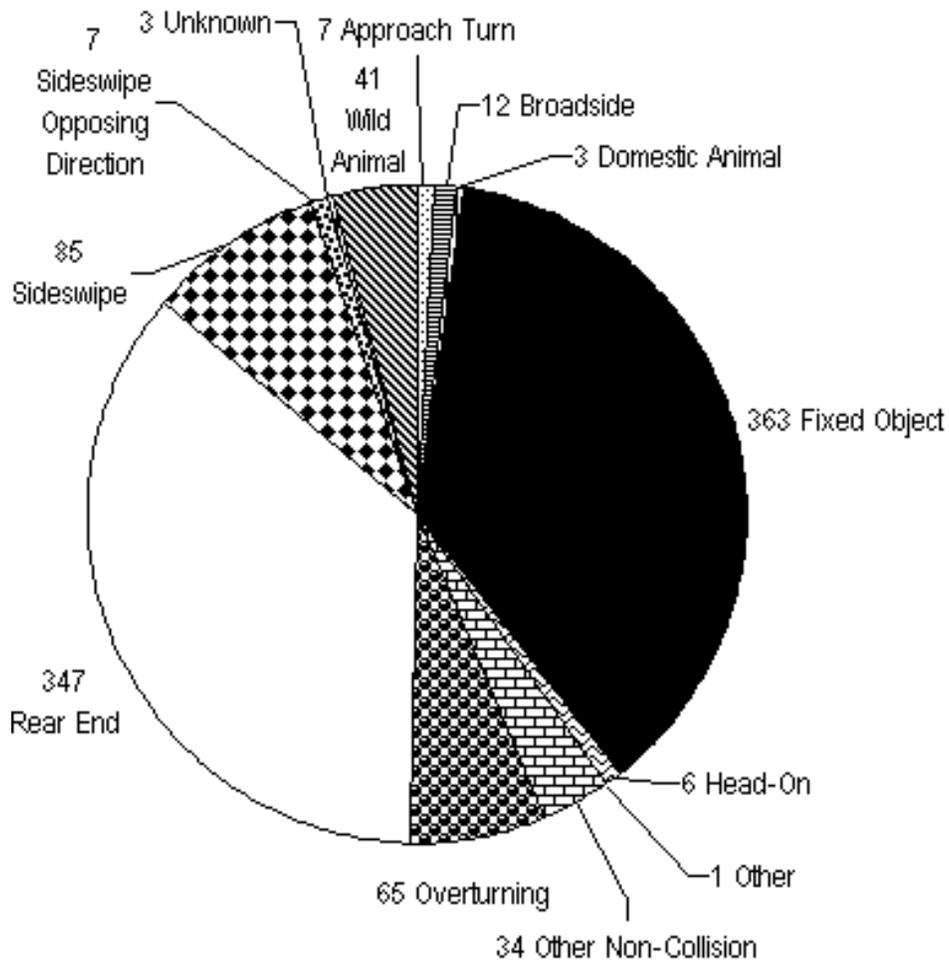
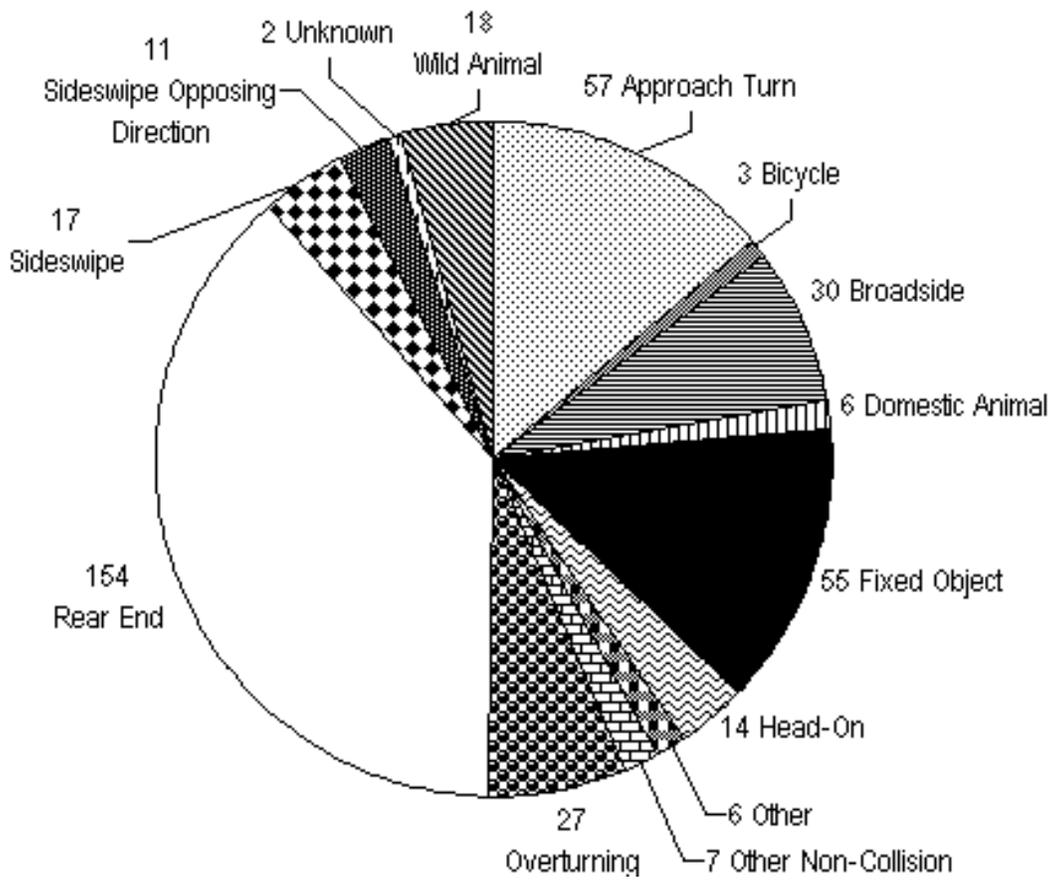


Figure 1.10
US 85 Corridor Crash Types and Number (1995 - 1997)



Source: CDOT

Table 1.5
I-25 Corridor Average Crash Rate (1995 - 1997)

Interchange	Number of Crashes (Three-Year Total)	ADT Volume	Crash Rate	Facility Classification
C-470	58	85,100	0.68	Urban
MP 194	45	85,100	0.53	Rural
Lincoln Ave	112	57,200	1.13	Rural
Schweiger	156	57,200	1.51	Rural
Surrey Ridge	101	57,200	1.28	Rural
Castle Pines Pkwy	102	54,700	1.10	Rural
Happy Canyon Rd	155	51,400	1.05	Rural
Meadows/Founders Pkwy	49	51,200	0.87	Urban
US 85/I-25 Interchange	90	58,800	0.98	Urban
Wolfensberger Rd	94	45,500	1.81	Urban
Plum Creek Pkwy				

1996 State Average Crash Rate: **1.92** crashes per million vehicle miles traveled on urban interstate
0.90 crashes per million vehicles miles traveled on rural interstate

US 85 Corridor Crash Rates

The 1996 statewide average crash rate for urban highways (US 85 near Castle Rock and north of Blakeland Drive) was 3.17 and 1.22 for rural highways (US 85 north of Meadows Parkway to Blakeland Drive).

Crash rates along US 85 are compared to the 1996 statewide average rates shown on Table 1.6. The segments along US 85 with a crash rate above the statewide average are located between Titan Road and Louviers Avenue and between County Line Road and the C-470 Interchange.

Types and patterns of crashes within each roadway segment (between interchanges or intersections) were analyzed to determine possible contributing factors and are detailed in the *I-25/US 85 Corridor Existing Traffic Operations Technical Report*, September 1999 and the *I-25/US 85 Corridor Existing Traffic Operations Technical Report Addendum*, May 2000.

1.5.2 Roadway Deficiencies

Roadway deficiencies affect both capacity and safety of a roadway. Existing deficiencies are described in the following text.

Table 1.6
US 85 Corridor Average Crash Rate (1995 - 1997)

Intersection	Number of Crashes (Three-Year Total)	ADT Volume	Crash Rate	Facility Classification
County Line Road	93	27,400	3.40	Urban
C-470 Interchange	45	28,700	1.02	Urban
Blakeland Drive	12	25,000	1.15	Rural
Town Center Drive	22	16,000	0.29	Rural
Highlands Ranch Parkway	37	16,000	1.20	Rural
Titan Road	47	12,600	1.83	Rural
Louviers Avenue	27	10,900	0.62	Rural
SH 67	39	8,700	1.18	Rural
Happy Canyon Road	25	8,700	0.99	Rural
Meadows Parkway	25	8,700	1.69	Urban
US 85/I-25 Interchange Ramps				

1996 State Average Crash Rate: **3.17** crashes per million vehicle miles traveled on urban highway
1.22 crashes per million vehicle miles traveled on rural highway

1.5.2.1 I-25 Corridor Roadway Deficiencies

The following roadway deficiencies have been identified along I-25:

- Within the project corridor, I-25 has several segments with steep grades, reaching a maximum grade of 4.7 percent. Steep grades cause significant slowing for heavy vehicles. Most crashes that occurred during the three-year period along the I-25 Corridor were rear-end collisions; this type of collision usually occurs as a result of vehicles slowing or stopped prior to the crash. Many of these crashes occurred between passenger cars and heavy vehicles. The addition of climbing lanes in each direction should reduce the number of rear-end collisions caused by slowing vehicles or slow-moving heavy vehicles. CDOT has completed the construction of the climbing lanes from Lincoln Avenue to Castle Pines Parkway and is currently constructing the climbing lanes from Castle Pines Parkway to Meadows/Founders Parkway as part of the Early-Action projects. For more detailed information, see the *I-25/US 85 Corridor Existing Traffic Operations Technical Report*, September 1999 and *I-25/US 85 Corridor Existing Traffic Operations Technical Report Addendum*, May 2000.
- Substandard acceleration/deceleration lanes exist along I-25. These lanes are not long enough to meet CDOT's design standards. They are unsafe, forcing vehicles to merge into traffic before fully accelerated and to decelerate faster than the standards. The Early-Action projects will upgrade the acceleration/deceleration lanes between Lincoln Avenue and Meadows/Founders Parkway. The area from Meadows/Founders Parkway to Douglas Lane will not be improved.
- The railroad bridge overpass north of Wolfensberger exit is geometrically deficient and needs replacing.

- Several inadequate interchanges along I-25 that create congestion and safety problems include the following:
 - The Schweiger Interchange consists of two stop-controlled hook ramps leading into a roadway. Each hook ramp has a deceleration lane leading to the ramp and an acceleration lane leading from the ramp. This awkward interchange decreases vehicle mobility and is not adequate for a major interstate.
 - The Surrey Ridge Road Interchange consists of hook ramps leading into a stop-controlled intersection. Each hook ramp has a deceleration lane leading into the ramp and an acceleration lane leading from the ramp. This awkward interchange decreases vehicle mobility and is not adequate for a major interstate.
 - The Plum Creek Parkway Interchange is comprised of hook ramps for the northbound movements while the southbound movements use a partial diamond interchange. This interchange requires vehicles to access I-25 via downtown Castle Rock, which adds more vehicles to the local Castle Rock traffic and does not provide direct access to I-25.

1.5.2.2 US 85 Corridor Roadway Deficiencies

Multiple roadway deficiencies identified along US 85 include the following:

- Narrow lanes (between 3 meters and 3.6 meters [9 feet and 12 feet]) and inadequate shoulders exist along US 85 from Happy Canyon Road to Titan Road. These deficiencies make it difficult to maintain through traffic when a vehicle is pulled onto the shoulder. Narrow shoulders also reduce the driver's ability to recover safely from slight swerves or driving errors.
- Few passing opportunities exist along US 85, making it difficult to pass slow-moving vehicles. Frustration and inability to pass leads to road rage and inappropriate behavior (e.g., passing on shoulders and in no-passing zones).
- The lack of acceleration and deceleration lanes creates hazards for motorists entering and exiting the highway. Traffic slows, congestion increases, and safety hazards result when slow traffic pulls onto the highway and when vehicles slow for a turn.
- Multiple access points that are closely and inconsistently spaced impair traffic flow and increase the potential for crashes.
- Inadequate sight distance due to vertical and horizontal alignment results in unsafe attempts to pass and impairs traffic flow because of inability to pass.
- Inadequate capacity for crossings and turns at intersections creates congestion when turning vehicles slow or stop through traffic because trains and cross traffic prevent drivers from completing turns.
- Many wildlife species use habitat on both sides of US 85. At-grade crossings of wildlife moving between

habitat types create hazards to wildlife and motorists.

1.6 MOBILITY

Mobility is the degree of ease by which people travel from one point to another. One purpose of the South I-25 Corridor and US 85 Corridor EIS is to increase mobility in the study area. Currently more than 77,500 vehicles (approximately 93,000 person trips, assuming 1.2 people per vehicle) a day travel on I-25 between Happy Canyon Road and Lincoln Avenue. US 85 handles more than 37,600 vehicles (approximately 44,400 person trips) daily north of Titan Road up to C-470. The 2020 projections show 183,000 vehicles (219,960 person trips) on I-25 between Happy Canyon Road and Lincoln Avenue and 31,500 vehicles (37,800 person trips) on US 85 north of Titan Road.

The I-25 Corridor is the major north-south corridor in Colorado, connecting the major front-range metropolitan communities of Fort Collins, Denver, Colorado Springs, and Pueblo. Three major business destination points in Colorado are the Denver CBD, the SEBD, and Colorado Springs. Roadways serving these areas have large volumes due to commuters driving to and from work. The I-25 Corridor provides access to all three areas. US 85 provides access to C-470, which converges with I-25 approximately 1.6 kilometers (1 mile) south of the SEBD, and approximately 24.1 kilometers (15 miles) south of the Denver CBD. The southern end of US 85 permits access to southbound I-25, thus providing access to Colorado Springs.

In addition to serving Colorado, I-25 is only north/south interstate highway linking southern states (Texas, New Mexico, and Oklahoma), through Colorado, to northern states (Wyoming and Montana). Due to the North American Free Trade Agreement (NAFTA), I-25 also acts as a freight corridor, linking Mexico, the United States, and Canada. The ability of I-25 to fulfill its national and statewide function is vital to the state's economy.

1.7 SYSTEM LINKAGES

System linkages are the relationship between the study area and the existing and/or potential transportation system. Proposed improvements must be compatible with the local network, connecting transit systems (LRT and bus), existing railroads, and bicycle facilities.

1.7.1 Local Network

The local network consists of local roads and arterials within the community. Douglas County and Castle Rock local networks connect to I-25. I-25 is sometimes used as part of the local network because no other convenient north/south transportation alternatives exist through Castle Rock and northern Douglas County.

The local street networks of Louviers, Sedalia, Highlands Ranch, and Castle Rock connect to US 85. US 85 is used for commuting and residential and commercial local access. US 85 has multiple access points such as residential driveways, business driveways, and street intersections. These multiple access points make US 85 part of the local community network.

1.7.2 Light Rail Transit Connections

The Southeast Corridor Project provides for the construction of an LRT system to extend the existing LRT along I-25 from the Broadway Park and Ride to north of Lincoln Avenue (the I-25 Corridor northern terminus). The 14-

km (8.7-mile) Southwest I-25 Corridor LRT line has recently been constructed and is in service along Santa Fe (US 85) ending at Mineral Avenue, just north of the US 85 Corridor northern study limit.

1.7.3 Bus Connections

An intra-city shuttle bus operates between Castle Rock's CBD and the Prime Outlets (a group of outlet shopping stores).

Most of the study corridor is located outside the boundaries of the RTD system. The only RTD bus operating in the study area is the Highlands Ranch Town Center Express. Two other RTD bus routes are adjacent to the study corridor: the first route serves Franktown and Parker and accesses I-25 at Lincoln Avenue; the second route serves the SEBD, ending at I-25 and Lincoln Avenue.

1.7.4 Freight Rail

The Burlington Northern Santa Fe Railroad and the Union Pacific Railroad are located on the west side of US 85. After US 85 ends at the merge point with I-25 (north of the Wolfensberger Interchange), the Burlington Northern Santa Fe Railroad continues along the west side of I-25, and the Union Pacific Railroad crosses I-25 to the east side and runs through the Town of Castle Rock. Both railroads converge to the west side of I-25 in the vicinity of Larkspur, south of the project area. The Burlington Northern Santa Fe and Union Pacific Railroad lines are currently serving approximately 40 trains daily to transport freight. Although most of the freight traffic is through traffic, there is one local stop at Big Lift, which is in the Louviers area.

1.7.5 Bicycle Facilities

Biking for transportation as well as recreation is a popular activity in Douglas County. Currently, four maintained trails exist within the project area: Centennial Bike Trail, High Line Canal Trail, East Plum Creek Trail, and Front Street Trail. Several agencies and organizations within the county are in the process of developing a vision for interconnecting existing trails and creating new trails (see Section 4.2.5.1, *Hiking/Bike Trails*).

1.8 ECONOMIC DEVELOPMENT

The study corridor is undergoing abundant growth and development. Rapid economic development and land use changes have accelerated the need for transportation improvements. It is important to examine existing and future land uses to provide a network that addresses demand.

1.8.1 Land Use

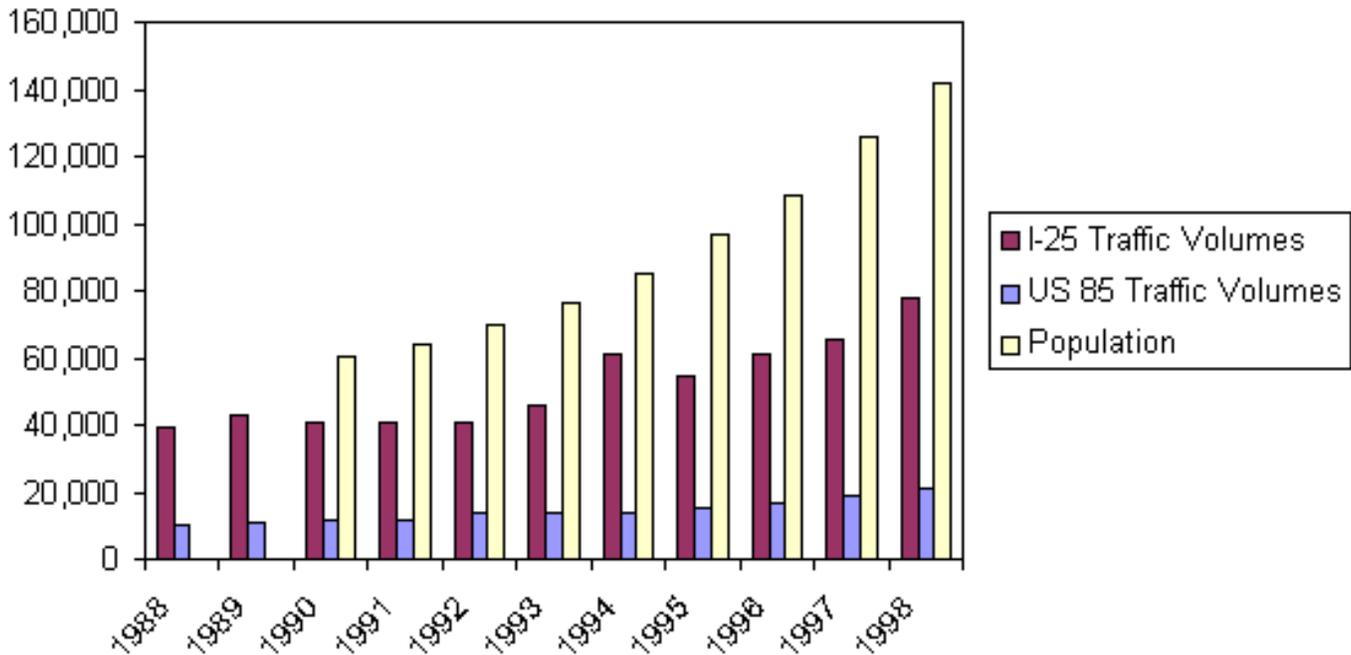
Land use is the main factor in developing travel demand projections. Once the type (residential or commercial) and size of the land use is known, population and employment projections can be determined. Regional growth, household size, income, and employment type influence the projected transportation demand.

From 1980 to 1990 the population in Douglas County nearly doubled from 35,238 to 60,391. Douglas County had an average annual growth rate of 12 percent (between 1991 and 1998), making it one of the fastest growing counties in the country. In 1998 142,000 people lived in Douglas County; the estimated 2020 population is

385,000. This figure reflects the county's analysis of building permits and other data and recent growth trends in the state and metropolitan area.

Population increases have led to increased traffic volumes. From 1988 to 1998, I-25 and US 85 had an average traffic growth of 114 and 97 percent, respectively. This figure equates to an average annual growth rate of 7.1 percent along I-25 and 6.3 percent along US 85. Figure 1.11 shows the historical population and ADT volumes within Douglas County over the past ten years.

**Figure 1.11
Historic Douglas County Population and Average Daily Traffic Volumes**



Note: 1988 and 1989 population data not available.

Several developments along the study corridor, both residential and commercial, are in the planning stage. Further development of the SEBD will create numerous employment opportunities on the north side of the I-25 Corridor. The area's business growth directly affects residential growth. The tremendous growth of the Highlands Ranch area is indicative of the corridor's expansive growth. The proposed Rampart Range Development south of Lincoln Avenue is indicative of growth yet to come.

The Meridian International Business Center is a commercial and residential development (750 single-family unit) adjacent to the Lincoln Avenue Interchange. The development is considered part of the SEBD, which also includes the Denver Technological Center (DTC). Douglas County (as stated in the Master Plan) is trying to keep "separate, identifiable communities, while most of the Denver metropolitan area is made up of one continuous city." The Meridian fits into this overall vision by concentrating the commercial areas in the northern part of Douglas County as an extension of the DTC.

The Rampart Range Development is being proposed adjacent to I-25, approximately 1,460 meters (4,800 feet) south of Lincoln Avenue. The Rampart Range Development Group has projected 8 to 10 million commercial square feet and 8,000 to 10,000 dwelling units by 2020 based upon market potential. The development is

scheduled to be constructed in eight phases, with the last phase completed by 2040. The development includes a Town Center that provides activities for the community. The Rampart Range Development Group, along with the City of Lone Tree, is evaluating the benefits of an interchange along I-25.

The Douglas Lane Interchange is being proposed along I-25 approximately 1,450 meters (4,750 feet) south of Plum Creek Parkway. Three development projects are being planned in Southern Douglas County near Douglas Lane. The three developments total approximately 4,330 dwelling units in the Douglas Lane Interchange area.

The loop ramp at Castle Pines Parkway is being examined in response to proposed development in the area. The Canyons residential development is proposed east of I-25 on roughly 1,416 hectares (3,500 acres) between Happy Canyon Road and Castle Pines Parkway. There is also a separate piece, referred to as the Southern Piece, of the development located on roughly 809 hectares (2000 acres) away from I-25 and closer to Crowfoot Valley Road. Currently, the northern section of the plan calls for the lots to be situated approximately 762 meters (2,500 feet) east of I-25 and on east-facing slopes. Approximately 600 dwelling units are planned for construction within the next 5 years with most located in the northern section. Complete build-out of the total 2,226 hectares (5,500 acres) will occur over the next 20 years.

1.8.2 Transportation Plans

Transportation plans adopted by governing bodies in the study area include the *1994 Castle Rock Town Wide Transportation Plan*, the *Douglas County 2015 Transportation Plan*, the *DRCOG Metro Vision 2020 Plan*, and the *DRCOG 1999 Regional Transportation Plan (RTP)*. The *1994 Town of Castle Rock Transportation Plan* recommended the following:

- Upgrade the I-25 Meadows/Founders Interchange to a partial cloverleaf design (completed)
- Convert the I-25/US 85 Interchange to a local service crossing of I-25 only (Early-Action project)
- Retain Liggett Road as a crossing of I-25
- Upgrade the I-25 Wolfensberger/Wilcox Interchange and supplement this crossing of I-25 with a new 5th Street Bridge (Early-Action project)
- Upgrade the Plum Creek Parkway Interchange as a long-term goal

The *Douglas County 2015 Transportation Plan* is an element of the *Douglas County Master Plan* completed in 1997. The plan outlines transportation improvements that will be needed in Douglas County in 5-year increments for the next 15 years. Some improvements related to the study area include:

- Construct 5th Street overpass across I-25 (Early-Action project)
- Widen Meadows/Founders Interchange at I-25 from two to four lanes (completed)
- Widen Titan Road between Moore Road and US 85 from two to four lanes

- Construct four-lane facility and bridge overpass at the existing US 85/I-25 Interchange (Early-Action project)
- Install traffic signals on ramp at Plum Creek Parkway and I-25 Interchange
- Improve intersection at Wolfensberger and County Road 105
- Construct a four-lane facility extension of Peoria Street between E-470 and Potomac
- Widen US 85 between Highlands Ranch Parkway and Meadows Parkway from two to four lanes
- Widen I-25 from Meadows Parkway to Wolfensberger from four to six lanes
- Widen US 85 from County Line Road to Highlands Ranch Parkway from four to six lanes
- Widen Meadows Parkway between I-25 and US 85 from four to six lanes

The ***DRCOG Metro Vision 2020 Plan*** is the Denver region's plan for addressing future growth of the metropolitan area. The plan outlines strategies and implementation steps to preserve the region's quality of life while also positioning the region to benefit from growth. The plan is organized around six core elements addressing the development pattern of the region, the necessary transportation system, and the actions needed to preserve air quality and water quality. The six core elements are:

- Extent of urban development
- Open space
- Free-standing communities
- Balanced/multi-modal transportation system
- Urban centers
- Environmental quality

The DRCOG 2020 RTP is the fiscally constrained version of the ***DRCOG Metro Vision 2020 Plan***. It includes those elements of the Metro Vision that can be provided through the year 2020, based on reasonably expected revenues.

Elements included in the DRCOG 2020 RTP along the I-25 Corridor include:

- Eight lanes from C-470 to Meadows/Founders Parkway
- Six lanes from Meadows/Founders Parkway to Douglas Lane

- Half-diamond interchange at Schweiger
- Three-quarter diamond interchange at Surrey Ridge Road
- Car pool lot

Elements included in the DRCOG 2020 RTP along the US 85 Corridor include:

- Six lanes from C-470 to Highlands Ranch Parkway
- Four lanes from Highlands Ranch Parkway to Meadows Parkway

Improvements to the transportation system in the I-25 Corridor and US 85 Corridor are crucial for growth and to maintain acceptable roadway LOS and safety in Douglas County.

1.9 SUMMARY OF DEIS COMMENTS

One of the purposes of the FEIS is to address all comments received during the DEIS formal comment period. Of the 152 letters received during the DEIS formal comment period, 26 letters were agency comments and 126 letters were public comments. Generally, comments were made on the project limits, process, Long-Term Vision, Early-Action projects, I-25 alternatives and design, US 85 alternatives and design, environmental issues, funding, and travel demand. Comments on I-25 included anything from the mainline widening to the frontage road to the Surrey Ridge Road Interchange, Schweiger Interchange, Rampart Range Interchange, and Douglas Lane Interchange. Comments on US 85 included anything from the mainline widening to traffic signals to access issues. These comments have been addressed throughout the FEIS process. The responses to these comments, including comments received at the DEIS public hearings, are included in Volume 2.

Three major issues were raised throughout the EIS process. These issues included the request for a bicycle/pedestrian facility along US 85, a concern for wildlife crossings along US 85, and various proposed alternatives for the Surrey Ridge Road/I-25 Interchange and the Schweiger/I-25 Interchange.

1.9.1 Bicycle/Pedestrian Facility

Concern: Several agencies and individuals requested a detached bicycle/pedestrian facility along US 85.

Solution: Throughout the EIS process, CDOT coordinated with the various agencies in developing a bicycle/pedestrian facility along the US 85 Corridor. There are several elements along the US 85 Corridor that restrict the amount of a detached facility. These elements include residents, businesses, and Section 4(f) properties. The Preferred Alternative includes a bicycle/pedestrian facility where the location (attached, detached, widen shoulder) varies along the corridor. For additional information on the bicycle/pedestrian facility, see Section 2.7: *Bicycle and Pedestrian Facilities along the US 85 Corridor*.

1.9.2 Wildlife Crossings

Concern: The US 85 Corridor bisects open space land used by wildlife. Widening of US 85 increases the barrier

to wildlife attempting to cross over US 85 and further fragments deer and elk habitat.

Solution: Based on the wildlife crossing concerns, CDOT conducted a wildlife tracking study to identify the types of animals crossing under and over US 85. This study assisted in the identification of two wildlife crossing enhancements that are included in the Preferred Alternative. These two wildlife crossings are developed to meet the Colorado Division of Wildlife suggested design to accommodate elk (the largest animal to potentially cross). For additional information on the wildlife crossings, see Section 2.8: *Wildlife Crossings along the US 85 Corridor*.

1.9.3 Surrey Ridge Road Interchange and Schweiger Interchange

Concern: Based on safety issues, CDOT must either improve the Surrey Ridge Road Interchange and Schweiger Interchange or remove the existing ramps to these interchanges. Residents currently accessing I-25 through these interchanges have expressed concern over changes being proposed to their access.

Solution: Throughout the EIS process, CDOT has presented numerous improvement options for both the Surrey Ridge Road/I-25 Interchange and the Schweiger/I-25 Interchange. In addition, based on comments received at the November public open houses, CDOT has added variations of the Preferred Alternative and Other Alternative to the FEIS. CDOT also met with the Douglas County Commissioners to get their input. The final configurations will be determined after the FEIS public hearings, based on public/agency input and additional technical analysis. For additional information on the proposed variations, see Section 2.10: *Alternative Variations*.

For additional information on the public involvement process, see Section 2.2: *Public/Agency Involvement Process* and Volume 2 of this FEIS.

2.0 ALTERNATIVES

TABLE OF CONTENTS

<u>Section</u>	<u>Page</u>
<u>2.0 ALTERNATIVES</u>	1
<u>2.1 INTRODUCTION</u>	1
<u>2.2.1 Issues Team</u>	1
<u>2.2 PUBLIC/AGENCY INVOLVEMENT PROCESS</u>	2
<u>2.2.1 Issues Team</u>	2
<u>2.2.2 Technical Committee</u>	2
<u>2.2.3 Project Management Team</u>	2
<u>2.2.4 Ecological Resources Technical Advisory Committee</u>	3
<u>2.3 ALTERNATIVE EVALUATION PROCESS OVERVIEW</u>	3
<u>2.4 NO-ACTION ALTERNATIVE</u>	6
<u>2.4.1 I-25 Corridor Elements of the No-Action Alternative</u>	7
<u>2.4.2 US 85 Corridor Elements of the No-Action Alternative</u>	8
<u>2.5 PREFERRED ALTERNATIVE</u>	12
<u>2.5.1 I-25 Corridor Elements of the Preferred Alternative</u>	14
<u>2.5.2 US 85 Corridor Elements of the Preferred Alternative</u>	19
<u>2.5.3 Transportation Demand Management Program for Preferred Alternative</u>	26
<u>2.6 OTHER ALTERNATIVE</u>	45
<u>2.6.1 I-25 Corridor Elements of the Other Alternative</u>	47
<u>2.6.2 US 85 Corridor Elements of the Other Alternative</u>	53
<u>2.6.3 Transportation Demand Management Program for the Other Alternative</u>	60
<u>2.7 BICYCLE AND PEDESTRIAN FACILITIES ALONG THE US 85 CORRIDOR</u>	79
<u>2.8 WILDLIFE CROSSINGS ALONG THE US 85 CORRIDOR</u>	84
<u>2.9 ALTERNATIVE COSTS</u>	88
<u>2.10 ALTERNATIVE VARIATIONS</u>	88
<u>2.10.1 Variation 1</u>	88
<u>2.10.1 Variation 1</u>	88
<u>2.10.2 Variation 2</u>	88
<u>2.10.3 Variation 3</u>	88
<u>2.11 THE LONG-TERM VISION FOR SOUTH I-25 and US 85 THROUGH 2020 AND BEYOND</u>	91
<u>2.11.1 I-25 CORRIDOR LONG-TERM VISION ELEMENTS</u>	91

2.11.2 US 85 Corridor Long-Term Vision Elements	98
2.11.3 Responsibility of Long-Term Vision Elements	100
2.12 ALTERNATIVES ELIMINATED FROM CONSIDERATION	100
2.12.1 Alternatives Eliminated at Level 1: Eliminate Unrealistic Alternatives	101
2.12.2 Alternatives Eliminated at Level 2: Evaluation of Alternatives by Mode and Corridor	102
2.12.3 Alternatives Eliminated at Level 3: Evaluation of Packages by Corridor	109
2.12.4 I-25 and US 85 Transportation Management Alternatives	118
2.12.5 Other Alternatives Eliminated	118
2.12.6 DEIS Alternatives Eliminated	124

2.1 INTRODUCTION

This chapter presents the three alternatives (and three variations) still under consideration and the alternative evaluation process. The alternatives presented in this chapter are the result of an extensive public and agency process, combined with environmental and technical analysis. Elements of the public and agency process included several scoping meetings, numerous public meetings, neighborhood group meetings, one-on-one meetings, media outreach, project newsletters, a Web site, a project office, and various advisory committees.

From the public and agency scoping meetings, more than 80 alternatives for improvements were identified. A three-step evaluation process was used to progressively eliminate alternatives from further consideration. From this evaluation process, the Long-Term Vision for South I-25 and US 85 Through 2020 and Beyond was developed to meet the project objectives and community vision. Vision elements likely to be constructed over the next 20 years are presented and comparably evaluated in this Final Environmental Impact Statement (FEIS). This FEIS presents the evaluation of the No-Action Alternative, Preferred Alternative, and Other Alternative. The Other Alternative expands and modifies the elements included in the Preferred Alternative. The Preferred Alternative and Other Alternative were developed based on comments made during the Draft EIS (DEIS) formal comment period and through additional analysis. One of these alternatives, or an alternative developed from a combination of the three, will likely be the Selected Alternative presented in the ROD.

After the initial three-step alternative evaluation process that developed the Long-Term Vision Through 2020 and Beyond was completed, the I-25 project limits were extended from Lincoln Avenue to C-470. This extension was necessary to be compatible with the Southeast Corridor improvements and to provide lane continuity along I-25. A notice of intent to extend the corridor limits was published in the *Federal Register* on November 9, 1999. The Long-Term Vision and the alternatives evaluated in this FEIS reflect the project limit extension.

Sections of this chapter highlight the alternative evaluation process. The first section is a discussion of the public/agency involvement process that was completed throughout the EIS. The second section is an overview of the alternative evaluation process that was followed throughout the FEIS. The third section defines the No-Action Alternative, Preferred Alternative, Other Alternative, and Alternative Variations. The fourth section discusses the Long-Term Vision, which provides an overview of the community's vision for both corridors through 2020 and beyond. The fifth section provides additional detail of the evaluation process that developed the Long-Term Vision and the alternatives that were eliminated.

The Federal Highway Administration (FHWA) and the Colorado Department of Transportation (CDOT) have chosen the Preferred Alternative because it best meets the local communities needs and desires, fulfills the project objectives, and provides flexibility in future transportation needs.

2.2 PUBLIC/AGENCY INVOLVEMENT PROCESS

An extensive public/agency involvement process has been ongoing since the project began in October 1998. This process involves meeting with various community groups, agencies, developers, landowners, special interest groups, and the general public. Four committees/teams representing various interest groups met once or twice a month to discuss the project. Newsletters, a Web site, project hotline, and project office are used to enhance community outreach. The committee/teams that have been involved with this EIS process and a brief discussion of their responsibilities and membership are provided.

2.2.1 Issues Team

The Issues Team consists of representatives from the affected interests, community groups, special interest groups, and the general public. The Issues Team provides input into the EIS process and assesses and reviews recommendations. Their roles and responsibilities include the following activities:

- Provide insight into the planning process and stakeholders' concerns
- Ensure all ideas and concerns are considered throughout the process
- Disseminate project information to neighbors, community groups, and affected interests

2.2.2 Technical Committee

The Technical Committee is made up of agency staff including FHWA, CDOT, Federal Transit Administration (FTA), Federal Railroad Administration (FRA), Douglas County, Town of Castle Rock, Denver Regional Council of Governments (DRCOG), Regional Transportation District (RTD), Public Utilities Commission (PUC), City of Lone Tree, and Colorado Division of Wildlife (CDOW). Their roles and responsibilities include the following activities:

- Technical review of project reports
- Technical support and insight on agency issues and regulations
- Coordination and communication with their respective agency staff and/or elected officials
- Assistance in developing, screening, and evaluating alternatives

2.2.3 Project Management Team

The Project Management Team is an advisory group made up of CDOT, DRCOG, Douglas County, Town of Castle Rock, and the consultant team. The Project Management Team acts in an advisory capacity. Their roles

and responsibility include the following activities:

- Provide guidance, insights, and input to the consulting team throughout the EIS process
- Review project documents
- Communicate project status, issues, and recommendations to their agency

2.2.4 Ecological Resources Technical Advisory Committee

The Ecological Resources Technical Advisory Committee (ERTAC) is made up of agencies having interests or responsibilities with the ecology within the study area. ERTAC consists of representatives from CDOT, CDOW, Douglas County, Chatfield Basin Conservation Network, Shea Homes, Intermountain Rural Electric Association (IREA), Chatfield State Parks, Chatfield Basin Conservation Network, and the Cherokee Ranch Foundation. Their roles and responsibilities include the following activities:

- Provide support and guidance on ecological issues
- Perform technical review of project reports

These four teams are part of the ongoing public/agency involvement process, and have been involved throughout the alternative evaluation process. In addition to the above-mentioned formal committees/teams, 12 public open houses and 8 community meetings have been conducted throughout the alternative evaluation process. CDOT met periodically with a Douglas County trails group to obtain insight on the proposed bicycle/pedestrian facilities along US 85 as well.

2.3 ALTERNATIVE EVALUATION PROCESS OVERVIEW

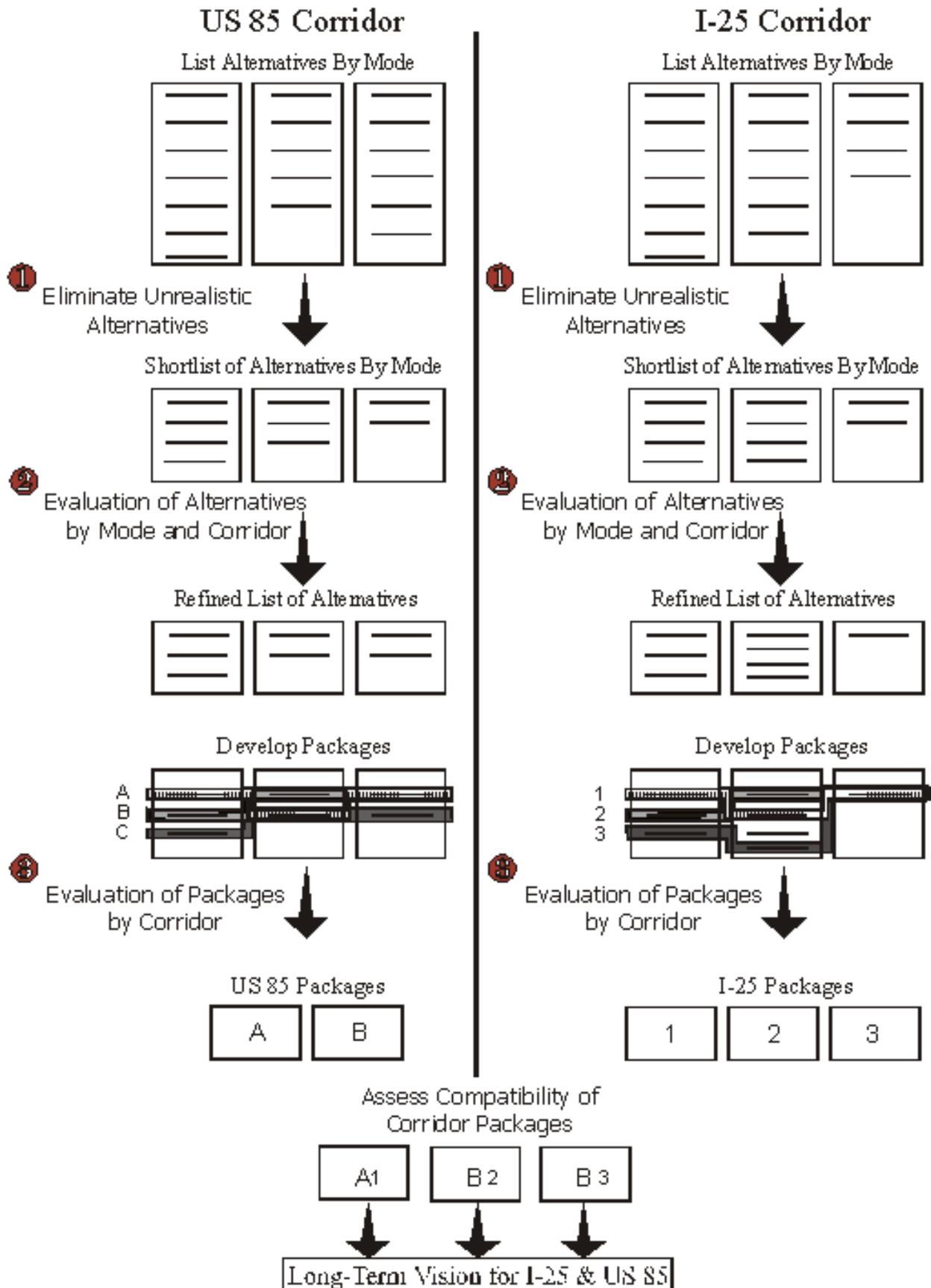
An evaluation process was used to evaluate more than 80 different alternatives for I-25 and US 85 and to reduce the number of alternatives to those that are most reasonable and best meet project objectives. The result of the evaluation process, combined with community input, is the Long-Term Vision for South I-25 and US 85 Through 2020 and Beyond. Based on financial constraints and demand, not all of the improvements can be constructed before 2020, which is the planning period for this study.

The South I-25 Corridor and US 85 Corridor Alternative Evaluation Process was developed with input from the public, the Issues Team, Technical Committee, Project Management Team, and ERTAC. The evaluation process applies progressively more finite criteria to the alternatives through three levels of evaluation. The evaluation process and Long-Term Vision analysis are displayed on Figure 2.1. As shown on Figure 2.1, the process uses a systematic approach to develop the best alternatives for each corridor.

To develop the Long-Term Vision, three evaluation levels were used: **1. Eliminate Unrealistic Alternatives**, **2. Evaluation of Alternatives by Mode and Corridor**, and **3. Evaluation of Packages by Corridor**. Alternatives were analyzed and compared at each level based on criteria from five categories: mobility, safety, environmental, implementation, and community values. These categories and respective criteria were developed from the project purpose and need, project objectives, public input, and environmental regulations. Table 2.1 outlines the criteria used for each level of evaluation. For additional information on the alternative evaluation process, please refer to

Section 2.12: Alternatives Eliminated From Consideration and the South I-25 Corridor and US 85 EIS Alternatives Evaluation Process, March 2000.

Figure 2.1
Alternative Evaluation Process





**Table 2.1
Alternative Evaluation Criteria**

Category	① Eliminate Unrealistic Alternatives	② Evaluation of Alternatives by Mode and Corridor	③ Evaluation of Packages by Corridor
	Yes / No	  	Corridor Measurements
Mobility	<ul style="list-style-type: none"> ➤ Is it compatible with existing or planned transportation system? 	<ul style="list-style-type: none"> ➤ Travel time between origin and destination pairs 	<ul style="list-style-type: none"> ➤ LOS on highway ➤ Travel time on mode ➤ Ridership on transit ➤ Capacity
Safety			<ul style="list-style-type: none"> ➤ Safety
Environmental		<ul style="list-style-type: none"> ➤ Amount of new right-of-way (ROW) required ➤ Number of disturbed acres 	<ul style="list-style-type: none"> ➤ Amount of new ROW required ➤ Number of disturbed acres ➤ Noise impacts ➤ Air quality
Implementation	<ul style="list-style-type: none"> ➤ Is this a proven technology in a comparable application? 	<ul style="list-style-type: none"> ➤ Ease of construction ➤ Capital costs 	<ul style="list-style-type: none"> ➤ Capital costs ➤ Operation/maintenance costs ➤ Does it require moving the railroad? ➤ User costs ➤ Cost per new user by mode
Community Values	<ul style="list-style-type: none"> ➤ Is this compatible with local goals and objectives? ➤ Does it preserve future transit options? 	<ul style="list-style-type: none"> ➤ Community/agency support ➤ Ease of use 	<ul style="list-style-type: none"> ➤ Communities/agencies support ➤ Change in vehicle miles traveled (VMT)

-  Least Favorable
-  Moderately Favorable
-  Most Favorable

After the Long-Term Vision was finalized, the elements that best addressed the purpose and need and could realistically be funded within the next 20 years were carried into the full DEIS alternative evaluation for

comparative analysis. The alternatives fully evaluated in the DEIS included the following:

I-25 Corridor Alternatives:

- Alternative 1: No-Action
- Alternative 2: Mainline Widening (Additional General-Purpose Lanes)
- Alternative 3: Mainline Widening (Additional General-Purpose Lanes), Interchange Improvements, and Frontage Road

US 85 Corridor Alternatives:

- Alternative A: No-Action
- Alternative B: Mainline Widening (Additional General-Purpose Lanes) and Reconstruction

The FEIS alternatives were developed based on public and agency comments on the DEIS alternatives and additional analysis. The FEIS alternatives being evaluated accommodate the Long-Term Vision elements and do not preclude any of the identified improvements. The FEIS alternatives being evaluated in this document include:

- No-Action Alternative
- Preferred Alternative
- Other Alternative

Characteristics of each of the three alternatives evaluated in this FEIS are discussed in the following sections. Two build alternatives are being fully evaluated in this FEIS to allow for the flexibility of selecting different improvement options based on the identified funding. Funding has been identified for the improvements included in the Preferred Alternative. However, funding has not yet been identified for all of the improvements included in the Other Alternative. These improvements are being evaluated in this FEIS so that if funding is identified, with the appropriate amendments, they may be constructed.

2.4 NO-ACTION ALTERNATIVE

The No-Action Alternative represents the conditions if improvements are not recommended as a result of this study. This Alternative consists of no major improvements other than the Early-Action projects that have already been committed and the construction of the Douglas Lane Interchange. These projects are independent projects and accepted as part of the No-Action Alternative. The No-Action Alternative also includes minor safety and maintenance improvements along I-25 and US 85 (e.g., pothole repair and re-striping). Early-Action projects and the Douglas Lane Interchange included in this alternative include the following activities:

- *Climbing Lanes, Phase I.* This project provides one additional lane in each direction along I-25 between Lincoln Avenue and Castle Pines Parkway designated (but not restricted) as climbing lanes for slow-

moving vehicles. The I-25 configuration after the completion of this project is six lanes between Lincoln Avenue and Castle Pines Parkway. This project was completed in October 2000.

- *Climbing Lanes, Phase II.* This project extends the Climbing Lanes Phase I project to Meadows/Founders Parkway. The I-25 configuration after the completion of this project is six lanes between Castle Pines Parkway and Meadows/Founders Parkway. This project is currently under construction and is scheduled to be completed in September 2002.
- *Meadows/Founders Parkway Interchange.* This project improved the existing diamond interchange deficiencies by constructing a partial cloverleaf interchange. This project was completed 1999.
- *Wolfensberger Road.* This project improves the existing I-25 interchange deficiencies by removing and replacing the south half of the Wolfensberger Road Bridge over I-25 and Plum Creek. This project is scheduled to begin construction in Fall 2001 and be completed in Fall 2002.
- *US 85/I-25 Interchange.* This project removes the existing US 85/I-25 Interchange ramps and reroutes traffic through the improved Meadows/Founders Parkway/I-25 Interchange. An overpass is constructed at the existing interchange location to connect the east side of Castle Rock to the west side. This project is scheduled to begin construction in Summer 2001 and be completed in Fall 2002.
- *5th Street Overpass.* This project improves the local Castle Rock transportation network by providing an overpass from 5th Street on the east side of I-25 to Park Street on the west side of I-25. This project began construction in October 2000.
- *US 85 and Titan Road Grade-Separated Intersection.* This project improves existing safety deficiencies of the railroad crossings by constructing a grade-separated intersection at US 85 and Titan Road and by providing grade separations with Titan Road and the Burlington Northern Santa Fe Railroad and Union Pacific Railroad. With the proposed design, traffic crossing the existing Union Pacific Railroad tracks at the existing at-grade crossing will be limited to local business access. Construction is scheduled to begin in October 2001.
- *Douglas Lane Interchange.* This project provides a new interchange along I-25 at Douglas Lane, approximately 1,450 meters (4,750 feet) south of Plum Creek Parkway. The interchange design is a single-point urban interchange. Funding for the Douglas Lane Interchange will be provided through the cooperative efforts of Douglas County, the Town of Castle Rock, and private entities.

In addition to these projects, other roadway improvements being completed by Douglas County and the Town of Castle Rock are part of the No-Action Alternative (i.e., improvements to local network and maintenance of existing systems). One such roadway improvement within the I-25 Corridor is the construction of a two-lane frontage road along I-25 from Sinclair Boulevard to Castle Rock on the west side of the Union Pacific Railroad and Burlington Northern Santa Fe Railroad tracks. Along the US 85 Corridor, roadway improvements include, but are not limited to, Daniels Park Road and widening Titan Road west of the Plum Creek Bridge.

2.4.1 I-25 Corridor Elements of the No-Action Alternative

Alignment, typical section, and cost for the No-Action Alternative along the I-25 Corridor is described in the

following sections.

2.4.1.1. I-25 Corridor Alignment for the No-Action Alternative

The No-Action Alternative is the existing alignment after construction of the Early-Action projects.

2.4.1.2 I-25 Corridor Typical Section for the No-Action Alternative

Typical sections for the No-Action Alternative are shown on Figure 2.2. This alternative consists of six general-purpose lanes between C-470 and Lincoln Avenue, four general-purpose lanes, and two climbing lanes between Lincoln Avenue and Meadows/Founders Parkway, and four general-purpose lanes between Meadows/Founders Parkway and Douglas Lane.

The six-lane section (the same typical as the four general-purpose lanes and two climbing lanes) includes 3.6-meter (12-foot) travel lanes, 3.6-meter (12-foot) outside shoulders, 3-meter (10-foot) inside shoulder, and a 0.6-meter (2-foot) concrete barrier separating the opposing traffic. The total typical section width is 35.4 meters (116 feet). On the outside shoulder of southbound I-25 between Schweiger and Surrey Ridge Road, a Type IV barrier is provided.

The four-lane section includes 3.6-meter (12-foot) travel lanes, 3.0-meter (10-foot) outside and inside shoulders, and a 9.1-meter (30-foot) grass median. The total typical section width is 35.5 meters (116.5 feet).

2.4.1.3. I-25 Corridor Cost for the No-Action Alternative

Because the No-Action Alternative consists of no additional major construction, there are no construction or right-of-way (ROW) costs associated with this alternative along the I-25 Corridor, beyond what is already committed.

2.4.2 US 85 Corridor Elements of the No-Action Alternative

Alignment, typical section, and cost for the No-Action Alternative along the US 85 Corridor is described in the following sections.

2.4.2.1. US 85 Corridor Alignment for the No-Action Alternative

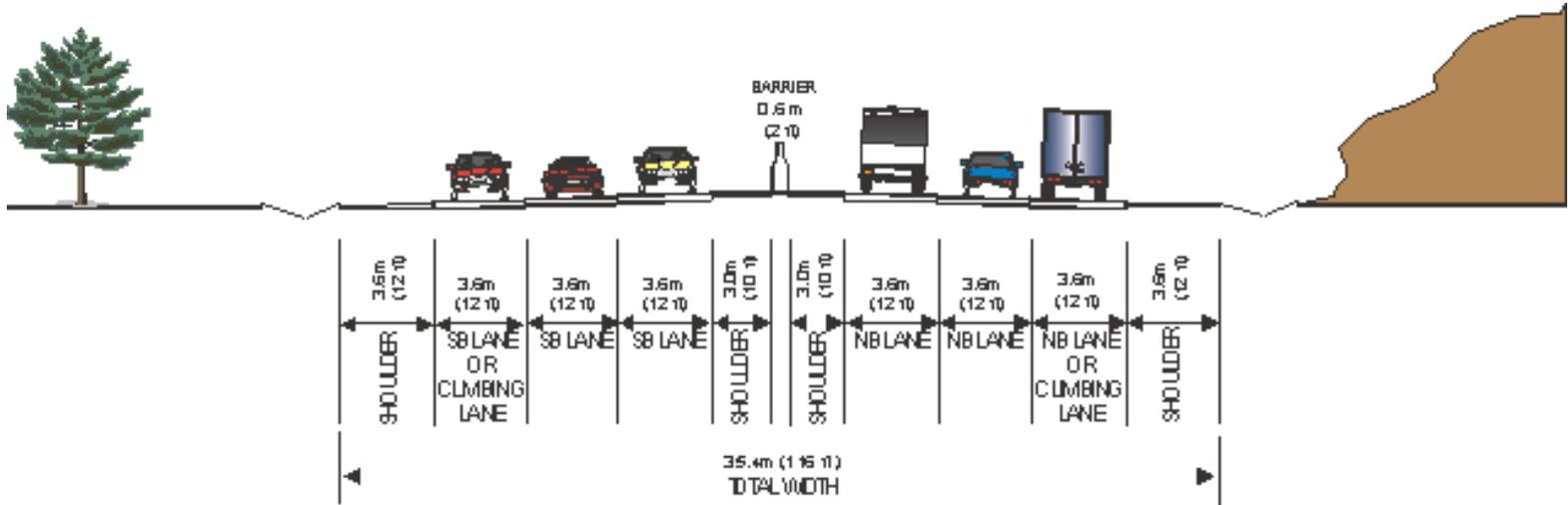
The No-Action Alternative is the existing alignment after the construction of the Early-Action projects.

2.4.2.2. US 85 Corridor Typical Section for the No-Action Alternative

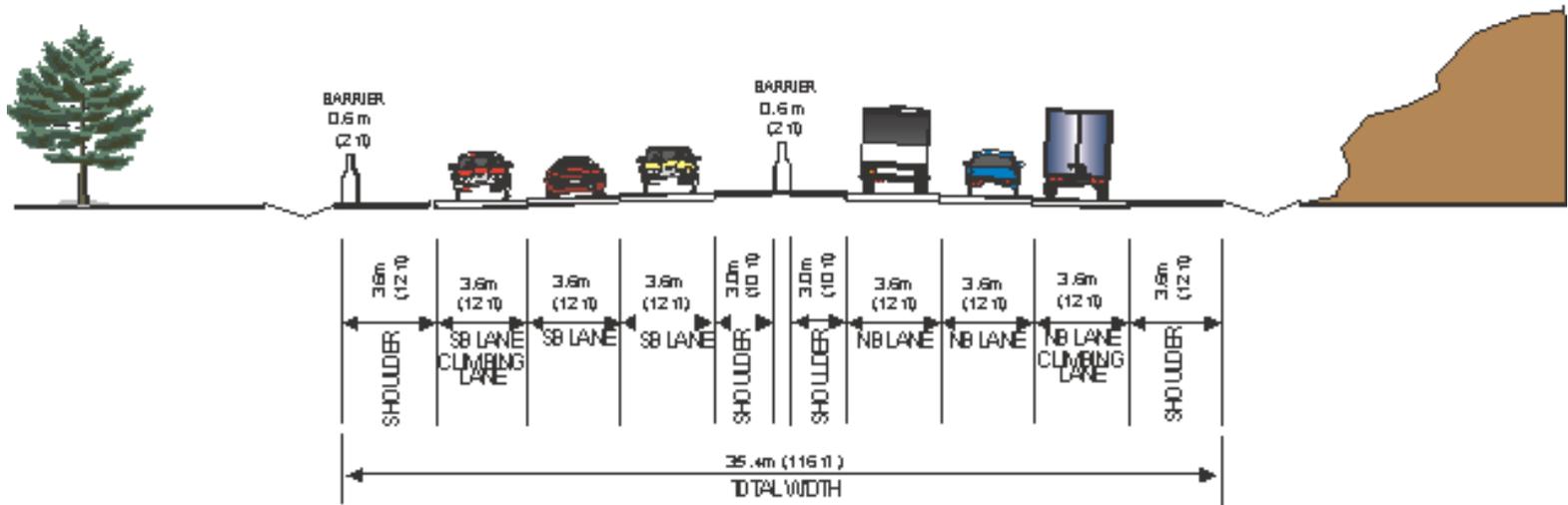
Typical sections for the No-Action Alternative are shown on Figure 2.3. This alternative consists of four lanes between C-470 and Highlands Ranch Parkway and two general-purpose lanes between Highlands Ranch Parkway and Meadows Parkway. Auxiliary lanes are included where they currently exist. The four-lane section includes four 3.6-meter (12-foot) travel lanes, various widths for the median ranging from 0 to 5 meters (0 to 16 feet), and various substandard widths for the outside shoulder ranging from 0.6 meter (2 feet) to 2.4 meters (8 feet). Total typical section width varies from 15.6 to 24.2 meters (51.2 to 79.4 feet).

Figure 2.3 also shows the two-lane typical section. This section includes 3.6-meter (12-foot) travel lanes and various substandard widths for the outside shoulder ranging from 0.6 meter (2 feet) to 2.4 meters (8 feet). Total typical section width south of Highlands Ranch Parkway varies from 8.4 to 12 meters (27.6 to 39.4 feet).

Figure 2.2
I-25 Corridor Typical Sections for the No-Action Alternative



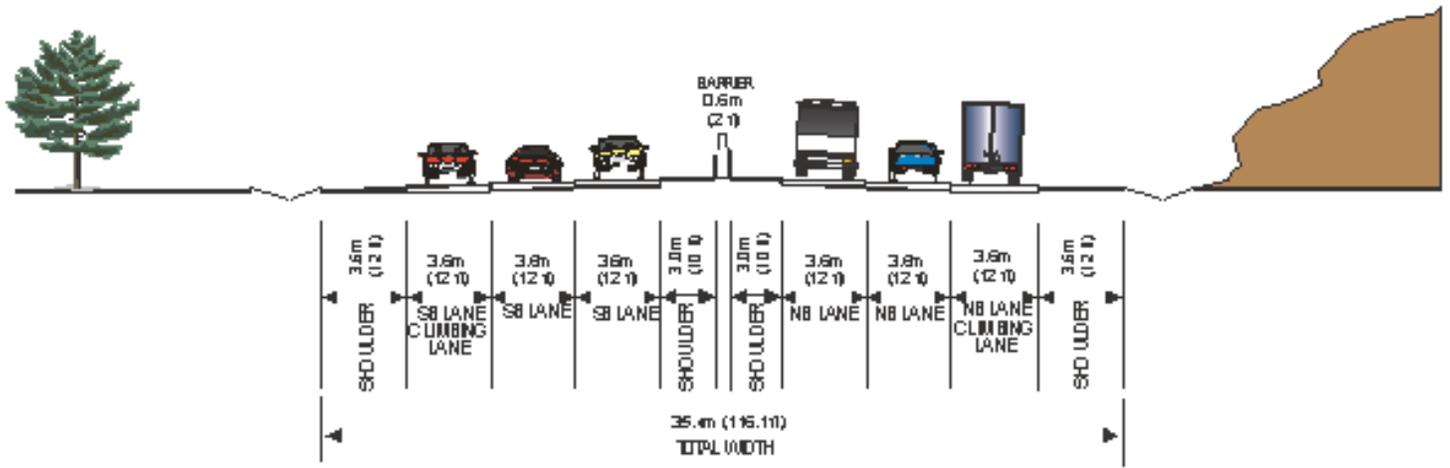
C-470 to Schweiger



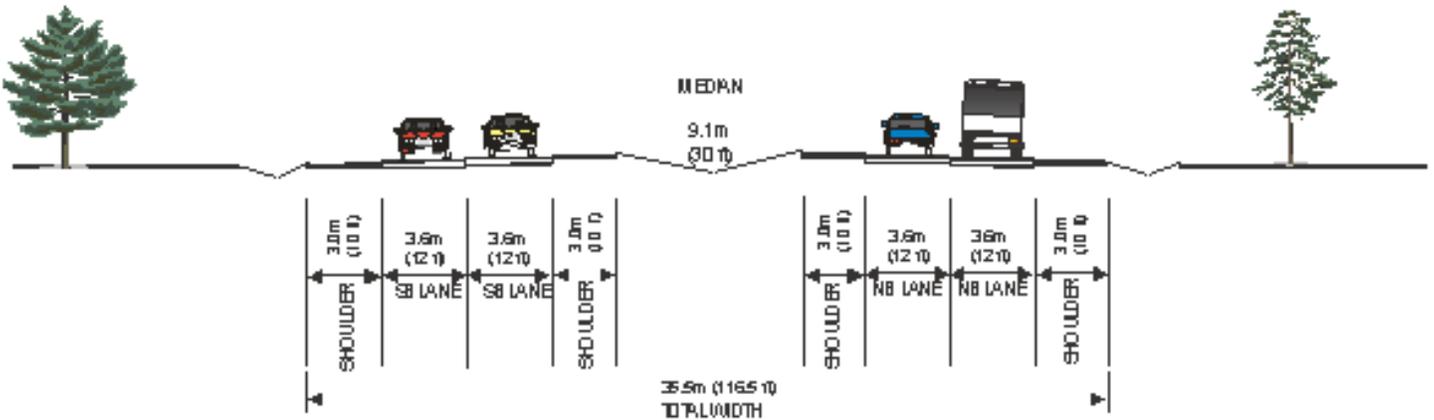
Schweiger to Surrey Ridge Road

Note: Numbers may not add due to rounding of metric unit/english unit conversions.

Figure 2.2 cont.
I-25 Corridor Typical Sections for the No-Action Alternative



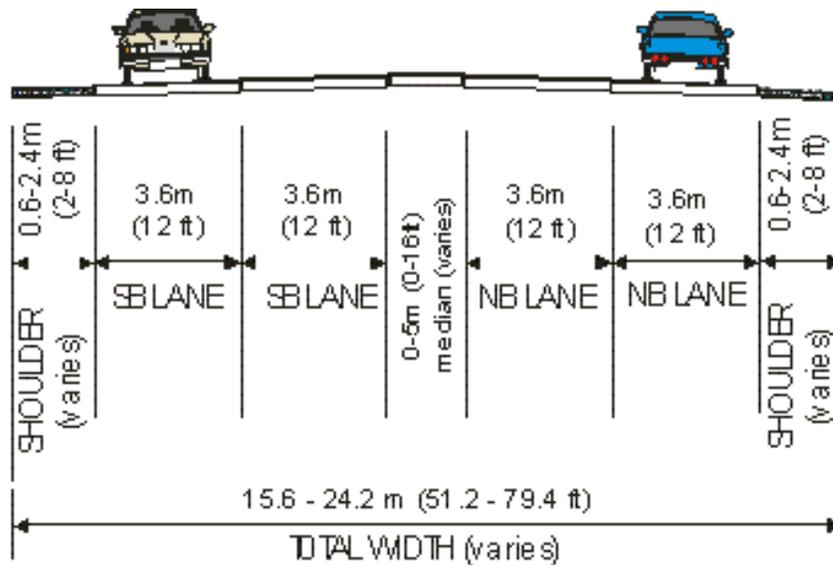
Surrey Ridge Road to Meadows/Founders Parkway



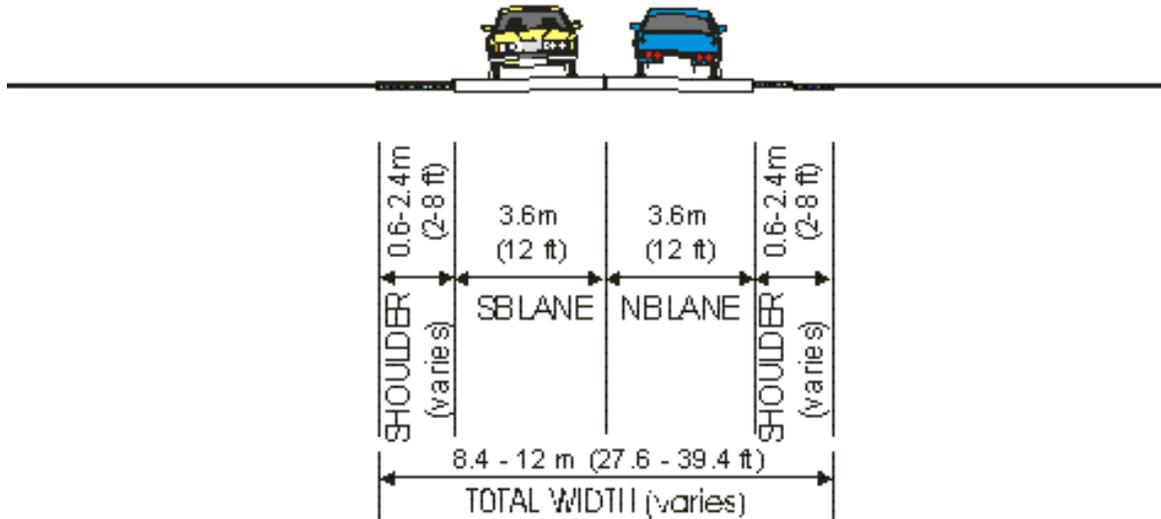
Meadows/Founders Parkway to Douglas Lane

Note: Numbers may not add due to rounding of metric unit/english unit conversions.

Figure 2.3
US 85 Corridor Typical Sections for the No-Action Alternative



C-470 to Highlands Ranch Parkway



Highlands Ranch Parkway to Meadows Parkway

Note: Numbers may not add due to rounding of metric unit/english unit conversions

2.4.2.3. US 85 Corridor Cost for the No-Action Alternative

Because the No-Action Alternative consists of no additional major construction, there are no construction or ROW costs associated with this alternative along the US 85 Corridor, beyond what is already committed.

2.5 PREFERRED ALTERNATIVE

The Preferred Alternative was developed based on comments made on the DEIS alternatives and additional analysis. The Preferred Alternative consists of improvements to the I-25 Corridor and US 85 Corridor such as

mainline widening, minor realignment, and interchange improvements. All Early-Action projects and the Douglas Lane Interchange are included in this alternative (see Section 2.4, *No-Action Alternative*). The Preferred Alternative is included in the DRCOG Regional Transportation Plan (RTP) (except the Douglas Lane Interchange) and is the responsibility of CDOT (includes federal, state, and local funds). A schematic of the Preferred Alternative is provided on Figure 2.4.

The FHWA and CDOT have chosen the Preferred Alternative because it best meets the local communities needs and desires, fulfills the project objectives, and provides flexibility in future transportation needs.

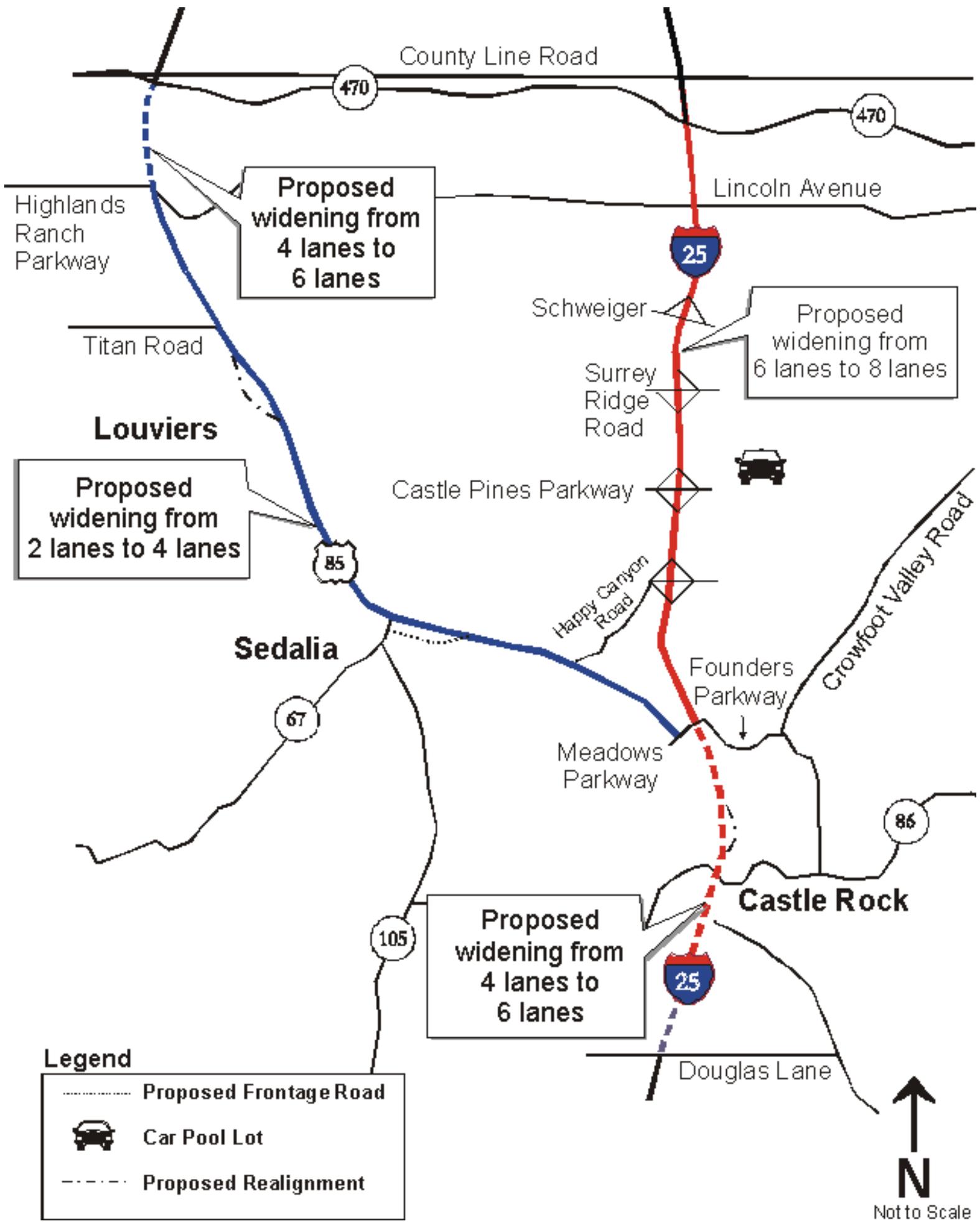
Major components of the Preferred Alternative along the I-25 Corridor include:

- Eight lanes (six through lanes and two climbing lanes) between C-470 and Meadows/Founders Parkway
- Six lanes between Meadows/Founders Parkway and Douglas Lane
- Reconstruction of the Schweiger Interchange into a half diamond interchange (improve and reconstruct northern ramps and remove southern ramps)
- Reconstruction of the Surrey Ridge Road Interchange into a three-quarter diamond interchange (improve southern ramps and northbound entrance ramp; remove southbound exit ramp)
- Car pool lot (accommodating 500 spaces) in northeast quadrant of the I-25 and Castle Pines Parkway Interchange
- Minor I-25 realignment to the east between Wolfensberger Road and Liggett Road
- Construction of a new bridge for the Union Pacific Railroad south of the existing bridge
- Supporting measures

Major components of the Preferred Alternative along the US 85 Corridor include:

- Six lanes between C-470 and Highlands Ranch Parkway
- Four lanes between Highlands Ranch Parkway and Meadows Parkway
- US 85/State Highway (SH) 67 Intersection reconfiguration

Figure 2.4
Preferred Alternative Schematic



- Sedalia frontage road
- US 85 minor realignment at Cook Ranch (approximate milepost [MP] 195.4)
- Bicycle/pedestrian facilities along US 85
- High Line Canal Trail grade-separated crossing under US 85
- Enhanced wildlife crossings
- Supporting measures

Acceleration lanes and deceleration lanes are constructed according to CDOT Design Standards at the interchanges. Retaining walls are added, or slope paving adjusted, under the interchange bridges to accommodate roadway widening.

The Southeast Corridor's ten general-purpose lanes will end on the north end of the C-470 Interchange where two lanes will be dropped in each direction on the north ramps. After a short stretch of six lanes, additional lanes are added at the County Line Road ramps for a total of eight lanes. Traffic studies show that the six-lane section will be sufficient due to the large percentage of entering and exiting vehicles on to and off of the C-470/E-470 Interchange. The six-lane section is between the C-470 north ramps and County Line Road ramps. Figure 2.5a (located at the end of this section) shows the connection to the Southeast Corridor improvements.

Total cost for the Preferred Alternative is \$151.6 million. For a breakdown of cost information, see Section 2.9, *Alternative Costs*. CDOT lacks sufficient funding to build all US 85 elements of the Preferred Alternative. CDOT and Douglas County are working together to find additional funding. If sufficient funds are not found prior to the Record of Decision (ROD), the project work will be prioritized. The Selected Alternative presented in the ROD will be based on available funding.

2.5.1 I-25 Corridor Elements of the Preferred Alternative

Alignment; typical section; changes in travel patterns, access, and safety; and cost for the Preferred Alternative within the I-25 Corridor are described in the following sections.

2.5.1.1. I-25 Corridor Alignment for the Preferred Alternative

The Preferred Alternative generally follows the existing alignment along the entire section of I-25 (between C-470 and Douglas Lane), with one minor realignment between Wolfensberger Road (MP 182) and Liggett Road (MP 182.5) where the existing centerline shifts to the east by 14 meters (46 feet).

As part of the Climbing Lanes Early-Action projects, the entire interstate is being reconstructed between Lincoln Avenue and Meadows/Founders Parkway, providing for three 3.6-meter (12-foot) travel lanes, 3.6-meter (12-foot) outside shoulder, and 3.0-meter (10-foot) inside shoulder in each direction. As part of the Preferred

Alternative improvements, between C-470 and Lincoln Avenue, the interstate is widened to the outside. From Lincoln Avenue to Meadows/Founders Parkway, the shoulder is converted to a travel lane and a new shoulder is constructed. Between Meadows/Founders Parkway and Douglas Lane, the entire interstate is reconstructed with widening primarily to the inside. Figure 2.5a through Figure 2.5i (included at the end of this section, Section 2.5, *Preferred Alternative*) illustrate the I-25 Corridor alignment for the Preferred Alternative.

2.5.1.2. Additional Major Improvements along the I-25 Corridor for the Preferred Alternative

In addition to the mainline widening, the Preferred Alternative includes:

- *Interchange Improvements to Schweiger Interchange and Surrey Ridge Road Interchange.* The existing Schweiger Interchange and Surrey Ridge Road Interchange are reconstructed into improved partial interchanges. The southern I-25 ramps at the Schweiger Interchange and the northwest I-25 ramp at the Surrey Ridge Road Interchange are removed. The remaining ramps are reconstructed according to CDOT design standards. This requires relocating approximately 300 meters (980 feet) of Clydesdale Road.
- *Castle Pines Parkway Car Pool Lot.* A new car pool lot in the northeast quadrant of the Castle Pines Parkway Interchange is constructed. The lot provides for 500 parking spaces and serves as a meeting place and parking area. The car pool lot can be built in phases, starting with a fewer number of parking spaces. The car pool lot may be converted into a park-and-ride lot once transit is operating within the corridor.
- *Union Pacific Railroad Bridge.* The existing Union Pacific Railroad crosses over I-25 just north of the Wolfensberger Road Interchange. The Preferred Alternative proposes realigning the Union Pacific Railroad Bridge 14 meters (46 feet) to the south of the existing alignment. As a result of this realignment, a new bridge for the Union Pacific Railroad is constructed, and the existing bridge is removed. If ROW issues cannot be resolved with Union Pacific Railroad, the bridge will be reconstructed at the existing location.
- *Plum Creek Parkway Bridges and Plum Creek Bridges.* The Plum Creek Parkway Bridges and the Plum Creek Bridges are widened and rehabilitated.

2.5.1.3. I-25 Corridor Typical Section for the Preferred Alternative

The Preferred Alternative along the I-25 Corridor consists of eight general-purpose lanes between C-470 and Lincoln Avenue, six general-purpose lanes and two climbing lanes (designated for, but not restricted to slow-moving vehicles) between Lincoln Avenue and Meadows/Founders Parkway, and six general-purpose lanes between Meadows/Founders Parkway and Douglas Lane. Continuous auxiliary lanes are provided between C-470 and Lincoln Avenue, Lincoln Avenue and Schweiger Interchange, and Wolfensberger Road and Plum Creek Parkway. Figure 2.6 shows the typical sections for the Preferred Alternative.

Each lane in the typical eight-lane section of I-25 between C-470 and Lincoln Avenue is 3.6 meters (12 feet) wide. In order to accommodate the proposed improvements in the Southeast Corridor, a southbound inside shoulder variance of 1.2 meters (4 feet) (to be approved by the FHWA) and an outside shoulder of 3.0 meters (10 feet) is included. The northbound inside shoulder is 3.0 meters (10 feet) wide and the outside shoulder is 3.6 meters (12 feet) wide. A concrete barrier 0.6 meter (2 feet) wide, 0.9 meter (2.8 feet) high separates opposing traffic. The total width of the eight-lane typical section is 40.2 meters (132 feet).

Figure 2.6
I-25 Corridor Typical Sections for the Preferred Alternative

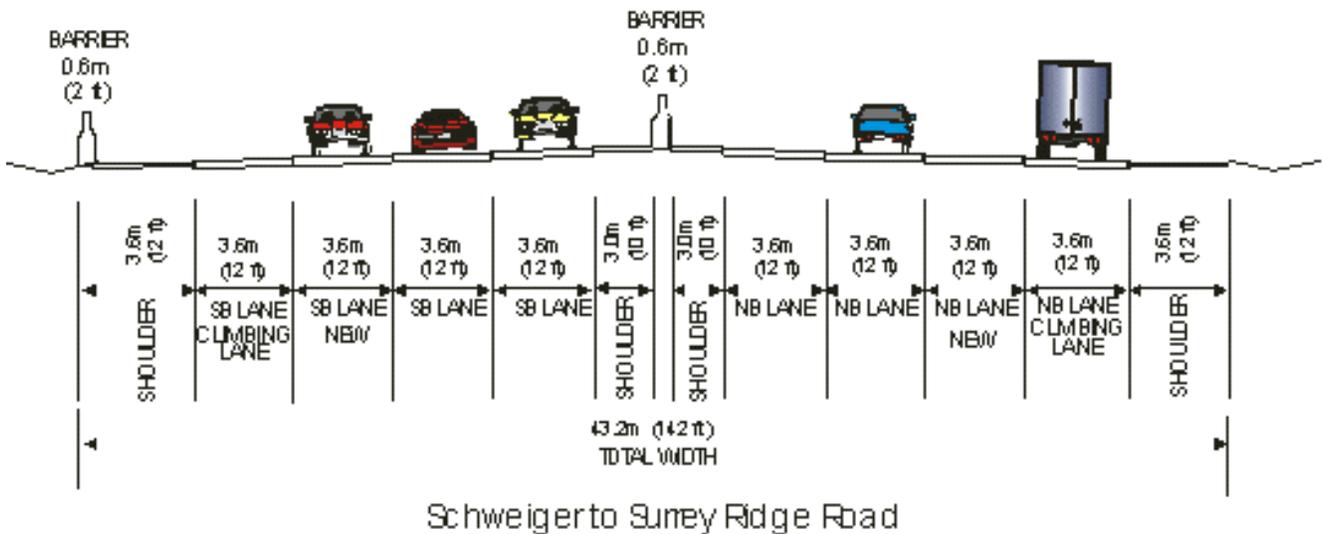
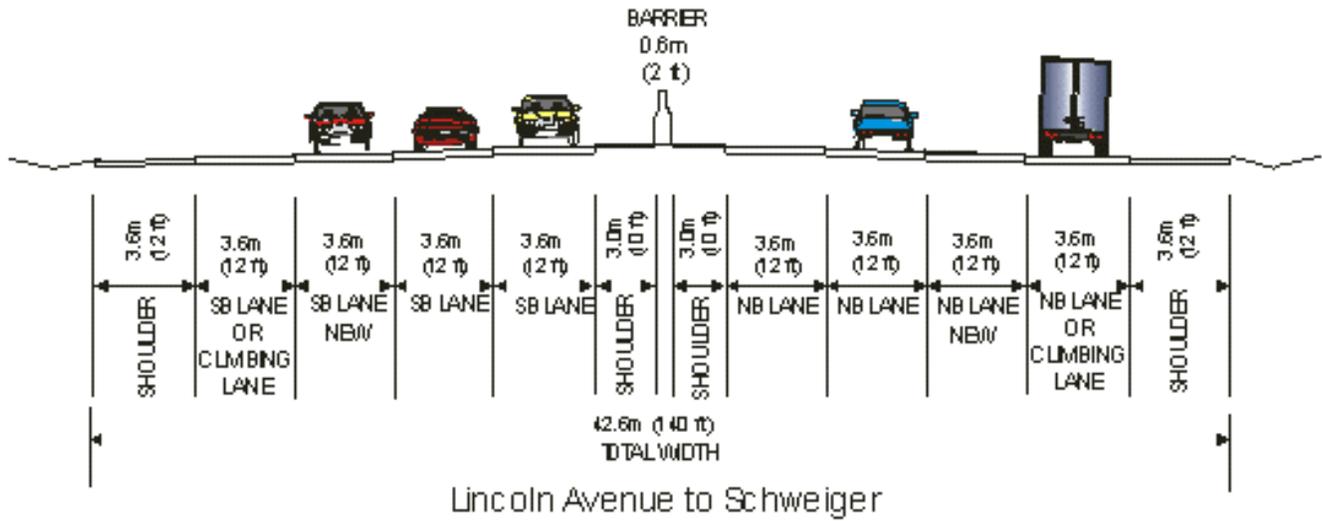
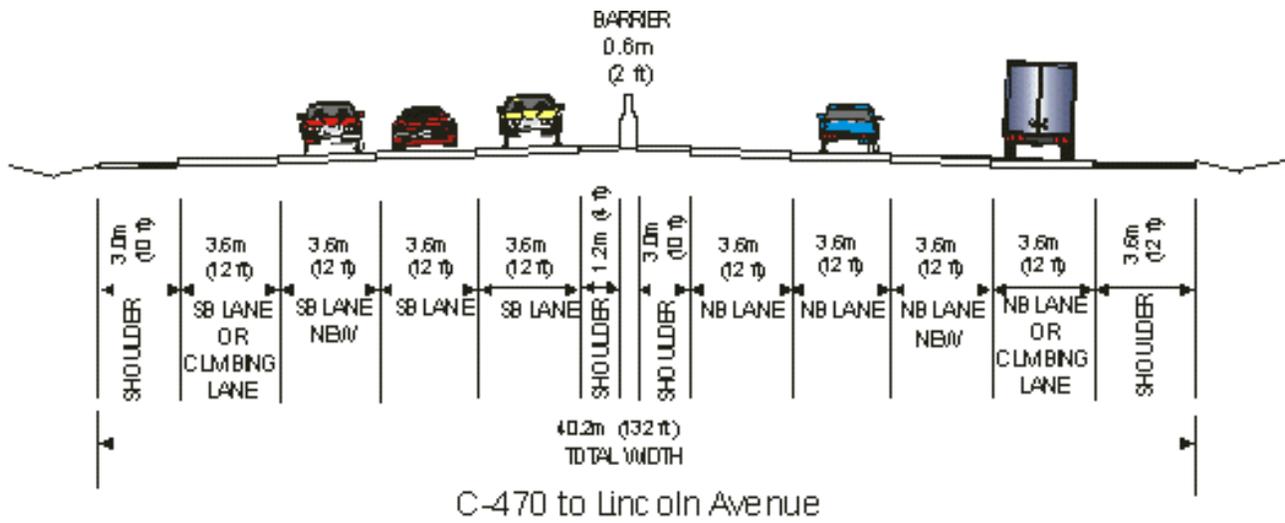
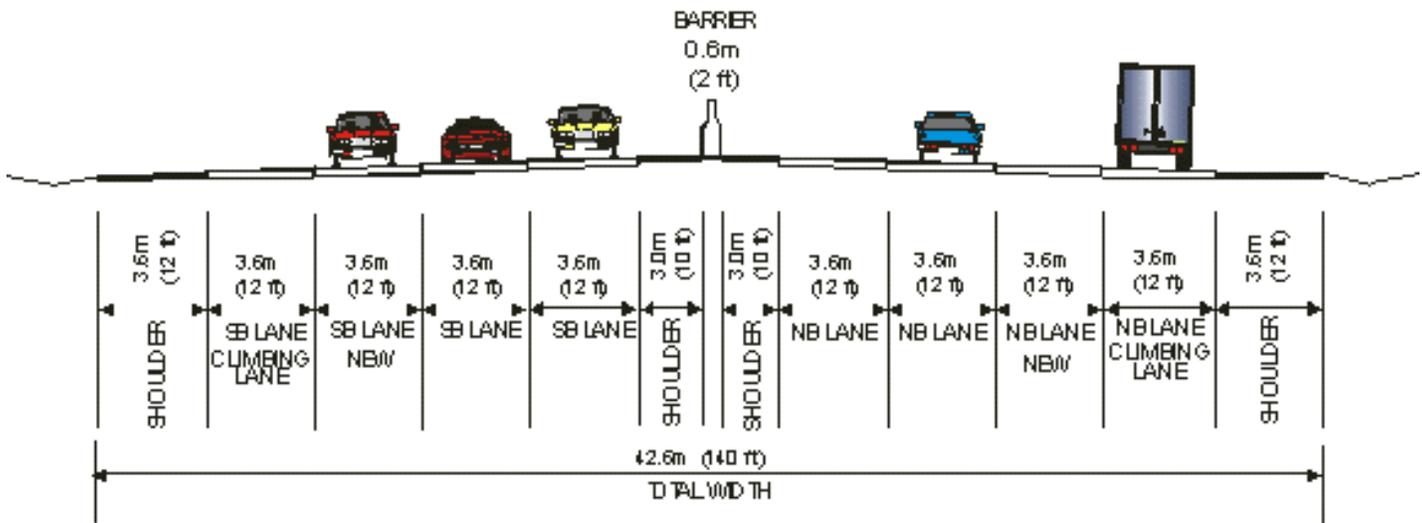
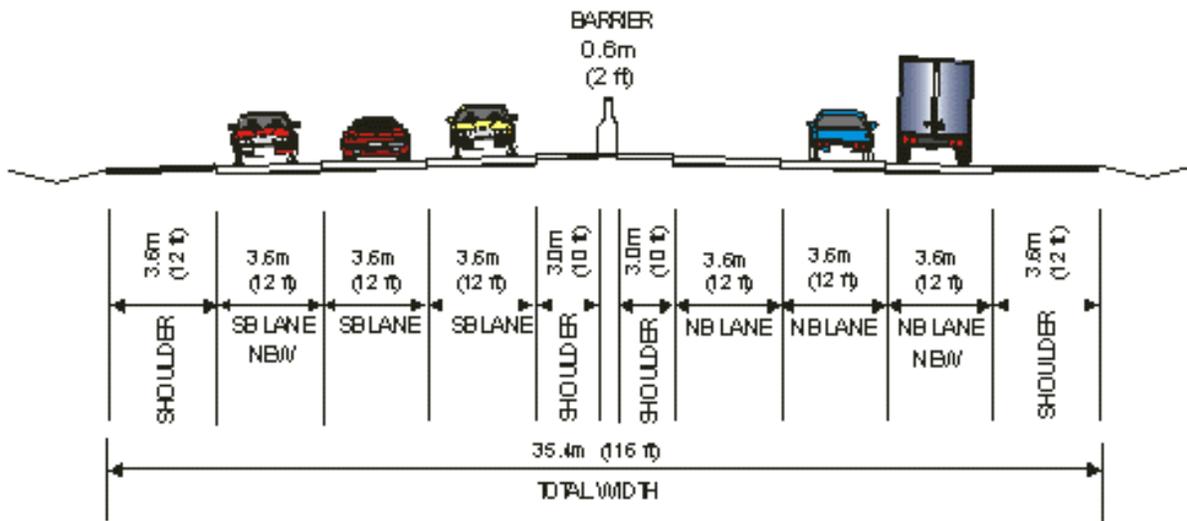


Figure 2.6 cont.
I-25 Corridor Typical Sections for the Preferred Alternative



Surrey Ridge Road to Meadows/Founders Parkway



Meadows/Founders Parkway to Douglas Lane

Each lane in the typical eight-lane section of I-25 between Lincoln Avenue and Meadows/Founders Parkway is 3.6 meters (12 feet) wide. The outside shoulders of this typical section are 3.6 meters (12 feet) wide, allowing enough room for emergency parking on the roadway. The inside shoulders are 3.0 meters (10 feet) wide, with a concrete barrier 0.6 meter (2 feet) wide (0.9 meter [2.8 feet] high) separating opposing traffic. Total width of the eight-lane typical section is approximately 42.6 meters (140 feet). On the outside shoulder of southbound I-25 between Schweiger and Surrey Ridge Road, a Type IV barrier [0.6 meter (2 feet) wide] is provided.

Each lane in the typical six-lane section of I-25 between Meadows/Founders Parkway and Douglas Lane is 3.6 meters (12 feet) wide. The outside shoulder of this typical section is 3.6 meters (12 feet) wide, allowing enough room for emergency parking on the roadway. The inside shoulder is typically 3.0 meters (10 feet) wide, with a concrete barrier 0.6 meter (2 feet) wide (0.9 meter [2.8 feet] high) separating the opposing traffic. The total width of the six-lane typical section is approximately 35.4 meters (116 feet).

2.5.1.4. I-25 Corridor Changes in Travel Patterns, Access, and Safety for the Preferred Alternative

The Preferred Alternative improves access to the interchanges along the I-25 Corridor between Meadows/Founders Parkway and Douglas Lane by improving the acceleration and deceleration lanes to comply with CDOT design standards. As part of the Climbing Lanes Early-Action projects, the acceleration and deceleration lanes from Lincoln Avenue to Meadows/Founders Parkway are extended to comply with CDOT design standards.

The Preferred Alternative includes safety features such as wider shoulders, concrete median barriers, ramp adjustments, longer acceleration and deceleration lanes, wider structures at the Union Pacific Railroad Bridge and Plum Creek Bridge, and better curve geometry. The realignment of I-25 to the east between Wolfensberger Road and Liggett Road increases the curve radius to improve safety along the roadway. Highway safety is also improved due to the additional capacity that the mainline widening provides.

The new interchange configurations improve the safety for vehicles entering and exiting I-25 at Schweiger and Surrey Ridge Road by providing ramps that comply with CDOT design standards.

The reconstruction of the Schweiger Interchange and Surrey Ridge Road Interchange changes travel patterns because the southern I-25 ramps at the Schweiger Interchange and the northwest I-25 ramp at the Surrey Ridge Road Interchange are removed. With the Preferred Alternative, vehicles that currently access southbound I-25 from the Schweiger Interchange will access southbound I-25 from the Surrey Ridge Road Interchange. Vehicles that currently exit northbound I-25 at the Schweiger Interchange will exit at either the Surrey Ridge Road Interchange or Lincoln Avenue. Vehicles that currently exit southbound I-25 at the Surrey Ridge Road Interchange will exit at the Schweiger Interchange or the Castle Pines Parkway Interchange.

The addition of a car pool lot at the Castle Pines Parkway Interchange changes the travel patterns for people using the lot. Currently, the lot does not exist and people do not exit I-25 and consolidate vehicles. Local neighborhood commuters will meet at the car pool lot to consolidate into one car. The car pool lot may increase the number of vehicles using the Castle Pines Parkway Interchange.

2.5.1.5. I-25 Corridor Cost for the Preferred Alternative

The estimated total cost for the I-25 Corridor elements of the Preferred Alternative is \$54.5 million. For a cost breakdown, see Section 2.9, *Alternative Costs*.

The estimated cost between Lincoln Avenue and Meadows/Founders Parkway is substantially less than between Meadows/Founders Parkway and Douglas Lane because the northern section adds only a shoulder in each direction (majority of improvements constructed as part of Early-Action projects). The majority of the alternative cost is in the southern section because it includes complete reconstruction of the entire cross section.

ROW cost to purchase 10.1 hectares (25 acres) along I-25 is \$2.9 million, which is minimal compared to the overall construction cost. It is the intent that this cost is conservative with the anticipation that Douglas County and the Town of Castle Rock will continue to work with CDOT to preserve future ROW as development occurs.

2.5.2 US 85 Corridor Elements of the Preferred Alternative

Alignment; typical section; changes in travel patterns, access, and safety; and cost for the Preferred Alternative within the US 85 Corridor are described in the following sections.

2.5.2.1. US 85 Corridor Alignment for the Preferred Alternative

The Preferred Alternative alignment generally follows the existing alignment with widening to the outside. Exceptions are portions of the roadway at Sedalia and Titan Road where the alignment moves to the northeast and at Cook Ranch (approximate MP 195.4) where the alignment moves to the west.

Beginning at C-470 moving south, the alignment stays along the existing alignment. At Blakeland Drive, the alignment shifts 2.1 meters (7 feet) to the west and then returns to the existing alignment at Highlands Ranch Parkway. The US 85 alignment at Lakeside Drive (approximate MP 197.2) is elevated by approximately 4.2 meters (14 feet) to improve the intersection. Continuing south, the alignment follows the existing alignment to approximately MP 195.4 where it shifts to the west by at most 77.7 meters (255 feet). The alignment returns to the existing alignment at approximately MP 194.9 and continues until MP 190.7.

At approximately MP 190.7 the alignment shifts from the existing alignment to the southeast until approximately MP 187.8 where it returns to the existing alignment. The US 85 alignment at Daniels Park Road runs southwest along the existing alignment to Meadows Parkway. The alignment remains at least 3 meters (10 feet) from the Union Pacific Railroad and the Burlington Northern Santa Fe Railroad ROW throughout the US 85 Corridor.

Figure 2.7a through Figure 2.7h (included at the end of this section, Section 2.5, *Preferred Alternative*) illustrate the US 85 Corridor alignment for the Preferred Alternative.

2.5.2.2. Additional Major Improvements along the US 85 Corridor for the Preferred Alternative

In addition to the mainline widening, the Preferred Alternative includes the following elements:

- *SH 67/US 85 Intersection Reconfiguration and Frontage Road.* This improvement includes construction of a short frontage road in the Town of Sedalia (approximately 365 meters [1,200 feet] long). The intersection of SH 67 and US 85 is improved by extending SH 67 to the north with a full-movement signalized intersection. A frontage road is constructed in the southeast quadrant, connecting SH 67 to US 85 at the Cherokee Ranch access road. The intersection of US 85 and the frontage road is stop-sign controlled. The frontage road provides full-movement access to the local Sedalia businesses. Left turns will be prohibited when accessing SH 67 from the frontage road and when accessing the frontage road from SH 67.
- *Bicycle/pedestrian facilities along US 85.* Bicycle and pedestrian facilities are provided along the US 85 Corridor as described in Section 2.7, *Bicycle and Pedestrian Facilities along the US 85 Corridor*
- *High Line Canal Trail grade-separated crossing under US 85.* See Section 2.7, *Bicycle and Pedestrian Facilities along the US 85 Corridor.*
- *Enhanced wildlife crossings.* See Section 2.8, *Wildlife Crossings along the US 85 Corridor.*

2.5.2.3. US 85 Corridor Typical Section for the Preferred Alternative

Typicals discussed here best minimize environmental impacts while providing safe roadway and roadside design. Typical section width varies depending on the impacts in the area. For example, around Sedalia many environmental and land use impacts force the typical section to be narrower. Multiple typical sections have been discussed and evaluated during the EIS process.

An inside curb and gutter section is generally used throughout US 85. Where reasonable (south of Daniels Park Road), a full 4.6-meter (15-foot) raised median is used. In areas where the typical section needs to be minimized, a 0.9- to 3.1-meter (3- to 10-foot) raised median is used. The raised median physically separates the opposing flows of traffic and control access.

Figure 2.8 shows the US 85 typical sections for the Preferred Alternative. The six-lane section between C-470 and Blakeland Drive includes six 3.6-meter (12-foot) travel lanes, 3.1-meter (10-foot) raised median, 0.5-meter (1.6-foot) inside curb and gutter, 0.8-meter (2.6-foot) outside curb and gutter, 0.9-meter (3-foot) inside shoulder, 3.0-meter (10-foot) continuous auxiliary lanes, and a 2.4-meter (8-foot) bicycle/pedestrian facility on both sides of the highway. The total typical section is approximately 40 meters (131 feet).

The section between Blakeland Drive and Highlands Ranch Parkway has a total typical section width of 39.6 meters (130 feet). This section includes six 3.6-meter (12-foot) travel lanes, 3.1-meter (10-foot) raised median, 0.5-meter (1.6-foot) inside curb and gutter, 0.8-meter (2.6-foot) outside curb and gutter, 0.9-meter (3-foot) inside shoulder, 3.0-meter (10-foot) continuous auxiliary lanes, and a detached 3.0-meter (10-foot) bicycle/pedestrian facility on the east side of US 85. The detached bicycle/pedestrian facility changes to an attached facility at the Union Pacific Railroad Bridge due to bridge width restrictions. The attached facility is separated from the highway with a 0.6-meter (2-foot) barrier.

The typical section between Highlands Ranch Parkway and Titan Road includes four 3.6-meter (12-foot) travel lanes, 1.8-meter (6-foot) raised median, 0.5-meter (1.6-foot) inside curb and gutter, 0.9-meter (3-foot) inside shoulder, and two 3.0-meter (10-foot) shoulder/bikeway. The total typical section width is approximately 25.0 meters (82 feet).

The section between Titan Road and IREA has a total typical section width of 26.3 meters (86 feet). There are four 3.6-meter (12-foot) lanes, a 3.1-meter (10-foot) raised median, 0.5-meter (1.6-foot) inside curb and gutter, 0.9-meter (3-foot) inside shoulder, and two 3-meter (10-foot) shoulder/bikeway.

The section between IREA and Sedalia (SH 67) has a total typical section width of 20.9 meters (69 feet). There are four 3.6-meter (12-foot) lanes, a 0.9-meter (3-foot) raised median, 0.5-meter (1.6-foot) inside curb and gutter, and a 3-meter (10-foot) bicycle/pedestrian facility on the south side of the typical section. The narrower typical section is required in this section due to ROW constraints and environmental impacts.

The section between Sedalia and the north end of the Cherokee Ranch (approximately MP 190.1) consists of the typical section described previously between IREA and Sedalia, with the addition of a frontage road on the south side of US 85. The frontage road is separated from US 85 by a grass median that varies in width. The frontage road has two 3.6-meter (12-foot) lanes, 0.8-meter (2.6-foot) outside curb and gutter, and a bicycle/pedestrian facility on the north side of the frontage road. The

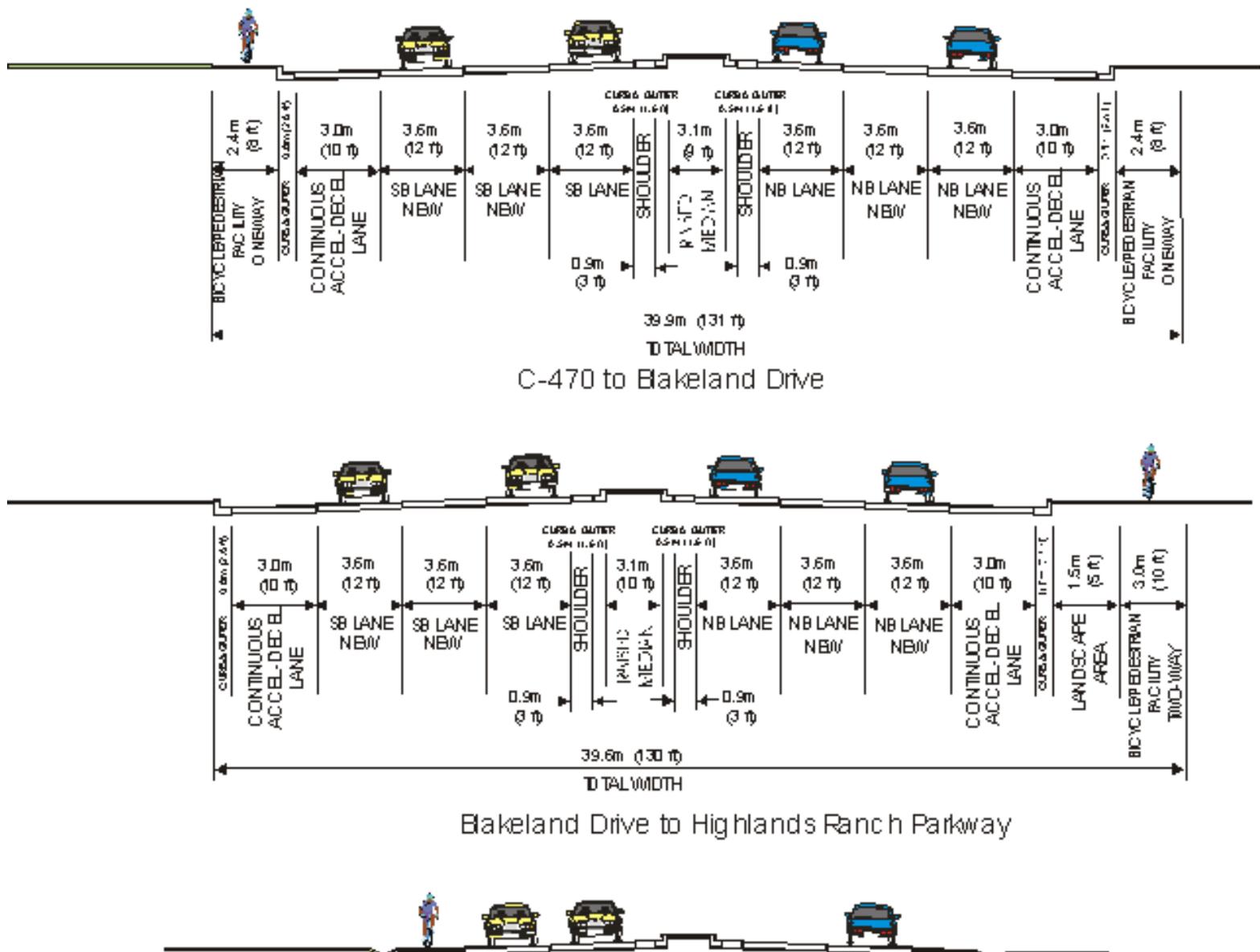
total width of this section is 17.9 meters (59 feet).

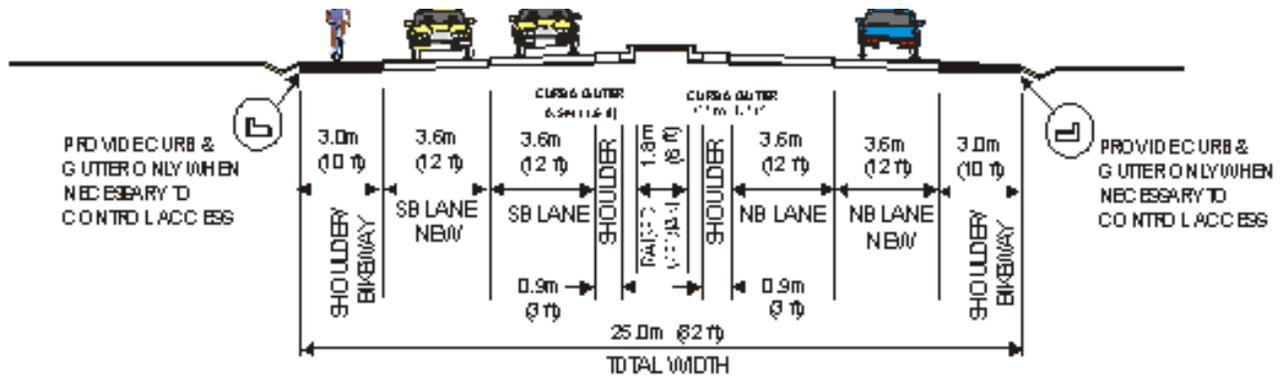
The section between the north end of the Cherokee Ranch and Daniels Park is the same as described between IREA and Sedalia.

From Daniels Park Road to Meadows Parkway, a wider typical section is used with continuous acceleration and deceleration lanes. There are four 3.6-meter (12-foot) lanes, a 4.6-meter (15-foot) raised median, 0.5-meter (1.6-foot) inside and 0.8-meter (2.6-foot) outside curb and gutter, 0.9-meter (3-foot) inside shoulder, 3.0-meter (10-foot) acceleration and deceleration lanes, a landscaped area of approximately 1.5 meters (5 feet) between the roadway and the bikeway, and a detached 3.0-meter (10-foot) bicycle/pedestrian facility on the east side. The total typical section width is approximately 33.6 meters (110 feet).

Typical sections may include left-turn lanes, acceleration lanes, and deceleration lanes where appropriate. Continuous auxiliary lanes are used where accesses are spaced closely together. Most business and residential accesses are provided with right-in/right-out access.

Figure 2.8
US 85 Corridor Typical Sections for the Preferred Alternative

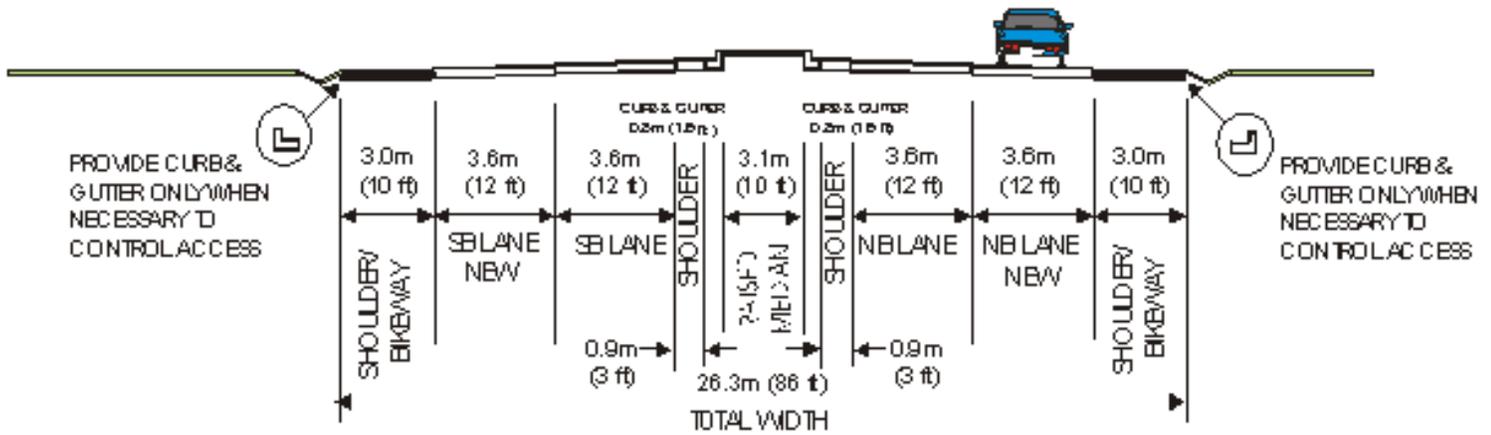




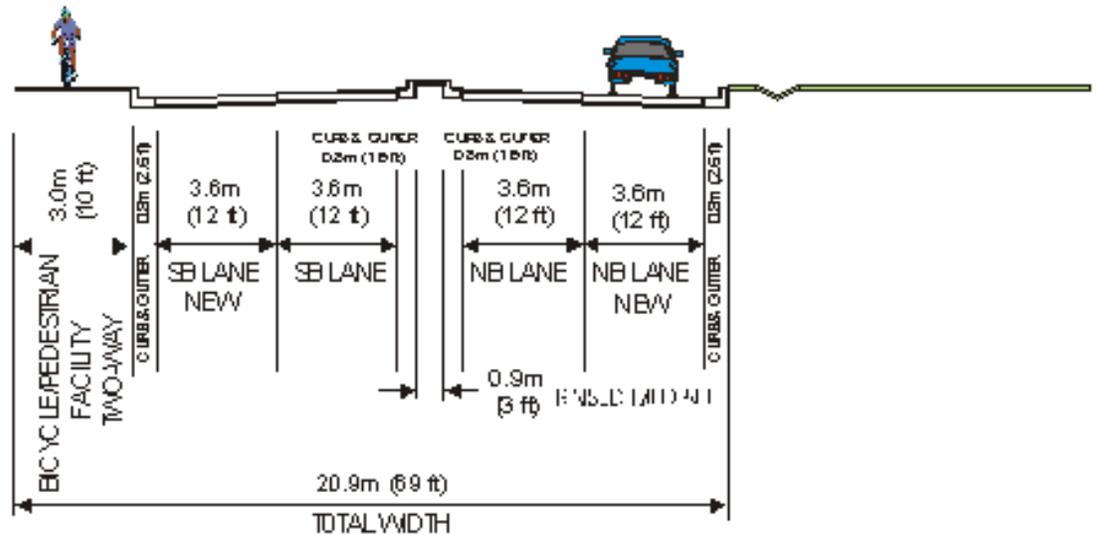
Highland's Ranch Parkway to Titan Road

Note: Numbers may not add due to rounding of metric unit/english unit conversions.

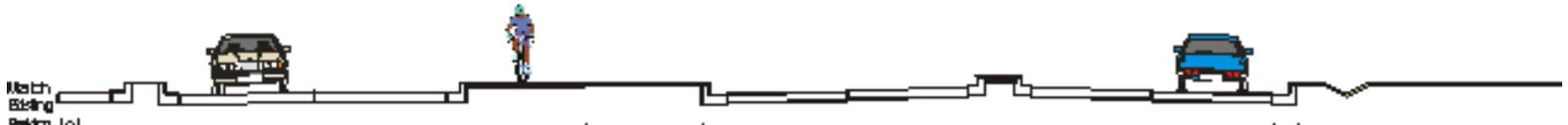
Figure 2.8 cont.
US 85 Corridor Typical Sections for the Preferred Alternative

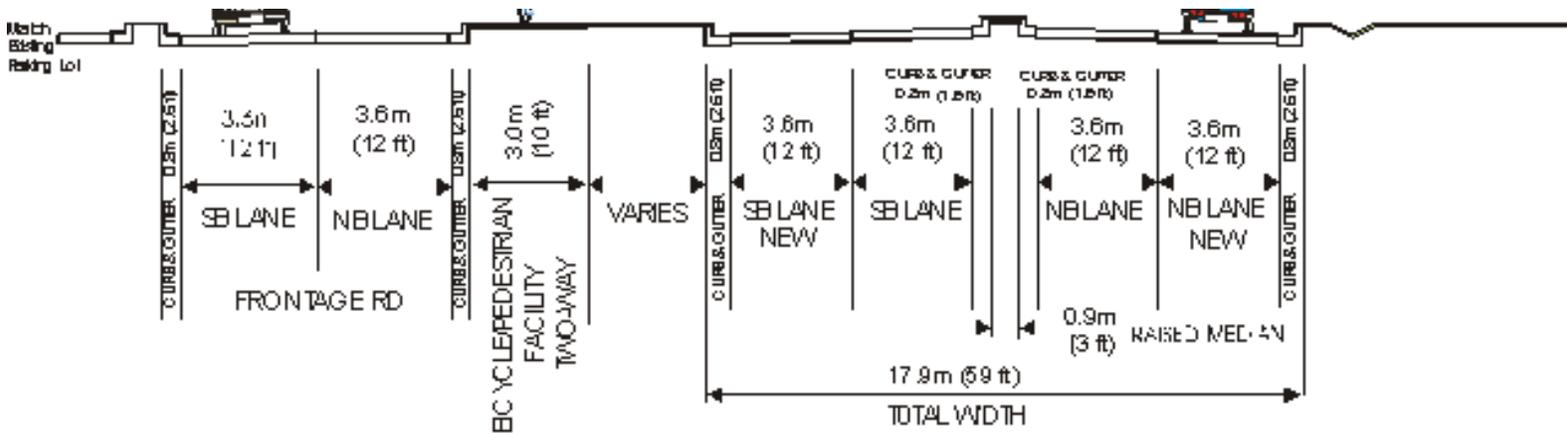


Titan Road to IREA



IREA to Sedalia (SH 67)

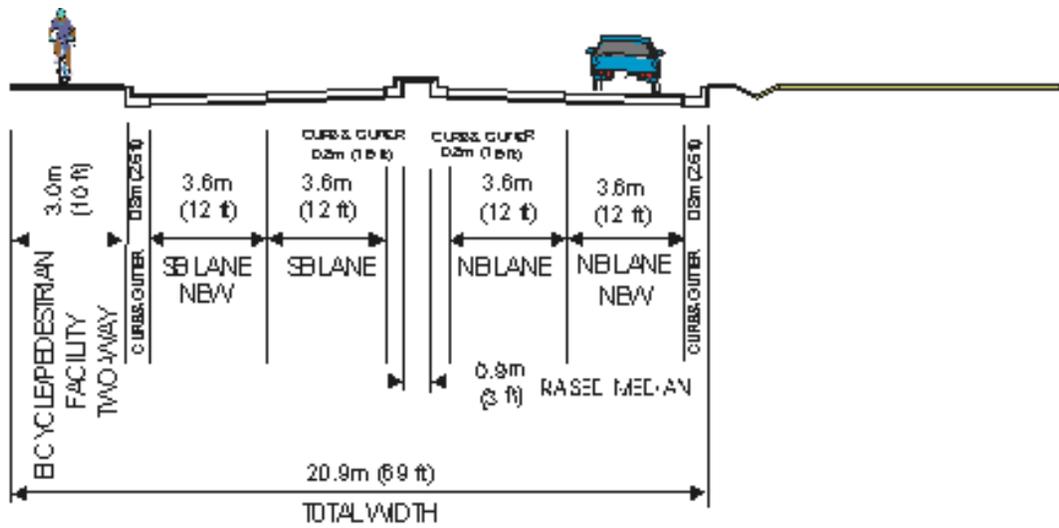




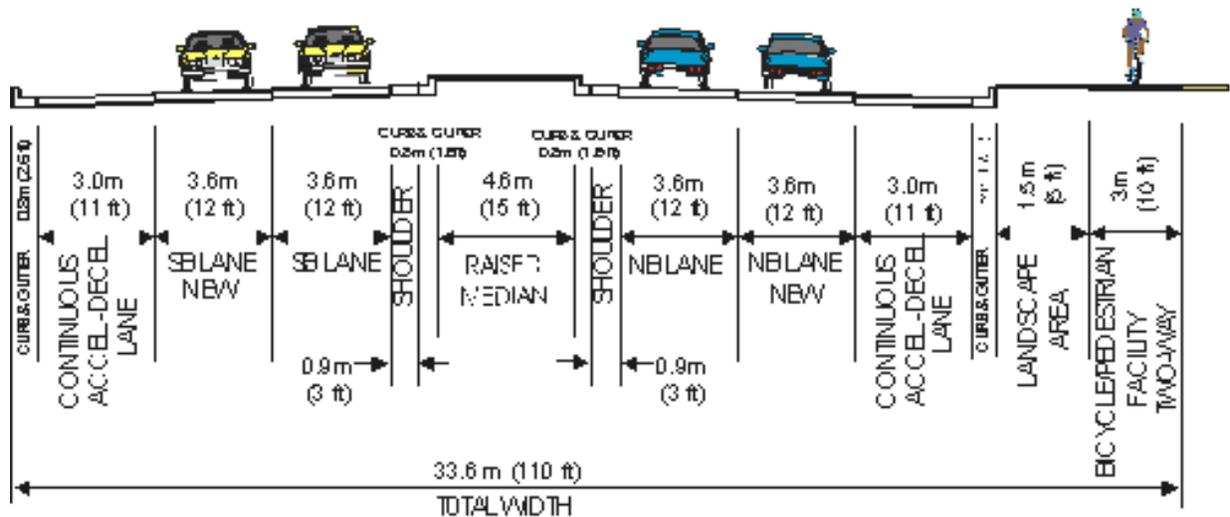
Sedalia to north end of Cherokee Ranch

Figure 2.8 cont.

US 85 Corridor Typical Section for the Preferred Alternative



North end of Cherokee Ranch to Daniels Park Road



Daniels Park Road to Meadows Parkway

Note: Numbers may not add due to rounding of metric unit/english unit conversions.

Note: Numbers may not add due to rounding of metric unit/english unit conversions.

2.5.2.4. US 85 Corridor Travel Patterns, Access, and Safety for the Preferred Alternative

Travel patterns change for those accessing the businesses located in the southeast quadrant of the SH 67 and US 85 intersection. The Preferred Alternative improves the intersection of SH 67 and US 85 at Sedalia. The intersection is improved by adding acceleration and deceleration lanes, a frontage road, and a raised median along SH 67. The interchange moves to the northeast, and a frontage road is constructed along the existing US 85 roadway providing access to the Sedalia businesses. Left turns into and out of the frontage road from SH 67 will be prohibited. Travel patterns change for those currently accessing the businesses directly off of US 85 and from SH 67 as well. Under this alternative, businesses in this area must be accessed via the frontage road.

Access points along US 85 are improved in conjunction with the widening of US 85 based on recommendations from the *Final US 85 Access Management Plan*, February 2001. The purpose of the plan is to improve traffic flow, improve traffic safety, reduce traffic conflicts, and provide appropriate access to adjacent land uses. To meet this objective, existing accesses are consolidated or changed to right-in/right-out. Residents who are provided a limited access of right-in/right-out alter their travel patterns by traveling out of the desired direction to a full-movement access to make a U-turn. Maximum out-of-direction travel is approximately 1.6 kilometers (1 mile). The new SH 67 and US 85 intersection improves access to Sedalia and the businesses.

Safety features incorporated in the Preferred Alternative include wider shoulders, mountable curb, raised median, intersection turn lanes, acceleration lanes, deceleration lanes, and better curve geometry. Highway safety is improved due to the additional capacity that the mainline widening provides and due to the realignment of US 85 at the Cook Ranch property where a curve is minimized. Safety is also improved by reducing traffic conflicts by consolidating access points along US 85. By shifting the SH 67 and US 85 intersection to the northeast, safety and operations are improved by increasing the distance between the railroad tracks and the traffic signal.

2.5.2.5. US 85 Corridor Cost for the Preferred Alternative

The Preferred Alternative assumes the full reconstruction of US 85. Total cost for the US 85 Corridor elements of the Preferred Alternative, assuming full reconstruction of US 85, is approximately \$97.1 million. CDOT currently lacks sufficient funding to build all US 85 elements of the Preferred Alternative. CDOT and Douglas County are working together to find additional funding. If sufficient funds are not found prior to the ROD, the project work will be prioritized. The ROD will be based on available funding. For a cost breakdown, see Section 2.9, *Alternative Costs*.

The ROW/relocation cost for the Preferred Alternative is approximately \$17.3 million to purchase 49.4 hectares (122 acres).

2.5.3 Transportation Demand Management Program for Preferred Alternative

A transportation demand management (TDM) program is recommended to complement the Preferred Alternative identified in the South I-25 Corridor and US 85 Corridor FEIS. The following strategies are planned to be implemented in coordination with local communities.

- Smart Community Information Network – Internet and variable message sign (VMS) based local

information network provides promotional opportunities, real-time congestion information, and other transportation services.

- Area-wide Ridesharing Programs – Programs and incentives that encourage commuters to use alternatives to driving single occupant vehicle (SOV), and encouraging employers to provide in-house programs that promote ridesharing among employees.
- Commuter Education and Outreach – Education campaign to promote alternative transportation to commuters. Outreach to employers to support employee commute programs. Provides for worksite promotions events.
- Pedestrian/Bicycle Facility – Pedestrian/bicycle facility from the Castle Pines car pool lot to the west side of I-25. Encourages pedestrians and bicyclists to car pool.

The cost for the TDM program is estimated to be \$155,000 start-up cost and \$130,000 annual cost.

A commitment has been made to implement these strategies. More detail regarding the TDM program is included in the *South I-25 Corridor and US 85 Corridor Transportation Demand Management Program Report*, December 2000.

Figures 2.5a through Figure 2.5i show improvements included in the Preferred Alternative along the I-25 Corridor.

[Figure 2.5a](#)

[Preferred Alternative I-25 Corridor](#)

[Figure 2.5b](#)

[Preferred Alternative I-25 Corridor](#)

[Figure 2.5c](#)

[Preferred Alternative I-25 Corridor](#)

[Figure 2.5d](#)

[Preferred Alternative I-25 Corridor](#)

[Figure 2.5e](#)

[Preferred Alternative I-25 Corridor](#)

[Figure 2.5f](#)

[Preferred Alternative I-25 Corridor](#)

[Figure 2.5g](#)

[Preferred Alternative I-25 Corridor](#)

[Figure 2.5h](#)
[Preferred Alternative I-25 Corridor](#)

[Figure 2.5i](#)
[Preferred Alternative I-25 Corridor](#)

Figures 2.7a through Figure 2.10h show improvements included in the Preferred Alternative along the US 85 Corridor.

[Figure 2.7a](#)
[Preferred Alternative US 85 Corridor](#)

[Figure 2.7b](#)
[Preferred Alternative US 85 Corridor](#)

[Figure 2.7c](#)
[Preferred Alternative US 85 Corridor](#)

[Figure 2.7d](#)
[Preferred Alternative US 85 Corridor](#)

[Figure 2.7e](#)
[Preferred Alternative US 85 Corridor](#)

[Figure 2.7f](#)
[Preferred Alternative US 85 Corridor](#)

[Figure 2.7g](#)
[Preferred Alternative US 85 Corridor](#)

[Figure 2.7h](#)
[Preferred Alternative US 85 Corridor](#)

2.6 OTHER ALTERNATIVE

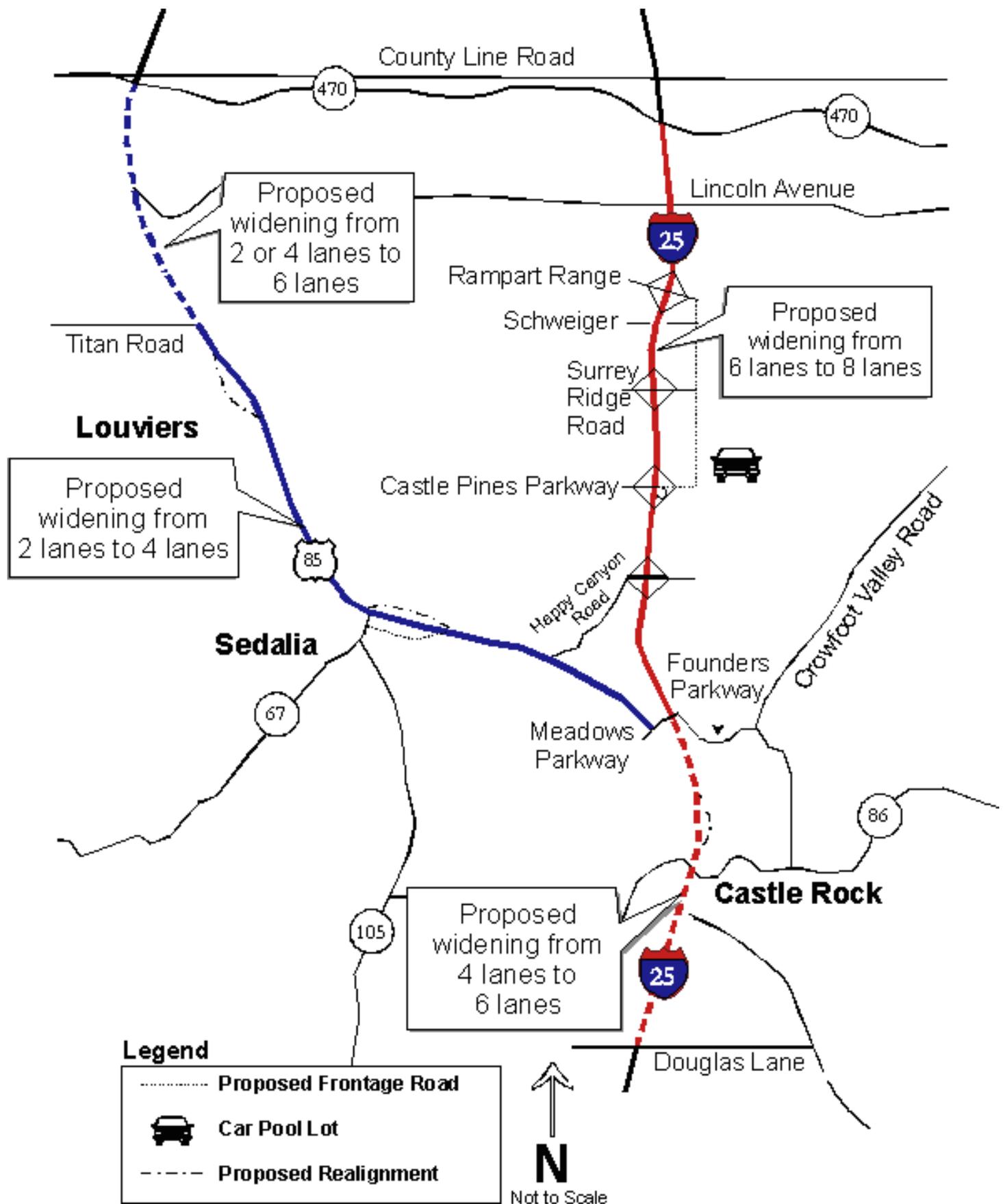
The Other Alternative was also developed based on comments regarding alternatives evaluated in the DEIS and additional analysis. This alternative expands and modifies elements included in the Preferred Alternative. The Other Alternative consists of improvements to the I-25 Corridor and US 85 Corridor such as mainline widening, mainline realignment, and major interchange improvements. All Early-Action projects and the Douglas Lane Interchange are included in this alternative (see Section 2.4, *No-Action Alternative*). A schematic of the Other Alternative is provided on Figure 2.9.

Major components of the Other Alternative along the I-25 Corridor include:

- Eight lanes (six through lanes and two climbing lanes) between C-470 and Meadows/Founders Parkway
- Six lanes between Meadows/Founders Parkway and Douglas Lane
- Diamond interchange at proposed Rampart Range Development
- Reconstruction of the Surrey Ridge Road Interchange to a diamond interchange
- Removal of Schweiger Interchange ramps
- Frontage road on the east side of I-25 from Castle Pines Parkway to proposed Rampart Range Interchange
- Castle Pines Parkway Interchange reconstruction with loop ramp in southeast quadrant
- Car pool lot (accommodating 500 spaces) in northeast quadrant of the I-25 and Castle Pines Parkway Interchange
- Happy Canyon Road Bridge widening
- Minor I-25 realignment to the east between Wolfensberger Road and Liggett Road
- Construction of a new bridge for the Union Pacific Railroad south of the existing bridge
- Supporting measures

Elements not part of the Preferred Alternative along the I-25 Corridor include the completion of a diamond interchange at the proposed Rampart Range Development. If the Rampart Range Interchange is built, the Schweiger Interchange is no longer needed and the Surrey Ridge Road Interchange would be upgraded to a full diamond interchange. A frontage road on the east side of I-25 connecting Castle Pines Parkway to Rampart Range is included to provide local mobility within the corridor. The financial responsibility of these improvements will be determined at a later date.

Figure 2.9
Other Alternative Schematic



Major components of the Other Alternative along the US 85 Corridor include:

- Six lanes between C-470 and Titan Road

- Four lanes between Titan Road and Meadows Parkway
- US 85/SH 67 Intersection reconfiguration
- Sedalia frontage road
- US 85 minor realignment at Cook Ranch (approximate MP 195.4)
- Bicycle/pedestrian facilities along US 85 (see Section 2.7, *Bicycle and Pedestrian Facilities along the US 85 Corridor*)
- Grade-separated crossing under US 85 for High Line Canal Trail (see Section 2.7, *Bicycle and Pedestrian Facilities along the US 85 Corridor*)
- Enhanced wildlife crossings (see Section 2.8, *Wildlife Crossings along the US 85 Corridor*)
- Supporting measures

Acceleration lanes and deceleration lanes are constructed according to CDOT design standards at the interchanges. Retaining walls are added or slope paving adjusted under the interchange bridges to accommodate roadway widening.

The Southeast Corridor's 10 general-purpose lanes will end at the north end of the C-470 Interchange, where two lanes will be dropped in each direction on the northern ramps. After a short stretch of six lanes, additional lanes are added at the County Line Road ramps for a total of eight lanes. Traffic studies show that the six-lane section will be sufficient due to the large percentage of entering and exiting vehicles on to and off of the C-470/E-470 Interchange. The six-lane section is between the C-470 north ramps and County Line Road ramps. Figure 2.10a (located at the end of this section) shows the connection to the Southeast Corridor improvements.

An improvement along the US 85 Corridor included in this alternative is providing six lanes from Highlands Ranch Parkway to Titan Road as opposed to the four lanes shown in the Preferred Alternative. CDOT intends to complete this widening when funding becomes available after the necessary revisions are made to the RTP and ROD.

Total cost for the Other Alternative is \$177.5 million. For a breakdown of the cost information, see Section 2.9, *Alternative Cost*.

2.6.1 I-25 Corridor Elements of the Other Alternative

The alignment; typical section; changes in travel patterns, access, and safety; and cost for the Other Alternative within the I-25 Corridor are described in the following sections.

2.6.1.1. I-25 Corridor Alignment for the Other Alternative

The Other Alternative generally follows the existing alignment along the entire section of I-25 (between C-470 and Douglas Lane) with one minor realignment between Wolfensberger Road (MP 182) and Liggett Road (MP 182.5) where the existing centerline shifts to the east by 14 meters (46 feet).

As part of the Climbing Lanes Early-Action projects, the entire interstate is being reconstructed between Lincoln Avenue and Meadows/Founders Parkway, providing for three 3.6-meter (12-foot) travel lanes, 3.6-meter (12-foot) outside shoulder, and 3.0-meter (10-foot) inside shoulder in each direction. As part of the Other Alternative improvements, between C-470 and Lincoln Avenue, the interstate is widened to the outside. From Lincoln Avenue to Meadows/Founders Parkway, the shoulder is converted into a travel lane and a new shoulder is constructed. Between Meadows/Founders Parkway and Douglas Lane, the entire interstate is reconstructed with widening primarily to the inside. Figure 2.10a through Figure 2.10i (included at the end of this section, Section 2.6, *Other Alternative*) illustrate the I-25 Corridor alignment for the Other Alternative.

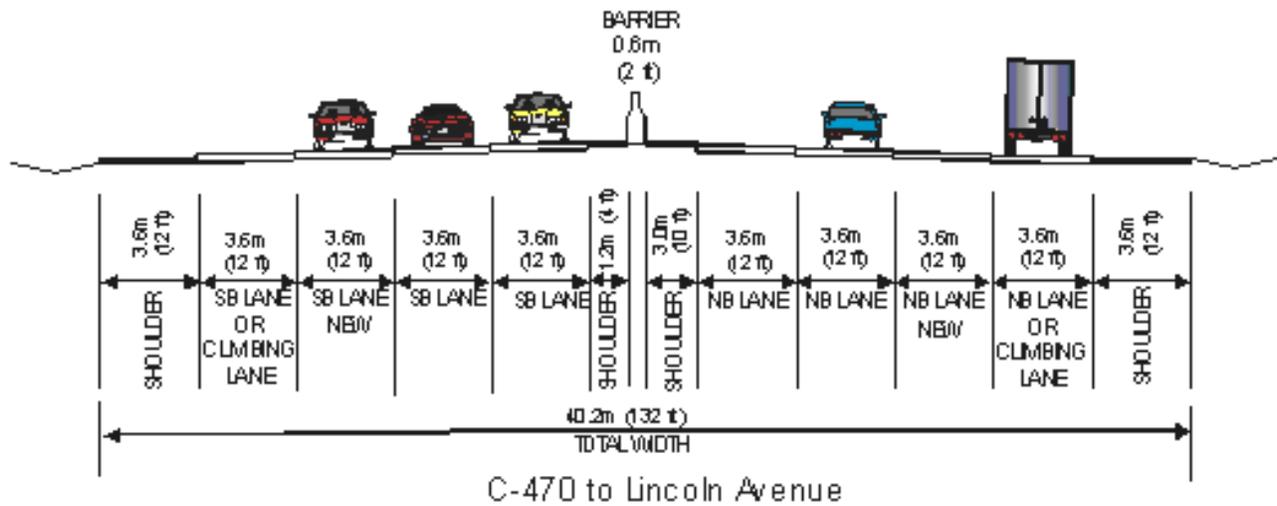
A frontage road is added along the east side of I-25 between Rampart Range and Castle Pines Parkway. The frontage road typical section is shown on Figure 2.11. This frontage road is separated from I-25 by approximately 30 to 343 meters (70.5 to 1,094 feet). This separation provides room for a future transportation envelope (e.g., fixed-guideway). The frontage road flares out at the Surrey Ridge Road Interchange (new diamond interchange), Rampart Range Interchange (new diamond interchange), and Castle Pines Parkway Interchange to provide space for the new interchanges and an additional 180 meters (600 feet) to accommodate traffic signal timing and access spacing requirements.

2.6.1.2. Additional Major Improvements along the I-25 Corridor for the Other Alternative

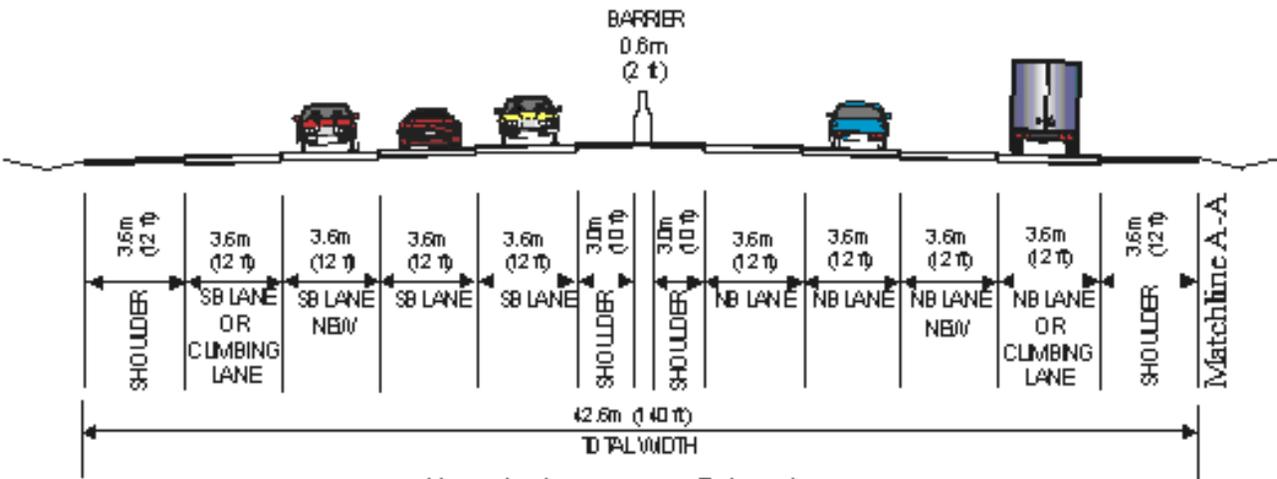
In addition to the mainline widening, the Other Alternative include:

- *Diamond Interchange at Rampart Range.* A new diamond interchange at the proposed Rampart Range is constructed approximately 1,460 meters (4,800 feet) south of Lincoln Avenue to service future development. The Rampart Range Interchange exit ramps flare out to accommodate future loop ramps. This improvement is funded by others because the need for the new interchange is driven by proposed development in the area.
- *Diamond Interchange at Surrey Ridge Road.* The existing Surrey Ridge Road Interchange is reconstructed into a diamond interchange.
- *Removal of Schweiger Interchange Ramps.* The I-25 ramps at the Schweiger Interchange are removed and Schweiger is connected to the frontage road.
- *East-Side Frontage Road from Castle Pines Parkway to Rampart Range.* An east-side, two-lane frontage road is constructed between Castle Pines Parkway and Rampart Range. The frontage road may be accessed by Schweiger and Surrey Ridge Road. Local entities are taking the lead in obtaining ROW for the frontage road. Although CDOT is participating in the funding, local funds are also required.

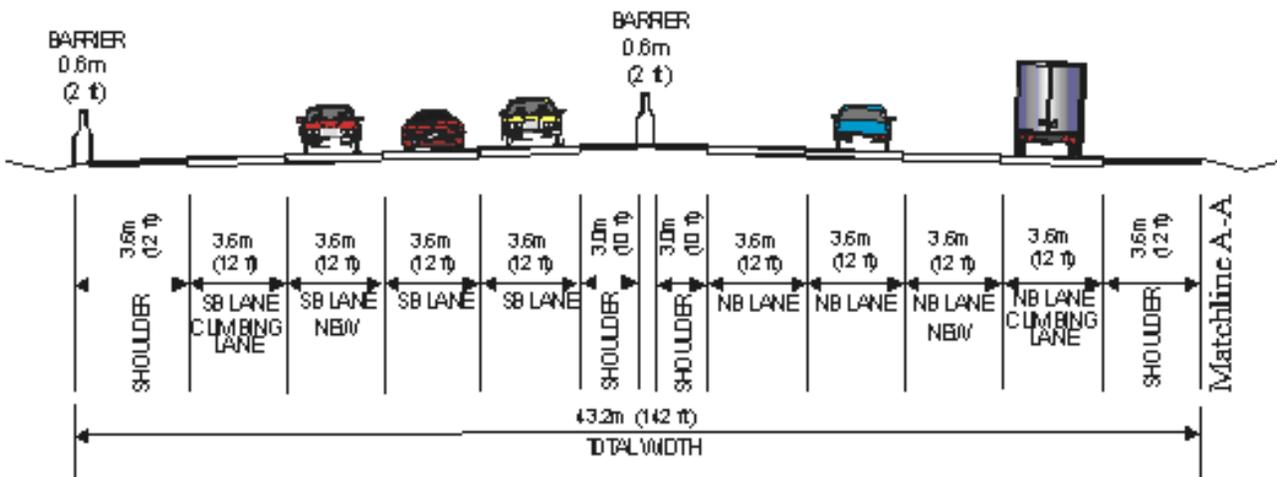
Figure 2.11
I-25 Corridor Typical Sections for the Other Alternative



C-470 to Lincoln Avenue

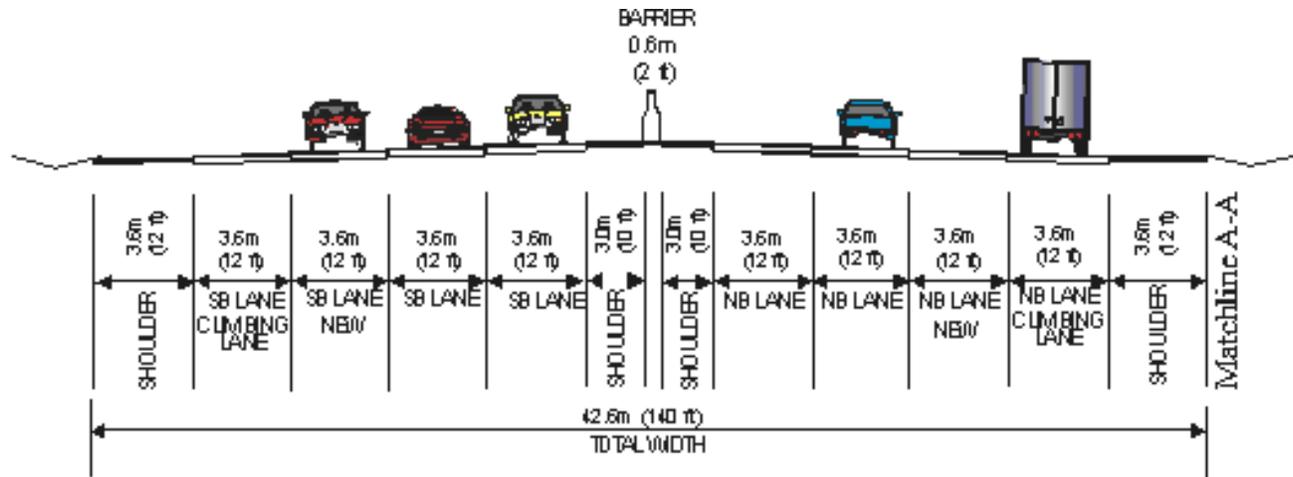


Lincoln Avenue to Schweiger
(includes Rampart Range)

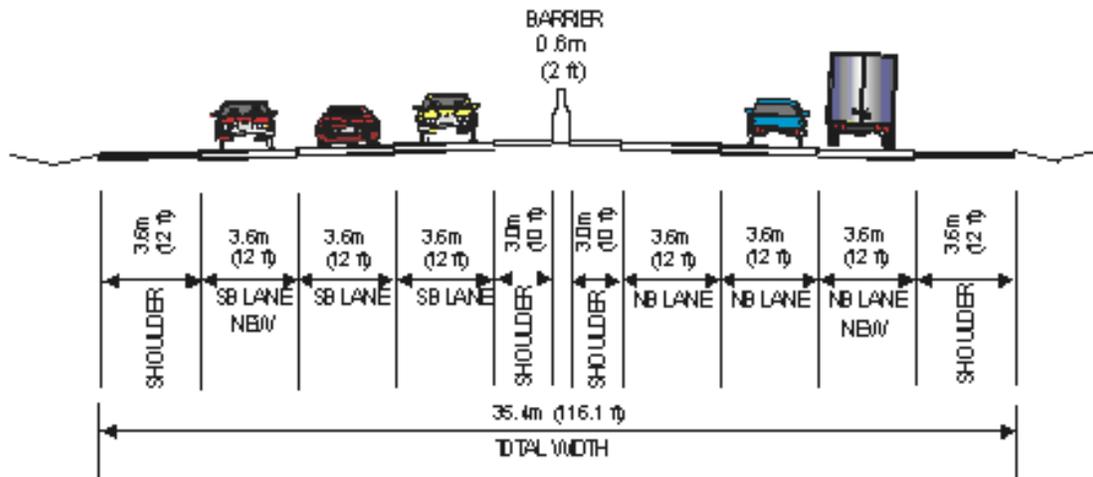


Schweiger to Suncy Ridge Road

Figure 2.11 cont.
I-25 Corridor Typical Sections for the Other Alternative

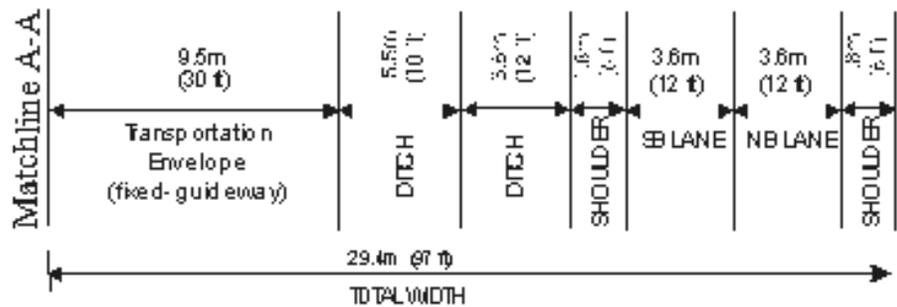


Surrey Ridge Road to Meadows/Founders Parkway
 (includes Castle Pines Parkway)



Meadows/Founders Parkway to Douglas Lane

Connection to
Northbound Lane



Frontage Road
 (Between Rampart Range and Castle Pines Parkway)

Note: Numbers may not add due to rounding of metric unit/English unit conversions.

Note: Numbers may not add due to rounding of metric unit/English unit conversions.

- *Partial Cloverleaf Interchange at Castle Pines Parkway.* The Castle Pines Parkway Interchange is reconfigured by adding a loop ramp in the southeast quadrant of the Castle Pines Parkway Interchange to improve traffic operations for eastbound to northbound traffic in response to proposed development in the area. For more information on the traffic operations at this interchange, see the *South I-25 Corridor Interchange Study*, January 2000. Although CDOT is participating in the funding of the improvements to this interchange, local funds are also required due to the development needs.
- *Castle Pines Parkway Car Pool Lot.* A new car pool lot in the northeast quadrant of the Castle Pines Parkway Interchange is constructed. The lot provides for 500 parking spaces and serves as a meeting place and parking area. The car pool lot can be built in phases, starting with a fewer number of parking spaces. When transit is constructed within the corridor, the car pool lot may be converted into a park-and-ride lot.
- *Happy Canyon Road Bridge Widening.* The Happy Canyon Road Bridge is widened to provide additional left-turn lanes. Projected traffic volumes warrant the addition of turning lanes to accommodate access onto I-25. Although CDOT is participating in the funding of the improvements to this bridge, local funds are also required due to the development needs. For additional information on projected traffic volumes, see *I-25 Corridor and US 85 Corridor Future (2020) Traffic Operations*, December 2000.
- *Union Pacific Railroad Bridge.* The existing Union Pacific Railroad crosses over I-25 just north of the Wolfensberger Interchange. The Other Alternative proposes realigning the Union Pacific Railroad Bridge 14 meters (46 feet) to the south of the existing alignment. As a result of this realignment, a new bridge for the Union Pacific Railroad is constructed, and the existing bridge is removed.
- *Plum Creek Parkway Bridges and Plum Creek Bridges.* The Plum Creek Parkway Bridge and the Plum Creek Bridges are widened and rehabilitated.

Figures 2.10a through Figure 2.10i show improvements included in the Other Alternative along the I-25 Corridor.

2.6.1.3. I-25 Corridor Typical Section for the Other Alternative

The Other Alternative along the I-25 Corridor consists of eight general-purpose lanes between C-470 and Lincoln Avenue, six general-purpose lanes and two climbing lanes between Lincoln Avenue and Meadows/Founders Parkway, and six general-purpose lanes between Meadows/Founders Parkway and Douglas Lane. Figure 2.11 shows the typical sections for the Other Alternative.

Each lane in the typical eight-lane section of I-25 between C-470 and Lincoln Avenue is 3.6 meters (12 feet) wide. In order to accommodate the proposed improvements in the Southeast Corridor, a southbound inside shoulder variance of 1.2 meters (4 feet) (to be approved by the FHWA) and an outside shoulder of 3.0 meters (10 feet) is included. The northbound inside shoulder is 3.0 meters (10 feet) wide and the outside shoulder is 3.6 meters (12 feet) wide. A concrete barrier 0.6 meter (2 feet) wide, 0.9 meter (2.8 feet) high separates opposing traffic. The total width of the eight-lane typical section is 40.2 meters (132 feet).

Each lane in the typical eight-lane section of I-25 between Lincoln Avenue and Meadows/Founders Parkway is

3.6 meters (12 feet) wide. The outside shoulders of this typical section are 3.6 meters (12 feet) wide, allowing enough room for emergency parking on the roadway. Inside shoulders are 3.0 meters (10 feet) wide, with a concrete barrier 0.6 meter (2 feet) wide (1 meter [3 feet] high) separating the opposing traffic. Total width of the eight-lane typical section is approximately 42.6 meters (140 feet). On the outside shoulder of southbound I-25 between Schweiger and Surrey Ridge Road, a Type IV barrier [0.6 meter (2 feet) wide] is provided.

Each lane in the typical six-lane section of I-25 between Meadows/Founders Parkway and Douglas Lane is 3.6 meters (12 feet) wide. The outside shoulder of this typical section is 3.6 meters (12 feet) wide, allowing enough room for emergency parking on the roadway. The inside shoulder is typically 3.0 meters (10 feet) wide, with a concrete barrier 0.6 meter (2 feet) wide (0.9 meter [2.8 feet] high) separating opposing traffic. Total width of the six-lane typical section is approximately 35.4 meters (116 feet).

The frontage road between Castle Pines Parkway and Rampart Range includes two 3.6-meter (12-foot) travel lanes and 1.8-meter (6-foot) shoulders. Total width of the frontage road is approximately 10.8 meters (35.5 feet). The frontage road is located at least 9 meters (30 feet) from I-25 to accommodate future transit, this width may be adjusted to accommodate various types of fixed-guideway.

2.6.1.4. I-25 Corridor Changes in Travel Pattern, Access, and Safety for the Other Alternative

The Other Alternative improves access to the interchanges along the I-25 Corridor between Meadows/Founders Parkway and Douglas Lane by improving the acceleration and deceleration lanes to comply with CDOT design standards. As part of the Climbing Lanes Early-Action projects, acceleration and deceleration lanes from Lincoln Avenue to Meadows/Founders Parkway are extended to comply with CDOT design standards.

The Other Alternative includes safety features such as wider shoulders, concrete median barriers, ramp adjustments, longer acceleration and deceleration lanes, wider structures at the railroad and Plum Creek, and better curve geometry. The realignment of I-25 to the east between Wolfensberger Road and Liggett Road increases the curve radius to improve safety along the roadway. Highway safety is also improved due to the additional capacity that the mainline widening provides.

The new diamond interchanges at Rampart Range and Surrey Ridge Road improve safety for vehicles entering and exiting I-25 by providing ramps that comply with CDOT design standards. The Rampart Range Interchange adds new access points along I-25, which increase the likelihood of crashes. The Surrey Ridge Road Interchange does not add another access. The Schweiger Interchange is eliminated by removing the I-25 ramps. Safety conditions here may improve due to a possible decrease in crashes as a result of removing the access to I-25.

The frontage road along I-25 between Rampart Range and Castle Pines Parkway may change travel patterns for those traveling in the vicinity of the frontage road. The frontage road allows residents to access adjacent neighborhoods without using I-25. Included in this alternative is the closure of the Schweiger Interchange, and access is provided to I-25 via the frontage road. The travel patterns of those in the vicinity of the Schweiger Interchange access I-25 from either Rampart Range or Surrey Ridge Road on the frontage road.

Vehicles traveling eastbound on Castle Pines Parkway have improved access on northbound I-25 by providing a loop entrance ramp and eliminating the need for left turns. The eastbound-to-northbound traffic flow is continuous (eliminating left turns), thus improving interchange operations. The loop provides an additional on-ramp to I-25. The Castle Pines loop ramp improves safety for vehicles traveling eastbound onto northbound I-25.

The loop ramp eliminates conflict for vehicles currently making left turns. However, the addition of the Castle Pines loop ramp creates another access point on I-25, increasing the possibility of crashes; thus safety conditions may deteriorate along I-25.

The addition of a car pool lot at the Castle Pines Parkway Interchange changes the travel patterns for those using the lot. Currently, the lot does not exist and people do not exit I-25 and consolidate vehicles. Local neighborhood commuters may meet at the car pool lot to consolidate into one car. The car pool lot may increase the number of vehicles using the Castle Pines Parkway Interchange and alter the existing access.

The addition of left-turn lanes on Happy Canyon Road creates greater capacity for the entire intersection and, in return, improves access for those turning onto I-25 to travel either northbound or southbound. Additional left-turn lanes on Happy Canyon Road improve safety by providing more capacity for vehicles making left turns.

2.6.1.5. I-25 Corridor Cost for the Other Alternative

The estimated cost for the I-25 Corridor elements of the Other Alternative is approximately \$78.7 million. For a cost breakdown, see Section 2.9, *Alternative Costs*.

Minimal construction cost is included for the I-25 mainline improvements between Lincoln Avenue and Meadows/Founders Parkway because this section only includes adding a shoulder in each direction. Most of the construction cost for I-25 widening is south of Meadows/Founders Parkway because this section includes complete interstate reconstruction.

A major cost of this alternative is the interchange improvements and frontage road. The ROW increases for this alternative because the frontage road is being constructed on a new alignment. The total ROW required for the Other Alternative is 28.9 hectares (71.4 acres), which costs \$8.2 million to purchase. However, it is intended that as part of the Douglas County planning process, future ROW will be preserved as development occurs.

2.6.2 US 85 Corridor Elements of the Other Alternative

The alignment; typical section; changes in travel patterns, access, and safety; and cost for the Other Alternative within the US 85 Corridor are described in the following sections.

2.6.2.1. US 85 Corridor Alignment for the Other Alternative

The Other Alternative alignment generally follows the existing alignment with widening to the outside. Exceptions are portions of the roadway at Sedalia and Titan Road where the alignment moves to the northeast and at Cook Ranch (approximate MP 195.4) where the alignment moves to the west.

Beginning at C-470 moving south, the alignment stays along the existing alignment. At Blakeland Drive, the alignment shifts 2.1 meters (7 feet) to the west and then returns to the existing alignment at Highlands Ranch Parkway. The US 85 alignment at Lakeside Drive (approximate MP 197.2) is elevated by approximately 4.2 meters (14 feet) to improve the intersection. Continuing south, the alignment follows the existing alignment to approximately MP 195.4 where it shifts to the west by at most 77.7 meters (255 feet). The alignment returns to the existing alignment at approximately MP 194.9 and continues until MP 190.7.

At approximately MP 190.7, the alignment shifts from the existing alignment to the southeast until approximately MP 187.8 where it returns to the existing alignment. The US 85 alignment at Daniels Park Road runs southwest along the existing alignment to Meadows Parkway. The alignment remains at least 3 meters (10 feet) from the Union Pacific Railroad and the Burlington Northern Santa Fe Railroad ROW throughout the US 85 Corridor.

Figure 2.12a through Figure 2.12h (included at the end of this section, Section 2.6, *Other Alternative*) illustrate the US 85 Corridor alignment for the Other Alternative.

2.6.2.2. Additional Major Improvements along the US 85 Corridor for the Other Alternative

In addition to the mainline widening, the Other Alternative includes:

- *SH 67/US 85 Intersection Reconfiguration and Frontage Road.* This improvement includes the construction of a short frontage road in the Town of Sedalia (approximately 365 meters [1,200 feet] long). The intersection of SH 67 and US 85 is improved by extending SH 67 to the north with a full-movement signalized intersection. A frontage road is constructed in the southeast quadrant, connecting SH 67 to US 85 at the Cherokee Ranch access road. The intersection of US 85 and the frontage road is stop-sign controlled. The frontage road provides full-movement access to local Sedalia businesses. Left turns will be prohibited when accessing SH 67 from the frontage road and when accessing the frontage road from SH 67.
- *Bicycle/pedestrian facilities along US 85.* Bicycle and pedestrian facilities are provided along the US 85 Corridor as described in Section 2.7, *Bicycle and Pedestrian Facilities along the US 85 Corridor*)
- *High Line Canal Trail grade-separated crossing under US 85.* See Section 2.7, *Bicycle and Pedestrian Facilities along the US 85 Corridor.*
- *Enhanced wildlife crossings.* See Section 2.8, *Wildlife Crossings along the US 85 Corridor.*

2.6.2.3. US 85 Corridor Typical Section for the Other Alternative

Typical sections discussed here best minimize environmental impacts while providing safe roadway and roadside design. Typical section width varies depending on impacts in the area. For example, many environmental and land use impacts around Sedalia force the typical section to be narrower. Multiple typical sections were discussed and evaluated during the EIS process.

An inside curb and gutter section is generally used throughout US 85. Where reasonable, a full 4.6-meter (15-foot) raised median is used. In areas where the typical section needs to be minimized, a 1.8-meter (6-foot) raised median is used. The raised median physically separates opposing traffic flows and controls access.

Figure 2.13 shows the typical section for the Other Alternative. The six-lane section between C-470 and Blakeland Drive includes six 3.6-meter (12-foot) travel lanes, 3.1-meter (10-foot) raised median, 0.5-meter (1.6-foot) inside curb and gutter, 0.8-meter (2.6-foot) outside curb and gutter, 0.9-meter (3-foot) inside shoulder, 3.0-meter (10-foot) continuous auxiliary lanes, and a 2.4-meter (8-foot) bicycle/pedestrian facility on both sides of the highway. The total typical section is approximately 40 meters (131 feet).

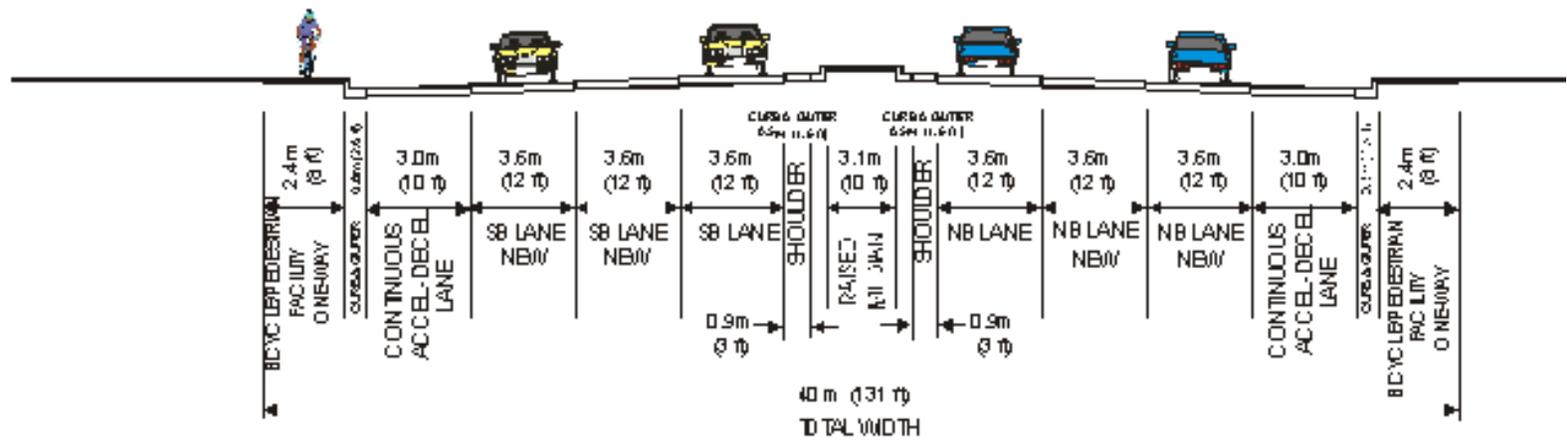
The section between Blakeland Drive and Highlands Ranch Parkway has a total typical section width of 39.6 meters (130 feet). This section includes six 3.6-meter (12-foot) travel lanes, 3.1-meter (10-foot) raised median, 0.5-meter (1.6-foot) inside curb and gutter, 0.8-meter (2.6-foot) outside curb and gutter, 0.9-meter (3-foot) inside shoulder, 3.0-meter (10-foot) continuous auxiliary lanes, and a detached 3-meter (10-foot) bicycle/pedestrian facility on the east side of US 85. The detached bicycle/pedestrian facility changes to an attached facility at the Union Pacific Railroad Bridge due to width restrictions with the bridge. The attached facility is separated from the highway with a 0.6-meter (2-foot) barrier.

The typical section between Highlands Ranch Parkway and Titan Road includes six 3.6-meter (12-foot) travel lanes, 1.8-meter (6-foot) raised median, 0.5-meter (1.6-foot) inside curb and gutter, 0.9-meter (3-foot) inside shoulder, and two 3.0-meter (10-foot) shoulder/bikeway. The total typical section width is approximately 32.2 meters (106 feet).

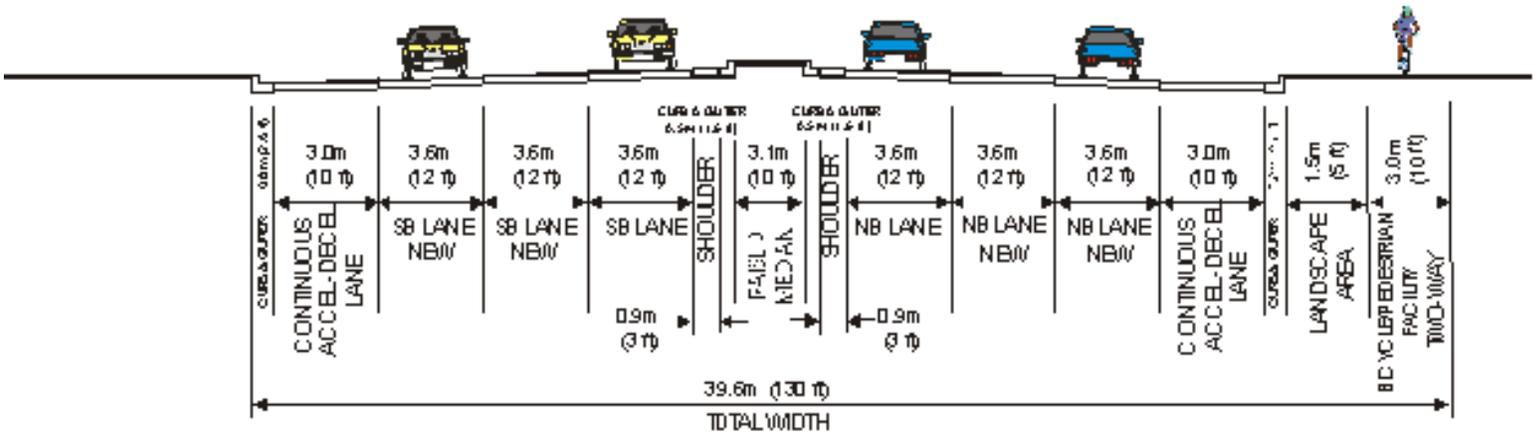
The section between Titan Road and IREA has a total typical section width of 26.3 meters (86 feet). There are four 3.6-meter (12-foot) lanes, a 3.1-meter (10-foot) raised median, 0.5-meter (1.6-foot) inside curb and gutter, 0.9-meter (3-foot) inside shoulder, and two 3-meter (10-foot) shoulder/bikeway.

The section between IREA and Sedalia (SH 67) has a total typical section width of 20.9 meters (69 feet). There are four 3.6-meter (12-foot) lanes, a 0.9-meter (3 feet) raised median, 0.5-meter (1.6-foot) inside and 0.8-meter (2.6-foot) outside curb and gutter, and a 3-meter (10-foot) bicycle/pedestrian facility on the south side of the typical section. The narrower typical section is required in this section due to ROW constraints and environmental impacts.

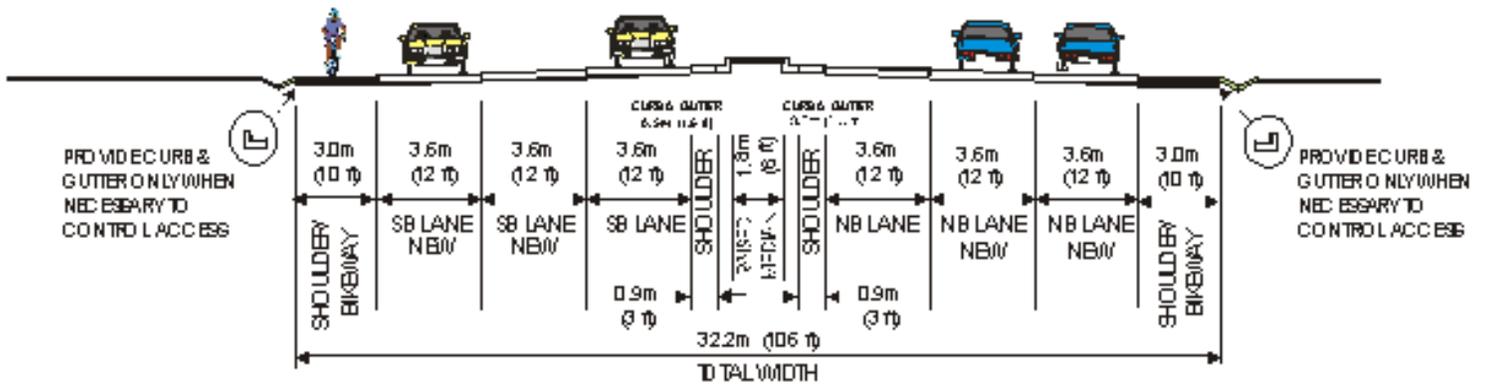
Figure 2.13
US 85 Corridor Typical Sections for Other Alternative



C-470 to Blakeland Drive



Blakeland Drive to Highlands Ranch Parkway



Highlands Ranch Parkway to Titan Road

Note: Numbers may not add due to rounding of metric unit/english unit conversions.

Figure 2.13
US 85 Corridor Typical Sections for the Other Alternative

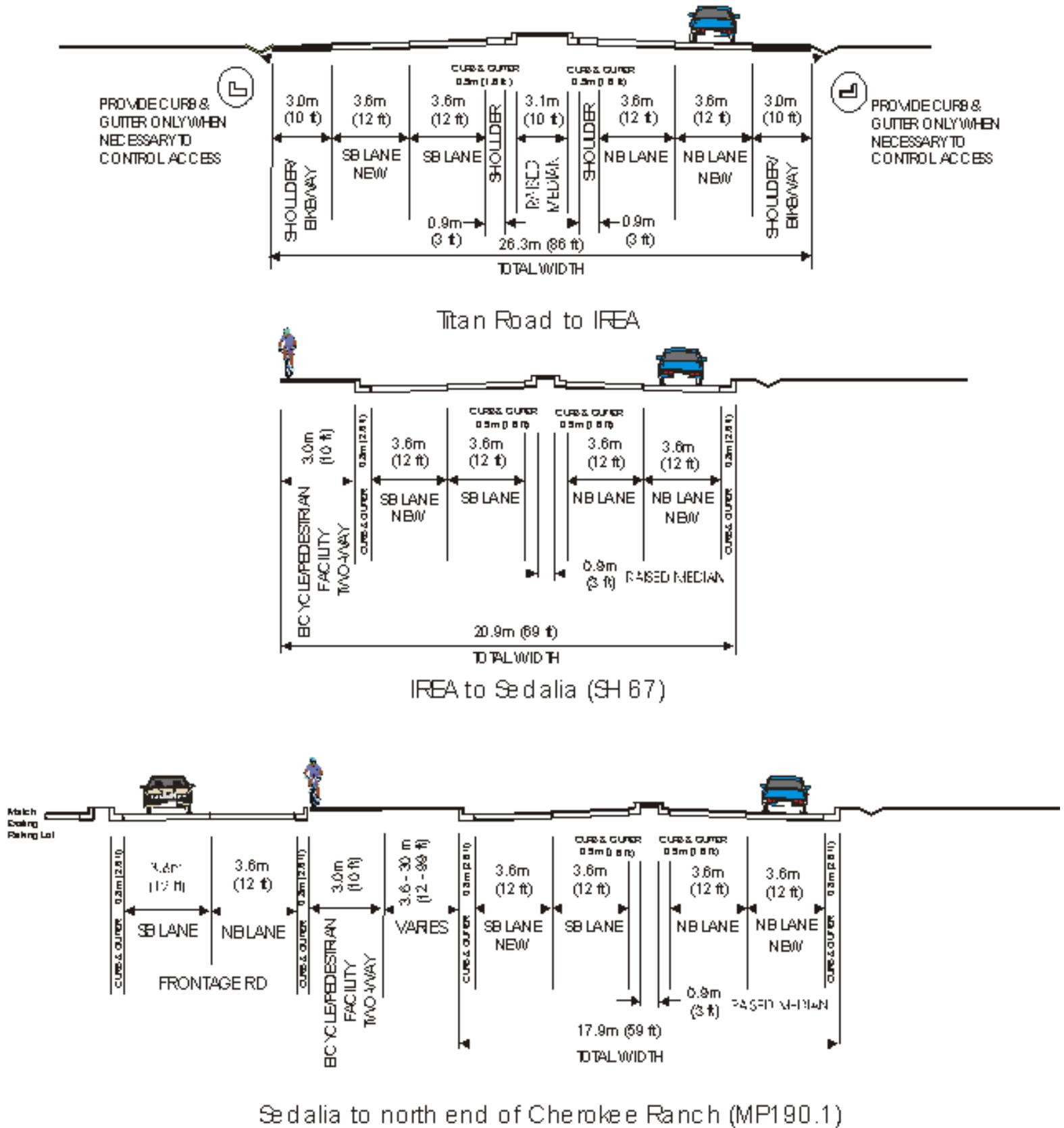
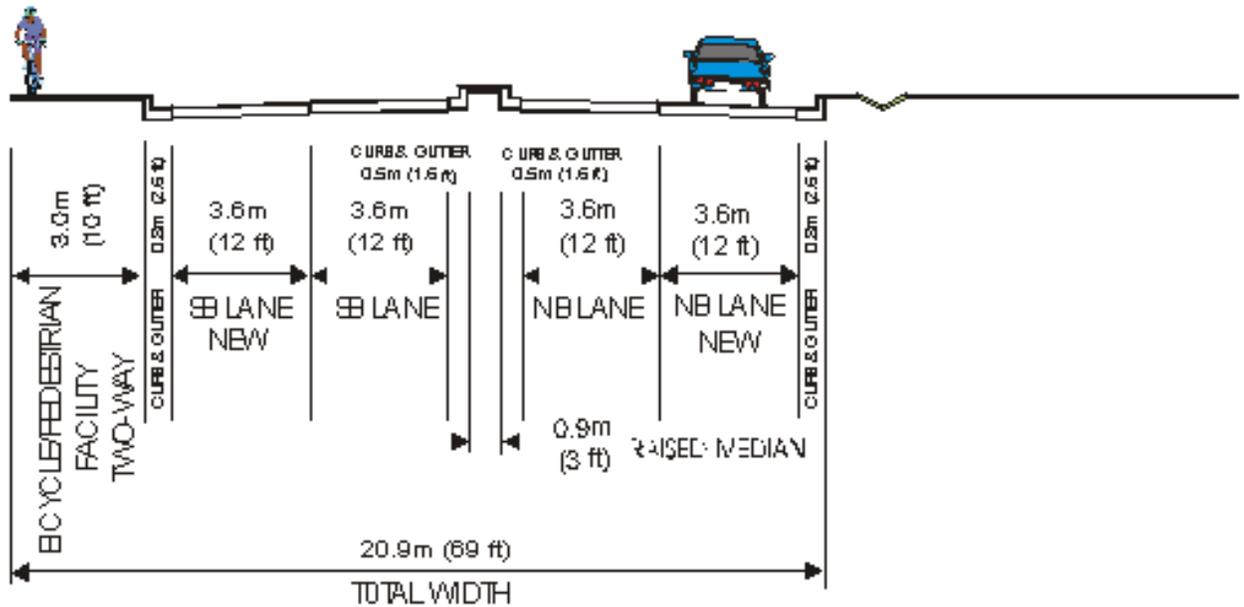
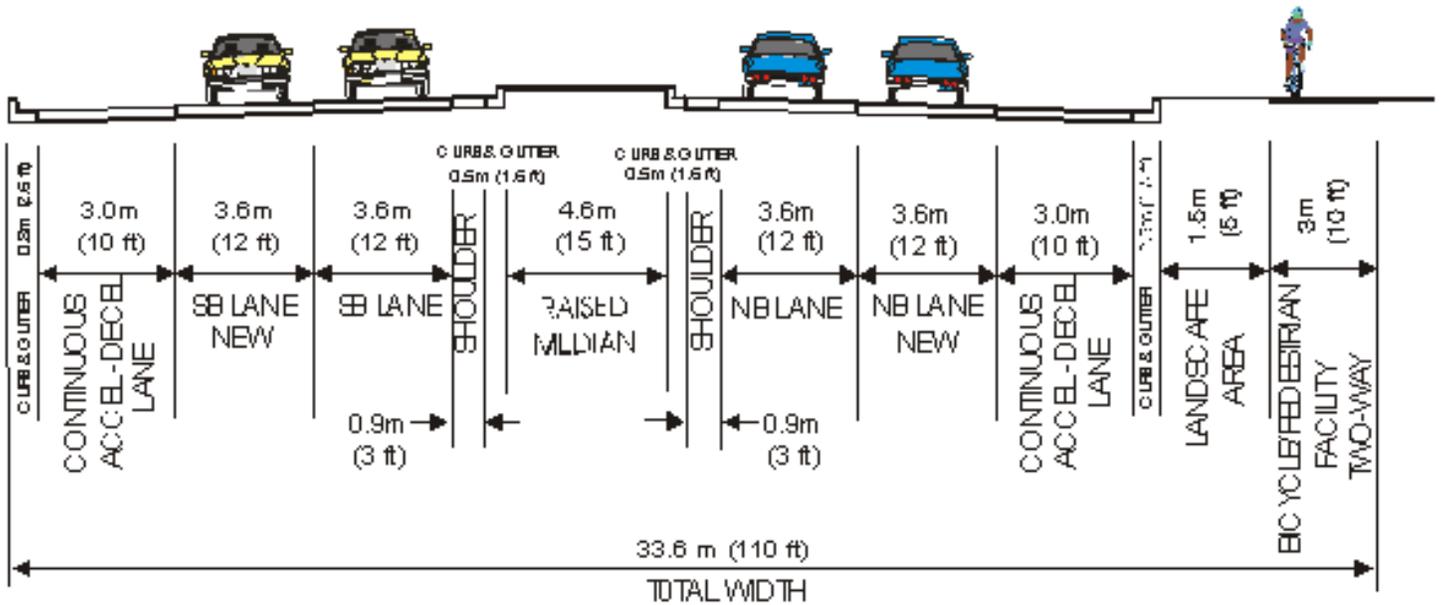


Figure 2.13
US 85 Corridor Typical Sections for the Other Alternative



**North end of Cherokee Ranch (MP 190.1)
to Daniels Park Road**



Daniels Park Road to Meadows Parkway

The section between Sedalia and the north end of the Cherokee Ranch (approximately MP 190.1) consists of the typical section described previously between IREA and Sedalia, with the addition of a frontage road on the south side of US 85. The frontage road is separated from US 85 by a grass median that varies in width. The frontage road has two 3.6-meter (12-foot) lanes, 0.8-meter (2.6-foot) outside curb and gutter, and a bicycle/pedestrian facility to the north. Total width of this section is 17.9 meters (59 feet).

The section between the north end of the Cherokee Ranch and Daniels Park is the same as described between IREA and Sedalia.

From Daniels Park Road to Meadows Parkway, a wider typical section is used with continuous acceleration and deceleration lanes. There are four 3.6-meter (12-foot) lanes, a 4.6-meter (15-foot) raised median, 0.5-meter (1.6-foot) inside curb and gutter, 0.9-meter (3-foot) inside shoulder, 3.0-meter (10-foot) acceleration and deceleration lanes, a landscaped area of approximately 1.5 meters (5 feet) between the roadway and the bikeway, and a detached 3.0-meter (10-foot) bicycle/pedestrian facility on the east side. The total typical section width is approximately 33.6 meters (110 feet).

The typical section may include left-turn lanes, acceleration lanes, and deceleration lanes where appropriate. Continuous auxiliary lanes are used where accesses are spaced closely together. Most business and residential accesses are provided with right-in/right-out access.

2.6.2.4. US 85 Corridor Travel Patterns, Access, and Safety for the Other Alternative

Travel patterns change for those accessing the businesses located in the southeast quadrant of the SH 67 and US 85 intersection. The Other Alternative improves the intersection of SH 67 and US 85 at Sedalia. The intersection is improved by adding acceleration and deceleration lanes, a frontage road, and a raised median along SH 67. The interchange moves to the northeast, and a frontage road is constructed along the existing US 85 roadway providing access to the Sedalia businesses. Travel patterns change for those currently accessing the businesses directly off of US 85 and from SH 67 as well. Left turns onto and off of the frontage road frontage road from SH67 will be prohibited. Under this alternative, businesses in this area must be accessed via the frontage road.

Access points along US 85 are improved in conjunction with the widening of US 85 based on recommendations from the *Final US 85 Access Management Plan*, February 2001. The purpose of the plan is to improve traffic flow, improve traffic safety, reduce traffic conflicts, and provide appropriate access to adjacent land uses. To meet this objective, existing accesses are consolidated or changed to right-in/right-out. Residents who are provided a limited access of right-in/right-out alter their travel patterns by traveling out of the desired direction to a full-movement access to make a U-turn. Maximum out-of-direction travel is approximately 1.6 kilometers (1 mile). The new SH 67 and US 85 intersection improves access to Sedalia and the businesses.

Safety features incorporated in the Other Alternative include wider shoulders, mountable curb, raised median, intersection turn lanes, acceleration lanes, deceleration lanes; and better curve geometry. Highway safety is improved due to the additional capacity that the mainline widening provides and due to the realignment of US 85 at the Cook Ranch property where a curve is minimized. Safety is also improved by reducing traffic conflicts by consolidating access points along US 85. By shifting the SH 67 and US 85 intersection to the northeast, safety and operations are improved by increasing the distance between the railroad tracks and the signal.

2.6.2.5. US 85 Corridor Cost for the Other Alternative

Total cost for the US 85 Corridor elements of the Other Alternative is approximately \$98.8 million. For a cost breakdown, see Section 2.9, *Alternative Costs*.

The ROW/relocation cost for the Other Alternative is approximately \$17.8 million to purchase 51.4 hectares (127 acres).

2.6.3 Transportation Demand Management Program for the Other Alternative

The TDM program for the Other Alternative is the same as the TDM program for the Preferred Alternative. For additional information, see Section 2.5.3, *Transportation Demand Management Program for the Preferred Alternative*.

Figures 2.10a through Figure 2.10i show improvements included in the Other Alternative along the I-25 Corridor.

**[Figure 2.10a](#)
[Other Alternative I-25 Corridor](#)**

**[Figure 2.10b](#)
[Other Alternative I-25 Corridor](#)**

**[Figure 2.10c](#)
[Other Alternative I-25 Corridor](#)**

**[Figure 2.10d](#)
[Other Alternative I-25 Corridor](#)**

**[Figure 2.10e](#)
[Other Alternative I-25 Corridor](#)**

**[Figure 2.10f](#)
[Other Alternative I-25 Corridor](#)**

**[Figure 2.10g](#)
[Other Alternative I-25 Corridor](#)**

**[Figure 2.10h](#)
[Other Alternative I-25 Corridor](#)**

**[Figure 2.10i](#)
[Other Alternative I-25 Corridor](#)**

Figures 2.12a through Figure 2.10h show improvements included in the Other Alternative along the US 85 Corridor.

[Figure 2.12a](#)

Other Alternative US 85 Corridor

Figure 2.12b

Other Alternative US 85 Corridor

Figure 2.12c

Other Alternative US 85 Corridor

Figure 2.12d

Other Alternative US 85 Corridor

Figure 2.12e

Other Alternative US 85 Corridor

Figure 2.12f

Other Alternative US 85 Corridor

Figure 2.12g

Other Alternative US 85 Corridor

Figure 2.12h

Other Alternative US 85 Corridor

2.7 BICYCLE AND PEDESTRIAN FACILITIES ALONG THE US 85 CORRIDOR

In addition to improving the existing highway, CDOT is also seeking opportunities to improve the entire multi-modal system. Figure 2.14 shows the bicycle and pedestrian facilities along US 85 under consideration in the Preferred Alternative and Other Alternative.

CDOT would prefer a detached bicycle and pedestrian facility along US 85. However, various properties along US 85, including houses, businesses, and Section 4(f) properties, restrict the amount of bikeway that can be detached. As part of the Preferred Alternative and Other Alternative, a detached bicycle/pedestrian facility is located between Blakeland Drive and Highlands Ranch Parkway and between Daniels Park Road and Meadows Parkway. Figure 2.15 is a photo simulation of the detached trail just north of Happy Canyon Road. Where a detached bicycle/pedestrian facility does not fit due to various restrictions, either an attached facility or a large shoulder serves as the bikeway. Multiple bicycle/pedestrian facilities were discussed and evaluated during the EIS process.

Bicycle/pedestrian facilities generally follow the US 85 alignment where possible. Between C-470 and Blakeland Drive, an attached, 2.4-meter (8-foot) bicycle/pedestrian facility is located on both sides of US 85. Along the east side of US 85 from Blakeland Drive to Highlands Ranch Parkway, a 3.0-meter (10-foot), detached bicycle/pedestrian facility that is separated from US 85 by a 1.5-meter (5-foot) landscaped area is provided. The detached bicycle/pedestrian facility changes to an attached facility at the Union Pacific Railroad Bridge due to width restrictions with the bridge. The attached facility is separated from the highway with a 0.6-

meter (2-foot) barrier.

The section between Highlands Ranch Parkway and IREA includes 3.0-meter (10-foot) shoulder/bikeways on both sides of the highway. Along the west side of US 85 from IREA to Sedalia (SH 67), a 3.0-meter (10-foot), attached bicycle/pedestrian facility is provided.

The section between Sedalia and the north end of the Cherokee Ranch (approximately MP 190.1) consists of a frontage road on the south side of US 85. A 3.0-meter (10-foot) bicycle/pedestrian facility is located on the east side of the frontage road. From approximately MP 190.1 to Daniels Park Road, a 3.0-meter (10-foot), attached bicycle/pedestrian facility is located on the west side of US 85. Between Daniels Park Road and Meadows Parkway, a detached, 3.0-meter (10-foot) bicycle/pedestrian facility that is separated from US 85 by a 1.5-meter (5-foot) landscaped area is provided on the east side of US 85.

Bicycle and pedestrian facilities included in the Preferred Alternative and Other Alternative connect to existing paths, such as the High Line Canal Trail. Improvements to the High Line Canal Trail are included as part of the Preferred Alternative and Other Alternative. The trail is realigned to the north and improved into a grade-separated crossing. The crossing is a 3-meter (10-foot) high by 3.7-meter (12-foot) wide culvert. The original High Line Canal Trail remains in place to provide a connection to the US 85 bicycle/pedestrian facility. Figure 2.16 shows the design and typical section of the trail under US 85. Figure 2.17 is a photo simulation showing the new grade-separated crossing and the original trail.

Figure 2.14
Bicycle/Pedestrian Facilities Considered for the Preferred Alternative
and the Other Alternative

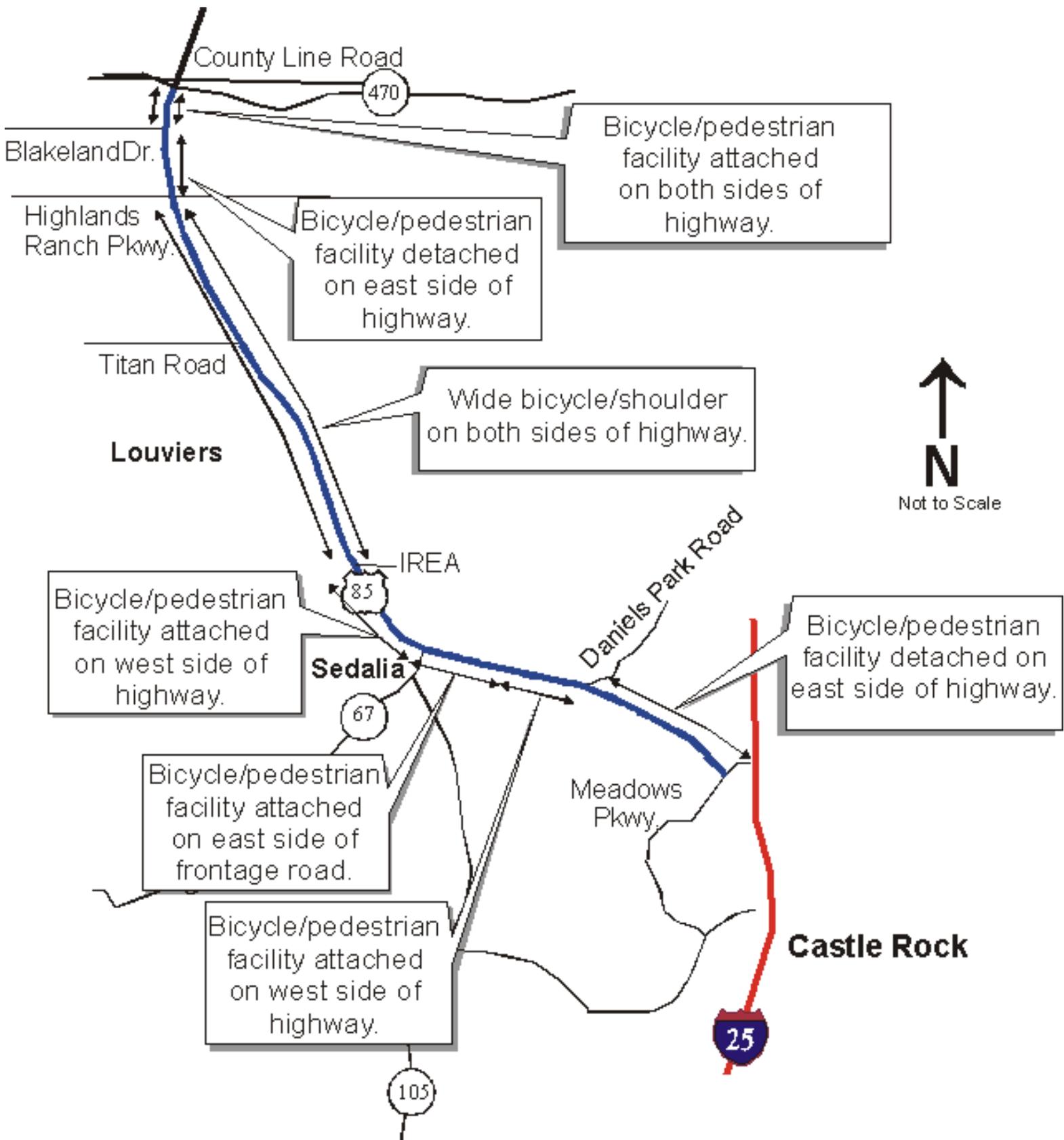


Figure 2.15
Detached Bicycle/Pedestrian Facility Photo Simulation at Approximate MP 187.2
(looking north)



Figure 2.16
High Line Canal Trail Grade - Separation
M.P. 199.56

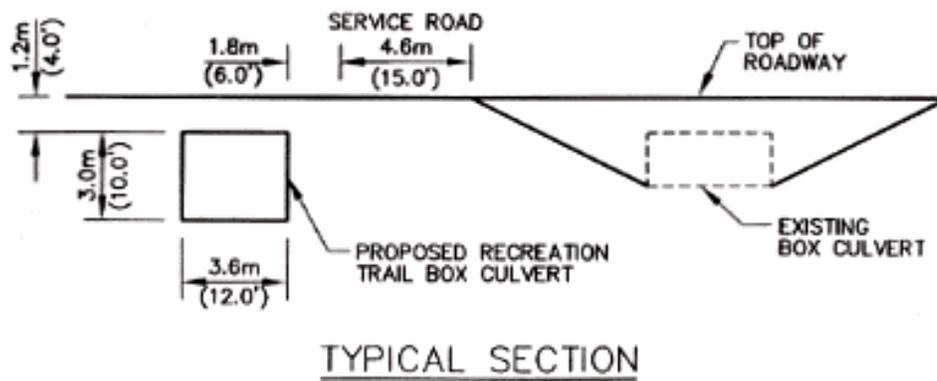
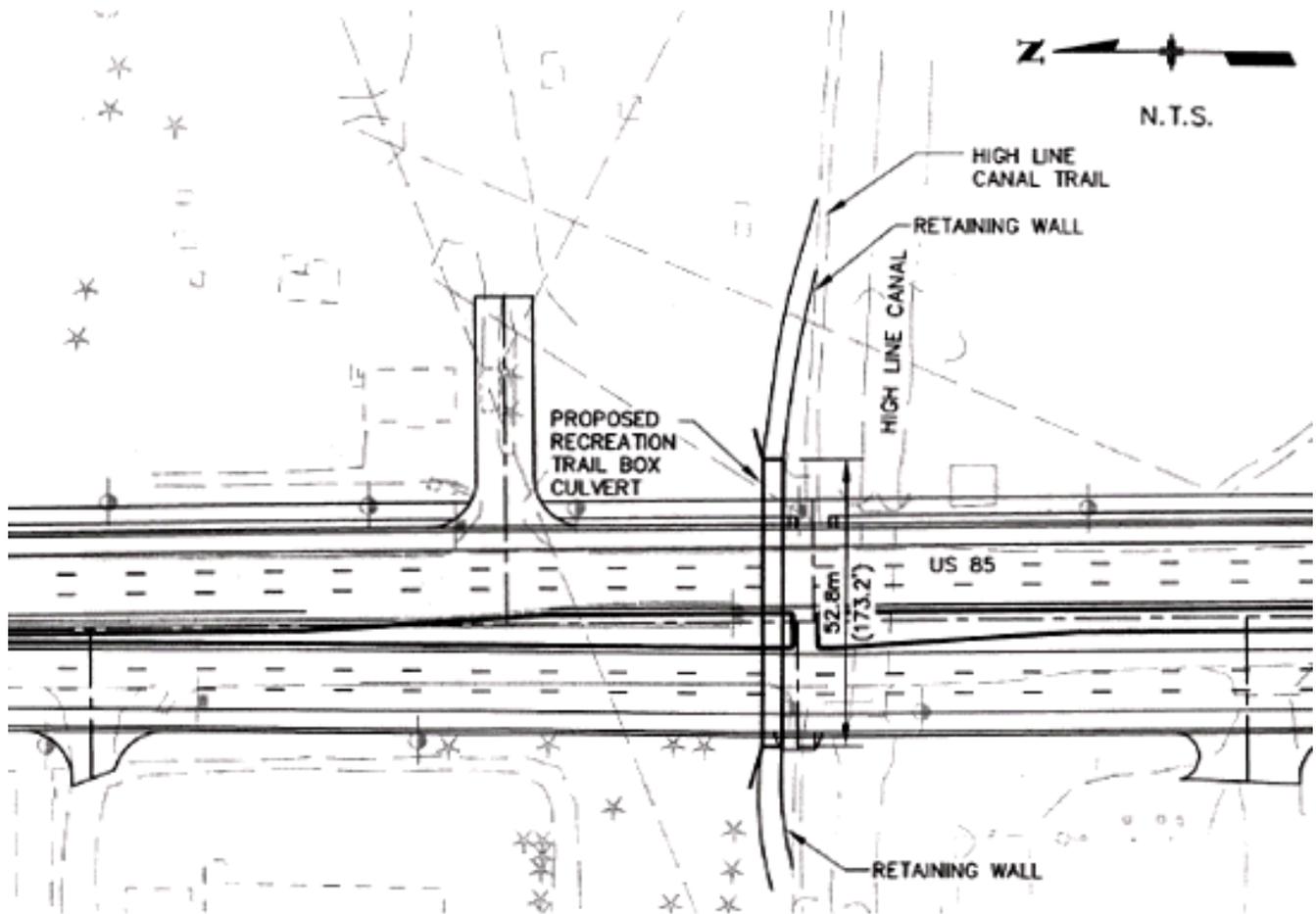


Figure 2.17
High Line Canal Trail Photo Simulation at Approximate MP 199.5
(looking west)



CDOT is committed to continue working with trail groups throughout the design process to develop the best possible design for the bicycle/pedestrian facility within the existing constraints. A design enhancement example is to provide curb inlet grates along US 85 to accommodate bicyclists. It is CDOT's intent to continue to work with Douglas County to try to tie into the existing trail system where possible and to encourage the county to also contribute to improving the current system.

Total cost of the bicycle and pedestrian facilities along the US 85 Corridor for the Preferred Alternative and Other Alternative is \$1.2 million. The cost of the High Line Canal grade-separation crossing for the Preferred Alternative and Other Alternative is \$0.3 million.

For a detailed description of the US 85 typical sections for the future build alternatives, see Section 2.5.2.3, *US 85 Corridor Typical Section for the Preferred Alternative* and Section 2.6.2.3, *US 85 Corridor Typical Section for the Other Alternative*.

2.8 WILDLIFE CROSSINGS ALONG THE US 85 CORRIDOR

The US 85 Corridor bisects open space land used by wildlife. Crucial impacts to wildlife along US 85 are the potential for habitat fragmentation and reduction in wildlife habitat connectivity as a result of the widening. Widening increases the barrier to wildlife attempting to cross over US 85 and further fragments deer and elk

habitat.

Tracking studies at existing highway crossings indicate that available bridges and culverts along US 85 are being used by small- to medium-sized mammals. These structures appear to be inadequate for deer and elk due to the small openness factors. The openness factor is defined as the relative openness of an underpass and is calculated as $(\text{height} \times \text{width})/\text{length}$. CDOW recommends an openness factor of greater than 0.6 for deer crossing and 0.78 for elk crossing. These recommended openness factors have been determined to provide the adequate size needed to encourage deer and elk crossing.

To mitigate wildlife impacts and to enhance existing crossings, two wildlife crossings along US 85 are improved by the future build alternatives. These crossings were strategically chosen based on tracking study results. The first crossing is located on US 85 at MP 195.1 as shown on Figure 2.18. This wildlife crossing is a proposed bridge at the realignment of US 85 near the Cook Ranch property. The proposed crossing is 26.2 meters (86 feet) long, 4.1 meters (13.5 feet) high, and 9.1 meters (30 feet) wide. The openness factor of the proposed bridge is 4.7, which is greater than the recommended factor for elk crossing. A photo simulation of this wildlife crossing is shown in Figure 2.19.

The second crossing is an enhancement of an existing crossing located along US 85 at MP 189.65 as shown on Figure 2.20. The existing crossing is a 2.4-meter (8-foot) by 2.4-meter (8-foot) box culvert 32 meters (105 feet) long. The existing openness factor is 0.61, which is not adequate for elk crossing. The proposed crossing shows an increase in the height of the culvert to 4.1 meters (13.5 feet), which provides an openness factor of 1.0, which is greater than the recommended factor for elk crossing.

Figure 2.18
Proposed Elk Crossing M.P. 195.1

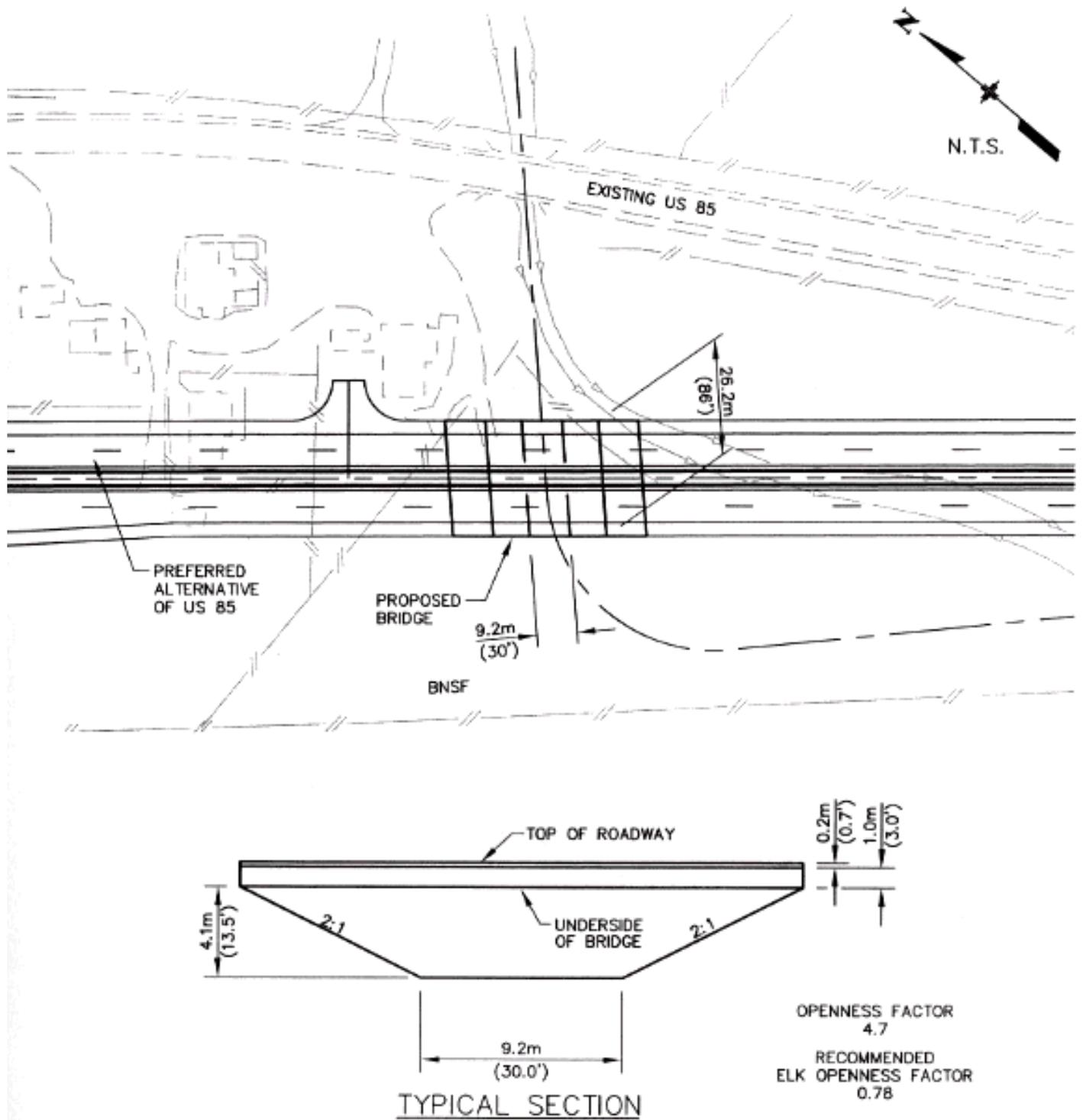
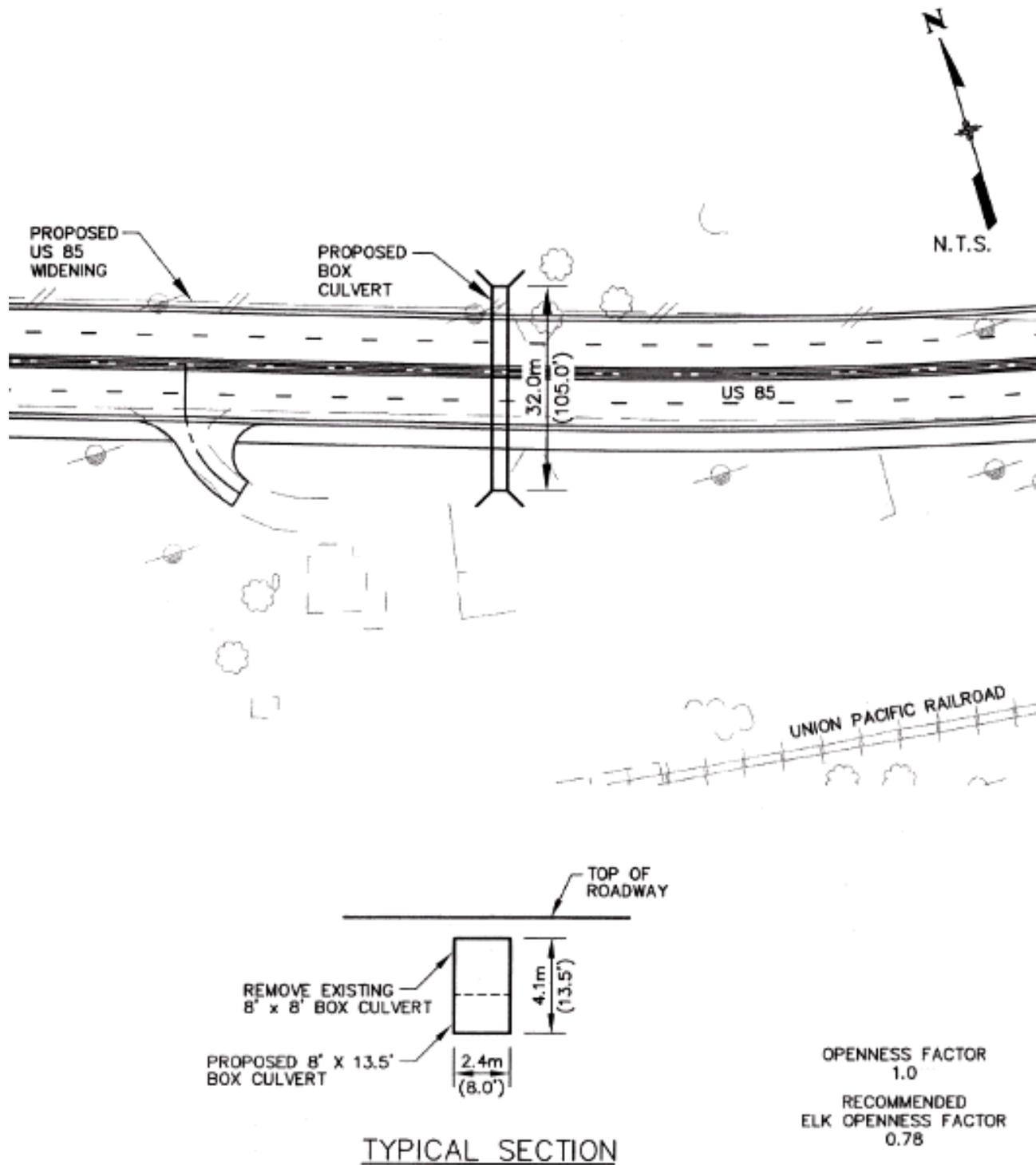


Figure 2.19
Wildlife Crossing Photo Simulation at Approximate MP 195.1
(looking east)



Figure 2.20
Proposed Elk Crossing M.P. 189.65



The two proposed wildlife crossings are strategically located and provide openness factors to accommodate deer and elk movement. These crossings help maintain habitat connectivity for elk, deer, and other wildlife. The total cost of the wildlife enhancements along the US 85 Corridor for the Preferred Alternative and Other Alternative is \$0.3 million. CDOT will coordinate with the CDOW during the design phase in order to determine if any additional wildlife crossing enhancements are needed. For more information on wildlife and wildlife crossings, see Section 4.3.6, *Wildlife*; Section 5.3.3.6, *Wildlife Impacts*; and Section 7.3.6, *Wildlife*.

CDOT has been working with ERTAC to determine wildlife mitigation measures and enhancements. This committee is an advisory group made up of agencies with interests or responsibilities with the ecology within the study area. For more information on ERTAC, see Section 2.2.4, *Ecological Resources Technical Advisory*

Committee.

2.9 ALTERNATIVE COSTS

Preferred Alternative and Other Alternative cost is shown on Table 2.2. The Preferred Alternative assumes the full reconstruction of US 85. Total cost for the US 85 Corridor elements of the Preferred Alternative, assuming full reconstruction of US 85, is approximately \$97.1 million. CDOT lacks sufficient funding to build all US 85 elements of the Preferred Alternative. CDOT and Douglas County are working together to find additional funding. If sufficient funds are not found prior to the ROD, the project work will be prioritized. The ROD will be based on available funding.

2.10 ALTERNATIVE VARIATIONS

Previous sections in this chapter presented the No-Action Alternative, Preferred Alternative, and Other Alternative. Based on comments received at the November public open houses, three variations along the I-25 Corridor between Lincoln Avenue and Castle Pines Parkway were suggested and are presented below. One of these alternatives, or an alternative developed from a combination of the three, will likely be the Selected Alternative presented in the ROD.

2.10.1 Variation 1

Variation 1 is the Preferred Alternative with the addition of an east-side frontage road between Schweiger and Surrey Ridge Road, as shown on Figure 2.21. The new east-side frontage road would provide vehicle access to and from I-25 without disrupting the Surrey Ridge residential area.

2.10.2 Variation 2

Variation 2 eliminates the Surrey Ridge Road Interchange and provides an east-side frontage road from Schweiger to Castle Pines Parkway as shown on Figure 2.22. Under this variation, residents of the Surrey Ridge area access I-25 from either the Schweiger Interchange or Castle Pines Parkway Interchange.

2.10.3 Variation 3

Variation 3 eliminates the Schweiger Interchange and Surrey Ridge Road Interchange, provides a new interchange at Rampart Range, and provides an east-side frontage road from Rampart Range to Castle Pines Parkway as shown on Figure 2.23. Under this variation, residents of the Surrey Ridge area access I-25 from either the Rampart Range Interchange or Castle Pines Parkway Interchange.

Table 2.2
Cost Comparison (\$ million)

		Improvements	Preferred Alternative	Other Alternative	
I-25 Corridor	Mainline Widening	C-470 to Lincoln Ave	3.5	3.5	
		Lincoln Ave to Castle Pines Pkwy	10.2	10.2	
		Castle Pines Pkwy to Meadows/Founders Pkwy	6.1	6.1	
		Meadows/Founders Pkwy to MP 178 and Union Pacific Railroad relocation	30.0	30.0	
	Frontage Road	Rampart Range to Schweiger	N/A	3.7	
		Schweiger to Surrey Ridge Rd	N/A	4.5	
		Surrey Ridge Rd to Castle Pines Pkwy	N/A	4.9	
	Interchanges	Schweiger	1.7	N/A	
		Rampart Range	N/A	9.1	
		Surrey Ridge Rd	2.4	3.6	
		Castle Pines Pkwy	N/A	5.1	
		Happy Canyon Rd	N/A	1.6	
	Other	Car pool lot	1.0	1.0	
			I-25 Corridor Total	54.5	78.7
	US 85 Corridor	Mainline Widening	C-470 to Highlands Ranch Parkway	12.3	12.3
Highlands Ranch Parkway to Titan Road			16.3	18.0	
Titan Road to MP 190.6			39.5	39.5	
MP 190.6 to 189.74 (SH 67/US 85 Intersection)			6.2	6.2	
MP 189.74 to Meadows Parkway			21.0	21.0	
Other		Bicycle/Pedestrian Facilities	1.2	1.2	
		High Line Canal Trail Grade-Separation	0.3	0.3	
		Enhanced Wildlife Crossings	0.3	0.3	
		US 85 Corridor Total	97.1	98.8	
TOTAL			151.6	177.5	
N/A Not Applicable All values shown in 1999 dollars.					

**Figure 2.21
Variation 1**

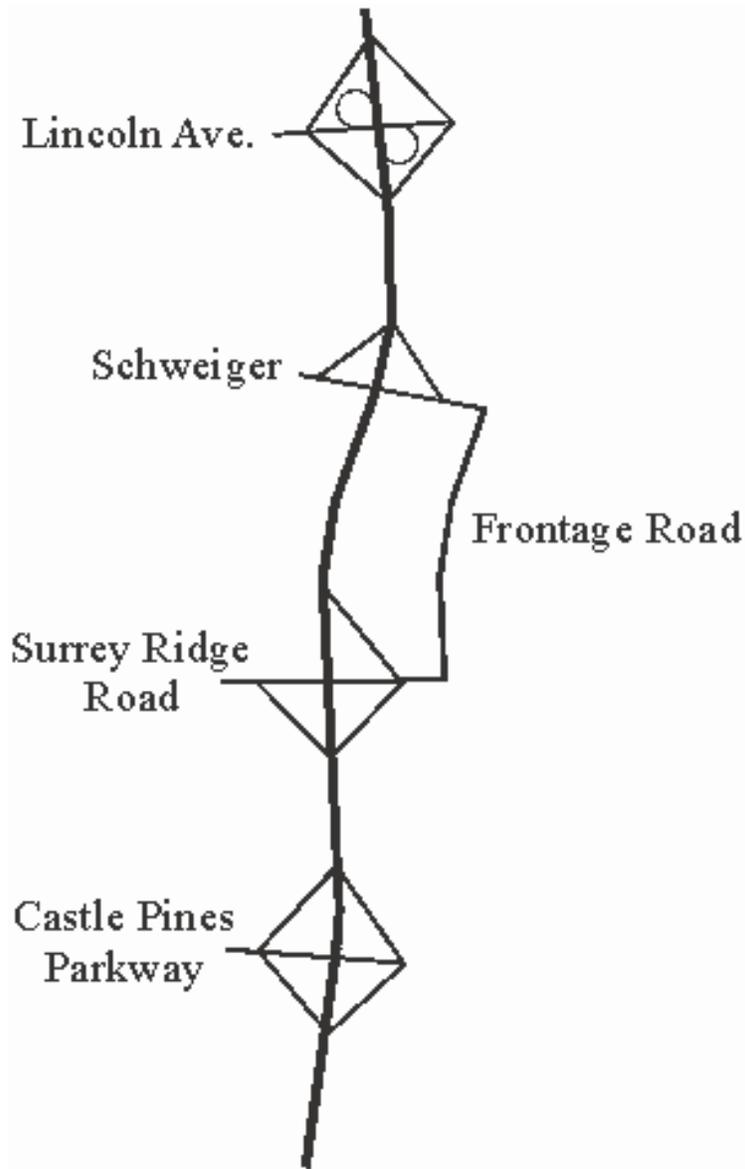


Figure 2.22
Variation 2

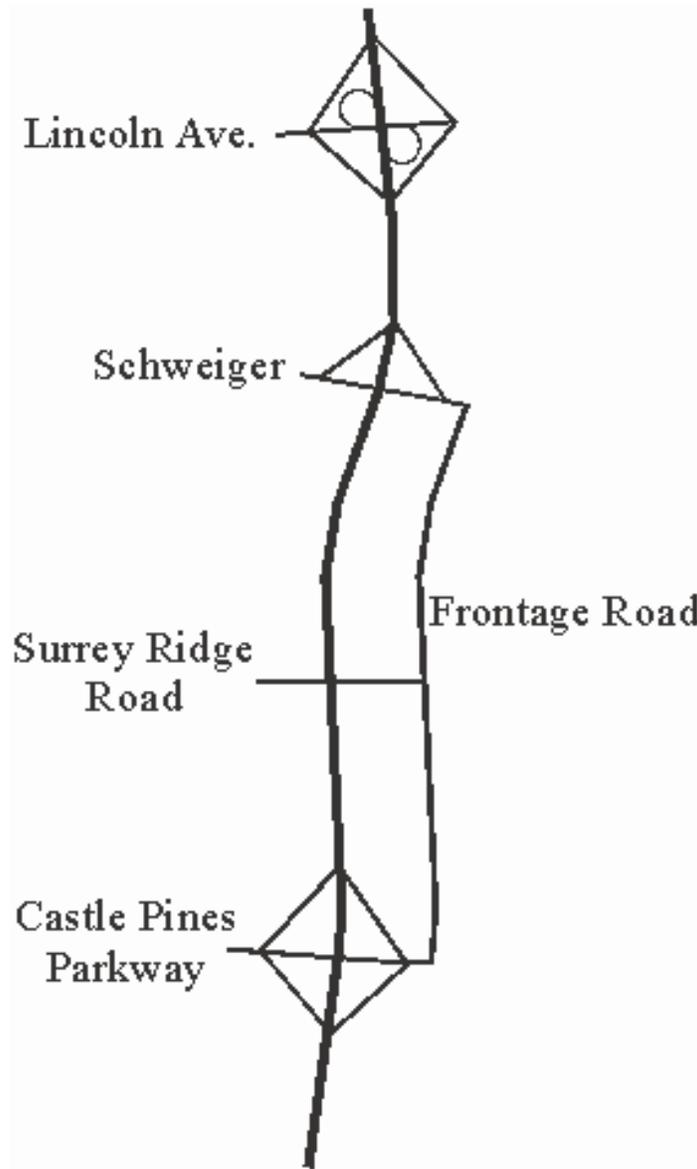
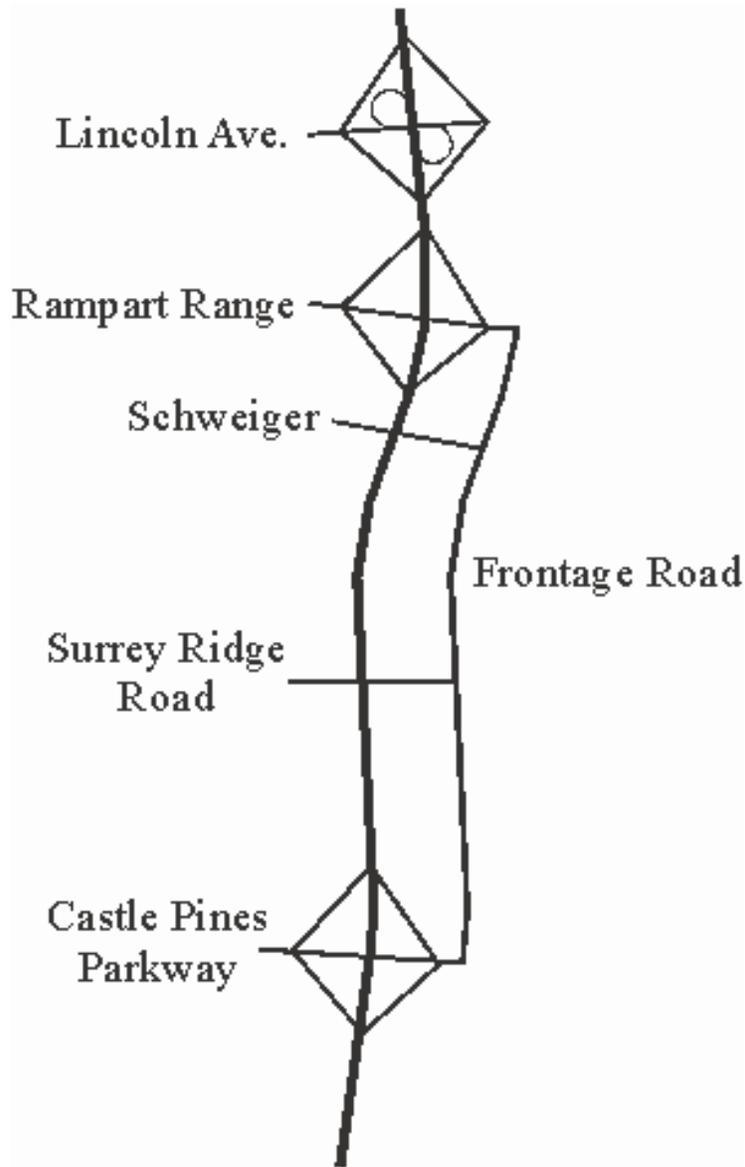


Figure 2.23
Variation 3



2.11 THE LONG-TERM VISION FOR SOUTH I-25 AND US 85 THROUGH 2020 AND BEYOND

The Long-Term Vision for South I-25 and US 85 Through 2020 and Beyond (referred to as the Long-Term Vision) was developed through the previously discussed extensive evaluation and public/agency involvement process. The Long-Term Vision reflects improvements that meet the purpose and need and/or are desired through community values and agency support. Because the Long-Term Vision assumes no fiscal constraints, not all of the elements included in the Long-Term Vision have been included in the FEIS build alternatives. Major elements of the vision are discussed in the following sections and are shown on Figure 2.24. Upon adoption of this FEIS by FHWA and CDOT, these items will be conveyed to DRCOG with a request for inclusion in Metro Vision.

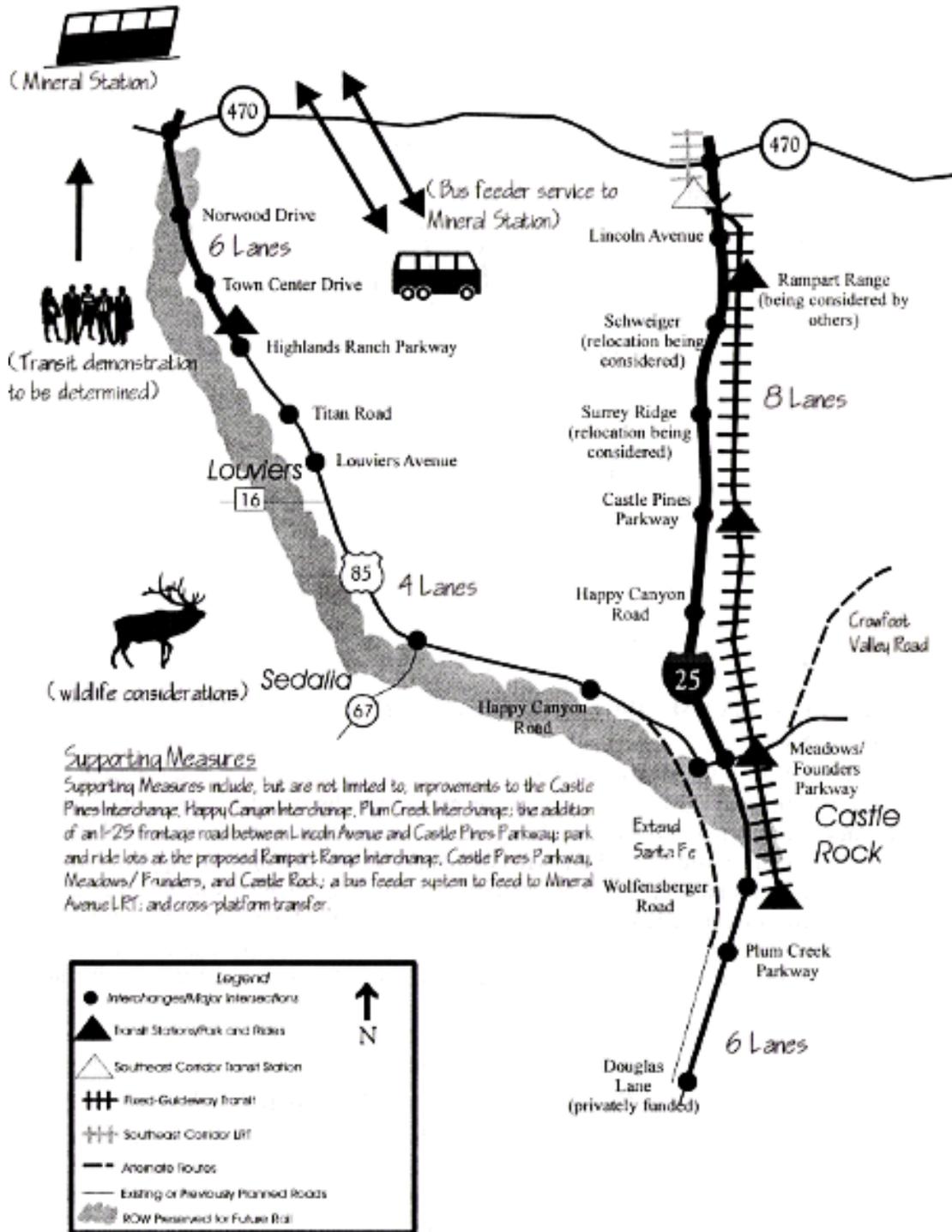
2.11.1 I-25 Corridor Long-Term Vision Elements

2.11.1.1. Additional General-Purpose Lanes from C-470 through Castle Rock

One additional lane is added in each direction from C-470 to Douglas Lane. The final configuration is eight lanes between C-470 and Meadows/Founders Parkway and six lanes between Meadows/Founders Parkway and Douglas Lane. This element of the Long-Term Vision is evaluated in the Preferred Alternative and Other

Alternative.

Figure 2.24
The Long-Term Vision for the South I-25 Corridor and US 85 Corridor
Through 2020 and Beyond



2.11.1.2. I-25 Fixed-Guideway

The Long-Term Vision includes fixed-guideway along I-25. The fixed-guideway in the Long-Term Vision extends from the Southeast Corridor terminus, north of Lincoln Avenue to Castle Rock. Proposed stations are

located at the Rampart Range Development, Castle Pines Parkway, Meadows/Founders Parkway, and Castle Rock. Future construction of this element is provided for as a transportation envelope (located between I-25 and the frontage road) between Lincoln Avenue and Castle Pines Parkway in the Other Alternative. Fixed-guideway is not anticipated to be constructed in the next 20 years, but CDOT has been coordinating with Douglas County, the Town of Castle Rock, and the City of Lone Tree to not preclude future fixed-guideway options.

Fixed-Guideway Alignment

The tentative conceptual alignment of the fixed-guideway is shown on Figure 2.25. The fixed-guideway alignment extends south from the Southeast Corridor terminus at Lincoln Avenue along the west side of I-25. The alignment crosses I-25 near the Lincoln Avenue Interchange. This crossing may be either north or south of the interchange and may be either an overpass or tunnel. (For cost estimating purposes, the fixed-guideway alignment is assumed to cross north of Lincoln Avenue through a tunnel.) After the fixed-guideway crosses I-25, the alignment closely parallels I-25 on the east side and curves around interchanges to reach stations.

The southern terminus of the fixed-guideway has not been finalized. The final determination will be part of the planning effort for fixed-guideway construction. Several options within the Town of Castle Rock have been identified as potential termini:

- Meadows/Founders Parkway
- Downtown Castle Rock
- Plum Creek Parkway

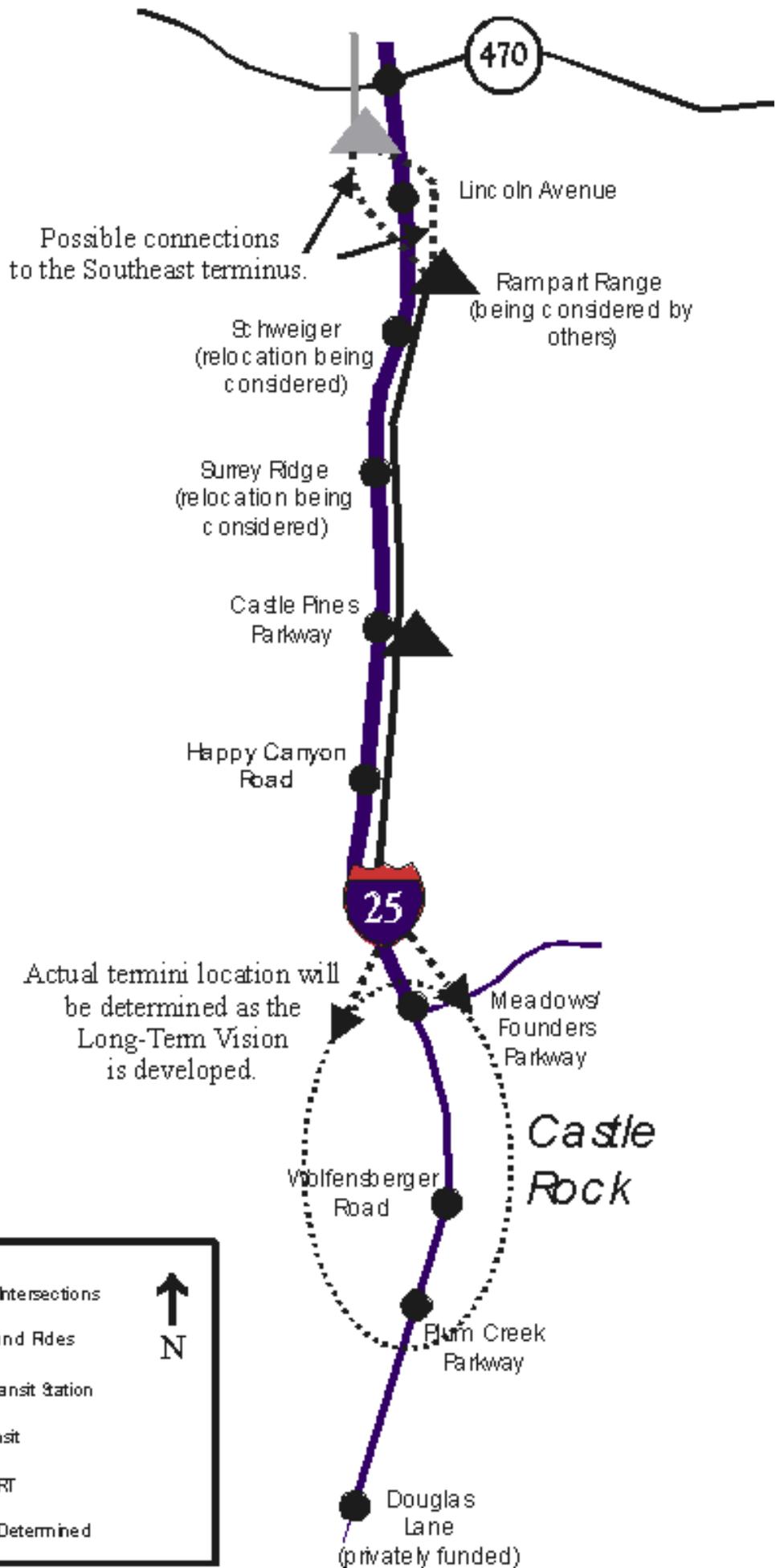
Meadows/Founders Parkway. The fixed-guideway could terminate near the Meadows/Founders Parkway Interchange. Three alignment options exist for this terminus. One option is to continue the alignment on the east side of I-25 and terminate just north of the houses along Allen Street. This option includes a pedestrian overpass that connects the fixed-guideway station to the Prime Outlets.

A second option is located at the Meadows/Founders Interchange and crosses the fixed-guideway from the east side of I-25 to the west side of I-25 and ends at the Prime Outlets.

The third option examines the location of a fixed-guideway terminus near the Prime Outlets that accommodates possible future rail corridors along I-25 and US 85.

Downtown Castle Rock. The fixed-guideway could terminate in downtown Castle Rock. Two alignment options exist for this terminus. One option is to continue the alignment on the east side of I-25 and continue up the Wilcox northbound entrance ramp. The fixed-guideway alignment is adjacent to the east side of Wilcox Street and terminates at 5th Street.

Figure 2.25
Potential I-25 Fixed-Guideway



Legend

●	Interchanges/Major Intersections	
▲	Transit Stations/Park and Rides	
▲	Southeast Corridor Transit Station	
—	Fixed-Guideway Transit	
- - -	Southeast Corridor LRT	
· · · ·	Termini Route to be Determined	



(privately funded)

Another option for the fixed-guideway ending in downtown Castle Rock is to continue the alignment on the east side of I-25 and connect to the existing railroad tracks. The fixed-guideway could use the existing tracks into downtown Castle Rock, dependent on the existing railroad tracks being relocated.

Plum Creek Parkway. The fixed-guideway may terminate at Plum Creek Parkway. The alignment for this option continues on the east side of I-25 and terminates at the Plum Creek Parkway Interchange.

This FEIS provides for the fixed-guideway alignment between Lincoln Avenue and Castle Pines Parkway in the Other Alternative (between I-25 and Frontage Road). Several options for the alignment are available at the other locations. These decisions will be made after additional evaluation is completed.

Fixed-Guideway Typical Section

Figure 2.26 shows the fixed-guideway typical section. A concrete barrier and 3.6-meter (12-foot) shoulder separate the fixed-guideway from the highway. The double-track, fixed-guideway is located on the east side of I-25 in a 9.1-meter (30-foot) envelope. The fixed-guideway envelope may be revised (for example, 9.4-meter [31-foot] wide to match the Southeast Corridor envelope) after additional evaluation is completed and at the time of final design.

Fixed-Guideway Cost

The cost for the fixed-guideway was developed as part of the second level of evaluation and was used only for comparison purposes with the other alternatives. The cost is estimated at \$105 million and would need to be re-evaluated in the future. The estimated cost assumes single-track, and diesel multiple unit (DMU) commuter rail. It includes tunneling beneath I-25 north of Lincoln Avenue. The alignment begins at Lincoln Avenue and continues to Plum Creek Parkway. The cost is conceptual and does not include ROW costs, although some of the ROW costs are included in the Other Alternative. The above assumptions were made for comparison purposes only. The type of fixed-guideway alignment and station locations should be re-evaluated closer to the time of implementation.

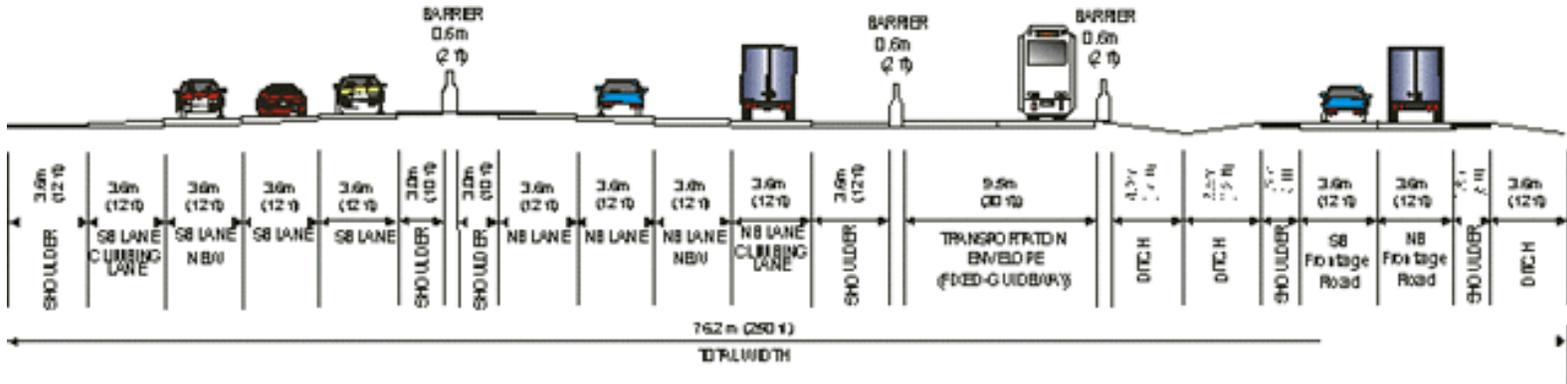
2.11.1.3. I-25 Interchange Improvements and Frontage Road (Recommendations from the *South I-25 Corridor Interchange Study*, March 2000)

Based on the recommendations of the I-25 Interchange Study and the public process, the following improvements or options are included in the Long-Term Vision:

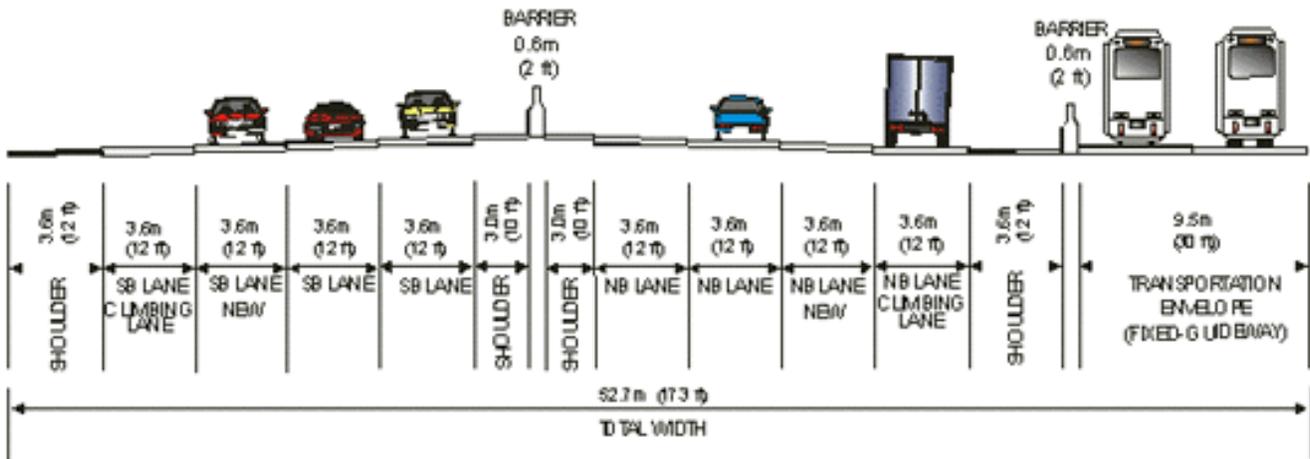
- Construct new interchange at Rampart Range (funded privately) or reconstruct Surrey Ridge Road Interchange as a diamond
- Build frontage road between either Castle Pines Parkway and Rampart Range or Castle Pines Parkway and Lincoln Avenue
- Reconstruct or relocate the I-25/Schweiger (exit 191) Interchange

- Close the I-25/Surrey Ridge Road Interchange and relocate access to the north or south

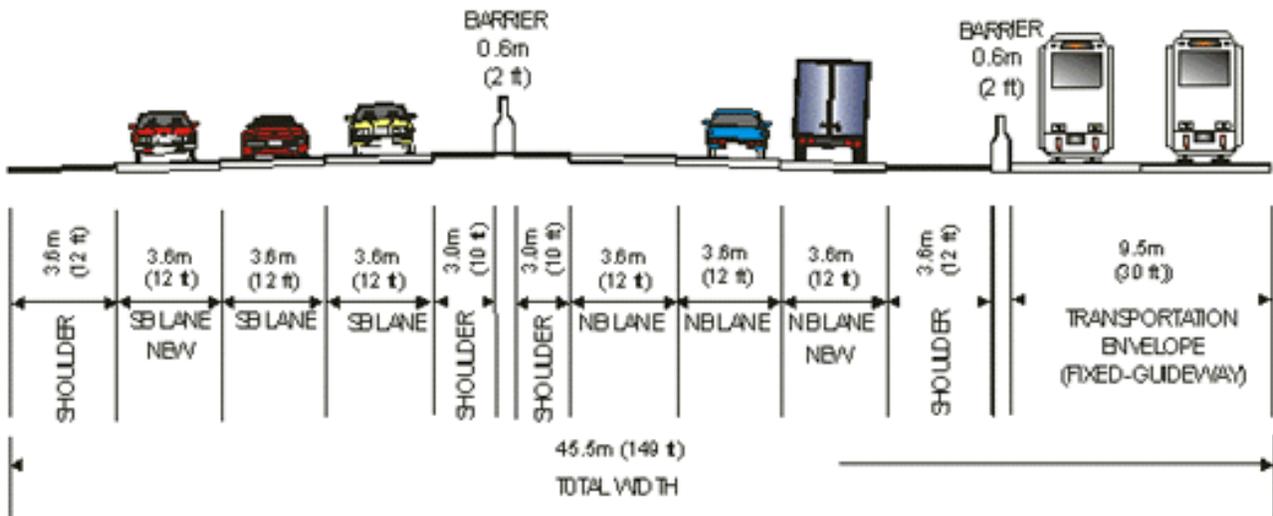
Figure 2.26
Potential I-25 Fixed-Guideway Typical Section



Lincoln Avenue to Castle Pines Parkway



Castle Pines Parkway to Meadows/Founders Parkway



Meadows/Founders Parkway to Fixed-Guideway Southern Termini

Note: Numbers may not add due to rounding of metric unit/english unit conversions.

Note: Numbers may not add due to rounding of metric unit/english unit conversions.

- Add a southeast quadrant loop ramp at the I-25/Castle Pines Parkway Interchange to serve eastbound Castle Pines Parkway to northbound I-25
- Widen Happy Canyon Road over I-25 to provide for additional through lane and turn lane
- Reconstruct Plum Creek Parkway either in existing location as a single-point urban interchange or at a new location to the south as a diamond interchange
- Construct new diamond interchange at Douglas Lane (funded privately)
- Review operational characteristics of freeway merge and diverge at Larkspur/Palmer Lake Interchange and provide improvements as necessary

2.11.1.4. Preservation of Future Transportation Options along I-25

As part of the Long-Term Vision, none of the constructed improvements will preclude future transportation options. CDOT encourages local entities to obtain transportation easements from developers as part of their referral process. As discussed in the DEIS, CDOT has been working with Douglas County, the Town of Castle Rock, and City of Lone Tree to provide for and preserve mass transit and bicycle facilities. Each of these agencies has been supportive in implementing mass transit and providing for bicycle facilities. Examples where CDOT is preserving ROW include providing for mass transit along the east side of I-25 (shown in the Other Alternative) between I-25 and the proposed frontage road and the inclusion of a car pool lot in the FEIS that may be converted into a park-and-ride lot at a future date. Douglas County and the Town of Castle Rock are working with developers to provide a transportation easement along both US 85 and I-25 for future improvements. The City of Lone Tree has been working with the Rampart Range Development in extending light rail transit (LRT) from the Southeast Corridor terminus. RTD boundaries do not include the Town of Castle Rock. The only RTD bus operating in the study area is the Highlands Ranch Town Center Express. Several years ago the residents of the Town of Castle Rock voted against expanding RTD service into Castle Rock.

2.11.1.5. I-25 Alternate Routes

Crowfoot Valley Road is improved to provide for a local access alternate route to I-25. Improvements include upgrading Crowfoot Valley Road to Stroh Road to four-lane arterials between Founders Parkway and Parker Road. This improvement helps the local network and is currently part of Douglas County's planned improvements. This alternate route will need to be funded by others.

2.11.1.6. Supporting Measures

As part of the overall corridor plan, measures that support mobility and safety are desirable. These measures include TDM, transportation system management (TSM), and intelligent transportation systems (ITS). Supporting measures may also include, but are not limited to, car pool/park-and-ride lots, bus feeder systems, and cross-platform transfers. CDOT has initiated an I-25 incident management study that evaluates strategies to handle incidents along I-25.

2.11.1.7. Car Pool Lots

Car pool lots are included as elements of the Long-Term Vision. These lots are designed to encourage travelers to car pool to their destination. A car pool lot is being evaluated in the FEIS build alternatives along I-25 at the northeast quadrant of the Castle Pines Parkway Interchange (see Section 2.5.1.2, *Additional Major Improvements along the I-25 Corridor for the Preferred Alternative*). Other car pool lots are included in the Long-Term Vision but are not being fully evaluated in this FEIS. Environmental clearances will be completed for these car pool lots prior to ROW purchase and construction. Proposed locations include:

- The proposed Rampart Range/I-25 Interchange
- Meadows/Founders Parkway Interchange
- Downtown Castle Rock

Car pool lots are being designed to be converted into park-and-ride facilities when the fixed-guideway transit is extended to Castle Rock.

2.11.2 US 85 Corridor Long-Term Vision Elements

2.11.2.1. Additional General-Purpose Lanes from C-470 to Meadows Parkway

One general-purpose lane is added in each direction between C-470 and Meadows Parkway. The Long-Term Vision lane configuration is six general-purpose lanes between C-470 and Titan Road and four general-purpose lanes between Titan Road and Meadows Parkway. This element is evaluated in the Other Alternative.

2.11.2.2. Bus Feeder Service from Highlands Ranch Parkway to the Mineral Avenue Light Rail Transit Station

A bus service is provided as a feeder system to the Mineral Avenue LRT station and park-and-ride. As part of this, a new park-and-ride lot will be located along US 85 in the vicinity of Highlands Ranch Parkway. The buses will use the general-purpose lanes. RTD currently operates circulation routes to feed the Mineral Avenue LRT station.

2.11.2.3. US 85 Transit Rail Demonstration Project

Included in the Long-Term Vision is a Transit Demonstration Project along US 85. A potential demonstration project is being investigated as an independent study. (CDOT is not leading this effort.) This project is exploring the option of connecting a commuter rail line to the Southwest Corridor LRT terminus at Mineral Avenue to determine potential ridership of a permanent rail line. An independent group is evaluating the cost and operations of three commuter rail options operating on or parallel to the existing freight railroad tracks from Mineral Avenue to downtown Castle Rock. All three options include a cross-platform transfer at the Mineral Avenue LRT station. Train times are scheduled to coincide with peak hour demand, although off-peak service is also offered. Travel time from Castle Rock to Mineral Avenue is approximately 35 minutes, making the total trip time from Castle Rock to Denver approximately 1 hour. The following three options are being evaluated by the group:

Option A: Six-Month to One-Year Demonstration Project

Option A is a six-month to one-year demonstration that operates with one train set making continuous round trips. It includes minimal mainline improvements, assuming the trains can feasibly operate on the existing tracks.

Option B: Annual Service Demonstration Project

Option B operates on an annual basis using 4 train sets, making a total of 14 daily train trips (7 inbound, 7 outbound). It includes moderate mainline improvements, assuming the trains can operate on a portion of the existing track. The trains operate mostly on the existing freight track with an additional 9.6 kilometers (6 miles) of new siding and station area track.

Option C: Permanent Service

Option C operates on a permanent basis using four train sets, making a total of 18 daily train trips (9 inbound, 9 outbound). The trains operate on a newly constructed track connecting Castle Rock to the Mineral Avenue LRT station.

The Commuter Rail Between Castle Rock and Mineral Avenue, January 2000 provides more details of the demonstration project.

2.11.2.4. Preservation of Future Fixed-Guideway Corridor along Existing Rail Corridor

As part of the Long-Term Vision and the Rail Corridor Preservation Policy, the existing rail corridors are preserved for future transit use. If the existing rail corridor is abandoned, the land is preserved for future fixed-guideway transit, and none of the roadway improvements constructed preclude future fixed-guideway. The Rail Corridor Preservation Policy Directive 1906, adopted by CDOT on April 19, 1000, requires CDOT to consider passenger and freight rail transportation. This includes developing criteria used in defining rail corridors of state interest and describing rail activities in which CDOT may engage. Since the existing rail corridor included in the South I-25 Corridor and US 85 Corridor FEIS has been designated as a rail corridor of state significance, CDOT is required to design and construct roads and roadway related structures that will preserve an envelope sufficient for future rail service unless physically or financially prohibited. The Preferred Alternative and Other Alternative remain at least 3 meters (10 feet) from the Union Pacific Railroad ROW and the Burlington Northern Santa Fe Railroad ROW.

2.11.2.5. US 85 Alternate Routes

Santa Fe Drive (US 85) is extended to the south at approximately Meadows/Founders Parkway along I-25 to provide for an alternate route to US 85. Improvements include extending and upgrading US 85 (Santa Fe Drive) to a four-lane arterial between the existing Castlegate Drive and downtown Castle Rock. This alternate route is under the jurisdiction of the Town of Castle Rock, and planning and funding will ultimately be their responsibility.

2.11.2.6. Supporting Measures

As part of the overall corridor plan, measures that support mobility and safety are desirable. These measures include TDM, TSM, and ITS. Supporting measures may also include, but are not limited to, car pool/park-and-ride lots, bus feeder systems, and cross-platform transfers. Another supporting measure is the *Final Access Management Plan for US 85*, November 2000.

The South I-25 Corridor and US 85 Corridor Transportation Demand Management Program Report, December 2000, details TDM measures included in the Preferred Alternative.

2.11.3 Responsibility of Long-Term Vision Elements

Because of jurisdictional and funding constraints, CDOT cannot be responsible for all elements of the Long-Term Vision. Other agencies/groups (i.e., Douglas County, the Town of Castle Rock, Rampart Range Development Group) have jurisdiction over some elements. Potential responsibilities are outlined in Table 2.3 and will be refined as the different elements are developed.

Table 2.3
Responsibility of Elements

Major Elements of Draft Vision	Responsible Agency(s)
I-25 Fixed-Guideway Transit	To Be Determined
I-25 General-Purpose Lanes	CDOT
I-25 Interchanges/Frontage Road	To Be Determined
I-25 Park-and-Ride Lots/Stations	To Be Determined
US 85 General-Purpose Lanes	CDOT
US 85 Transit Demonstration Project	To Be Determined
US 85 Bus Circulation Service (Highlands Ranch to Mineral Station)	RTD
US 85 Park-and-Ride lot (Highlands Ranch Area)	To Be Determined
Alternate Routes	Varies – Douglas County and Castle Rock
Early-Action Projects	CDOT with assistance from Douglas County and Castle Rock
Supporting Measures	Varies – CDOT, Douglas County, Castle Rock, Private Developers, and Others

2.12 ALTERNATIVES ELIMINATED FROM CONSIDERATION

A three-level evaluation process was developed to reduce the number of alternatives fully evaluated in the EIS to those that are reasonable and meet the project purpose and need. The first level of evaluation eliminates unrealistic alternatives; the second level of evaluation eliminates alternatives based on how well they compare with the other alternatives; and the third level of evaluation evaluates combinations of alternatives to determine how well the alternatives work together. The Long-Term Vision is developed from the results of the third level of evaluation and the communities' desires. Additional analysis that determined the alternatives considered in the DEIS was completed after the Long-Term Vision was developed. Since the release of the DEIS, some elements in those alternatives were eliminated and are discussed in Section 2.12.6, *DEIS Alternatives Eliminated*. The

alternatives presented in this FEIS were developed based on comments on the DEIS and on additional analysis.

The first step in the evaluation process is to assess alternatives to improve both the I-25 Corridor and US 85 Corridor. The purpose of determining this assessment is to ensure that all reasonable alternatives are included in the evaluation process. Approximately 80 improvement alternatives were considered for the I-25 Corridor and US 85 Corridor. Alternatives were sorted into the different modes: highway, fixed-guideway, rubber-tired transit, transportation management, alternate routes, and supporting measures. These alternatives are identified in Figure 2.27a and Figure 2.27b. These alternatives proceeded through the evaluation process, and several were eliminated as appropriate.

The No-Action Alternative is evaluated throughout the three-step evaluation process. The No-Action Alternative includes existing conditions and Early-Action projects. Early-Action projects are primarily safety improvements or minor improvements that have either been previously approved or are in the process of being approved.

2.12.1 Alternatives Eliminated at Level 1: Eliminate Unrealistic Alternatives

The first level of evaluation eliminated unrealistic corridor improvements. Alternatives are eliminated at this level for one or more of the following reasons:

- Are not compatible with existing or planned transportation systems
- Are not technologies in use in similar settings
- Do not meet local community goals and objectives
- Fail to preserve future transit options

Alternatives not eliminated at this level are evaluated at the second level. Figure 2.27a and Figure 2.27b identify results of the first level. These figures identify all of the alternatives under consideration and whether they are eliminated at this level. If the alternative is eliminated, the figure shows it stopping at the first level line and gives a brief explanation of why it failed. If the alternative passed this level, the figure shows an arrow passing through the line. The *South I-25 Corridor and US 85 Corridor EIS Alternative Evaluation Process Technical Report*, March 2000, details why each alternative is eliminated.

2.12.2 Alternatives Eliminated at Level 2: Evaluation of Alternatives by Mode and Corridor

The second level of evaluation assesses alternatives that passed the first level of evaluation for each corridor. A rating system is used to categorize each alternative as least favorable, moderately favorable, and most favorable within each mode based on the criteria within each category. The alternatives that generally scored moderately favorable and most favorable were carried forward to the third level of evaluation.

The alternatives eliminated during the second level of evaluation are described in the following sections and the second level of evaluation is summarized on Figure 2.28a and Figure 2.28b. A discussion of why they were eliminated is also included. For additional information see the *South I-25 Corridor and US 85 Corridor EIS Alternative Evaluation Process Technical Report*, March 2000.

Figure 2.27a
I-25 Alternatives Eliminated at Level 1

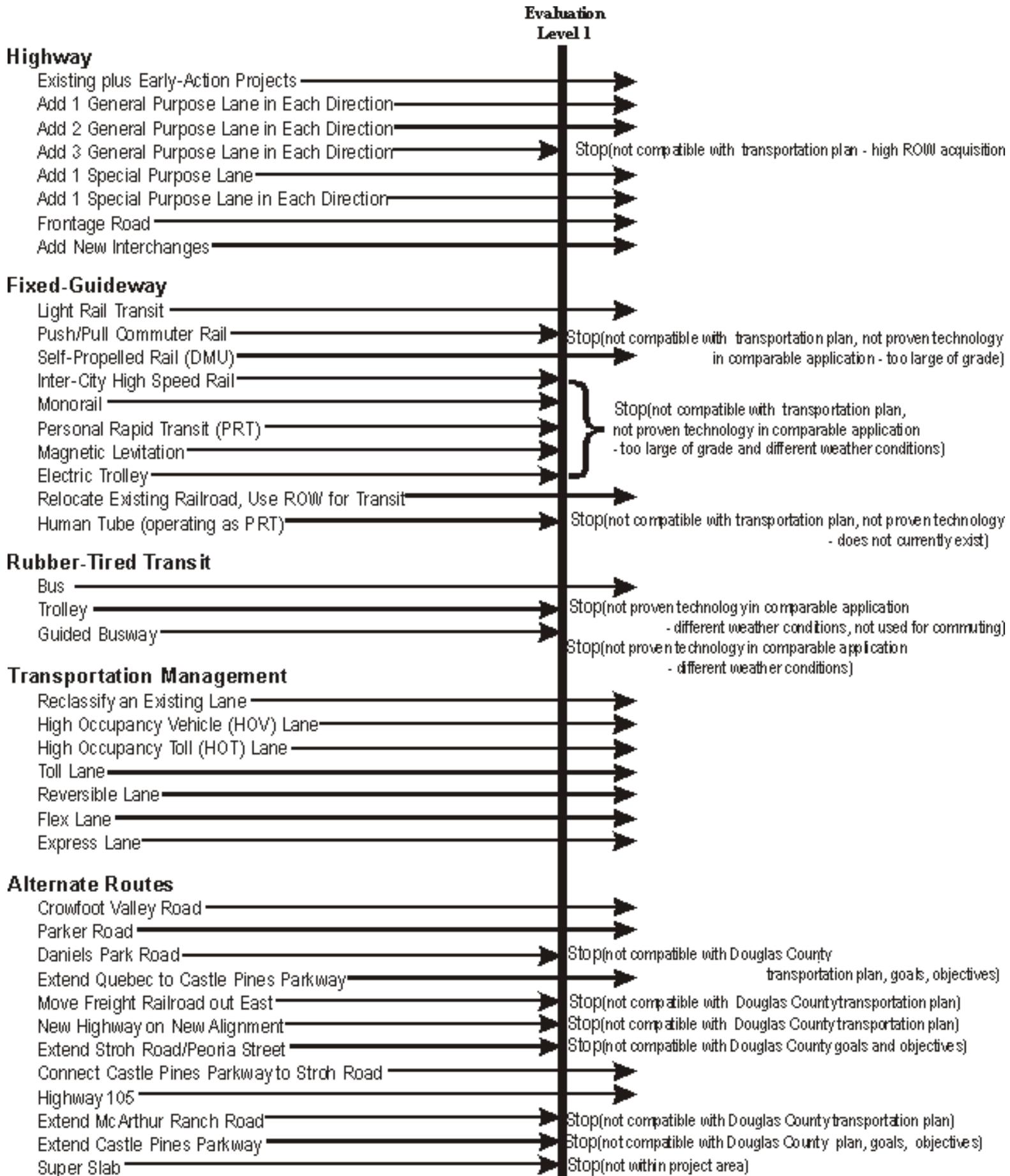
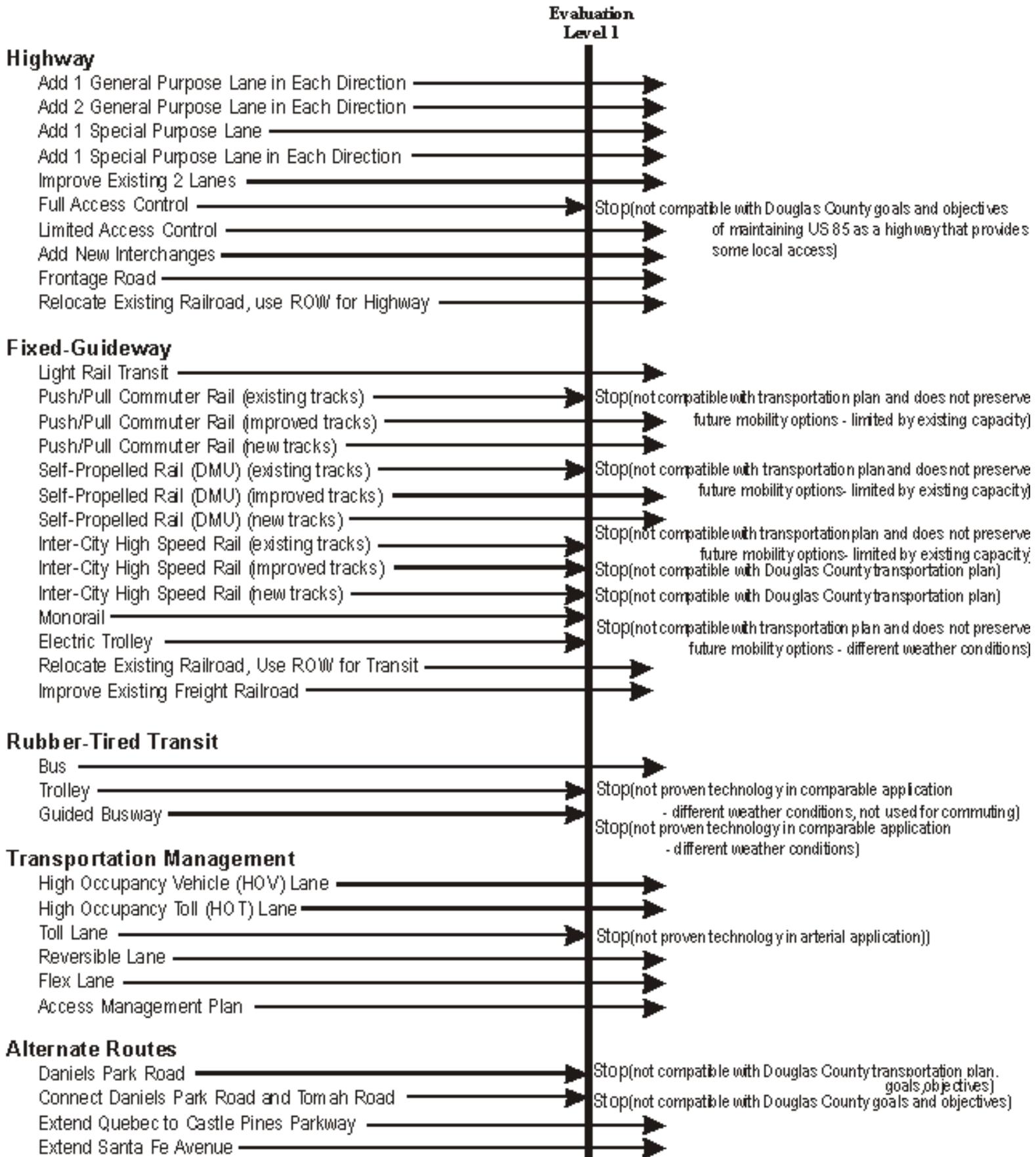


Figure 2.27b
US 85 Alternatives Eliminated at Level 1



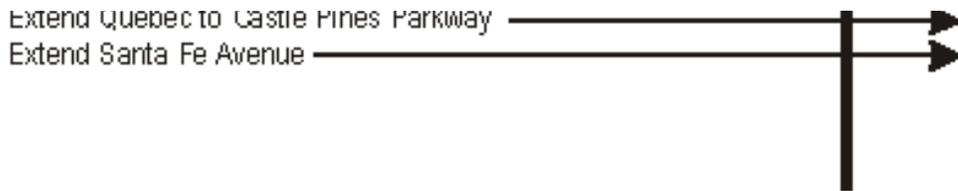
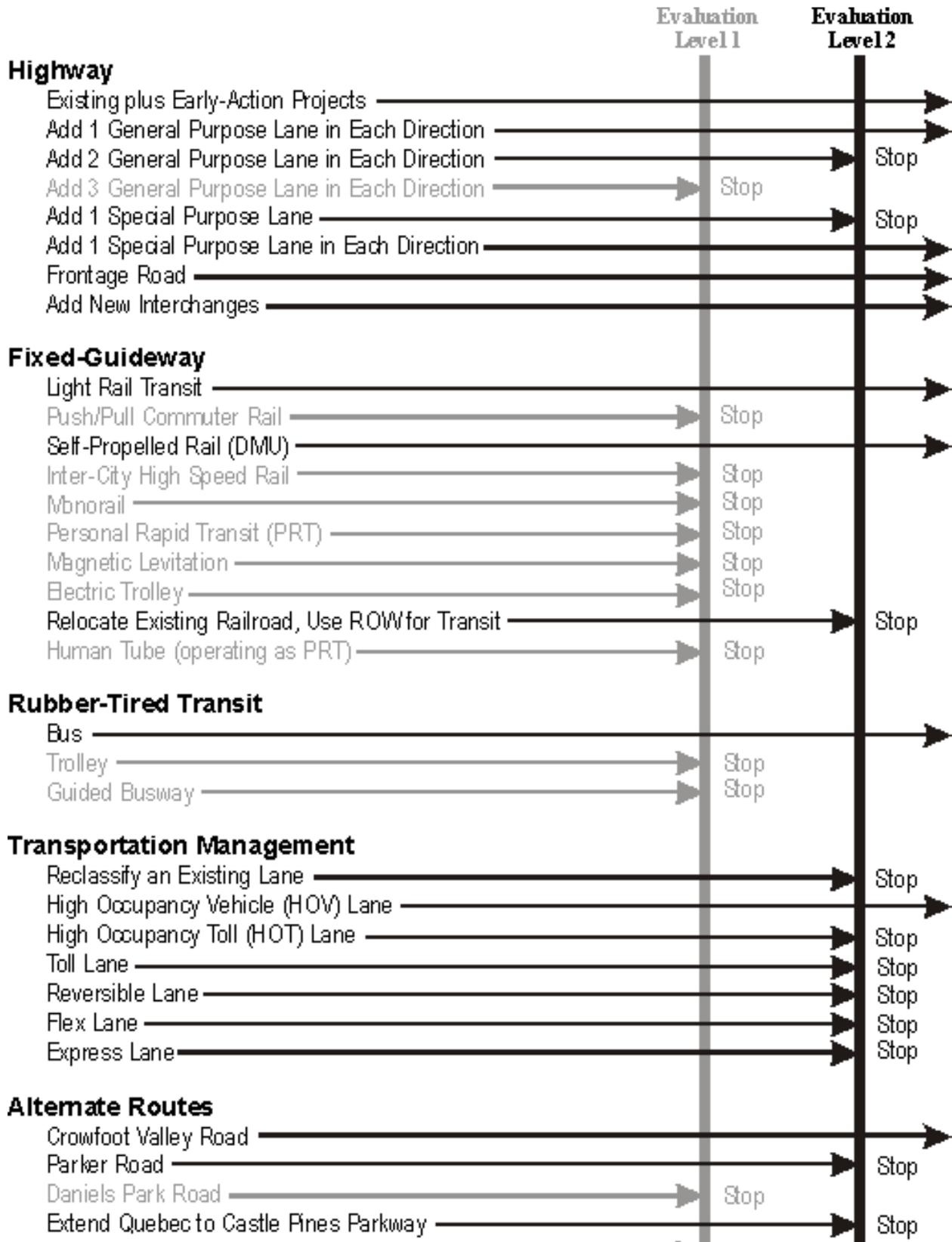


Figure 2.28a
I-25 Alternatives Eliminated at Level 2



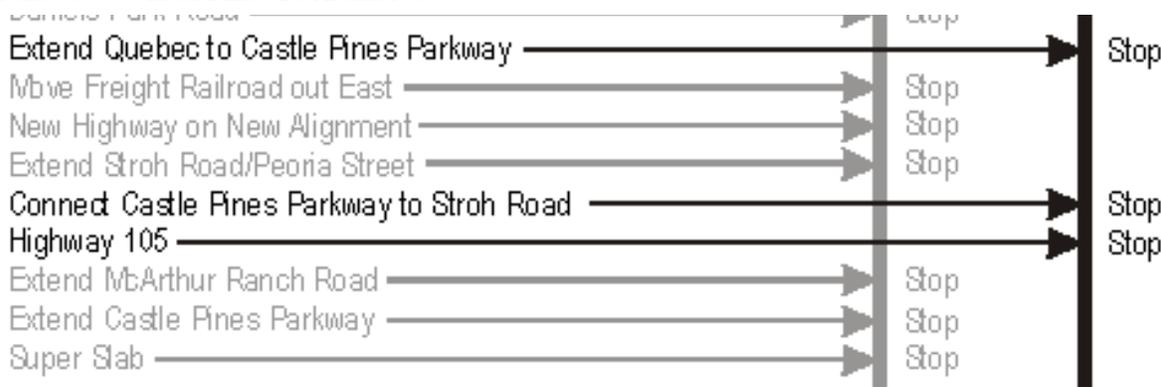
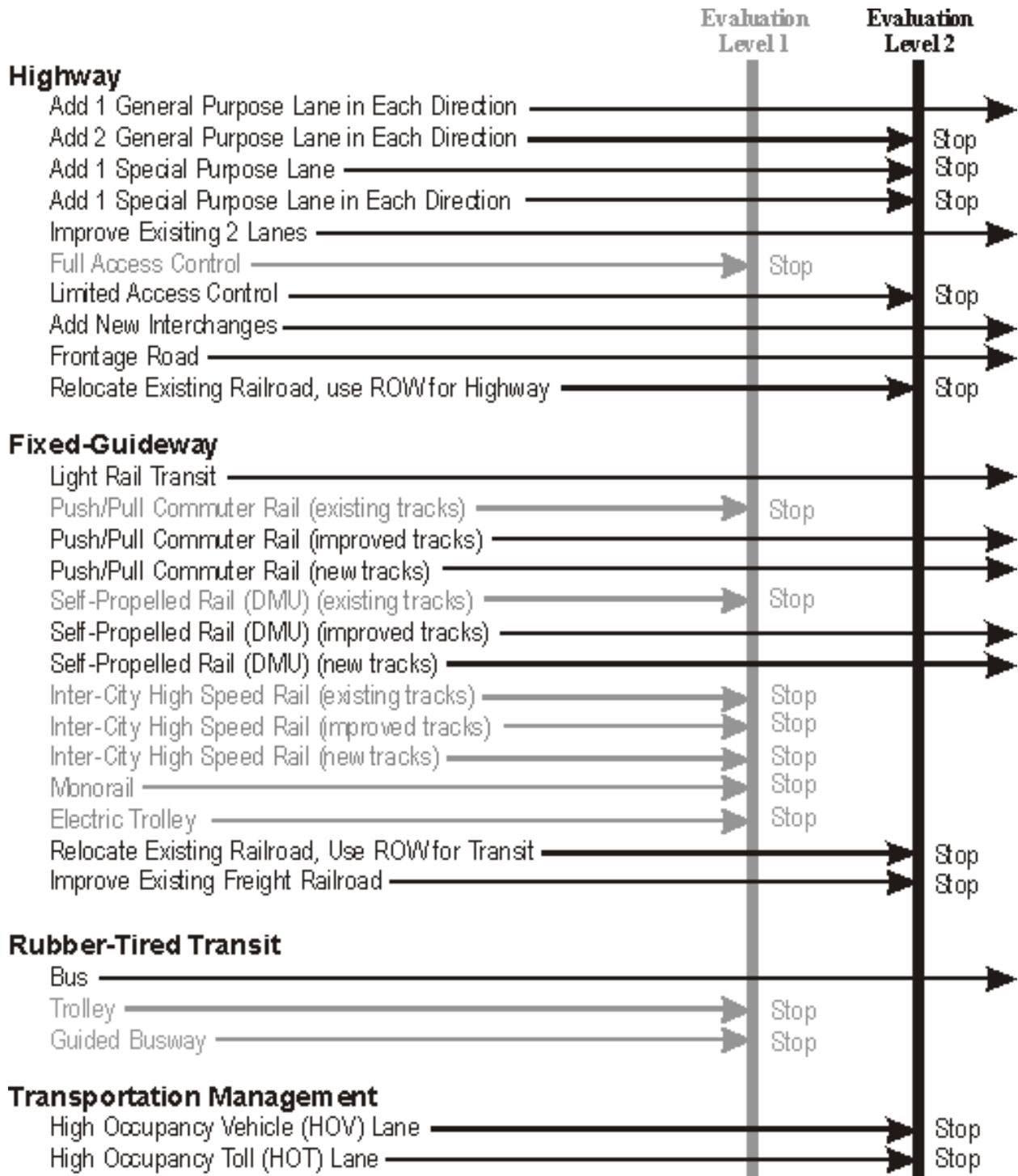
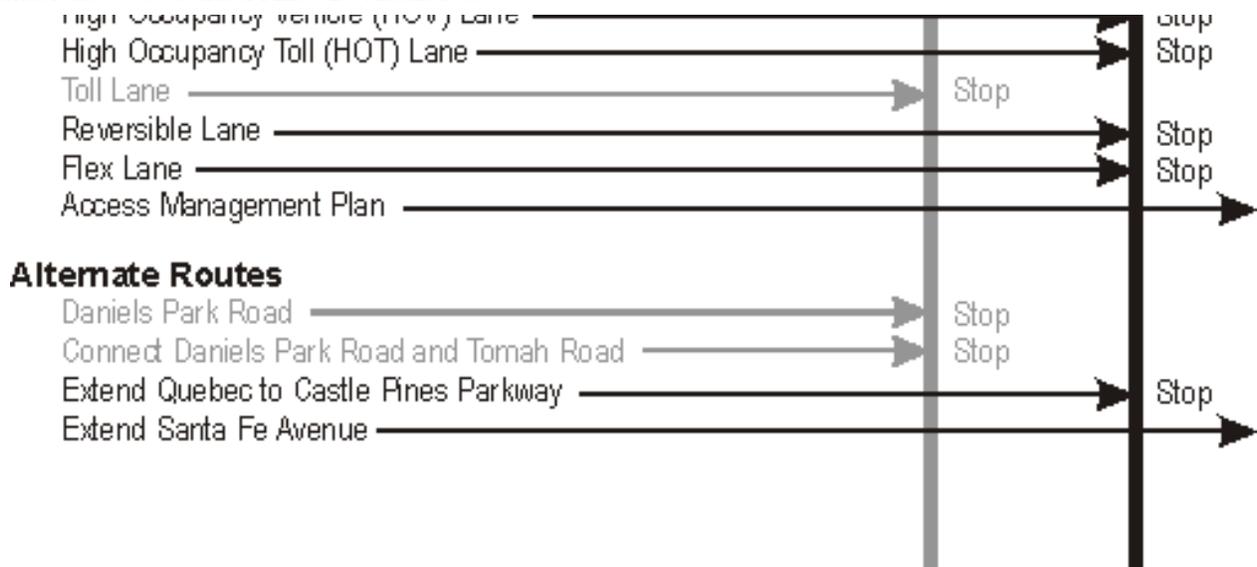


Figure 2.28b
US 85 Alternatives Eliminated at Level 2





I-25 Corridor Alternatives Eliminated at Level 2

The following I-25 alternatives are eliminated at the second level of evaluation:

Highway

- *Add Two General-Purpose Lanes.* This alternative adds two general-purpose lanes in each direction along I-25. The final configuration is 10 lanes from Lincoln Avenue to Meadows/Founders Parkway and 8 lanes from Meadows/Founders Parkway to Douglas Lane. This alternative did not proceed to the third level of evaluation due to environmental issues, implementation issues (including compatibility concerns north of C-470), and community values.
- *Add One Special-Purpose Lane.* This alternative adds one lane along I-25 to be managed as a special-purpose lane (high occupancy vehicle [HOV], high occupancy toll [HOT], or toll lane). The final configuration is six general-purpose lanes and one special-purpose lane from Lincoln Avenue to Meadows/Founders Parkway and four general-purpose lanes and one special-purpose lane from Meadows/Founders Parkway to Douglas Lane. This alternative did not proceed to the third level of evaluation due to implementation issues and community values.

Fixed-Guideway

- *Relocate Existing Railroad; Use Existing ROW for Transit.* This alternative relocates the existing Union Pacific Railroad through Castle Rock and constructs passenger rail on the existing ROW. This alternative did not proceed to the third level of evaluation due to ease of construction issues and capital costs.

Transportation Management (Programs and Policies Designed to Reduce Travel Demand and to Improve Utilization of the Transportation System)

- *Reclassify an Existing Lane.* This alternative changes the classification of the existing lane (i.e., an existing general-purpose lane is changed to a special-purpose lane). This alternative did not proceed to the third level of evaluation due to implementation issues and community values.

- *HOT Lane*. This alternative manages one or more lanes for use of HOV (typically defined as two or more people) or single-occupancy vehicles that are charged a fee. This alternative was eliminated due to implementation issues and community values.
- *Toll Lane*. This alternative manages one or more lanes by requiring a fee from every vehicle using the lane. This alternative was eliminated due to implementation issues and community values.
- *Reversible Lane*. This alternative manages one or more lanes by designating travel in one direction during part of the day and the other direction during a different part of the day. Reversible lanes are effective when travel patterns are predominantly in one direction during the morning peak and the other direction during the evening peak. This alternative was eliminated due to implementation issues and community values.
- *Flex Lane*. This alternative uses a shoulder as a through lane during peak periods. This alternative was eliminated due to mobility issues, implementation issues, and community values.
- *Express Lane*. This alternative manages one or more lanes by designating it for regional through traffic only (e.g., Denver Tech Center to Colorado Springs). This alternative was eliminated due to implementation issues and community values.

Alternate Routes

- *Parker Road*. This alternate route is a north/south connector between C-470 and SH 86. Improvements include upgrading Parker Road by adding an auxiliary lane in each direction north of Stroh Road and adding one through lane in each direction between Stroh Road and SH 86. This improvement is shown on the 2020 RTP, thus is considered part of the base condition.
- *Connect Castle Pines Parkway to Stroh Road*. This alternate route is an east/west connector between I-25 and Parker Road. Improvements include extending Castle Pines Parkway east to connect with Stroh Road, upgrading Castle Pines Parkway to a four-lane arterial from I-25 to Stroh Road, and upgrading Stroh Road to a four-lane arterial. This alternative was eliminated due to environmental issues, implementation issues, and community values.
- *Extend Quebec to Castle Pines Parkway*. This alternate route is a north/south connector between Lincoln Avenue and US 85. Improvements include extending and upgrading Quebec to a four-lane arterial between Lincoln Avenue and Castle Pines Parkway and upgrading Daniels Park Road from Castle Pines Parkway to US 85 to a four-lane arterial. This alternative was eliminated due to environmental issues and community values.
- *Highway 105*. This alternate north/south route parallels I-25 south of Sedalia. Improvements include enhancing safety and alignment and upgrading Highway 105 to a two-lane arterial to support additional traffic. The northern terminus to the northwest is extended, connecting US 85 with a two-lane ramp. This alternative was eliminated due to environmental issues, implementation issues, and community values.

2.12.2.2. US 85 Corridor Alternatives Eliminated at Level 2

The following US 85 alternatives are eliminated during the second level of evaluation:

Highway

- *Add Two General-Purpose Lanes.* This alternative adds two general-purpose lanes in each direction along US 85. The final configuration is eight lanes from C-470 to Highlands Ranch Parkway and six lanes from Highlands Ranch Parkway to Meadows Parkway. This alternative was eliminated due to environmental issues, implementation issues, and community values.
- *Add One Special-Purpose Lane.* This alternative adds one lane to be managed as a special-purpose (HOV, HOT, or toll) lane. The final configuration is four general-purpose lanes and one special-purpose lane from C-470 to Highlands Ranch Parkway and two general-purpose lanes and one special-purpose lane from Highlands Ranch Parkway to Meadows Parkway. This alternative was eliminated due to environmental issues, implementation issues, and community values.
- *Add One Special-Purpose Lane in Each Direction.* This alternative adds two lanes to be managed as special-purpose (HOV, HOT, or toll) lanes. The final configuration is four general-purpose lanes and two special-purpose lanes from C-470 to Highlands Ranch Parkway and two general-purpose lanes and two special-purpose lanes from Highlands Ranch Parkway to Meadows Parkway. This alternative was eliminated due to environmental issues, implementation issues, and community values.
- *Limited Access Control.* This alternative provides minimal accesses on US 85. Various driveways and minor roadways are consolidated and allowed to access US 85 through frontage roads. This alternative was eliminated due to environmental issues and community values.
- *Relocate Existing Railroad; Use ROW for Highway.* This alternative relocates the existing Union Pacific Railroad track (closest to US 85) and uses the ROW for highway improvements (either re-align US 85 or construct a new highway). This alternative was eliminated due to environmental issues, implementation issues, and community values.

Fixed-Guideway

- *Relocate Existing Railroad; Use Existing ROW for Transit* - This alternative relocates the existing Union Pacific Railroad track (closest to US 85) and constructs passenger rail on the existing ROW. This alternative was eliminated due to mobility issues, environmental issues, and implementation issues.
- *Improve Existing Freight Railroad.* This alternative improves the existing Union Pacific Railroad and Burlington Northern Santa Fe Railroad tracks so that all freight can be transported on trains along the tracks. This alternative reduces all heavy trucks from US 85. This alternative was eliminated due to a lack of community/agency support.

Transportation Management (Programs and Policies Designed to Reduce Travel Demand and to Improve Utilization of the Transportation System)

- *HOV Lane.* This alternative manages one or more lanes to be used only by vehicles with high occupancy

(typically defined as two or more people). This alternative was eliminated due to environmental issues, implementation issues, and community values.

- *HOT Lane*. This alternative manages one or more lanes for use of HOV (typically defined as two or more people) or single occupancy vehicles that are charged a fee. This alternative was eliminated due to implementation issues, community values, and is not a proven technology in arterial use.
- *Reversible Lane*. This alternative manages one or more lanes designated for one direction during part of the day and the other direction during a different part of the day. Reversible lanes are effective when travel patterns are predominantly in one direction during the morning peak and the other direction during the afternoon peak. This alternative was eliminated due to implementation issues, community values, and safety concerns.
- *Flex Lane*. This alternative uses a shoulder as a lane during peak periods. This alternative was eliminated due to mobility issues, implementation issues, community values, and safety concerns.

Alternate Routes

- *Extend Quebec to Castle Pines Parkway*. This alternate route is a north/south connector between Lincoln Avenue and US 85. Improvements include extending and upgrading Quebec to a four-lane arterial between Lincoln Avenue and Castle Pines Parkway and upgrading Daniels Park Road from Castle Pines Parkway to US 85 to a four-lane arterial. This alternative was eliminated due to environmental issues and community values.

2.12.3 Alternatives Eliminated at Level 3: Evaluation of Packages by Corridor

Alternatives that performed well in the second level of evaluation (Evaluation of Alternatives by Mode and Corridor) are combined into packages for the third level of evaluation (Evaluation of Packages by Corridor). The packages are developed to test concepts and evaluate the operations of various modes combined for each corridor. Results of the third level of evaluation identify which modes perform well together to meet project objectives. These results are used to help develop the Long-Term Vision.

Corridor packages used in the third level of evaluation were developed from alternatives of the different modes or categories that scored favorably in the second level of evaluation. If the alternative did not score favorably, it was not included in a package. Each package included different alternatives (there were no duplications) to evaluate the benefits of each alternative. Table 2.4a and Table 2.4b show how the alternatives were placed in each package.

2.12.3.1. I-25 Corridor Packages Evaluated

Descriptions of the I-25 Corridor packages evaluated in the third level of evaluation are as follows:

I-25 Package 1: No-Action

This package consists of no major build improvements as a result of the EIS. The No-Action Package consists of existing conditions and the Early-Action projects.

I-25 Package 2: No-Action with Supporting Measures (Transportation Management Package)

This package consists of the No-Action Package as described above, with minor improvements to the existing transportation system. Supporting measures include TDM measures, TSM measures, and ITS measures. Resulting laneage along I-25 is two lanes in each direction and one climbing lane in each direction from Lincoln Avenue to Meadows/Founders Parkway and two lanes in each direction from Meadows/Founders Parkway to Douglas Lane.

I-25 Package 3: Add General-Purpose Lanes

This package adds one lane in each direction for all uses between Lincoln Avenue and Douglas Lane to the No-Action Package. The Early-Action projects and supporting measures are also included. Resulting laneage is three general-purpose lanes in each direction and one climbing lane in each direction from Lincoln Avenue to Meadows/Founders Parkway, and three lanes in each direction from Meadows/Founders Parkway to Douglas Lane.

**Table 2.4a
I-25 Placement of Alternatives for Packages in Level 3**

	Package 1: No-Action	Package 2: No-Action with Supporting Measures	Package 3: Add General Purpose Lanes	Package 4: Add Special Purpose Lanes with Regional Bus Service	Package 5: Fixed-Guideway Transit	Package 6: Add General Purpose Lanes with Fixed-Guideway Transit	Package 7: Add General Purpose Lanes with Limited Fixed-Guideway Transit
NO-ACTION ALTERNATIVE	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
HIGHWAY							
Add 1 General Purpose Lane in each direction			<input type="checkbox"/>			<input type="checkbox"/>	<input type="checkbox"/>
Add 1 Special Purpose Lane in each Direction				<input type="checkbox"/>			
Add Frontage Road		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Add New Interchanges		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
FIXED GUIDEWAY							
Light Rail Transit					<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Self-Propelled Rail (DMU)					<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
RUBBER-TIRED TRANSIT							
Bus				<input type="checkbox"/>			
TRANSPORTATION MANAGEMENT							
HOV Lane				<input type="checkbox"/>			
ALTERNATE ROUTES							
Crowfoot Valley Road		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Crowfoot Valley Road		<input type="checkbox"/>					
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- included in package

✓ - included as a supporting measure

Table 2.4b
US 85 Placement of Alternatives for Packages in Level 3

	Package A: No-Action	Package B: Reconstruct U.S. Highway 85/Safety Improvements	Package C: Add General Purpose Lanes	Package D: Add General Purpose Lanes with Regional Bus Service	Package E: Fixed-Guideway Transit with Reconstructed US 85/Safety Improvements	Package F: Add General Purpose Lanes with Fixed-Guideway Transit
NO-ACTION ALTERNATIVE	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
HIGHWAY						
Add 1 General Purpose Lane in each direction			<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>
Improve the Existing 2 lanes		<input type="checkbox"/>			<input type="checkbox"/>	
Add New Interchanges		✓	✓	✓	✓	✓
Frontage Road		✓	✓	✓	✓	✓
FIXED GUIDEWAY						
Light Rail Transit					<input type="checkbox"/>	<input type="checkbox"/>
Push/Pull Commuter Rail (improved tracks)					<input type="checkbox"/>	<input type="checkbox"/>
Push/Pull Commuter Rail (new tracks)					<input type="checkbox"/>	<input type="checkbox"/>
Self-Propelled (DMU) (improved tracks)					<input type="checkbox"/>	<input type="checkbox"/>
Self-Propelled (DMU) (new tracks)					<input type="checkbox"/>	<input type="checkbox"/>
RUBBER-TIRED TRANSIT						
Bus				<input type="checkbox"/>		
TRANSPORTATION MANAGEMENT						
Access Management Plan		✓	✓	✓	✓	✓
ALTERNATE ROUTES						
Extend Santa Fe Avenue		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

- included in package

✓ - included as a supporting measure

I-25 Package 4: Add Special-Purpose Lanes with Regional Bus Service

This package adds one lane in each direction between Lincoln Avenue and Douglas Lane to be managed as a bus/HOV lane. Early-Action projects and supporting measures are also included. Resulting laneage is two general-purpose lanes in each direction, one special-purpose lane in each direction, and one climbing lane in each direction from Lincoln Avenue to Meadows/Founders Parkway; and two general-purpose lanes in each direction and one special-purpose lane in each direction from Meadows/Founders Parkway to Douglas Lane.

I-25 Package 5: Fixed-Guideway Transit

This package adds a rail system (LRT or Self-Propelled Rail [DMU]) between the Southeast Corridor Terminus at Lincoln Avenue and Plum Creek Parkway. Early-Action projects and supporting measures are also included. Resulting laneage along I-25 is two lanes in each direction and one climbing lane in each direction from Lincoln Avenue to Meadows/Founder Parkway and existing laneage south of Meadows/Founders Parkway. Fixed-guideway stations are assumed to be located at the proposed Rampart Range Development, Castle Pines Parkway, Meadows/Founders Parkway, and Castle Rock.

I-25 Package 6: Add General-Purpose Lanes and Fixed-Guideway Transit

This package adds one general-purpose lane in each direction for all uses between the Southeast Corridor Terminus at C-470 and Douglas Lane and adds a fixed-guideway transit system between the Southeast Corridor terminus at Lincoln Avenue and Plum Creek Parkway. Early-Action projects and supporting measures are also included. Resulting configuration is three general-purpose lanes in each direction and one climbing lane in each direction from Lincoln Avenue to Meadows/Founders Parkway and three lanes in each direction from Meadows/Founders Parkway to Douglas Lane. Fixed-guideway stations are assumed to be located at the proposed Rampart Range Development, Castle Pines Parkway, Meadows/Founders Parkway, and Castle Rock.

I-25 Package 7: Add General-Purpose Lanes and Limited Fixed-Guideway Transit

This package adds one general-purpose lane in each direction for all uses between Lincoln Avenue and Douglas Lane and adds a fixed-guideway transit system between the Southeast Corridor Terminus at Lincoln Avenue and the proposed Rampart Range. The Early-Action projects and supporting measures are also included. The resulting laneage is three general-purpose lanes in each direction and one climbing lane in each direction from Lincoln Avenue to Meadows/Founders Parkway and three lanes in each direction from Meadows/Founders Parkway to Douglas Lane. The fixed-guideway station is assumed to be located at Rampart Range.

2.12.3.2. US 85 Corridor Packages Evaluated

Descriptions of the US 85 Corridor packages evaluated in the third level of evaluation are as follows:

US 85 Package A: No-Action

This package consists of no major build improvements as a result of the EIS. The No-Action Package includes the existing conditions in addition to the Early-Action projects:

- Titan Road
- I-25/US 85 Interchange

- Re-striping and minor widening from C-470 to Highlands Ranch Parkway

In addition to these projects, other roadway improvements are anticipated to be completed by Douglas County and the Town of Castle Rock as part of the No-Action Alternative. The resulting configuration is two lanes in each direction from C-470 to Highlands Ranch Parkway and one lane in each direction from Highlands Ranch Parkway to Meadows Parkway.

US 85 Package B: Reconstruct US 85/Safety Improvements

This package reconstructs US 85 to meet CDOT standards. The package includes reconstructing the roadway bed, paving the roadway, increasing existing shoulders and lane widths, and smoothing out substandard horizontal curves. Early-Action projects and supporting measures are also included. Supporting measures may include, but are not limited to, a bus feeder system in the Highlands Ranch area to collect people for the Mineral Avenue LRT and an access management plan. Resulting configuration is the same as existing: two lanes in each direction from C-470 to Highlands Ranch Parkway and one lane in each direction from Highlands Ranch Parkway to Meadows Parkway.

US 85 Package C: Add General-Purpose Lanes

This package reconstructs existing US 85 and adds one lane in each direction for all uses between C-470 and Norwood Drive, two lanes in each direction between Norwood Drive and Highlands Ranch Parkway, and one lane in each direction between Highlands Ranch Parkway and Meadows Parkway. The final configuration is six lanes between C-470 and Highlands Ranch Parkway and four lanes between Highlands Ranch Parkway and Meadows Parkway. Early-Action projects and the supporting measures are also included.

US 85 Package D: Add General-Purpose Lanes with Regional Bus Service

This package reconstructs existing US 85 and adds one lane in each direction for all uses between C-470 and Norwood Drive, two lanes in each direction between Norwood Drive and Highlands Ranch Parkway, and one lane in each direction between Highlands Ranch Parkway and Meadows Parkway. The final configuration is six lanes between C-470 and Highlands Ranch Parkway and four lanes between Highlands Ranch Parkway and Meadows Parkway. A regional bus system is provided to service passengers between Castle Rock and Denver. The park-and-ride stations are assumed to be located at Highlands Ranch Parkway, Sedalia, Meadows Parkway, and Castle Rock. Early-Action projects and supporting measures are also included.

US 85 Package E: Fixed-Guideway Transit with Reconstructed US 85 Safety Improvements

This package includes fixed-guideway transit between Mineral Avenue and Plum Creek Parkway and the reconstruction of the existing highway lanes to meet CDOT standards. Fixed-guideway stations are assumed to be located at Highlands Ranch Parkway, Sedalia, Meadows Parkway, and Castle Rock. Early-Action projects and supporting measures are also included.

US 85 Package F: Add General-Purpose Lanes and Fixed-Guideway Transit

This package reconstructs existing US 85 and adds one lane in each direction for all uses between C-470 and Norwood Drive, two lanes in each direction between Norwood Drive and Highlands Ranch Parkway, and one lane in each direction between Highlands Ranch Parkway and Meadows Parkway. Fixed-guideway transit, connecting the Mineral Avenue LRT station with Plum Creek Parkway is also added. Fixed-guideway stations are assumed to be located at Highlands Ranch Parkway, Sedalia, Meadows Parkway, and Castle Rock. Early-Action projects and supporting measures are also included.

Results for the third level of evaluation for I-25 are shown on Table 2.5a. Table 2.5b shows results for the US 85 third level of evaluation. Criteria summarized include ridership, LOS, cost, and ROW.

Figure 2.29a and Figure 2.29b outline this evaluation process. The *South I-25 Corridor and US 85 Corridor EIS Alternative Evaluation Process Technical Report*, March 2000 contains detailed information on the third level of evaluation.

2.12.3.3. I-25 Corridor Packages Eliminated at Level 3

One I-25 Corridor Package was eliminated during the third level of evaluation. Package 4: Add Special Purpose Lanes with Regional Bus Service did not proceed into the compatibility analysis. This package does not substantially address the north/south mobility of I-25. This package has high costs and high ROW acquisition.

2.12.3.4. US 85 Corridor Packages Eliminated at Level 3

Package B, Package E, and Package F were eliminated during the third level of evaluation. Package B: Reconstruct US 85/Safety Improvements does not address the purpose and need of the project because it does not address the north/south mobility of US 85 and it minimally addresses the safety issues. Package E: Fixed-Guideway Transit with Reconstructed US 85/Safety Improvements does not address the north/south mobility of US 85 and it minimally addresses the safety issues. Package F: Add General-Purpose Lanes with Fixed-Guideway Transit requires substantial ROW acquisition and has high costs.

2.12.3.5. Package Compatibility Analysis

A compatibility analysis was completed based on the results of the third level of evaluation. This analysis evaluated the effects each I-25 package has on each US 85 package. The analysis evaluated how each combination met the purpose and need, what fiscal constraints each combination had, and whether the combination consisted of competing capital-intensive improvements (i.e., fixed-guideway on both I-25 and US 85 would compete for ridership). The result of the compatibility analysis is that certain I-25 packages are compatible with certain US 85 packages.

- The I-25 Package 3: Add General-Purpose Lanes is compatible with US 85 Package C: Add General-Purpose Lanes and US 85 Package D: Add General-Purpose Lanes with Regional Bus Service.
- The I-25 Package 4: Add Special-Purpose Lanes with Regional Bus Service is compatible with US 85 Package C: Add General-Purpose Lanes and US 85 Package D: Add General-Purpose Lanes with Regional Bus Service.

Table 2.5a

I-25 Corridor Package Summary

		Packages						
		Package 1: No-Action	Package 2: No-Action with Supporting Measures	Package 3: Add General Purpose Lanes	Package 4: Add Special Purpose Lanes with Regional Bus Service	Package 5: Fixed-Guideway	Package 6: Add General Purpose Lanes with Fixed-Guideway Transit	Package 7: Add General Purpose Lanes with Limited Fixed-Guideway Transit
Criteria	Measure							
Ridership	Number of Daily Boardings	N/A	N/A	N/A	254	1,630	1,630	110
LOS	Range of LOS on Highway	E-F	D-F	C-F	D-F	E-F	C-F	C-F
Cost ¹	Capital Cost (Millions)	N/A	N/A	\$71	\$124	\$109	\$183	\$106
ROW ²	Number of acres of new ROW required	0	0	6	25	15	25	9

¹ Cost does not include ROW acquisition

² ROW acres are based on typical cross sections for each package and assumes improvements are along the existing I-25 centerline.

N/A: not applicable

**Table 2.5b
US 85 Corridor Package Summary**

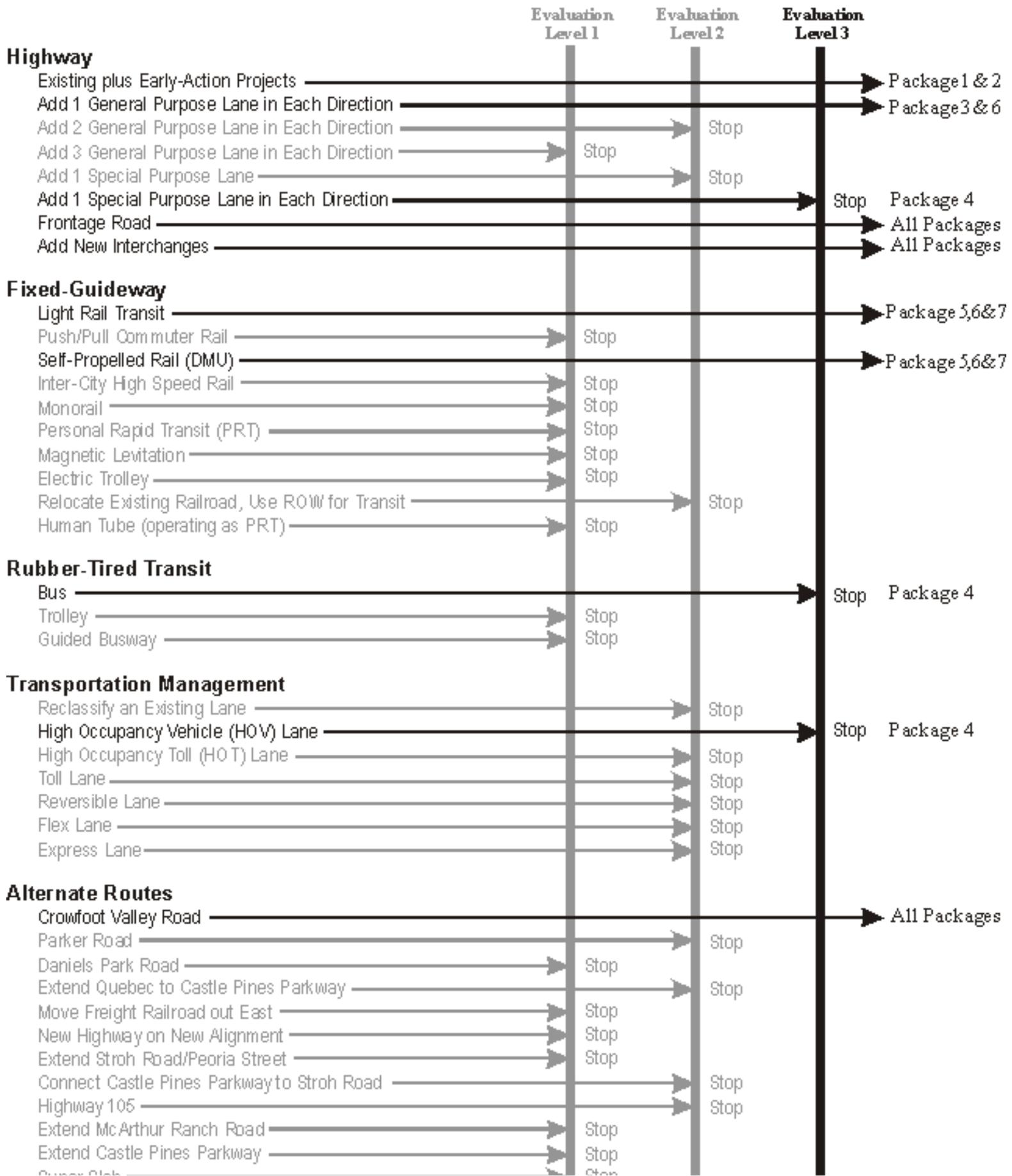
		Packages					
		A: No-Action	B: Reconstruct US 85/Safety Improvements	C: Add General Purpose Lanes	D: Add General Purpose Lanes with Regional Bus Service	E: Fixed-Guideway Transit with Reconstructed US 85/Safety Improvements	F: Add General Purpose Lanes with Fixed-Guideway Transit
Criteria	Measure						
Ridership	Number of Daily Boardings	N/A	N/A	N/A	302	1,258	1,258
LOS	Range of LOS on Highway	E-F	E-F	C-E	C-E	E-F	C-E
Cost ¹	Capital Cost (Millions)	N/A	\$37	\$56	\$63	\$139	\$177
ROW ²	Number of acres of new ROW required	0	12	35	38	66	117

¹ Cost does not include ROW acquisition

² ROW acres are based on typical cross sections for each package and assumes improvements are along the existing US 85 centerline.

N/A: not applicable

Figure 2.29a
I-25 Alternatives Eliminated at Level 3



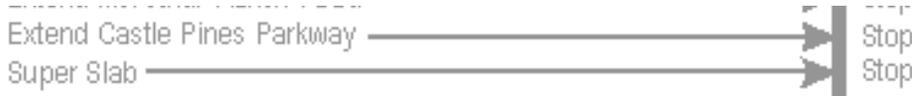
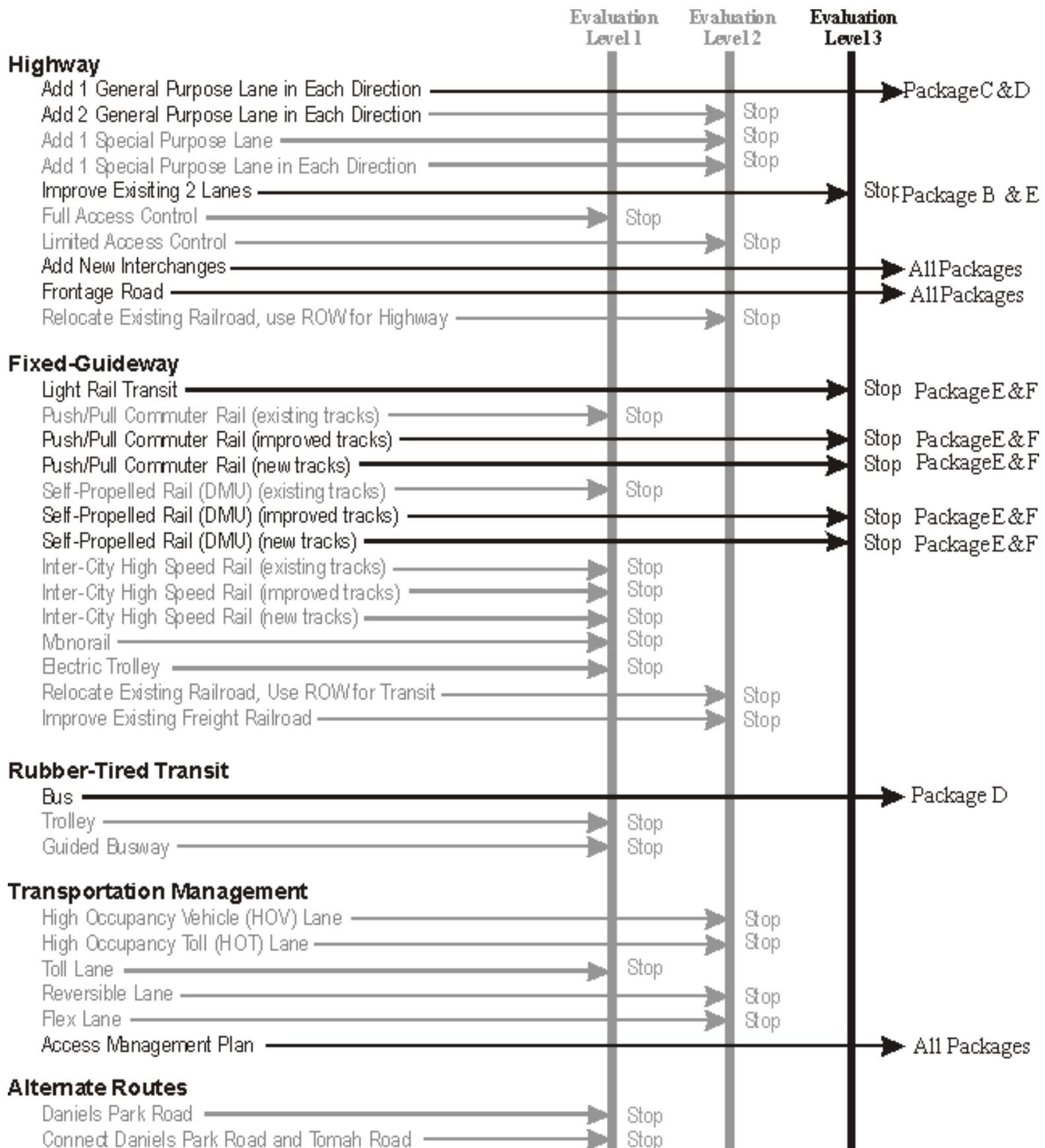
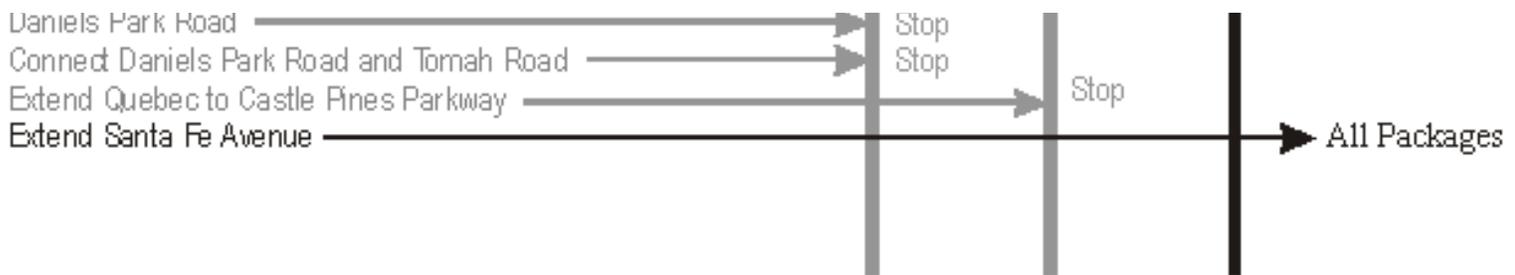


Figure 2.29b
US 85 Alternatives Eliminated at Level 3





- The I-25 Package 7: Add General-Purpose Lanes and Limited Fixed-Guideway Transit is compatible with US 85 Package C: Add General-Purpose Lanes and US 85 Package D: Add General-Purpose Lanes with Regional Bus Service.

Based on the results of the compatibility analysis, the project objectives, and the communities' needs the Long-Term Vision was developed. The Long-Term Vision includes adding general-purpose lanes to both I-25 and US 85, fixed-guideway transit along the I-25 Corridor, improvements to two alternate routes, park-and-ride lots, preservation of future transportation corridor, wildlife considerations, US 85 transit demonstration project, and supporting measures.

2.12.4 I-25 and US 85 Transportation Management Alternatives

The I-25 and US 85 transportation management (TM) alternatives (as stand-alone alternatives) were eliminated from consideration because they did not meet the purpose and need. However, TM measures (TSM, TDM, and ITS) are being carried forward as supporting measures to accompany each of the alternatives being evaluated in the FEIS. TM measures will be included throughout both corridors in the FEIS Alternatives, but will not be stand-alone alternatives.

Other Alternatives Eliminated

While developing the conceptual design of the alternatives under consideration in the DEIS, other alternatives not carried into the full EIS comparative analysis were evaluated and eliminated. These include:

- Major reconstruction of C-470 and I-25 Interchange
- Plum Creek Parkway Interchange alternatives
- I-25 west-side frontage road (between the proposed Rampart Range Interchange and Castle Pines Parkway Interchange)
- Major improvements to C-470 and US 85 Interchange
- Various SH 67 and US 85 intersection alternatives
- Various I-25 typical sections
- Various US 85 typical sections

- Relocation of existing railroad corridor along US 85

Following are discussions of each of the alternatives and why they were eliminated.

2.12.5.1. Major Reconstruction of C-470 and I-25 Interchange

During the EIS alternative analysis process, the study corridor was extended to C-470 to ensure continuity and capacity of the I-25 lanes to C-470. The Southeast Corridor I-25 improvements end on the north side of the C-470 Interchange. The South I-25 Corridor and US 85 Corridor EIS was responsible for developing a logical connection to C-470 that did not restrict traffic or create a bottleneck. Two general alternatives were developed and evaluated. The alternative that carried eight through lanes and the accompanying auxiliary lanes through the C-470 interchange was eliminated because of major impacts and associated cost with major reconstruction of the interchange structures, the I-25 northbound entrance ramp from C-470, the I-25 southbound exit ramp to C-470, and the I-25 northbound exit ramp to County Line Road. The travel demand projection for 2020 also showed a large percentage of the I-25 traffic entering or exiting I-25 at C-470. This characteristic in traffic flow demonstrated that eight continuous through lanes was not warranted between the C-470 exit and entrance ramps based on the *American Association of State Highway and Transportation Officials* design criteria, such as the basic number of lanes and lane balance.

The alternative that is evaluated in this FEIS carries eight through lanes to C-470 and drops or adds the lanes at County Line Road ramps. The outside northbound lane is an optional lane at the C-470 exit and at the County Line Road exit. The outside southbound lane is carried continuously south from the County Line Road entrance.

2.12.5.2. Plum Creek Parkway Interchange Alternatives

The existing Plum Creek Parkway Interchange consists of split ramps from Wilcox Street on the east and a half-diamond from Plum Creek Parkway on the west. The *I-25 Through Castle Rock Corridor Feasibility Study*, 1995 and the *I-25/US 85 Interchange Study*, April 13, 1999, discuss the following two alternatives that were considered for improvements to this interchange but were not carried forward:

- *Single-Point Urban Interchange at Existing Location.* This alternative includes complete reconstruction of the existing interchange. Existing hook ramps are removed and replaced with a single-point urban interchange. This alternative costs approximately \$20 million. This alternative was evaluated and not carried forward due to major environmental impacts, high costs, and minor benefits.
- *Diamond Interchange at Relocated Location.* This alternative includes constructing a new diamond interchange approximately 700 meters (2,500 feet) south of the existing interchange. Existing hook ramps are removed. This alternative costs approximately \$15 million. This new interchange was planned to tie into the "ring road" proposed by the Town of Castle Rock. Since the initial design of the interchange, the ring road to that location is no longer feasible, and the relocated Plum Creek Interchange would have poor connectivity to the local network. Also, the Douglas Lane proposed interchange will redirect some of the traffic currently using the Plum Creek Parkway Interchange. A diamond interchange at a relocated site was evaluated and not carried forward due to inconsistencies with the local planned network, high costs, and minor benefits.

2.12.5.3. I-25 West-Side Frontage Road

An I-25 east-side frontage road between Castle Pines Parkway and Rampart Range is included in the Other Alternative. A frontage road was also evaluated along the west side of I-25. The west-side frontage road generally followed Clydesdale Road, through the Surrey Ridge neighborhood. This alternative was evaluated in the *South I-25 Corridor Interchange Study*, January 2000 and eliminated through the public involvement process.

2.12.5.4. Major Improvements to C-470 and US 85 Interchange

Improvements to the C-470/US 85 Interchange are needed to improve US 85 operations. The C-470/US 85 Interchange is currently operating at a LOS F. The following alternatives were considered for improving the operations of this interchange:

- *Southwest Quadrant Loop Ramp*. This alternative includes the addition of a loop ramp in the southwest quadrant. The US 85 southbound left-turn vehicles exit on the right side and loop around onto eastbound C-470. The new configuration improves the existing operations by eliminating the US 85 southbound left-turns onto eastbound C-470.
- *Southwest and Northeast Quadrant Loop Ramps*. This alternative includes the addition of two loop ramps, one in the southwest quadrant and one in the northeast quadrant. The US 85 southbound left-turn vehicles exit on the right side and loop around onto eastbound C-470 and the northbound US 85 left-turns exit on the right side and loop around onto westbound C-470. The new configuration improves the existing operations by eliminating the US 85 left-turns onto C-470.
- *Single-Point Urban Interchange*. This alternative reconstructs the existing diamond interchange to a single-point urban interchange. The new configuration improves the existing operations by reducing the traffic signal phases from four to three phases, thus increasing interchange capacity.
- *Directional Interchange*. This alternative includes two-directional US 85 to C-470 entrance ramps. One ramp is for the southbound US 85 traffic that exits on the right side and flies over the interchange, merging with the eastbound C-470 traffic. The other ramp is for northbound US 85 traffic that exits on the right side and flies-over the interchange, merging with the westbound C-470 traffic. This option improves existing operations by eliminating US 85 left turns onto C-470.

Major improvements to the C-470/US 85 Interchange are needed but were eliminated from further consideration in this EIS due to high costs, associated environmental impacts, and limited funding. Improvements to this interchange will be further identified and evaluated under a separate environmental study.

2.12.5.5. Various SH 67 and US 85 Intersection Alternatives

As part of the alternative evaluation process, numerous alternatives were evaluated for the intersection of SH 67 and US 85. These alternatives included grade separations, railroad relocation, and numerous intersection combinations. The alternative that best meets the needs of the community, minimizes environmental impacts, and provides for safe operations is included in the Preferred Alternative and Other Alternative. Other options evaluated but eliminated from further consideration include:

- *Reconstruct Existing Intersection.* This alternative reconstructs the existing SH 67/US 85 signalized intersection with full-movement access. Two right-in/right-out access points are provided for businesses along US 85. This alternative costs approximately \$4 million, not including highway ROW costs. This alternative was eliminated due to safety and access problems. Two alternatives were recommended from the public for reconstruction of the SH 67/US 85 Intersection. These alternatives were eliminated due to safety problems and railroad impacts.
- *Relocate Railroad.* This alternative reconstructs the existing SH 67/US 85 signalized intersection with full-movement access. Two right-in/right-out access points are provided for businesses along US 85. The Burlington Northern Santa Fe Railroad is relocated to the south, parallel to the Union Pacific Railroad. This alternative costs approximately \$19 million, not including highway ROW costs. This alternative was eliminated due to high costs with minimal benefits and railroad impacts.
- *New SH 67 Alignment.* This alternative constructs a new SH 67 alignment with a new full-movement intersection at US 85. The existing SH 67/US 85 Intersection is reconstructed with controlled access. Two right-in/right-out access points are provided for businesses along US 85. This alternative costs approximately \$12 million, not including highway ROW costs. This alternative was eliminated due to environmental impacts, community impacts, and high costs.

2.12.5.6. Various I-25 Typical Sections

Currently along I-25, south of Meadows/Founders Parkway, a 9.1-meter (30-foot) grass median separates the northbound and southbound lanes. The typical section of the Preferred Alternative and Other Alternative between Meadows/Founders Parkway and Plum Creek Parkway includes reconstructing the existing highway and widening to the inside. A 0.6-meter (2-foot) concrete barrier separates northbound and southbound lanes. Another alternative evaluated but eliminated from further consideration includes widening to the outside. This option consists of six 3.6-meter (12-foot) travel lanes, 3.0-meter (10-foot) outside and inside shoulders, 4.6-meter (15-foot) ditch area, and a 9.1-meter (30-foot) grass median. The total typical width is 53.5 meters (172 feet). This option was eliminated from further consideration due to environmental impacts.

2.12.5.6. Various I-25 Typical Sections

Typical sections evaluated in this FEIS for the US 85 Corridor are a result of numerous revisions. Because the US 85 Corridor is located in a sensitive area (surrounded by parkland, businesses, and residences), impacts are minimized by using a narrow typical section. Several typical sections for improvements to US 85 were evaluated and eliminated from further consideration due to environmental and safety impacts.

The environmental assessment (EA) completed for the US 85 Corridor in 1994 presented a conceptual design with four different typical sections. The EA proposed six lanes from C-470 to Highlands Ranch Parkway. Two 3.6-meter (12-foot) general-purpose lanes, one 3.6-meter (12-foot) HOV lane, and one 4.3-meter (14-foot) auxiliary lane were used in each direction. From Highlands Ranch Parkway to Lakeside Drive, the typical section becomes a split alignment, and the northbound lane moves to the east to avoid the transmission lines in the Highlands Ranch Parkway area. This typical section has two general-purpose lanes in each direction and an HOV lane in each direction. There is a 3-meter (10-foot) outside shoulder and a 2.4-meter (8-foot) inside shoulder in each direction. From Lakeside Drive to Titan Road, the typical section continues with the same number of lanes, but the median is reduced to a 7.3-meter (24-foot) grass median. From Titan Road to the intersection of US 85

and I-25, the typical section becomes two lanes in each direction and the median is 21.9 meters (72 feet) wide.

Typical sections used for the US 85 EA were much wider than the US 85 typical sections being evaluated for this FEIS. Through the use of a narrower typical section, environmental impacts are minimized.

2.12.5.8. Relocation of Existing Railroad Corridor along US 85

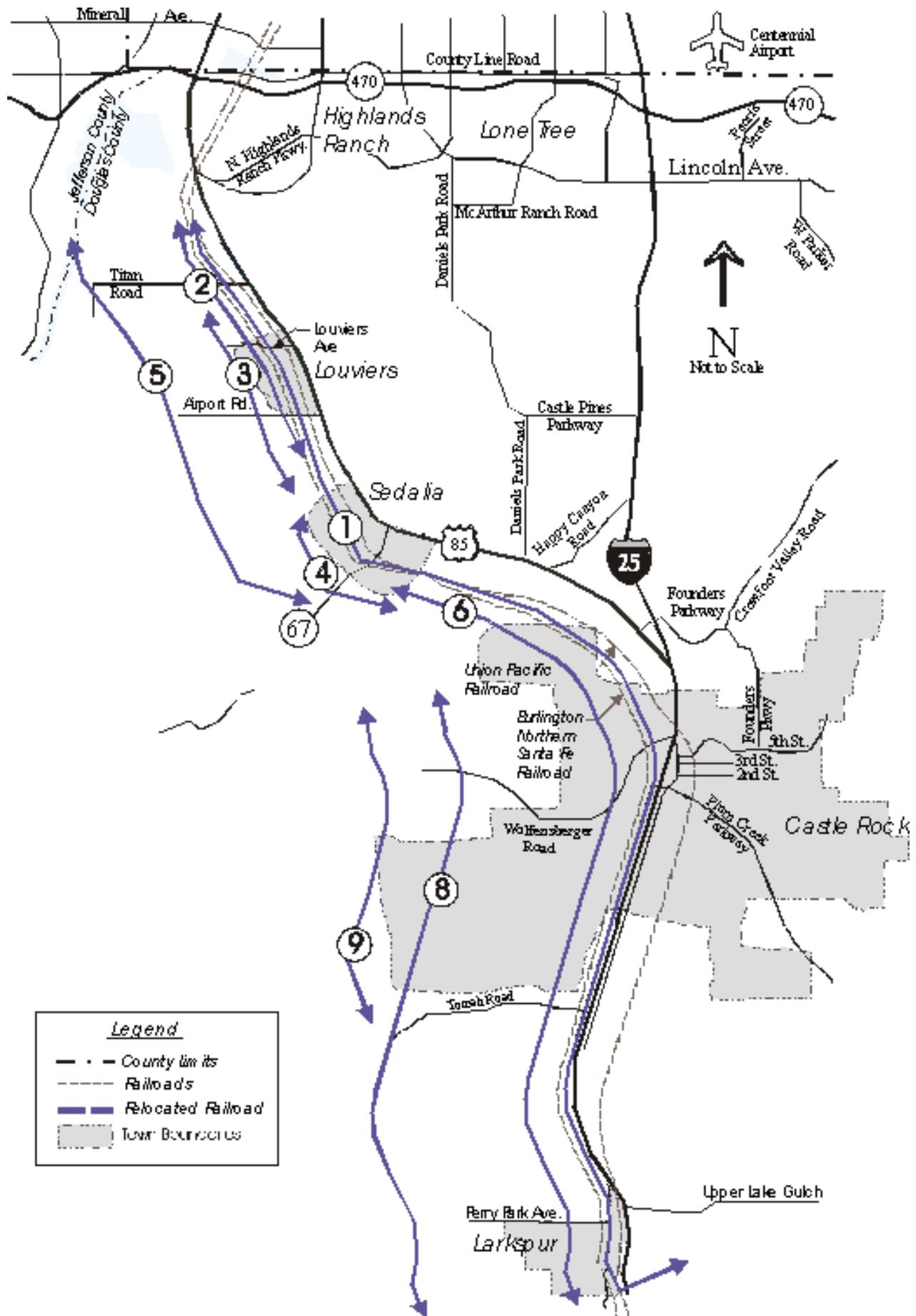
A railroad relocation study was completed to explore the options and feasibility of relocating a portion or all of the easternmost rail line along US 85 to provide benefits to US 85. Relocating the railroad would improve safety on local streets by combining and/or eliminating at-grade crossings through the towns of Louviers, Sedalia, and Castle Rock. There are currently 25 single-track public crossings and 30 single-track private crossings throughout the corridor. In all cases, the rail line was relocated from the east rail line to the west rail line. Nine alternatives were analyzed and are listed in Table 2.6 and illustrated on Figure 2.30.

Relocation of the railroad has been eliminated from further consideration for this EIS due to the high costs and minimal benefits provided to the mobility and safety of US 85. The Town of Castle Rock and Douglas County are currently researching funding options to explore relocation options.

Table 2.6
Railroad Relocation Analysis Results

Alternative Description	Track Miles Relocated	Existing Single Track Crossings		Single Track Crossings Eliminated		Single Track Crossings Converted to Double Track		Estimated Cost (in millions)
		Private	Public	Private	Public	Private	Public	
1. Consolidate railroad for length of corridor	27.5	30	25	17	12	13	13	\$98.8
2. Consolidate railroad from south of C-470 to south of Louviers	7.3	6	10	6	5	0	5	\$31.3
3. Consolidate railroad from north of Titan Road to south of Louviers	3	4	6	4	3	0	3	\$20.5
4. Consolidate railroad from north of Sedalia to south of Sedalia	2.5	1	3	0	1	1	2	\$15.0
5. Consolidate railroad from south of C-470 to south of Sedalia	10.5	10	13	6	6	4	7	\$35.7
6. Consolidate railroad from south of Sedalia to south of Larkspur	18	20	12	11	6	9	6	\$66.4
7. Make safety improvements to signalized public at-grade crossings	0	0	0	0	0	0	0	\$0.37
8. Consolidate railroad from north of Castle Rock to south of Larkspur	12.8	11	11	5	6	6	5	\$69.7
9. Consolidate railroad from north of Castle Rock to south of Castle Rock	6	3	6	2	3	1	3	\$69.0

Figure 2.30
Railroad Relocation Alternatives



2.12.6 DEIS Alternatives Eliminated

Alternatives presented in this FEIS were developed from elements evaluated in the DEIS alternatives. The DEIS alternatives listed in this section were eliminated from further consideration after the full evaluation in the DEIS.

2.12.6.1. I-25 Corridor DEIS Alternatives Eliminated

Three alternatives (including the No-Action Alternative) and various improvement options were considered for the I-25 Corridor in the DEIS:

- Alternative 1: No-Action
- Alternative 2: Mainline Widening (Additional General-Purpose Lanes)
- Alternative 3: Mainline Widening (Additional General-Purpose Lanes), Interchange Improvements, and Frontage Road

The No-Action Alternative is still under consideration in the FEIS. Portions of Alternative 2 and Alternative 3 were incorporated into the Preferred Alternative and Other Alternative.

Alternative 2: Mainline Widening (Additional General-Purpose Lanes)

Alternative 2 focuses on mainline I-25 widening to add one general-purpose lane in each direction without major interchange reconstruction or improvements. Existing interchanges are improved minimally (box culverts extended, bridges widened, ramps adjusted, slope paving removed, etc.) where necessary to accommodate the widening of I-25. The new bridge for the Union Pacific Railroad is constructed to the north of the existing bridge. All Early-Action projects are included in this alternative. Major elements of Alternative 2 include:

- Eight lanes between C-470 and Meadows/Founders Parkway
- Six lanes between Meadows/Founders Parkway and Douglas Lane

Estimated total cost for Alternative 2 is \$66.3 million, including the cost for adding one general-purpose lane in each direction along I-25 between C-470 and Douglas Lane and minor interchange improvements that adjust for the widening.

Alternative 3: Mainline Widening (Two Additional General-Purpose Lanes), Interchange Improvements, and Frontage Road

Alternative 3 builds on Alternative 2 in that it includes all the Early-Action projects and Alternative 2 elements and a new Surrey Ridge Road diamond interchange, Castle Pines Parkway partial cloverleaf interchange, Castle Pines Parkway car pool lot, widened Happy Canyon Bridge, and a two-lane frontage road on the east side of I-25 between Castle Pines Parkway and Lincoln Avenue. Bridge reconstruction is required for the Union Pacific Railroad. This alternative also includes the following major improvements:

- Eight lanes between C-470 and Meadows/Founders Parkway

- Six lanes between Meadows/Founders Parkway and Douglas Lane
- New diamond interchange at Surrey Ridge Road, east-side frontage road between Castle Pines Parkway and Lincoln Avenue, and removal of Schweiger Interchange I-25 ramps
- Castle Pines Parkway Interchange reconstruction with loop ramp in southeast quadrant
- Car pool lot (500 spaces) in northeast quadrant of the I-25 and Castle Pines Parkway Interchange
- Happy Canyon Road Bridge widening

In addition to the mainline widening, Alternative 3 includes Additional Major Improvements:

- *Frontage Road and Diamond Interchange at Surrey Ridge Road.* The existing Surrey Ridge Road Interchange is reconstructed into a diamond interchange and an east-side, two-lane frontage road is constructed between Castle Pines Parkway and Lincoln Avenue. The I-25 ramps at the Schweiger Interchange are removed, and Schweiger is connected to the frontage road.
- *Partial Cloverleaf Interchange at Castle Pines Parkway.* The Castle Pines Parkway Interchange is reconfigured by adding a loop ramp in the southeast quadrant of the Castle Pines Parkway Interchange. Remaining ramps are adjusted for mainline widening.
- *Castle Pines Parkway Car Pool Lot.* A new car pool lot in the northeast quadrant of the Castle Pines Parkway Interchange is constructed. The lot provides for approximately 500 parking spaces and serves as a meeting place and parking area. The car pool lot can be built in phases, starting with a fewer number of parking spaces.
- *Happy Canyon Road Bridge Widening.* The Happy Canyon Bridge is widened to accommodate the additional left-turn lanes warranted with the projected future traffic volumes.

Total cost for Alternative 3 is approximately \$95.3 million, including adding one general-purpose lane in each direction along I-25 between C-470 and Douglas Lane, constructing a frontage road along the east side of I-25 between Lincoln Avenue and Castle Pines Parkway, and providing major interchange improvements. A major cost of this alternative is the interchange improvements and frontage road estimated to be \$26.0 million. The ROW increases for this alternative because the frontage road is being constructed on a new alignment that requires 23 hectares (57 acres).

Other I-25 Corridor Improvement Options

Certain sections of I-25 have variations or options that could be included in different combinations with any of the three alternatives. The options have been developed to provide variations to the three alternatives. The improvement options for I-25 that have been eliminated are described below.

Interchange Improvements and Frontage Road between Lincoln Avenue and Castle Pines Parkway, Option B: Diamond Interchange at Surrey Ridge Road and Frontage Road

This option includes constructing a new diamond interchange at Surrey Ridge Road and an east-side frontage road between Castle Pines Parkway and Lincoln Avenue. The exiting I-25 ramps at Castle Pines Parkway and Lincoln Avenue are adjusted for the mainline widening. Existing ramps at Surrey Ridge Road are replaced with a standard diamond interchange. The I-25 ramps at Schweiger Interchange are removed, and local traffic circulation is provided at Lincoln Avenue and Surrey Ridge Road via the frontage road. A variation of this option (Surrey Ridge Road diamond interchange and frontage road between Rampart Range and Castle Pines Parkway) is included in the Other Alternative.

Laneage Options between Castle Pines Parkway and Meadow/Founders Parkway, Option A: Existing Conditions of Six Lanes Between Castle Pines Parkway and Meadow/Founders Parkway

This option does not include widening on I-25 between Castle Pines Parkway and Meadows/Founders Parkway beyond the Early-Action projects. The configuration in this section remains as the No-Action (after the completion of Climbing Lanes, Phase II) four general-purpose lanes and two climbing lanes.

2.12.6.2. US 85 Corridor DEIS Alternatives Eliminated

Two general alternatives (including the No-Action Alternative) and an improvement option were considered for improvements to US 85 in the DEIS:

- Alternative A: No-Action
- Alternative B: Mainline Widening (Additional General-Purpose Lanes) and Reconstruction

The No-Action Alternative is still under consideration in the FEIS. Alternative B and an improvement option have been eliminated and are described in the following section.

Alternative B: Mainline Widening (Additional General-Purpose Lanes) and Reconstruction

Alternative B focuses on complete reconstruction and mainline US 85 widening. Where needed, the existing culverts are extended and other drainage structures are replaced to accommodate the widening. The proposed access along US 85 is managed as described in the *Draft US 85 Access Management Plan*, June 2000. This alternative also includes a bikeway along US 85. All Early-Action projects are assumed for this alternative. Major elements of Alternative B include:

- Six lanes between C-470 and Titan Road
- Four lanes between Titan Road and Meadows Parkway
- US 85/SH 67 Intersection Reconfiguration

The total cost for Alternative B is approximately \$93.3 million, including the cost for complete reconstruction of US 85 and widening to six lanes between C-470 and Titan Road and four lanes between Titan Road and Meadows Parkway. The ROW cost for Alternative B is approximately \$10 million (not including relocation costs) to purchase 46 hectares (114 acres).

Other US 85 Proposed Typical Sections

The Douglas County Trail Group submitted typical sections showing detached bicycle and pedestrian facilities. Various restrictions along US 85, including houses, businesses, and Section 4(f) Properties restrict the amount of bikeway that can be detached. The Preferred Alternative and Other Alternative include a detached bikeway at prudent and feasible locations. Where a detached trail does not fit due to various restrictions, either an attached facility or a large shoulder serves as the bikeway.

3.0 TRAVEL DEMAND

TABLE OF CONTENTS

<u>Section</u>	<u>Page</u>
<u>3.0 TRAVEL DEMAND</u>	1
<u>3.1 INTRODUCTION</u>	1
<u>3.2 TRANSPORTATION MODEL METHODOLOGY</u>	1
<u>3.2.1 The DEIS Transportation Model (version 3D20)</u>	3
<u>3.2.2 The FEIS Transportation Model (version 5A20)</u>	3
<u>3.2.3 Douglas County Land Use Growth Models</u>	3
<u>3.3 EXISTING (1998) AND FUTURE (2020) TRAVEL DEMAND</u>	5
<u>3.3.1 Existing (1998) Travel Demand</u>	5
<u>3.3.2 Future (2020) Travel Demand</u>	5
<u>3.4 EXISTING (1998) AND FUTURE (2020) TRAFFIC OPERATIONS</u>	10
<u>3.4.1 Existing (1998) Operations</u>	11
<u>3.4.2 Future (2020) Operations</u>	11
<u>3.5 TRANSIT DEMAND</u>	15
<u>3.5.1 I-25 Corridor Ridership</u>	16
<u>3.5.2 US 85 Corridor Ridership</u>	16
<u>3.6 SUMMARY</u>	19

3.1 INTRODUCTION

Travel demand is the amount of traffic that uses a facility in a defined situation. Travel demand is typically shown in either person trips or vehicle trips. For this Environmental Impact Statement (EIS), travel demand is projected 20 years into the future (year 2020) to estimate traffic volumes and transit ridership to assist in long-term planning.

Traffic volumes have been increasing continuously over the past several years. This trend is not expected to change. In 1998 the average daily traffic (ADT) on I-25 between Plum Creek Parkway and Wolfensberger Road was approximately 60,250, while the ADT between Lincoln Avenue and C-470 was approximately 85,100. These figures equate to approximately 72,300 and 102,120 person trips (assuming 1.2 persons per vehicle) for each respective link. Based on the travel demand model refined for this project, traffic volumes along the I-25 Corridor are projected to increase between 90 and 142 percent (depending on location) by 2020. The ADT projected on I-25 in 2020, between Plum Creek Parkway and Wolfensberger Road, is approximately 114,600 (137,500 person trips), while the projected ADT is approximately 206,200 (247,400 person trips) on the section between Lincoln Avenue and C-470.

The 1998 ADT on US 85 between Meadows Parkway and Happy Canyon Road was approximately 13,200, and

the ADT between Town Center Drive and Blakeland Drive was approximately 37,600. These figures equate to approximately 15,840 and 45,120 person trips for each respective link. US 85 Corridor traffic volumes are projected to increase between 29 percent and 50 percent by 2020. The projected ADT between Meadows Parkway and Happy Canyon Road for 2020 is approximately 19,800 vehicles (23,800 person trips), and approximately 35,100 vehicles (42,100 person trips) on the segment between Town Center Drive and Blakeland Drive. Section 1.4, *Traffic Characteristics* details existing traffic volumes.

Transportation models project future traffic volumes and transit ridership for a particular study area. The Denver Regional Council of Governments (DRCOG) maintains the regional travel demand model for the Denver metropolitan area. Planning studies conducted as part of the state and federal process are required to use this model as the basis of analysis. These projections allow comparisons to be made between the alternatives. Section 3.3, *Existing (1998) and Future (2020) Travel Characteristics*, outlines the level of service (LOS) and the hours of congestion for the alternatives being evaluated.

This chapter discusses the transportation model used for this Final EIS (FEIS). It also discusses the differences between FEIS and Draft EIS (DEIS) traffic volume projections and differences between FEIS projections and Douglas County proposed land use projections. Existing and proposed traffic volumes and operations are discussed in this chapter.

3.2 TRANSPORTATION MODEL METHODOLOGY

The travel demand model is used to forecast future traffic volumes. This model is not designed to produce an absolute answer; rather, it is a tool used to develop relatively accurate travel projections in the context of regional or corridor transportation analysis. These projections are based on many assumptions about population, employment, and land use. Variations in the actual growth and location of population, employment, and land use development will affect the accuracy of the travel projections. Given one set of assumptions about future land use, however, the model will produce reliable results that are well suited for the comparison of transportation network alternatives.

The first step in the DRCOG modeling process is to determine land use data and transportation network data (including major roads, transit, proposed major improvements, and other modes of transportation). By changing these elements, changes in travel demand can be projected. The model does not produce a definitive answer; it is a tool used to test assumptions or alternatives. The four steps of the modeling process are:

- *Trip generation* calculates how trips begin or end (productions and attractions) in each traffic analysis zone (TAZ) based on household and employment characteristics of each zone.
- *Trip distribution* determines where the trips produced in each zone are attracted by establishing a relationship for trip interchanges between zones.
- *Modal split* determines which modes of travel are used for trips between each pair of zones.
- *Traffic assignment* determines the route(s) that are traveled for non-transit trips between each pair of zones.

The DRCOG transportation model is calibrated with current data and updated periodically. While the calibration

does not produce an exact model, the model allows for adjustments and provides a reasonable estimate of travel behavior.

Induced trips are elements of travel demand projection not included in the DRCOG transportation model or in the analysis for this EIS. Induced trips are trips currently not being made because of traffic congestion, safety, or other travel deterrents. In theory, as capacity and mobility improvements are made, conditions become more conducive to travel such that previously unmade trips are now made, thus increasing traffic volumes without changing land use or population.

The Transportation Research Board (TRB) recently investigated the phenomenon of induced travel, concluding that some effect exists, but the TRB was inconclusive on the magnitude. Research suggests that pricing and land use practices are more effective in controlling traffic to discourage induced travel than are highway improvements. The long-term operations of both corridors in this study ultimately become congested; therefore, it could be concluded that, although induced trips may occur in the interim, long-term congestion ultimately deters induced travel.

Latent demand trips are trips being made but on a different route because of shorter travel times. The model includes latent demand trips; and as improvements are made to a particular route and the travel time becomes shorter, trips previously routed on less congested local streets are assigned to the faster route.

For comparison purposes, the following discussion outlines the DRCOG transportation model used for the DEIS, the updated DRCOG transportation model used for the FEIS, and the Douglas County projected 2020 low- and moderate-growth land use projections.

3.2.1 The DEIS Transportation Model (version 3D20)

The South I-25 Corridor and US 85 Corridor DEIS transportation model used the 3D20 DRCOG model as a base, and added more detailed information about the transportation network to more accurately reflect local travel patterns. The DRCOG model includes a structure of 1,530 TAZs. Household, population, and employment are forecasted for each TAZ. This information is then used to project the number of trips to and from each TAZ. It was determined that the accuracy of the model in the study area could be improved by representing the larger zones in Douglas County as multiple smaller zones. Therefore, input from Douglas County and the Town of Castle Rock was used to refine the model by changing the TAZ structure and roadway network. This improved model was used to perform the DEIS analysis.

3.2.2 The FEIS Transportation Model (version 5A20)

DRCOG recently updated their 3D20 transportation model. The revised model (5A20) was used to project traffic volumes for the FEIS. Between the DEIS and the FEIS, the travel projections were reviewed and revised as appropriate.

The new model provides additional detail for Douglas County and provides outputs for 10-year increments. More detail regarding the transportation network was added based on information obtained from Douglas County and the Town of Castle Rock. Based on the new model estimates, the traffic volumes and resulting LOS have been revised from the DEIS model results and are discussed in this chapter.

Figure 3.1 compares DEIS and FEIS traffic volumes. The I-25 traffic volumes have increased due to traffic increases from the south (Colorado Springs) and the developments that have recently been added to the updated model. The US 85 Corridor traffic volumes also increased due to updated growth projections.

3.2.3 Douglas County Land Use Growth Models

As part of the corridor study and updates to the *Douglas County Master Plan*, 1998, Douglas County has developed two different population growth scenarios: low-growth and moderate-growth. The local growth scenarios incorporate different land use scenarios than the South I-25 Corridor and US 85 Corridor Transportation Model forecasts (obtained from DRCOG) used for this FEIS. Table 3.1 shows projected growth rates for the county from 2005 to 2020 based on the Douglas County scenarios. The Douglas County low-growth population model was based on land use projections developed in 1999. The projected population in the year 2020 for this low-growth scenario was 313,000. Douglas County has since revised their low-growth scenario, shown on Table 3.1. The traffic volumes projected for the Douglas County Land Use Growth Model was the DEIS transportation model and not the FEIS transportation model.

Figure 3.1
2020 No-Action Average Daily Traffic Volumes
(DEIS Volumes/FEIS Volumes)



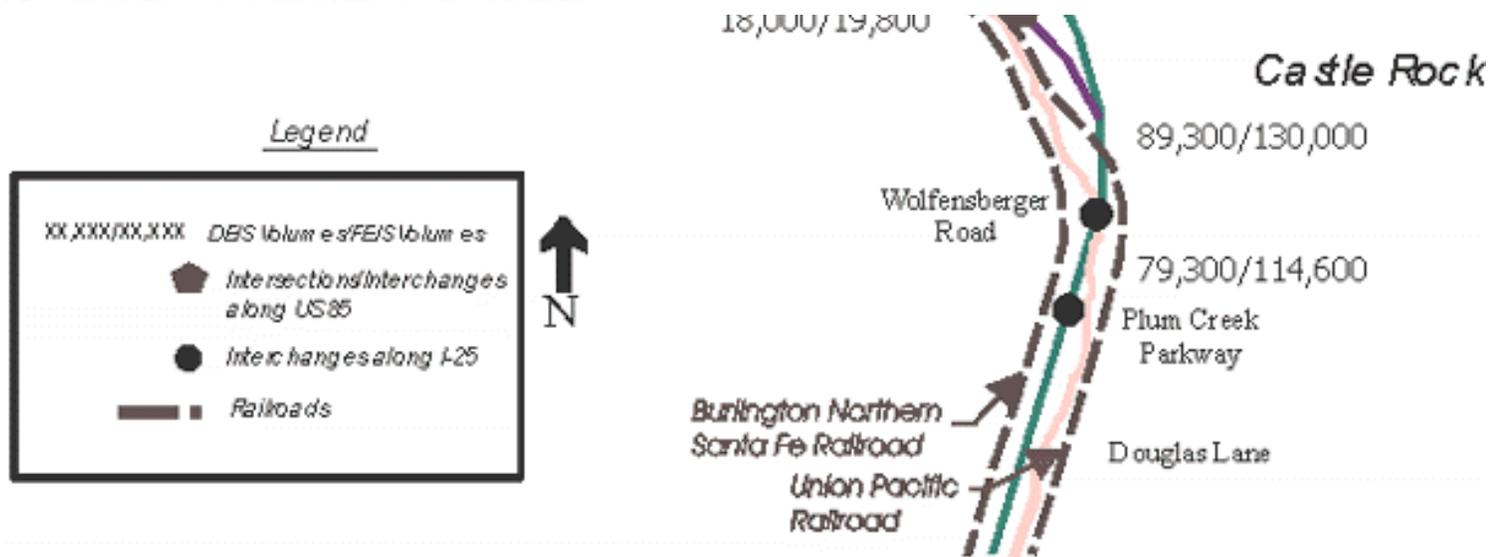


Table 3.1
South I-25 Corridor and US 85 Corridor and Douglas County
Population Projections (2005-2020)

Scenario	Growth Projections			
	2005	2010	2015	2020
South I-25 Corridor and US 85 Corridor				296,000
Douglas County Low-Growth Scenario	222,000	272,000	319,000	357,000
Douglas County Moderate-Growth Scenario	248,000	310,000	355,000	386,000

Source: Douglas County Population and Development Report, 2000

Figure 3.2 compares the forecasted ADT volumes using the Douglas County low- and moderate-growth scenarios and the South I-25 Corridor and US 85 Corridor FEIS model projections. When making comparisons, the north and south end of each corridor vary in the percent change. For I-25, the Douglas County low-growth scenario is between 3 percent less (between Schweiger and Lincoln Avenue) and 44 percent less (between Plum Creek Parkway and Wolfensberger Road) in 2020 than the South I-25 Corridor and US 85 Corridor model. The moderate-growth scenario averages 3 percent more to 42 percent less than the South I-25 Corridor and US 85 Corridor model. For US 85, the low-growth scenario is between 30 percent more to 77 percent more traffic than the South I-25 Corridor and US 85 Corridor model; and the moderate-growth scenario is between 37 to 92 percent more traffic than the South I-25 Corridor and US 85 Corridor model.

3.3 EXISTING (1998) AND FUTURE (2020) TRAVEL DEMAND

Existing and future traffic volumes are used to identify capacity needs for the I-25 Corridor and US 85 Corridor. Existing (1998) traffic volumes were obtained by CDOT. Future (2020) traffic volumes are forecasted using the revised DRCOG model.

3.3.1 Existing (1998) Travel Demand

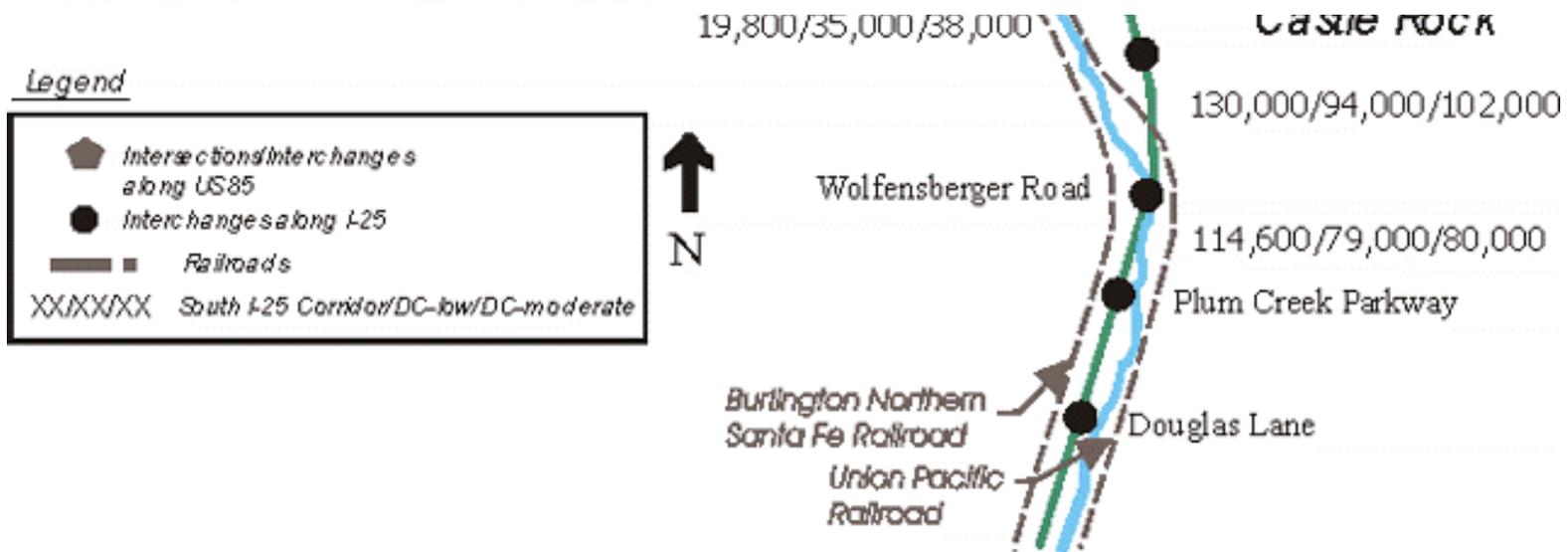
Population and employment increases in Douglas County have substantially contributed to the traffic volume increase along the I-25 Corridor and US 85 Corridor. Travel volumes along the I-25 Corridor have increased 12 percent to 15 percent annually from 1997-1999. Traffic volumes along the US 85 Corridor have increased 6 percent to 28 percent annually from 1997-1999. As discussed in Section 1.4, *Traffic Characteristics*, ADT volumes along I-25 reached 85,100 in 1998. The ADT volume along US 85 reached 37,600 in 1998. Currently, volumes on both corridors are generally heavier in the northbound direction during the morning peak period and in the southbound direction during the evening peak period.

3.3.2 Future (2020) Travel Demand

Three alternatives are being evaluated for the I-25 Corridor and US 85 Corridor: the No-Action Alternative, the Preferred Alternative, and the Other Alternative. For a complete description of the alternatives, see Chapter 2.0, *Alternatives*.

Figure 3.2
2020 Forecasted Average Daily Traffic Model Comparisons
South I-25 Corridor and US 85 Corridor/Douglas County Low/Douglas County Moderate





3.3.2.1 No-Action Alternative

The No-Action Alternative includes the Early-Action projects and the Douglas Lane Interchange. The number of travel lanes along I-25 is six lanes from C-470 to Meadows/Founders Parkway and four lanes between Meadows/Founders Parkway and Douglas Lane. This I-25 configuration is different from the existing conditions due to the Early-Action projects, which includes four lanes from Castle Pines Parkway to Meadows/Founders Parkway. US 85 lane configuration includes four lanes between C-470 and Highlands Ranch Parkway and two lanes from Highlands Ranch Parkway to Meadows Parkway. This US 85 lane configuration is the same as the existing conditions. For more information on the No-Action Alternative, see Section 2.4, *No-Action Alternative*.

The I-25 ADT volume for the No-Action Alternative is projected to increase between 90 percent and 142 percent (depending on location) from the existing ADT by 2020. The average number of vehicles driving on I-25 in 2020 between Plum Creek Parkway and Wolfensberger Road is 114,600 (137,500 people, assuming 1.2 persons per vehicle), while 206,200 vehicles (247,400 people) drive on the segment between Lincoln Avenue and C-470. These volumes can be compared to the 1998 volumes of 60,250 (90 percent increase) and 85,100 (142 percent increase), respectively.

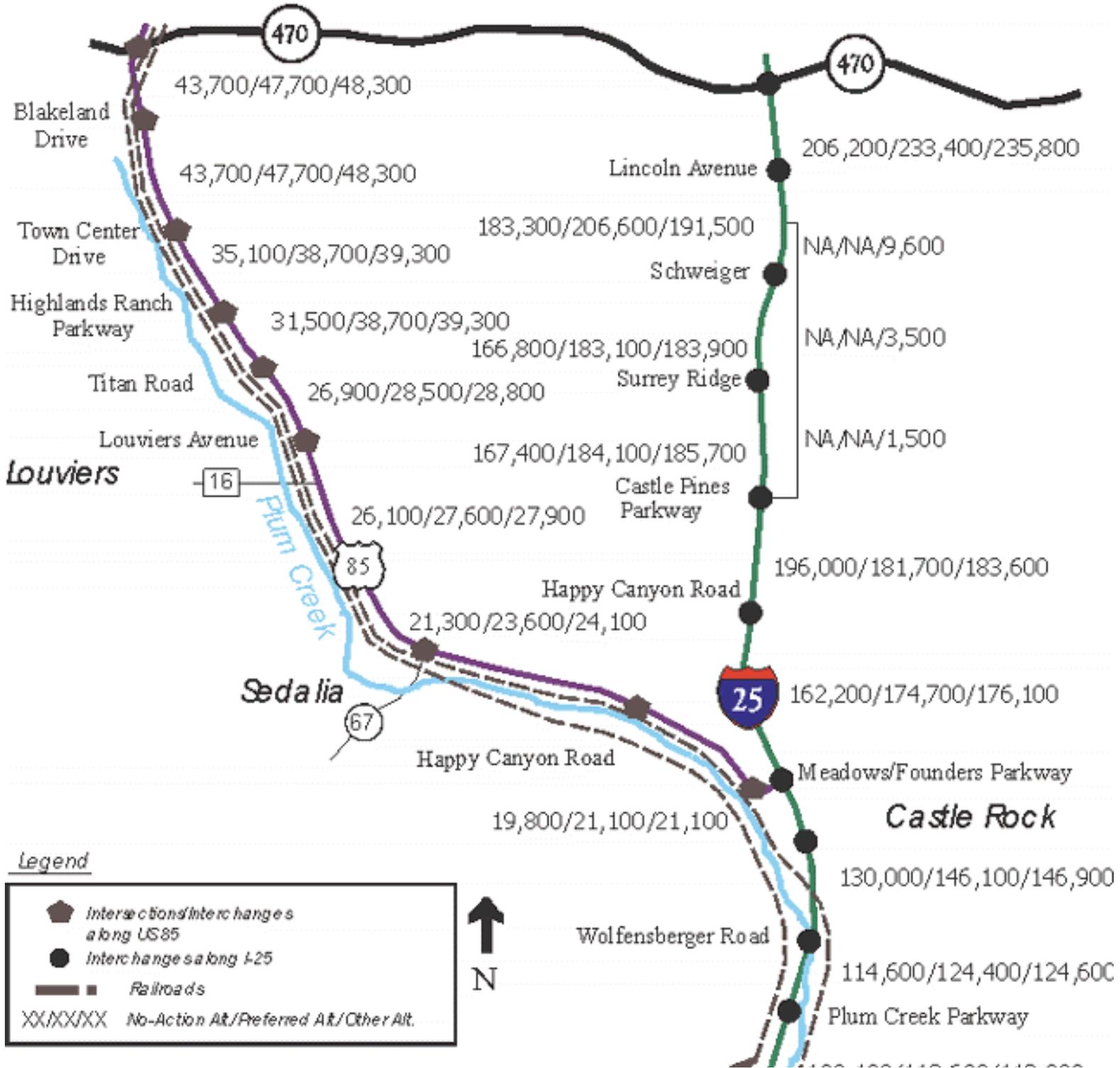
The US 85 ADT volume for the No-Action Alternative is projected to increase between 21 percent and 50 percent (depending on location) from the existing ADT by 2020. The average number of vehicles driving on US 85 in 2020 between Meadows Parkway and Happy Canyon Road is 19,800 (23,800 people, assuming 1.2 persons per vehicle), while 35,100 vehicles (42,100 people) drive on the segment between Highlands Ranch Parkway and Town Center Drive. These volumes can be compared to the 1998 volumes of 13,200 (50 percent increase) and 29,100 (29 percent increase), respectively.

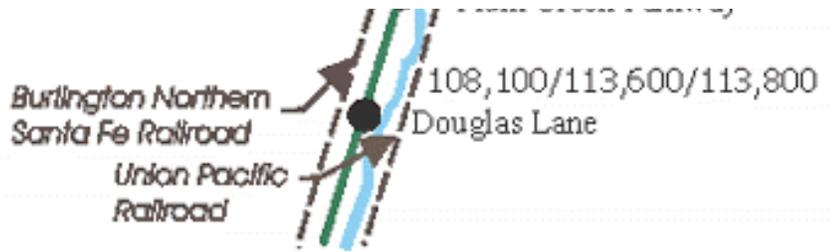
3.3.2.2 Preferred Alternative

The Preferred Alternative includes adding one general-purpose lane in each direction from C-470 to Douglas Lane along I-25 and adding one general-purpose lane in each direction from C-470 to Meadows Parkway along US 85. The total I-25 lane configuration includes eight lanes between C-470 and Meadows/Founders Parkway and six lanes between Meadows/Founders Parkway and Douglas Lane. The total US 85 lane configuration includes six lanes from C-470 to Highlands Ranch Parkway and four lanes from Highlands Ranch Parkway to Meadows Parkway. For more information on the Preferred Alternative, see Section 2.5, *Preferred Alternative*.

By 2020, the I-25 ADT volume for the Preferred Alternative is projected to increase between 106 percent and 174 percent from the existing ADT volume. This increase is an additional 16 percent to 32 percent from the No-Action Alternative. As shown on Figure 3.3, the average number of vehicles driving on I-25 in 2020 (with the Preferred Alternative) between Plum Creek Parkway and Wolfensberger Road is 124,400 (149,300 people, assuming 1.2 persons per vehicle), while 233,400 vehicles (280,100 people) drive on the section between Lincoln Avenue and C-470.

Figure 3.3
2020 Forecasted Average Daily Traffic Volumes
(No-Action Alternative/Preferred Alternative/Other Alternative)





By 2020, the US 85 ADT volume for the Preferred Alternative is projected to increase between 33 percent and 60 percent (depending on location) from the existing ADT volume. This increase is an additional 10 percent to 12 percent from the No-Action Alternative. The average number of vehicles driving on US 85 in 2020 (with the Preferred Alternative) between Meadows Parkway and Happy Canyon Road is 21,100 (25,300 people, assuming 1.2 persons per vehicle), while 38,700 vehicles (46,400 people) drive on the segment between Highlands Ranch Parkway and Town Center Drive.

As travel time is reduced due to the Preferred Alternative improvements, trips made on alternate routes return to the I-25 Corridor and the US 85 Corridor, resulting in the 10 percent to 12 percent increase over the No-Action Alternative. Though traffic volumes increase within the corridors, overall vehicle miles travel (VMT) does not change because traffic volumes projected on the secondary road decreased based on the projected traffic volumes.

3.3.2.2 Preferred Alternative

The Other Alternative includes the addition of one general-purpose lane in each direction from C-470 to Douglas Lane along I-25 and the addition of a frontage road between Rampart Range and Castle Pines Parkway. The I-25 lane configuration includes eight lanes between C-470 and Meadows/Founders Parkway and six lanes between Meadows/Founders Parkway and Douglas Lane. The Other Alternative along US 85 includes the addition of one general-purpose lane in each direction from C-470 to Highlands Ranch Parkway, two general-purpose lanes in each direction from Highlands Ranch Parkway to Titan Road, and one general-purpose lane from Titan Road to Meadows Parkway. The US 85 lane configuration includes six lanes from C-470 to Titan Road and four lanes from Titan Road to Meadows Parkway. For more information on the Other Alternative, see Section 2.6, *Other Alternative*.

By 2020, the I-25 ADT volume for the Other Alternative is projected to increase between 106 percent and 177 percent from the existing ADT volume. This increase is an additional 16 percent to 35 percent from the No-Action Alternative. As shown on Figure 3.3, the average number of vehicles driving on I-25 in 2020 between Plum Creek Parkway and Wolfensberger Road is 124,600 (149,500 people, assuming 1.2 persons per vehicle), while 235,800 vehicles (283,000 people) drive on the section between Lincoln Avenue and C-470. Approximately 9,600 vehicles (11,500 people) are projected to travel on the frontage road during an average day.

By 2020, the US 85 ADT volume for the Other Alternative is projected to increase between 35 percent and 60 percent (depending on location) from the existing ADT volume. This increase is an additional 10 percent to 14 percent from the No-Action Alternative. As shown on Figure 3.3, the average number of vehicles driving on US 85 in 2020 between Meadows Parkway and Happy Canyon Road is 21,100 (25,300 people, assuming 1.2 persons per vehicle), while 39,300 vehicles (47,200 people) drive on the segment between Highlands Ranch Parkway and Town Center Drive.

The 10 percent to 35 percent increase over the No-Action Alternative along the I-25 Corridor and the US 85

Corridor is due to latent demand. As the travel times become shorter because of the Other Alternative improvements, trips previously made on less congested local streets move to the faster route, which in this case is I-25 and US 85.

3.4 EXISTING (1998) AND FUTURE (2020) TRAFFIC OPERATIONS

Highway traffic operations are expressed in terms of LOS as defined by the *Highway Capacity Manual* (HCM). LOS is a letter code ranging from A for excellent conditions to F for failing conditions. Complete free-flow operations with no restrictions caused by traffic conditions are described as LOS A. LOS F represents forced operations or breakdown of the traffic stream characterized by the familiar traffic jam. LOS B through LOS E describe progressively worse traffic conditions. CDOT defines LOS C as unacceptable operations for rural highways and LOS D unacceptable for urban highways. Conditions defining the LOS for a highway (from the HCM) are summarized as follows:

- LOS A represents the best operating conditions and is considered free flow. Individual users are unaffected by the presence of others in the traffic stream.
- LOS B represents reasonably free-flowing conditions but with some influence by others.
- LOS C represents a constrained constant flow below speed limits, with additional attention required by drivers to maintain safe operations. Comfort and convenience levels of the driver decline noticeably. LOS C is CDOT's design service level (design capacity) for rural highways. (Portions of US 85 and I-25 are rural facilities.)
- LOS D represents traffic operations approaching unstable flow with high passing demand and passing capacity near zero, characterized by drivers being severely restricted in maneuverability. LOS D is CDOT's design service level for urban highways. (Portions of I-25 and US 85 are urban highways.)
- LOS E represents unstable flow near capacity. LOS E often quickly changes to LOS F because of disturbances (road conditions, crashes, etc.) in traffic flow.
- LOS F - Represents the worst conditions with heavily congested flow and traffic demand exceeding capacity, characterized by stop-and-go waves, poor travel time, low comfort and convenience, and increased crash risk.

LOS is calculated differently based on the roadway classification. A two-lane highway LOS is dependent on the two-way traffic volume (US 85 between Meadows Parkway and Highlands Ranch Parkway) because operations worsen if one vehicle cannot pass another vehicle. The LOS of an arterial is dependent on the delay at traffic signals, overall travel time, and travel speed. The LOS of an interstate is dependent on the free-flow speed.

Traffic operations were analyzed for 1998 traffic volumes and 2020 traffic volumes for mainline freeway segments along I-25 and mainline roadway segments along US 85, as well as at intersections/interchanges along both corridors. Mainline traffic operations were affected by the classification of roadway (i.e., controlled access, principal arterial), geometry of the roadway (i.e., curves, shoulder width), number of vehicles on the roadway, ability of vehicles to pass other slow-moving vehicles, percentage of trucks on the roadway, vehicle speeds, terrain type, and weather.

3.4.1 Existing (1998) Operations

Figure 3.4 shows the existing (1998) peak-hour LOS for the I-25 Corridor and the US 85 Corridor. In 1998, the peak-hour LOS in the northbound direction was generally LOS C, with LOS B south of Wolfensberger Road. The LOS in the southbound direction was generally worse, with LOS C through LOS F north of Meadows/Founders Parkway.

As shown on Figure 3.4, 1998 traffic conditions along the US 85 Corridor were operating at similar LOS in both directions during the peak periods. The LOS along US 85 ranged from LOS C to LOS E. The section from Highlands Ranch Parkway to Meadows Parkway operated at LOS E during peak periods.

Hours of congestion are used to evaluate improvements resulting from a proposed alternative. Hours of congestion are used to evaluate the time roadway section is congested (i.e., LOS E or LOS F) and whether the proposed improvements reduce the hours of congestion. Some roadway sections will have LOS E or LOS F regardless of the improvements made. Table 3.2 shows existing daily hours of congestion for the I-25 Corridor and the US 85 Corridor. US 85 is currently a two-lane highway south of Highlands Ranch Parkway, and the LOS for a two-lane highway is analyzed as a whole, not by direction. In 1998, northbound I-25 and US 85 operated at LOS C during the a.m. peak hour.

Table 3.2
Existing (1998) Daily Hours of Congestion

Roadway	Existing Hours of Congestion
I-25 Northbound	0
I-25 Southbound	1
US 85 (Northbound and southbound)	8

3.4.2 Future (2020) Operations

Traffic volumes were projected for 2020 for each of the three alternatives. These volumes were used to estimate roadway operations on the corridors. Figure 3.5 summarizes the operational LOS for the No-Action Alternative, Preferred Alternative, and the Other Alternative for the I-25 Corridor and the US 85 Corridor.

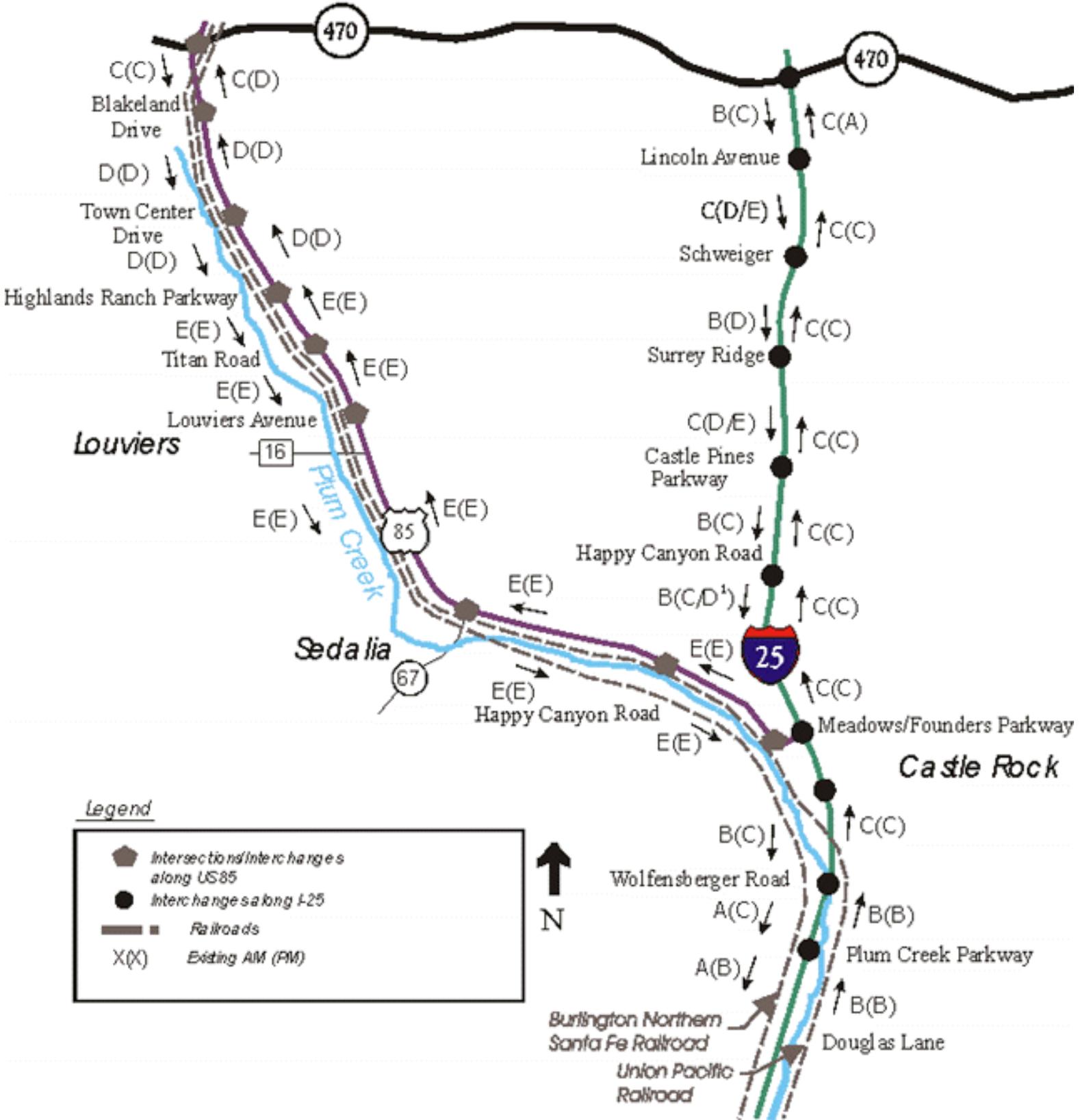
3.4.2.1 No-Action Alternative

No-Action traffic volumes projected for 2020 indicate that all sections of the I-25 Corridor operate at poor levels if no additional improvements are made. The LOS on I-25 is LOS D through LOS F throughout the entire corridor for the No-Action Alternative. Figure 3.5 shows the LOS for the No-Action Alternative along the I-25 Corridor.

The US 85 Corridor also has poor LOS during the peak hour for the No-Action Alternative. The LOS is generally

LOS F throughout the US 85 Corridor for the No-Action Alternative. Figure 3.5 shows the LOS for the No-Action Alternative along the US 85 Corridor.

Figure 3.4
Existing (1998) Freeway Level of Service



When LOS E or LOS F is experienced on the roadway, it is defined as hours of congestion. The hours of

congestion are used to further evaluate the proposed improvements. For the No-Action Alternative, there are 12.5 hours of congestion northbound and 7.0 hours of congestion southbound on I-25 south of Lincoln Avenue. Congestion occurs in most US 85 Corridor sections during both the morning and evening peak periods. There are 4.5 hours of congestion northbound and 7.0 hours of congestion southbound on US 85, north of Titan Road. Table 3.3 and Table 3.4 show the hours of congestion for the No-Action Alternative. The existing hours of congestion as shown on Table 3.2 compared with the projected 2020 No-Action Alternative hours of congestion dramatically illustrates the impact of the increased traffic on the overall operation of the I-25 Corridor and the US 85 Corridor without improvements. The I-25 Corridor increases the daily hours of congestion from a total of 1 hour to 19.5 hours. US 85 increases from a total of 8 hours of congestion per day to a total of 11.5 hours of congestion per day.

3.4.2.2 Preferred Alternative

The LOS for the Preferred Alternative along the I-25 Corridor is shown on Figure 3.5. The peak-hour LOS along the I-25 Corridor for the Preferred Alternative improves in some sections from the No-Action Alternative. On the southern sections, the LOS changes from LOS F (No-Action) to LOS C, LOS D, or LOS E. The LOS for the peak hour does not improve on the north end of I-25 where congestion is the most severe.

The peak-hour LOS along the US 85 Corridor improves in most sections. In several sections the LOS changes from LOS F (No-Action) to LOS B. With the additional lanes, the capacity more than doubles from Highlands Ranch Parkway to Meadows Parkway, causing the improved LOS. The LOS for the Preferred Alternative along the US 85 Corridor is shown on Figure 3.5.

The Preferred Alternative improves the peak-hour LOS along both I-25 and US 85 in some areas. The LOS does not improve in those areas with severe congestion. Another method used to evaluate the operational improvements of an alternative is the hours of congestion. Improvements along the I-25 Corridor and the US 85 Corridor with regard to operations can be seen in the hours of congestion. The Preferred Alternative reduces the daily hours of congestion from the No-Action Alternative along I-25 by 8.5 hours northbound and 2.5 hours southbound and 6 hours northbound and 8 hours southbound along the US 85 Corridor.

When the study corridor limits were extended to include I-25 from Lincoln Avenue to C-470, an operational analysis was completed. Lane balance, basic number of lanes, and weaving analyses were completed for the C-470 and I-25 Interchange for the Preferred Alternative. The I-25 configuration is comprised of eight through lanes to C-470 and drops or adds the lanes on the south side of the interchange to carry six lanes into the proposed Southeast Corridor I-25 mainline configuration. The outside northbound lane is an optional lane at the C-470 exit and is dropped at the County Line Road exit. The outside southbound lane is carried continuously south from the County Line Road entrance. The resulting laneage is six lanes between the C-470 on-ramp and the County Line Road off-ramp and eight lanes from the County Line Road off-ramp to Lincoln Avenue. The analysis showed that the Preferred Alternative for I-25, with this configuration, passed the lane balance, basic number of lanes, and weaving analysis criteria.

Figure 3.5
Future 2020 Peak-Hour Level of Service
(No-Action Alternative/Preferred Alternative/Other Alternative)

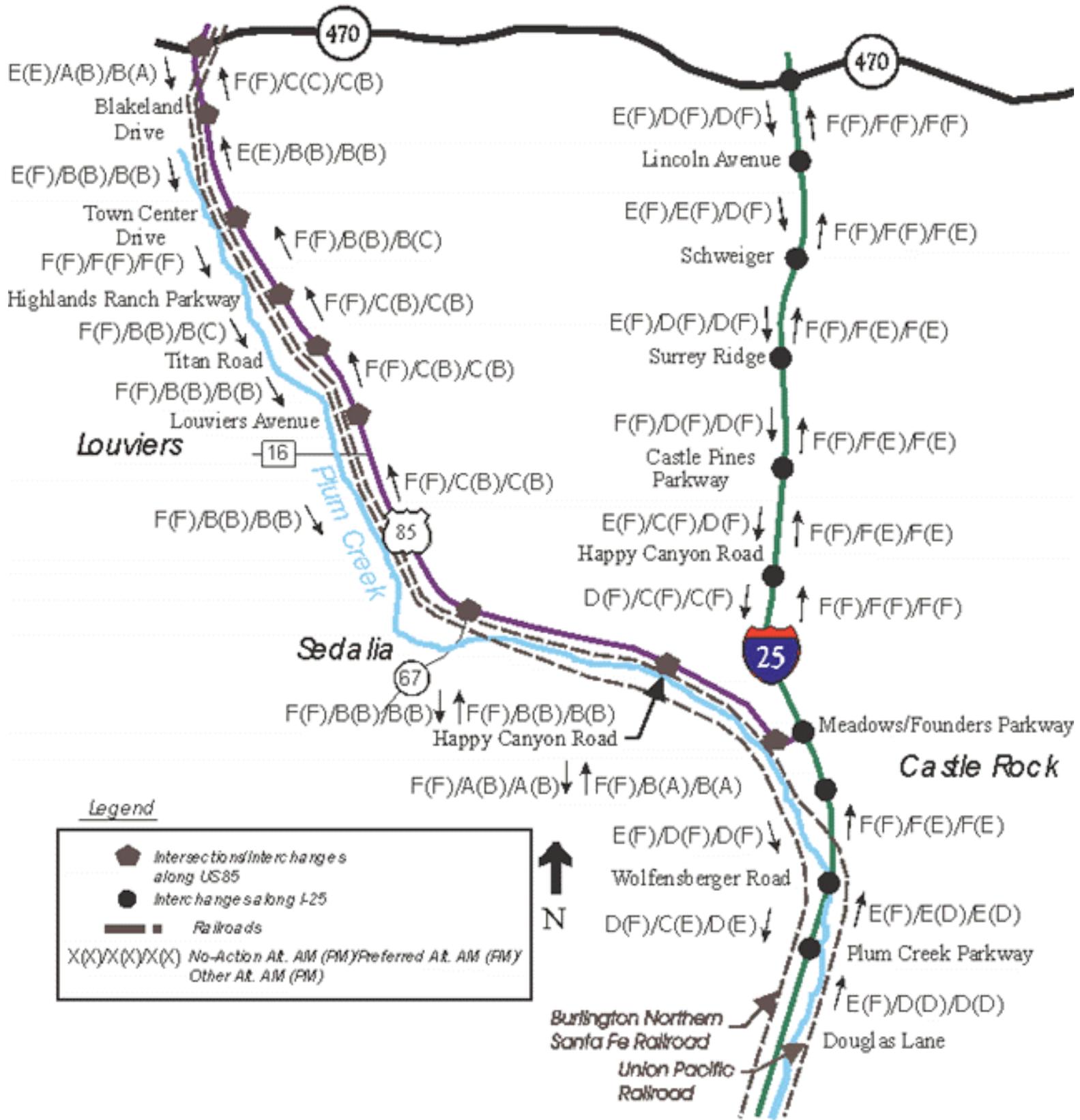


Table 3.3
2020 Daily Hours of Congestion

Alternative	Daily Hours of Congestion	
	Northbound	Southbound
I-25 Corridor		
No-Action	12.5	7.5
Preferred Alternative/Other Alternative	4	5
US 85 Corridor		
No-Action	7	8.5
Preferred Alternative/Other Alternative	1	0.5

I-25 hours of congestion measured south of Lincoln Avenue and US 85 hours of congestion measured north of Titan Road.

3.4.2.3 Other Alternative

The LOS for the Other Alternative is similar to the LOS calculated for the Preferred Alternative. The addition of the frontage road from Rampart Range to Castle Pines Parkway and the additional general-purpose lane in each direction from Highlands Ranch Parkway to Titan Road change the operations slightly on I-25. The improvement for the I-25 Corridor is seen in the northbound p.m. LOS (from LOS F to LOS E) and in the southbound a.m. LOS (from LOS E to LOS D). Figure 3.5 shows the LOS for the Other Alternative along the I-25 Corridor.

The LOS for the Other Alternative along the US 85 Corridor varies slightly from the Preferred Alternative. An improvement in the LOS can be seen from Titan Road to the north end of the corridor. Change in the LOS results from additional lanes from Titan Road to Highlands Ranch Parkway. Figure 3.5 shows the LOS for the Other Alternative along the US 85 Corridor.

The daily hours of congestion for the Other Alternative is the same as the Preferred Alternative. The Other Alternative yields 4 hours of congestion northbound and 5 hours of congestion southbound along the I-25 Corridor. The Other Alternative has 1 hour of congestion northbound and 0.5 hour of congestion south bound along US 85.

Lane balance, basic number of lanes, and weaving analyses were completed for the C-470 and I-25 Interchange for the Other Alternative. A detailed explanation is included as part of the Preferred Alternative discussion. The analysis showed that the Other Alternative for I-25, with this configuration, passed the lane balance, basic number of lanes, and weaving analysis criteria.

3.5 TRANSIT DEMAND

Fixed-guideway transit is part of the South I-25 Corridor and US 85 Corridor Long-Term Vision Through 2020 and Beyond. Due to fiscal constraints, fixed-guideway is not evaluated as an alternative in this FEIS. Fixed-guideway and bus transit were analyzed as part of the third level of evaluation in the alternative evaluation process to determine transit ridership. Fixed-guideway and bus transit were eliminated because ridership numbers did not reduce the number of trips made by single-occupant vehicles to improve north to south mobility.

Ridership numbers for each corridor are independent of one another (i.e., as transit was modeled on one corridor, no improvements were modeled along the other corridor). If improvements are made to both corridors, it is anticipated that the ridership numbers would decrease because of competing transit systems. This section presents the projected ridership for the fixed-guideway transit.

3.5.1 I-25 Corridor Ridership

A fixed-guideway alternative and a bus alternative were modeled along I-25 between the proposed Southeast Corridor LRT termini and Castle Rock. Daily ridership (one-way trips) between stations is shown on Figure 3.6. These numbers assume no improvements to US 85. Figure 3.6 also shows proposed station locations for commuters. The northernmost station is part of the Southeast Corridor Project, located on the west side of I-25 north of Lincoln Avenue. Other station locations are:

- Castle Pines Parkway (east side of I-25)
- Meadows/Founders Parkway (east side of I-25)
- Downtown Castle Rock

Daily ridership was calculated based on frequency assumptions. The fixed-guideway and buses are assumed to run 12.5 hours daily. During peak hours, 2 hours in the morning and 2.5 hours in the evening, the fixed-guideway and buses run every 15 minutes. During off-peak hours (the remaining 8 hours of operations) the fixed-guideway and buses run every 30 minutes.

As shown on Figure 3.6, the highest ridership is in the northern section, with 1,630 riders daily for fixed-guideway and 255 riders daily for bus.

3.5.2 US 85 Corridor Ridership

A fixed-guideway alternative and a bus alternative were modeled along US 85 between the existing Southwest Corridor LRT termini and Castle Rock. Daily ridership between stations is shown on Figure 3.7. These numbers assume no improvements to I-25. Figure 3.7 also shows the locations of proposed commuter stations. The northernmost station is the existing Southwest Corridor Termini, located on the west side of US 85 at Mineral Avenue. Other station locations are:

- Highlands Ranch Parkway
- Sedalia
- Meadows/Founders Parkway
- Downtown Castle Rock

Daily ridership was calculated based on frequency assumptions. The fixed-guideway and buses are assumed to run 12.5 hours daily. During peak hours, 2.5 hours in the morning and 3 hours in the evening, the fixed-guideway and buses run every 10 minutes. During off-peak hours (the remaining 7 hours of operations) the fixed-guideway and buses run every 30 minutes.

Figure 3.6

I-25 Corridor Projected Transit Ridership (2020)

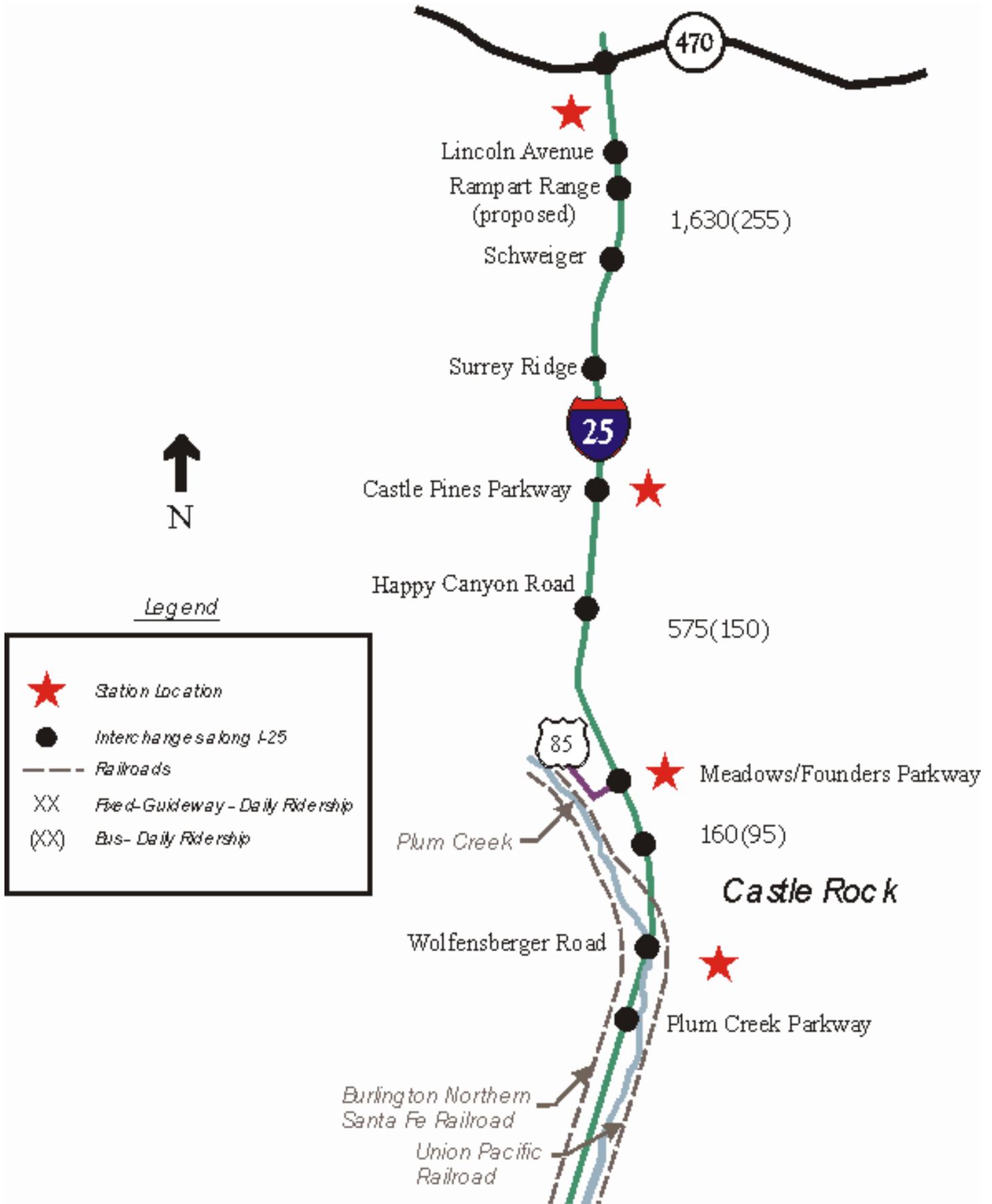
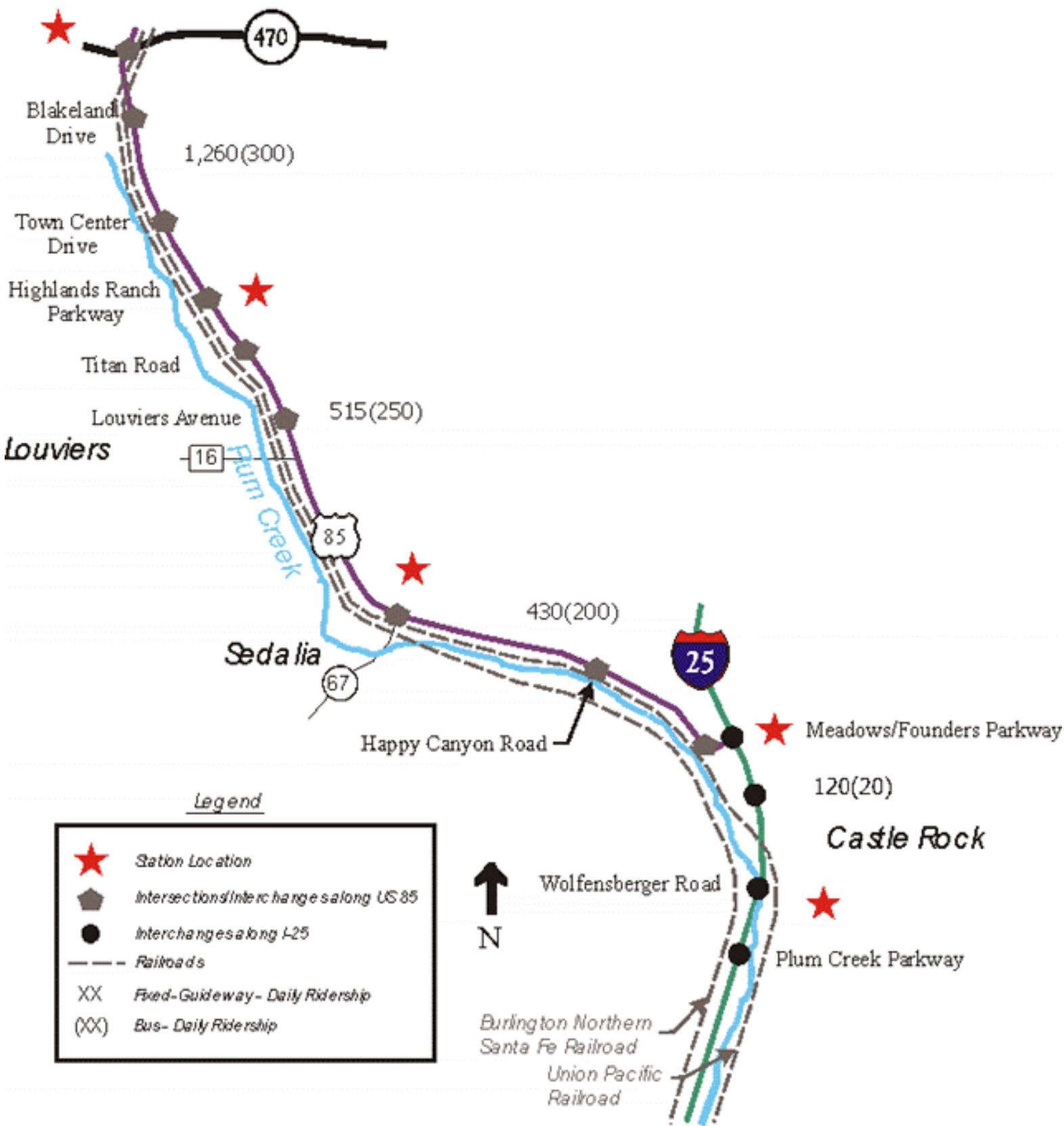


Figure 3.7
US 85 Corridor Projected Transit Ridership (2020)



As shown on Figure 3.7, the highest ridership is in the northern section, with 1,260 for fixed-guideway and 300 for bus.

3.6 SUMMARY

The operational analysis of the 2020 No-Action Alternative indicates that traffic volumes will exceed capacity by 2020 on both I-25 and US 85 if no improvements are implemented. The analysis of the alternatives being evaluated shows that traffic volumes will continue to be high during peak travel periods. By implementing improvements, the highway LOS will improve on some links and it will reduce the duration of congestion on all links. The Preferred Alternative and the Other Alternative reduce the hours of congestion along I-25 by 11 hours a day and by 14 hours a day along US 85 compared to the No-Action Alternative.

4.0 AFFECTED ENVIRONMENT

TABLE OF CONTENTS

<u>Section</u>	<u>Page</u>
<u>4.0 AFFECTED ENVIRONMENT</u>	1
<u>4.1 INTRODUCTION</u>	1
<u>4.2 SOCIOECONOMICS</u>	1
<u>4.2.1 Demographics</u>	2
<u>4.2.2 Environmental Justice</u>	3
<u>4.2.3 Lifestyle</u>	6
<u>4.2.4 Neighborhoods</u>	6
<u>4.2.5 Economics</u>	8
<u>4.2.6 Development</u>	9
<u>4.2.7 Recreation</u>	10
<u>4.2.8 Land Use and Zoning</u>	16
<u>4.2.9 Applicable Transportation Plans</u>	22
<u>4.3 PHYSICAL ENVIRONMENT</u>	23
<u>4.3.1 Air Quality</u>	23
<u>4.3.2 Water Quality and Quantity</u>	26
<u>4.3.3 Vegetation</u>	30
<u>4.3.4 Wetlands</u>	32
<u>4.3.5 Geology</u>	39
<u>4.3.6 Wildlife</u>	48
<u>4.3.7 Wild and Scenic Rivers</u>	60
<u>4.3.8 Floodplains</u>	60
<u>4.3.9 Threatened, Endangered, and Other Special-Status Species</u>	63
<u>4.3.10 Historical Resources</u>	72
<u>4.3.11 Archaeological Resources</u>	78
<u>4.3.12 Paleontological Resources</u>	80
<u>4.3.13 Prime and Unique Farmlands</u>	81
<u>4.3.14 Noise</u>	82
<u>4.3.15 Visual Character</u>	83
<u>4.3.16 Hazardous Waste Sites</u>	88

4.1 INTRODUCTION

Information discussed in this chapter has been collected from several sources, including, but not limited to, the following:

- 1990 US Census Data
- *Douglas County Master Plan*, 1997
- *Douglas County Parks, Trails and Open Space Master Plan*, 1998
- *Douglas County 2015 Transportation Plan*
- *Douglas County Master Plan Land Use Map*, September 2000
- *Douglas County Zone District Map*, April 2000
- *Douglas County Population and Development Report*, 1999
- Colorado Department of Labor and Employment, December 1999
- *I-25 and US 85 Environmental Surveys and Studies*, Sugnet & Assoc, 1998
- *Castle Rock Town Wide Transportation Plan*, 1994
- *State Highway 85 Environmental Assessment: C-470 to I-25 at Castle Rock*, 1994
- *Colorado State Parks: Chatfield Web Site*, 2000
- *Town of Castle Rock Generalized Zoning Map*, October 2000
- *Chatfield Reservoir Clean Lakes Study*, 1984
- *Historic Resources Technical Report*, May 2000

This chapter discusses the existing social, economic, and physical environment of the I-25 Corridor and US 85 Corridor. The project limits along I-25 are from C-470 to Douglas Lane and along US 85 from C-470 to Meadows Parkway.

4.2 SOCIOECONOMICS

Socioeconomics information was obtained from the *Douglas County Population and Development Report*, 1999, which provides current and forecasted population estimates and income. Information from the US Census Bureau and the *Douglas County Master Plan*, 1997 provided supplemental data.

Douglas County has had substantial population growth and development during the past 20 years, and has had the

distinction of being the fastest growing county in the United States. In the late 1970s, Douglas County, including Castle Rock and the project corridors, was a rural county with approximately 12,000 residents. In 1998 Douglas County had a population of more than 150,000 and the second highest per capita and median family income of all 63 counties in Colorado.

For additional information on socioeconomics, see the *Socioeconomic Technical Memorandum South I-25 Corridor and US 85 Corridor*, May 2000, amended November 2000, in the Technical Reports Volume of the *South I-25 Corridor and US 85 Corridor FEIS*.

4.2.1 Demographics

According to figures from the *Douglas County Population and Development Report*, 1999, the county's population was estimated at 221,774 for the low-growth scenario and 248,184 for the moderate-growth scenario in the year 2005. The two growth scenarios provide the envelope for the projected growth. Table 4.1 shows the projected growth rate for the county from 2005 to 2020. The 2005 population estimates represent a 260 percent increase for the low-growth scenario and a 304 percent increase for the moderate-growth scenario over the 1990 census, projecting Douglas County to be one of the nation's fastest growing counties during that period.

Table 4.1
Douglas County Population Projections, 2005-2020

	2005	2010	2015	2020
Douglas County Low-Growth Scenario	221,774	271,967	318,688	356,716
Douglas County Moderate-Growth Scenario	248,184	309,528	354,683	385,685

Source: Douglas County Population and Development Report, 2000

In 2010 there is a projected population increase from the year 2005 of an additional 23 percent for the low-growth scenario and an additional 25 percent for the moderate-growth scenario. In 2020 there is projected population increase from the year 2010 of an additional 31 percent for the low-growth scenario and an additional 25 percent for the moderate-growth scenario.

The Town of Castle Rock has a current population of 18,000, based on town figures from March 1999. Table 4.2 shows the 1999 average labor force in Douglas County.

Table 4.2
Douglas County Labor Force Data, 1999 Average
(Not Seasonally Adjusted)

	Total Labor Force	Total Employment	Number Unemployed	Percent Unemployed
Douglas County	85,174	83,914	1,260	1.5

Source: Colorado Department of Labor and Employment, 2000

The median age of the Douglas County population on January 1, 1997, was 33.2 years, with 5.7 percent of the population being 60 years and older, and 18.3 percent being under 10 years and under.

4.2.2 Environmental Justice

In February 1994 President Clinton issued Executive Order 12898 requiring federal agencies to incorporate consideration of environmental justice into the National Environmental Policy Act (NEPA) evaluation process. The purpose of the order is to ensure that minority communities and low-income communities do not suffer a disproportionate share of adverse environmental impacts resulting from federal actions that are not offset by project benefits. The order also requires that these parties have had adequate access to and opportunity for participation in project planning.

4.2.2.1 Minority Populations

The United States Department of Transportation (USDOT) defines minorities in its guidelines on implementation of the Environmental Justice Order, to be persons who are (1) Black (a person having origins in any of the black racial groups of Africa); (2) Hispanic (a person of Mexican, Puerto Rican, Cuban, Central or South American, or other Spanish culture or origin, regardless of race); (3) Asian American (a person having origins in any of the original peoples of the Far East, Southeast Asia, the Indian subcontinent, or the Pacific Islands); or (4) American Indian and Alaskan Native (a person having origins in any of the original people of North America and who maintains cultural identification through tribal affiliation or community recognition).

In 1990 the US Census determined the racial composition of Douglas County. As shown on Table 4.3, minority populations represent a much smaller percentage of the county population than is typical for the State of Colorado. Colorado's minorities represent 19.1 percent of the state's population. In contrast, minorities comprise only 5.2 percent of the Douglas County population.

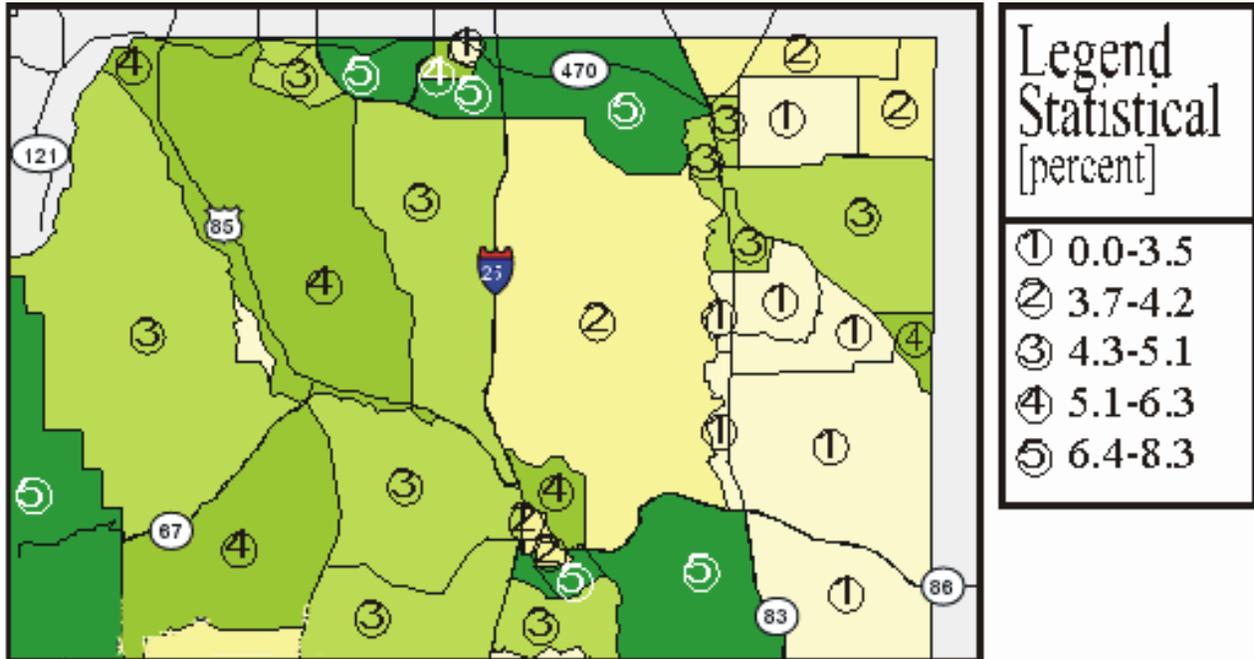
Table 4.3
Minority Populations, 1990

Minority	Douglas County Total Population	Douglas County Percent of Total Population	Colorado Total Population	Colorado Percent of Total Population
Hispanic	1,460	2.4	244,264	7.4
Black	407	0.67	131,223	4.0
American Indian	267	0.44	28,544	0.87
Asian/Pacific Islander	508	0.84	59,411	1.8
Other	527	0.88	165,778	5.0
Total Minority	3,169	5.2	629,220	19.1
Total Population	60,391	100	3,294,394	100
<i>Source: 1990 US Census</i>				

Figure 4.1a and Figure 4.1b illustrate the distribution of minority and Hispanic populations within Douglas County. Due to Census data limitations, maps depicting the geographic distribution of total minority populations are not available. As Figure 4.1a and Figure 4.1b indicate, percentages of minorities tend to be slightly higher along C-470 and within the US 85 Corridor. The area is characterized by slightly higher concentrations of

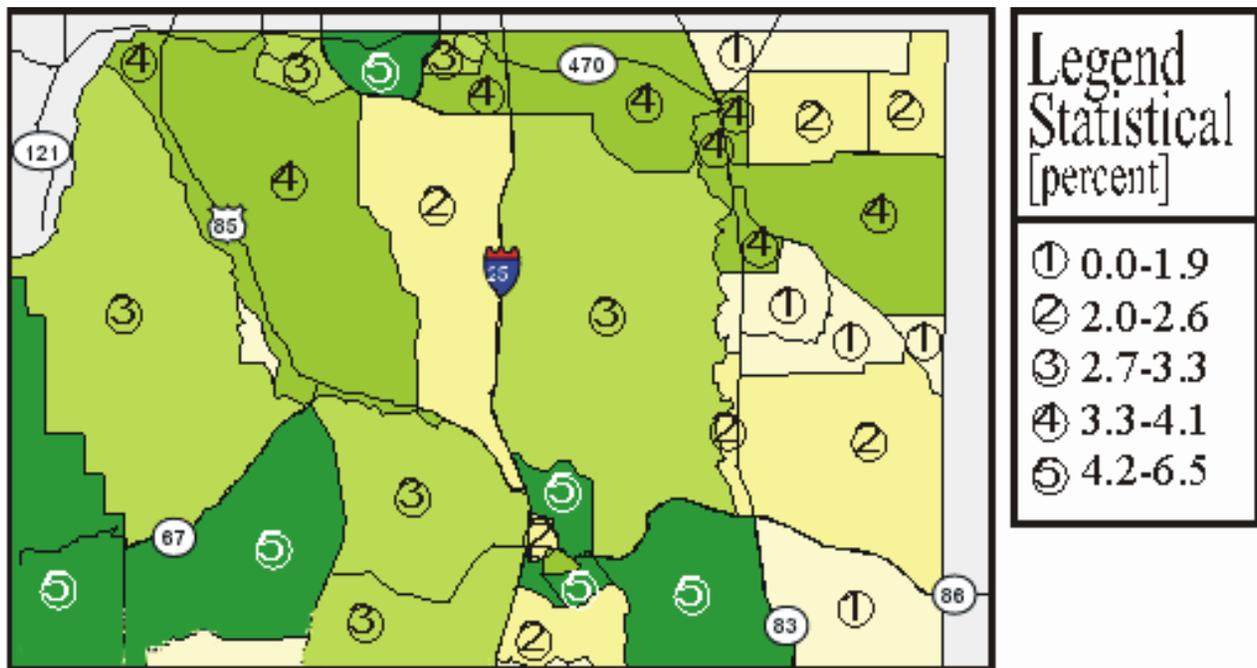
minority residents to the west of I-25 and slightly higher levels of Hispanics to the east.

Figure 4.1a
Douglas County Minority Population Distribution



Prepared with American Fact Finder
 source: 1990 US census

Figure 4.1b
Douglas County Hispanic Population Distribution



Prepared with American Fact Finder
 source: 1990 US census

4.2.2.2 Income

Per capita income in Douglas County has more than doubled since the early 1980s. Table 4.4 shows the increase in the per capita income for Douglas County over the last several years.

Table 4.4
Douglas County Per Capita Income

Year	Income (in current dollars)
1980	14,140
1985	22,427
1990	24,740
1991	26,084
1992	26,847
1993	28,606
1994	30,067
1995	30,448
1996	32,076
1997	34,264

Source: State of Colorado, Demography Section

4.2.2.3 Low Income Populations

The USDOT draft guideline addressing the Environmental Justice Order defines low income as "...a person whose median household income is below the US Department of Health and Human Services (HHS) poverty guidelines." These guidelines provide a formula based on the number of persons in a household or family and their annual income. The US Census provides population data based on these guidelines.

According to the State of Colorado, 1997 Douglas County per capita income was \$34,264. This represents a 38 percent increase over the 1990 level of \$24,740. In comparison, the annual per capita income for the area has traditionally been characterized by high per capita income, and recent increases in population have corresponded with higher incomes.

The 2000 national poverty level, according to HHS, was reported to be \$17,050 per family. The median family income and per capita income for the residents of Douglas County was reported to be \$77,000 and \$34,264, respectively, by the Colorado Department of Labor and Employment in 1997. Table 4.5 provides the Douglas County poverty level as compared to the State of Colorado.

Table 4.5
Poverty Level

	Douglas County	Colorado
People of All Ages in Poverty	1,895	375,214
Percentage of Population in Poverty	3.1	11.3
<i>Source: 1990 US Census</i>		

Figure 4.1c illustrates the distribution of individuals living below poverty levels in 1990. Concentrations of people living in poverty are slightly higher along the US 85 Corridor and to the east of I-25. As Figure 4.1d illustrates, median incomes are highest to the west of I-25 and in areas along State Highway (SH) 83 in eastern portions of the county.

4.2.3 Lifestyle

Residents adjacent to I-25 between Lincoln Avenue and the Town of Castle Rock enjoy a semi-rural lifestyle. The only commercial development in this section is residential-supported (e.g., grocery stores and service stations). Homes are situated on large lots, with golf courses within short driving distance. Employment for residents in this area is primarily to the north in the Denver metropolitan area. Commuters going to and from the employment centers in the South East Business District (SEBD) and downtown Denver use I-25.

The Town of Castle Rock continues to maintain a small town ambiance while incorporating a growing low-density suburban fringe. Employment opportunities exist in the town in retail and in county government services. Castle Rock, the small communities along US 85, and residential areas along both corridors serve as bedroom communities for the Denver metropolitan region and to Colorado Springs to the south. Commuters use both I-25 and US 85 as their primary routes to work.

The east side of the US 85 Corridor is lined with large, open space areas and large ranches. The west side of the corridor has two communities, Sedalia and Louviers. US 85 parallels the Union Pacific Railroad and Burlington Northern Santa Fe Railroad. The west side of US 85 is paralleled by the Plum Creek floodplain that passes through a low-density developed area. The northern half of the US 85 Corridor is in close proximity to segments of strip commercial development and heavy industrial development.

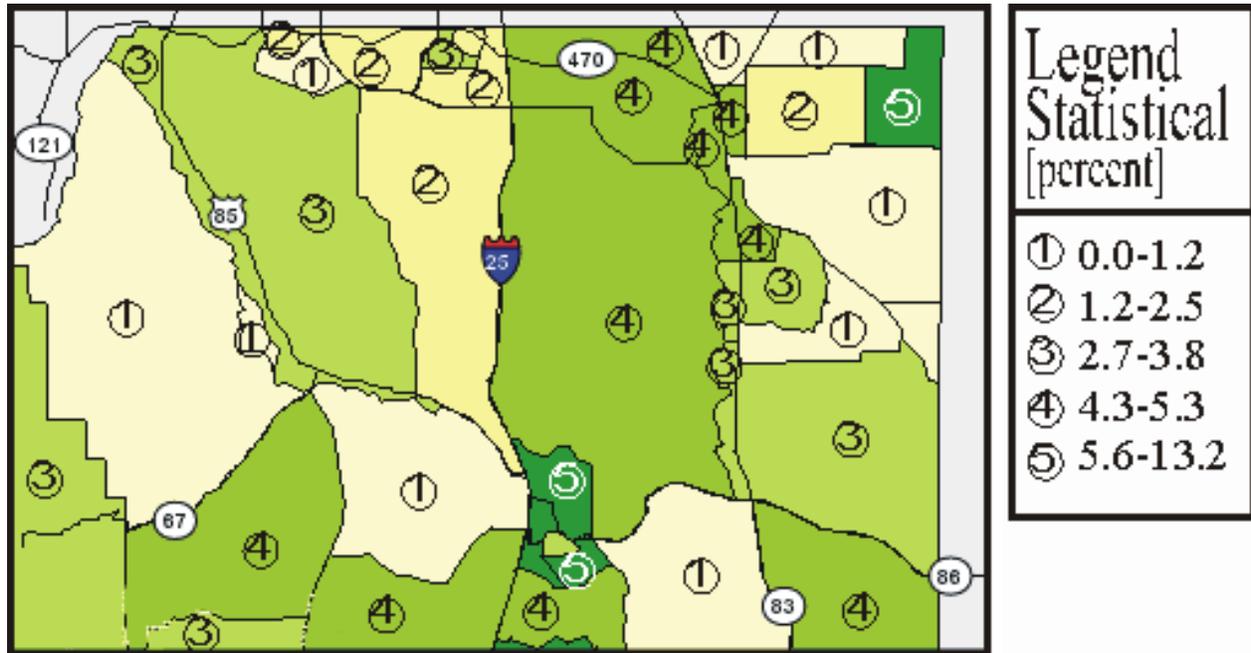
The Douglas County Master Plan states that no additional urban development (beyond what is already approved) is planned in the valley, west of US 85, within the 2010 timeframe because of the existing inventory of approved development, and the major cost to provide infrastructure and service to this area.

4.2.4 Neighborhoods

Distinct neighborhoods and/or subdivisions are located adjacent to I-25 and US 85. Each of these neighborhoods is confined to one side of the existing highway. There are no neighborhoods or subdivisions that are spilt by the highway.

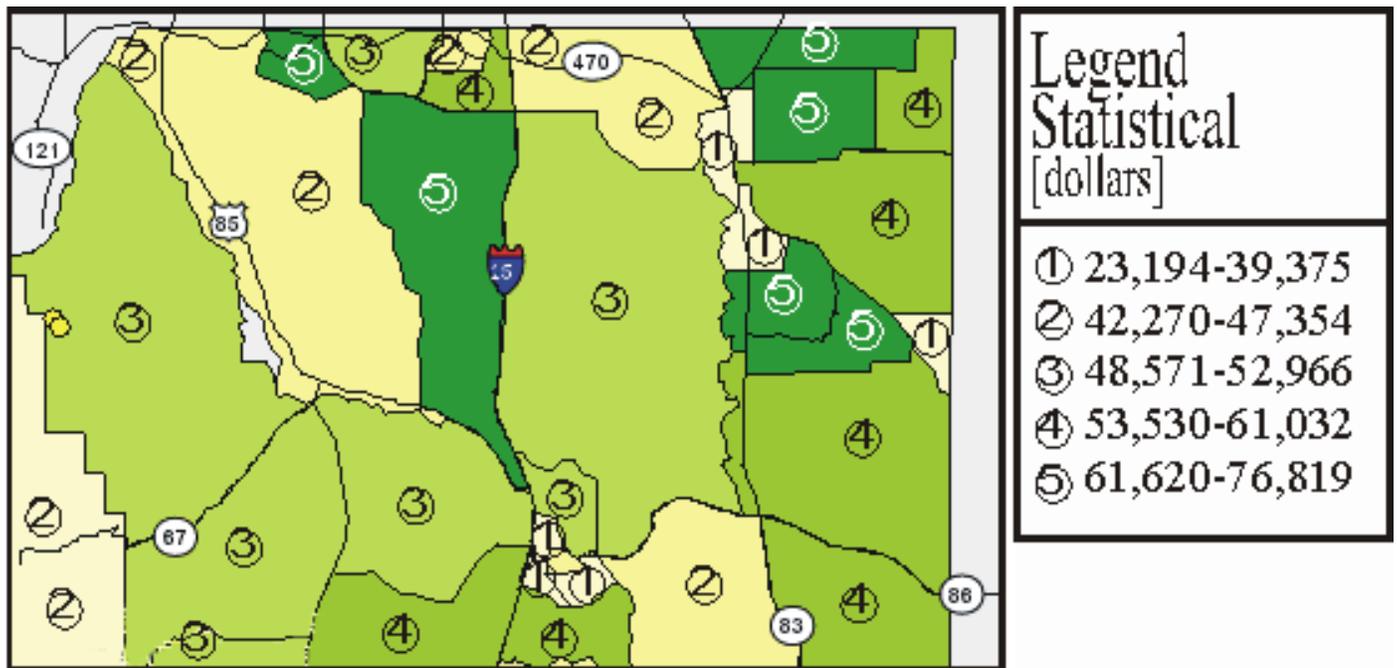
Along I-25, from the north to south, the following neighborhoods and municipalities currently exist: Surrey Ridge, Oak Hills, Castle Pines North, Castle Pines Villages, Happy Canyon, Silver Heights, Castle Rock, Yucca Hills, Twin Oaks and Bell Mountain Ranch. Along US 85, from the north to the south, the following neighborhoods and municipalities currently exist; Highlands Ranch, Chatfield Acres/Chatfield East, Louviers, and Sedalia. Table 4.6 displays information about these neighborhoods in terms of location and size.

Figure 4.1c
Douglas County Population Living Below Poverty Level



Prepared with American Fact Finder
source: 1990 US census

Figure 4.1d
Douglas County Median Income



Prepared with American Fact Finder
source: 1990 US census

Table 4.6
Neighborhoods and Municipalities along the I-25 Corridor and US 85 Corridor

Neighborhoods			
I-25 Neighborhoods			
Neighborhood Name	East or West Side of Highway	Number of Occupied Housing Units	Approximate Zoned Acreage
Surrey Ridge	West	162	408
Oak Hills	West	72	504
Castle Pines North	West	1216	1697
Castle Pines (Villages)	West	802	2673
Happy Canyon	East	166	504
Silver Heights	East	108	80
Castle Rock	East and West	7216	20,000
Yucca Hills	West	27	180
Twin Oaks	West	42	635
Bell Mountain Ranch	East	70	2040
US 85 Neighborhoods			
Name	East or West Side of Highway	Number of Occupied Housing Units	Approximate Zoned Acreage
Highlands Ranch	East	36,700	21,796
Chatfield Acres/Chatfield East	East	41/97	100/601
Louviers	West	106	74
Sedalia	West	50	NA
<i>Source: Douglas County Population and Development Report, 2000</i>			

Many of these neighborhoods are considered rural or large lot neighborhoods, and have a significantly lower density than neighborhoods such as Highlands Ranch. These neighborhoods include Surrey Ridge, Oak Hills, Castle Pines Villages, Happy Canyon, Yucca Hills, Twin Oaks, Bell Mountain Ranch, and Chatfield East.

For planning purposes, Douglas County has identified incorporated towns and municipalities, primary urban areas and subareas of growth, defined with boundaries. Within the confines of this project, only the Town of Castle Rock is considered a municipality and Highlands Ranch is part of the Primary Urban Area. Subareas in the project include the Chatfield Valley Subarea, High Plateau Subarea, the Castle Pines Subarea, West Plum Creek Subarea and the Cherry Valley Subarea. The specific neighborhoods in these subareas that are adjacent to either I-25 or US 85 are included in the table above.

4.2.5 Economics

Douglas County is strategically located between Colorado's two largest cities, Denver and Colorado Springs. The county actively plans for, and pursues, well-managed, quality commercial development to provide local employment opportunities and to diversify its tax base. The county's strength as the centerpiece of the Denver/Colorado Springs Development Corridor comes from a blend of quality lifestyle and business environment.

4.2.6 Development

Douglas County continues to undergo rapid growth in both population and construction. Total building permit value rose 18.5 percent in 1998, with commercial construction value up a phenomenal 59 percent. New housing

starts were down slightly (2 percent) from the 1997 all-time high, attributable to a high number of apartment starts in 1997. Unincorporated Douglas County's single-family unit permits were up nearly 8 percent in 1998.

Building trends have been consistent for many years in Douglas County. The total number of residences by the end of 1999 totaled 60,502, an 11.2 percent increase over 1998. Since 1993, Douglas County has experienced housing growth rates more than 10 percent every year. Over 21 hectares (52 acres) of new commercial construction began in unincorporated Douglas County in 1999. Employment in the County has increased 268 percent since 1990.

To serve the growing population, retail growth has been explosive, with more than 278,710 square meters (3 million square feet) built in recent years. Just north of the I-25 Corridor, Park Meadows Town Center opened in Douglas County in August 1996, bringing scores of new retail shops to the area. Surrounding the mall, numerous complementary stores have opened. In 1997 Prime Outlets along I-25 at the Meadow/Founders Interchange completed a 9,290 square-meter (100,000 square-foot) expansion.

The county continues to seek quality commercial development. 1996 was a record year for commercial development, and included the start of the Merrill Lynch business campus, the 139,350 square-meter (1.5 million-square-foot) Park Meadows Town Center, and adjacent retail power centers. 1997 saw continued expansion of the Park Meadows Town Center and power centers, as well as office development along the northern I-25 Corridor.

Commercial development for 1998 focused on the Meridian International Business Center, with the new AT&T Cable Services, American Family Insurance headquarters, and First Data Corporation headquarters. In total, more than 185,810 square meters (2 million square feet) of commercial development occurred in the county in 1998. With commercial development proceeding, in 1999 the SEBD emphasized the development of 1,500 dwelling units for local employees earning less than the county's median family income level.

The County is actively planning to preserve quality of life through planning and zoning. The preservation of open space is a critical component in maintaining quality of life and quality of environment. The county has been aggressive in purchasing open space and conservation easements, particularly along the I-25 Corridor and the US 85 Corridor. The county has a goal of protecting areas of visual significance and of wildlife habitat to preserve the quality of life for the residents and to protect the image and identity of Douglas County. Several studies have been conducted on this issue, including the *High Plateau Conservation Area Study and the Douglas County Open Space Plan*. These plans will aid in managing of growth and development. Large areas recently purchased or acquired in the program include the Cherokee Ranch along US 85 and the Greenland Ranch near Larkspur. Additionally, 3,320 hectares (8,200 acres) south of the developed portion of Highlands Ranch was planned by Mission Viejo for open space and recreation at the inception of the Highlands Ranch Development. The county supports planning for Open Space Conservation Area (OSCA) to ensure its preservation.

4.2.7 Recreation

The rapid population growth in Douglas County creates an increasing demand for recreational facilities, while at the same time depleting the available land for recreation areas. To maintain the area's natural environment, local, state, and federal agencies, as well as community volunteers and organizations, are working together to retain recreation areas, trails, and open space throughout the county.

I-25 and US 85, between C-470 and Castle Rock, provide access to many popular recreation areas adjacent to and

beyond the project area. These recreation areas include Pike National Forest, Chatfield State Park, Spring Gulch Equestrian Facility, Roxborough State Park, and Daniel’s Park as well as other county, municipal, and local parks and trails. In addition, several public golf courses are close to the project area. These recreation areas are shown on Figure 4.2a and Figure 4.2b. Open space properties exist within the project area, but are not open to public recreation. For the purpose of this section, only trails and recreation areas adjacent to, or within the project area, are reviewed in detail; they are listed in Table 4.7 and illustrated in Figure 4.2c and Figure 4.2d.

For additional information on recreation, see the *Recreation Technical Report*, May 2000, amended November 2000, in the Technical Reports Volume of the *South I-25 Corridor and US 85 Corridor FEIS*.

**Table 4.7
Trails and Recreation Areas Within or Adjacent to the Project Area**

Resource Description	Corridor	Property Type
Castle Rock Baseball Fields and Park Complex	I-25	Recreation Area
East Plum Creek Trail	I-25	Trail
Front Street Trail	I-25	Trail
Centennial Bike Trail	I-25/US 85	Trail
Chatfield State Park	US 85	Recreation Area
High Line Canal Trail	US 85	Trail
Spring Gulch Equestrian Facility	US 85	Recreation Area
Chatfield East Park	US 85	Recreation Area

4.2.7.1 Hiking/Bike Trails

Hiking and biking are popular activities in Douglas County. Governmental agencies, private citizens, and local organizations have attempted to preserve and improve existing trails, as well as plan for future trails in the area. The *Douglas County Parks, Trails and Open Space Master Plan*, 1998 provides a design for future interconnected trails throughout the project area.

In addition, other agencies and organizations including Chatfield Basin Conservation Network, Colorado State Parks, US Army Corp of Engineers (USACE), Highlands Ranch Metropolitan District, Denver Water Board, and South Suburban Park and Recreation District have set similar goals to improve existing trails and increase the number of interconnecting trails within the area.

**Figure 4.2a
Recreation Resources along the I-25 Corridor**



Highland Heritage Regional Park



Legend:

- Public Golf Course
- Local Park
- Regional Park
- Recreational Trail

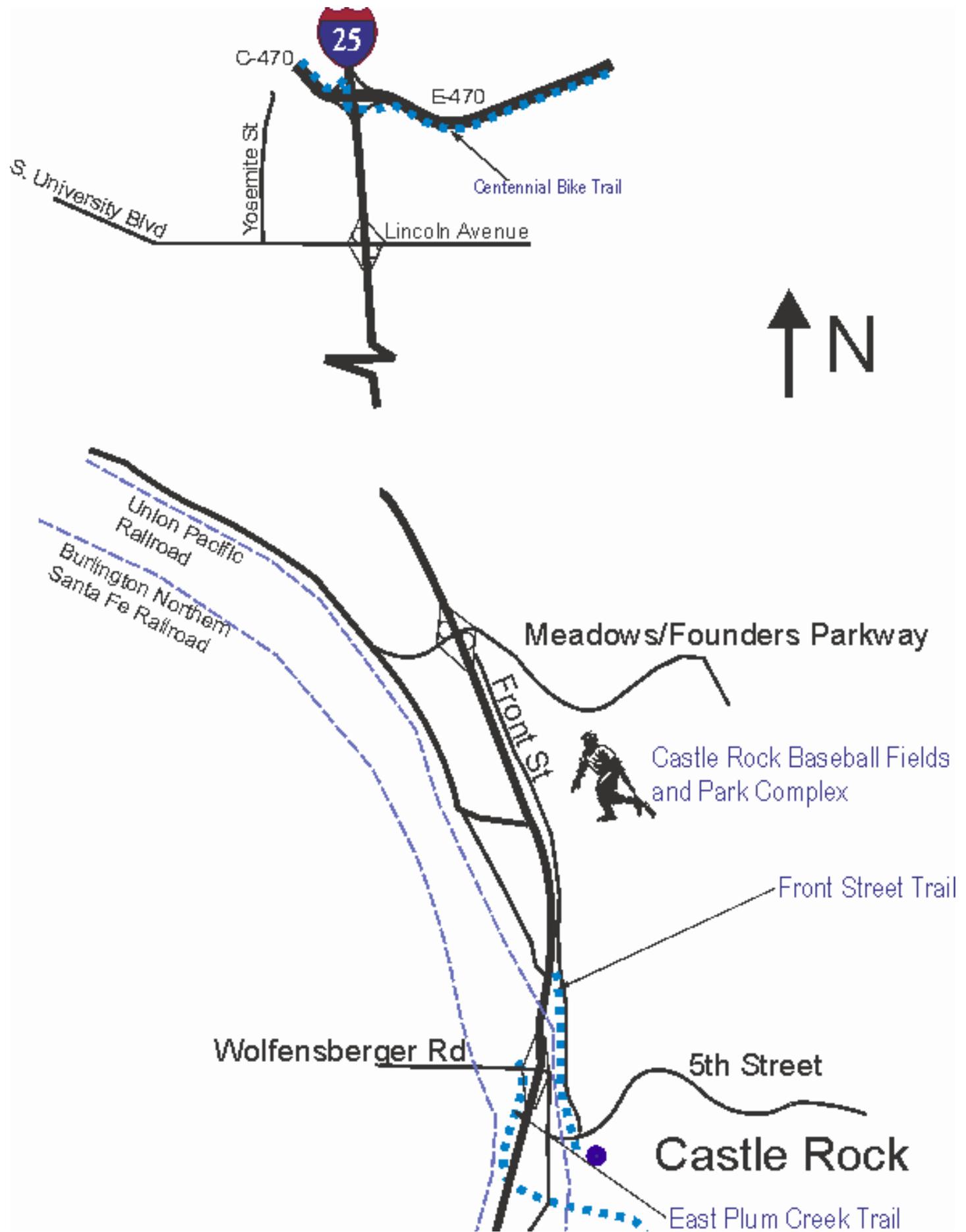
Source:
Douglas County Assessor's Maps
and Pierson Graphics Corp. 1998

Figure 4.2b
Recreation Resources along the US 85 Corridor



Source:
 Douglas County Assessor's Maps
 and Pierson Graphics Corp. 1998

Figure 4.2c
Recreation Resources within the I-25 Project Area



Source:
Douglas County Assessor's Maps,
Douglas County 1998, and
Sugnet and Associates 1998

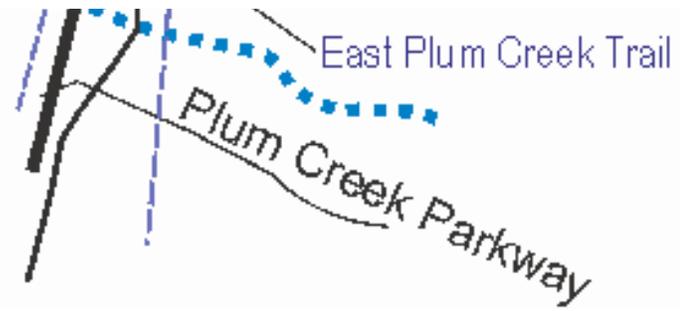
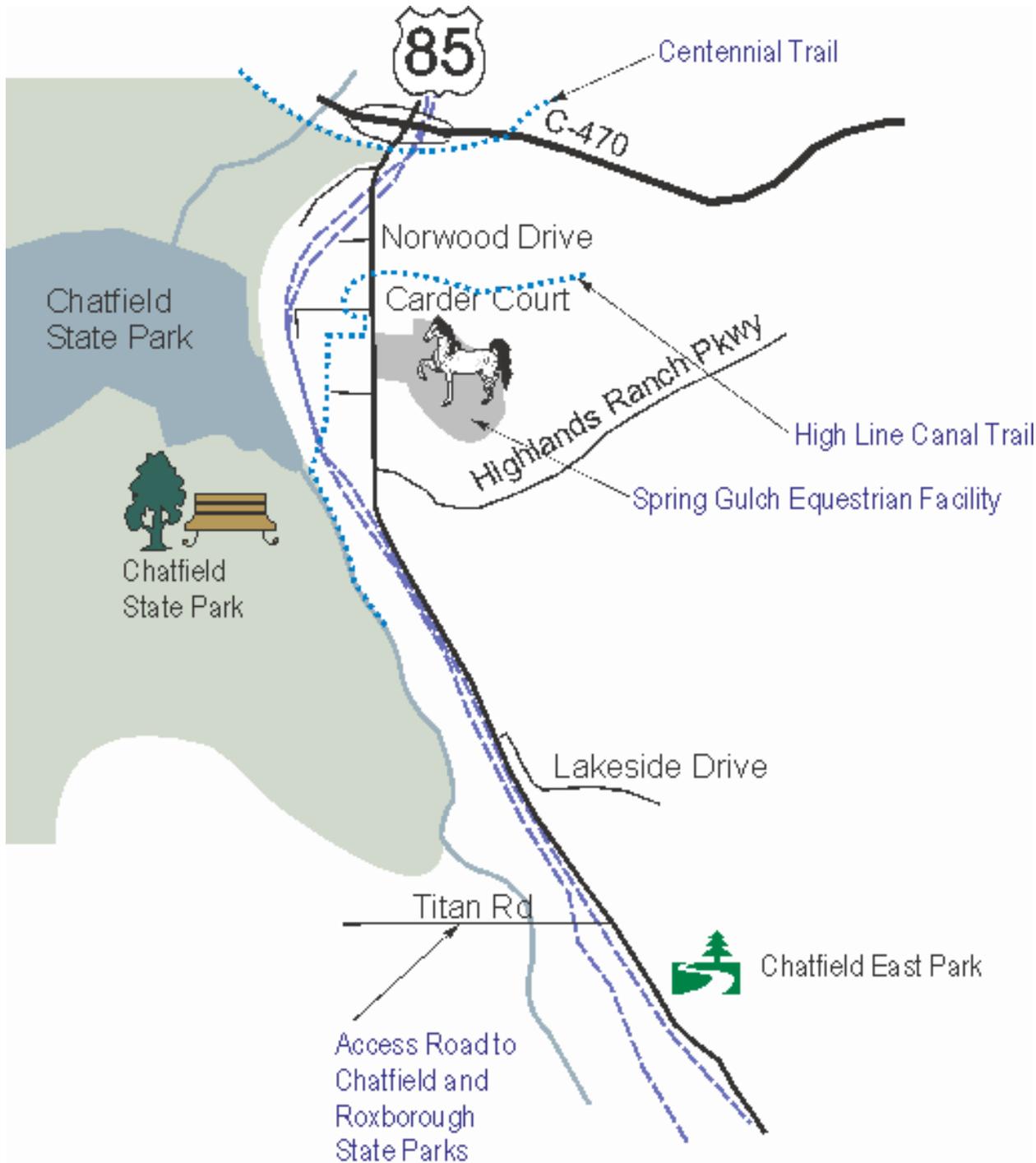
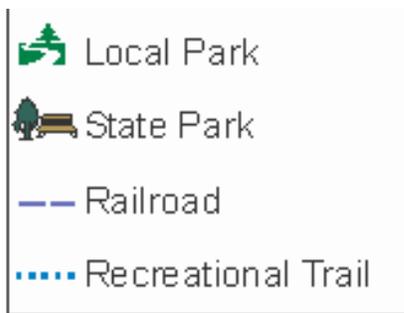


Figure 4.2d
Recreation Resources within the US 85 Project Area



Legend:





(resources not to scale)

Source:
Douglas County Assessor's Maps
and Pierson Graphics Corp. 1998

Currently, four maintained trails exist within the project area: East Plum Creek Trail, Front Street Trail, Centennial Bike Trail, and High Line Canal Trail.

- East Plum Creek Trail in Castle Rock is a multi-use, paved trail extending south from Wolfensberger Road for approximately 0.9 kilometers (0.6 mile) along East Plum Creek on the west side of I-25. The trail crosses beneath I-25 at Third Street and continues southeast to the Douglas County Fairgrounds. Future Douglas County plans will extend the trail to the west through Plum Creek Valley to Titan Road.
- Front Street Trail in Castle Rock is a multi-use trail extending along the west side of Front Street for approximately 1.9 kilometers (1.2 miles). A short segment of the trail, directly south of the Liggett Road overpass on I-25, is within the project area.
- Centennial Bike Trail is paved and publicly owned. It is a multi-use trail extending approximately 40 kilometers (25 miles) along C-470 from Belleview Avenue to near the Town of Parker. The trail crosses US 85 at-grade immediately south of the US 85/C-470 Interchange. A spur of the trail also extends southwest from the main trail, ending on the east side of US 85 at approximately milepost (MP) 200. The Centennial Bike Trail also crosses the northern terminus of the I-25 Corridor at C-470.
- High Line Canal Trail is approximately 120 kilometers (75 miles) long, and runs alongside the High Line Canal. It includes both paved and unpaved segments and is used for walking, running, biking, and horseback riding. The trail crosses US 85 at-grade approximately 1.1 kilometers (0.7 mile) south of C-470 (approximately MP 199.5.) The trail begins approximately 1.6 kilometers (1.0 mile) south of Highlands Ranch Parkway, extending to I-70 and Tower Road.

In addition to the above four trails, Highlands Ranch Metro Districts, Douglas County, Chatfield State Park, Denver Water Department, and South Suburban Park and Recreation District maintain a series of trails in Douglas County that are outside the US 85 right-of-way (ROW). These groups and the Chatfield Basin Conservation Network are in the process of developing a trail plan that includes existing trail locations and identifies new trails and trail connections.

4.2.7.2 Recreation Areas

Four recreation areas are adjacent to or within the project area: Castle Rock Baseball Fields and Park Complex, Chatfield State Park, Spring Gulch Equestrian Facility, and Chatfield East Park. Each area offers unique

recreational activities to the general public.

- Castle Rock Baseball Fields and Park Complex, located on the east side of I-25 in Castle Rock, includes approximately 17.4 hectares (43.0 acres). The park is currently under construction and is adjacent to a future middle school site. When completed, the park will have four baseball fields, two inline hockey rinks, picnic tables with shelters, a small amphitheater, two playgrounds, a concession stand, and restrooms. The park is owned and maintained by the Town of Castle Rock and is designed for public use.
- Chatfield State Park is located on the west side of US 85. One of two entrances into the park is through Titan Road via US 85. The recreation area includes 2,853 hectares (7,050 acres), of which 2,266 hectares (5,600 acres) is ground surface and 586.8 hectares (1,450 acres) is water surface. Chatfield State Park offers a wide range of recreation opportunities including horseback riding, hiking, biking, camping, picnicking, wildlife viewing, water sports, fishing, and an area specifically designed for flying model airplanes and launching hot air balloons. Nearly 1.5 million people visit the park annually.
- Spring Gulch Equestrian Facility encompasses 42.5 hectares (105.0 acres), and is operated and maintained by Chatfield State Park through a lease with the USACE. In 1999, 8,565 visitors used the facility. The area is open to the public for equestrian training and competition-related activities. Access to the facility is from US 85.
- Chatfield East Park is located on the east side of US 85 at MP 196. The property was dedicated to the Douglas County Commissioners in 1978 by the developers of Chatfield East Subdivision. The property includes approximately 19.8 hectares (49.0 acres). A small playground and a horse arena are on the easternmost part of the property. The remainder of the property is open and undeveloped.

4.2.8 Land Use and Zoning

The study area is undergoing abundant growth and development. Rapid economic development and land use changes can accelerate the need for transportation improvements. The following discussion focuses on the existing conditions for land use and zoning. Land use is defined as how the property is used today. Figure 4.3a and Figure 4.3b show existing land uses in the I-25 Corridor and US 85 Corridor, respectively. This information was taken from the *Douglas County Master Plan Land Use Map*, September 2000. Zoning reflects the particular development purpose that has been approved by the appropriate governmental entity (Douglas County, Town of Castle Rock, or City of Lone Tree). Zoning information was taken from the *Douglas County Zone District Map*, April 2000, and the *Town of Castle Rock Generalized Zoning Map*, October 2000. Denver Regional Council of Governments (DRCOG) developed a comprehensive guide for future development that combines the separate plans for growth, development, transportation, and water quality for the eight-county region served by DRCOG into a single integrated plan. The implementation strategies and how they may affect future land use in this project is discussed in Section 5.3.2.6, *Land Use and Zoning Impacts*. Figure 4.3c and Figure 4.3d show the zoning in the I-25 Corridor and US 85 Corridor, respectively.

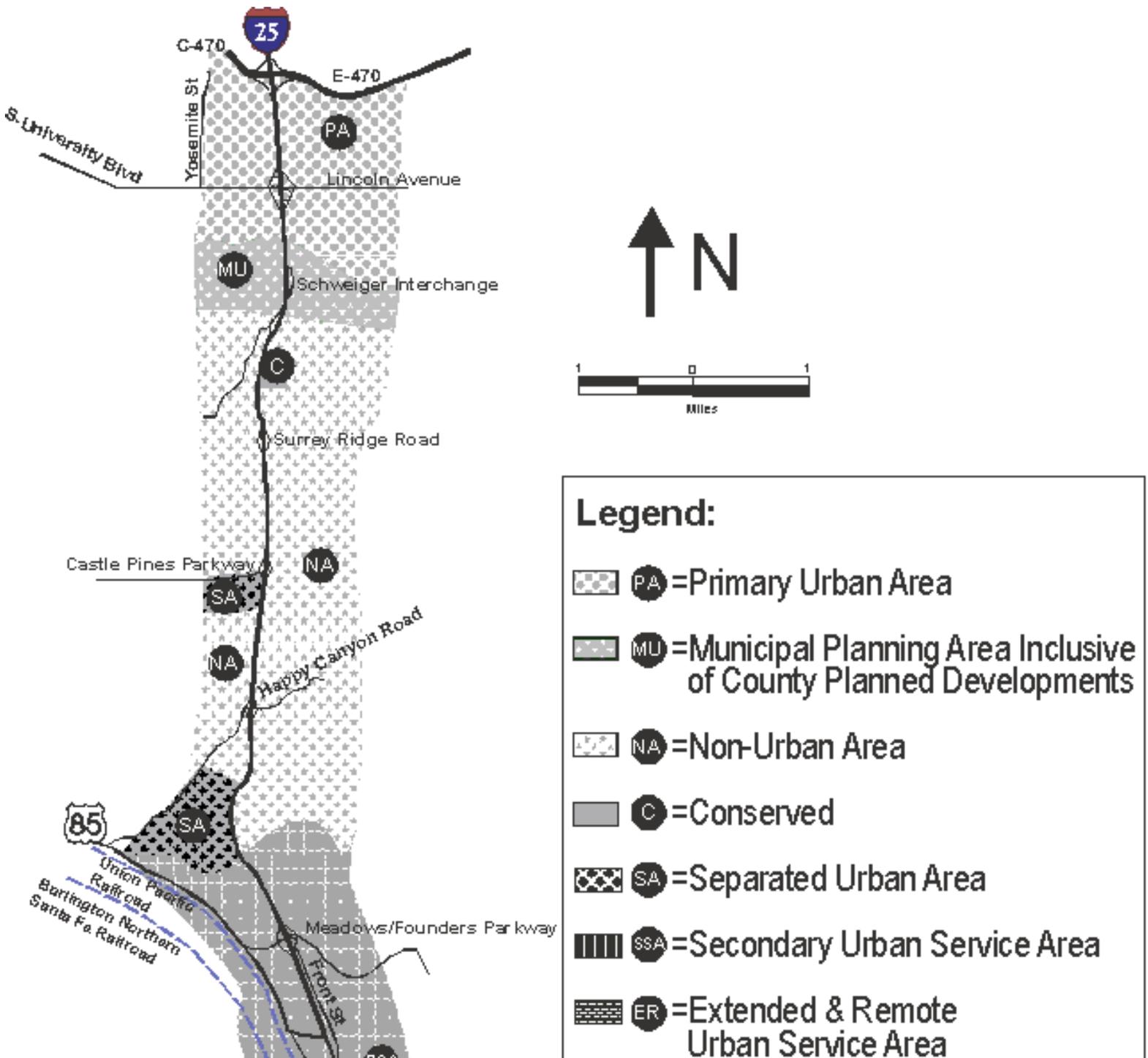
4.2.8.1 I-25 Corridor Land Use and Zoning

Land Use

At the northern limit of the project near Lincoln Avenue, land use is defined as primary urban area; this includes

residential in the vicinity of Yosemite, office parks in Meridian, and the currently undeveloped land in Rampart Range. Land use surrounding the Schweiger Interchange is classified as municipal planning area inclusive of county planned developments. Further south along I-25, in the vicinity of Surrey Ridge Road and Castle Pines Parkway, the land use definition changes to predominantly non-urban areas (primarily large ranches or large single-family lots), with some separated urban area (primarily residential). Through Castle Rock, the land use is primary urban service area. South of Castle Rock, the land use reverts to primarily urban area. Heading south, land uses quickly start to thin out from the urban nature of Castle Rock and move more into a rural theme where they are categorized by Douglas County as extended and remote urban service areas, secondary urban service areas, and non-urban areas.

Figure 4.3a
Land Use along the I-25 Corridor



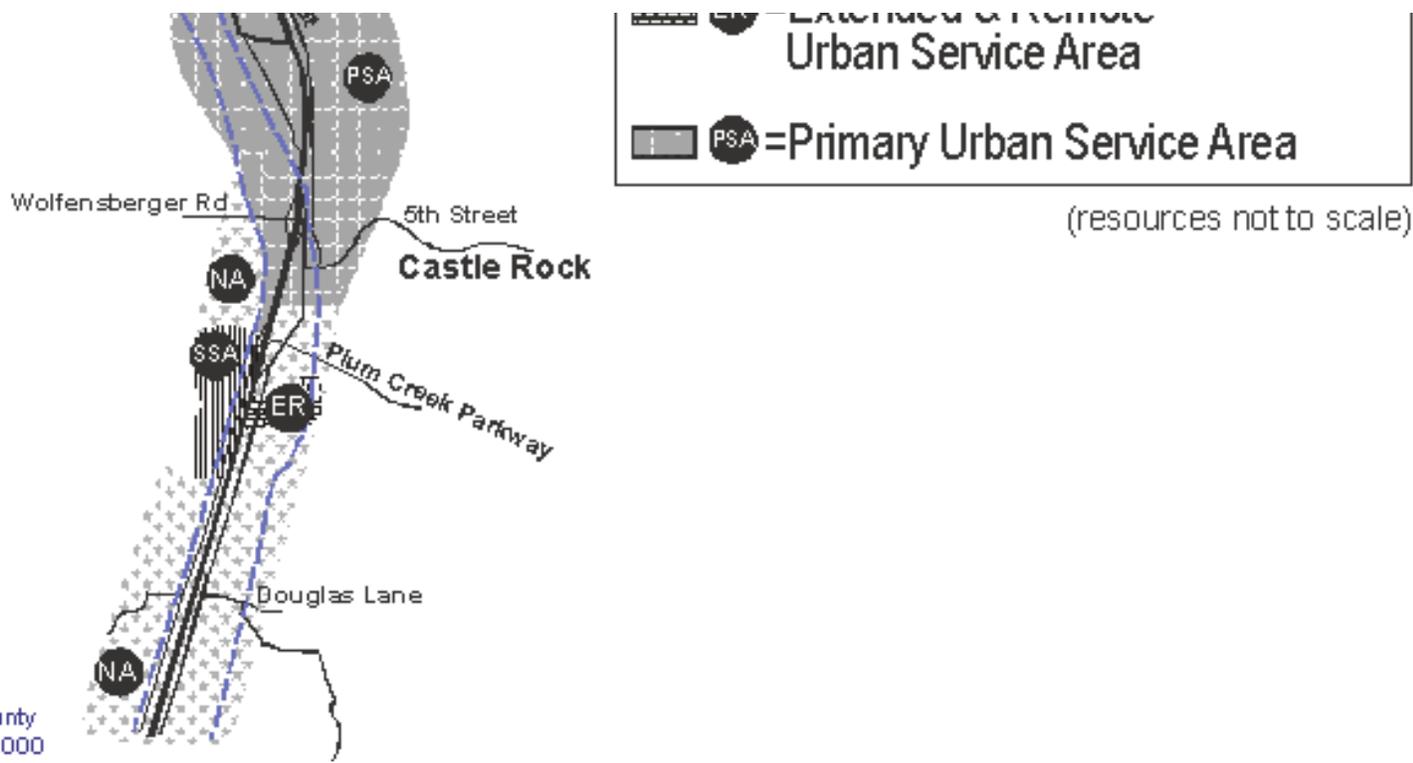
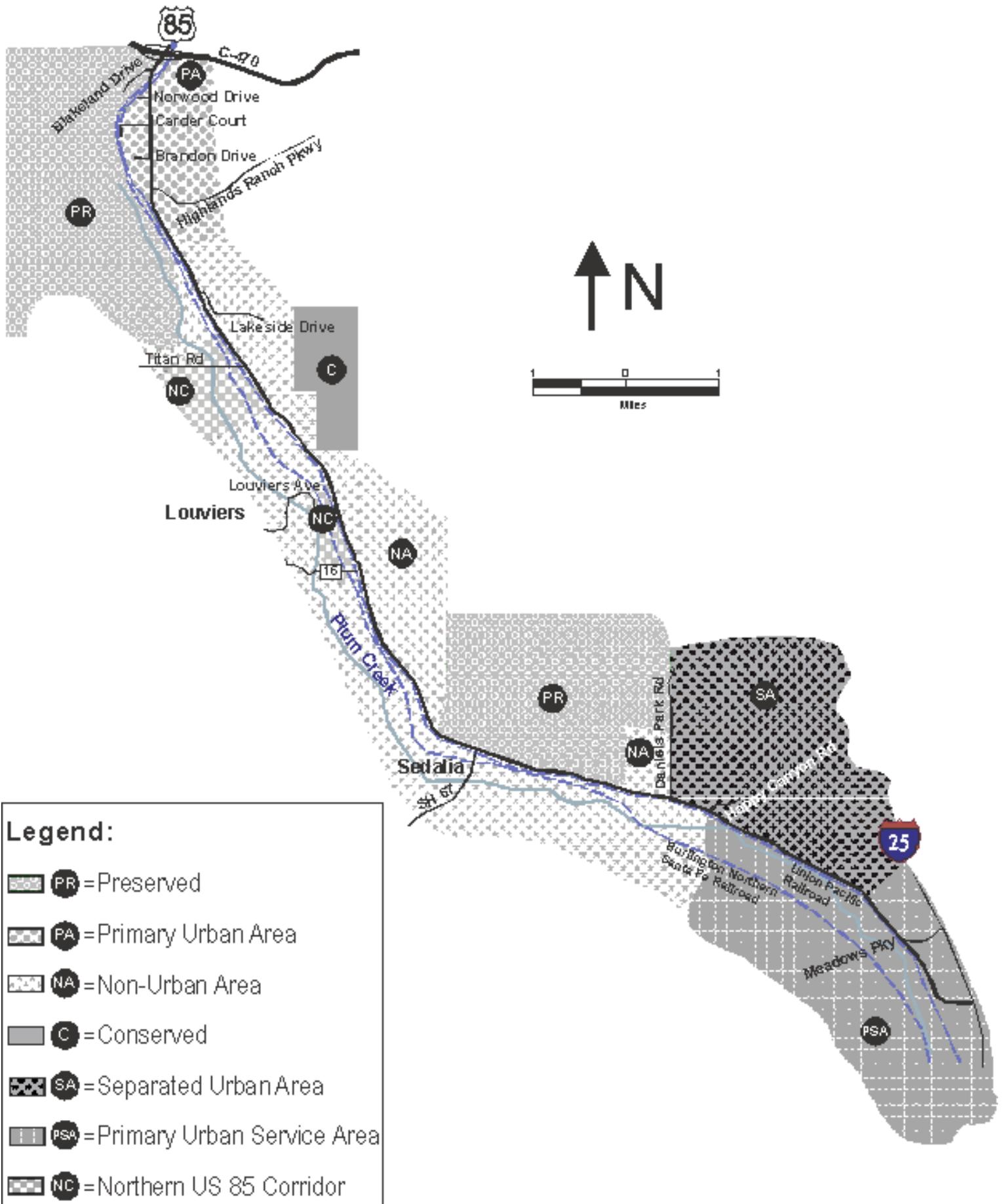
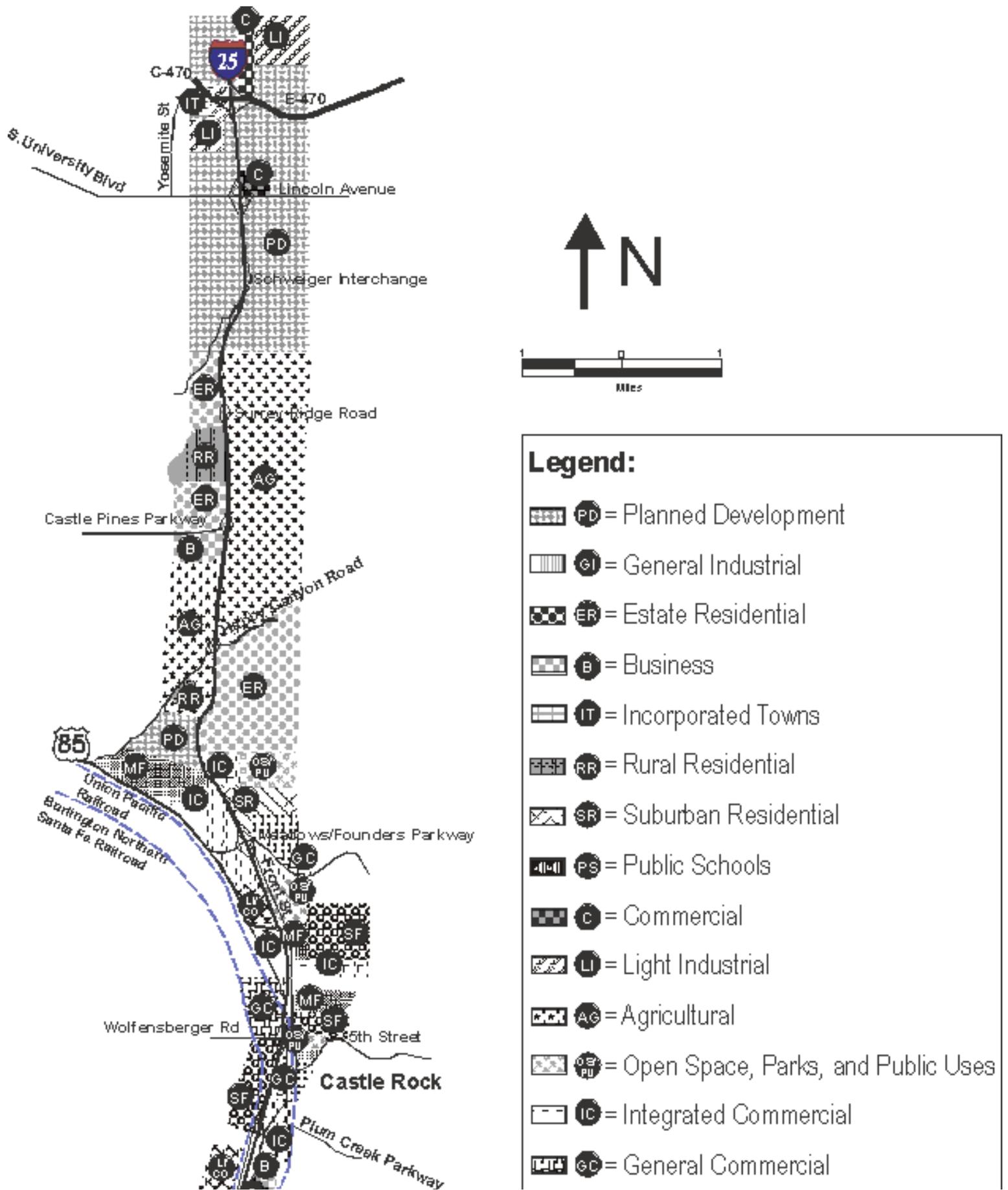


Figure 4.3b
Land Use along the US 85 Corridor

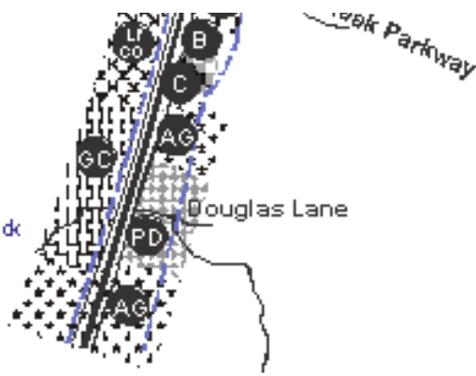


Source: (resources not to scale)
 Douglas County
 September 2000

Figure 4.3c
Zoning along the I-25 Corridor



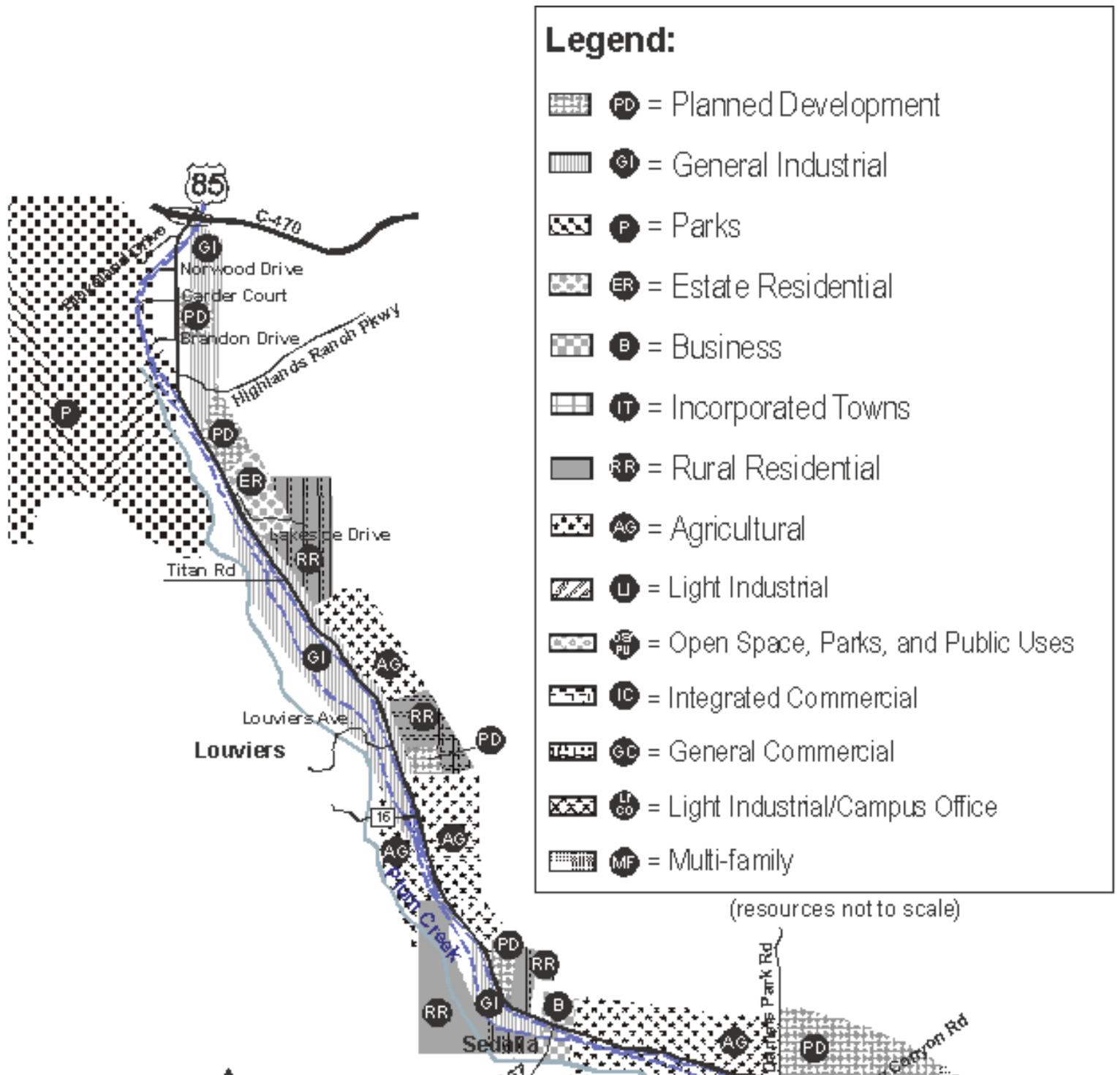
Source:
Douglas County
Town of Castle Rock
October 2000



- GC = General Commercial
- LI/CO = Light Industrial/Campus Office
- MF = Multi-family
- SF = Single-family

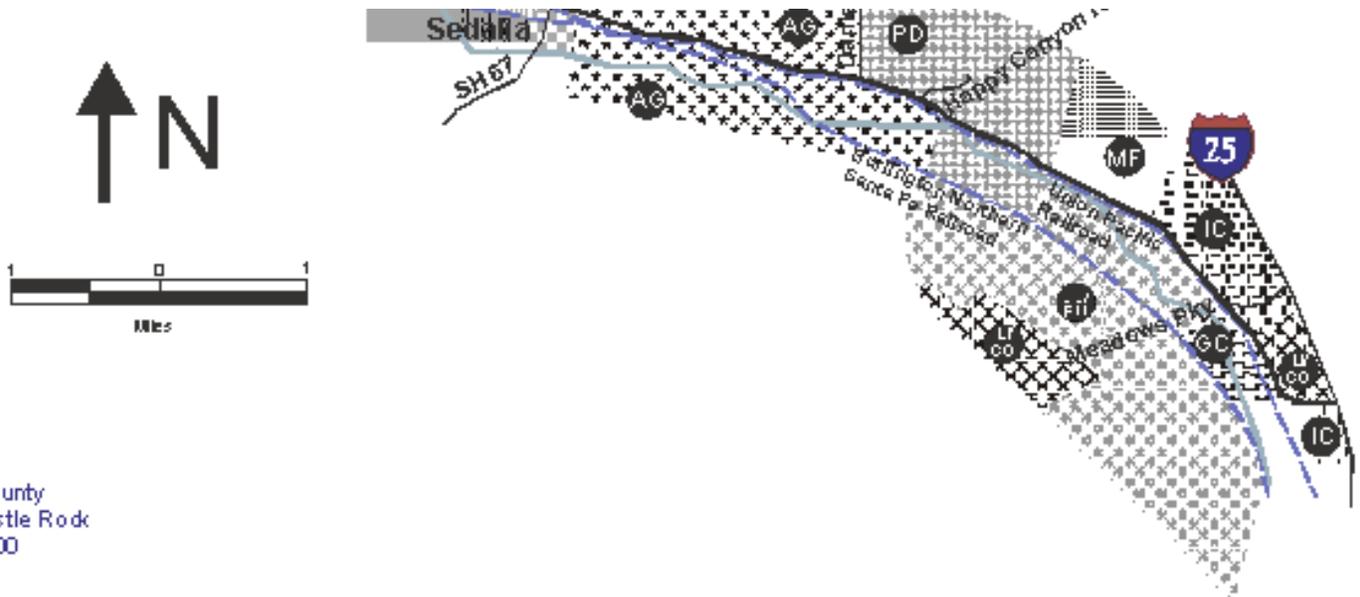
(resources not to scale)

Figure 4.3d
Zoning along the US 85 Corridor



- Legend:**
- PD = Planned Development
 - GI = General Industrial
 - P = Parks
 - ER = Estate Residential
 - B = Business
 - IT = Incorporated Towns
 - RR = Rural Residential
 - AG = Agricultural
 - LI = Light Industrial
 - OS/PU = Open Space, Parks, and Public Uses
 - IC = Integrated Commercial
 - GC = General Commercial
 - LI/CO = Light Industrial/Campus Office
 - MF = Multi-family

(resources not to scale)



Source:
Douglas County
Town of Castle Rock
October 2000

Zoning

The area surrounding the C-470/I-25 Interchange consists of various zoning such as commercial, light industrial, incorporated towns, and planned development. The I-25 Corridor from C-470 to just north of Surrey Ridge Road is zoned as planned development land. The west side of I-25 from Surrey Ridge Road to Castle Pines Parkway is zoned rural residential and estate residential land. The east side is zoned agricultural. The area between Happy Canyon Road and Meadows/Founders Parkway along I-25 is predominantly rural residential and suburban residential. In the Town of Castle Rock between US 85 and 5th Street, the east side of I-25 is predominantly zoned as single-family and multi-family with a public school (Douglas County High School) and open space along Front Street. On the west side of I-25, the area is zoned primarily general and integrated commercial. South of 5th Street to Plum Creek Parkway, the land to the east of I-25 is zoned general and integrated commercial, and land to the west of I-25 is zoned single-family. South of Plum Creek Parkway to Douglas Lane, land is zoned general commercial to the west and business/commercial to the east. At Douglas Lane, land is zoned planned development.

4.2.8.2 US 85 Corridor Land Use and Zoning

Land Use

At the northern limit of the project near C-470, the *Douglas County Master Plan Land Use Map*, September 2000, depicts primarily urban area (Highlands Ranch) to the east and preserved land (Chatfield State Recreation Area) to the west. This area of Highlands Ranch is currently undergoing development. From just north of Lakeside Drive through the towns of Louviers and Sedalia, land use is primarily non-urban area (large ranches and large single-family lots) on both sides of US 85, along with a substantial number of low-density, general industrial uses. The Douglas County map also lists Louviers and Sedalia as rural town centers. The east side of US 85 in the vicinity of Sedalia has preserved land uses, which cover about 2 miles; this preserved land is part of the Cherokee Ranch. The southern portion of US 85 is shown as a separated urban area near Castle Pines, which is mostly single-family residential. South of that, the land use is shown as urban service area (Town of Castle Rock).

Zoning

The west side of US 85 from C-470 to Highlands Ranch Parkway is zoned general industrial land. West of this industrial area from C-470 to Titan Road is zoned parkland. The east side of US 85 begins as general industrial land at C-470 and continues to Highlands Ranch Parkway. Douglas County has planned development land beginning along the east side of US 85 that becomes estate and rural residential areas until reaching Titan Road. Along both sides of US 85 south of Titan Road to south of Louviers Avenue, zoning is general industrial. Just north of County Road (CR) 16, on the east side of US 85, is an area of rural residential and planned development land. Sedalia and its surroundings are made up of various zoned parcels such as general industrial, rural residential, planned development, agricultural, and business. South of Daniels Park Road is planned development land to the east and agricultural and planned development land to the west. At the southern end of the US 85 Corridor, zoning is comprised of integrated and general commercial to the east and open space to the west.

4.2.9 Applicable Transportation Plans

Transportation plans adopted by governing bodies in the study area include the *DRCOG Metro Vision 2020 Plan*, the *1999 Regional Transportation Plan (RTP)*, *1994 Castle Rock Town Wide Transportation Plan* and the *Douglas County 2015 Transportation Plan*. Impacts to each of the plans are outlined in Section 5.3.2.6, *Land Use and Zoning Impacts*.

DRCOG Metro Vision 2020 Plan

The *DRCOG Metro Vision 2020 Plan* is the Denver region's plan for addressing future growth of the metropolitan area. The plan outlines strategies and implementation steps to preserve the region's quality of life while also positioning the region to benefit from growth. The plan is organized around six core elements addressing the development pattern of the region, the necessary transportation system, and the actions needed to preserve air quality and water quality. The six core elements are:

- Extent of urban development
- Open space
- Free-standing communities
- Balanced/multi-modal transportation system
- Urban centers
- Environmental quality

Regional Transportation Plan

The RTP is the fiscally constrained version of the *DRCOG Metro Vision 2020 Plan*. It includes those elements of the Metro Vision that can be provided through the year 2020, based on reasonably expected revenues.

Elements included in the DRCOG RTP along the I-25 Corridor include:

- Eight lanes from C-470 to Meadows/Founders Parkway
- Six lanes from Meadows/Founders Parkway to MP 178
- Car pool lot

Elements included in the DRCOG RTP along the US 85 Corridor include:

- Six lanes from C-470 to Highlands Ranch Parkway
- Four lanes from Highlands Ranch Parkway to Meadows Parkway

Castle Rock Town Wide Transportation Plan

The *Castle Rock Town Wide Transportation Plan*, completed in 1994, outlines recommended transportation improvements for the Town of Castle Rock.

Douglas County Transportation Plan

The *Douglas County 2015 Transportation Plan* is an element of the *Douglas County Master Plan* completed in 1997. The plan outlines transportation improvements that will be needed in Douglas County in 5-year increments for the next 15 years. Douglas County is about to start updating the current transportation plan.

4.3 PHYSICAL ENVIRONMENT

4.3.1 Air Quality

The U.S. Environmental Protection Agency (EPA) has established National Ambient Air Quality Standards (NAAQS) for six criteria pollutants to protect the public from the adverse health effects associated with air pollution. These six criteria pollutants are carbon monoxide (CO), ground level ozone (O₃), oxides of nitrogen (NO_x), sulfur dioxide (SO₂), fine particulate matter (PM₁₀), and lead (Pb).

4.3.1.1 Meteorology and Climate

The geographical and meteorological characteristics of Douglas County contribute to the air quality conditions within the study area. Douglas County is located at the foot of the Rampart Range of the Rocky Mountains. It is the subdrainage basin of Plum Creek, which drains into the Platte River Basin north of Douglas County.

The climate is moderate with average monthly temperatures ranging from -1.8° C (28.7° F) in January to 29.9° C (85.8° F) in July, with low relative humidity. Prevailing winds are from the south at an average of 12.9 kilometers per hour (km/h) (8.0 miles per hour [mph]). The average annual precipitation is 43.7 centimeters (17.2 inches).

4.3.1.2 Air Quality Levels

Douglas County is a part of the Central Front Range Air Quality Control Region along with Boulder, Gilpin, Clear Creek, Adams, Arapahoe, Denver, and Jefferson counties. The Denver metropolitan area consists of Boulder, Adams, Arapahoe, Denver, Jefferson, and Douglas Counties. The Denver metropolitan area is currently classified as non-attainment for CO and PM₁₀. The project area is the northern portion of Douglas County. No violations of the NAAQS in the project area have been reported for the last 11 years. According to the *Colorado Air Quality Control Commission Report to the Public, 1998-1999*, there are no monitors in the project area to provide CO, NO_x, hydrocarbons (HC), and O₃ air quality data; therefore, actual levels of these pollutants are not available. PM₁₀ monitoring in the Town of Castle Rock has shown no PM₁₀ violations in the last 11 years in Douglas County. Emission inventories projected for the Denver non-attainment area are represented in Table 4.8.

It is predicted that motor vehicle operation on paved and unpaved roads will contribute approximately 90 tons per day of PM₁₀ of the total projected emissions of 112 tons per day or about 80 percent. About 95 percent of these emissions are contributed by road dust, sand, and unpaved roads. Actual vehicle PM₁₀ emissions are 5 percent of the total motor vehicle operation.

Table 4.8
Emission Inventories for the Denver Non-Attainment Area
(Tons per Day)

Source Category	2001 Attainment SIP			2006 Interim Year			2013 Maintenance		
	CO	NO _x	VOC*	CO	NO _x	VOC*	CO	NO _x	VOC*
Pollutant									
Point Sources	70.2	121.8	45.8	46.7	123.4	52.4	46.7	126.0	55.8
On-Road Sources	875.2	139.4	123.8	844.7	115.2	84.4	867.2	117.2	73.6
Non-Road Sources	61.6	64.4	66.7	46.9	51.2	39.9	41.3	40.4	39.5
Area Sources	196.3	6.9	73.7	187.1	9.8	72.8	170.2	10.9	80.0
Total Sources	1203.3	332.5	310.0	1125.4	299.6	249.6	1125.4	294.5	248.9
Mobile Source Contribution (%)	72.7	41.9	39.9	75.1	38.5	33.8	77.1	39.8	29.6

* Volatile organic compound (VOC) is the same as HC for purposes of this report.

4.3.1.3 State Implementation Plan

Colorado Air Quality Control Commission Regulation No. 10, "Criteria for Analysis of Conformity" requires that a transportation improvement plan (TIP), or RTP (a long-range plan) must conform to the state implementation plan (SIP). As part of the SIP development process, an emissions budget for CO is established for non-attainment and maintenance areas to maintain the NAAQS. Because the Denver Metropolitan Area is currently classified as non-attainment for CO and PM₁₀, projected emissions of these pollutants resulting from the TIP or RTP must not exceed the emissions budgets set forth in the SIP. The CO emissions budget for the Denver Metropolitan Area in the horizon years (2010 and 2020) is set at 800 tons per day. The PM₁₀ emissions budget for the Denver Metropolitan Area in the horizon years is set at 60 tons per day.

In addition, Regulation No. 10 sets the requirements for air quality analysis for regional and "hot-spot" air quality on a project level. This includes the requirements for modeling and screening analysis of the selected project. These requirements have been incorporated in the air quality analysis for the South I-25 Corridor and US 85

Corridor EIS.

4.3.1.4 Conformity Requirements

Section 176 (c) of the Clean Air Act (CAA) and related requirements of the Transportation Equity Act for the 21st Century (TEA-21) and the Federal Transit Act, require that transportation plans, programs, and projects that are developed, funded, or approved by USDOT and by metropolitan planning organizations or other recipients of funds under TEA-21 or the Federal Transit Act, must demonstrate and assure conformity of such activities to the applicable SIP. The provision related to conformity applies in all non-attainment and maintenance areas for transportation-related criteria pollutants for which the area is designated non-attainment or has a maintenance plan.

An RTP is the official intermodal metropolitan transportation plan that is developed through the metropolitan planning process for the metropolitan planning area. A TIP is a staged, multi-year, intermodal program of transportation projects covering a metropolitan planning area, which is consistent with the metropolitan transportation plan. The RTP specifically describes the transportation system envisioned over the next 20 years. The RTP quantifies and documents the demographic and employment factors influencing expected transportation demand, including land use forecasts. Additions and modifications to the transportation network must also be sufficiently specific to show there is a reasonable relationship between expected land use and the envisioned transportation system. It is a requirement that the RTP, TIP, and their approved projects respond to anticipated growth, showing the relationship of these projects to land use, population growth, and employment.

Table 4.9 and Table 4.10 summarize the results of the emission inventory and dispersion modeling analyses on the 2001-2006 DRCOG TIP conformity transportation networks.

**Table 4.9
Denver-Boulder Carbon Monoxide Non-Attainment Area**

Parameter*	2001 Transportation Model Results (Model EA01)	2010 Transportation Model Results (Model OA10)	Base year 2020 Regional Transportation Model Results (Model 5A20)
VMT	56,796,900	72,014,700	84,488,200
CO – tons/day	805.6	791.1	735.6
Budget	825.0	800.0	800.0

*National low-emissions vehicle included
VMT, Vehicle miles traveled

**Table 4.10
Denver PM₁₀ State Implementation Plan Modeling Domain**

Parameter	2010 Transportation Model Results (Model OA10)	Base year 2020 Regional Transportation Model Results (Model 5A20)
VMT	62,712,700	72,491,900
PM ₁₀ – tons/day	53.10	55.54
PM ₁₀ Budget – tons/day	60.0	60.0
NO _x – tons/day	131.29	130.12
Tier II/Low Sulfur NO _x adjustment – tons/day	-27.27	-41.64
NO _x w/ Tier II – tons/day*	104.02	88.48
NO _x Budget – tons/day*	119.4	119.4
Dispersion modeling*	<150 µg/m ³	137.5 µg/m ³

* National low-emissions vehicle not included; Tier II included; 2010 and 2020 cut-point = 1.5 grams per mile

4.3.1.5 Other Pollutants of Concern

Toxic Air Constituents

In addition to the NAAQS set forth by EPA for the six criteria pollutants, EPA has also established a list of 33 urban hazardous air pollutants. These pollutants include air toxics emitted from stationary (factories), non-road (lawnmowers, airplanes, etc.), and road (cars, trucks, and buses) sources.

To better understand the harmful effects road sources have on human health, the EPA has also developed a list of 22 mobile source air toxics (MSAT), such as benzene, formaldehyde, diesel exhaust, lead, and 1,3 butadiene. People are exposed to these MSATs in six basic ways: airborne emissions from burning of fuel; airborne emissions from partially burning the fuel; emissions from evaporating fuel primarily at filling stations; chemical reactions that transform MSATs once they are released to the air into other MSATs; airborne exposure to worn engine parts, tires or brakes, and direct exposure to toxics from leaking underground fuel storage tanks through drinking water sources.

The EPA is currently conducting studies to better understand the rates at which these MSATs are emitted. They are also developing an air toxics model called the Assessment System for Population Exposure Nationwide (ASPEN). The ASPEN will help predict areas where toxics may be concentrated based on emission estimates of toxic air pollutants and meteorological data from the National Weather Service.

Greenhouse Gas

Carbon dioxide (CO₂) is a greenhouse gas of global concern. The Colorado Air Pollution Control Division (APCD) has developed a list of CO₂ reduction strategies and will be considering CO₂ reduction options that will affect point, area, and mobile sources on a region-wide basis.

For additional information on air quality, see the *Air Quality Analysis South I-25 Corridor and US 85 Corridor*, November 2000, in the Technical Reports Volume of the *South I-25 Corridor and US 85 Corridor FEIS*.

4.3.2 Water Quality and Quantity

4.3.2.1 Surface Water

The I-25 Corridor and US 85 Corridor are located in portions of two watersheds: Upper South Platte and Middle South Platte-Cherry Creek. Both watersheds eventually drain into the South Platte River and can be characterized by high plains and rolling foothills, with elevations ranging from approximately 1,676 meters above mean sea level (amsl) (5,500 feet amsl) to 2,134 meters amsl (7,000 feet amsl). Groundcover in these watersheds is largely grass, although some forested areas do exist. Drainages in the corridors can be characterized as sandy washes with streambanks populated by upland vegetation species. Drainages in both corridors flow intermittently, typically in response to spring snowmelt or high-intensity precipitation events. The Upper South Platte watershed includes the entire US 85 Corridor and portions of the I-25 Corridor occurring south of Happy Canyon Road.

The US 85 Corridor parallels, but does not include, the northerly banks of Plum Creek and East Plum Creek between Castle Rock and Highlands Ranch Parkway. Surface water drainage between Highlands Ranch Parkway and C-470 flows into either Spring Gulch or Marcy Gulch (see Figure 4.6b in Section 4.3.8, *Floodplains*). Spring Gulch discharges into a reservoir situated between US 85 and Chatfield Reservoir, and Marcy Gulch discharges into the South Platte River. Thirty-three ephemeral or intermittent tributaries of Plum Creek or East Plum Creek flow under US 85 including Highlands Gulch and Haskins Gulch.

East Plum Creek flows under I-25 in the Town of Castle Rock and also flows through Castle Rock northwesterly, discharging into Plum Creek near Sedalia (see Figure 4.6a in Section 4.3.8, *Floodplains*). I-25 crosses eight drainages including Hangman's Gulch and seven unnamed drainages that are tributary to East Plum Creek. Plum Creek continues northwesterly, discharging into Chatfield Reservoir. Chatfield Reservoir was completed in 1976 for flood control, silt control, recreation, fish and wildlife, and water supply storage. The High Line Canal, constructed in 1883 as an irrigation ditch, flows under US 85 to the northeast.

A segment of I-25, north of Happy Canyon Road, occurs in the Middle South Platte-Cherry Creek watershed. Seven natural, ephemeral, or intermittent drainages flow through this portion of the study area into Cherry Creek or Cherry Creek Reservoir: Cottonwood Creek, Newlin Gulch, Happy Canyon Creek, and unnamed tributary drainages. The Arapahoe Canal Pipeline also flows through the study area. Cherry Creek flows to the north, approximately 8.0 kilometers (5.0 miles) east of the I-25 project corridor, and discharges into Cherry Creek Reservoir, a water supply and flood control reservoir completed in 1950.

For additional information on surface water drainageways, see the *Floodplain and Drainage Assessment Technical Report*, May 2000, amended November 2000, in the Technical Reports Volume of the *South I-25 Corridor and US 85 Corridor FEIS*.

4.3.2.2 Groundwater

Groundwater quality is generally considered good in the project area, although population growth may be causing a decline in aquifer levels. Groundwater pumped within the project corridors is primarily used for domestic and agricultural purposes, although commercial and industrial uses predominate within the Town of Castle Rock.

Groundwater underlies the project corridors in a series of unconfined and confined aquifers. The Plum Creek alluvial aquifer is the primary aquifer in the vicinity of US 85. The vertical extent of the Plum Creek aquifer saturated zone occurs at an elevation slightly higher than that of Plum Creek, or between 6 and 24 meters (20 to

80 feet) beneath US 85, depending on the proximity to Plum Creek or East Plum Creek. The Plum Creek alluvium is about 30 meters (100 feet) thick and is underlain by the 60- to 70-million-year-old semi-confined Dawson Formation.

The I-25 Corridor follows a ridge north from Castle Rock. Groundwater under this corridor occurs in the Dawson Formation at depths of 61 meters (200 feet) or greater. Some saturated alluvium does occur adjacent to the surface water drainages. These alluvial aquifers have small yields and are of limited use for water supply purposes.

4.3.2.3 Water Quality

Urbanization is affecting water quality in both corridor watersheds. The increase in impervious surfaces brought about by urbanization generates elevated stormwater flows. As the natural vegetated land surface is replaced with roads, parking lots, houses, sidewalks, golf courses, and other landscaped areas, the area of soil available for stormwater infiltration diminishes and storm-related runoff increases, thus resulting in three primary impacts to water quality:

- *Release of pollutants.* Runoff from developed areas typically contains pesticides, herbicides, fertilizers, hydrocarbons, salts, volatile and semivolatile organics, heavy metals, bacteria, and other contaminants.
- *Erosion.* Gully erosion occurs when increased overland flows are concentrated in drainageways.
- *Sediment loading.* Sediment loading to surface waters occurs when snowmelt or precipitation contacts disturbed lands laid bare from construction activities.

East Plum Creek, Plum Creek and Cherry Creek receive runoff from residential and commercial development. Gully erosion and sediment inflows can result in large quantities of sediment being delivered to East Plum Creek, Plum Creek, and Cherry Creek. Suspended solids will be transported downstream until the material settles out in a dormant reach, such as Chatfield Reservoir and Cherry Creek Reservoir.

Upper South Platte

The mainstems of East Plum Creek and Plum Creek are classified by the CDPHE Water Quality Control Division (WQCD) as Cold Water Aquatic Life, Class 1; Recreation, Class 2; Water Supply; and Agriculture.

The *Cold Water Aquatic Life, Class 1* designation is applied to waters capable of sustaining a wide variety of cold-water biota, including sensitive species. The *Recreation, Class 2* secondary contact designation is applied to those surface waters that are suitable or are intended to become suitable for recreational uses on or about but not in the water. Recreation, Class 2 generally results in a standard of 2,000 fecal coliforms per 100 milliliters.

All tributaries of the East Plum Creek system, including all lakes and reservoirs not on National Forest lands, are classified by CDPHE WQCD as Warm Water Aquatic Life, Class 2; Recreation, Class 2; and Agriculture. Warm Water Aquatic Life, Class 2 waters are not capable of sustaining a wide variety of warm water biota, including sensitive species, due to physical habitat, water flows or levels, or uncorrectable water quality conditions that result in substantial impairment of the abundance and diversity of species.

Waters that flow through and along the US 85 Corridor are not currently listed on either the state 303(d) list of impaired waters or the state monitoring and evaluation list. However, some reaches of East Plum Creek and Plum Creek outside of the project corridor are included on the state monitoring and evaluation list. Identified impairments for these reaches include sediment, temperature, and aquatic life. Reaches of East Plum Creek and Plum Creek adjacent to and through the project corridor exhibit many of these same characteristics. Sections of Plum Creek, for example, have obvious sediment deposition problems. Sediment build-up is changing the nature of the stream, possibly making this reach uninhabitable for aquatic species. Continued degradation of the streams in and along the project corridor may lead to 303(d) listing in the future and additional restrictions on projects adjacent to the impaired waters.

The *Chatfield Reservoir Clean Lakes Study*, 1984, presented the following water quality findings relevant to the Plum Creek drainage:

- Concentration of total and dissolved phosphorus are generally greater in Plum Creek than the other two streams discharging into Chatfield Reservoir: Deer Creek and the South Platte River
- The average concentration of total suspended solids (TSS) is high in Plum Creek flows; this condition is attributed to the fine sediments that occur on the channel bottom
- Concentrations of all contaminants are higher during storm flow events

In 1985, following the Clean Lakes Study, DRCOG established the Chatfield Basin Task Force (Task Force) to make recommendations regarding water quality issues in drainages upstream from Chatfield Reservoir, including Plum Creek. The Task Force collects and disseminates ambient water quality data for Plum Creek at Titan Road. Total phosphorus, nitrate, and nitrite concentrations in 1999 were similar to the 1986 through 1999 average values of 0.13 mg/l, 0.50 mg/l, and 0.01 mg/l, respectively. Annual average phosphorus concentrations ranged from a high of 0.42 mg/l in 1987 to 0.05 mg/l in 1996, the 1998 and 1999 average concentrations were 0.16 mg/l and 0.13 mg/l, respectively. The Chatfield Reservoir Control Regulation has set the goal of a 50 percent reduction in phosphorus loading from non-point sources, including stormwater runoff. Specific conductance, an indicator of dissolved solids and total suspended solids, were higher in 1998 and 1999, compared to the 1986 through 1999 averages of 274.8 microsiemens/centimeter (μ s/cm) and 161.6 mg/l. It is difficult to draw any conclusions from the limited data points; however, these studies suggest that Plum Creek water quality has not changed significantly since 1986.

Middle South Platte-Cherry Creek

All tributaries to Cherry Creek, including all lakes and reservoirs, from the source of East and West Cherry Creeks to the confluence with the South Platte River, are classified by CDPHE WQCD as Warm Water Aquatic Life, Class 2; Recreation, Class 2; and Agriculture. None of the project corridor streams in the Middle South Platte-Cherry Creek Basin are currently listed on the state 303(d) list or in the state monitoring and evaluation list.

Land use in the Middle South Platte-Cherry Creek basin is changing from agrarian to suburban residential, with associated development. Urbanization is accompanied by changes in water quality and water quality concerns. Forest and rangeland are sources of nutrients, suspended sediment, dissolved solids, and metals in surface water. Suburban environments typically generate greater volumes of stormwater as homes, yards, roads, and other impervious surface areas replace undeveloped land. Increased stormwater can result in higher quantities of

sediment and nutrients (e.g., phosphorus and nitrogen) discharged into surface waters as well as increased levels of HC and VOCs.

Cherry Creek Reservoir, like Chatfield Reservoir, is susceptible to eutrophication from upstream point and non-point source pollutant loading. Eutrophication is the process by which a body of water becomes enriched in dissolved nutrients that stimulate the growth of aquatic plant life, usually resulting in the depletion of dissolved oxygen. Phosphorus is the nutrient most responsible for causing eutrophication in reservoirs and aquatic plant growth in streams. The most significant source of phosphorus in Cherry Creek Reservoir is stormwater runoff, as identified in the 1984 *Cherry Creek Reservoir Clean Lakes Study*. The Water Quality Control Commission (WQCC) set a phosphorus standard for Cherry Creek Reservoir in August 1984.

The narrative standard states the goal of achieving a 50 percent overall reduction in non-point source phosphorus discharges for the entire Cherry Creek Basin, including the Middle South Platte-Cherry Creek, through the use of detention and rapid infiltration basins for the treatment of stormwater runoff. The Cherry Creek Basin Authority (CCBA) is using this narrative standard as a target for development of point and non-point source pollution control strategies. The CCBA was established specifically to develop a water quality program to control pollutant loading upstream of the reservoir.

4.3.3 Vegetation

Several factors influence the distribution and abundance of plants across a landscape, including latitude, elevation, aspect, slope, soils, precipitation, and land use. Within the APE, latitude and precipitation differences are minimal; therefore, differences in the remaining factors primarily influence the composition and distribution of plant species within the I-25 Corridor and US 85 Corridor. The topography of the APE consists of rolling hills, with elevation increasing from north to south. Elevations in the study area generally range from 1,646 meters (5,400 feet) at C-470 and US 85 and 1,798 meters (5,900 feet) at C-470 and I-25 to approximately 1,890 meters (6,200 feet) in Castle Rock.

Wetland vegetation types are discussed in the wetland section of this document. Dominant upland vegetation types in the APE include:

- Grasslands
- Shrublands
- Woodlands
- Riparian
- Urban

These vegetation types were mapped from aerial photography along I-25 within a range of 150 to 245 meters (500 to 800 feet) from each side of the highway (Table 4.11). Along US 85, plant communities were mapped within a range of 30 to 305 meters (100 to 1,000 feet) from each side of the highway. Although the APE is likely to be 30 meters (100 feet) from the existing ROW for US 85 and 60 meters (200 feet) from the existing ROW for I-25, the larger vegetation type mapping area provides context for impact analysis. Due to rapid urbanization in Douglas

County, acreage estimates may vary slightly from those presented in Table 4.11.

For additional information on vegetation, see the *Vegetation Technical Report*, May 2000, amended November 2000, in the Technical Reports Volume of the *South I-25 Corridor and US 85 Corridor FEIS*.

Table 4.11
Area Estimates for Vegetation Types Adjacent to
I-25 and US 85, Douglas County

Vegetation Type	I-25 Hectares (Acres)	US 85 Hectares (Acres)
Grasslands	521 (1,287)	495 (1,223)
Shrublands	84 (208)	41 (101)
Woodlands	83 (205)	4 (10)
Riparian	30 (74)	21 (52)
Urban	127 (314)	145 (358)
Total Area	845 (2,088)	706 (1,744)

4.3.3.1 Grasslands

The grassland vegetation type dominates (65 percent of total area mapped) much of the landscape along both highway corridors. Immediately adjacent to both highways, introduced grasses such as smooth brome (*Bromopsis inermis*) and crested wheatgrass (*Agropyron cristatum*) are common. Weeds such as Japanese brome (*Bromus japonicus*), musk thistle (*Carduus nutans*), Canada thistle (*Breca arvensis*), yellow sweetclover (*Melilotus officinale*), and diffuse knapweed (*Acosta diffusa*) are also prevalent. Japanese brome is also common further from I-25 in historically grazed areas and is often indicative of depleted rangeland from livestock grazing or other land use. Of the above-mentioned weeds, Canada thistle, diffuse knapweed, and musk thistle are among the top 10 weed species in Colorado.

Native grasses such as buffalograss (*Buchloë dactyloides*), blue grama (*Chondrosum gracile*), side-oats grama (*Bouteloua curtipendula*), and little bluestem (*Schizachyrium scoparium*) are more common further from I-25. Other native species common in upland grasslands along I-25 are *Alyssum* spp., yucca (*Yucca glauca*), and prickly pear (*Opuntia* spp.).

Sand dropseed (*Sporobolus cryptandrus*) is the dominant native grass along much of US 85. Other native grass species include buffalograss, blue grama, side-oats grama, little bluestem, and big bluestem (*Andropogon gerardii*). Additional plant species observed includes yucca and prickly pear.

4.3.3.2 Shrublands

Shrublands occur in mesic draws and on hillsides within the project area of both highways (8 percent of the total mapped area). These areas are dominated by a Gambel oak (*Quercus gambelii*) overstory. Though not dominant, ponderosa pine (*Pinus ponderosa*) is found in some areas, scattered among the Gambel oak. The mid-canopy is composed of mixed shrubs such as skunkbrush (*Rhus aromatica trilobata* spp.), hawthorn (*Crataegus* spp.), snowberry (*Symphocarpus occidentalis*), and wild rose (*Rosa woodsii*). The herbaceous understory is typically depauperate; some western wheatgrass (*Pascopyrum smithii*), bluegrass (*Poa* spp.), and Oregon grape (*Mahonia repens*) occur along the interface between grasslands and shrublands. Some shrubland communities located near

the tops of hills with northern aspects are dominated by mountain mahogany (*Cercocarpus montanus*) and have a grass understory with some Oregon grape.

4.3.3.3 Woodlands

Woodlands are dominated by ponderosa pine and occur primarily along I-25 between Happy Canyon Road and Meadows/Founders Parkway (6 percent of the total mapped area). Some ponderosa pine woodlands also occur along the southern section of US 85 near Daniels Park Road. Woodlands are typified by a ponderosa pine overstory and a patchy mid-canopy layer comprised of Gambel oak. In the understory, patches of snowberry, wild rose, and yucca are common. Grasses typically found with this association include little bluestem, big bluestem, smooth brome, and Canada wildrye (*Elymus canadensis*).

4.3.3.4 Riparian

Riparian areas occur primarily along Happy Canyon Creek, East Plum Creek, Marcy Gulch, Spring Gulch, and Plum Creek (3 percent of the total mapped area). Where an overstory occurs, it is dominated by cottonwood (*Populus* spp.), with some crack willow (*Salix fragilis*) and boxelder (*negundo aceroides*). The shrub canopy is primarily coyote willow (*Salix exigua*) and shining willow (*S. lutea*). The understory is mixed and includes patches of snowberry, wild rose, smooth brome, Canada wildrye, and Kentucky bluegrass (*Poa pratensis*). Herbaceous hydrophytic species, such as sedges (*Carex* spp.) and rushes (*Juncus* spp.), generally occur in wetter locations and are discussed in Section 4.3.4, *Wetlands*.

4.3.3.5 Urban

The urban vegetation type represents landscaped areas associated with residential and commercial development (18 percent of the total mapped area). Area estimates include both impervious surface (e.g., buildings and parking lots) and landscaped areas (e.g., lawns). Non-native grass (e.g., bluegrass) and ornamental shrubs and trees are the dominant vegetation in these areas.

4.3.4 Wetlands

Wetlands are defined using three criteria:

- Occurrence of at least 50 percent hydrophytic vegetation
- Wetland hydrology
- Hydric soils

Jurisdictional wetlands exhibit all three criteria and are under the jurisdiction of the USACE through their administration of Section 404 of the Clean Water Act. Non-jurisdictional wetlands are those wetlands that exhibit all three criteria, but USACE did not take jurisdiction over them. A letter dated May 5, 2000, from the USACE concurred with the wetland delineations, and is included in Appendix A of this document.

In compliance with Executive Order 11990, "Protection of Wetlands," 23 CFR 771 and 777, Technical Advisory

T6640.8A, and Section 404 of the Clean Water Act, wetland surveys were performed from May 1999 through April 2000 within 60 meters (200 feet) of the existing I-25 ROW and 30 meters (100 feet) of the existing US 85 ROW. A combination of routine and comprehensive wetland delineation methods, as detailed in the USACE *Wetlands Delineation Manual*, 1987, was used. Wetlands identified within the survey area (APE) are depicted in Figure 4.4a and Figure 4.4b. The majority of wetlands within the APE occur as non-jurisdictional, roadside ditch wetlands. Jurisdictional wetlands in the APE occur primarily along East Plum Creek, Happy Canyon Creek, Marcy Gulch, and along small drainages where stream flow patterns or damming by beavers provides the necessary wetland hydrology and soil saturation for a prevalence of hydrophytic vegetation to exist.

For additional information on wetlands, see the *Wetland Technical Report*, May 2000, amended, November 2000, in the Technical Reports Volume of the *South I-25 Corridor and US 85 Corridor FEIS*.

4.3.4.1 Classification of Wetlands and Other Waters of the United States

Wetlands are classified in accordance with the Cowardin classification system. Palustrine wetlands within the APE occur in the form of emergent wetlands, willow shrublands, and cottonwood/willow forests.

East Plum Creek, Happy Canyon Creek, Plum Creek, Marcy Gulch, Newlin Gulch, and other perennial or intermittent streams that exhibit a defined streambed and bank are classified as Other Waters of the US and are jurisdictional waters regulated by the USACE. Wetlands may or may not be associated with these jurisdictional waters. Several stormwater detention ponds in upland sites were identified as Waters of the US in the DEIS; however, the USACE determined these ponds to be non-jurisdictional waters and they have been removed from this FEIS.

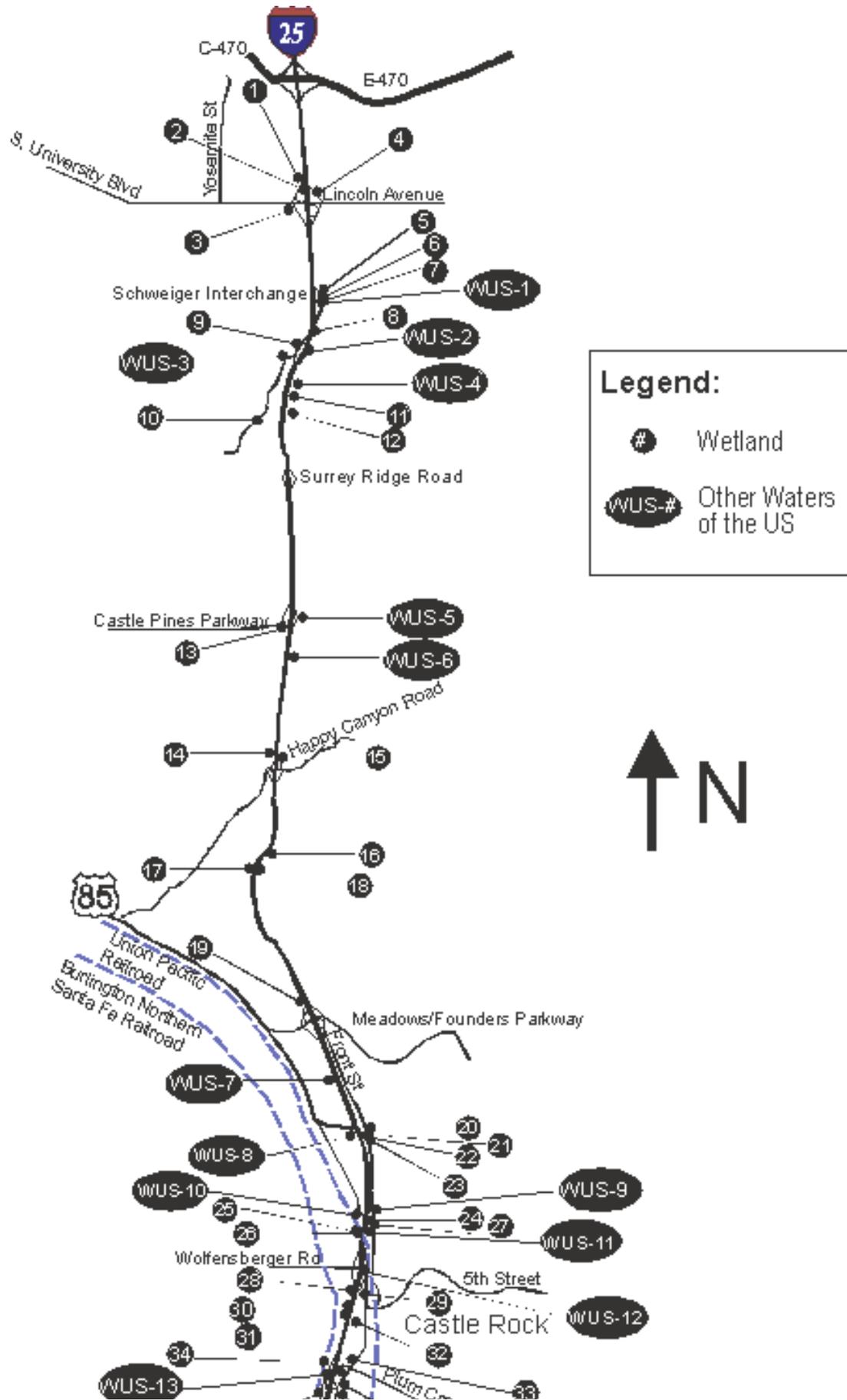
4.3.4.2 Wetland Vegetation

Botanical names follow Weber and Wittmann (1996). Determinations of hydrophytic vegetation indicator status are based on Reed (1998) and include the following categories:

- Obligate (OBL) plants almost always (> 99 percent probability) occur in wetlands.
- Facultative Wet (FACW) plants usually (> 67 percent probability) occur in wetlands.
- Facultative (FAC) plants are equally likely (34 to 66 percent probability) to occur in wetland or upland habitat.
- Facultative Upland (FACU) plants usually (67 to 99 percent probability) occur in uplands.
- Obligate upland (UPL) plant species, under natural conditions, almost always (>99 percent probability) occur in upland habitat.

Wetlands occur as inclusions within upland plant communities throughout the APE. Upland plant communities found in the project area are described in Section 4.3.3, *Vegetation*, and include upland grasslands, shrublands, woodlands, riparian, and urban.

Figure 4.4a
Wetlands and Other Waters of the US
along I-25 Corridor



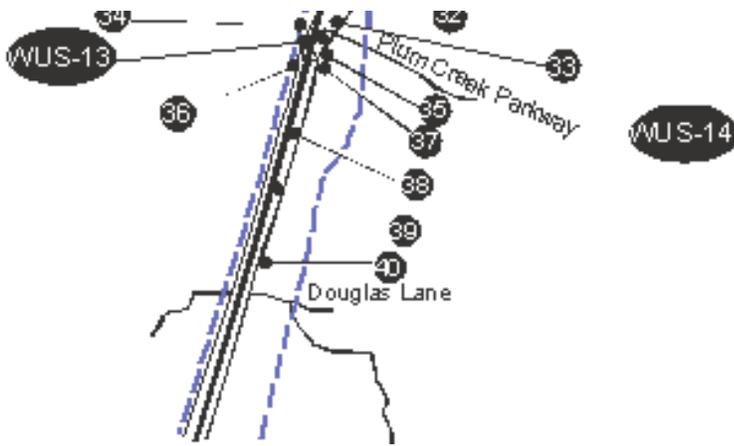
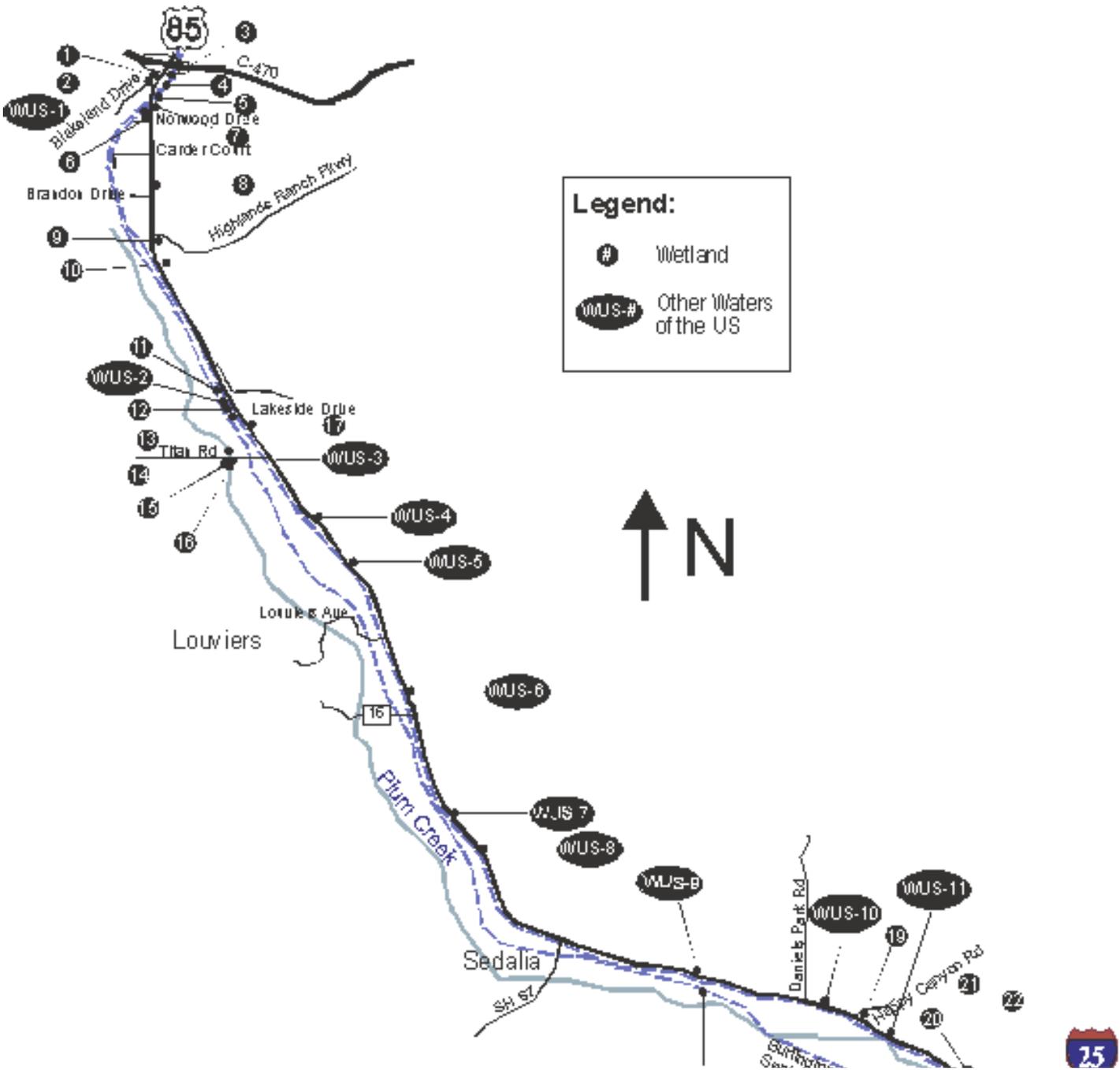
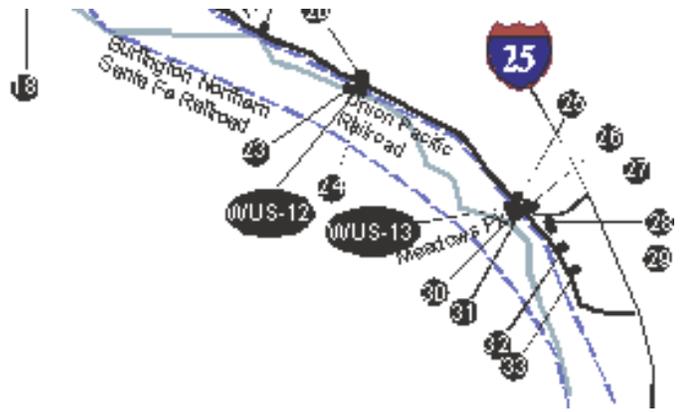


Figure 4.4b
Wetlands and Other Waters of the US
along US 85 Corridor





4.3.4.3 Wetland Soils

Soil pits were excavated to a depth of approximately 40 centimeters (16 inches), and soil horizons were described by thickness, texture, and color. Soils within the floodplains of East Plum Creek and Plum Creek are composed of stratified sand, loamy sand, and gravel classified as sandy wet alluvial land. In upland areas within the I-25 APE, the Fondis-Kutch association (F-K), Razor-Denver association (R-D), and the Loamy Alluvial Land-Sampson association (LAL-S) predominate. These soil associations range from deep to moderately deep loamy upland soils in the F-K association, to deep to moderately deep clayey upland soils in the R-D association, and deep loamy and sandy soils in the LAL-S association. Soils within the US 85 APE consist primarily of the LAL-S association and the R-D association.

Many of the wetland soils sampled in the project area lack hydric soil field indicators due to the relatively recent formation of a wetland, ditch maintenance activities, and/or sediment deposition in roadside ditches from highway sanding and erosion along the highway. These circumstances are considered normal for these areas. In these cases, topographic position and wetland hydrology were relied on for the determination.

4.3.4.4 Wetland Hydrology

A site is generally considered to exhibit wetland hydrology if soil saturation occurs continuously for a minimum of 5 percent of the growing season. The growing season within the study area is 147 days, making the number of consecutive days required for wetland hydrology 7.35 days, (or 7 days). Along East Plum Creek, wetland hydrology was determined through the use of groundwater monitoring wells. Throughout the rest of the project area, wetland hydrology was determined through primary and secondary indicators.

Visual observation of rapid downcutting within the primary channel at East Plum Creek was observed during the summer of 1999. Incision of the primary channel along East Plum Creek appears to have lowered the water table within the floodplain, consequently disconnecting wetland vegetation from the relatively shallow, subsurface water. Due to the rapidity at which this channel incision is occurring, wetland delineations will need to be updated in these areas immediately prior to construction.

4.3.4.5 Wetland Function

The specific functions a wetland provides, and the degree to which it performs those functions, depend on several factors including the type, size, plant diversity, and location of the wetland. A qualitative assessment of wetland functions was performed for the following functions:

- Dynamic water storage
- Flood flow attenuation
- Production export/aquatic food chain support
- Nutrient and pollutant removal/sediment retention
- Shoreline stabilization/sediment control
- Wildlife habitat

In general, most wetlands along the I-25 Corridor and US 85 Corridor are small, isolated, roadside ditch wetlands created by roadside runoff that exhibit low plant species diversity and limited functionality. Relatively larger wetlands along the corridors are typically associated with natural drainages, exhibit higher plant species diversity, and higher functionality. Those wetlands associated with East Plum Creek, Happy Canyon Creek, Marcy Gulch, and Plum Creek exhibit the highest functionality of all project area wetlands; however, study surveys indicate that hydrologic and other non-transportation-related changes in these drainages may limit their functionality.

4.3.4.6 I-25 Corridor Wetlands

Forty wetlands totaling 1.72 hectares (4.25 acres) (Figure 4.4a) occur within the I-25 APE (Table 4.12). Wetlands include 27 palustrine emergent (PEM) (0.98 hectare [2.41 acres]), 11 palustrine scrub-shrub (PSS), (0.67 hectare [1.65 acres]) and two palustrine forested (PFO) (0.08 hectare [0.19 acre]). PEM, narrow (0.3 to 0.9 meter [1 to 3 feet] wide) fringe wetlands exist adjacent to East Plum Creek, and PSS narrow fringe wetlands (Wetland 8) exist along one reach of Happy Canyon Creek (Figure 4.4a). Narrow fringe wetlands occur sporadically and can change rapidly during high-runoff events.

Hydrophytic vegetation common to I-25 Corridor PEM wetlands includes Nebraska sedge (*Carex nebrascensis*, OBL), clustered field sedge (*C. praegracilis*, FACW), spikerush (*Eleocharis palustris*, OBL), wiregrass (*Juncus arcticus*, OBL), curly dock (*Rumex crispus*, FACW), foxtail barley (*Critesion jubatum*, FACW), and barnyard grass (*Echinochloa crusgalli*, FACW). Most PEM wetlands occur in roadside ditches where wetland hydrology is created by ponding of highway runoff.

Jurisdictional PSS wetlands were found at five locations including a narrow fringe adjacent to Happy Canyon Creek (Wetlands 5, 6, 7, 8, and 10), and at three locations adjacent to East Plum Creek (Wetlands 26, 30, and 32). This type of wetland is typically dominated by sandbar willow (*Salix exigua*, OBL), shining willow (*S. lutea*, OBL), and reed canarygrass (*Phalaroides arundinacea*, FACW) or Nebraska sedge. Three non-jurisdictional PSS wetlands (Wetlands 27, 29, and 37) were found in roadside ditches and dominated primarily by sandbar willow.

Two PFO (Wetlands 9 and 25; Figure 4.4a) were found within the I-25 APE (Table 4.12). These wetlands are dominated by cottonwood (*Populus* spp.), crack willow (*Salix fragilis*, FAC), sandbar willow, shining willow, reed canarygrass, sedges (*Carex* spp.), and wiregrass.

4.3.4.7 US 85 Corridor Wetlands

Thirty-three wetlands totaling 1.56 hectares (3.86 acres) (Table 4.13, Figure 4.4b) were found within the US 85 APE. Twenty-six PEM (0.96 hectare [2.37 acre]), five PSS (0.1 hectares [0.25 acre]), and two PFO (0.50 hectare [1.24 acres]) wetlands were identified (Table 4.13).

Five PSS seasonally flooded wetlands in the APE are dominated by an overstory of sandbar willow and cottonwood saplings, and a mixed understory of narrow-leaved cattail (*Typha angustifolia*, OBL), Meadow fescue (*Festuca pratensis*, FAC), Kentucky bluegrass (*Poa pratensis*, FACU), and barnyard grass. Highway runoff is the primary source of water for four of the wetlands, while East Plum Creek provides overbank-flow to Wetland 15.

Table 4.12
Area Calculations, Wetland Classification, and Preliminary Jurisdictional Status for Wetlands within the I-25 Corridor Project Area

Wetland ID	Hectares (Acres)	Square Meters (Square Feet)	Classification*	Jurisdictional Status
1	0.001 (0.003)	10.5 (113)	PEM1C	Non-jurisdictional
2	0.004 (0.011)	43.2 (464)	PEM1C	Non-jurisdictional
3	0.037 (0.091)	369.0 (3,968)	PEM2C	Non-jurisdictional
4	0.026 (0.065)	262.8 (2,826)	PEM1C	Non-jurisdictional
5	0.147 (0.363)	1,471.5 (15,823)	PSS1C	Jurisdictional
6	0.041 (0.102)	413.0 (4,449)	PSS1C	Jurisdictional
7	0.018 (0.044)	178.6 (1,920)	PSS1C	Jurisdictional
8	0.007 (0.018)	71.7 (772)	PSS1C	Jurisdictional
9	0.062 (0.153)	619.9 (6,665)	PFO1C	Jurisdictional
10	0.147 (0.362)	1,466.5 (15,769)	PFO1C	Jurisdictional
11	0.055 (0.135)	547.1 (5,883)	PEM1C	Jurisdictional
12	0.05 (0.123)	497.0 (5,344)	PEM1C	Jurisdictional
13	0.007 (0.018)	73.1 (786)	PEM2C	Non-jurisdictional
14	0.024 (0.059)	239.4 (2,574)	PEM1C	Jurisdictional
15	0.075 (0.186)	753.4 (8,101)	PEM1C	Jurisdictional
16	0.003 (0.007)	28.6 (308)	PEM1C	Non-jurisdictional
17	0.023 (0.057)	232.2 (2,497)	PEM1C	Jurisdictional
18	0.006 (0.014)	56.8 (611)	PEM1C	Jurisdictional
19	0.039 (0.096)	387.9 (4,171)	PEM2C	Non-jurisdictional
20	0.005 (0.011)	45.8 (488)	PEM1C	Non-jurisdictional
21	0.009 (0.023)	92.6 (996)	PEM1C	Non-jurisdictional
22	0.001 (0.992)	8.6 (92)	PEM1C	Non-jurisdictional
23	0.005 (0.013)	53.3 (573)	PEM1C	Non-jurisdictional
24	0.027 (0.068)	273.8 (2,944)	PEM1C	Jurisdictional
25	0.016 (0.039)	158.5 (1,704)	PFO1C	Jurisdictional
26	0.094 (0.233)	943.5 (10,145)	PSS1C	Jurisdictional
27	0.001 (0.002)	9.9 (107)	PSS1C	Non-jurisdictional
28	0.308 (0.761)	3,079 (3,143)	PEM1C	Jurisdictional
29	0.024 (0.060)	242.7 (2,609)	PSS1C	Non-jurisdictional
30	0.067 (0.165)	667.8 (7,181)	PSS1C	Jurisdictional

30	0.067 (0.165)	667.8 (7,181)	PSS1C	Jurisdictional
31	0.024 (0.059)	240.3 (2,584)	PEM1C	Jurisdictional
32	0.11 (0.270)	1,095.1 (11,775)	PSS1C	Jurisdictional
33	0.129 (0.319)	1291.5 (13,887)	PEM1C	Jurisdictional
34	0.070 (0.173)	698.9 (7,515)	PEMIC	Non-jurisdictional
35	0.001 (0.003)	12.4 (133)	PEMIC	Non-jurisdictional
36	0.001 (0.003)	10.4 (112)	PEM2C	Non-jurisdictional
37	0.011 (0.028)	111.6 (1,200)	PSS1C	Non-jurisdictional
38	0.035 (0.085)	346.3 (3,723)	PEMIC	Non-jurisdictional
39	0.009 (0.022)	90.6 (974)	PEMIC	Non-jurisdictional
40	0.002 (0.004)	16.5 (177)	PEMIC	Non-jurisdictional
Total =	1.72 (4.25)	17,196.7 (185,106)		

*PEM1C=palustrine persistent emergent seasonally flooded; PEM2C=palustrine non-persistent emergent seasonally flooded; PSS1C=palustrine scrub-shrub seasonally flooded; PFO1C=palustrine forested broad-leaf deciduous seasonally flooded.

Table 4.13
Area Calculations, Wetland Classification, and Preliminary Jurisdictional Status for Wetlands within the US 85 Corridor Project Area

Wetland ID	Hectares (Acres)	Square Meters (Square Feet)	Classification*	Jurisdictional Status
1	0.002 (0.004)	15.2 (163)	PEM1C	Non-jurisdictional
2	0.005 (0.011)	45.2 (486)	PEM1C	Non-jurisdictional
3	0.019 (0.047)	191.5 (2,059)	PEM1C	Non-jurisdictional
4	0.022 (0.053)	216.7 (2,330)	PEM1C	Non-jurisdictional
5	0.021 (0.052)	209.3 (2,250)	PEM1C	Non-jurisdictional
6	0.002 (0.005)	21 (225)	PEM1C	Jurisdictional
7	0.036 (0.09)	363 (3,903)	PEM1C	Jurisdictional
8	0.095 (0.234)	948 (10,194)	PFO1F	Jurisdictional
9	0.004 (0.01)	41.9 (450)	PEM1C	Non-jurisdictional
10	0.002 (0.006)	23.3 (251)	PEM1C	Non-jurisdictional
11	0.018 (0.043)	175.3 (1,885)	PEM2C	Non-jurisdictional
12	0.007 (0.016)	65.2 (701)	PEM1C	Non-jurisdictional
13	0.005 (0.011)	46.1 (496)	PEM1C	Non-jurisdictional
14	0.407 (1.005)	4,070 (43,773)	PFO1C	Jurisdictional
15	0.078 (0.193)	780.3 (8,390)	PSS1C	Jurisdictional
16	0.013 (0.033)	134.3 (1,444)	PEM2C	Non-jurisdictional
17	0.001 (0.002)	9.8 (105)	PEM1C	Non-jurisdictional
18	0.031 (0.075)	304.7 (3,276)	PEM1C	Non-jurisdictional
19	0.004 (0.01)	41.7 (448)	PEM2C	Non-jurisdictional
20	0.011 (0.028)	111.6 (1,200)	PEM2C	Non-jurisdictional
21	0.652 (1.608)	6,515.8 (70,062)	PEM2C	Non-jurisdictional
22	0.048 (0.117)	476 (5,118)	PEM2C	Non-jurisdictional
23	0.005 (0.013)	54.3 (584)	PEM2C	Non-jurisdictional
24	0.014 (0.035)	143.3 (1,542)	PEM2C	Non-jurisdictional
25	0.002 (0.005)	19.6 (210)	PSS1C	Non-jurisdictional
26	0.011 (0.027)	109.4 (1,176)	PEM2C	Non-jurisdictional
27	0.01 (0.023)	94.6 (1,017)	PSS1C	Non-jurisdictional

26	U.U11 (U.U27)	109.4 (1,176)	PEM2C	Non-jurisdictional
27	0.01 (0.023)	94.6 (1,017)	PSS1C	Non-jurisdictional
28	0.011 (0.026)	105.7 (1,136)	PEM2C	Non-jurisdictional
29	0.002 (0.005)	19.3 (208)	PEM2C	Non-jurisdictional
30	0.004 (0.009)	37.0 (398)	PSS1C	Non-jurisdictional
31	0.007 (0.017)	67.6 (727)	PSS1C	Non-jurisdictional
32	0.006 (0.015)	61.4 (660)	PEM2C	Non-jurisdictional
33	0.01 (0.025)	100 (1075)	PEM2C	Non-jurisdictional
TOTAL =	1.56 (3.855)	15,602 (167,942)		

*PEM1C=palustrine persistent emergent seasonally flooded, PEM2C=palustrine non-persistent emergent seasonally flooded, PSS1C=palustrine scrub-shrub broad-leaf deciduous seasonally flooded, PFO1F=palustrine forested broad-leaf deciduous semi-permanently flooded.

PFO wetlands are dominated by cottonwoods, crack willow, coyote willow, reed canarygrass, and broadleaved cattail. Overbank flows at Plum Creek (Wetland 14) and dam release waters at Spring Gulch (Wetland 8) support these wetlands.

4.3.5 Geology

A survey of recent geotechnical reports along the I-25 Corridor and the US 85 Corridor was made to compile soil characteristics within the area affected by roadway, major structure, and drainage construction. Design and construction plans are determined using soil properties to develop structural information for paving and construction of major structures. Soil information generated from testing and research information allows a determination of how drainage structures and erosion control can be impacted by soil conditions.

For additional information on geology, see the *Geology Technical Memorandum South I-25 Corridor and US 85 Corridor*, November 2000, in the Technical Reports Volume of the *South I-25 Corridor and US 85 Corridor FEIS*.

4.3.5.1 I-25 Corridor Geology

Data from recent geotechnical (science that deals with the application of geology to engineering) investigations along the I-25 Corridor indicate the following geomorphology (relief features of the earth).

Northern Area

From the C-470 Interchange to the Meadows/Founders Interchange, is the high bluff topography that is part of the Colorado Piedmont section of the Great Plains physiographic province. The Colorado Piedmont is a broad erosional trench that separates the Southern Rocky Mountains from the High Plains. Structurally, the site lies along the western flank of the Denver Basin. Relatively flat uplands and broad valleys characterize the present-day topography of the Colorado Piedmont in this region.

Geomorphology

Surficial geologic conditions at the Happy Canyon Creek Bridge site, as mapped by the US Geological Survey (USGS), consist of Piney Creek Alluvium of Holocene age. These alluvial materials have been described as yellowish brown to grayish brown poorly sorted silt, clay, sand, and interbedded gravel. The

Piney Creek Alluvium is commonly about 1.5 to 4.5 meters (5 to 15 feet) in thickness, but locally may be as much as 9 meters (30 feet) thick.

Onsite claystone materials are not recommended for use beneath structural areas of the site or as backfill. Should claystone materials be used for general site grading, placement in fills at non-structural locations on the site is recommended.

Bedrock

Bedrock underlying the surface units consists of the Dawson and Denver Formations of Paleocene age. The Dawson Formation unit at the Happy Canyon Creek Bridge site has been described as interbedded olive claystone and sandstone. The Denver Formation at the site has been described as medium gray to grayish brown claystone. In the Parker Quadrangle, the thickness of the Dawson Formation is reported to be approximately 460 meters (1,500 feet), while the Denver Formation is about 6 to 15 meters (20 to 50 feet). It should be recognized that the information presented in this USGS publication is of a generalized nature, and local variations are possible.

Swell Potential

Mapping completed by the Colorado Geological Survey indicates the Happy Canyon Creek Bridge site is in an area of low to very high swell potential. The Surrey Ridge Bridge site is in an area of moderate swell potential. Potentially expansive materials mapped in this area include bedrock, weathered bedrock, colluvium, and surficial deposits.

Seismic Risk

The I-25 Corridor is located in Seismic Risk Zone I of the Seismic Zone Map of the United States as indicated on Figure 16-2 of the *1997 Uniform Building Code*. The principal structural components of the project will be bridges. Seismic design of bridges is governed by the *Standard Specifications for Highway Bridges*, 16th Edition. These specifications place the I-25 Corridor project in Seismic Performance Category A. No detailed seismic analysis is required for bridges in Seismic Performance Category A; although, specific requirements for connections between the substructure and the superstructure and for the length of the beam seat must be met.

Groundwater

Based upon review of USGS maps, regional groundwater is expected in unconsolidated alluvial deposits on the Happy Canyon Creek site, at depths ranging from 1.5 to 3.0 meters (5 to 10 feet) below the existing ground surface. For the Surrey Ridge Interchange site, regional groundwater beneath the project area is located in the Dawson Aquifer, generally below a depth of 6 meters (20 feet), and commonly more than a depth of 30 meters (100 feet) below present ground surface. Locally, shallow groundwater can be found in alluvial and colluvial deposits along modern streambeds.

Slope Stability

Existing cut slopes are 2:1 (horizontal: vertical) or slightly flatter, reaching a maximum height of 17

meters (55 feet) in the cut west of the southbound lanes and 10 meters (33 feet) at the cut east of the northbound lanes. A near vertical cut face in the sandstone caprock known as "The Bluffs" caps the east cut. This near vertical cut is an additional 5 meters (18 feet) high.

The slopes in the cut area west of the highway form ridges and swales sloping steeply down to the east toward the highway. Slopes east of the highway, in this area, extend gently to the east toward Happy Canyon Creek.

Southern Area

As the alignment transitions from the high bluff topography between C-470 and the Meadows/Founders Interchange to the Plum Creek floodplain, the geomorphology changes; this is detailed in recent bridge foundation geotechnical reports, from studies between the Meadows/Founders Parkway Interchange and the Plum Creek Parkway Interchange.

US 85/I-25 Interchange

The subsoils encountered in exploratory borings consist of approximately 0.6 to 5 meters (2 to 17 feet) of silty to clayey, slightly gravelly to gravelly sand fill or 1.1 to 1.2 meters (3.5 to 4 feet) of slightly clayey to clayey sand overlying very hard, weakly-cemented sandstone bedrock to the maximum explored depth of approximately 11 meters (35 feet). The lateral and vertical extent of the fill was not determined. A thin layer of topsoil or asphalt was encountered at the ground surface in three of the borings. Groundwater was encountered in two of the borings at depths between approximately 7 and 8.5 meters (23 and 28 feet) at the time of drilling and in the two borings checked at depths between approximately 2.1 and 2.4 meters (7 and 8 feet) when measured 31 days after drilling.

Wolfensberger Road Interchange

The surrounding terrain consists of rolling to mountainous topography drained by nearby Plum Creek. Site topography consists of sloping embankment material constructed for the existing G-17-R. Exploratory borings were drilled at the following locations of the proposed bridge abutments and pier for the bridge over Plum Creek:

Abutment 1

Subsurface material consists of up to 1.1 meters (3.6 feet) of embankment fill consisting of sandy clay. Underlying the embankment fill is Plum Creek floodplain alluvium consisting of 5.0 meters (16.5 feet) of loose silty gravelly sand to slightly denser sandy gravel. Underlying the overburden materials is a soft, friable, gray sandstone grading to harder blue-gray shale. The water table was encountered near elevation 1,875 meters (6,135 feet).

Pier 2

Subsurface materials at Pier 2 consist of approximately 0.6 to 0.9 meter (2 to 3 feet) of fill. Underlying the fill was approximately 6.4 meters (21 feet) of naturally deposited loose to medium, dense, gravelly sand. Underlying the gravelly sand was a sandy claystone to shale bedrock. The

gravelly sand was weathered claystone bedrock containing a petroleum residue and odor. The water table was encountered near elevation 1,872 meters (6,143 feet).

Abutment 3

Subsurface materials at abutment 3 consist of approximately 7 meters (23 feet) of embankment fill. The fill consists of loose and gravelly clay to soft, silty, and gravelly clay. Underlying the fill material is 2.1 meters (7 feet) of thick naturally deposited medium dense gravelly sand. Sandy claystone grading to harder sandy shale underlies the gravelly sand at elevation 1,872 meters (6,143 feet). The water table was encountered at elevation 1,872 meters (6,143 feet).

5th Street over Plum Creek and I-25

The geotechnical investigation reported the following soils and geologic conditions at the site:

The subsurface conditions encountered as part of this study vary greatly, but are generally consistent with the Colorado Geologic map. Most of the valley and hillsides contain some old artificial fill at the surface, although the thinnest sections are in the creek flood plain, and the thickest are near the planned abutment locations. The fill generally overlies a thick section of alluvial deposits of sand with some gravel and occasional clay layers.

The creek and the valley are incised into bedrock of the relatively flat-lying Dawson Arkose Formation. The Dawson Arkose Formation is of Paleocene Age and consists of conglomerate, sandstone, shale, and claystone. On the project site itself, there is an outcrop of weathered claystone, sandstone, and conglomerate immediately downstream of an existing railroad bridge near where a culvert is planned.

Slope Stability

In general, the geotechnical investigations along I-25 agree that slopes graded at 2 meters (6 feet) horizontal to 0.6 meter (2 feet) vertical (2:1) will provide long-term stability. However, to provide a gentle slope for the recovery of errant vehicles, revegetation, slope stability, and appearance, exposed slopes should ideally be no greater than 1.2 meters (4 feet) horizontal to 0.3 meter (1 foot) vertical (4:1). Care should be taken when planning these slopes to avoid triggering ancient landslides.

Soils

With the exception of the Happy Canyon area, soil conditions along the I-25 Corridor from Arapahoe County to Newman Gulch primarily consist of soils in the Fondis-Kutch association. These areas are characterized by deep, nearly level to gently sloping, loamy and sandy soils on floodplains and terraces. Fondis soils are deep and have clay subsoil that is underlain by calcareous older soil. Kutch soils are generally found at lower elevations than Fondis soils and have clay subsoil that is underlain by shale or sandstone.

Near Happy Canyon, and to the south of Newman Gulch, I-25 crosses soils of the Bressler-Newlin-Stapleton association. These are deep, gently sloping to moderately steep sandy and gravelly soils. Most of

the soils in this association have good bearing strength for foundations. Close to Castle Rock, near the US 85/I-25 Interchange, soil conditions change to the loamy, alluvial land of the Sampson association. These soils are deep and nearly level to gently sloping, loamy, and sandy soils on floodplains and terraces. Flooding is a hazard in these areas, especially in lower lying areas. Gullies are common in areas of alluvial land. Table 4.14 describes characteristics of the specific soil types found along the I-25 Corridor.

Hazards and Constraints

Much of the northern portions of the I-25 Corridor from C-470 to the Happy Canyon Interchange are designated as areas containing unstable or potentially unstable slopes. In these areas, evidence exists of past slope movement or geologic conditions favorable to slope failure. An area of potential rockfall or rockslide and debris avalanche hazard is located along I-25 from an area near the Happy Canyon Interchange south for about 3.2 kilometers (2 miles). These areas are subject to falling, sliding, or avalanching of individual blocks of rock or accumulations of blocky material, usually during heavy rainstorms. In addition to these classifications, most of the I-25 Corridor is designated as moderate to high erosion susceptibility, which include areas that are susceptible to erosion due to slope, composition, poor consolidation of surficial materials, sparse vegetation cover, or proximity and similarity to areas already undergoing accelerated erosion. A small portion of the corridor to the north of Newlin Gulch is classified as a low erosion susceptibility area. These areas are often characterized by materials that are difficult to excavate and by poorly defined surface drainage.

Table 4.14
Common Soil Types Found Along the I-25 Corridor

Symbol	Name	Description	Slopes (%)	Erosion Hazard	Size of Areas	Runoff	Primary Use
KtE	Kutch sandy loam	Strongly sloping to moderately steep soil located on alluvial fans, valley side slopes below rock cliffs, and below stony land along major drainageways.	5-20	Moderate	> 40 hectares (100 acres)	Rapid	Grazing
KwF	Kutch Newland Stapleton complex	Composed of 35% Kutch soils, 25% Newlin soils, 25% Stapleton soils, and 15% other soil types.	8-40	Moderate	N/A	Rapid	Grazing Wildlife
FoD	Fondis clay loam	Located on uplands in northern portions of the corridor. Gullies are found on larger drainageways not protected by grass.	3-9	Moderate	Irregular, 16-240 hectares (40 to 600 acres)	Medium	Cultivated (grains) Grazing
Fu	Fondis Kutch Association	Strongly sloping to steep soils on upland areas. Composed of 50% Fondis loam and 35% Kutch sandy loam. Other soil types comprise about 15% of the association.	5-40	Moderate to severe	N/A	Medium to Rapid	Grazing Wildlife

Note: N/A – Data not available

Source: U.S. Department of Agriculture, Soil Conservation Service, Soil Survey of Castle Rock Area, Colorado, November 1994

During construction of additional southbound climbing lanes approximately 0.8 kilometer (0.5 mile) south of

Lincoln Avenue in the spring of 2000, the contractor triggered two landslides. The slides propagated uphill and daylighted outside of the CDOT ROW at the crest of the steep natural slopes located above the existing cut slopes. The contractor had decreased the proposed lower slope angles and pushed the toe of the new cut slope further to the west, in order to generate more fill material. The cause of the slides, although not specifically defined in the report, *Engineering Geology for Proposed Cuts to Widen Interstate 25, CDOT Project No. IM 02052-038*, August 19, 1998, appears to be the result of general unloading of the toe of the steep upper slope.

These slope failures, although not catastrophic, emphasize the need for detailed geologic and geotechnical investigations prior to any slope modifications along the I-25 Corridor. The constructed slopes in question were less steep than the 2:1 slopes present along a majority of this corridor, and they were still subject to failure because of the presence of weak shear zones in the Denver Formation. The *Engineering Geology for Proposed Cuts to Widen Interstate 25, CDOT Project No. IM 02052-038*, document states: "The potential for triggering possible landslide movements should be carefully considered in performing evaluations for future roadway projects and private developments on the west and east side of the highway adjacent to and within the project vicinity."

4.3.5.2 US 85 Corridor Geology

A survey of available geologic reports along the US 85 Corridor was made to identify subsurface geology within the area affected by roadway, major structure, and drainage construction. Soil information generated from research allows a determination of how drainage structures and erosion control can be impacted by soil conditions.

The US 85 Corridor is located in Seismic Risk Zone I of the Seismic Zone Map of the United States as indicated on Figure 16-2 of the *1997 Uniform Building Code*.

The review of these reports indicated that the soil and subsurface conditions of US 85 are as follows.

Northern Area

The northern area begins at the US 85 and C-470 Interchange and extends south approximately 5.2 kilometers (3.3 miles) through the Lakeside Drive and US 85 Intersection.

Geomorphology

Surficial geologic conditions in the northern area were mapped by the USGS as eolian (wind-blown) sand and Broadway Alluvium. For this portion of the US 85 Corridor, the roadway parallels Plum Creek in a southerly direction, remaining on the east side of the creek. The eolian sand deposit is described as fine to medium sand derived mainly from alluvium of streams and distributed east of the source area by the wind. The Broadway Alluvium is described as gravel, sand, silt and clay that forms an alluvial terrace above the present creek level. Deposits of major streams east of the South Platte River are mostly sand. This deposit is a source of sound aggregate. The Broadway Alluvium is commonly less than approximately 7.6 meters (25 feet) thick.

Bedrock

Bedrock underlying the surface units consists of the Dawson, Denver, and Arapahoe Formations of Paleocene to Upper Cretaceous age. The formations are all described as containing sandstone, siltstone, claystone, and conglomerate and are highly locally variable. It should be realized that the information presented in this FEIS is of a generalized nature and local variations are possible. No large exposures are present in highway cuts along this section of the alignment.

Swell Potential

Swell potential of the subsoils in this area is low, although a significant risk of collapse is present with eolian soils, present over a significant portion of this area.

Groundwater

Shallow local groundwater is expected in unconsolidated alluvial deposits at this portion of the alignment, at or slightly below the water level in Plum Creek.

Slope Stability

Existing slopes on the east side of the highway are very flat and range from 40:1 (horizontal: vertical) or slightly flatter to 8:1 and up to 39.6 meters (130 feet) high. The topographic relief present to the east is located a significant distance from the present alignment which can be described as flat to very flat with some slight rolling hills toward the south of this area.

Central Area

The central area begins at the Lakeside Drive and US 85 Intersection, and extends south approximately 10 kilometers (6.3 miles) to 1.6 kilometers (1.0 mile) north of the intersection of SH 67 and US 85 in Sedalia.

Geomorphology

Surficial geologic conditions in the central area were mapped by the USGS as Broadway, Louviers, and Piney Creek Alluvium. For this portion of the US 85 Corridor, the roadway parallels Plum Creek in a southeasterly direction, remaining on the east side of the creek. The primary surficial materials are the Louviers and Piney Creek Alluvium, described as gravel, sand, silt, and clay of modern stream plains and slightly older low terraces less than 6 meters (20 feet) above stream level. The Piney Creek Alluvium is present in the northern portion of this section and in fingers that extend eastward from the main Plum Creek drainage in small valley fan drainages. In streams east of the South Platte River, the Piney Creek deposits are mainly sand. Sand, silt, and clay compose the deposits in small streams and tributaries. The Post-Piney Creek and Piney Creek Alluvium are commonly less than approximately 6 meters (20 feet) thick. Present to a lesser degree is the Broadway Alluvium, described above as gravel, sand, silt, and clay.

Bedrock

Bedrock underlying the surface units consists of the Dawson and Arapahoe Formation of Paleocene to Upper Cretaceous age. The formation is described as containing sandstone, siltstone, claystone, and

conglomerate and is highly locally variable. It should be recognized that the information presented in this FEIS is of a generalized nature and local variations are possible.

Two large exposures of the bedrock are present approximately 3.2 kilometers (2.0 miles) north of Sedalia on the east side of the existing highway. These cut slopes are between 6 and 12 meters (20 and 40 feet) high and are cut almost vertically. Weathering and raveling of the slope is evident from the small piles of loosened material present at the base of these cuts. The predominant material exposed in these cuts is a tan to orange sandstone with bands of claystone up to 0.9 meter (3.0 feet) in thickness. Capping the exposure is an alluvial deposit with sand, gravel, cobbles, and large boulders up to 1.5 meters (5.0 feet) in diameter.

An additional exposure is located approximately 1.6 kilometers (1.0 mile) north of Sedalia on the east side of the highway. Sandstone is again the predominant material in this almost vertical road cut. Also present was a very hard capping layer of highly cemented sandstone that had resisted weathering and raveling and showed relief from the remaining cut.

Slope Stability

Existing slopes on the east side of the highway are more steep in this section and range from 10:1 (horizontal: vertical) or slightly flatter to 4:1 and up to 40 meters (140 feet) high. The topographic relief present to the east is located adjacent to the present alignment. Two major and one minor cut slopes, described above in the geology discussion, are close to vertical in slope and range in height up to 12 meters (40 feet).

Swell Potential

Vegetation consists of native rangeland grasses, yucca, other shrubs, herbs, small cactus, and brush. Most of the existing near-vertical cut slopes are devoid of vegetation. Mapping completed by the Colorado Geological Survey indicates this central portion of the US 85 alignment is in an area of low to high swell potential. Potentially expansive materials in this area include bedrock, weathered bedrock, and surficial deposits. The swell potential of the claystone present in isolated layers in the Arapahoe formation is high. The swell potential of the subsoils and bedrock along this section is high, dependent on the presence of clay lenses in the alluvial materials, weathered bedrock zones, and whether the alignment intersects the expansive claystone bands in the Arapahoe Formation.

Groundwater

Shallow local groundwater is expected in unconsolidated alluvial deposits at this portion of the alignment, at or slightly below the water level in Plum Creek.

Southern Area

The southern area begins 1.6 kilometers (1.0 mile) north of the intersection of SH 67 and US 85 in Sedalia, and extends approximately 11.6 kilometers (7.3 miles) south of the US 85/I-25 Interchange.

Geomorphology

Surficial geologic conditions in the south area were mapped by the USGS as Slocum, Louviers, and Piney Creek Alluvium. For this portion of the US 85 Corridor, the roadway parallels Plum Creek in a southeasterly direction, remaining on the east side of the creek, turning almost eastward at Sedalia. The primary surficial materials are the Slocum and Louviers Alluvium. The Louviers Alluvium is described as gravel, sand, silt, and clay of modern stream plains and underlies much of the Piney Creek Alluvium in channels of major streams. It is a major source of commercial sand and gravel. The Slocum Alluvium is described as bouldery cobble gravel near the mountain front, decreasing in grain size eastward away from the mountains. The Piney Creek Alluvium is present in fingers that extend eastward from the main Plum Creek drainage in small valley fan drainages. In streams east of the South Platte River, the Piney Creek deposits are mainly sand. Sand, silt, and clay compose the deposits in small streams and tributaries. The Piney Creek Alluvium is commonly less than approximately 6 meters (20 feet) thick.

Bedrock

Bedrock underlying the surface units consists of the Dawson and Arapahoe Formation of Paleocene to Upper Cretaceous age. The formation is described as containing sandstone, siltstone, claystone, and conglomerate and is highly locally variable. It should be recognized that the information presented in this FEIS is of a generalized nature and local variations are possible. No large exposures are present in highway cuts along this section of the alignment.

Slope Stability

Existing slopes on the east side of the highway are very flat and range from 20:1 (horizontal: vertical) or flatter to 40:1. The topographic relief present to the east is located at least 305 meters (1,000 feet) from the present alignment, which can be described as flat to very flat with some slight rolling hills.

Swell Potential

Vegetation consists of native rangeland grasses, yucca, other shrubs, herbs, small cactus, and brush. Mapping completed by the Colorado Geological Survey, indicates this southern portion of the US 85 alignment is in an area of low to high swell potential. Potentially expansive materials in this area include bedrock, weathered bedrock, and surficial deposits. The swell potential of the claystone present in isolated layers in the Arapahoe Formation is high. The swell potential of the subsoils and bedrock along this section is highly dependent on the presence of clay lenses in the alluvial materials, weathered bedrock zones, and whether the alignment intersects the expansive claystone bands in the Arapahoe Formation.

Groundwater

Shallow local groundwater is expected in unconsolidated alluvial deposits at this portion of the alignment, at or slightly below the water level in Plum Creek.

Soils

Soil conditions along the US 85 Corridor are characteristic of the loamy, alluvial land of the Sampson association. These soils are deep, nearly level to gently sloping, loamy, and sandy soils located on the floodplains and terraces of Plum Creek. Flooding is a hazard in these areas, especially in lower lying areas. Gullies are common in areas

of alluvial land. In areas near Riverside and Sedalia, the corridor crosses the Bressler-Newlin-Stapleton association. These are deep, gently sloping to moderately steep sandy and gravelly soils. Most of the soils in this association have good bearing strength for foundations. Table 4.15 describes characteristics of the specific soil types found along the US 85 Corridor.

Hazards and Constraints

Through most of the corridor, US 85 follows the border between an area of low-erosion susceptibility to the west and south, and an area of medium to high erosion susceptibility with unstable or potentially unstable slopes to the east and north. The northern and eastern slopes show evidence of past slope movement or display geologic conditions favorable for slope failure. Areas to the south and west along Plum Creek are subject to occasional flooding and deposition of sediment. In many locations, stream bottomlands are aggrading by deposition of sediment produced by accelerated modern erosion in uplands.

4.3.6 Wildlife

The APE for the I-25 Corridor and US 85 Corridor encompasses an area 60 meters (200 feet) from either side of the existing I-25 ROW and an area 30 meters (100 feet) from either side of the existing US 85 ROW. The following wildlife and habitat descriptions are based on surveys of the APE. A broader level of analysis and description is also provided for landscape adjacent to the APE.

Table 4.15
Common Soil Types Found Along the US 85 Corridor

Symbol	Name	Description	Slopes (%)	Erosion Hazard	Size of Areas	Run off	Primary Use
Bo	Blakeland-Orsa Association	Gently sloping soils on footslopes and alluvial fans in northern portion of the county	1-4	Slight to moderate	Long, irregular, >8.1 ha (20 acres)	Slow to medium	Native grass Cultivated (dryland grain, irrigated alfalfa)
Sa	Sampson loam	Gently sloping soils on terraces along major drainageways in northern portion of the county	1-4	Slight	Long, irregular, > 40.5 ha (100 acres)	Slow	Cultivated
BsE	Bresser-Louvier complex	Sloping to steep soils on side slopes	7-30	Moderate to high	Irregular, > 16.2 ha (40 acres)	Medium to rapid	Grazing Wildlife
BrD	Bresser sandy loam	Soil is located on uplands in northern portion of the county	3-9	Moderate	< 64.7 ha (160 acres)	Medium	Cultivated (various) Grazing
BrB	Bresser sandy loam	Nearly level soil located on terraces and uplands in northern portion of the county	1-3	Slight to moderate	< 24.3 ha (60 acres)	Slow	Cultivated

> greater than

< less than

Source: U.S. Department of Agriculture, Soil Conservation Service, Soil Survey of Castle Rock Area, Colorado, November 1994

The APE and surrounding landscape occur within the western edge of the Great Plains – Palouse Dry Steppe

Province. Native habitats within the APE include grasslands, shrublands, woodlands, and riparian areas. Steppe is synonymous with short-grass prairie and describes a class of short grasses usually bunched and sparsely distributed. Common native short grasses in this ecoregion include blue grama (*Chondrosum gracile*) and buffalograss (*Buchlo• dactyloides*). Other grasses include western wheatgrass (*Pascopyrum smithii*), needle and thread grass (*Heterostipa comata*), fescue (*Festuca* spp.), and bluegrass (*Poa* spp.). The grasslands east of the Rockies have scattered trees and shrubs, such as plains cottonwood (*Populus deltoides*), ponderosa pine (*Pinus ponderosa*), rabbitbrush (*Chrysothamnus nauseosus*), and Gambel oak (*Quercus gambelii*).

Vegetation along streams within the APE is dominated by plains cottonwood, box elder (*Negundo aceroides*), and an understory of crack willow (*Salix fragilis*), peachleaf willow (*Salix amygdaloides*), and sandbar willow (*Salix exigua*). These riparian habitats may represent the most important wildlife habitats in the APE and the adjacent landscape due to the abundance and richness of species they support. Riparian areas also provide excellent wildlife movement corridors.

Most wildlife habitat within the APE is dominated by human activity due to its past use as a transportation corridor; associated residential, commercial, and industrial development; and historic cattle ranching. Despite human impacts on the landscape, Douglas County maintains an abundance of wildlife and wildlife habitat. In the *Douglas County Parks, Trails, and Open Space Master Plan (1998)*, preservation of wildlife was stated by the public as a high priority. Identification of wildlife use areas was an important criterion in determining suitable or priority areas for conservation.

Douglas County has more than 15,000 hectares (37,000 acres) of open space within the county, which is managed by Douglas County Division of Open Space and Natural Resources. Douglas County Parks currently manages 120 hectares (293 acres) of developed parkland, and more than 970 hectares (2,400 acres) of unimproved open space.

In addition to County-managed open space, nearby protected areas such as Chatfield State Park, Plum Creek Riparian Corridor, Roxborough State Park, Pike National Forest, Woodhouse State Wildlife Area, Cherokee Ranch Foundation, and Highlands Ranch Open Space Conservation Area also exist. These areas serve as refuges for wildlife and become increasingly important as surrounding lands are converted from agriculture and natural landscape to developed areas. Additionally, much of the project area between Daniels Park Road and Titan Road along US 85 is relatively undeveloped. A recent wildlife tracking study indicated that wildlife regularly moves across and under US 85 within the undeveloped area.

For additional information on wildlife, see the *Wildlife Technical Report*, May 2000, amended, November 2000, and the *Wildlife Tracking and Habitat Connectivity Study US Highway 85 Corridor*, October 2000, in the Technical Reports Volume of the *South I-25 Corridor and US 85 Corridor FEIS*.

4.3.6.1 Mammals

Big game species found within the APE and adjacent landscape include elk (*Cervus elaphus*), mule deer (*Odocoileus hemionus*), white-tailed deer (*Odocoileus virginianus*), pronghorn (*Antilocapra americana*), black bear (*Ursus americanus*), and mountain lion (*Felis concolor*). A resident elk population uses habitat west of I-25 to the foothills west of US 85. In addition, a foothills population of elk uses severe-winter range within the northwest portion of the project area. The primary east-west elk movement corridor across I-25 is south of the Town of Castle Rock, outside the APE. Elk activity within the study area along US 85 appears to concentrate near

South Pollock Gulch in the northern portion of the study area and on Cherokee Ranch and adjacent properties in the southern portion of the study area. Cherokee Ranch has a year-round elk population of approximately 400. Winter field surveys of the APE revealed elk movement south of Cherokee Ranch across Daniels Park Road into adjacent developed areas north of Castle Rock and east toward the interstate. According to the CDOW, elk cross I-25 primarily south of Castle Rock; however, evidence of unsuccessful elk crossing on I-25 has been recorded north of Castle Rock near the Castle Pines Parkway Interchange. (See *Wildlife Technical Report* for elk range map.)

Mule deer travel and forage within the APE and are abundant in adjacent winter and severe-winter range along US 85 and summer range to the west. Mule deer concentrate on winter and severe winter range due to the availability of resources, particularly forage that is scarce or inaccessible in other portions of their range. Winter range condition and availability can be a limiting factor for ungulate species survival within a population. Therefore, threats to connectivity between ungulate winter range and other seasonal ranges can have serious negative consequences at the population level. White-tailed deer are relatively common along riparian corridors and adjacent uplands within the APE. (See *Wildlife Technical Report* for mule deer range map.)

Pronghorn occur east of US 85 in the northeast section of the project area near Highlands Ranch. Pronghorn also occur east of I-25; however, numbers are few because both corridors are undergoing rapid development. Pronghorn have been observed on several occasions during winter surveys near South Pollock Gulch on the east side of US 85. (See *Wildlife Technical Report* for pronghorn range map.)

Black bears in Colorado are most common in sub-alpine forests at moderate elevations, montane forests, and shrublands and within well-developed stands of oakbrush or berry-producing shrubs such as chokecherry (*Padus virginiana*) or serviceberry (*Amelanchier alnifolia*). Black bears likely use oak and mountain mahogany shrublands during their hyperphagic phase in late summer and fall, when abundant nuts and berries allow them to gorge prior to hibernation.

Mountain lions are common in rough, broken foothills often in association with montane forests and shrublands. Evidence from wildlife tracking stations includes a mountain lion crossing beneath US 85 between Louviers and Sedalia.

Other mammalian predators exist within the project area, including coyote (*Canis latrans*), red fox (*Vulpes vulpes*), bobcat (*Lynx rufus*), raccoon (*Procyon lotor*), badger (*Taxidea taxus*), long-tailed weasel (*Mustela frenata*), western spotted skunk (*Spilogale gracilis*), and striped skunk (*Mephitis mephitis*). These predators have all been detected crossing tracking stations set up in culverts under I-25 and US 85 within the APE.

Gray fox (*Urocyon cinereoargenteus*) habitat occurs throughout Douglas County in broken terrain, montane shrublands, riparian areas, and weedy margins of fields; however, their presence may be limited by competition with red fox. Swift fox (*Vulpes velox* – State Species of Concern and candidate species for federal protection under the Endangered Species Act [ESA]) reside in Colorado on the eastern plains in flat or very gently rolling topography and its presence is documented in eastern Douglas County. However, the highly eroded terrain interspersed with gullies and washes east of I-25, and the brushy habitat west of I-25 are not likely swift fox habitat (see Section 4.3.9, *Threatened, Endangered, and Other Special-Status Species*).

Other carnivores whose range includes Douglas County are ringtail (*Bassariscus astutus*), short-tailed weasel (*Mustela erminea*), black-footed ferret (*Mustela nigripes* – State Endangered and Federal Endangered) (see

Section 4.3.9, *Threatened, Endangered, and Other Special-Status Species*), and mink (*Mustela vison*).

Upland grasslands within the project area contain colonies of black-tailed prairie dogs (*Cynomys ludivicianus* – State Species of Concern and Federal Proposed Candidate Species). Desert cottontails (*Sylvilagus audubonii*) are often associated with black-tailed prairie dog colonies and grassland habitat with scattered shrubs. Grasslands also provide habitat for the thirteen-lined ground squirrel (*Spermophilus tridecemlineatus*). Black-tailed jackrabbits (*Lepus californicus*) may use areas east of I-25. Mountain cottontails (*Sylvilagus nuttallii*) are found within the shrubland (oak and mountain mahogany) habitats west of US 85, as are rock squirrels (*Spermophilus variegatus*). Golden-mantled ground squirrels (*Spermophilus lateralis*), least chipmunks (*Tamias minimus*), and Colorado chipmunks (*Tamias quadrivittatus*) are found in mountain shrublands and ponderosa pine communities. Abert's squirrels (*Sciurus aberti*) are dependent upon ponderosa pine for nesting and food. Abert's squirrels were observed within the APE during field surveys. Eastern cottontails (*Sylvilagus floridanus*) and fox squirrels (*Sciurus niger*) inhabit riparian areas within Douglas County, as do beavers (*Castor canadensis*) and muskrats (*Ondatra zibethicus*). Beavers and their dams were observed in East Plum Creek in Castle Rock.

Small mammal sign is abundant along the I-25 APE and US 85 APE, particularly deer mouse (*Peromyscus maniculatus*) and bushy-tailed woodrat (*Neotoma cinerea*). The five general habitat types within the APE likely support a diverse, small mammal population. Grasslands are habitat for the northern grasshopper mouse (*Onychomys leucogaster*) and the prairie vole (*Microtus ochrogaster*). Gambel oak and mountain mahogany shrublands contain small mammals such as Mexican woodrat (*Neotoma mexicana*) and brush mouse (*Peromyscus boylii*). Montane vole (*Microtus montanus*), longtailed vole (*Microtus longicaudus*), and heather vole (*Phenacomys intermedius*) are all found in ponderosa pine woodlands. Riparian areas within the project area provide habitat for the threatened Preble's Meadow Jumping Mouse (*Zapus hudsonius preblei* – State Threatened and Federal Threatened) (see Section 4.3.9, *Threatened, Endangered, and Other Special-Status Species*) and the meadow vole (*Microtus pennsylvanicus*).

The western small-footed myotis (*Myotis ciliolabrum*) occurs in all the habitat types present within the project area. Little brown bats (*Myotis lucifugus*) would likely occur within wooded habitats (cottonwood and ponderosa) of the project area. Mountain shrublands provide habitat for the fringed (*Myotis hysanodes*) and long-eared myotis (*Myotis evotis*), big brown bat (*Eptesicus fuscus*), and Townsend's big-eared bat (*Plecotus townsendii*).

4.3.6.2 Birds

Breeding birds found in upland grass communities within the APE and surrounding landscape include horned lark (*Eremophila alpestris*), meadowlark (*Sturnella neglecta*), lark sparrow (*Chondestes grammacus*), common night hawk (*Chordeiles minor*), Swainson's hawk (*Buteo swainsoni*), northern harrier (*Circus cyaneus*), and burrowing owl (*Athene cunicularia* – State Threatened). Common breeding birds within Gambel oak and mountain mahogany shrublands include the spotted towhee (*Pipilo maculatus*), green-tailed towhee (*Pipilo chlorurus*), Virginia's warbler (*Vermivora peregrina*), orange-crowned warbler (*Vermivora ruficapilla*), scrub jay (*Aphelocoma coerulescens*), black-headed grosbeak (*Pheucticus melanocephalus*), and wild turkey (*Meleagris gallopavo*). Ponderosa pine forests provide breeding habitat for the Stellar's jay (*Aphelocoma coerulescens*), chipping sparrow (*Spizella passerina*), mountain chickadee (*Parus gambeli*), white-breasted nuthatch (*Sitta carolinensis*), and flammulated owl (*Otus flammeolus*). Low-elevation riparian areas are breeding habitat for Bullock's oriole (*Icterus graduacauda*), yellow warbler (*Dendroica petechia*), black-billed magpie (*Pica pica*), northern flicker (*Colaptes auratus*), house wren (*Troglodytes aedon*), and great horned owl (*Bubo virginiana*).

An active golden eagle (*Aquila chrysaetos*) nest is on the Cherokee Ranch south of Sedalia, approximately 1 kilometer (0.6 mile) from US 85. The nest site was active in March 2000 and has been consistently active in past years. Raptors observed within the APE and surrounding landscape during site visits include northern harrier (*Circus cyaneus*), ferruginous hawk (*Buteo regalis* – State Species of Concern), red-tailed hawk (*Buteo jamaicensis*), golden eagle (*Aquila chrysaetos*) and American kestrel (*Falco sparverius*). Other raptors that may be present within the study area include bald eagle (*Haliaeetus leucocephalus* – State Threatened and Federal Threatened) (see Section 4.3.9, *Threatened, Endangered, and Other Special-Status Species*), peregrine falcon (*Falco peregrinus* – State Species of Concern), prairie falcon (*Falco mexicanus*), and rough-legged hawk (*Buteo lagopus*), a winter resident in Colorado's grasslands. Sharp-shinned (*Accipiter striatus*) and Cooper's hawks (*Accipiter cooperii*) may occupy woodland habitats adjacent to the APE.

Chatfield Reservoir is a production area for breeding waterfowl and a staging area for migratory waterfowl. The South Platte River below the Chatfield Dam is winter range for waterfowl. Canada geese are commonly observed in agricultural fields and other habitats within the APE and adjacent landscape.

4.3.6.3 Tracking Study

Results from a wildlife tracking study in the I-25 and US 85 APE indicate that a variety of wildlife use bridges and culverts to cross under highways. Tracking stations that identify wildlife species crossing under bridges and through culverts, and quantify the number of crossing events, were established at four locations in November 1999 and at two additional stations in January 2000 along the I-25 Corridor and US 85 Corridor (Figure 4.5a and Figure 4.5b). Table 4.16 summarizes the crossings at each station.

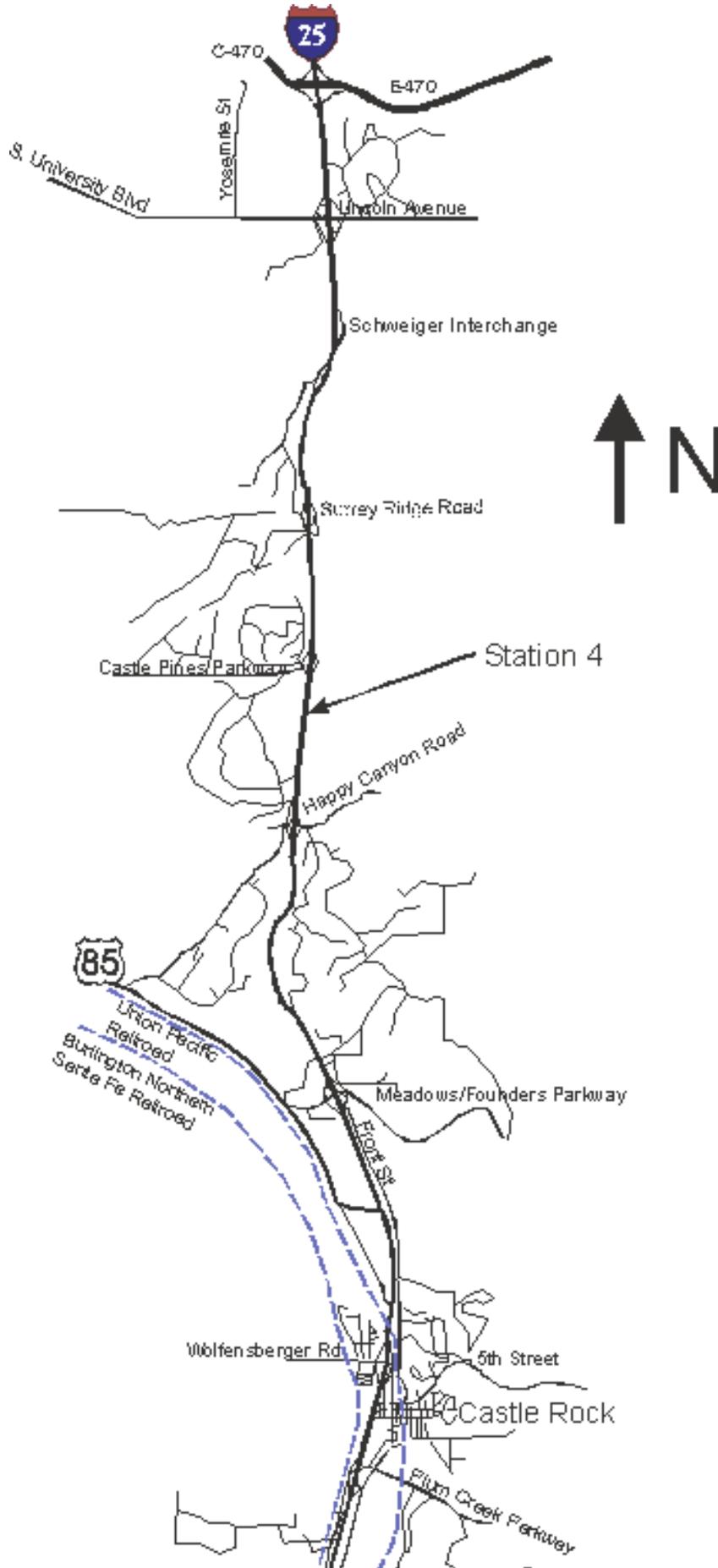
Table 4.16
Summary of Wildlife Tracking Station Records for Culverts
and Bridges Under I-25 and US 85 as of May 31, 2000

Species	TRACKING STATION						Total
	1 MP 195.1	2 MP 192.0	3 MP 189.6	4 (I-25) MP 188.0	5-East MP 192.4	5-West MP 192.4	
Mt. Lion	0	1	0	0	0	0	1
Bobcat	0	39	20	0	5	5	69
Coyote	3	1	1	7	10	4	26
Red fox	4	8	8	0	19	21	60
Badger	0	0	0	0	0	1	2
Raccoon	2	19	16	2	4	5	48
Striped skunk	0	15	5	0	27	31	78
Weasel	1	2	0	0	0	0	3
Cottontail	6	12	5	12	0	0	35
Squirrel	2	35	12	0	15	8	72
Woodrat	0	14	5	57	171	136	383
Dog	22	2	6	0	4	5	39
Domestic cat	42	0	3	0	0	0	45
Human	38	2	1	10	8	18	77
ATV *	2	0	0	0	0	3	5
Total Records	122	150	83	88	263	237	943
Total Tracking Days	196	196	196	154	147	147	

*All-terrain vehicle

Figure 4.5a

Wildlife Tracking Station Locations along the I-25 corridor



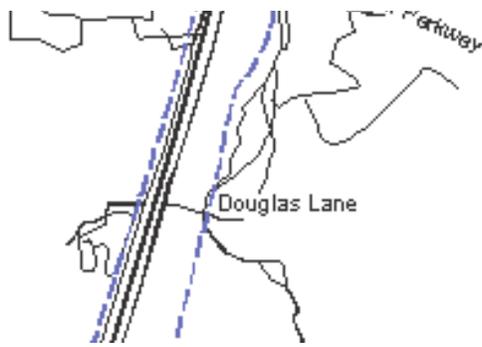
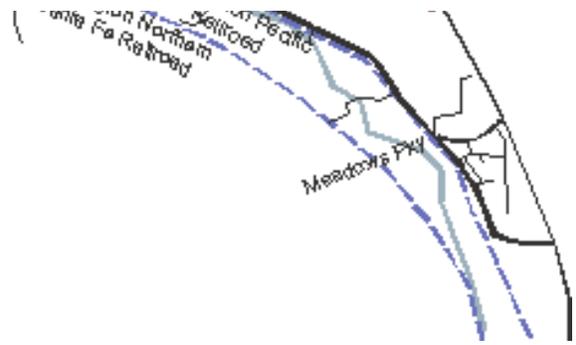


Figure 4.5b
Wildlife Tracking Station Locations along the US 85 Corridor





From November 15, 1999, through May 31, 2000, 943 crossing events were detected for 11 wildlife species (excluding mice). Eight of these were carnivores (bobcat, mountain lion, coyote, red fox, badger, weasel, skunk, and raccoon), and three were small mammals (woodrat, squirrel, and cottontail). Mice and voles were also recorded at the six tracking stations; however, the high number of records may be skewed by individuals living within the structure. One hundred and sixty-six domestic crossings were also recorded including dogs (39), domestic cats (45), all-terrain vehicles (ATV) (5), and human (77). No ungulate crossings were detected at any of the tracking stations; however, elk and deer were recorded crossing at grade.

Several factors that may affect ungulate and other wildlife use of bridges or culverts within the study area were noted during tracking surveys. Human occupation or related effects (e.g., noise, lighting, pets) may inhibit wildlife crossing. Artificial substrate (e.g., concrete) size (i.e., openness factor), structural barriers (e.g., riprap, fencing), and adjacent landscape features could also limit suitability of underpasses for some species.

An underpass may also appear long and confining so as to preclude passage by ungulates. Relative openness of an underpass, described as the "openness factor," may be a primary stimulus to ungulates approaching a potential crossing. The openness factor is calculated as $(\text{height} \times \text{width}) / \text{length}$. A CDOW study indicates that an openness factor of greater than 0.6 is required for motivated deer to use culverts or other below-grade structures. Elk, which are generally 30 percent larger than deer, require a larger opening. All six crossings monitored in the tracking study possess at least one of the above-described inhibiting factors to ungulate crossing.

Table 4.17 identifies the tracking stations and potentially inhibiting features for deer and other wildlife.

Although a small openness factor may preclude use of some underpasses by some species of wildlife (e.g., ungulates), this same feature may not deter or may be preferred by other wildlife (i.e., carnivores). As shown on Table 4.17, the small openness factor of Station 2 does not appear to inhibit use of the culvert by carnivores relative to other tracking stations.

Moreover, some research indicates that openness may not be a reliable predictor of wildlife use of structures. Fencing and other management tools may be more important than openness in motivating wildlife use of structures to cross highways.

Tracking results at highway crossings along US 85 (Stations 1, 2, 3, 5-East, and 5-West) indicate that available bridges and culverts within the project area are being used to varying degrees by carnivores and small- to medium-sized mammals. Although US 85 bisects the range of residential populations of deer and elk, current bridges and culverts under US 85 appear inadequate as crossing structures for deer and elk due to size, fencing, substrate, and proximity to human disturbance.

Additional tracking surveys, conducted after snow events, focused on detecting wildlife movement over the highway. Coyotes (1) and red fox (2) are the most frequently detected animals crossing over US 85, and they were detected at a higher rate than through monitored culverts. Next in crossing frequency are rodents, mule deer, and elk.

Table 4.17

Station Number, Structure, Site Description, Openness Factor, and Potential Inhibiting Features to Wildlife Movement for Wildlife Tracking Stations Under I-25 and US 85

Station No. (Milepost)	Structure	Site Description	Openness Factor	Potential Inhibiting Features
1 (195.2)	Bridge	Bar, liquor store on west side of US 85	4.50	Noise, lighting, human activity, and fencing
2 (192.0)	2.43m x 3.64m x 97.97m (8'x12' x 320')(west) 2.73m x 3.64m x 97.07m (9'x12' x 320')(east) Multi-directional stone culvert	Undeveloped both side US 85	West-0.30 East-0.34	Long and confining passage, openness factor, and fencing
3 (189.6)	2.44m x 2.44m x 16.46m (8'x8'x54') concrete box culvert	House and 3 dogs, west side of US 85	1.19	Dogs, human activity, concrete substrate, and openness factor
4 (188.0)	2.13m x 1.82m x 57.30m (7'x6'x188') concrete box culvert	Undeveloped both sides of I-25	0.22	Concrete substrate, culvert structural barrier, openness factor
5-East (192.4)	1.82m x 1.82m x 25.78m (6'x6'x85') concrete box culvert	Undeveloped east side of US 85; horse pasture on west side	0.42	Fencing, openness factor
5-West (192.4)	1.82m x 1.82m x 27.30m (6'x6'x90') concrete box culvert	Horse pasture on east side; undeveloped on west side	0.40	Fencing, openness factor

Wildlife habitat was evaluated in three primary connectivity zones that cross US 85 within the study area. These zones were designated A, B, and C. Zone A represents the northernmost zone of viable habitat connectivity in the study area. This zone is dominated by the Beeman Creek and South Pollock Gulch drainages, both of which arise east of US 85 at an approximate elevation of 1,920 meters above mean sea level (amsl) (6,300 feet amsl). These drainages flow west, ultimately crossing beneath US 85 at bridge structures. Neither drainage supports a year-round, permanent flow of surface water. The topography of this zone features a gentle slope from high ground in the vicinity of Daniels Park, to a low elevation represented by the channel of Plum Creek, west of US 85. The landforms are relatively diverse, offering creek bottoms, ridgelines, and slopes facing north, west, and south.

The plant communities of Zone A are dominated by a shrubby understory of Gambel oak, three-leaf sumac, and chokecherry. Herbaceous vegetation in the zone includes several graminoids (e.g., buffalograss, thread-leaved sedge, smooth brome, and needle and thread) and forbs (e.g., yucca, prickly pear cactus, purple mustard, and chiming bells). Evidence of wildlife observed during the habitat evaluation of the area included direct observations of an antelope buck, a mule deer doe, a coyote, and several bird species, including mourning dove, scrub jay, and Bullock's oriole. In general terms, vegetation along the banks of South Pollock Gulch drainage appears to offer good forage potential and cover (i.e., large patches of oak and sumac brush).

Wildlife tracking in Zone A (Station 1 within South Pollock Gulch) recorded tracks for large mammals (coyote and fox), medium mammals (raccoon and weasel), and small mammals (cottontail and squirrel). The total number of wild animal tracks (excluding humans and domestic species) counted at Station 1 versus the other four tracking stations along US 85 is low, ranking last out of six stations and accounting for only 2.4 percent of all wild animal passages under the highway at the six underpasses. Human and other domestic tracks at Station 1 were numerous, possibly due to the proximity of a liquor store and bar, and other human activities in the immediate vicinity. Human presence in Zone A and domestic passages through Station 1 underpass combine to explain the lower number of wildlife tracks recorded in the vicinity of South Pollock Gulch Bridge. In terms of both underpass and at-grade tracks, Zone A ranked lowest in terms of total wild animal tracks counted (18 underpass and 36 animals for six tracking events). Despite the lower track counts for this zone, Zone A still represents an important wildlife habitat connection. Reasons include the short distance between OSCA and the Plum Creek Riparian Corridor via South Pollock Gulch (approximately 1.6 kilometers [1.0 mile]), presence of relatively undisturbed terrain (development is primarily north of this zone) and the relatively simple techniques required to improve existing habitat (i.e., planting shrubs along drainages, replacing/removing fences, and managing existing development).

Zone B is dominated by streams draining the Cherokee Ranch property on the east side of US 85. These streams flow westward beneath US 85 at Stations 2, 5-E, and 5-W. As with Zone A drainages, the unnamed drainages of Zone B arise at an approximate elevation of 1,920 meters (6,300 feet), and drop to the low point of the valley represented by the channel of Plum Creek (elevation approximately 1,731 meters [5,680 feet]). The topography east of US 85 is also very similar to that found in Zone A, featuring dissected upland, prominent ridgelines, and slopes facing north, west, and south.

The dominant vegetation of Zone B includes ponderosa pine (*Pinus ponderosa*) in several of the drainages, as well as relatively large patches of Gambel oak (*Quercus gambelii*), three-leaf sumac (*Rhus aromatica* subsp. *trilobata*) and chokecherry (*Padus virginiana*). Other understory species included currant (*Ribes* sp.), wild rose (*Rosa woodsii*), and mountain mahogany (*Cercocarpus montanus*). The herbaceous vegetation included the graminoids Indian ricegrass (*Achnatherum hymenoides*), crested wheatgrass (*Agropyron cristatum*), smooth brome (*Bromopsis inermis*), big bluestem (*Andropogon gerardii*), blue grama grass (*Chondrosium gracile*), sand dropseed (*Sporobolus cryptandrus*) and thread-leaved sedge (*Carex filifolia*). Diverse forbs were also observed, including chiming bells (*Mertensia lanceolata*), Nelson's larkspur (*Delphinium nuttallianum*), green gentian (*Frasera speciosa*), lupine (*Lupinus* sp.), sand lily (*Leucocrinum montanum*), blue flax (*Adenolinum lewisii*), Fremont's geranium (*Geranium caespitosum*), milkvetch (*Astragalus* sp.), golden banner (*Thermopsis montanum*), senecio (*Senecio* sp.), fleabane (*Erigeron* sp.), several species of mustard, yucca (*Yucca glauca*), and prickly pear cactus (*Opuntia* sp.) Vegetative cover is substantial and continuous through the drainages that ultimately join and go beneath US 85 at Stations 2, 5-E, and 5-W. Bird life, especially in the areas near ponderosa pine and oak thickets, is diverse. Some of the observed species in Zone B include blue-gray gnatcatcher (*Poliophtila caerulea*), western bluebird (*Sialia mexicana*), western meadowlark (*Sturnella neglecta*) spotted towhee (*Pipilo maculatus*), warbling vireo (*Vireo gilvus*), a species of warbler, several species of sparrow, magpies (*Pica pica*), brown-headed cowbird (*Molothrus ater*) (frequently associated with habitat fragmentation and edge effects), Cooper's hawk (*Accipiter cooperii*), red-tailed hawk (*Buteo jamaicensis*), and broad-tailed hummingbird (*Selasphorus platycercus*). Evidence of mammals in this zone included mule deer (*Odocoileus hemionus*), elk (*Cervus elaphus*), fox (*Vulpes vulpes* and *Urocyon cinereoargenteus*), cottontail rabbit (*Sylvilagus floridanus*), and porcupine (*Erethizon dorsatum*). Abundant elk sign was on the Navratil, C. Thomas, and Sedalia Land Co. properties. This sign included scat, browsed vegetation, fresh tracks, and fresh rubs on pine saplings. The elk sign was found both in drainages and on ridgelines within the zone.

The wildlife tracking data in Zone B, for Stations 2, 5-W, and 5-E indicate that this area acts as an important travel corridor for mammals, especially predators. Of note are the tracks at Station 2 for a mountain lion (*Felis concolor*), and significant track evidence for bobcat (*Lynx rufus*) and fox. Medium-sized mammals, especially raccoons (*Procyon lotor*) and skunks (*Mephitis mephitis*, *Spilogale putorius*), were noted to use the culverts of this zone. Small mammals, particularly woodrats (*Neotoma* sp.), heavily used Stations 5-E and 5-W. The at-grade track record for this zone reveals a relatively high count for large mammals (112). However, of these 112 large-bodied mammals, only 3 were ungulates. Zone B ranked first in wild animal tracks counted, with 608 underpasses, and 121 at-grade tracks counted, for a total of 729. Thus, Zone B is considered an important wildlife habitat connection based on the high quality of habitat observed during site reconnaissance, connectivity of this zone to conservation areas on both sides of US 85, the higher track counts detected at track stations and at-grade crossings in this zone, and the presence of little commercial or industrial properties to fragment the landscape or interfere with animal movements. As in both of the other two zones, some presence of noxious weeds and residential development is to be considered, but the habitat fragmentation is less severe than in other portions of the study area.

Zone C lies on the southern end of the study area. This zone is dominated by an unnamed drainage that flows south from Cherokee Ranch and beneath US 85 at Station 3. This zone is narrower and shorter than the two previous zones, due to the close proximity of Cherokee Ranch to the East Plum Creek Riparian Corridor. As with Zones A and B, topography on the Cherokee Ranch side of US 85 is generally steep and dips toward the creek channel found immediately south of the tracking station.

Zone C features some ponderosa pine habitat on the north side of US 85, especially the drainage leading to Station 3. Other dominant vegetation near Station 3 includes plains cottonwood, western wheatgrass, crested wheatgrass, smooth brome, chicory (*Cichorium intybus*), yucca, and spiderwort (*Tradescantia occidentalis*). Wildlife tracking data for Station 3 recorded fewer overall mammals than detected at Stations 2, 5-W, and 5-E, but more than were recorded at Station 1 in Zone A. Bobcats, red fox, coyote, raccoons, skunks, badgers, squirrels, cottontails, and woodrats were all detected crossing under US 85 at Station 3. Perhaps more significantly, the at-grade tracking data for Zone C revealed more than 80 mammals recorded, including 11 ungulates. The ungulate count for this zone is higher than either of the other two zones. Two elk bulls were directly observed in the immediate vicinity of Station 3. The direct and relatively short distance between Cherokee Ranch and the East Plum Creek Corridor, coupled with a large resident elk herd on Cherokee Ranch, appears to warrant consideration of a crossing structure large enough to accommodate elk in Zone C.

These three zones represent key elements in maintaining at least a minimum of habitat connectivity between important wildlife conservation areas in the Chatfield Basin. It should also be noted that other portions of the US 85 Corridor, outside the three designated connectivity zones, may be integral to the continued overall connectivity across US 85. Examples of these other areas include grasslands, which provide elk forage, and ponderosa pine/Gambel oak forest, which provide excellent bird habitat. Much of this portion of the landscape is on private lands, outside the three connectivity zones.

4.3.7 Wild and Scenic Rivers

The Wild and Scenic Rivers Act (WSRA), 16 USC 271 *et seq.*, establishes requirements applicable to water resource projects affecting wild, scenic, or recreational rivers within the National Wild and Scenic Rivers System, as well as rivers designated on the National Rivers Inventory. No designated wild and scenic rivers occur within the project corridors.

4.3.8 Floodplains

Executive Order 11988, Floodplain Management, requires federal agencies to avoid direct or indirect support of floodplain development whenever a practicable alternative exists. The base flood (100-year flood) is the regulatory standard used by federal agencies and most states to administer floodplain management programs. As described in 23 CFR 650 Subpart A, floodplains provide natural and beneficial values serving as areas for fish, wildlife, plants, open space, natural beauty, scientific study, outdoor recreation, agriculture, aquaculture, forestry, natural flood moderation, water quality maintenance, and groundwater recharge.

Flood insurance rate maps (FIRM) from the Federal Emergency Management Agency (FEMA) were used to identify drainages with 100-year floodplains within the APE. The APE includes both the I-25 Corridor and US 85 Corridor. These roadways generally lie outside of existing 100-year floodplains, but do intersect several drainages in the Plum Creek and Cherry Creek watersheds (Figure 4.6a and Figure 4.6b). US 85 and I-25 both intersect nine drainages, with 100-year floodplains.

With the exception of East Plum Creek (Segment 1 and Segment 2, Figure 4.6a), and Happy Canyon Creek (Segment 1 and Segment 2, Figure 4.6a), I-25 and US 85 generally cross these drainages perpendicularly. In Castle Rock, I-25 runs parallel to East Plum Creek. Approximate widths of floodplain intersections within the APE are shown in Table 4.18. The majority of drainages in both project corridors are ephemeral streams, typically active only during high-intensity rainfall events. These areas are sandy washes with upland shrubs common along the banks.

Marcy Gulch on US 85 and East Plum Creek on I-25 are the only perennial streams within the APE. These creeks have sand beds and exhibit bank sloughing and channel incision. Well-developed riparian communities exist within the 100-year floodplain along both streams.

Although Happy Canyon Creek is intermittent, it also has a well-developed riparian zone within the 100-year floodplain. These three creeks exhibit considerable beneficial use for flood attenuation, groundwater recharge, water quality maintenance, wildlife habitat, and aesthetics.

Flooding in Douglas County is typically a result of intense rainfall. Under appropriate conditions, flooding at roadway intersections with 100-year floodplains is possible; however, potential for roadway flooding is reduced by an increase in elevation of the road surface above intersected floodplains (e.g., I-25 Bridge over East Plum Creek) and appropriately sized drainage structures.

Figure 4.6a
Floodplains along the I-25 Corridor



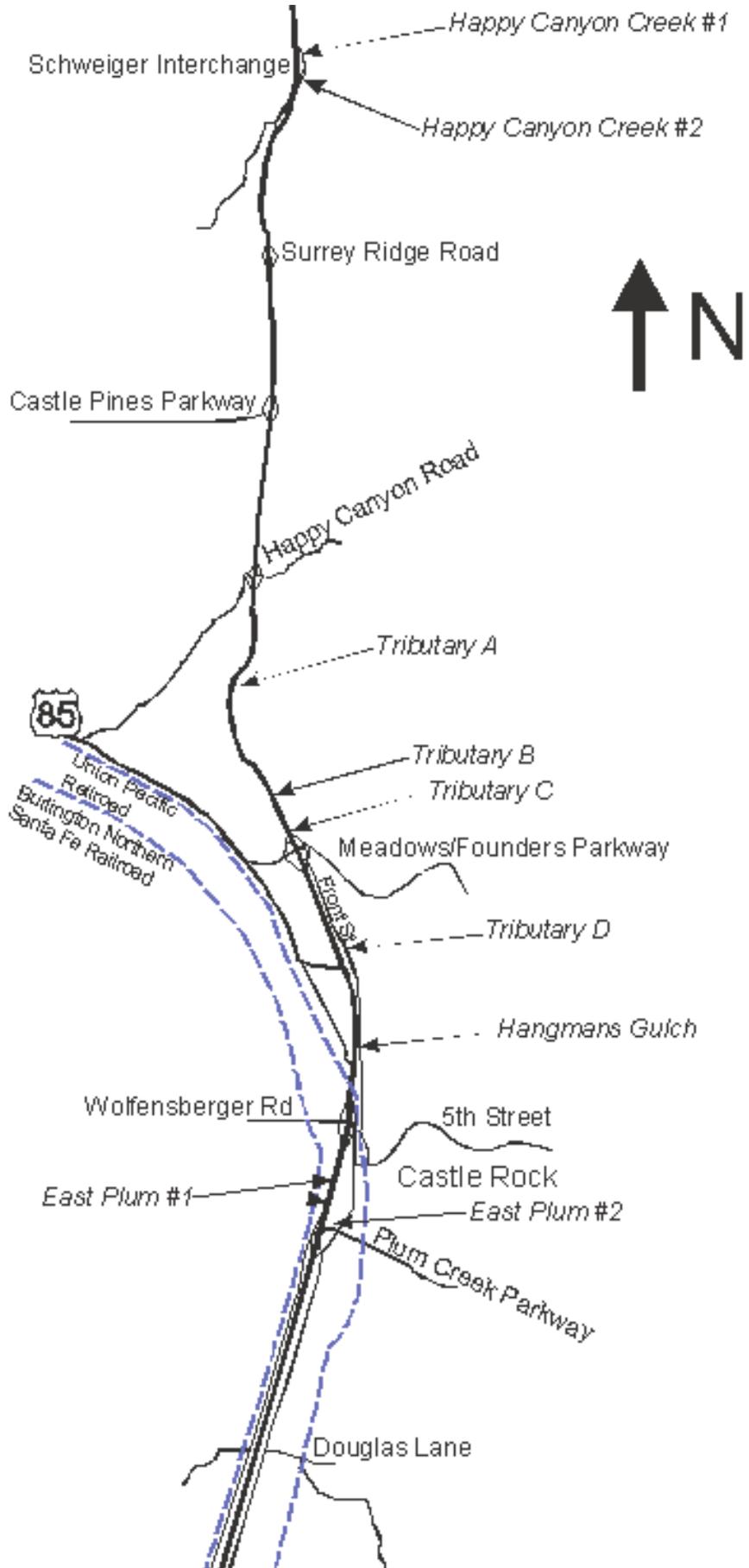


Figure 4.6b
Floodplains along the US 85 Corridor



Table 4.18
Intersection Widths of Identified 100-year Floodplains within the

Area of Potential Effect, Douglas County, Colorado

Drainage	Highway	Intersection Width meters (feet)
1. Happy Canyon Creek 1	I-25	122 (400)
2. Happy Canyon Creek 2	I-25	1,036 (3,400)
3. Tributary A	I-25	58 (190)
4. Tributary B	I-25	38 (125)
5. Tributary C	I-25	37 (120)
6. Tributary D	I-25	172 (565)
7. Hangman's Gulch	I-25	70 (230)
8. East Plum Creek 1	I-25	1,556 (5,105)
9. East Plum Creek 2	I-25	459 (1,505)
10. Marcy Gulch	US 85	314 (1,030)
11. No name 1	US 85	213 (700)
12. No name 2	US 85	107 (350)
13. Indian Creek	US 85	238 (780)
14. No name 3	US 85	238 (780)
15. Tributary A	US 85	37 (120)
16. Tributary B	US 85	110 (360)
17. Tributary C	US 85	67 (220)
18. Tributary D	US 85	274 (900)

For floodplain and drainage details, see the *Floodplain and Drainage Assessment Technical Report*, May 2000, amended November 2000, in the Technical Reports Volume of the *South I-25 Corridor and US 85 Corridor FEIS*.

4.3.9 Threatened, Endangered, and Other Special-Status Species

The US Fish and Wildlife Service (USFWS) has provided comments on federal threatened, endangered, and candidate species that occur, or whose historic range is, within Douglas County. A USFWS updated list in 1999 added lynx (*Lynx canadensis*) as a species potentially present in Douglas County. Species of interest to the State of Colorado were identified through consultation with the CDOW. Table 4.19 identifies the species considered in this section along with their status and likelihood of occurrence in the APE. Although surveys for threatened and endangered (T&E) species were restricted to within 30 meters (100 feet) of the existing ROW for US 85 and 60 meters (200 feet) from the existing ROW for I-25, the APE extends beyond these boundaries to encompass adjacent habitat and for consideration of secondary impacts in Chapter 5.0, *Environmental Consequences*.

For additional information on threatened and endangered species, see the *Special Status Plant and Animal Species Technical Report*, May 2000, amended November 2000, in the Technical Reports Volume of the *South I-25 Corridor and US 85 Corridor FEIS*.

Table 4.19
Status and Likelihood of Occurrence in the Area of Potential Effect for
Threatened and Endangered Species, Candidates for Federal Listing,
and State of Colorado Threatened, Endangered, or Species of Concern

Species	Status	Occur in APE?
Fauna		
Bald Eagle (<i>Haliaeetus leucocephalus</i>)	FT and ST	Yes
Mexican Spotted Owl (<i>Strix occidentalis lucida</i>)	FT and ST	Not Likely
Black-Footed Ferret (<i>Mustela nigripes</i>)	FE and SE	Not Likely
Preble's Meadow Jumping Mouse (<i>Zapus hudsonius preblei</i>)	FT and ST	Yes
Greenback Cutthroat Trout (<i>Oncorhynchus clarki stromias</i>)	FT and ST	Not Likely
Pawnee Montane Skipper (<i>Hesperia leonardus montana</i>)	FT	Not Likely
Black-Tailed Prairie Dog (<i>Cynomys ludovicianus</i>)	WBP and SSOC	Yes
Mountain Plover (<i>Charadrius melodus</i>)	FC and SSOC	Not Likely
Swift Fox (<i>Vulpes velox</i>)	FC and SSOC	Possible
Lynx (<i>Lynx canadensis</i>)	FC and SE	Not Likely
Wolverine (<i>Gulo gulo</i>)	FS and SE	Not Likely
Plains Sharp-Tailed Grouse (<i>Tympanuchus phasianellus jamesi</i>)	SE	Possible
Burrowing Owl (<i>Athene cunicularia</i>)	ST	Possible
Northern Redbelly Dace (<i>Phoxinus eos</i>)	SE	Possible
Common Shiner (<i>Notropis cornutus</i>)	ST	Possible
Brassy Minnow (<i>Hybognathus hankinsoni</i>)	ST	Possible
Iowa Darter (<i>Etheostoma exile</i>)	SSOC	Possible
American Peregrine Falcon (<i>Falco peregrinus</i>)	SSOC	Possible
Ferruginous Hawk (<i>Buteo regalis</i>)	SSOC	Yes
Northern Leopard Frog (<i>Rana pipiens</i>)	SSOC	Yes
Flora		
Ute Ladies' Tresses Orchid (<i>Spiranthes diluvialis</i>)	FT	Not Likely
Colorado Butterfly Plant (<i>Gaura neomexicana</i>)	FC	Not Likely
Abbreviations: FC – Federal Candidate for Listing		

4.3.9.1 Bald Eagle

In the Denver area, bald eagles are known to nest in large cottonwoods at the edge of reservoirs; however, no known active nests are in Douglas County. Bald eagles are winter visitors to Chatfield Reservoir in the northwest portion of the project area and likely use the Plum Creek drainage as a movement corridor. In addition, bald eagles are known to use black-tailed prairie dog colonies, where they pirate kills from ferruginous hawks.

4.3.9.2 Mexican Spotted Owl

In Colorado, Mexican spotted owls are known to inhabit three habitat types: older coniferous forests with complex vertical structure, sparsely forested canyons, and slickrock canyons in the southwest. The Mexican spotted owl currently nests in two known locations in Colorado; however, adequate breeding habitat does not exist within the project area, and no known active nest sites occur within Douglas County.

4.3.9.3 Black-Footed Ferret

The black-footed ferret has co-evolved with the black-tailed prairie dog, and their ranges and habitats overlap closely in short and mid-grass prairie and semi-desert shrublands. Ferrets use black-tailed prairie dog towns as a source of food and shelter. They are currently known to exist in remnant-restored populations in Shirley Basin, Wyoming, and in captive breeding populations at various locations across the country. No known population exists within the project area or in Douglas County. A local rancher near the south end of the project area reported two sightings (May 1986 and July 1989). Both sightings were at least 1.6 kilometers (1 mile) from US 85 and unconfirmed. No documented occurrences of black-footed ferrets exist for Douglas County. Because the active black-tailed prairie dog colonies located within and adjacent to the APE are well below 32 hectares (80 acres), they do not fall within USFWS guidelines for areas requiring surveys for the black-footed ferret.

4.3.9.4 Preble's Meadow Jumping Mouse

The Preble's Meadow Jumping Mouse (PMJM), a subspecies of the meadow jumping mouse (*Zapus hudsonius*), is known to occur only in portions of Colorado and Wyoming in moist lowlands with dense vegetation. The PMJM appears to require at least two habitat components: open water and dense cover. Known habitats along the Colorado Front Range include riparian corridors with diverse vegetation including shrubs such as willows (*Salix* spp.), but also areas heavily influenced by man such as more sparsely vegetated irrigation and runoff ditch habitats. PMJM presence has been confirmed, through field surveys, within the I-25 APE along East Plum Creek in Castle Rock (Figure 4.7a and Figure 4.7b). For more detail, see the *Preble's Meadow Jumping Mouse Biological Assessment for Interstate I-25/US 85 Environmental Impact Statement, Douglas County, Colorado*, October 2000.

4.3.9.5 Greenback Cutthroat Trout

The greenback cutthroat trout was originally found in mountain and foothill headwaters of the South Platte and Arkansas River drainages within Colorado and a small area of southeast Wyoming. Greenback cutthroat trout are not known to be present within the project area.

4.3.9.6 Pawnee Montane Skipper Butterfly

The Pawnee montane skipper butterfly occurs in Douglas County but only within South Platte Canyon, no further south than the Town of Deckers and not below 1,890 meters (6,200 feet).

4.3.9.7 Black-Tailed Prairie Dog

The black-tailed prairie dog exists in colonies in short grass or mixed prairie. They feed primarily on annual forbs, native grasses, and roots of forbs and grasses during late fall and winter. Eleven active black-tailed prairie dog colonies have been mapped within the APE along I-25. Two abandoned colonies were also noted within the APE along I-25. These colonies are long-abandoned and overgrown, and many of the burrows are filled in. Therefore, they are not considered active black-tailed prairie dog habitat. Fifteen black-tailed prairie dog colonies within the APE along US 85 have been mapped. Locations of black-tailed prairie dog colonies within the APE are depicted in Figure 4.7c and Figure 4.7d.

4.3.9.8 Mountain Plover

Nesting mountain plovers use short grass prairie grazed by black-tailed prairie dogs or cattle. Black-tailed prairie

dog colonies are considered a positive habitat image when conducting surveys for mountain plovers. Despite the presence of black-tailed prairie dog colonies, the likelihood of mountain plover occupancy within the project area is low. Mountain plover do not normally occur in western Douglas County. Additionally, the fragmented nature of the habitat makes occupancy unlikely.

4.3.9.9 Swift Fox

Swift fox typically inhabit flat grasslands, and their presence is documented in eastern Douglas County. The broken and shrubby nature of topography within the APE provides for marginal habitat for swift fox.

4.3.9.10 Lynx

The distribution of lynx is tied to boreal forest, generally above 2,400 meters (7,800 feet) in Colorado and Utah. Lynx populations in the southern Rocky Mountains occur at the periphery of the species' range in North America. Lynx in Colorado exist at low densities in fragmented distributions and are rare even within suitable habitat. No suitable lynx habitat exists within the project area; therefore, lynx presence is unlikely.

4.3.9.11 Wolverine

In addition to its federally sensitive and state endangered designations, the USFWS was recently petitioned to list the wolverine as threatened or endangered. Wolverines have one of the lowest densities of any carnivore, and their occurrence in Colorado has never been high. They have, however, been documented as far south as southern Colorado. Wolverines are generally restricted to sparsely populated wilderness areas in boreal forests, tundra, and similar habitats of the western mountains, where a year-round food supply is available. For these reasons, the probability of their occurrence within the APE (short grass prairie landscape) is low.

Figure 4.7a
I-25 Corridor Preble's Meadow
Jumping Mouse Habitat

Figure 4.7b
I-25 Corridor Preble's Meadow
Jumping Mouse Habitat

Figure 4.7c
Black-Tailed Prairie Dog Colonies
along the I-25 Corridor



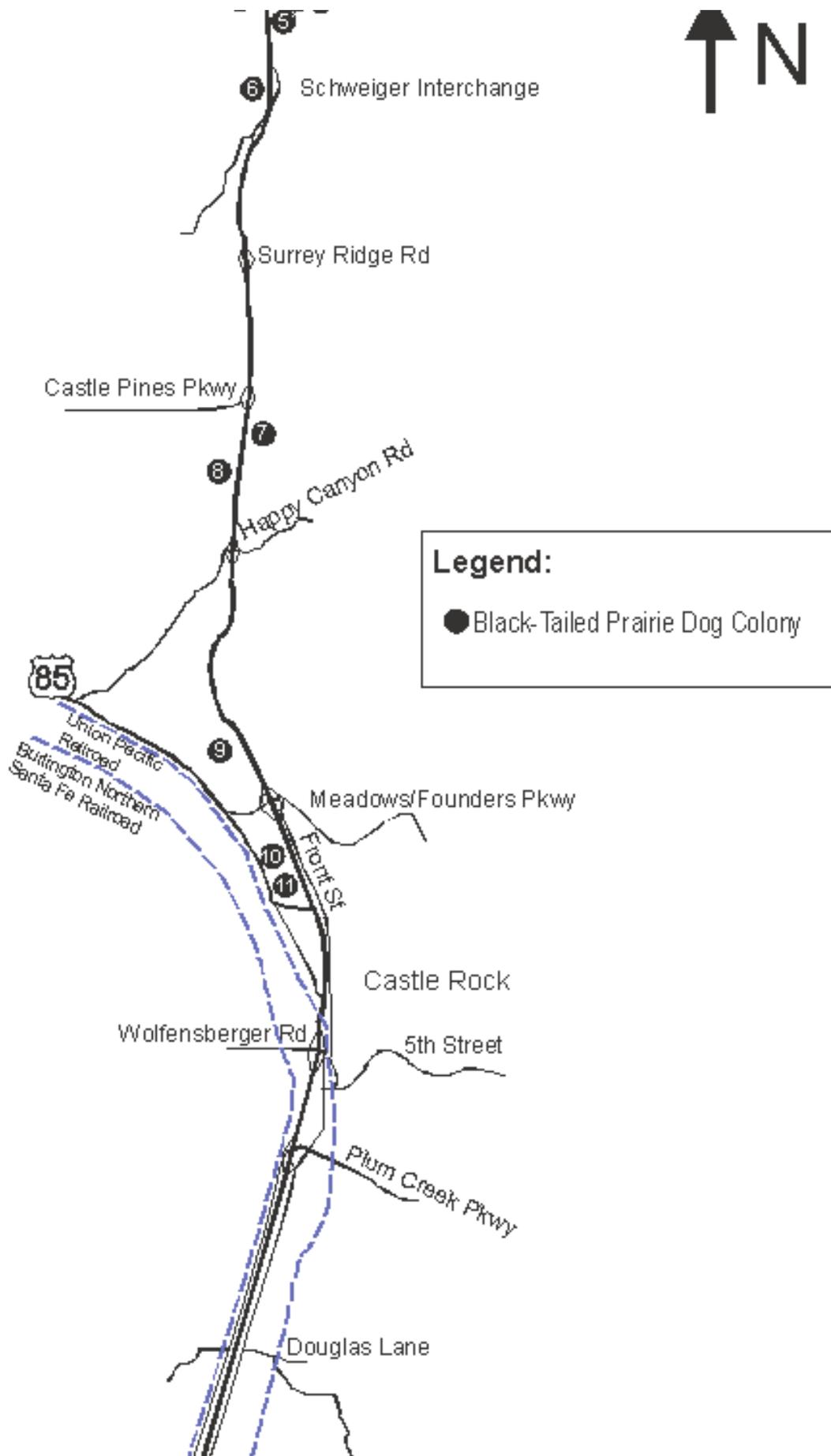


Figure 4.7d

Black-Tailed Prairie Dog Colonies along the US 85 Corridor



4.3.9.12 Plains Sharp-Tailed Grouse

The plains sharp-tailed grouse historically occurs in a narrow strip from El Paso County north to Larimer County within an area of short and mixed grass prairie containing abundant shrubs. Sharp-tailed grouse in Douglas County are the only remnants of this group surviving today. Douglas County sharp-tails use rolling hills interspersed with oak thickets and glades. Sharp-tailed grouse populations are only known to occur at three sites in Douglas County within the scope of the project area:

- Woodhouse State Wildlife Area
- Around Dakan Mountain Road
- Cherokee Ranch population (west of the Meadows Development)

None of these populations occur within the APE.

4.3.9.13 Burrowing Owls

Burrowing owls nest in rodent burrows within grasslands, shrublands, and deserts. Some populations also occupy habitat in grassy urban areas such as golf courses. Burrowing owls may prefer black-tailed prairie dog colonies using the burrows for shelter, mounds for perching, and cropped vegetation that affords an unobstructed view. When black-tailed prairie dog colonies become depopulated and vegetation starts growing higher, burrowing owls often abandon the burrows. A burrowing owl has been detected in a small black-tailed prairie dog colony in the northwest quadrant of the intersection of I-25 and C-470 adjacent to the project study area. Additional individuals may use black-tailed prairie dog colonies within the project area although none have been observed to date. Surveyors with the Colorado Breeding Bird Atlas Project confirmed one breeding occurrence of burrowing owls in northern Douglas County north of the APE.

4.3.9.14 Other Fish

Four species of fish listed as State of Colorado threatened or endangered potentially occur within the project area: the endangered northern redbelly dace, the threatened common shiner, the threatened brassy minnow, and the Iowa darter, which is listed as a species of concern. Plum Creek, immediately adjacent to the project area, is potential habitat for these four species. A documented occurrence of northern redbelly dace south of Sedalia in Plum Creek was made September 19, 1985. No occurrence has been documented since that time. The common shiner has been reported to occur in West Plum Creek, the brassy minnow in the South Platte River, and the Iowa darter in Plum Creek.

4.3.9.15 American Peregrine Falcon

Peregrine falcons nest on foothill and mountain cliffs from 1,370 meters (4,500 feet) to more than 2,740 meters (9,000 feet), often above pinyon/juniper or ponderosa pine forests. The project corridor does not contain nesting habitat, and the nearest known nesting peregrines are 24 kilometers (15 miles) southwest of Castle Rock and 26 kilometers (16 miles) west of Sedalia.

4.3.9.16 Ferruginous Hawk

Ferruginous hawks nest in large expanses of lightly grazed, short grass prairie, in trees or on the ground. Approximately 90 percent of their diet consists of medium-sized mammals (jackrabbits and cottontails west of the Continental Divide, and black-tailed prairie dogs and ground squirrels east of the Divide). Colorado's ferruginous hawks prey heavily on black-tailed prairie dogs, particularly in the winter. Ferruginous hawks have been observed within the project corridor on two occasions during field visits. Both observations occurred in the vicinity of the Castle Pines Parkway/I-25 Interchange.

4.3.9.17 Northern Leopard Frog

Water associated with ponds, streams, marshes, lakes, reservoirs, and beaver ponds, and that has rooted vegetation, is potential habitat for the northern leopard frog. On April 29, 1951, an occurrence was documented north of the project area in the vicinity of I-25/E-470 Interchange around Cottonwood Creek. During 1999, CDOW staff identified approximately 20 northern leopard frogs in a borrow ditch and along a small stream east of and adjacent to I-25 near MP 186.

4.3.9.18 Ute Ladies' Tresses Orchid

Wetlands and areas adjacent to wetlands (within the geographic range of the project area) are potential habitat for the federally threatened Ute ladies' tresses orchid. Surveys to detect presence of the Ute ladies' tresses orchid in the APE were negative. A letter dated January 12, 2000, was received from the USFWS concurring with these survey results and is included in Appendix of this FEIS.

4.3.9.19 Colorado Butterfly Plant

The Colorado butterfly plant within the project area was listed as threatened on October 18, 2000. Its known distribution is within Boulder, Douglas, Larimer, and Weld counties. However, the last documented occurrence within Douglas County was August 31, 1942. This plant typically inhabits sub-irrigated alluvial soils of drainage bottoms surrounded by mixed-grass prairie between elevations of 1,768 meters (5,800 feet) and 1,890 meters (6,200 feet). Surveys for Colorado butterfly plant within the project APE were negative. A letter dated January 12, 2000, was received from the USFWS concurring with these survey results and is included in the Appendix of this document.

4.3.10 Historical Resources

Historic resources are standing architectural and engineering features, such as buildings, bridges, roads, and railroads older than 50 years. Significant historic resources, as other cultural resources, are protected under Section 106 of the National Historic Preservation Act (NHPA) of 1966, as amended and Section 4(f) of the USDOT Act of 1966. Only significant historic resources warrant consideration with regard to adverse impacts resulting from a proposed action. Significant historic resources are either eligible for, or listed on, the National Register of Historic Places (NRHP). To be eligible for the NRHP, a resource must meet one or more of the criteria (as defined in 36 CFR 60.4) for inclusion on the NRHP.

NRHP-eligible resources are those:

- That are associated with events or have made a significant contribution to the broad patterns of our history

- That are associated with lives of persons significant in our past
- That embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction
- That have yielded, or may be likely to yield, information important in prehistory or history

Significant historic resources were identified through a records search at the Colorado Historical Society Office of Archaeology and Historic Preservation in Denver, a review of previous surveys in the area, and a complete inventory of historic resources in the project area. The most recent full-scale field investigations were concluded in August 1998. The methods and results of the literature review and surveys are detailed in *Historic Resources Survey Interstate 25/State Highway 85 Douglas County, Colorado*, August 1998.

Eight significant resources exist within the project area. The project area includes the I-25 Corridor from C-470 to Castle Rock, including the CDOT ROW plus 60 meters (200 feet) on either side of the ROW, the US 85 Corridor from C-470 to Castle Rock, including the CDOT ROW plus 30 meters (100 feet) on either side of the ROW. Two resources are listed on the NRHP and six are eligible for the NRHP. Two of the six eligible resources are railroads that pass through both the I-25 Corridor and the US 85 Corridor.

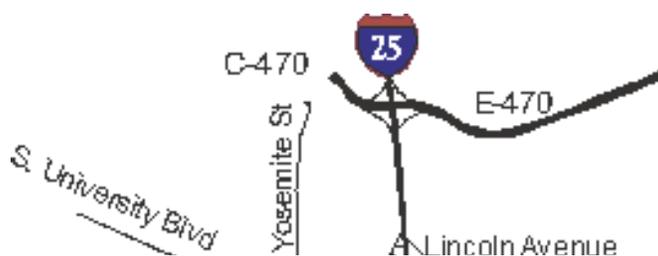
The State Historic Preservation Officer (SHPO) has concurred with the determinations of eligibility and effect on all resources recorded in association with this project.

For additional information on historic resources, see the *Historic Resources Survey Interstate 25/State Highway 85 Douglas County, Colorado*, August 1998; and the *Historic Resources Technical Report*, May 2000, amended November 2000 and the *Review of the Sugnet (1998) Technical Report: Historic Resources*, March 1999, in the Technical Reports Volume of the South I-25 Corridor and US 85 Corridor FEIS.

4.3.10.1 I-25 Corridor Historical Resources

The I-25 Corridor from C-470 to Castle Rock was surveyed for historic resources between June and August 1998. Four significant historic resources exist within the I-25 Corridor. Three resources are eligible for the NRHP, and one is listed on the NRHP (Table 4.20). These include the Denver and Rio Grande (D&RG) Railroad Depot (5DA216), the Stewart Residence (5DA1258), and two linear resources: the D&RG Railroad (5DA921.1) and the Atchison, Topeka, and Santa Fe (AT&SF) Railway (5DA922 Segment #1 and Segment #3). The locations of these historic resources are shown on Figure 4.8a.

Figure 4.8a
Historic Resources along the I-25 Corridor



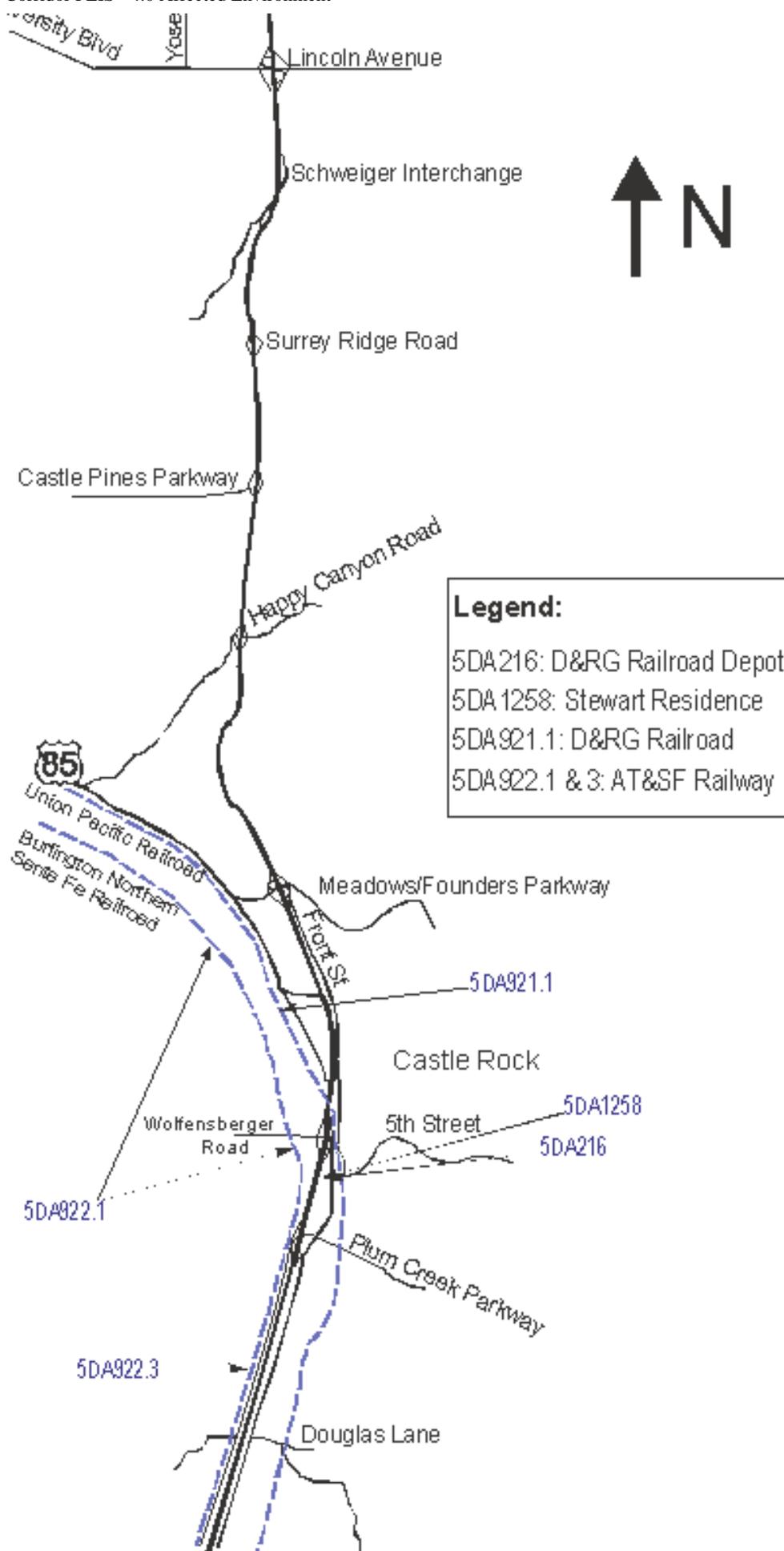


Table 4.20
Significant Historic Resources within the I-25 Corridor

Site Number	Property Description	NRHP Status
5DA216	D&RG Railroad Depot	Listed
5DA1258	Stewart Residence	Eligible
5DA921.1	D&RG Railroad*	Eligible
5DA922.1 & 3	AT&SF Railway*	Eligible

Listed: Listed on the NRHP

Eligible: Officially eligible for the NRHP

**This resource passes through both the I-25 Corridor and US 85 Corridor.*

The Denver and Rio Grande Railroad Depot (5DA216)

The D&RG Railroad Depot is located at 420 Elbert Street. It was constructed of local rhyolite stone in 1875. The depot was moved to its present location in 1970 and was listed on the NRHP in 1974. The depot currently houses the Castle Rock Historical Society Museum.

Stewart Residence (5DA1258)

The Stewart Residence is located at 422 Elbert Street. The house is a one-and-one-half-story frame bungalow-style structure with a front gabled roof, overhanging eaves, asphalt shingle roofing, and a brick chimney with corbelled top. The upper exterior walls are clad with coursed shingles; the lower walls are clad with narrow lap siding. This house is significant as one of the best-preserved examples of early 20th century bungalow-style construction in Castle Rock.

Denver and Rio Grande Railroad (5DA921.1)

The D&RG Railroad, currently operating as the Union Pacific Railroad, runs parallel to the south side of most of the project area. It follows Plum Creek for the majority of its length between Douglas County's northern boundary and Castle Rock. It is a standard gauge rail constructed of steel and timber with concrete and timber bridges. The standard gauge rail replaced the original narrow gauge rail in 1881. Until 1881, the D&RG Railroad held a monopoly on the lucrative trade between Colorado Springs and Denver when the railroad agreed to share its line with the AT&SF Railway. Over the years, the railroad contributed greatly to the growth of Douglas County ranching, as well as merchandising, lumbering, and coal mining. The D&RG Railroad remains in operation today and retains much of its original alignment throughout the Plum Creek Valley. This property is eligible for the NRHP because of its connection to the early transportation and development of the area, and it maintains integrity of design.

Atchison, Topeka, and Santa Fe Railway (5DA922.1 and 5DA922.3)

AT&SF Railway, currently operating as the Burlington Northern Santa Fe Railroad, runs parallel to the south side of most of the project area. It is a standard gauge rail constructed of steel track on wooden ties set in rock ballasts. The grade is about 1.2 meters (4 feet) high and 7.6 meters (25 feet) across. This

segment, built in 1887, is a significant portion of the AT&SF Railway Company line into Denver from Colorado Springs and Pueblo. The AT&SF Railway's entry into the Colorado market enhanced the state's transportation as well as its accessibility to the rest of the nation. It also provided competition to other lines. This segment of the railway is significant because it follows the original ROW and maintains integrity of design. It is officially eligible for the NRHP because of its connection to the early transportation and development of the area.

4.3.10.2 US 85 Corridor Historical Resources

The US 85 Corridor was surveyed for historic resources between June and August 1998. Five significant historic resources and one historic district exist within this corridor (Table 4.21). The five resources are eligible for the NRHP, and the historic district is listed on the NRHP. The locations of these historic resources are shown on Figure 4.8b.

Table 4.21
Significant Historic Resources within the US 85 Corridor

Site Number	Property Description	NRHP Status
5DA600	High Line Canal	Eligible
5DA914	Residence – Cook Ranch	Eligible
5DA708	Cherokee Ranch Historic District	Listed
5DA921.1	D&RG Railroad*	Eligible
5DA922.1	AT&SF Railway*	Eligible
5DA1385	Sedalia Water Tank	Eligible

Listed: Listed on the NRHP

Eligible: Eligible for the NRHP

** This resource passes through both the I-25 Corridor and US 85 Corridor.*

The following descriptions discuss NRHP-eligible or listed properties within the US 85 project area. The D&RG Railroad and the AT&SF Railway are located in both the I-25 Corridor and the US 85 Corridor and are described in Section 4.3.10.1, *I-25 Corridor Historical/Cultural Resources*.

High Line Canal (5DA600)

The High Line Canal crosses beneath US 85 at Blakeland approximately 1.2 kilometers (0.7 mile) south of the Arapahoe/Douglas County line, and again enters the APE 0.9 kilometer (0.6 mile) south of that point. The Northern Colorado Irrigation Company constructed the canal between 1879 and 1883. It flows approximately 113 kilometers (70.2 miles) from the South Platte River northeast to Second Creek. The Denver Water Board has owned and operated the property since 1924. The canal is eligible for the NRHP because of its association with agricultural and urban uses of water and irrigation and with the early settlement and development of Denver. The segment within the APE where the High Line Canal crosses beneath US 85 is a non-contributing segment of the canal.

Figure 4.8b
Historic Resources along the US 85 Corridor



Cook Ranch (5DA914)

According to local history sources, the Cook Ranch property served as an important stage stop along the First Territorial Road in the 1860s. However, the existing house, which belonged to Cook's daughter, was constructed

circa 1885. During the 1890s, the ranch became a popular resting place for bicyclists traveling between Denver and Palmer Lake. The house is considered eligible for the NRHP because of its architectural significance. The house is a good representation of a late 19th century farmhouse with a vernacular frame and Queen Anne details. It is particularly unusual because of the random-coursed ashlar stonework on the first story, and the use of vertical board and batten siding.

Sedalia Water Tank (5DA1385)

The Sedalia water tank is located between the AT&SF railroad tracks and US 85, and approximately 245 meters (800 feet) northwest of the intersection of SH 67 and US 85. The tank, built circa 1890 by the AT&SF Railway, is a cylindrical, steel water tank composed of sections of steel joined together. The tank is about 11 meters (36 feet) high and 5 to 5.5 meters (16 to 18 feet) in diameter with a capacity of 530,000 liters (140,000 gallons). The north side of the tank (facing US 85) bears the following information: "SEDALIA" and "ELEV. 5,835." This structure is considered eligible for the NRHP because of its connection to the historic themes of transportation and engineering. It is one of the last surviving steel water tanks in Colorado.

Cherokee Ranch Historic District (5DA708)

Cherokee Ranch Historic District includes approximately 1,330 hectares (3,280 acres). The district borders US 85 for approximately 3.2 kilometers (2.0 mile) east of Sedalia. It was listed on the NRHP in 1994 because of its significant association with local exploration and settlement of the area, as well as the property's wide variety of construction types, periods, and methods. Twenty-six contributing and 10 non-contributing resources are within the historic district. Of the 26 contributing resources, two exist within the APE. One resource is a decorative stone and wrought iron gate at the ranch entrance in Sedalia. Burnam Hoyt, the castle architect, designed the gate between 1925 and 1926. It consists of two stone piers on either side of Rattlesnake Road connected to a stone wall. Two metal poles support a sign bearing the name "Cherokee Ranch." A ponderosa pine is planted on each side of the gate. The other contributing resource is Rattlesnake Road. Built by Elmer Blunt and his son Ray in 1924, it is the original road leading into the ranch. The road has never been paved and is no longer in use.

4.3.11 Archaeological Resources

The Colorado Piedmont and foothills region contains archaeological remains indicating nearly continuous occupation by Native American groups for more than 12,000 years. In accordance with federal laws and regulations, a records search of the I-25 Corridor and US 85 Corridor was conducted through the Colorado Office of Archaeology and Historic Preservation to identify previously recorded archaeological localities, and an intensive survey along I-25 was completed soon thereafter. The US 85 Corridor was inventoried in 1990 under the auspices of an earlier CDOT action. The survey results were revisited in 1999.

As mandated by Section 106 of the National Historic Preservation Act (as amended) and the revised Advisory Council on Historic Preservation regulations (36 CFR 800), seven federally recognized Native American tribes with an established interest in Douglas County, Colorado have been notified of the project and invited to initiate cultural resource consultation, at their discretion. Consultation with an Indian tribe recognizes the government-to-government relationship between the Federal Government and tribal groups, and Federal agencies are sensitive to the fact that historic properties of traditional religious and cultural significance may be located on ancestral, aboriginal, or ceded lands beyond reservation boundaries. None of the tribes has expressed an interest in the consultation process for this undertaking. However, tribal entities may choose to enter the consultation process at

any time. FHWA and CDOT have fulfilled their initial legal obligations by contacting the appropriate Native American tribes; the opportunity for consultation by the Indian community will continue until such time as it is determined that any issues of concern have been addressed to the satisfaction of FHWA and the pertinent tribe(s).

Full documentation of archaeological resources is included in the following reports in the Technical Reports Volume of the *South I-25 Corridor and US 85 Corridor FEIS: Cultural Resources Management Report*, January 1999; *An Intensive Archaeological Resources Survey Along Interstate 25 and US Highway 85 In Arapahoe and Douglas Counties, Colorado*, December 1999; and *Survey Report Addendum for Colorado Department of Transportation Project IM 0252-317, Lincoln Avenue to South Castle Rock (I-25 Frontage Road and Interchange Development)*, April 2000.

4.3.11.1 I-25 Corridor Archaeological Resources

The area of potential effect (APE) to archaeological remains along I-25 was generally considered to be the existing CDOT ROW and a corridor extending 60 meters (200 feet) beyond the ROW on both the east and west sides of the highway. The survey area was expanded in areas where the proposed frontage road alignment extends beyond the 60-meter (200-foot) limit, and/or where interchange modifications or new interchanges are planned. Eight prehistoric sites and 19 isolated finds were identified, recorded, and evaluated for significance according to criteria established for the NRHP. In consultation with SHPO, three sites may meet the criteria for NRHP listing. These localities will be avoided during construction so testing is not appropriate. Depending upon the final alignment, however, if avoidance is not feasible subsurface testing to determine whether buried deposits are present will be necessary to determine eligibility. The remaining sites and isolated finds are considered to lack characteristics that would make them eligible for the NRHP, and no further actions are required.

4.3.11.2 US 85 Corridor Archaeological Resources

The area of potential direct impacts to archaeological sites along US 85 involved an area 150 meters (490 feet) east and 60 meters (200 feet) west of the present highway alignment. Eleven prehistoric sites and nine isolated finds were identified during field investigations. Ten sites and the isolated finds failed to meet the criteria for listing on the NRHP. In consultation with the SHPO, one site may meet the criteria for listing on the NRHP. Preservation in place is likely possible, so testing has been indefinitely postponed until final alignment is selected. If avoidance is not feasible, further consultation with the tribes and testing of the site will be necessary prior to re-initiating consultation with the SHPO to establish site eligibility. If a NR eligible site would be impacted by construction, FHWA and CDOT will consult with the SHPO and ACHP to reach a memorandum of agreement on the appropriate resolution of impacts. Such an agreement would be carried out in full prior to any construction activities on the site.

The site recommendations have been formulated in consultation with the SHPO.

4.3.12 Paleontological Resources

Paleontological Resources compliance is mandated by the Colorado Historical, Prehistorical, and Archaeological Resources Act of 1973. Paleontological surveys were completed in the summer of 1997 and June 1998. A literature survey was conducted to evaluate the potential for scientifically substantial paleontological resources included within the geologic units of the study area. In addition, the fossil databases of the University of Colorado Museum (UCM) and the Denver Museum of Nature and Science (DMNS), which are both state and federally

recognized repositories for paleontological resources, were searched to determine whether fossils had been previously found within the study corridor. The field work was conducted by completing a drive through reconnaissance of the entire study area while looking at road cuts. More detailed investigations were conducted by hiking and visually inspecting the relevant road cuts on foot.

The lithology throughout the majority of the I-25 and US 85 study area is Denver Formation and Dawson Arkose. In the area between Denver, Colorado Springs, and Limon, the Denver Formation has produced Late Cretaceous leaves and dinosaur bones as well as early Paleocene leaves and mammal, reptile, and amphibian bones and teeth. Only two invertebrate fossil occurrences in the Denver Formation have been documented. Fossils are very rare in the Dawson Arkose. Known Dawson Arkose fossil localities include approximately five fossil leaf localities, and one identifiable vertebrate fossil locality, which produced a single mammal tooth.

Full documentation of paleontological resources is included in the following reports in the Technical Reports Volume of the *South I-25 Corridor and US 85 Corridor FEIS: CDOT Project #IM 0252-0317 Paleontological Survey of the I-25 Improvement Options Between Castle Pines and Lincoln Avenue and the Extended Burlington Northern Railroad Project Area*, April 2000 and *Paleontologic Resources Along the Southeast Interstate Corridor, Arapahoe and Douglas Counties, Colorado*, February 1999.

4.3.12.1 I-25 Corridor Paleontological Resources

Six sites were found along the I-25 Corridor: DMNS 916, 917, 1200, 2134, 2135, and "new" site. Sites 917, 1200, 2134, and "new" are in the Denver Formations; sites 916 and 2135 are in the Dawson Arkose. The weathered remnants of several episodes of fossil quarrying by DMNS parties were observed at site 1200. This site is a very rare, possibly unique, leaf fossil locality that has produced specimens of more than 120 fossil plant species from a time period when the typical flora in western North America consisted of 8 to 10 species. This locality preserves a record of a very unusual, perhaps unique, paleoenvironment heretofore unknown from western North America from the time period represented by Denver Formation sediments. Other leaf fossil localities of this age and with similar broad species diversity may exist in the area between Denver and Colorado Springs, but further research into the nature of those localities is required before DMNS 1200 could even be considered only rare, rather than unique. Very faint, almost unnoticeable, leaf impressions were observed at site 2135. This site was ultimately determined not scientifically significant and was destroyed during construction of the CDOT I-25 Climbing Lanes Phase I Early-Action project. Mitigation plans for salvage excavation of and onsite monitoring of construction affects to sites 916, 917, and 2134 were completed. Several previously unrecorded fossil localities were discovered and excavated adjacent to site 2134 during construction. The "new" site probably was one of these excavated sites. Completed mitigation efforts may remove any future need to monitor or mitigate impact to fossils within the corridor recently impacted by construction of the CDOT I-25 Climbing Lanes Phase I Early-Action project.

4.3.12.2 US 85 Corridor Paleontological Resources

One site, UCM 92164, which lies in Denver Formation lithology, has been identified along the US 85 Corridor. UCM 92164 has been partially excavated previously, but collections made to date are small and most likely do not include a statistically valid representative sample of the preserved paleoflora. Previous excavation has produced suggestions of a paleoflora that may be as rare or unique as fossil locality DMNS 1200 (previously described) and possibly younger in age.

4.3.13 Prime and Unique Farmlands

US Congressional Public Law 95-87 (Federal Register January 31, 1978: Part 657) requires the US Department of Agriculture, Natural Resources Conservation Service (NRCS) to identify and locate prime and unique farmland. These farmlands are protected in accordance with the Farmland Protection Act of 1981.

Prime farmlands are considered to be of national importance and have been defined as being land with the best combination of physical and chemical characteristics for producing feed, forage, fiber, and oilseed crops, and are available for these uses. No prime farmland exists within the project area. Unique farmland is land other than prime farmland that is used for the production of specific, high-value crops. No unique farmland exists within the project area as determined by the NRCS.

In addition to the prime and unique lands, the farmland program encourages the identification of farmland of statewide and local importance. Farmlands of statewide importance fall into three categories:

- Irrigated lands (not Prime)
- Irrigated Land (water supply inadequate)
- High Potential Dry Cropland

Comparison of the *Soil Survey of Castle Rock Area, Colorado*, with the *Important Farmland Inventory – Colorado*, identified two farmland soils of statewide importance within the APE (Table 4.22). These soils occur as pockets scattered throughout each transportation corridor. Within the US 85 APE, statewide important soil types occur generally south of Titan Road and north of Louviers, and between Sedalia and Daniels Park Road. Within the I-25 APE, statewide important soil types occur generally just north of the Meadows/Founders Parkway Interchange, and just south of the US 85/I-25 Interchange. Using soil survey maps, and in consultation with the Natural Resource Conservation Service District Conservationist, areas were estimated for the two soil types (Table 4.22). Due to the scale and level of precision associated with soil mapping, area estimates are considered approximate.

Table 4.22
Estimated Area of Farmland Soils of Statewide Importance within the
I-25/US 85 Area of Potential Effect

Statewide Important Soil Type	I-25 Hectares (Acres)	US 85 Hectares (Acres)
Bresser sandy loam (BrB) (1-3 percent slopes)	8 (19.8)	5.7 (14)
Sampson sandy loam (Sa)	0.1 (0.25)	31.2 (77)
Total	8.1 (20)	36.9 (91)

For additional information on prime and unique farmlands, see the *Farmland Technical Report*, May 2000, amended November 2000, in the Technical Reports Volume of the *South I-25 Corridor and US 85 Corridor FEIS*.

4.3.14 Noise

Based on land use, the Federal Highway Administration (FHWA) and CDOT have established guidelines defining Noise Abatement Criteria (NAC) for maximum acceptable traffic noise levels (Table 4.23). These levels represent a balance between a desirable noise level and an achievable noise level. Noise levels are measured in decibels (dB) on the "A" weighted scale (dBA). This scale most closely approximates the response characteristics of the human ear for low-level sound. Noise levels are reported in Leq (h), which describes the average noise energy level over one hour. The FHWA endorses Leq (h) as the acceptable noise descriptor used on highway transportation projects. An impact is noted when the predicted noise level approaches or exceeds the acceptable NAC for that land use (67 dBA for residences and 72 dBA for businesses) or when there is an increase of 10 or more dBA from roadway improvements. Colorado regulations further define an impact at an "approaching" level of 1 dBA below the NAC. An increase of 10 dBA is perceived as a doubling of the noise level, whereas a doubling of traffic will generally cause a 3-dBA increase in noise. Section 5.3.3.14, *Noise Impacts*, describes existing and year 2020 noise levels within the study corridor.

Along I-25 are six existing noise barriers as described below and as shown on Figure 5.7d and Figure 5.7f in Section 5.3.3.14, *Noise Impacts*.

- Two overlapping noise walls, 5.0 meters (16.5 feet) high, are located on the east side of I-25 north of the Meadows/Founders Parkway Interchange and were constructed as part of the Meadows/Founders Interchange project
- A berm, varying in height up to 3.5 meters (11.5 feet), is located on the west side of I-25 south of the Happy Canyon Interchange (Castle Pines Village area) and was constructed as part of the Castle Pines Village development
- A berm, varying in height up to 4.2 meters (14.0 feet), is located on the west side of I-25 north of the Surrey Ridge Road Interchange and was constructed as part of the Climbing Lanes Phase I project
- A berm, varying in height up to 4.2 meters (14.0 feet), is located on the west side of I-25 south of the Surrey Ridge Road Interchange and was constructed as part of the Climbing Lanes Phase I project
- A noise wall, 4.2 meters (14.0 feet) high, is located on the west side of I-25 north of the Castle Pines Parkway Interchange and was constructed as part of the Climbing Lanes Phase I project

Table 4.23
Noise Abatement Criteria

Activity Category	Acceptable Levels (Leq(h))	Description of Activity Category
A	57 (Exterior)	Lands on which serenity and quiet are of extraordinary significance and serve an important public need and where the preservation of those qualities is essential if the area is to continue to serve its intended purpose.
B	67 (Exterior)	Picnic areas, recreational areas, hospitals, residences, playgrounds, active sports areas, parks, motels, hotels, schools, churches, and libraries.
C	72 (Exterior)	Developed lands, properties, or activities not included in Categories A or B.
D	--	Undeveloped lands.
E	52 (Interior)	Residences, motels, hotels, public meeting rooms, schools, churches, libraries, hospitals, and auditoriums.

Source: Federal Register, Volume 47, No. 131, July 8, 1982, Rules and Regulations

Exterior: Noise levels measured from outside

Interior: Noise levels measured from inside

Climbing Lanes Phase II, an Early-Action project, has recommended and designed noise barriers that will be constructed within the project area. A 4.2-meter (14.0-foot) berm on the east side of I-25 south of Happy Canyon Road and a 4.2-meter (14.0-foot) berm on the east side of I-25 across from the existing Castle Pines Village berm are both currently recommended for construction under the Climbing Lanes Phase II project. A third berm of 4.2 meters (14.0 feet) will most likely be constructed as part of the Climbing Lanes Phase II project. The barrier will extend the existing Castle Pines Village berm both north and south. These barriers are included in the No-Action Alternative, the Preferred Alternative, and the Other Alternative. The Climbing Lanes Phase II Early-Action noise barriers are shown on Figure 5.7e and Figure 5.7f in Chapter 5.0, *Environmental Consequences*.

Full documentation of noise is included in the *South I-25 Corridor and US 85 Corridor FEIS Traffic Noise Analysis*, November 2000.

4.3.15 Visual Character

Visual quality is a subjective judgment. It is important in an objective analysis to apply a systematic process to minimize personal bias. This is achieved by determining significant viewpoints in the project area, determining existing conditions of visual elements, and comparing those to resulting conditions with various alternatives. The elements of visual quality include line, form, color, and texture. The location of an alternative within a particular view (foreground, middleground, and background) is also important.

For additional information on visual character, see the *Visual Resource Technical Memorandum South I-25 Corridor and US 85 Corridor*, May 2000, amended November 2000, in the Technical Reports Volume of the *South I-25 Corridor and US 85 Corridor FEIS*.

4.3.15.1 I-25 Corridor Visual Character

Traveler's View

From the traveler's point of view, the existing visual landscape along the I-25 Corridor between C-470 to south of the Town of Castle Rock consists of three distinct areas.

Northern Area

The northern area, from approximately C-470 to Schweiger (Exit 191), is gently rolling landscape framed by a major bluff line to the south (Figure 4.9a). The view to the east is down to the Cherry Creek flood plain with the Town of Parker in the background. To the west are steeper bluffs and new suburban residential development in Lone Tree and Highlands Ranch. Commercial office development is limited to the north of Lincoln Avenue with the Meridian Development to the east and a few office buildings to the west in the Heritage Hills development. The natural landscape is predominantly short grassland prairie with trees limited to the draws. The background of the western view is dominated by front range mountain peaks and hogbacks.

Central Area

The central area, from approximately Schweiger (Exit 191) through Happy Canyon Road, consists of steeper bluffs that restrict distant views to either side of I-25. Between Castle Pines Parkway and Happy Canyon Road, the viewshed opens to the south with a spectacular view of Pikes Peak framed by the adjacent bluffs (Figure 4.9b). The surrounding landscape includes suburban low-density development between Surrey Ridge Road and Castle Pines Parkway. There are no commercial buildings near I-25. The vegetation transitions from the low grassland prairie to the north to evergreen forest between Castle Pines Parkway and Happy Canyon Road. Low-density residential development to the south of Happy Canyon Road is screened from I-25 by evergreen trees.

Southern Area

Along the southern area, from Happy Canyon Road to south of the Town of Castle Rock, I-25 descends from the bluff-top area to the Plum Creek floodway. The views of Pikes Peak to the south continue, obstructed only in part by the namesake bluff of Castle Rock (Figure 4.9c).

The rural-to low-density residential development transitions into the small urban environment of the Town of Castle Rock.

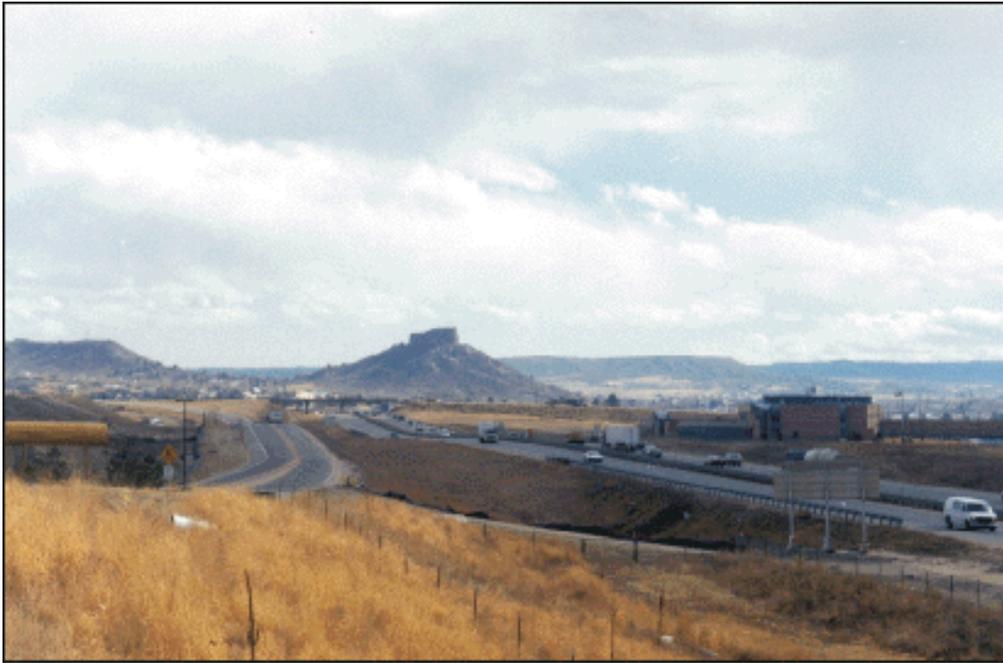
Figure 4.9a I-25 Visual Resources - Lincoln Avenue Interchange (facing south)



Figure 4.9b
I-25 Visual Resources – View of Pikes Peak from Happy Canyon (facing south)



Figure 4.9c
I-25 Visual Resources – View of the Rock, Castle Rock (facing south)



The I-25 alignment is depressed below the adjacent landscape between the Meadows/Founders Parkway and Plum Creek Interchange following the Plum Creek floodplain. The factory stores development and the Douglas County Justice Center dominate the immediate foreground west of I-25 at the Meadows/Founders Parkway Interchange. Restaurant and service station buildings are to the west of the Wolfensberger Road Interchange, with high mast signs being the predominant visual interest.

To the south of Wolfensberger Road, the historic homes and buildings along Elbert Street and Jerry Street are visible from I-25. To the west, Plum Creek is adjacent to I-25, providing a respite from the clutter of commercial development to the north. South of the Plum Creek Interchange, I-25 returns to a rural setting with short grasslands and very low-density residential development among the buttes and mesas. The Burlington Northern Santa Fe Railroad is in close proximity to I-25, with mile-long coal trains often obstructing views of the area.

Adjacent Property Views

Adjacent properties in the area offer only limited views of the I-25 Corridor. As described above, I-25 is generally in-cut. The residential properties between Surrey Ridge Road and Happy Canyon Road are further prevented from viewing I-25 by evergreen trees. Sound mitigation measures recently constructed in this area, including noise walls and noise berms, further restrict views of I-25. Through the Town of Castle Rock, I-25 is visible from all adjacent properties, but it does not obstruct distant views of the Rampart Range or to the east.

4.3.15.2 US 85 Corridor Visual Character

The US 85 Corridor begins at the C-470 Interchange and proceeds southeast to Meadows Parkway. US 85 is one of the original federal interstate highways and becomes identified as Santa Fe Drive in the Denver metropolitan area. Santa Fe Drive has historically been a major transportation route and a major commercial and industrial route. Supported by the railroad lines and US 85, the project area developed as an industrial area, predominately from C-470 to Louviers. Most of the industrial and commercial development occurs on the west side of the highway. Residential development adjacent to the highway is older and of historic significance. The northern 2

miles of the corridor are more recent commercial and residential development on both sides of the highway (Figure 4.9d).

US 85 parallels Plum Creek, and is the dividing line for most of the corridor between the rising hilly terrain on the east side of the highway and the Plum Creek Valley on the west. The viewsheds are predominately to the west; however, the views from US 85 between Sedalia and Meadows Parkway are open on both sides of the highway (Figure 4.9e). There are views of the Pikes Peak Forest and mountain ranges to the Plum Creek Valley. North of the Cherokee Ranch/Sedalia area on the east side, the views are minimal with terrain constraints. The views on the east side from Sedalia to Meadows Parkway range from evergreen tree areas to open views at the Cherokee Ranch, with pastureland and the steep rising peaks beyond. The east side of the roadway from Sedalia to Meadows Parkway is being planned and or developed commercially and residentially to Daniels Park Road at the beginning of the Cherokee Ranch.

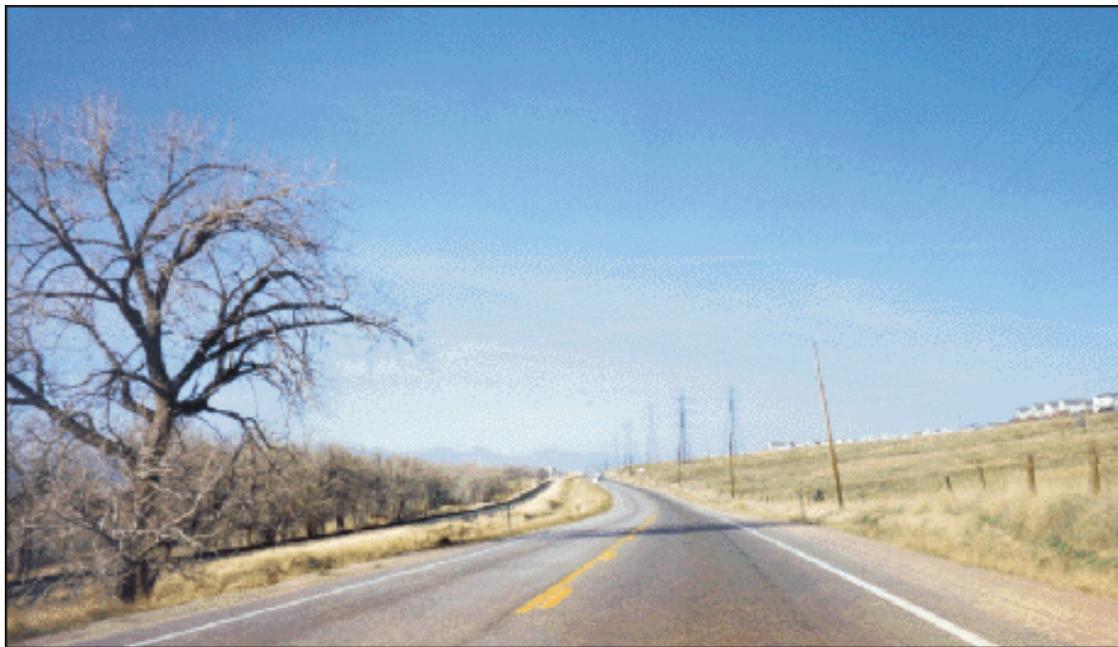
Figure 4.9d
US 85 Visual Resources – Approaching C-470 Interchange (facing north)



Figure 4.9e
US 85 Visual Resources – Sedalia Intersection (facing north)



Figure 4.9f
US 85 Visual Resources – Railroad Tracks (facing north)



The Burlington Northern Santa Fe Railroad and Union Pacific Railroad closely parallel US 85 through almost the entire corridor (Figure 4.9f). The view of the valley and the mountain range to the west, through the corridor, is intermittently affected by railroad track beds and residential and business development near the highway. Approximately 0.8 kilometer (0.5 mile) of US 85 beginning at Meadows Parkway is a large commercial center. On the west side is the Meadows, a large housing development. The view is open to the west and the mountain range. The setting in this area is urban.

Douglas County, in its Master Plans, has planned for and is accumulating open space east of US 85 from Daniels Park Road to the north. These open space areas are not within the viewshed of US 85.

4.3.16 Hazardous Waste Sites

Hazardous waste includes contaminants such as pesticides, petroleum products, heavy metals, and organic compounds. Hazardous waste sites are primarily regulated by the Resource Conservation and Recovery Act (RCRA) and the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA).

In accordance with FHWA and CDOT guidance, the potential for highway projects impacting hazardous waste must be evaluated. A Modified Environmental Site Assessment (MESA) is first prepared, which includes conducting a records search and a visual inspection of the project area. If potential hazardous waste sites are located from the MESA and can not be avoided, a site investigation/site assessment is required to determine the type and extent of contamination. The following steps were followed in the MESA:

- Communicated with property and business owners.
- Reviewed available state and federal environmental databases such as the RCRA list for Colorado, the EPA Superfund National Priorities List, and the CERCLA list.
- Reviewed files from the following sources: CDPHE, Colorado Department of Labor and Employment Oil Inspection Section, and the Tri-County Health Department. Also reviewed the list of underground storage tanks in Colorado.
- Reviewed aerial photographs of the study corridor.
- Reviewed historic maps of the study corridor.

Full documentation of potential hazardous waste sites is included in the *Phase I Environmental Site Assessment: I-25 Corridor; Lincoln Avenue to Castle Rock*, January 1999, and in the *Modified Phase I Environmental Site Assessment: State Highway 85 Corridor; C-470 to I-25*, July 1999.

4.3.16.1 I-25 Corridor Hazardous Waste Sites

Seventeen recognized hazardous waste sites have been identified along the I-25 Corridor (Figure 4.10a). The recognized environmental conditions along I-25 include nine bridges; one landfill; four leaking underground storage tank (LUST) sites; a wastewater pond; a spill site; and a CDOT maintenance facility.

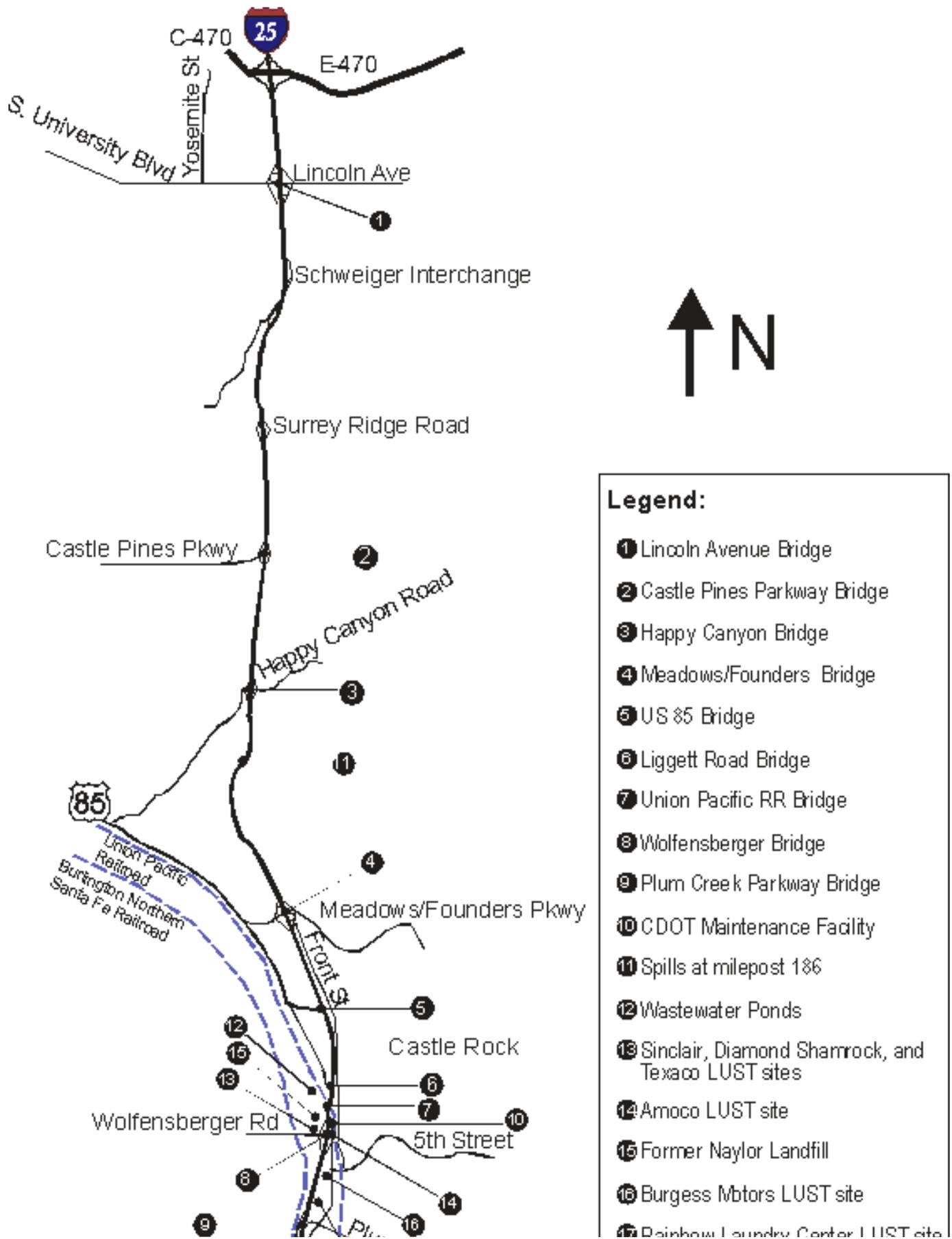
Nineteen potential hazardous waste sites were located within the study area (Figure 4.10b). These sites of potential concern could be within future highway construction zones.

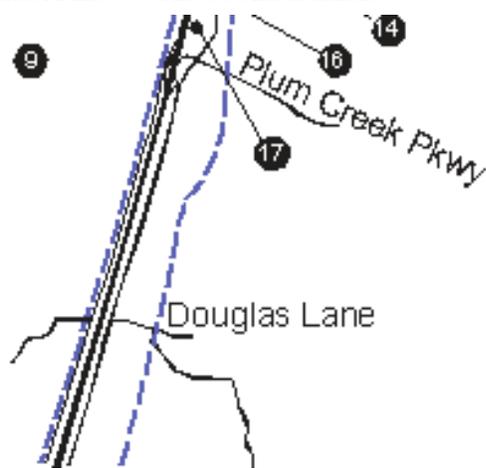
4.3.16.2 US 85 Corridor Hazardous Waste Sites

Eight recognized hazardous waste sites have been identified along the US 85 Corridor (Figure 4.10c). The recognized environmental conditions along US 85 include two landfill sites, two bridges, and four LUST sites.

Fifty-one potential hazardous waste sites were located within the study area (Figure 4.10d). These sites of potential concern could be within future highway construction zones.

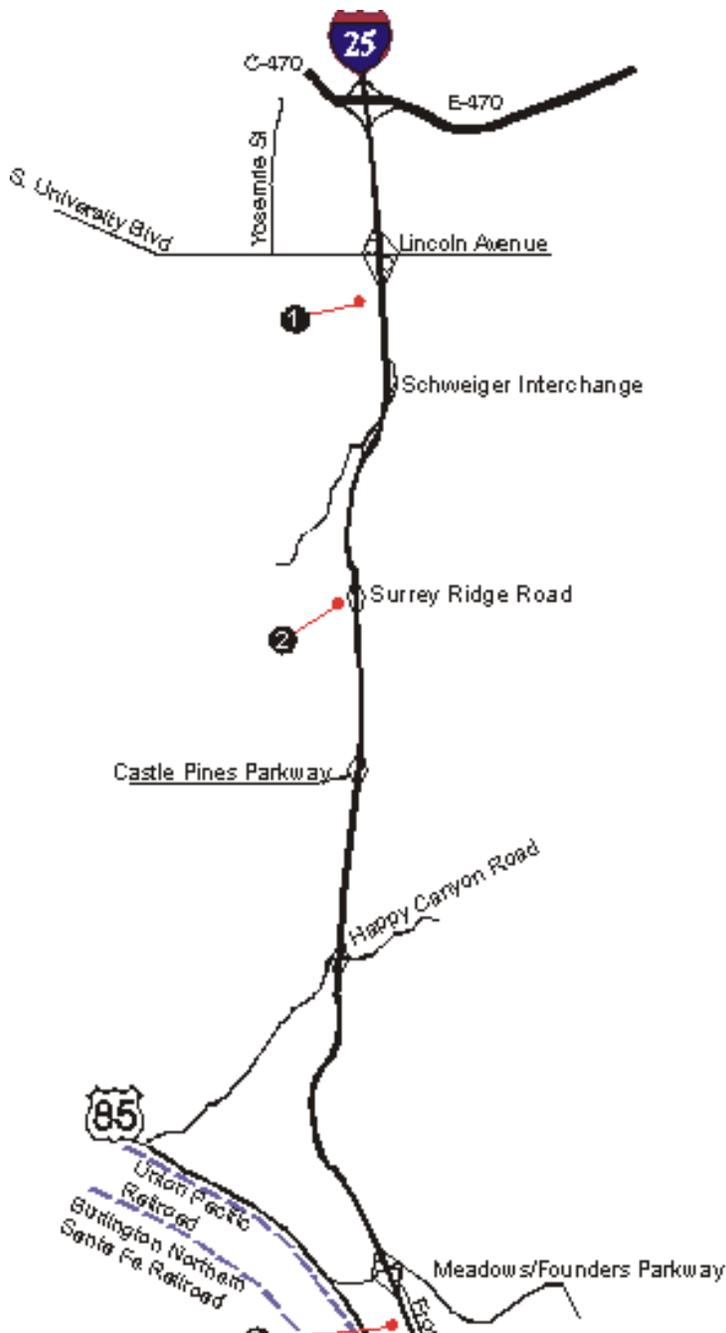
Figure 4.10a
Recognized Hazardous Waste Sites
along the I-25 Corridor





- 16 Burgess Motors LUST site
- 17 Rainbow Laundry Center LUST site

Figure 4.10b
Potential Hazardous Waste Sites
along the I-25 Corridor



Legend:

- 1 Possible Fill
- 2 Mile High Equipment Spill Site
- 3 Dirt and Rock Pile Area
- 4 Trailers USA
- 5 Traffic Sign Storage Area
- 6 Bayer Tire Store
- 7 Mobile Home Sales Lot
- 8 Car Dealership
- 9 Phillips 66 Gasoline Station
- 10 Western Gasoline Station
- 11 Fill Dirt and Disturbed Soil Area
- 12 Abandoned Railroad Station
- 13 Self Service Gasoline Station
- 14 Western Truck Stop
- 15 Medved Brutyn Ford
- 16 Scrieber Equipment
- 17 Former Douglas County Justice Center
- 18 Andrews Addition Landfill

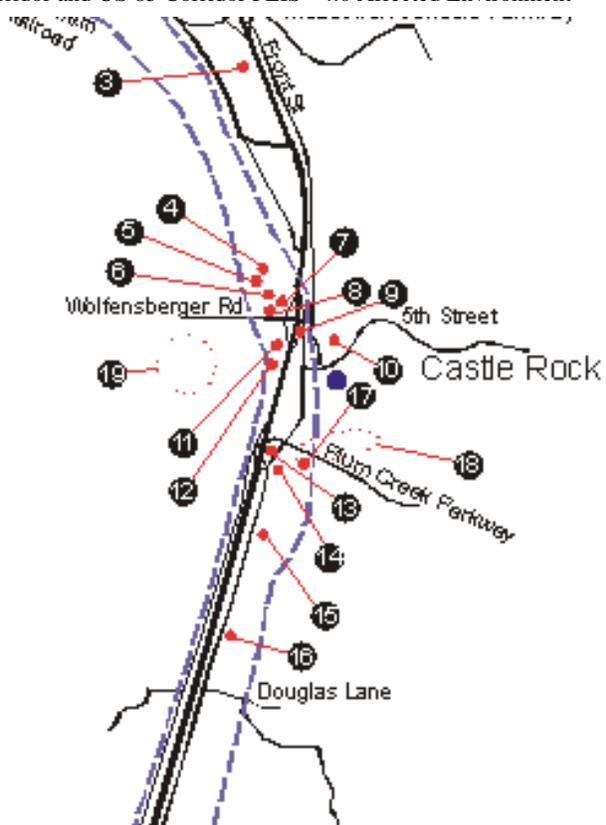


Figure 4.10c
Recognized Hazardous Wastes Sites
along the US 85 Corridor

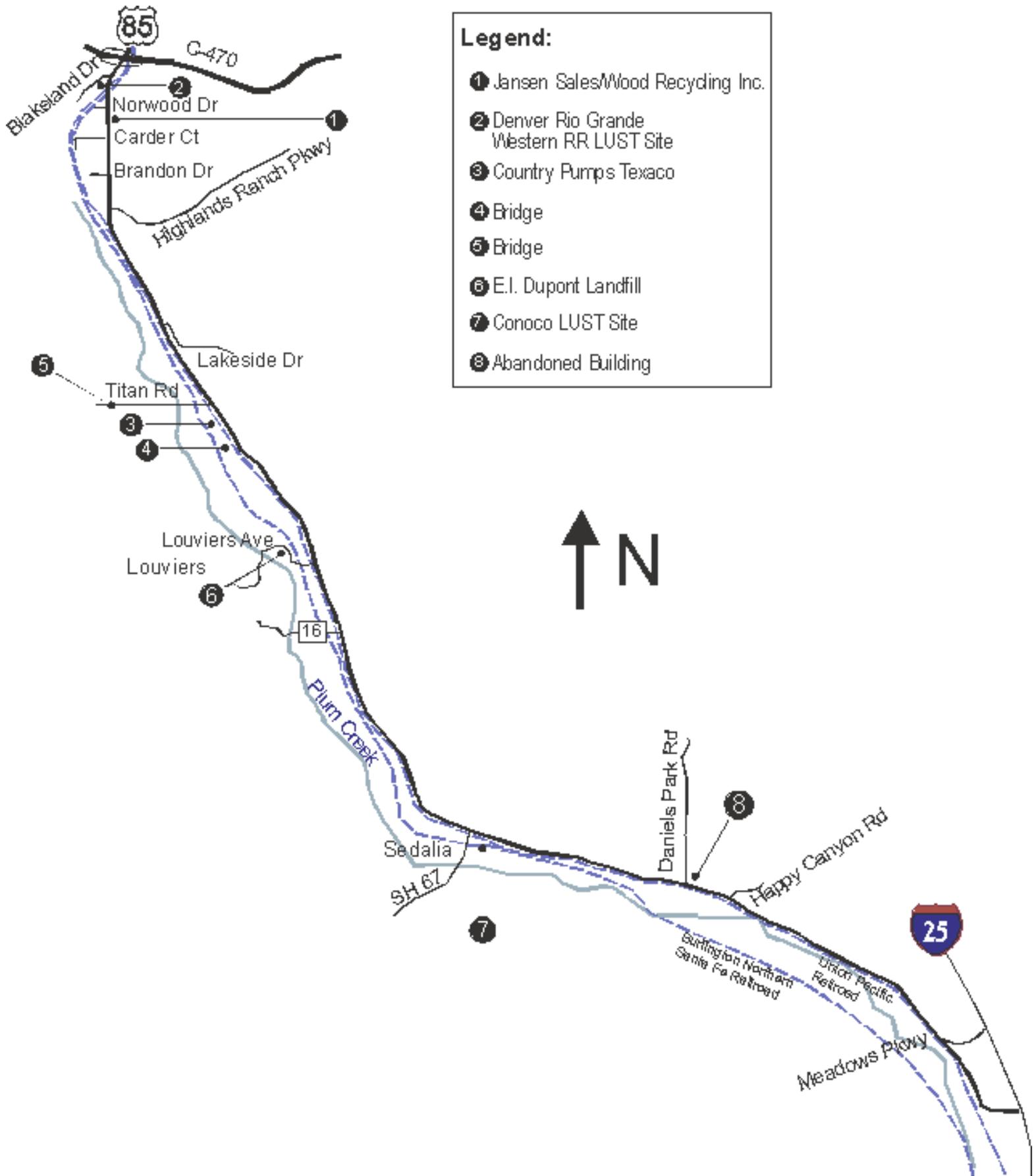
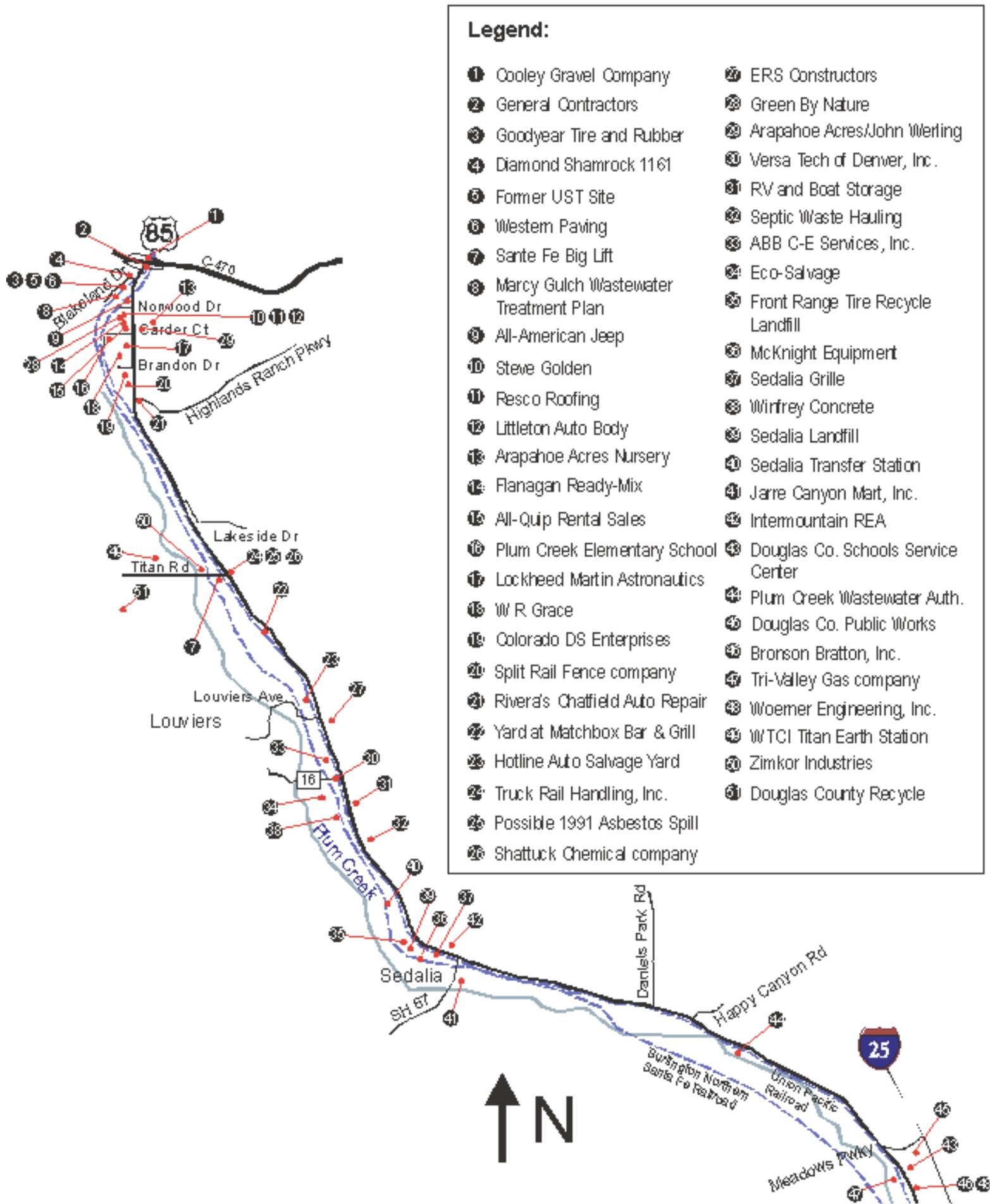
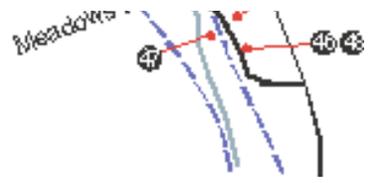


Figure 4.10d
Potential Hazardous Waste Sites

along the US 85 Corridor





5.0 ENVIRONMENTAL CONSEQUENCES

TABLE OF CONTENTS

<u>Section</u>	<u>Page</u>
<u>5.0 ENVIRONMENTAL CONSEQUENCES</u>	1
<u>5.1 INTRODUCTION</u>	1
<u>5.2 NO-ACTION ALTERNATIVE IMPACTS</u>	1
<u>5.3 FEIS ALTERNATIVE IMPACTS (PREFERRED ALTERNATIVE / OTHER ALTERNATIVE)</u>	2
<u>5.3.1 Permits And Approvals</u>	2
<u>5.3.2 Socioeconomic Impacts</u>	2
<u>5.3.2.1 Neighborhood Impacts</u>	2
<u>5.3.2.2 Environmental Justice Impacts</u>	4
<u>5.3.2.3 Relocation Impacts</u>	4
<u>5.3.2.4 Right-of-Way Acquisition</u>	5
<u>5.3.2.5 Recreational Impacts</u>	7
<u>5.3.2.6 Land Use and Zoning Impacts</u>	10
<u>5.3.2.7 Socioeconomic Secondary Impacts</u>	20
<u>5.3.2.8 Socioeconomic Cumulative Impacts</u>	20
<u>5.3.3 Physical Impacts</u>	21
<u>5.3.3.1 Air Quality Impacts</u>	21
<u>5.3.3.2 Water Quality and Quantity</u>	29
<u>5.3.3.3 Vegetation Impacts</u>	34
<u>5.3.3.4 Wetland Impacts</u>	35
<u>5.3.3.5 Geology Impacts</u>	41
<u>5.3.3.6 Wildlife Impacts</u>	41
<u>5.3.3.7 Wild and Scenic Rivers Impacts</u>	46
<u>5.3.3.8 Floodplain Impacts</u>	46
<u>5.3.3.9 Threatened, Endangered, and Other Special-Status Species Impacts</u>	51
<u>5.3.3.10 Historical Resources Effects</u>	60
<u>5.3.3.11 Archaeological Resources Impacts</u>	71
<u>5.3.3.12 Paleontological Resources Impacts</u>	72
<u>5.3.3.13 Prime and Unique Farmland Impacts</u>	73
<u>5.3.3.14 Noise Impacts</u>	74
<u>5.3.3.15 Visual Character Impacts</u>	107

5.3.3.16 Potential Hazardous Waste Sites Impacts	121
5.3.3.17 Energy Impacts	129
5.3.3.18 Temporary Construction Impacts	129
5.3.3.19 Secondary Impacts	132
5.3.3.20 Cumulative Impacts	134
5.4 SUMMARY OF IMPACTS	141

5.1 INTRODUCTION

Evaluation of impacts discussed in this chapter for the alternatives to the I-25 Corridor and US 85 Corridor was based on guidelines issued by the Federal Highway Administration (FHWA) (Technical Advisory T6640.8A, 1987). The following impact categories were considered during preparation of this Final Environmental Impact Statement (FEIS):

- Permits and Approvals
- Socioeconomics
- Relocation
- Right-of-Way
- Recreational Resources
- Land Use and Zoning
- Air Quality
- Water Quality
- Vegetation
- Wetlands
- Geology
- Wildlife
- Wild and Scenic Rivers
- Floodplains
- Threatened, Endangered, and Other Special-Status Species
- Historical Resources
- Section 4(f) Properties
- Archaeological Resources
- Paleontological Resources
- Prime and Unique Farmland
- Noise
- Visual Character
- Hazardous Waste Sites
- Energy
- Temporary Construction
- Secondary Impacts
- Cumulative Impacts

In this chapter, the No-Action Alternative is evaluated first, followed by an analysis of the Preferred Alternative and the Other Alternative. The environmental impacts discussed in this chapter are a result of the No-Action Alternative, Preferred Alternative, and the Other Alternative; they do not include the impacts from the Early-Action projects.

A tabular summary of quantifiable and qualitative impacts identified on Table 5.30 and Table 5.31 follows the impact analysis at the end of this chapter.

5.2 NO-ACTION ALTERNATIVE IMPACTS

The No-Action Alternative for the I-25 Corridor and US 85 Corridor includes the completion of all Early-Action projects and the Douglas Lane Interchange. Early-Action projects and the Douglas Lane Interchange have been environmentally cleared in previous studies or are in the process of being cleared (Douglas Lane Interchange is in

the process of completing the Colorado Procedural Directive 1601 Interchange Approval Process and amending the Denver Regional Council of Government [DRCOG] Regional Transportation Plan [RTP]). Their impacts have been or will be mitigated prior to the construction of the improvements discussed in this document and are not included in this Environmental Impact Statement (EIS).

Adoption of a No-Action Alternative for the I-25 Corridor and US 85 Corridor has no impact on many of the environmental resources discussed in this chapter. No direct land use impacts occur and no open space is taken for right-of-way (ROW). No relocations are required. No sedimentation or potential spills related to construction affect the corridor. No wetlands are disturbed and no additional impacts on vegetation and wildlife result. Floodplain hydraulics are not altered, and no recreation or historic resources are affected. No construction impacts occur.

The No-Action Alternative, however, results in several other impacts. Without additional corridor improvements, further deterioration of existing levels of service (LOS) on the I-25 Corridor and US 85 Corridor occurs with the increase in traffic volumes. Congestion and delays currently experienced during peak-traffic periods become much worse and extend through more hours of the day. Some increase in the number of minor (fender bender) traffic crashes is expected with the projected increased traffic volumes. The additional traffic volume increases the noise levels at homes and businesses and deteriorates air quality throughout both corridors. The local economy also experiences impacts, and energy consumption increases. The No-Action Alternative is not responsive to community planning efforts. This alternative does not accommodate the rapid growth and development of Douglas County.

5.3 FEIS ALTERNATIVE IMPACTS (PREFERRED ALTERNATIVE / OTHER ALTERNATIVE)

5.3.1 Permits And Approvals

The following permits and approvals may be required for the I-25 Corridor and US 85 Corridor improvements:

- Federal Emergency Management Agency (FEMA)
- Clean Water Act Section 404 permit for dredge and fill in Waters of the U.S.
- Clean Water Act Section 402 permit for point source discharge
- Water Quality Control Division Section 401 certification
- National Pollutant Discharge Elimination System (NPDES) Stormwater Permit
- Programmatic or individual certification for Senate Bill 40
- Migratory Bird Treaty Act permit
- Temporary construction permit to realign railroad
- Other permits such as Access, Utility, Survey, etc.

5.3.2 Socioeconomic Impacts

5.3.2.1 Neighborhood Impacts

An alternative is considered to have a substantial social or induced population impact if numerous residents or businesses are relocated involuntarily; if it causes the population of the surrounding region to exceed historic growth rates; if it substantially alters the location and distribution of population; or if it affects the local housing market and vacancy rates. These criteria are the basis by which social and economic consequences of a proposed project can be judged as having impacts of importance.

The proposed improvements are located either within existing Colorado Department of Transportation (CDOT) ROW or on land adjacent to existing ROW. The surrounding lands are currently developed adjacent to the highways. Because this project represents an expansion of existing operations and usage, minimal direct and indirect disruption occurs to the communities. Shifts in population or degradation of the socioeconomic attributes of Douglas County that have not already been accounted for in the original roadway development and previously considered by populations in the vicinity of the highways are not expected to occur.

Widening and other improvements to US 85 have the highest potential for socioeconomic impacts due to indirect or quality-of-life disruption. Increased noise, traffic, and evening lighting could adversely affect the lifestyle currently enjoyed by nearby residents. While these effects are not expected to exceed any thresholds of importance, they could become annoying and disruptive to limited numbers of residents of Sedalia and Louviers, and to others close to the existing highway who are already affected by highway activity. In some cases, ROW acquisitions may decrease the value of residences without actually taking them.

Contiguity to these highways could also have a positive effect on the value of some homes in nearby residential areas. Improving/managing access to these roads may improve residents' connection to commercial areas and employment locations and result in increased home values. Commercial areas could also benefit from improved highway access in terms of improved mobility, improved visibility, accessibility to a regional roadway, and improved safety.

Highway widening is not expected to cause adverse impacts to specific neighborhoods. There are no neighborhoods that exist on both sides of the highway, and the highway widening will not divide neighborhoods or create neighborhood disruption. Access to specific residences may change, most notably on US 85, but in no case will access to a residential area be eliminated. Highway widening will create beneficial impacts for the connection of communities along I-25 by reducing congestion times.

Modifications to the interchanges along the northern part of I-25 may change the primary access for residents in the Surrey Ridge and Oak Hills neighborhoods. Public meetings with these residents have been held to assess the residents' concerns. Although access may be modified by the closing of Schweiger and/or Surrey Interchanges, access to their neighborhoods will still be provided through a new frontage road or through a connection off of the Castle Pines Interchange, only a short distance to the north of the existing Surrey Interchange.

In the long-term, secondary impacts may occur that could also be disruptive to current and future nearby residents. Temporary construction impacts may occur through disrupting traffic flow. Residential and commercial development in the vicinity of the corridor may occur based on the availability of improved access. Impacts from any new development can be controlled by local site plan review and development regulations.

For additional information, please see Section 5.3.3.14, *Noise Impacts*, Section 5.3.3.15, *Visual Character*, Section 2.5.1.4, *I-25 Corridor Changes in Travel Patterns, Access, and Safety for the Preferred Alternative*, Section 2.5.2.4, *US 85 Corridor Changes in Travel Patterns, Access, and Safety for the Preferred Alternative*, Section 2.6.1.4, *I-25 Corridor Changes in Travel Patterns, Access, and Safety for the Other Alternative*, and Section 2.6.2.4, *US 85 Corridor Changes in Travel Patterns, Access, and Safety for the Other Alternative*.

5.3.2.2 Environmental Justice Impacts

Environmental Justice impacts are those with a disproportionate impact on the minority or low-income community resulting from any substantial adverse impact on nearby residents and businesses, including but not limited to social, economic, health-related environmental effects, and other environmental impacts (Executive Order 12898). A disproportional impact might result, if an impact is appreciably more severe or greater in magnitude than the impact that is suffered by the non-minority or non-low-income population.

The percentage of minority populations in the project corridors is similar to that of other locations in the county and is essentially dispersed into large census block groups. Low-income populations are likewise small in number and relatively well dispersed throughout the county.

No disproportionately high or adverse economic or environmental effects on minority or low-income populations are expected to occur as a result of developing the elements of the proposed project. This project does not result in adverse impacts in any specific neighborhood where residents are minority or low income. The impacts from this project are consistent with the spirit of the Executive Order on Environmental Justice.

For additional information on socioeconomic, see the *Socioeconomic Technical Memorandum South I-25 Corridor and US 85 Corridor*, May 2000, amended November 2000, in the Technical Reports Volume of the *South I-25 Corridor and US 85 Corridor FEIS*.

5.3.2.3 Relocation Impacts

Relocations described in this document are those in which a structure is actually being taken due to road construction so as to require relocating residents and businesses in the affected area. The CDOT will comply with the *Uniform Relocation and Assistance and Real Property Acquisition Policies Act of 1970*, as amended (1989). The purpose of this act is to provide for uniform and equitable treatment of all persons displaced from their homes, businesses, or farms. All relocatees are given a minimum of 90 days in which to find replacement housing or business locations. Relocatees may receive monetary payments, which can include payments of moving expenses, business in lieu of payments, rent supplements, down payments, and increased interest payments.

No person shall be displaced by a federal aid project unless and until adequate replacement housing has been offered to all affected persons regardless of race, color, religion, sex, or national origin.

In accordance with Title VI, in addition to full compliance with the *Uniform Relocation and Assistance and Real Property Acquisition Policies Act of 1970*, as amended (1989), CDOT will provide assistance to any eligible owner or tenant in relocating their business or residence at the time of displacement. Benefits under the Act, to which each eligible owner or tenant may be entitled (including early [or hardship] acquisition), will be determined on an individual basis and explained to them in detail, in addition to information regarding their

financial options.

Preferred Alternative and Other Alternative

This section considers potential relocation impacts within the I-25 Corridor and US 85 Corridor by the Preferred Alternative and the Other Alternative because the impacts are the same for both alternatives.

I-25 Corridor Relocations (Preferred Alternative and Other Alternative)

No relocation impacts are anticipated within the I-25 Corridor as a result of the Preferred Alternative and Other Alternative.

US 85 Corridor Relocations (Preferred Alternative and Other Alternative)

Nine relocations are required based on the conceptual design of the Preferred Alternative and Other Alternative as shown on Figure 5.1 and Table 5.1. Six sites are businesses and three are residences. Currently, there appears to be commercial properties of comparable value and character in the vicinity of the study area.

It is customary to include family characteristics in relocation studies of this type; however, when there are few displacees, information on race, ethnicity and income levels is not included to protect the privacy of those affected. Their locations are easily identified by alternative, and no data will be published about the specific characteristics of individuals potentially affected.

**Table 5.1
Potential Relocations
(Number of Relocations)**

	Preferred Alternative	Other Alternative
I-25 Corridor	0	0
US 85 Corridor	9	9
Total	9	9

5.3.2.4 Right-of-Way Acquisition

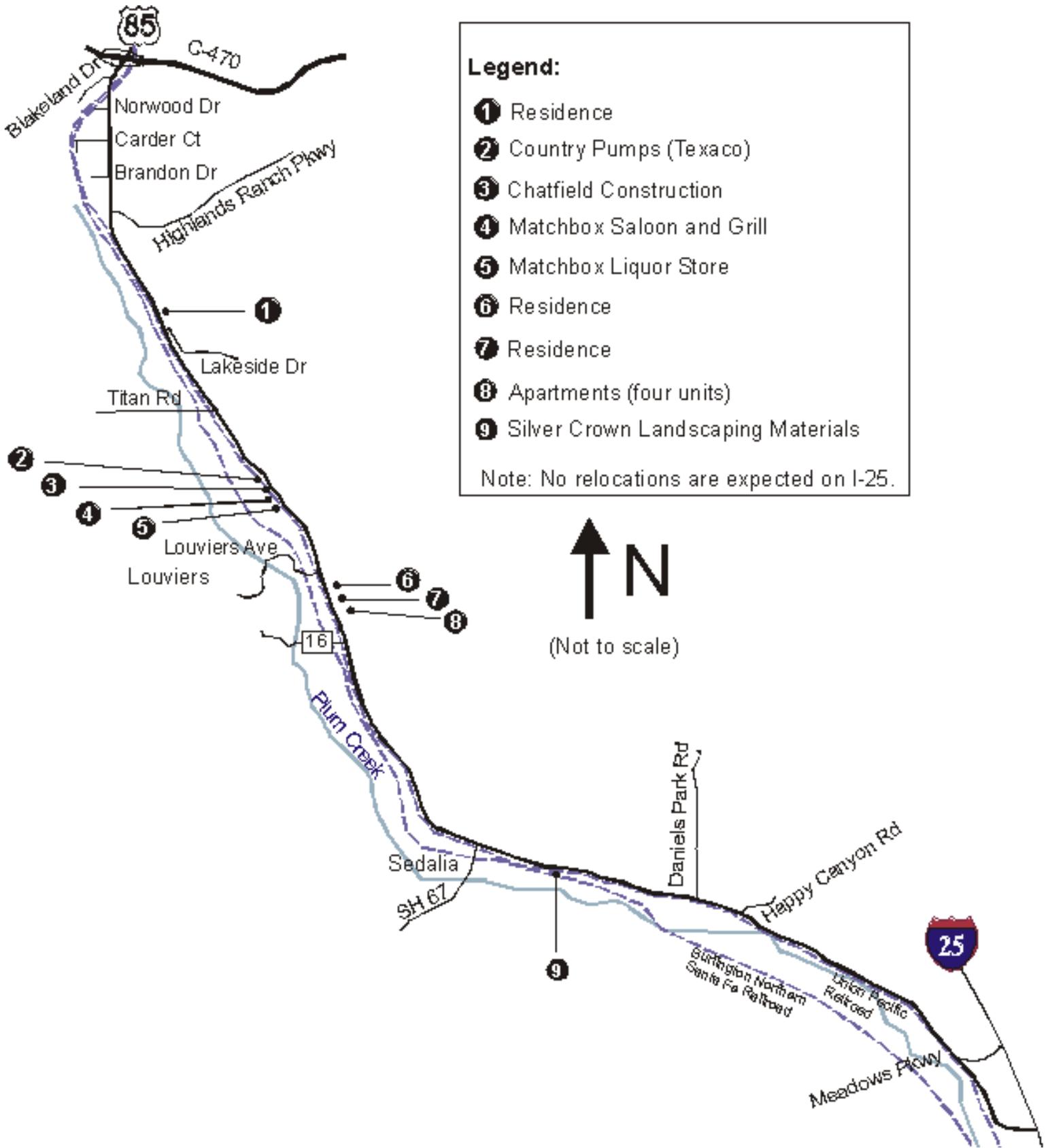
ROW acquisitions are necessary for both the Preferred Alternative and Other Alternative. As the highway is widened, additional ROW is required. In some cases, ROW acquisitions may decrease the value of residences without actually taking them. Some commercial property values may increase due to the proximity to a regional roadway. CDOT has been coordinating with Douglas County, the City of Lone Tree, the Town of Castle Rock, and developers to provide setbacks for the transportation corridor. Table 5.2 summarizes the ROW impacts for the Preferred Alternative and the Other Alternative.

Preferred Alternative

I-25 Corridor Right-of-Way Acquisition (Preferred Alternative)

The estimated amount of ROW needed for the I-25 Corridor elements of the Preferred Alternative is 10.1 hectares (25.0 acres).

**Figure 5.1
Potential Relocations**



14

Table 5.2
Potential Right-of-Way Acquisition
Hectares (Acres)

	Preferred Alternative	Other Alternative
I-25 Corridor	10.1 (25.0)	28.9 (71.4)
US 85 Corridor	49.4 (122)	51.4 (127)
Total	59.7 (147.6)	80.3 (198.4)

US 85 Corridor Right-of-Way Acquisition (Preferred Alternative)

The estimated amount of ROW needed for the US 85 Corridor elements of the Preferred Alternative is 49.4 hectares (122 acres).

Other Alternative

I-25 Corridor Right-of-Way Acquisition (Other Alternative)

The estimated amount of ROW needed for the I-25 Corridor elements of the Other Alternative is 28.9 hectares (71.4 acres). The ROW increases for this alternative because the frontage road is being constructed on a new alignment.

US 85 Corridor Right-of-Way Acquisition (Other Alternative)

Estimated amount of ROW needed for the US 85 Corridor elements of the Other Alternative is 51.4 hectares (127 acres). The ROW increases for this alternative because of the additional laneage between Highlands Ranch Parkway and Titan Road.

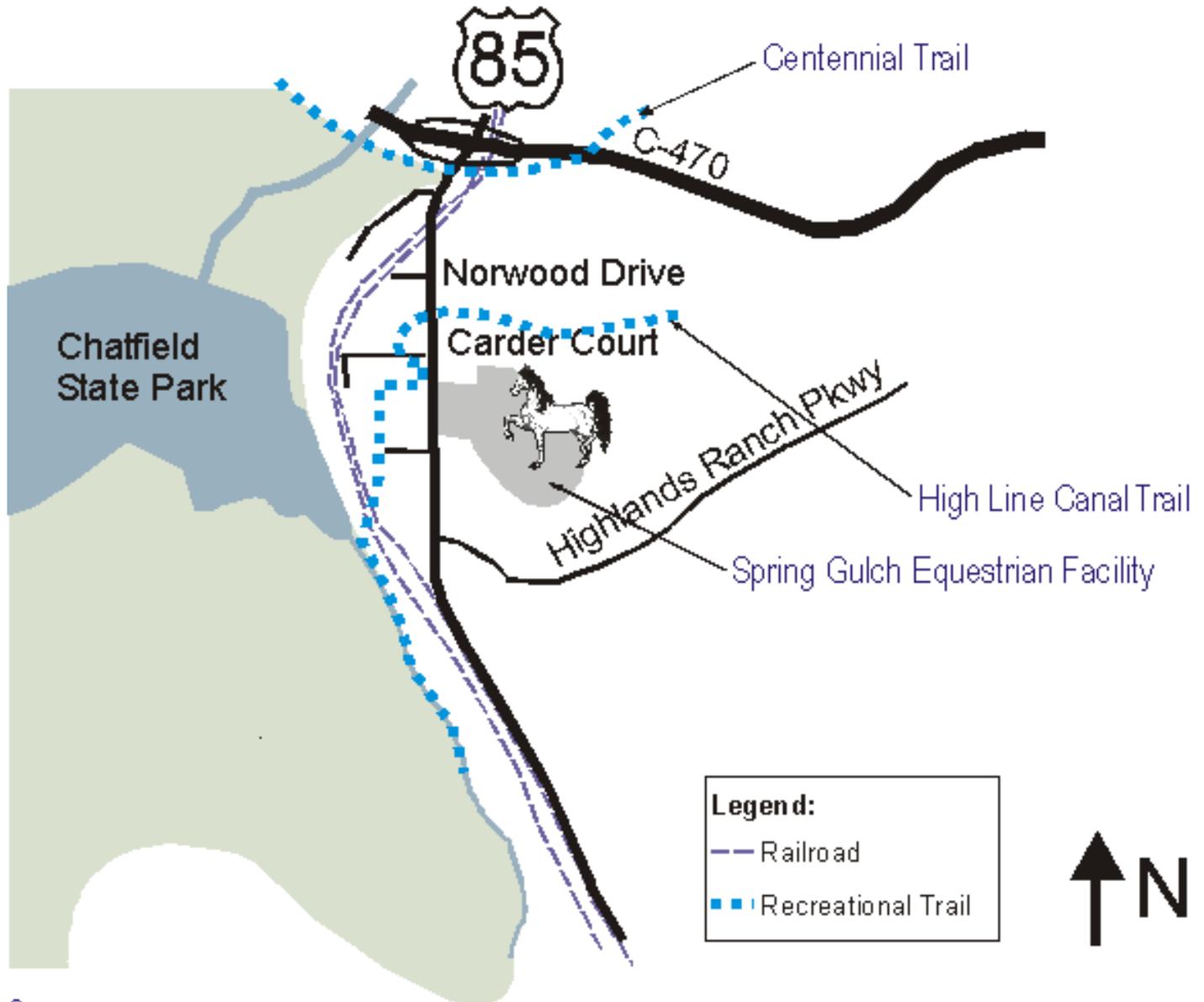
5.3.2.5 Recreational Impacts

Potential impacts to recreational resources may occur as a result of highway improvements. This section evaluates potential impacts to recreational resources along the I-25 Corridor and the US 85 Corridor for the Preferred Alternative and the Other Alternative. The likelihood of impacts is evaluated based on the proximity of both temporary and permanent impact areas to recreational resources. The total area of primary impact to each property is calculated by overlaying proposed project area maps on parcel maps provided by Douglas County and recent ROW mapping. Calculation of secondary impact is based on corridor noise projections (Section 5.3.3.14: *Noise Impacts*), consideration of visual character impacts (Section 5.3.3.15: *Visual Character Impacts*), and potential changes in accessibility to each resource. Letters of concurrence relating to recreational impacts are included in the Appendix of this document.

Preferred Alternative and Other Alternative

This section considers potential impacts to recreational resources within the I-25 Corridor and US 85 Corridor by the Preferred Alternative and the Other Alternative since the impacts are the same for both alternatives. Table 5.3, at the end of this section, summarizes impacts to recreational resources. Figure 5.2 shows the location of impacted resources.

**Figure 5.2
Recreation Impacts***



Source:
Douglas County Assessor's Maps
and Pierson Graphics Corp. 1998

*All impacts to recreational resources occur within the US 85 Corridor.

I-25 Corridor Recreational Impacts (Preferred Alternative and Other Alternative)

No primary impacts to recreational resources are anticipated as a result of the Preferred Alternative or the Other

Alternative, along the I-25 Corridor. No secondary impacts resulting from noise, visual, or impaired accessibility are anticipated as a result of the Preferred Alternative or the Other Alternative, along the I-25 Corridor.

US 85 Corridor Recreational Impacts (Preferred Alternative and Other Alternative)

Three recreational resources along US 85 are impacted as a result of the Preferred Alternative and the Other Alternative. These resources include: Centennial Trail, High Line Canal Trail, and the Spring Gulch Equestrian Facility. No substantial secondary impacts (noise or visual) are anticipated as a result of the Preferred Alternative or the Other Alternative.

Centennial Trail

The Preferred Alternative and Other Alternative each impact approximately 2 meters (6.5 feet) of the Centennial Trail where it intersects with US 85. This portion of the trail is within CDOT's existing ROW. No secondary impact resulting from noise, visual, or impaired accessibility are anticipated as a result of either alternative.

High Line Canal Trail

The Preferred Alternative and Other Alternative each impact 124 meters (410 feet) of the existing High Line Canal Trail where it intersects with US 85. However, under both alternatives, this segment of the trail will be rerouted directly north of its current location to cross US 85 below grade. No secondary impact resulting from noise, visual, or impaired accessibility are anticipated as a result of either alternative. The High Line Canal Trail is protected under Section 4(f) of the Department of Transportation Act of 1966. For additional information on Section 4(f) impact, see Chapter 6.0, *Section 4(f) Evaluation*.

Spring Gulch Equestrian Facility

The Preferred Alternative and Other Alternative each impact approximately 0.2 hectare (0.6 acre) of the Spring Gulch Equestrian Facility along US 85. The land impacted as a result of this alternative is not used for equestrian recreation. No secondary impact resulting from noise, visual, or impaired accessibility are anticipated as a result of either alternative. Spring Gulch Equestrian Facility is protected under Section 4(f) of the Department of Transportation Act of 1966. For additional information on this Section 4(f) impact, see Chapter 6.0, *Section 4(f) Evaluation*.

Table 5.3 Potential Recreation Impacts

Resource	Preferred Alternative	Other Alternative
Centennial Trail US 85 Corridor	2 meters* (6.5 feet)	2 meters* (6.5 feet)
High Line Canal Trail US 85 Corridor	124 meters (410 feet)	124 meters (410 feet)
Spring Gulch Equestrian Facility US 85 Corridor	0.2 hectare (0.6 acre)	0.2 hectare (0.6 acre)

* within CDOT ROW

For additional information on recreation, see the *Recreation Technical Report*, May 2000, amended November 2000, in the Technical Reports Volume of the *South I-25 Corridor and US 85 Corridor FEIS*.

5.3.2.6 Land Use and Zoning Impacts

This section discusses the effects of the proposed action on land uses and zoning as well as the effects of the project on DRCOG's *Metro Vision 2020 Plan* and the RTP (the fiscally constrained elements). More specifically, how the proposed action may or may not affect the extent of urban development, open space, free-standing communities, balanced multi-modal transportation systems, urban centers, and environmental quality.

Preferred Alternative and Other Alternative

This section considers potential impacts to land use and zoning within the I-25 Corridor and US 85 Corridor by the Preferred Alternative and the Other Alternative since the impacts are the same for both alternatives. The FEIS Preferred Alternative and Other Alternative do not encourage substantial land use and zoning changes within the project corridor. Figure 5.3a and Figure 5.3b show land use and zoning along the I-25 Corridor. Figure 5.3c and Figure 5.3d show land use and zoning along the US 85 Corridor according to Douglas County and Town of Castle Rock plans.

The South I-25 Corridor and US 85 Corridor FEIS project proposes improvements to existing roadway facilities. This project does not create or induce growth, but is responding to current and projected demand. Creation of new jobs has been limited, this community is a bedroom community and employment is largely situated outside Douglas County. Three major links to employment for residents in Douglas County are US 85, I-25, and State Highway (SH) 83.

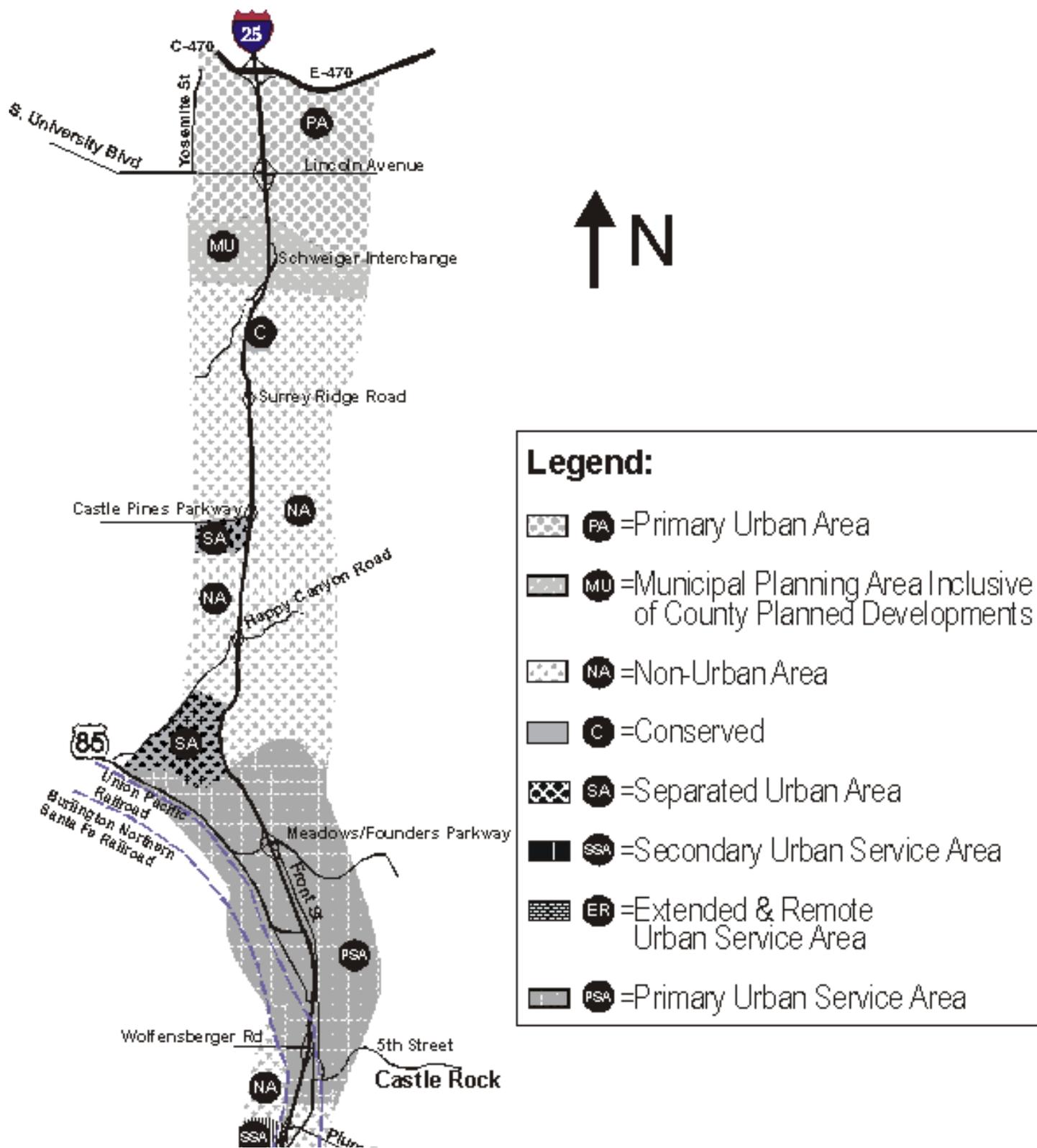
Douglas County growth trends have been consistent, indicating it will continue to be a growing area, independent of improvements to I-25 and US 85. Infrastructure needs will increase due to anticipated residential development and other actions. As a result, this project's impact on non-transportation infrastructure needs and tax changes for county and state residents are unforeseeable and impossible to assess beyond its purpose to provide improved transportation for current and proposed Douglas County land use.

Impacts on the Metro Vision 2020 Plan

The South I-25 Corridor and US 85 Corridor FEIS alternatives and the Long-Term Vision for South I-25 Corridor and US 85 Corridor Through 2020 and Beyond are in accordance with the Metro Vision 2020 Plan. The Metro Vision elements are discussed as follows:

- *Extent of urban development.* The Metro Vision 2020 Plan aims to contain urban development within 1,126 square kilometers (700 square miles) by the year 2020, accommodating expected population growth. This would add 265 square kilometers (165 square miles) to the existing urbanized area. If the current land use trend continues, the Denver region is expected to grow to 1,170 square kilometers (1,100 square miles) by the year 2020. Keeping urban growth to 1,126 square kilometers (700 square miles) will

Figure 5.3a
I-25 Corridor Land Use



Source:
Douglas County
September 2000
Town of Castle Rock
October 2000

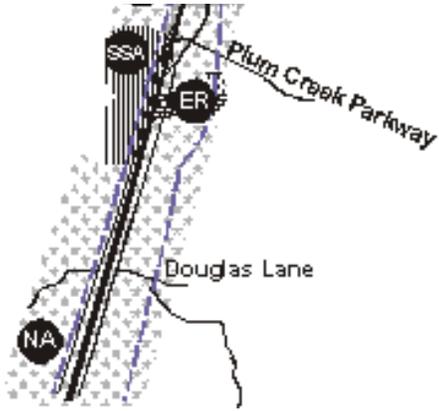
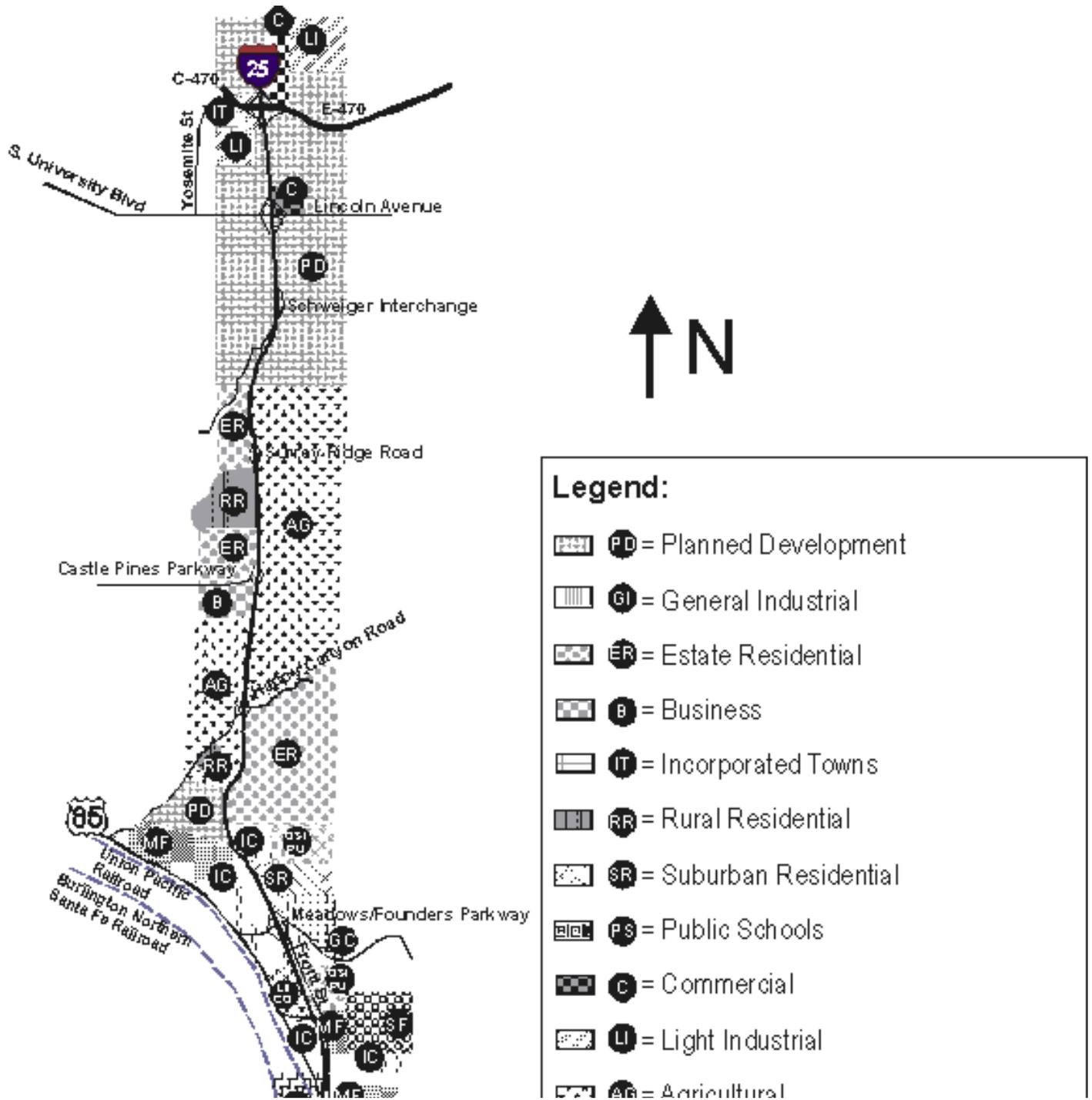


Figure 5.3b
I-25 Corridor Zoning



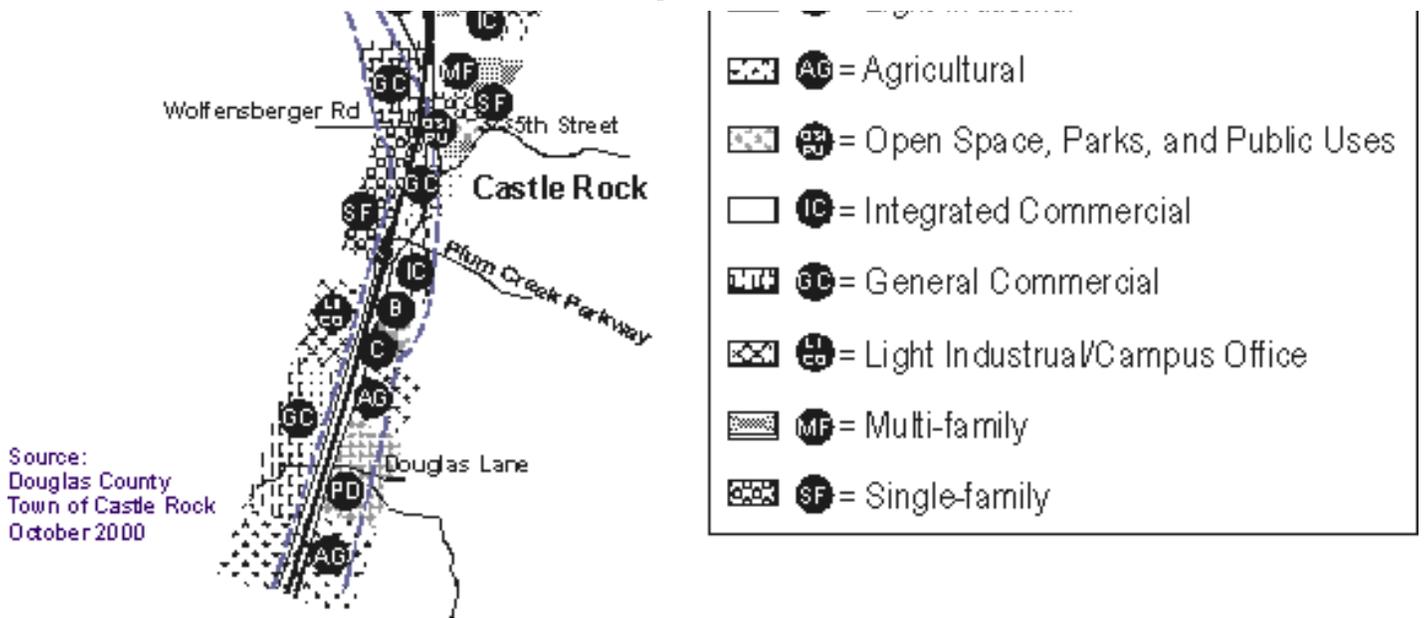
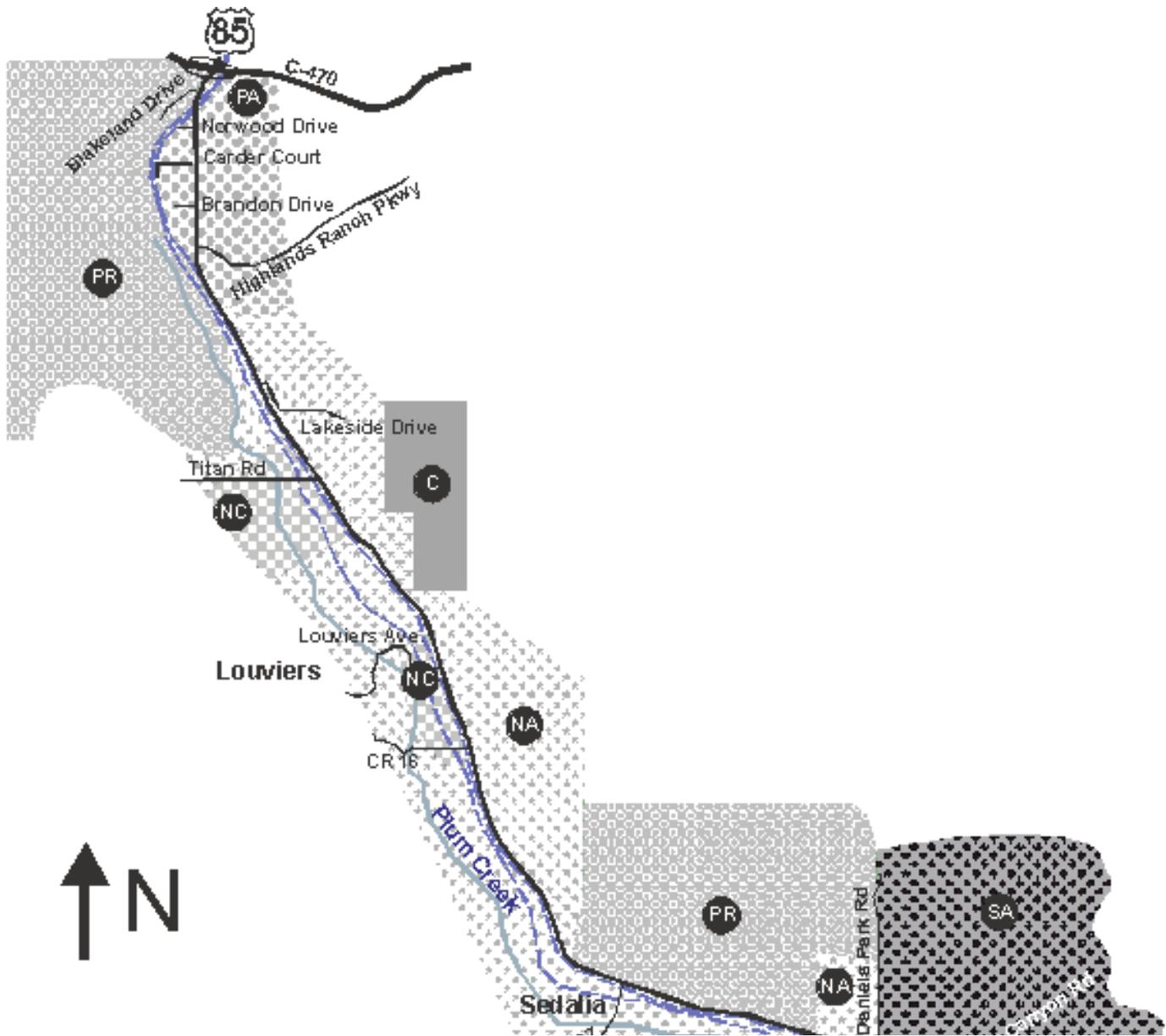


Figure 5.3c
US 85 Corridor Land Use



Legend:

-  PR = Preserved
-  PA = Primary Urban Area
-  NA = Non-Urban Area
-  C = Conserved
-  SA = Separated Urban Area
-  PSA = Primary Urban Service Area
-  NC = Northern US 85 Corridor

Source:
Douglas County
September 2000

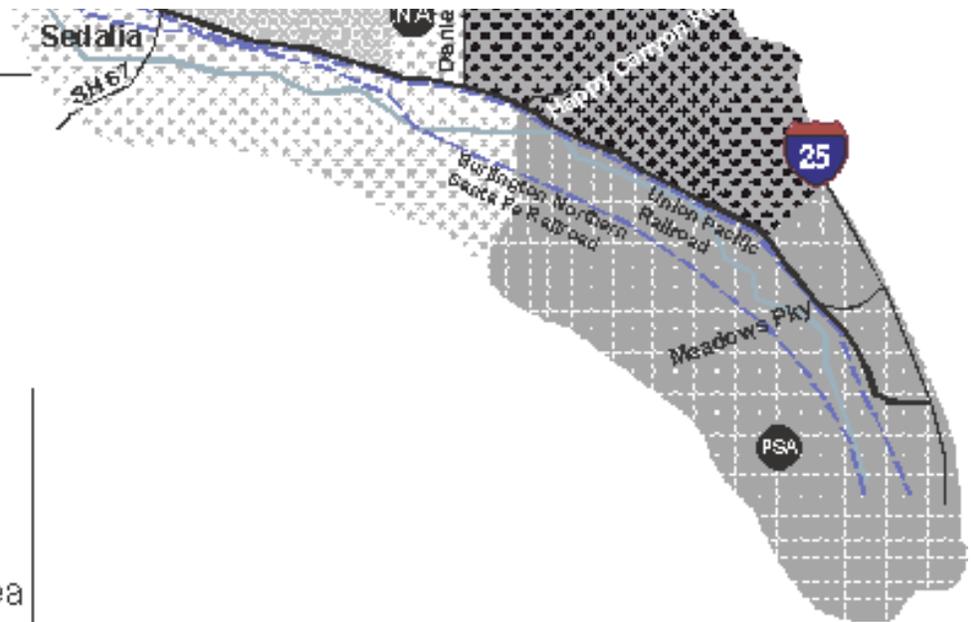
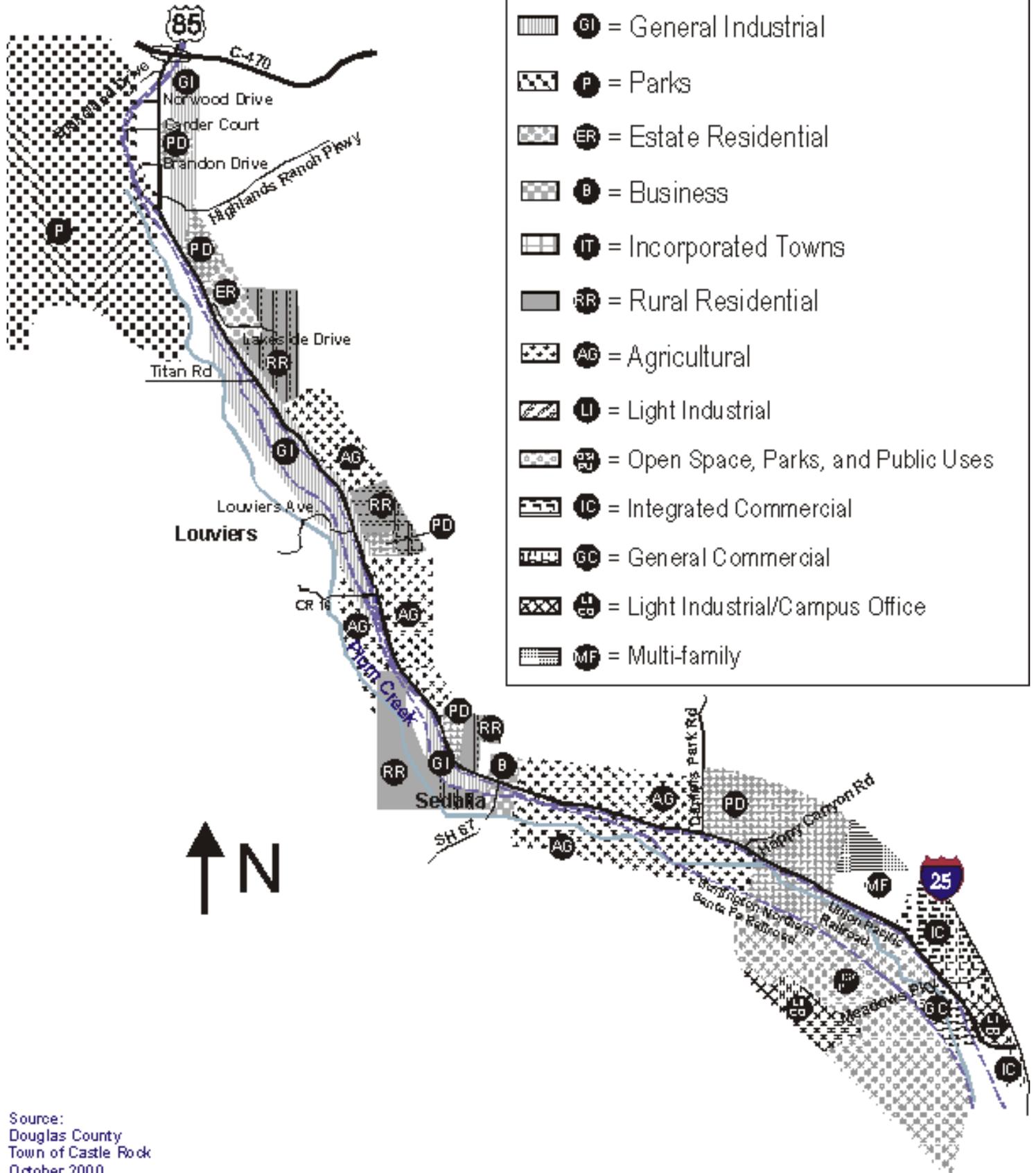


Figure 5.3d
US 85 Corridor Zoning

Legend:

-  PD = Planned Development
-  GI = General Industrial
-  P = Parks
-  ER = Estate Residential
-  B = Business
-  IT = Incorporated Towns
-  RR = Rural Residential
-  AG = Agricultural
-  LI = Light Industrial
-  OS/PJ = Open Space, Parks, and Public Uses
-  IC = Integrated Commercial
-  GC = General Commercial
-  LI/CO = Light Industrial/Campus Office
-  MF = Multi-family



Source:
Douglas County
Town of Castle Rock
October 2000

encourage contiguous and orderly land development, help prevent unnecessary infrastructure extension, reduce vehicle travel, maintain air quality and help preserve open space. The regional Urban Growth Boundary creates predictability in planning for local and regional facilities and services, such as water, sewer, and roads, so that costs are reduced and can be managed efficiently. The South I-25 Corridor and US 85 Corridor FEIS Preferred Alternative and Other Alternative are responding to existing and planned travel conditions and is compatible with the Metro Vision's approach to urban development.

Currently, there is no demand for additional capacity to the south of the project. Therefore, it is not anticipated that the improvements would create additional growth. However, it is recognized that new developments will occur in the near future in Douglas County. From a cumulative perspective, the housing and commercial developments planned for Highlands Ranch, the Rampart Range area, Meridian, the Canyons, and the Douglas Lane area add a substantial number of persons to Douglas County. The extent of these developments is still not well defined but has been accounted for in DRCOG's plan used for transportation studies. However, the relative contribution of the highway project and its associated capacity are negligible in respect to the anticipated amount of growth effects from new development. It is not anticipated that the Preferred Alternative and the Other Alternative will create growth or induce development. It is generally understood that growth will occur in Douglas County regardless of transportation enhancements. For additional information, please refer to **Section 5.3.2.8 Socioeconomic Cumulative Impacts** of the FEIS.

In addition, as part of the FEIS, an access management plan has been developed for US 85. The access management plan evaluates existing and new access points along a highway. The purpose of the plan is to improve traffic flow and safety, reduce traffic conflicts, and provide appropriate access to adjacent land uses. Moreover, the access management plan will assist in managing growth.

- *Open space.* The Metro Vision encourages preservation of open space. Open space is being avoided where possible within each alternative. Douglas County has more than 15,000 hectares (37,000 acres) of open space within the county, which is managed by Douglas County Division of Open Space and Natural Resources. Douglas County Parks currently manages 120 hectares (293 acres) of developed parkland, and more than 970 hectares (2,400 acres) of unimproved open space.

Douglas County is actively planning to preserve quality of life through planning and zoning. The preservation of open space is a critical component in maintaining quality of life and quality of environment. The county has been aggressive in purchasing open space and conservation easements, particularly along the I-25 Corridor and the US 85 Corridor. The county has a goal of protecting areas of visual significance and of wildlife habitat to preserve the quality of life for the residents and to protect the image and identity of Douglas County. Several studies have been conducted on this issue, including the **High Plateau Conservation Area Study** and the **Douglas County Open Space Plan**. These plans will aid in managing of growth and development. Large areas recently purchased or acquired in the program include the Cherokee Ranch along US 85 and the Greenland Ranch near Larkspur. Additionally, 3,320 hectares (8,200 acres) south of the developed portion of Highlands Ranch was planned by Mission Viejo for open space and recreation at the inception of the Highlands Ranch Development. The county supports planning for Open Space Conservation Area (OSCA) to ensure its preservation.

Moreover, the bicycle/pedestrian facilities also potentially tie into the open space areas to develop a network of trails. Governmental agencies, private citizens, and local organizations have attempted to preserve and improve existing trails, as well as plan for future trails in the area. The **Douglas County**

Parks, Trails and Open Space Master Plan, 1998 provides a design for future interconnected trails throughout the project area. In addition, other agencies and organizations including Chatfield Basin Conservation Network, Colorado State Parks, US Army Corp of Engineers (USACE), Highlands Ranch Metropolitan District, Denver Water Board, and South Suburban Park and Recreation District have set similar goals to improve existing trails and increase the number of interconnecting trails within the area.

In addition to preserving open space and encouraging trail connectivity, wildlife is considered. Nearby protected open space areas not managed by Douglas County include Chatfield State Park, Plum Creek Riparian Corridor, Roxborough State Park, Pike National Forest, Woodhouse State Wildlife Area, Cherokee Ranch Foundation, and Highlands Ranch Open Space Conservation Area. These areas serve as refuges for wildlife and become increasingly important as surrounding lands are converted from agriculture and natural landscape to developed areas. Additionally, much of the project area between Daniels Park Road and Titan Road along US 85 is relatively undeveloped. A wildlife tracking study was completed along both corridors. Two enhanced wildlife crossings are included in the Preferred Alternative and Other Alternative to ensure wildlife connecting to the different open spaces.

- ***Free-standing communities.*** Free-standing communities are communities that are visually and physically separated from the core of the metro area, and strive to meet their residents' employment and service needs. The communities have the ability to balance jobs and housing. This balance reduces traffic, leading to less congestion and improved air quality. The communities retain town centers for focused mixed-use development and create internal and external transportation systems. The Town of Castle Rock is one of four communities designated as a free-standing community in the Metro Vision 2020 Plan. For Castle Rock to remain the free-standing community envisioned by the Denver Regional Council of Governments and the Town of Castle Rock, a non-urban buffer needs to surround the community. The South I-25 Corridor and US 85 Corridor FEIS alternatives are compatible with the Metro Vision's approach to free-standing communities. The FEIS Preferred Alternative works with the Douglas County Master Plan and the Town of Castle Rock transportation network to provide the good internal transportation system a free-standing community needs to support a reasonable job/housing balance. The non-urban buffer should not be impacted, as it is not anticipated that the Preferred Alternative and Other Alternative will create growth or induce development. It is generally understood that growth will occur in Douglas County regardless of transportation enhancements. The ability to travel quickly through the southern portion of Douglas County already exists. Once a southbound motorist passes the Castle Rock area, the LOS is very high, and traffic flows smoothly. Currently, there is no demand for additional capacity to the south of the project. Consequently, the project does not drive development further to the south or encourage drivers to go further to the south than they already do.

The 5th Street Overpass Early-Action project and the US 85/I-25 Early-Action project will assist in the development of east/west connectors in the internal transportation system. The 5th Street Overpass project reduces demand at the Wolfensberger Interchange and improves the local Castle Rock transportation network by providing an overpass from 5th Street on the east side of I-25 to Park Street on the west side of I-25. The US 85/I-25 Interchange project removes the existing US 85/I-25 Interchange ramps and reroutes traffic through the improved Meadows/Founders Parkway and I-25 Interchange. An overpass is constructed at the existing interchange location, connecting the east side of Castle Rock to the west side.

- ***Balanced/multi-modal transportation system.*** The Metro Vision shows inter-city rail along US 85 as part of the Rapid Transit Network. The Long-Term Vision for South I-25 Corridor and US 85 Corridor Through 2020 and Beyond calls for corridor preservation of the current freight rail system in an effort to

implement future commuter rail. Although the Long-Term Vision is not being fully evaluated in this FEIS, the alternatives do not preclude the construction of the elements identified in the Long-Term Vision. A transit demonstration project is being researched by others to test US 85 commuter rail popularity.

Fixed-guideway is shown along I-25 in the Long Term Vision for South I-25 and US 85 Through 2020 and Beyond. Fixed-guideway is not being evaluated as an alternative in this FEIS, but improvements are being developed as to not preclude transit. Planning for fixed-guideway along I-25 is in accordance with the Metro Vision Rapid Transit Network.

A car pool lot in the northeast corner of the Castle Pines Parkway Interchange is included as part of the Preferred Alternative and Other Alternative. Initially the car pool lot will have approximately 500 spaces and will be used by commuters. It is anticipated that the lot will serve as a future transit station. This lot is consistent with the Metro Vision Rapid Transit Network.

A more friendly bicycle environment is created in conjunction with the Preferred Alternative and the Other Alternative along the US 85 Corridor. Improvement alternatives include a grade-separated crossing for pedestrians and bicycles at the High Line Canal Trail and an improved crossing for the Centennial Trail. For additional information on bicycle/pedestrian facilities, please refer to *Section 7.2.5 Recreational Resources* of the FEIS.

- *Urban centers.* The Denver region's urban centers are envisioned as communities (urban villages) that are compact, have a mixture of uses, and are focused on pedestrian activity. They are intended to be locations that provide a range of retail, business, civic, cultural, service and diverse residential opportunities within the growing metropolitan area. Urban centers can help improve traffic congestion and air quality by keeping activities and services near where people live. They can serve as transit origins and destinations and are friendly to all travel modes. Local communities have discussed urban center plans for several locations in the South I-25 Corridor and US 85 Corridor FEIS study area, including Highlands Ranch, Rampart Range, and the Castle Rock Town Center. The South I-25 Corridor and US 85 Corridor FEIS is compatible with the Metro Vision's approach to urban centers. Although fixed-guideway is not being evaluated as an alternative in the FEIS, the future fixed-guideway will not be precluded. The Long-Term Vision calls for preservation of the current freight rail system in an effort to implement commuter rail in the future. The implementation of commuter rail will enable the construction of additional transit stations, thereby assisting in the development of urban centers.
- *Environmental quality.* The Metro Vision recognizes that the decisions made locally about how we grow and develop in the region will affect environmental factors, especially air and water quality. All the core elements of the Metro Vision work together to provide a balanced growth and development strategy that will lessen the negative environmental impacts on the region. CDOT will comply with appropriate federal, state, and local regulations to ensure that project-related impacts do not result in additional water quality degradation over current conditions. CDOT will obtain a Construction Stormwater Discharge Permit(s) for the Selected Alternative presented in the ROD. The Construction Stormwater Discharge Permit requires preparation of a Stormwater Management Plan (SWMP), site inspections every 14 days, and specific erosion control and pollution prevention measures. The SWMP is project-specific and will be prepared during the design phase. The SWMP will specify and describe BMPs needed to mitigate any potential adverse impacts to surface water quality resulting from construction activities in the I-25 Corridor and US 85 Corridor. The proposed improvements in the South I-25 Corridor and US 85 Corridor FEIS are

compatible with the core elements of the Metro Vision. For additional information on air quality and water quality, see Section 5.3.3.1 *Air Quality Impacts* and Section 5.3.3.2 *Water Quality and Quantity* of the FEIS.

Impacts on the Regional Transportation Plan

Improvements included in the Selected Alternative identified in the Record of Decision (ROD) must be in the RTP. If an improvement is not currently in the RTP but is recommended, then the RTP will need to be amended and the ROD will need to be revised.

The following elements evaluated in the South I-25 Corridor and US 85 Corridor FEIS are not currently included in the RTP:

- Six lanes between Highlands Ranch Parkway and Titan Road along the US 85 Corridor (Other Alternative)
- Rampart Range Interchange (Other Alternative)
- Removal of Schweiger Interchange ramps (Other Alternative)
- Full diamond interchange at Surrey Ridge (Other Alternative)

Impacts on the Castle Rock Town Wide Transportation Plan

The *1994 Castle Rock Town Wide Transportation Plan* recommends the following:

- Upgrade the I-25 Meadows/Founders Parkway Interchange to a partial cloverleaf design – One of the Early-Action projects
- Convert the US 85/I-25 Interchange to a local service crossing of I-25 only – One of the Early-Action projects
- Retain Liggett Drive as a crossing of I-25 – FEIS alternatives do not preclude this option
- Upgrade the I-25 Wolfensberger/Wilcox Interchange and supplement this crossing of I-25 with a new 5th Street Overpass – One of the Early-Action projects
- Upgrade the Plum Creek Parkway Interchange in the long-term future – FEIS alternatives do not preclude this option

Alternatives evaluated in this FEIS meet the goals and objectives of the Town of Castle Rock.

Impacts on the Douglas County Transportation Plan

The *Douglas County 2015 Transportation Plan* outlines transportation improvements that will be needed in

Douglas County in 5-year increments for the next 15 years. Some improvements related to the study area include:

- Construct 5th Street overpass across I-25 – One of the Early-Action projects
- Widen Meadows/Founders Parkway Interchange at I-25 from two to four lanes – One of the Early-Action projects
- Widen Titan Road between Moore Road and US 85 from two to four lanes – FEIS alternatives do not preclude this option

Construct four-lane facility and bridge overpass at the existing US 85/I-25 Interchange>

- Signalize ramps at Plum Creek Parkway and I-25 Interchange– FEIS alternatives do not preclude this option
- Improve intersection at Wolfensberger and County Road 105 – FEIS alternatives do not preclude this option
- Construct a four-lane facility extension of Peoria Street between E-470 and Potomac – FEIS alternatives do not preclude this option
- Widen US 85 between Highlands Ranch Parkway and Meadows Parkway from two to four lanes – Part of the Preferred Alternative and Other Alternative
- Widen I-25 from Meadows Parkway to Wolfensberger Road from four to six lanes – FEIS alternatives do not preclude this option
- Widen US 85 from County Line Road to Highlands Ranch Parkway from four to six lanes – FEIS alternatives do not preclude this option
- Widen Meadows Parkway between I-25 and US 85 from four to six lanes – One of the Early-Action projects

Alternatives evaluated in this FEIS meet the goals and objectives of Douglas County.

5.3.2.7 Socioeconomic Secondary Impacts

The Preferred Alternative and Other Alternative add capacity to I-25 and US 85. A benefit of the additional capacity is improved north/south mobility throughout Douglas County. The result of improved mobility and travel times on an existing roadway does not necessarily lead to additional development. Douglas County is a desirable area as a residential community with or without roadway improvements. The per capita income of Douglas County is one of the highest of all counties in the state and the historic and future growth trends are among the largest in the nation. Changes to the economy or to the cost of housing are more likely to have impacts to the county's growth, than implementation of the proposed highway improvements.

5.3.2.8 Socioeconomic Cumulative Impacts

The proposed improvements to the I-25 Corridor and US 85 Corridor, in combination with other highway projects, do not contribute to economic growth in a quantifiable way. Impacts to socioeconomic conditions are from residential development and increased growth and other foreseeable events. Given the fact that it has been almost fifty years since I-25 was constructed and US 85 has been improved, it would appear that improved transportation has had a historically negligible affect.

Improvements to the transportation system and the I-25 Corridor and US 85 Corridor are crucial for expected growth as well as for maintaining acceptable roadway operations and safety in Douglas County. The alternatives evaluated in this FEIS meet the goals and objectives of Douglas County.

It is not anticipated that the improvements would create additional growth to the south or into El Paso County. The ability to travel quickly through the southern portion of Douglas County already exists. Once a southbound motorist passes the Castle Rock area, the LOS is very high, and traffic flows smoothly. Currently, there is no demand for additional capacity to the south of the project. Consequently, the project does not drive development further to the south or encourage drivers to go further to the south than they already do.

The Preferred Alternative does not include new interchanges. If new interchanges are developed, such as Rampart Range (included in the Other Alternative), additional service-oriented business is likely to follow. However, it is noteworthy that existing interchanges that currently serve residential areas only, such as the interchanges at Surrey Ridge Road and Happy Canyon Road, do not have commercial services associated with them.

Additionally, as stated in the *Douglas County Master Plan*, growth within Douglas County is directed toward areas within their urban growth boundaries. Douglas County has identified primary urban areas, municipal service areas, and separated urban areas. The county intends to support infrastructure improvements to these areas before other undeveloped areas. The county also encourages separation of these development areas and the preservation of open space. It is not anticipated that the project causes growth within or outside of the county's urban growth boundaries.

An analysis of cumulative impacts must take into consideration impacts from past, current, and reasonably foreseeable actions and their effects when added to the proposed project. In this situation, it is not only the cumulative impacts resulting from other transportation projects, but also from other developments that might use the transportation system in the foreseeable future. It is recognized that new developments will occur in the near future in Douglas County. From a cumulative perspective, the housing and commercial developments planned for Highlands Ranch, the Rampart Range Area, Meridian, the Canyons, and the Douglas Lane area add a substantial number of persons to Douglas County. The extent of these developments is still not well defined but has been accounted for in DRCOG's plan used for transportation studies. However, the relative contribution of the highway project and its associated capacity are negligible in respect to the anticipated amount of growth effects from new development.

It is not anticipated that the Preferred Alternative and Other Alternative will create growth or induce development. It is generally understood that growth will occur in Douglas County regardless of transportation enhancements. The county anticipates a population increase of roughly 180 percent by the year 2020. Resulting environmental damage such as loss of open space and wildlife habitat will be caused primarily by proposed developments such as those mentioned above and not by the improvements to the I-25 Corridor and US 85

Corridor. The Preferred Alternative and Other Alternative includes mitigation measures for environmental damages to resources, such as wetlands caused by the addition of lanes or changes to bridge structures, as required by law, but it does not compensate or mitigate for the damages caused by future housing and commercial developments. Environmental degradation caused by these developments will be addressed through municipal, county, and state permits and clearances.

In cases where the project causes potential minor impacts, there are no substantial cumulative effects. This is due to the fact that impacts of other projects are also minor, temporary, can be fully mitigated, or the effects are controlled by planning and development regulations in the potentially effected areas.

5.3.3 Physical Impacts

5.3.3.1 Air Quality Impacts

Corridor-Level Emission Impacts

The air quality status of the Central Front Range Air Quality Region is currently designated as non-attainment for carbon monoxide (CO) and fine particulate (PM₁₀). The current emission budgets for the horizon years (2010 and 2020) are 800 tons per day for CO and 60 tons per day for PM₁₀.

Corridor-level impacts were determined based on the daily vehicle miles traveled (VMT). The VMT of each of the three FEIS alternatives for 2010 and 2020 were used to determine levels of emissions from the proposed project. The emission factors utilized were generated by the Colorado Department of Public Health and Environment (CDPHE), Air Pollution Control Division (APCD).

Carbon Monoxide (CO) "Hot-Spot" Screening Analysis for Selected Intersections

The "hot-spot" screening analysis was performed on selected intersections along the I-25 Corridor and US 85 Corridor. The closest signalized intersection on either side of each interchange on I-25, and each signalized intersection on US 85 were analyzed for LOS using current and projected traffic count information. If an intersection can demonstrate a LOS C or better, then this intersection by EPA definition cannot lead to a violation of the National Ambient Air Quality Standards (NAAQS), and no additional analysis is required. An intersection that demonstrates a LOS D or worse is subject to "hot-spot" modeling.

The LOS results were generated from traffic analysis modeling of the I-25 Corridor and US 85 Corridor specifically used in assessing the impacts of each alternative.

PM₁₀ "Hot-Spot" Analysis

The requirements for performing a PM₁₀ quantitative "hot-spot" analysis will not take effect until the Environmental Protection Agency (EPA) releases modeling guidance on this subject and announces in the Federal Register that these requirements are in effect. EPA has not released its modeling guidance to date; therefore, these requirements are not in effect for this project. As a result a PM₁₀ "hot-spot" analysis will not be conducted for this project.

The PM₁₀ air quality dispersion modeling that was conducted for the RTP and transportation improvement program (TIP) shows that there would be no exceedances of the PM₁₀ standard in the project area.

Carbon Monoxide (CO) "Hot-Spot" Modeling Analysis for Selected Intersections

Those intersections that demonstrated a LOS of D or worse were modeled using the CAL3QHC model to determine the estimated CO concentrations at the "hot-spot" intersections. The background CO concentrations included in the projected ambient levels are 4.5 parts per million (ppm) for the 1-hour concentration, and 3.1 ppm for the 8-hour concentration. The CO NAAQS for the 1-hour level is 35 ppm, and for the 8-hour level is 9 ppm.

No-Action Alternative

I-25 Corridor Air Quality Impacts (No-Action Alternative)

Average daily VMT for the I-25 Corridor is estimated at 1,350,000 (2010) and 1,613,400 (2020) for the No-Action Alternative. The air pollution emissions associated with the I-25 Corridor are represented on Table 5.4 at the end of this section.

The following signalized intersections demonstrate a LOS D or worse for the No-Action Alternative (CO hot-spot analysis is not required):

- Southbound Lincoln a.m. peak for 2020
- Southbound Lincoln p.m. peak for 2020
- Northbound Lincoln a.m. peak for 2010
- Northbound Lincoln a.m. peak for 2020
- Northbound Lincoln p.m. peak for 2010
- Northbound Lincoln p.m. peak for 2020
- Northbound Castle Pines a.m. peak for 2020
- Northbound Happy Canyon p.m. peak for 2020
- Southbound Wolfensberger p.m. peak for 2020

The "hot-spot" modeling determined that these intersections were in compliance with the CO NAAQS. A summary of the "hot-spot" modeling analysis along the I-25 Corridor is shown at the end of this section on Table 5.6.

US 85 Corridor Air Quality Impacts (No-Action Alternative)

The daily VMT for the US 85 Corridor is estimated at 259,300 (2010) and 313,300 (2020) for the No-Action Alternative. The air pollution emissions associated with the US 85 Corridor are represented on Table 5.5 at the end of this section.

The following signalized intersections demonstrate a LOS D or worse for the No-Action Alternative (CO hot-spot analysis is not required):

- Town Center a.m. peak for 2020
- Town Center p.m. peak for 2020
- Blakeland a.m. peak for 2010
- Blakeland a.m. peak for 2020
- Blakeland p.m. peak for 2010
- Blakeland p.m. peak for 2020
- Highlands Ranch a.m. peak for 2010
- Highlands Ranch a.m. peak for 2020
- Highlands Ranch p.m. peak for 2010
- Highlands Ranch p.m. peak for 2020
- Louviers a.m. peak for 2010
- Louviers a.m. peak for 2020
- Louviers p.m. peak for 2010
- Louviers p.m. peak for 2020
- Sedalia a.m. peak for 2010
- Sedalia a.m. peak for 2020
- Sedalia p.m. peak for 2010
- Sedalia p.m. peak for 2020
- Meadows Parkway a.m. peak for 2020

- Meadows Parkway p.m. peak for 2010
- Meadows Parkway p.m. peak for 2020

The "hot-spot" modeling determined that these intersections were in compliance with the CO NAAQS. A summary of the "hot-spot" modeling analysis along the US 85 Corridor is shown at the end of this section on Table 5.7.

Preferred Alternative

I-25 Corridor Air Quality Impacts (Preferred Alternative)

The average VMT for the I-25 Corridor is estimated at 1,462,700 (2010) and 1,748,000 (2020) for the Preferred Alternative. The air pollution emissions associated with the Preferred Alternative are represented on Table 5.4 at the end of this section.

The following signalized intersections demonstrate a LOS D or worse for the Preferred Alternative (CO hot-spot analysis is not required):

- Southbound Lincoln p.m. peak for 2010
- Southbound Lincoln p.m. peak for 2020
- Northbound Lincoln a.m. peak for 2020
- Northbound Meadows/Founders p.m. peak for 2020
- Southbound Wolfensberger p.m. peak for 2010
- Southbound Wolfensberger p.m. peak for 2020

The number of intersections that demonstrated LOS D or worse decreased by 37 percent as compared to the No-Action Alternative.

The "hot-spot" modeling determined that these intersections were in compliance with the CO NAAQS. A summary of the "hot-spot" modeling analysis along the I-25 Corridor is shown at the end of this section on Table 5.6.

US 85 Corridor Air Quality Impacts (Preferred Alternative)

The daily VMT for the US 85 Corridor is estimated at 263,100 (2010) and 314,400 (2020) for the Preferred Alternative. The air pollution emissions associated with the Preferred Alternative are represented on Table 5.5 at the end of this section.

The following signalized intersections demonstrate a LOS D or worse for the Preferred Alternative (CO hot-spot analysis is not required):

- Town Center p.m. peak for 2010
- Town Center p.m. peak for 2020
- Highlands Ranch a.m. peak for 2020
- Highlands Ranch p.m. peak for 2010
- Highlands Ranch p.m. peak for 2020
- Meadows Parkway a.m. peak for 2010
- Meadows Parkway a.m. peak for 2020
- Meadows Parkway p.m. peak for 2010
- Meadows Parkway p.m. peak for 2020

The number of intersections that demonstrated LOS D or worse decreased by 68 percent as compared to the No-Action Alternative

The "hot-spot" modeling determined that these intersections were in compliance with the CO NAAQS. A summary of the "hot-spot" modeling analysis along the US 85 Corridor is shown at the end of this section on Table 5.7.

Other Alternative

I-25 Corridor Air Quality Impacts (Other Alternative)

The average daily VMT for the I-25 Corridor is estimated at 1,472,200 (2010) and 1,759,400 (2020) for the Other Alternative. The air pollution emissions associated with the Other Alternative are represented on Table 5.4 at the end of this section.

The following signalized intersections demonstrate a LOS D or worse for the Other Alternative (CO hot-spot analysis is not required):

- Southbound Lincoln p.m. peak for 2010
- Southbound Lincoln p.m. peak for 2020
- Northbound Lincoln a.m. peak for 2020

- Northbound Lincoln p.m. peak for 2020
- Northbound Meadows/Founders p.m. peak for 2020
- Southbound Wolfensberger p.m. peak for 2010
- Southbound Wolfensberger p.m. peak for 2020

The number of intersections that demonstrated LOS D or worse decreased by 45 percent as compared to the No-Action Alternative.

The "hot-spot" modeling determined that these intersections were in compliance with the CO NAAQS. A summary of the "hot-spot" modeling analysis along the I-25 Corridor is shown at the end of this section on Table 5.6.

US 85 Corridor Air Quality Impacts (Other Alternative)

The VMT for the US 85 Corridor is estimated at 264,700 (2010) and 316,300 (2020) for the Other Alternative. The air pollution emissions associated with the Other Alternative are represented on Table 5.5 at the end of this section.

The following signalized intersections demonstrate a LOS D or worse for the Other Alternative (CO hot-spot analysis is not required):

- Town Center p.m. peak for 2010
- Town Center p.m. peak for 2020
- Highlands Ranch a.m. peak for 2020
- Highlands Ranch p.m. peak for 2010
- Highlands Ranch p.m. peak for 2020
- Meadows Parkway a.m. peak for 2010
- Meadows Parkway a.m. peak for 2020
- Meadows Parkway p.m. peak for 2010
- Meadows Parkway p.m. peak for 2020

The number of intersections that demonstrated LOS D or worse decreased by 64 percent as compared to the No-Action Alternative.

The "hot-spot" modeling determined that these intersections were in compliance with the CO NAAQS. A summary of the "hot-spot" modeling analysis along the US 85 Corridor is shown in at the end of this section Table 5.7.

Table 5.4
I-25 Corridor Projected Air Quality Emission Levels

Year	Hydrocarbons (HC)		Carbon Monoxide (CO)		Oxides of Nitrogen (NO _x)		Fine Particulate Matter (PM ₁₀)	
	2010	2020	2010	2020	2010	2020	2010	2020
No-Action Alternative	1.34	1.03	11.68	9.15	2.47	2.61	1.04	1.24
Preferred Alternative	1.46	1.12	12.7	9.91	2.67	2.83	1.13	1.35
Other Alternative	1.47	1.12	12.7	9.97	2.69	2.85	1.14	1.36

Note: Vehicles in 2020 will run cleaner and emit less pollutants; therefore, in some cases, 2020 pollutants are predicted to be slightly less than year 2010 pollutants.

Table 5.5
US 85 Corridor Projected Air Quality Emission Levels

Year	Hydrocarbons (HC)		Carbon Monoxide (CO)		Oxides of Nitrogen (NO _x)		Fine Particulate Matter (PM ₁₀)	
	2010	2020	2010	2020	2010	2020	2010	2020
No-Action Alternative	0.20	0.24	2.80	2.57	0.52	0.56	0.20	0.24
Preferred Alternative	0.20	0.24	2.85	2.58	0.53	0.56	0.20	0.24
Other Alternative	0.20	0.24	2.86	2.60	0.53	0.56	0.20	0.24

Note: Vehicles in 2020 will run cleaner and emit less pollutants; therefore, in some cases, 2020 pollutants are predicted to be slightly less than 2010 pollutants.

Table 5.6
I-25 Corridor "Hot-Spot" Modeling Analysis Results

Location	Peak	Year	No-Action Alternative		Preferred Alternative		Other Alternative	
			CO 1-hour (35 ppm)	CO 8-hour (9 ppm)	CO 1-hour (35 ppm)	CO 8-hour (9 ppm)	CO 1-hour (35 ppm)	CO 8-hour (9 ppm)
SB Lincoln	p.m.	2010	*	*	7.1	5.0	7.1	4.9
NB Lincoln	a.m.	2010	7.0	4.8	N/A	N/A	N/A	N/A
NB Lincoln	p.m.	2010	7.9	5.5	N/A	N/A	N/A	N/A
NB Castle Pines	p.m.	2010	*	*	N/A	N/A	N/A	N/A
SB Wolfensberger	p.m.	2010	N/A	N/A	6.0	4.2	6.0	4.2
SB Lincoln	a.m.	2020	6.4	4.4	N/A	N/A	N/A	N/A
SB Lincoln	p.m.	2020	7.0	4.9	7.0	4.9	6.6	4.6
NB Lincoln	a.m.	2020	7.0	4.8	6.6	4.6	6.4	4.4
NB Lincoln	p.m.	2020	8.0	5.5	7.4	5.1	*	*
NB Castle Pines	a.m.	2020	5.3	3.7	N/A	N/A	N/A	N/A
NB Happy Canyon	p.m.	2020	5.1	3.5	N/A	N/A	N/A	N/A
NB Meadows/Founders	p.m.	2020	N/A	N/A	6.6	4.6	6.1	4.2
SB Wolfensberger	p.m.	2020	5.7	3.9	6.2	4.3	6.1	4.2

Note: CO 1-hour levels include a background of 4.5 ppm and 8-hour levels include a background of 3.1 ppm.

N/A: Not Applicable

*Researching information at this location

Table 5.7
US 85 Corridor "Hot-Spot" Modeling Analysis Results

Location	Peak	Year	No-Action Alternative		Preferred Alternative		Other Alternative	
			CO 1-hour (35 ppm)	CO 8-hour (9 ppm)	CO 1-hour (35 ppm)	CO 8-hour (9 ppm)	CO 1-hour (35 ppm)	CO 8-hour (9 ppm)
Town Center	p.m.	2010	N/A	N/A	8.1	5.6	7.4	5.1
Blakeland	a.m.	2010	6.6	4.6	N/A	N/A	N/A	N/A
Blakeland	p.m.	2010	6.8	4.7	N/A	N/A	N/A	N/A
Highlands Ranch	a.m.	2010	6.7	4.6	N/A	N/A	N/A	N/A
Highlands Ranch	p.m.	2010	7.4	5.1	7.5	5.2	7.6	5.3
Louviers	a.m.	2010	5.8	4.0	N/A	N/A	N/A	N/A
Louviers	p.m.	2010	5.8	4.0	N/A	N/A	N/A	N/A
Sedalia	a.m.	2010	8.0	5.6	N/A	N/A	N/A	N/A
Sedalia	p.m.	2010	7.2	5.0	N/A	N/A	N/A	N/A
Meadows	a.m.	2010	N/A	N/A	7.1	4.6	7.0	4.5
Meadows	p.m.	2010	8.0	5.6	8.4	5.8	8.1	5.6
Town Center	a.m.	2020	7.1	4.9	N/A	N/A	N/A	N/A
Town Center	p.m.	2020	7.3	5.1	8.1	5.6	7.3	5.1
Blakeland	a.m.	2020	6.6	4.6	N/A	N/A	N/A	N/A
Blakeland	p.m.	2020	6.9	4.8	N/A	N/A	N/A	N/A
Highlands Ranch	a.m.	2020	7.6	5.3	7.6	5.3	7.0	4.9
Highlands Ranch	p.m.	2020	7.3	5.1	7.1	4.9	7.3	5.1
Louviers	a.m.	2020	5.8	4.0	N/A	N/A	N/A	N/A
Louviers	p.m.	2020	5.5	3.8	N/A	N/A	N/A	N/A
Sedalia	a.m.	2020	7.7	5.3	N/A	N/A	N/A	N/A
Sedalia	p.m.	2020	7.0	4.9	N/A	N/A	N/A	N/A
Meadows	a.m.	2020	6.8	4.7	7.4	5.1	7.4	5.1
Meadows	p.m.	2020	8.0	5.6	8.5	5.9	8.4	5.8

Note: CO 1-hour levels include a background of 4.5 ppm and 8-hour levels include a background of 3.1 ppm.

N/A: Not Applicable

Other Pollutants of Concern

Toxic Air Constituents

In addition to the NAAQS set forth by EPA for the six criteria pollutants, EPA has also established a list of 33 urban hazardous air pollutants. This list of pollutants includes air toxics emitted from stationary (factories), non-road (lawnmowers, airplanes, etc.) and road (cars, trucks, and buses) sources.

In order to better understand the harmful effects road sources have on human health, the EPA has also developed a list of 22 mobile source air toxics (MSAT). Toxics such as benzene, formaldehyde, diesel exhaust, lead and 1,3 butadiene are included on the list of 22 MSATs. People are exposed to the MSATs in six basic ways: airborne emissions from burning of fuel, airborne emissions from partially burning the fuel, emissions from evaporating fuel primarily at filling stations, chemical reactions that transform MSATs once they are released to the air into other MSATs, and airborne exposure to worn engine parts, tires or brakes and direct exposure to toxics through drinking water sources from leaking underground fuel storage tanks.

Studies are currently being conducted by the EPA to better understand the rates at which these MSATs are emitted. They are also developing an air toxics model called the Assessment System for Population Exposure Nationwide (ASPEN). The ASPEN will help predict areas where toxics may be concentrated based on emission estimates of toxic air pollutants and meteorological data from the National Weather Service.

Greenhouse Gas

Carbon dioxide (CO₂) is a "greenhouse gas" that is a global concern. The Colorado APCD has developed a list of CO₂ reduction strategies and will be considering CO₂ reduction options that will affect point, area, and mobile sources on a region-wide basis. The transportation sector in Colorado represents approximately 28 percent of the CO₂ emissions. The Preferred Alternative results in a 7.24 percent increase in CO₂ emissions in 2010 and a 7.04 percent increase in CO₂ emissions in 2020 over the No-Action Alternative for the proposed project.

Air Quality Secondary Impacts

Secondary air quality impacts that may result from changes in the pattern of land use, population density, or growth rate include:

- Increased emissions from natural gas space and hot-water heating systems installed in new residential, commercial, recreational and industrial facilities
- Increased emissions from new commercial and industrial facilities that provide increased employment in the region
- Increased emissions from electric generating systems in the air quality region needed to serve the projected growth
- Increased emissions from new home heating fireplaces and out door barbecue appliances
- Increased emissions from additional lawn mower usage

However, these secondary or indirect impacts are accounted for in the development and implementation of the State Implementation Plan (SIP), which combines these impacts with the transportation related impacts to ensure compliance with the NAAQS.

Air Quality Cumulative Impacts

A transportation plan or RTP is the official intermodal metropolitan transportation plan that is developed through the metropolitan planning process for the metropolitan planning area. A TIP is a staged, multi-year, intermodal program of transportation projects covering the metropolitan planning area, which is consistent with the metropolitan transportation plan. The RTP and TIP account for the vast majority of transportation projects well into the future. When planning for and approving these transportation projects, air quality is taken into consideration and modeled to show that the projects will not have an adverse affect on air quality. In turn, the RTP and TIP are then tested for conformity with the SIP, which not only includes the transportation-related emissions, but also includes all other sources of emissions related to the future growth of a region.

Hence, for any transportation project that has already been approved, the cumulative impacts of air quality have already been assessed and determined to be acceptable. The Preferred Alternative is part of DRCOG's conforming RTP and 2001-2006 TIP, and the cumulative impacts of air quality in combination with other transportation projects are within pre-determined acceptable levels.

For additional information on air quality, see the *Air Quality Analysis South I-25 Corridor and US 85 Corridor*, November 2000.

5.3.3.2 Water Quality and Quantity

Impacts to surface water quality and quantity are of primary concern within and adjacent to the area of potential effect (APE). However, potential impacts to surface water quality and water resources may result from proposed construction activities in and adjacent to perennial and intermittent streams such as Happy Canyon Creek, East Plum Creek, and Marcy Gulch. Temporary and permanent impacts that may result from either build alternative include:

- Temporary increases in sediment loading to surface waters during and immediately after construction from the movement of heavy machinery in and around the channel and banks.
- Construction-related discharges of concrete wash or saw water. Concrete wash water is highly alkaline, contains fine particles of suspended solids that are difficult to settle out, and can be detrimental or fatal to aquatic organisms.
- Temporary increases in petroleum distillates in surface waters due to the movement of heavy machinery in the stream channels or spills of gasoline, diesel fuel, and engine oils.
- Permanent impacts to water temperature and riparian buffer vegetation due to bridge widening at East Plum Creek.
- Increases in phosphorus levels due to increased run-off.

Water quality impacts potentially resulting from construction will be prevented or minimized. Any industrial wastewater generated during construction activities will be treated to water quality standards before being discharged to the land surface for dust suppression. The potential for fuel and other spills to reach state waters will be minimized through implementation of the spill prevention and emergency response plan created for this project. Discharges from construction dewatering activities are not expected to be substantial in the I-25 Corridor and US 85 Corridor.

Impacts to groundwater are not expected from any of the alternatives because local aquifers occur at depths significantly below ground surface. The South I-25 Corridor and US 85 Corridor EIS is not expected to need a construction dewatering permit because the Dawson Aquifer occurs more than 30 meters (98 feet) below I-25 and the Plum Creek Alluvial Aquifer occurs between 6 and 24 meters (20 to 80 feet) below US 85.

The expected growth in Douglas County will likely lead to the designation of the Town of Castle Rock area as a Municipal Separate Storm Sewer System Phase II permit area. It is important to mention this possibility to ensure adequate steps are taken during the design phase to comply with the permit (acquire ROW, design of adequate stormwater control structures, provide for inspections and maintenance).

Preferred Alternative

I-25 Corridor Water Quality Impacts (Preferred Alternative)

The Preferred Alternative is not expected to result in substantial impacts to water quality (including groundwater). Construction of bridge footings within, and construction activities adjacent to, East Plum Creek and Happy Canyon Creek, will likely result in sediment discharges and increased suspended solids and turbidity downstream from the construction site. These impacts are expected to be small and temporary in nature and are not expected to increase annual total suspended solids (TSS) loads over time. Mandatory adherence to national, state, and local water quality, stormwater, and drainage regulations ensure that project related impacts do not result in additional water quality degradation over current conditions. Shading is a permanent impact related to bridge widening that can affect stream temperatures and streamside vegetation. Impacts related to an increase in shading will be negligible due to the relatively small projected increase in bridge widths at Happy Canyon and East Plum Creeks.

US 85 Corridor Water Quality Impacts (Preferred Alternative)

The Preferred Alternative is not expected to result in substantial impacts to water quality (including groundwater) for the reasons discussed in the Preferred Alternative I-25 Corridor section. However, the Preferred Alternative has the potential to positively benefit water quality and re-establish hydrologic connections along the US 85 Corridor through cross-culvert resizing, reconstruction, or clearing of obstructions. Over the years many of the cross-culverts have become clogged with debris causing potential erosion of surface and side slopes. Cross-culverts can be cleared, resized, or reconstructed, as required, to re-establish hydrologic connections and minimize sediment delivery to the Plum Creek, East Plum Creek, and Other Waters of the US. These measures also reduce the risk of flooding that can occur when surface water ponds behind clogged culverts.

Other Alternative

I-25 Corridor Water Quality Impacts (Other Alternative)

Impacts from the Other Alternative are projected to be slightly larger than those discussed for the Preferred Alternative. This is due to a new crossing of Happy Canyon Creek by the proposed frontage road. Though intermittent, work in the stream channel could temporarily increase downstream sediment loads and TSS.

US 85 Corridor Water Quality Impacts (Other Alternative)

Impacts from the Other Alternative are not expected to be substantially different from those discussed in the Preferred Alternative.

Table 5.8 summarizes the impervious surface area associated with each of the proposed alternatives. The use of impervious surface area as a water quality metric may underestimate the area of land disturbed, and associated water quality impacts from erosion and sedimentation, during the construction phase, because this measurement does not include temporary staging areas, possible traffic detours, and other construction related disturbances. These additional disturbances, however, are expected to be similar for the two construction alternatives. Moreover, these temporary disturbances will be operated and reclaimed according to the Stormwater Management Plans (SWMPs) created for the FEIS alternatives. SWMPs contain provisions to control stormwater runoff and minimize potential impacts to water quality. Totals presented on Table 5.8 do not include Early-Action projects that are included as part of the No-Action Alternative.

Table 5.8
Potential Water Quality Impacts
Square Meters (Square Feet) of Impervious Surface Area

	No-Action Alternative*	Preferred Alternative*	Other Alternative*
I-25 Corridor	592,383 (6,377,269)	1,048,801 (11,285,096)	1,191,194 (12,817,247)
US 85 Corridor	257,701 (2,772,862)	711,452 (7,655,223)	732,544 (7,882,178)
Total	830,384 (9,150,131)	1,760,253 (18,940,319)	1,923,737 (20,699,411)

**Total does not include impermeable surface area created by the Early-Action projects*

Water Quality Secondary Impacts

Secondary impacts are projected to be negligible for both corridors and both alternatives due to adherence to mandatory county, state, and federal regulations. Best management practices (BMPs) should preclude any increases in sediment loading, stormwater runoff, and pollutant loading downstream of the construction sites during construction and operation of the new highway surfaces. However, potential secondary impacts to water quantity and quality include:

- *Water Quantity.* Changes in stormwater runoff volume due to increased impervious surface area, changes in drainage pattern, or reductions in floodplain capacity.
- *Water Quality.* Elevated inputs of pollutants to surface waters from increased traffic flow and increased

maintenance activities. Types of pollutants potentially include sand, de-icers (e.g., salt, liquid magnesium chloride), hydrocarbons, and metals including lead, zinc, iron, chromium, cadmium, nickel, and copper.

- Either water quantity or water quality impacts may result in loss or degradation of riparian and aquatic habitat, loss of aesthetics; degradation of recreation areas (e.g., Chatfield Reservoir); loss of recreation opportunity; increased water treatment costs; and declines in human health.

I-25 Corridor Water Quantity Secondary Impacts

The Preferred Alternative along the I-25 Corridor results in 77 percent more impervious surface area than the No-Action Alternative. The frontage road and interchange improvements included in the Other Alternative increases impervious surface area by an additional 14 percent over the Preferred Alternative, or 101 percent more than the No-Action Alternative along the I-25 Corridor. Both build alternatives generate additional stormwater runoff compared to the No-Action Alternative; however, increased run-off volume will be accommodated by adequate drainage systems. For example, stormwater mitigation typically involves construction of stormwater retention basins with outlets sized to release historic flow levels, to prevent downstream conveyance of stormwater in excess of historic levels. As a result, neither build alternative is expected to adversely impact water quantity or quality downstream from the project corridor over the short- or long-term.

US 85 Corridor Water Quantity Secondary Impacts

The Preferred Alternative along the US 85 Corridor increases impervious surface area by 176 percent over the No-Action Alternative due to mainline widening, mainline reconstruction, and the detached bicycle/pedestrian facilities. The Other Alternative adds two additional lanes between Highlands Ranch Parkway and Titan Road, increasing impermeable surface area by 3 percent over the Preferred Alternative. Appropriate sizing of the drainage system, including retention basins, designed and implemented for either alternative, should adequately control the additional stormwater run-off generated.

I-25 Corridor Water Quality Secondary Impacts

Types and concentrations of pollutants present in highway runoff are affected by factors such as: traffic characteristics, climatic conditions, maintenance practices, surrounding land use, adjacent vegetation types, and institutional characteristics, e.g., litter laws or car emission regulations. CDOT applies a maximum of 0.23 metric ton (500 pounds) of a sand/salt mixture to each lane-mile, equal to 5,900 m² (63,360 ft²) of paved surface, per winter storm. CDOT is beginning to substitute liquid magnesium chloride, and other de-icing compounds, for the traditional sand/salt mixture.

The additional driving surfaces constructed as part of the Preferred Alternative require additional application of winter traction materials over the No-Action Alternative along the I-25 Corridor. The additional application of traction material is estimated to be no more than 17.8 metric tons (38,700 pounds) per storm event, or 77 percent more than the No-Action Alternative. Under the Other Alternative 5.6 metric tons (12,067 pounds) per storm additional sand material would be applied over the Preferred Alternative. As part of the SWMP, construction of retention structures will benefit water quality by allowing solids and other contaminants to settle out of stormwater runoff.

US 85 Corridor Water Quality Secondary Impacts

The Preferred Alternative sand-application rate increases by 17.7 metric tons (39,000 pounds) per storm, 176 percent more than application rates under the No-Action Alternative along the US 85 Corridor. The Other Alternative sand application rate increases by 0.82 metric ton (1,787 pounds) per storm over the Preferred Alternative.

Water Quality Cumulative Impacts

The cumulative impact of changing land uses, from rural to suburban, and accompanying increases in population has potentially modified the quantity, timing, and quality of surface water runoff. Urban and suburban runoff typically contains higher concentrations of nutrients (e.g., nitrogen and phosphorus), oxygen consuming wastes, pathogens, pesticides, heavy metals, and oil, compared with runoff from rural areas. The Cherry Creek and Chatfield Reservoir Control Regulations were adopted in 1985 and 1989, respectively, to address point and non-point source water quality degradation (e.g., increased phosphorus loading) resulting from upstream development in the Cherry Creek and Chatfield Basins.

At least four major residential developments are planned for the I-25 Corridor: the Canyons Development; the Meridian Development; the Douglas Lane Development; and the Rampart Range Development. These planned developments and the FEIS build alternatives contribute to the cumulative degradation of water quality in the Chatfield Basin and Cherry Creek Basin.

The original construction of US 85 in the 1940's and subsequent land use changes (e.g., agriculture to residential) and population increases along the transportation corridor may have adversely impacted Chatfield Basin water quality. For example, access roads and driveways in large lot subdivisions along US 85 comprise one-half to three-quarters of the impervious surface area surrounding this transportation corridor. Substantial head-cuts are developing where roads and driveways cut across drainages. Head-cuts generally occur when cross-culverts are constructed below grade. The abrupt change from the natural grade, above or below the cross culvert, causes the stream to down-cut in an attempt to regain the natural gradient, causing downstream sedimentation and erosion. The Chatfield Reservoir Control Regulation was adopted in 1989 to address point and non-point source water quality degradation (e.g., increased phosphorus loading) resulting from upstream development in the Chatfield Basin. The FEIS build alternatives and planned residential developments in the area (i.e., Highlands Ranch build-out) add to the cumulative degradation of water quality in the Chatfield Basin.

Land preservation in Douglas County is a beneficial cumulative impact to water quality. For example, from 1995 to 2000, the Douglas County Open Space and Natural Resource program has preserved over 6,680 hectares (16,500 acres). These conservation efforts and others occurring in the vicinity of the project corridors are generally up-gradient from US 85; including the Highlands Ranch Conservation Area, Daniels Park, and the Cherokee Ranch Foundation. Preservation of these areas helps limit stormwater runoff, erosion, and sedimentation reaching the project area to historic levels, and thereby minimizes the cumulative impact to the water resource.

Recognizing the importance of water quality and quantity, it is expected that Douglas County and CDOT/FHWA regulations, guidelines, and BMP's on stormwater management and runoff can minimize the cumulative impacts to water resources in Douglas County. For additional information on surface water drainageways, see the *Floodplain and Drainage Assessment Technical Report*, May 2000, amended November 2000, in the Technical

Reports Volume of the *South I-25 Corridor and US 85 Corridor FEIS*.

5.3.3.3 Vegetation Impacts

Impacts to native vegetation can occur in three ways: as direct, secondary, or as cumulative impacts. The direct loss of native vegetation is either permanent or temporary and is quantified as hectares (acres). Secondary impacts to native vegetation may occur due to noxious weed invasion or as changes in vegetation types some distance from the direct road widening. Other types of secondary impacts such as habitat fragmentation, as well as cumulative impacts to native vegetation are discussed in Section 5.3.3.6, *Wildlife Impacts*.

Preferred Alternative

I-25 Corridor Vegetation Impacts (Preferred Alternative)

The Preferred Alternative permanently impacts 73.6 hectares (182 acres) (Table 5.9) and temporarily impacts 13.4 hectares (33.0 acres) of upland vegetation communities along the I-25 Corridor. This estimate includes 0.8 hectare (2.0 acres) of permanent impact from the proposed railroad realignment, and approximately 1.3 hectares (3.1 acres) from the addition of a car pool lot at the Castle Pines Parkway Interchange. The largest relative impact from the Preferred Alternative is to woodlands, with 15.6 percent (12.9 hectares [31.9 acres]) of woodlands within the APE converted.

Temporarily impacted lands from construction activities have an increased susceptibility to noxious weed invasion. Weeds such as diffuse knapweed, Canada thistle, and musk thistle occur within the APE on both corridors, and are among the ten most widespread weeds in the State of Colorado.

US 85 Corridor Vegetation Impacts (Preferred Alternative)

The Preferred Alternative permanently impacts 68 hectares (169 acres) (Table 5.9) and temporarily impacts 12.9 hectares (32 acres) of upland vegetation communities along the US 85 Corridor

Other Alternative

I-25 Corridor Vegetation Impacts (Other Alternative)

The Other Alternative permanently impacts approximately 3.6 percent (30.5 hectares [75.4 acres]) (Table 5.9) more native vegetation along the I-25 Corridor than the Preferred Alternative. The proposed Rampart Range Interchange and frontage road impact grasslands, shrublands, and riparian habitat. The proposed Surrey Ridge diamond interchange increases permanent impacts to grasslands and shrublands. The loop ramp at Castle Pines Parkway impacts grasslands and shrublands. The widening of the Happy Canyon Interchange Bridge impacts grasslands and woodlands.

US 85 Corridor Vegetation Impacts (Other Alternative)

Permanent, direct impacts to grasslands associated with the Other Alternative are slightly more (4 percent) than the Preferred Alternative along the US 85 Corridor due to the difference in laneage between

Highlands Ranch Parkway and Titan Road (Table 5.9).

For additional information on vegetation, see the *Vegetation Technical Report*, May 2000, amended November 2000, in the Technical Reports Volume of the *South I-25 Corridor and US 85 Corridor FEIS*.

Table 5.9
Potential Direct Impacts to Vegetation Cover Types
Hectares (Acres)

		Preferred Alternative	Other Alternative
Grasslands	I-25 Corridor	44.2 (109.2)	69.3 (171.1)
	US 85 Corridor	54 (134)	56.5 (139.5)
Woodlands	I-25 Corridor	12.9 (31.9)	13.3 (32.9)
	US 85 Corridor	0.5 (1.2)	0.5 (1.2)
Shrublands	I-25 Corridor	9.8 (24.3)	13.8 (34.2)
	US 85 Corridor	5.4 (13.4)	5.4 (13.4)
Riparian	I-25 Corridor	1.2 (3.0)	2.2 (5.5)
	US 85 Corridor	0.7 (1.8)	0.7 (1.8)
Urban	I-25 Corridor	5.5 (13.6)	5.5 (13.6)
	US 85 Corridor	7.4 (18.4)	7.4 (18.4)
	Total	141.6 (350.8)	174.6 (431.6)

5.3.3.4 Wetland Impacts

Impacts to wetlands and Other Waters of the US resulting from roadway construction can potentially occur either directly as temporary or permanent filling or draining, or as secondary impacts. A direct loss of wetland area is unavoidable for both build alternatives (Table 5.10). Direct impacts will be mitigated on a 1:1 replacement ratio.

Preferred Alternative

I-25 Corridor Wetland Impacts (Preferred Alternative)

The locations of permanent impacts to wetlands and Other Waters of the US from the Preferred Alternative along the I-25 Corridor are shown on Figure 5.4a and summarized on Table 5.10. Temporary impacts from construction result in an additional 0.03-hectare (0.07-acre) impact to wetlands and 0.08 hectare (0.19 acre) of impact to Other Waters of the US. The majority of the impacts caused by the Preferred Alternative occur to wetlands located adjacent to Happy Canyon Creek. These wetlands provide all six wetland functions evaluated including wildlife habitat, dynamic water storage, flood flow attenuation, production export/aquatic food chain support, nutrient and pollutant removal/sediment retention, shoreline stabilization/sediment control. Many of the remaining wetland impacts are to isolated roadside ditch wetlands that were not considered jurisdiction by the United States Army Corps of Engineers (USACE). This type of wetland provides relatively limited functionality, but provides some wildlife habitat as well as acting as biotic filters for non-point source pollution. Impacts to Other Waters of

the US are typically due to culvert replacements and/or extensions.

US 85 Corridor Wetland Impacts (Preferred Alternative)

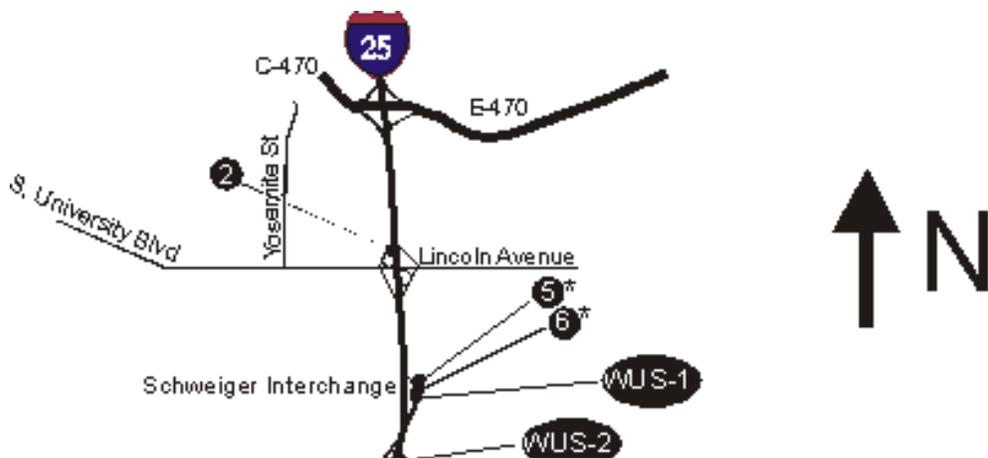
The locations of permanent impacts to wetlands and Other Waters of the US from the Preferred Alternative along the US 85 Corridor are shown on Figure 5.4b and summarized on Table 5.10. Temporary impacts from construction result in an additional 0.02 hectare (0.05 acre) of impact to wetlands and 0.06 hectare (0.16 acre) of impact to Other Waters of the US. The majority of permanent impact is to jurisdictional wetlands in the northern part of the study area.

Although the total area of jurisdictional wetland impact is relatively small, wetland habitat at Marcy Gulch and Spring Gulch do provide functions such as dynamic water storage, flood flow attenuation, production export/aquatic food chain support, nutrient and pollutant removal/sediment retention, shoreline stabilization/sediment control, and wildlife habitat. Impacts to Other Waters of the US are typically due to culvert replacements and/or extensions.

**Table 5.10
Potential Direct Impacts to Wetlands and Other Waters of the US
Hectares (Acres)**

		Preferred Alternative	Other Alternative
Jurisdictional Wetlands	I-25 Corridor	0.06 (0.15)	0.11 (0.28)
	US 85 Corridor	0.06 (0.15)	0.06 (0.15)
	Total	0.12 (0.30)	0.17 (0.43)
Non-Jurisdictional wetlands	I-25 Corridor	0.04 (0.1)	0.04 (0.1)
	US 85 Corridor	0.04 (0.09)	0.04 (0.09)
	Total	0.08 (0.19)	0.08 (0.19)
Other Waters of the US	I-25 Corridor	0.19 (0.48)	0.35 (0.85)
	US 85 Corridor	0.46 (1.14)	0.46 (1.14)
	Total	0.65 (1.19)	0.81 (1.99)

**Figure 5.4a
I-25 Corridor Wetland Impacts**



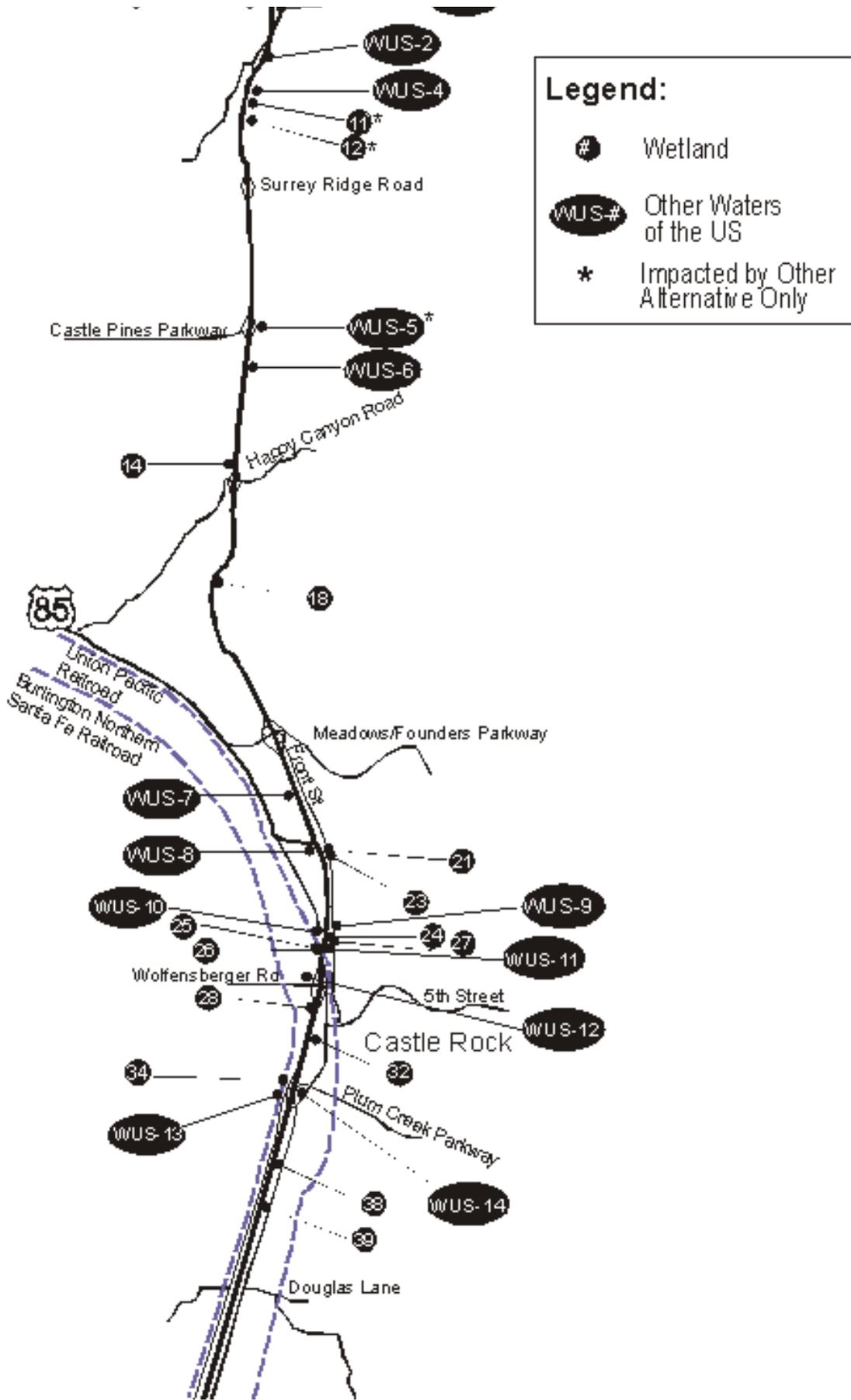
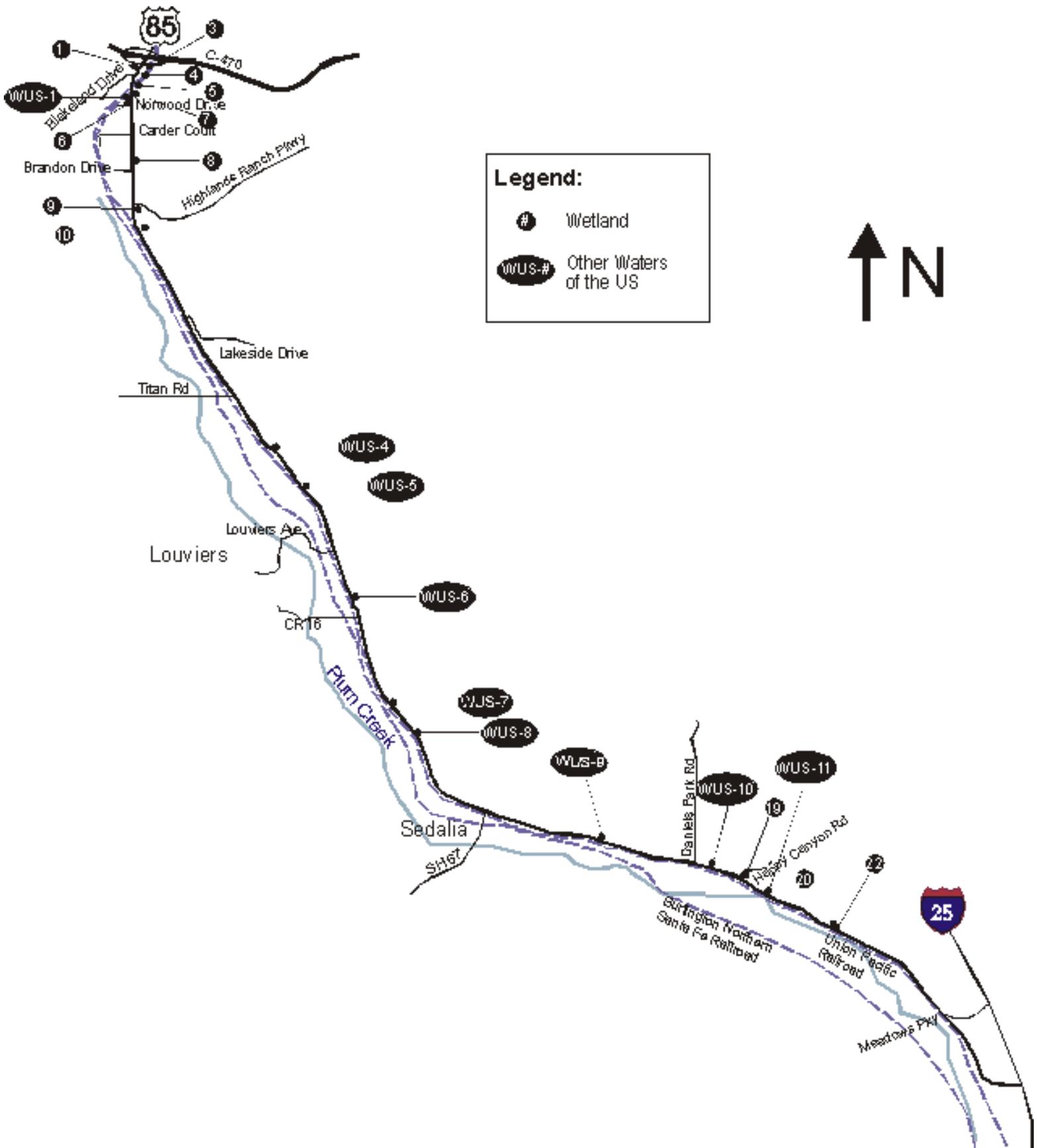


Figure 5.4b
US 85 Corridor Wetland Impacts



Other Alternative

I-25 Corridor Wetland Impacts (Other Alternative)

Direct impacts to wetlands caused by the Other Alternative along the I-25 Corridor are the same as described in the Preferred Alternative. Additional impacts to wetlands (0.05 hectare [0.13 acre]) and Other Waters of the US (0.16 hectare [0.37 acre]) also result due to the loop ramp at the Castle Pines Parkway and the frontage road between Castle Pines Parkway and the proposed Rampart Range Interchange (Table 5.10) included as elements of the Other Alternative.

US 85 Corridor Wetland Impacts (Other Alternative)

Direct impacts to wetlands caused by the Other Alternative along the US 85 Corridor are the same as those described under the Preferred Alternative.

Wetland Secondary Impacts

Potential secondary impacts to wetlands from either build alternative include:

- Alteration of wetland hydrology from changes in drainage patterns or changes in runoff volumes.
- Increased delivery of non-point source pollution including temporary increases in sediment loads from land clearing activities, seasonal pulses of sediment and salt from winter road maintenance, and petroleum distillates, metals, and rubber contained in stormwater from ordinary vehicle wear.
- Degradation of wetland/wildlife habitat due to increased noise levels.

CDOT and Douglas County regulations limit the amount of allowable impact to historic drainage patterns (see Section 5.3.3.2, *Water Quality*). It is, therefore, unlikely that runoff volumes to nearby creeks from either build alternative (i.e., East Plum Creek, Marcy Gulch) change substantially. However, the potential for secondary impacts increases slightly under the Other Alternative due to increases in impervious surface area. The development and implementation of a SWMP minimizes potential impact from non-point source pollution. Secondary impacts to wetlands or Other Waters of the US removed from the APE are therefore expected to be minimal.

Secondary impacts resulting from gravel mining to provide borrow material needs is not an issue. Projected fill requirements are currently exceeded on both corridors by planned excavation.

Although the ambient noise level likely increases in most wetlands adjacent to the highways, it is likely that most wildlife species in these areas habituate to the higher noise levels (see Sections 4.3.14, *Noise* and 5.3.3.14, *Noise Impacts*).

Wetland Cumulative Impacts

Previous, current, and foreseeable actions were considered in this cumulative impact analysis. USACE data indicate that within Douglas County, 11.61 hectares (28.68 acres) of documented wetland impact has occurred from 1992 to 2000. Of this impact, 4.08 hectares (10.08 acres) have been mitigated, representing a net loss of 7.53 hectares (18.6 acres) of wetland area. The majority of this impact has occurred in the northern half of Douglas County near the towns of Parker and Castle Rock, and in the Highlands Ranch area near C-470. It should

be noted that more impacts to wetlands have likely occurred in the past 8 years, but due to less stringent regulations in the past and illegal activities, these impacts may not have been recorded.

Impact to wetlands from the FEIS build alternatives increase the total amount of cumulative impact to this resource. However, CDOT's and FHWA's commitment to no net loss minimizes the cumulative loss of wetlands from transportation projects. For example, CDOT proposes to install a series of check dams along East Plum Creek with wetland restoration as one of the project's primary goals.

I-25 Corridor Wetland Cumulative Impacts

The proposed Douglas Lane Interchange and Rampart Range Interchange do not impact wetland resources. Early-Action projects, such as the Climbing Lanes Phase II, US 85/I-25 Interchange, and the 5th Street Overpass, have a combined wetland fill of 0.05 hectare (0.13 acre) (Table 5.11).

**Table 5.11
Wetland Impacts and Mitigation for Cumulative Transportation Projects Considered**

Corridor	Transportation Project Name	Area of Impact hectares (acres)	Area of Mitigation hectares (acres)
I-25	Climbing Lanes, Phase II	0.03 (0.08)	0.03 (0.08)
	US 85/I-25 Interchange	0.01 (0.03)	0.01 (0.03)
	5th Street Overpass	0.008 (0.02)	0.008 (0.02)
US 85	Titan Road	0.03 (0.07)	0.03 (0.07)
	Total	0.08 (0.20)	0.08 (0.20)

Planned residential developments along the I-25 Corridor may impact additional wetland area, contributing to the cumulative loss of wetlands. National Wetland Inventory (NWI) mapping indicates that approximately 6 hectares (15 acres) of wetlands occur in the vicinity of the future Canyons Development, and approximately 1.6 hectares (4 acres) of wetlands occur in the vicinity of the future developments near Douglas Lane. Current Clean Water Act regulations limit impacts to wetlands and typically require compensatory wetland mitigation for impacted wetland areas greater than 0.13 hectare (0.33 acre) in size.

Residential and commercial developments may increase runoff to wetlands, thereby creating secondary impacts. This is of higher concern in areas where development will occur close to East Plum Creek and Marcy Gulch, because stormwater runoff may be directed into these perennial creeks as point sources of runoff. It is expected that this type of secondary impact will be minimized by adherence to Douglas County regulations on stormwater management.

US 85 Corridor Wetland Cumulative Impacts

The Preferred Alternative and the Other Alternative have small, but equal contributions to the cumulative loss of wetlands along the US 85 Corridor. In addition to the US 85/I-25 Interchange discussed previously, the Titan Road Interchange project permanently impacts 0.03 hectare (0.07 acre) of non-jurisdictional wetland area.

Current NWI mapping indicates that the Highlands Ranch build-out includes approximately 19.8 hectares (49 acres) of potential wetland. It is unlikely, however, that this much wetland area will be directly impacted due to the inaccuracies in the NWI mapping and regulations limiting impacts to wetlands.

For additional information on wetlands, see the *Wetland Finding* in Volume II of this FEIS, or in the Appendix of the *Wetland Technical Report*, May 2000, amended November 2000, in the Technical Reports Volume of the *South I-25 Corridor and US 85 Corridor FEIS*.

5.3.3.5 Geology Impacts

Chapter 4.0, *Affected Environment*, describes the geology and soils constraints for development. No impacts as a result of the South I-25 Corridor and US 85 Corridor project are identified; however, it is recommended that the project designers use the data in Section 4.3.5, *Geology*, as a reference for appropriate design and construction measures.

For additional information on geology, see the *Geology Technical Memorandum South I-25 Corridor and US 85 Corridor*, October 2000, in the Technical Reports Volume of the *South I-25 Corridor and US 85 Corridor FEIS*.

5.3.3.6 Wildlife Impacts

Impacts to wildlife from highway projects include road kill and the loss, degradation, or fragmentation of habitat. These impacts are either temporary (i.e., construction) or permanent (i.e., operational and construction). Construction and operational impacts may include the temporary loss of habitat in construction areas; loss of habitat from paving; degradation of adjacent habitats due to altered runoff and/or increased exposure to salts and other pollutants including noise; fragmentation of habitat by formation of barriers to wildlife movement; increased edge effect; displacement of wildlife due to increased noise and human activity; changes in wildlife movement patterns; and reductions in biological diversity. Increased traffic volume also increases the likelihood of direct mortality from collisions with vehicles. Wildlife impacts are calculated similar to vegetation impacts with the exception of urban cover type. Urban cover type is not considered wildlife habitat and is not included in the wildlife impacts calculation.

Preferred Alternative

I-25 Corridor Wildlife Impacts (Preferred Alternative)

The Preferred Alternative results in a permanent loss of approximately 67.5 hectares (166.8 acres) of habitat along the I-25 Corridor (see section 5.3.3.3, *Vegetation Impacts*, for descriptions of impacted habitat types; urban vegetation types are not included in calculations for impacted wildlife habitat). Some of this habitat is within the existing ROW and is of poor quality due to its proximity to the highway, alteration of ROW plant communities following original construction, and the effect of subsequent highway maintenance (i.e., snow plowing). Other ROW habitat has higher value to wildlife species, such as disturbed sites favored by the black-tailed prairie dogs colonies, or the riparian corridors at Happy Canyon Creek and East Plum Creek.

The Preferred Alternative impacts approximately 0.1 hectare (0.2 acre) of black-tailed prairie dog habitat

along the I-25 Corridor (black-tailed prairie dog impact calculations include losses from road construction and a 3-meter [10-foot] temporary construction zone). Approximately 1.2 hectares (3.0 acres) of riparian habitat are lost with this alternative. Riparian habitat is used by an array of birds, reptiles, amphibians, and mammals. Although the area lost may be relatively small, its per acre value to wildlife is high. In addition, riparian corridors maintained across highways by directing stream channels under bridges or through culverts also provide passage for wildlife attempting to cross I-25. Tracking studies indicate that bridges and culverts are used by carnivores and small-to medium-sized mammals to cross under I-25; however, no deer or elk were detected crossing under I-25.

Existing culverts under I-25 are extended under the Preferred Alternative to accommodate highway widening. The small openness factors of these existing culverts (see Section 4.3.6, *Wildlife*, for information on openness factor) are further reduced without improvements. Ungulates, such as deer and elk, are not expected to use the smaller extended structures. Based on wildlife tracking data from a similar length culvert under US 85, (i.e., Station Number 2), the small openness factor for existing and future extended I-25 culverts is not expected to substantially reduce the number of crossings for species that already use these structures. Rather, the lower number of underpass crossings and reduced diversity of species crossing under I-25, relative to US 85, are more likely related to the lower quality of surrounding habitat, lower density of conservation areas, and greater amount of development adjacent to I-25 culverts compared to US 85 culverts.

Currently, at-grade crossing of I-25 is difficult for wildlife species given the pavement width, traffic volume, and artificial barriers (i.e., Type IV concrete barriers). The Colorado Division of Wildlife (CDOW) considers I-25 to be a substantial barrier to wildlife movement, particularly since there are no large, nearby, protected tracts of land to serve as stand alone habitat areas, and development has encroached substantially on the project area. Successful at-grade wildlife crossings over I-25 in the APE are expected to further decrease with implementation of the Preferred Alternative.

US 85 Corridor Wildlife Impacts (Preferred Alternative)

Construction noise and ROW ground clearing activities for US 85 have impacts similar to those described for the Preferred Alternative along the I-25 Corridor.

The Preferred Alternative results in a permanent loss of approximately 61 hectares (151 acres) of upland habitat along the US 85 Corridor. Portions of several small black-tailed prairie dog colonies are impacted, resulting in the loss of approximately 2.47 hectares (6.1 acres) of black-tailed prairie dog habitat. The Preferred Alternative results in impacts to some mesic shrub vegetation that occurs within dry gulches intersected by US 85 and some streamside riparian vegetation at Marcy Gulch and Spring Gulch. The area of impervious surface increases with the Preferred Alternative (see Section 5.3.3.2, *Water Quality Impacts* for details on increases in impervious surface runoff).

The Preferred Alternative increases the highway's barrier effect to wildlife attempting to cross US 85, especially to ungulates. Currently, bridges and culverts are inadequate to provide safe crossing for deer and elk. Although the Preferred Alternative includes improvements to two wildlife crossings, it is expected to increase the barrier effect of US 85 to deer and elk movement. The Preferred Alternative similarly decreases the permeability of the US 85 Corridor for species less likely to use extended bridges or culverts.

Other Alternative

I-25 Corridor Wildlife Impacts (Other Alternative)

The Other Alternative directly impacts an additional 30.5 hectares (75.4 acres) of habitat along the I-25 Corridor over the Preferred Alternative. This alternative impacts approximately 0.03 hectare (0.074 acre) less black-tailed prairie dog habitat than the Preferred Alternative.

The frontage road on the east side of I-25 from Castle Pines Parkway to proposed Rampart Range Interchange adds to the movement barrier across I-25 and further fragments habitat.

US 85 Corridor Wildlife Impacts (Other Alternative)

The Other Alternative directly impacts an additional 63 hectares (156 acres) of habitat along the US 85 Corridor over the Preferred Alternative. No additional impacts occur to black-tailed prairie dog habitat due to the increase in laneage between Highlands Ranch Parkway and Titan Road as part of the Other Alternative.

Wildlife Secondary Impacts

Secondary impacts to wildlife habitat may occur from increased operational capacity/activity, and habitat loss or degradation. Potential secondary impacts due to both build alternatives include:

- impacts to wildlife that utilize impacted black-tailed prairie dog colonies
- impacts to aquatic and riparian communities due to increased runoff
- isolation of wildlife populations due to habitat fragmentation and decreased permeability of the US 85 Corridor, and
- habitat degradation from increased noise.

Loss of black-tailed prairie dog habitat has the potential to secondarily affect numerous other species such as 4 species of reptiles, 23 species of birds, and 16 species of mammals that may be drawn to black-tailed prairie dog colonies. Species such as desert cottontail use black-tailed prairie dog burrows for cover. Pronghorn may prefer to forage in colonies because black-tailed prairie dogs may improve the quality of some preferred plants. Predators such as coyotes, bobcats, badgers, long-tailed weasels, bull snakes, prairie rattlesnakes, golden eagles, bald eagles, northern harriers, prairie falcons, red-tailed hawks, and ferruginous hawks prey on black-tailed prairie dogs. As a keystone species, impacts to black-tailed prairie dog habitat have the potential to secondarily impact numerous other species.

Secondary impacts to riparian and aquatic habitats may occur in two ways: (1) degrade water quality by increasing non-point source pollutants to surface waters; and (2) further downcutting of East Plum Creek due to the erosive effects of runoff. Downcutting disconnects the stream channel and associated hydrology from the floodplain and can degrade adjacent wetland and riparian habitat. Loss of wetlands and riparian

habitat, which can filter pollutants from runoff, further exacerbates aquatic habitat degradation.

ROW clearing activities and noise generated during construction temporarily displaces wildlife from habitat in the immediate vicinity of the construction zone, with some wildlife species returning to the area once construction is complete. The potential for substantial adverse operational noise impact to wildlife, resulting from the FEIS build alternatives, is minor due to animal habituation to existing highway sound levels.

Wildlife Cumulative Impacts

I-25 Corridor Wildlife Cumulative Impacts

To better understand the FEIS build alternatives' effects on wildlife communities, it is necessary to assess cumulative impacts within the I-25 Corridor. The five Early-Action projects along I-25 impact all five cover types. Grassland habitat has been or will be impacted by the Climbing Lanes Phase I project, the Climbing Lanes Phase II project, and the Meadows/Founders Interchange project. Woodlands are impacted by the Climbing Lanes Phase II project. The Climbing Lanes Phase I project impacted Shrublands. Riparian habitat is impacted by the Wolfensberger Bridge project and 5th Street Bridge project. However, due to the presence of the Preble's Meadow Jumping Mouse (PMJM) in these areas, full mitigation offsets impacts to the riparian communities in those areas. A small amount of riparian habitat along Happy Canyon Creek was impacted by the Climbing Lanes Phase I project as well. The urban cover type has been impacted by the Meadow/Founders Interchange project.

In addition to these other transportation projects, current and future development in the Chatfield Basin area will increase barriers to wildlife movement, fragment habitat, cause habitat loss (including black-tailed prairie dog colonies, riparian and wetland areas), and increase impervious surface runoff. Four major residential development areas are planned for the I-25 Corridor (Table 5.12). Combined with historic impacts, these current and foreseeable activities may further impact wildlife habitat.

The Meridian Development will be surrounded by the Rampart Range Development in the area east of I-25, south of E-470 and north of Lincoln Avenue, with a portion also located east of I-25 and south of Lincoln Avenue. Total development is expected to be 80 hectares (199 acres), with approximately 4.9 hectares (12 acres) preserved as open space. This area is primarily grasslands and is adjacent to black-tailed prairie dog colonies. The Rampart Range Development will total 1,417 hectares (3,514 acres), with 337 hectares (835 acres) maintained as open space. Developments in the vicinity of Douglas Lane, located south of the Town of Castle Rock, will include approximately 2,242 hectares (5,540 acres). All three development areas may further fragment wildlife habitat in the I-25 Corridor.

Table 5.12
Cumulative Vegetation Impacts for Residential Development Projects

	Project Name	Area Impacted hectares (acres)	Cover Type Impacted	Open Space Areas hectares (acres)
I-25	The Meridian Development	80 (199)	Grassland	4.9 (12)
	Rampart Range Development	1,417 (3,514)	Shrubland, grassland	337 (835)
	The Canyons Development	2,248 (5,576)	Shrubland, grassland	202 (500)
	Douglas Lane Developments	2,242 (5,540)	Shrubland, grassland	196 (485)
US 85	Highlands Ranch Development	242 (600)	Riparian, shrubland, grassland	None indicated

The Canyons Development will occur in an area south of Castle Pines Parkway, east of I-25, and north of Happy Canyon. The total direct impact from the development will be 2,248 hectares (5,576 acres), although 202 hectares (500 acres) of open space will abut I-25. Habitat subject to impact is primarily shrubland and grassland, but could include high quality habitats such as black-tailed prairie dog colonies. Wildlife movement across I-25 north of Castle Rock is already heavily inhibited by I-25. The Canyons Development will fragment habitat east of I-25 but will likely not appreciably reduce movement of deer and elk across I-25. However, permeability of the I-25 Corridor will be reduced for smaller animals.

Continued habitat changes along I-25 may eventually cause a shift in species composition from the existing grassland specialists such as ferruginous hawks and burrowing owls, to suburban generalists such as European starlings and raccoons. This type of shift would lead to a loss in regional biodiversity.

US 85 Corridor Wildlife Cumulative Impacts

Planned development along the US 85 Corridor exacerbates pressures on wildlife, and is a cumulative impact. Development in Highlands Ranch will include the area south of C-470, north of Highlands Ranch Parkway, and east of US 85 (see Table 5.12). This development will primarily impact grasslands, shrublands, and may impact some riparian areas, as well as contribute to habitat loss and fragmentation. In addition, the Titan Road and I-25/US 85 Interchange Early-Action projects impact grasslands.

Land preservation in Douglas County is a beneficial cumulative impact resulting from revenues generated by the rapidly growing economy. Douglas County, Chatfield Basin Conservation Network, private entities, local, state, and federal agencies have all invested considerable time and expense preserving land (conservation areas) on both sides of US 85. Their efforts provide habitat for a rich wildlife community directly south of a major metropolitan area, as well as scenic vistas, recreational opportunities, and community buffers all of which improve the quality of life for residents in Douglas County. For example, from 1995 to 2000 the Douglas County Open Space and Natural Resource program has purchased over 6,680 hectares (16,500 acres). These areas, and other significant conservation areas in the vicinity of US 85, include Chatfield State Park, Highlands Ranch Conservation Area, Daniels Park, and Cherokee Ranch Foundation. Preservation of these areas may benefit black-tailed prairie dogs by reducing the total amount of cumulative habitat loss possible to them.

Habitat connectivity is a crucial component to maintaining the habitat quality and biological diversity of this resource. Decreasing the permeability of the US 85 Corridor, coupled with loss and degradation of habitat associated with ongoing development, has the potential to undermine conservation and preservation efforts. Currently Douglas County is developing a Habitat Conservation Plan, which will aid land managers and planners in planning additional development and conservation areas within the county. For additional information on wildlife, see the *Wildlife Technical Report*, May 2000, amended November 2000, and the *Wildlife Tracking and Habitat Connectivity Study US Highway 85 Corridor*, October 2000, in the Technical Reports Volume of the *South I-25 Corridor and US 85 Corridor FEIS*.

5.3.3.7 Wild and Scenic Rivers Impacts

No known wild or scenic rivers are in the APE. Therefore, no wild and scenic river impacts are anticipated as a result of the I-25 Corridor and US 85 Corridor Preferred Alternative and Other Alternative.

5.3.3.8 Floodplain Impacts

Impacts to the 100-year floodplain can occur in two forms: (1) directly through changes to the volumetric capacity of the floodplain (e.g., filling, bridge piers); or (2) indirectly through an increase in the total volume of water arriving at and being conveyed by the floodplain. Indirect impacts are especially important when considering cumulative impacts to floodplains from all the previous, current, and planned projects in an area.

Fill needed to accommodate additional laneage could potentially impact 100-year flood surface elevations downgradient from the project area. However, this type of impact is expected to be minimal because the amount of fill added to 100-year floodplains is not substantial relative to the total volume each 100-year floodplain embodies. Moreover, at each crossing, adequate freeboard between the bottom of a crossing structure (e.g., bridge) and the predicted 100-year flood surface elevation is maintained to ensure a minimal risk of flooding new areas. These types of impacts are evaluated in more detail in the *Floodplain and Drainage Assessment Technical Report*, November 2000.

Preferred Alternative

I-25 Corridor Floodplain Impacts (Preferred Alternative)

The primary source for impact to 100-year floodplain surface elevations is mainline widening. The floodplains of Happy Canyon Creek, Tributary A, Tributary D, Hangmans Gulch, and East Plum Creek are expected to be directly impacted by mainline widening. Figure 5.5a shows the locations of these impacted floodplains. The estimated direct impact at these locations is provided on Table 5.13. Drainage designs for 50- and 100-year precipitation events minimize long-term on-site impacts to the natural and beneficial values of these floodplains. Drainage designs were based on the 50- and 100-year precipitation events primarily because these drainages are ungaged and peak flow data is not available. The design approach used is consistent with procedures recommended by the Urban Drainage and Flood Control District (UDFCD) and Douglas County's "Storm Drainage Design and Technical Criteria." The hydrologic model used to estimate 50- and 100-year flood events used numerous watershed-specific input factors to estimate stormwater hydrographs including: the Douglas County two-hour design storm hyetograph, basin geometry, and development characteristics such as basin area, catchment length, distance from the design point to the basin centroid, percent impervious, retention, and infiltration rates. This procedure is described

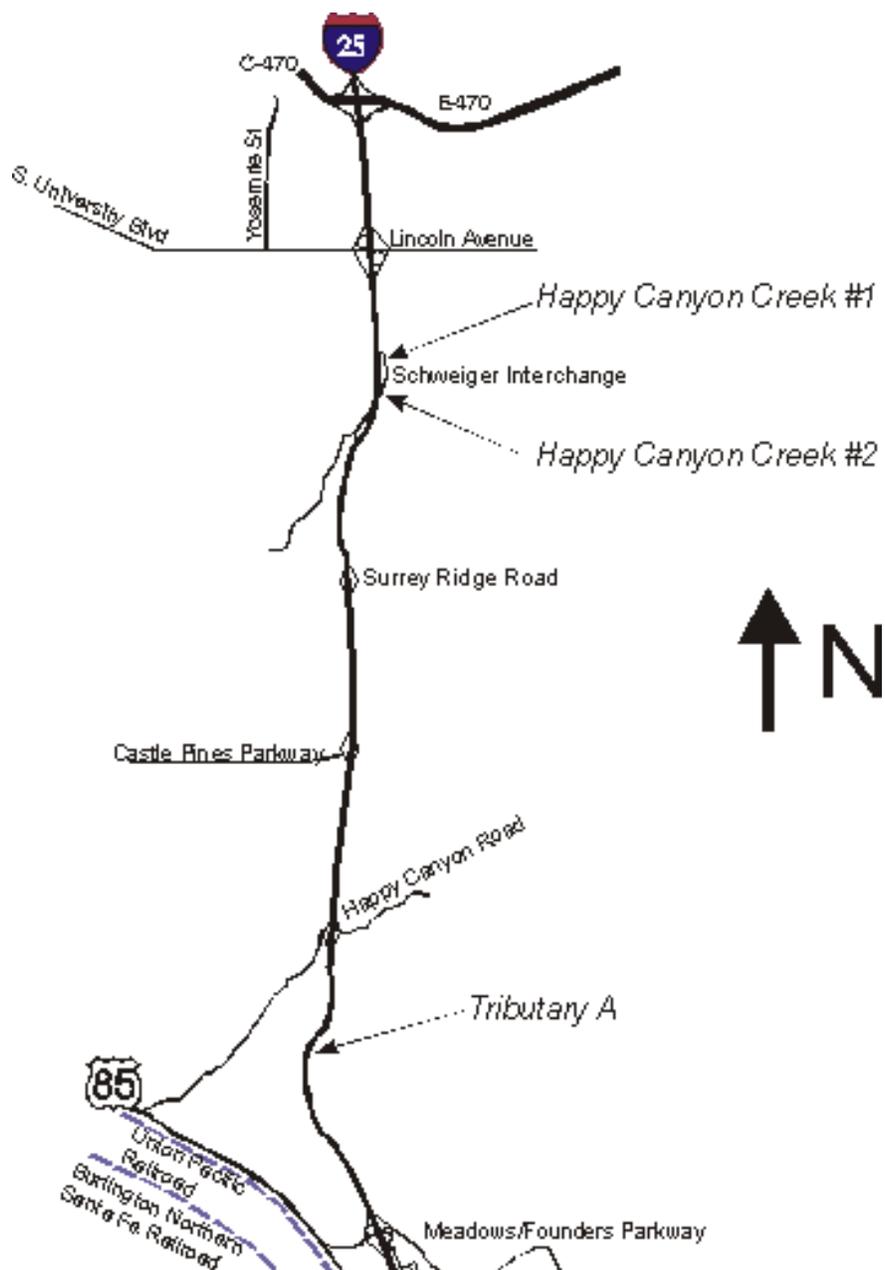
in some detail in the *Floodplain and Drainage Technical Appendix*.

BMPs that minimize runoff prevent secondary impacts caused by mainline widening. Temporary impacts caused by construction, to the aesthetics, wildlife habitat, and water quality maintenance functions of floodplains are also minimized by BMPs.

US 85 Corridor Floodplain Impacts (Preferred Alternative)

Mainline widening of US 85 causes direct impact to eight of the 100-year floodplains found within the US 85 APE (Table 5.13). Figure 5.5b shows the locations of these impacted floodplains. However, no adverse effects to 100-year flood surface elevations are anticipated because design considerations account for predicted 50- and 100-year flood volumes. Minimization of impact potentially caused by increased runoff volumes requires appropriate use of BMPs.

Figure 5.5a
I-25 Corridor Floodplain Impacts



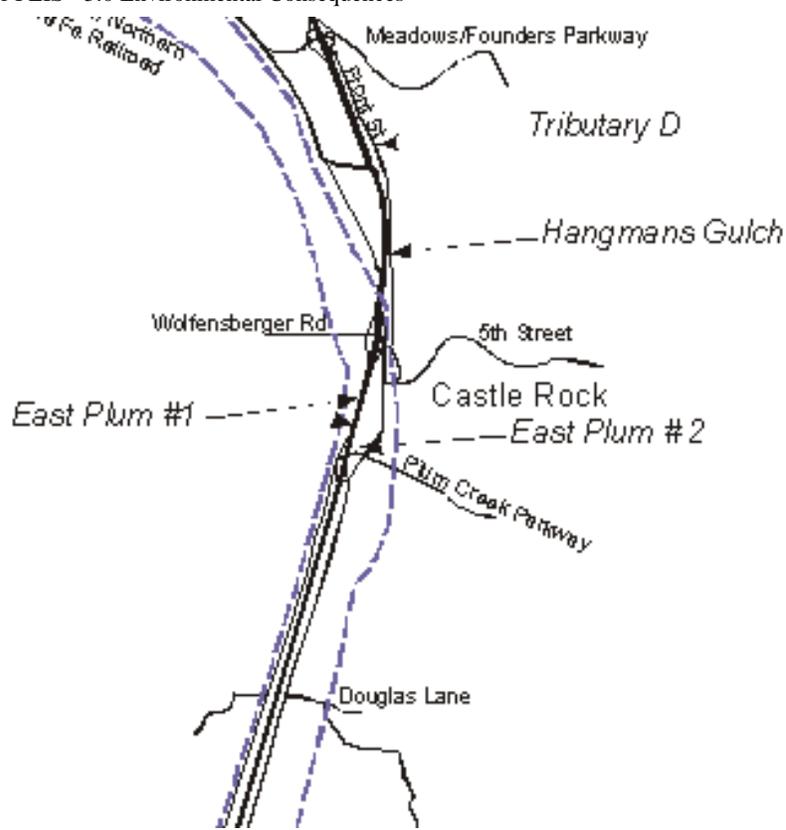


Figure 5.5b
US 85 Corridor Floodplain Impacts

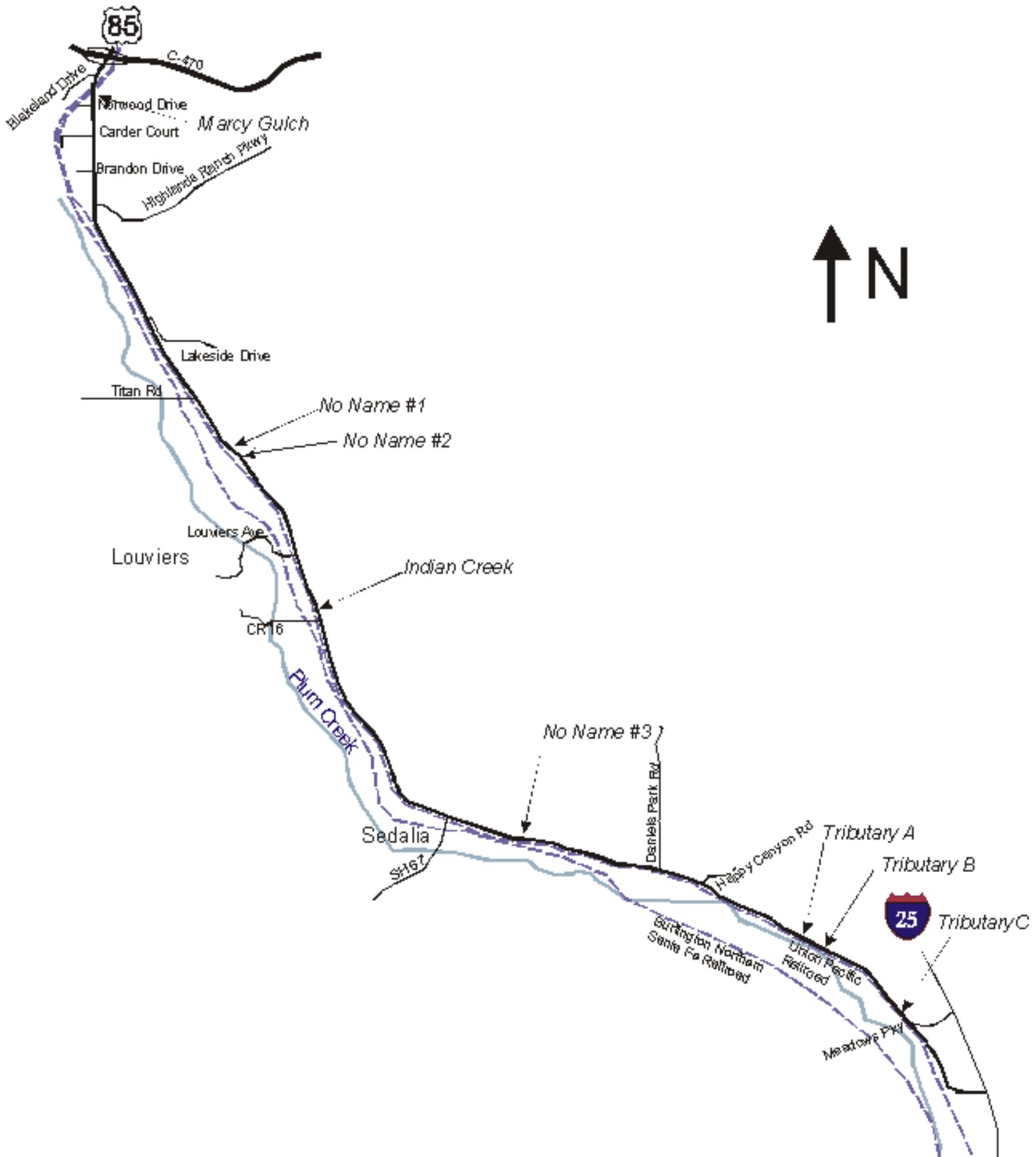


Table 5.13
Potential Direct Impacts to the Beneficial Uses of Floodplains*
Hectares (Acres)

	Preferred Alternative	Other Alternative
I-25 Corridor		
Happy Canyon Creek #1	0.02 (0.05)	0.33 (0.82)
Happy Canyon Creek #2	0.58 (1.43)	1.3 (3.21)
Tributary A	0.02 (0.04)	0.02 (0.04)
Tributary D	0.24 (0.58)	0.24 (0.58)
Hangman's Gulch	0.02 (0.04)	0.02 (0.04)
East Plum Creek #1	0.56 (1.38)	0.56 (1.38)
East Plum Creek #2	0.09 (0.21)	0.09 (0.21)
US 85 Corridor		
Marcy Gulch	0.35 (0.86)	0.35 (0.86)
No Name # 1	0.53 (1.32)	0.53 (1.32)
No Name # 2	0.26 (0.65)	0.26 (0.65)
Indian Creek	0.69 (1.7)	0.69 (1.7)
No Name # 3	0.16 (0.39)	0.16 (0.39)
Tributary A	0.15 (0.37)	0.15 (0.37)
Tributary B	0.22 (0.55)	0.22 (0.55)
Tributary C	0.15 (0.36)	0.15 (0.36)
Total	4.04 (9.93)	5.07 (12.48)

**100-year flood surface elevations will not be impacted, however, other uses such as aesthetics and wildlife habitat will be impacted. Impacts shown here include impacts to Other Waters of the US (not wetlands) found within designated 100-year floodplains.*

Other Alternative

I-25 Corridor Floodplain Impacts (Other Alternative)

In addition to impacts associated with mainline widening (Preferred Alternative), the frontage road and interchange improvements included in the Other Alternative increase runoff volumes. Impacts associated with each of these are estimated on Table 5.13.

The addition of a frontage road from the Castle Pines Parkway Interchange to the proposed Rampart Range Interchange is a potential source of direct impact to the Happy Canyon Creek floodplain. Design configurations will likely span the 100-year floodplain surface elevation allowing for adequate freeboard between the new structure and the 100-year flood elevation. The increase in runoff volume requires BMPs (i.e., retention basins) to prevent alteration of the 100-year floodplain.

US 85 Corridor Floodplain Impacts (Other Alternative)

The additional laneage of the Other Alternative is expected to generate more stormwater runoff, and thus potentially more indirect impact, than the Preferred Alternative.

For more floodplain and drainage details, see the *Floodplain and Drainage Assessment Technical Report*, May 2000, amended November 2000, in the Technical Reports Volume of the *South I-25 Corridor and US 85 Corridor FEIS*.

5.3.3.9 Threatened, Endangered, and Other Special-Status Species Impacts

This section analyzes potential impacts to special-status species such as those listed or proposed for listing as threatened or endangered under the Endangered Species Act (ESA). Also included are species warranted for federal listing but precluded by other higher priority species (warranted but precluded) and candidates for federal listing. Species identified as threatened, endangered, or of special concern by the State of Colorado are also discussed in this section although they are not protected under ESA. Threatened and endangered species letters of concurrence are included in the Appendix of this document.

The potential for impacts to special-status wildlife and plants are discussed by species. Only those species identified in Section 4.3.9, *Threatened, Endangered, and Other-Special Status Species*, as occurring or possibly occurring in the project APE are discussed in this section. Direct impacts to special-status species occur as impacts to black-tailed prairie dog and PMJM habitat.

Preferred Alternative

The Preferred Alternative does not take any listed, proposed, or candidate species, or their critical habitat, as defined in accordance with the ESA.

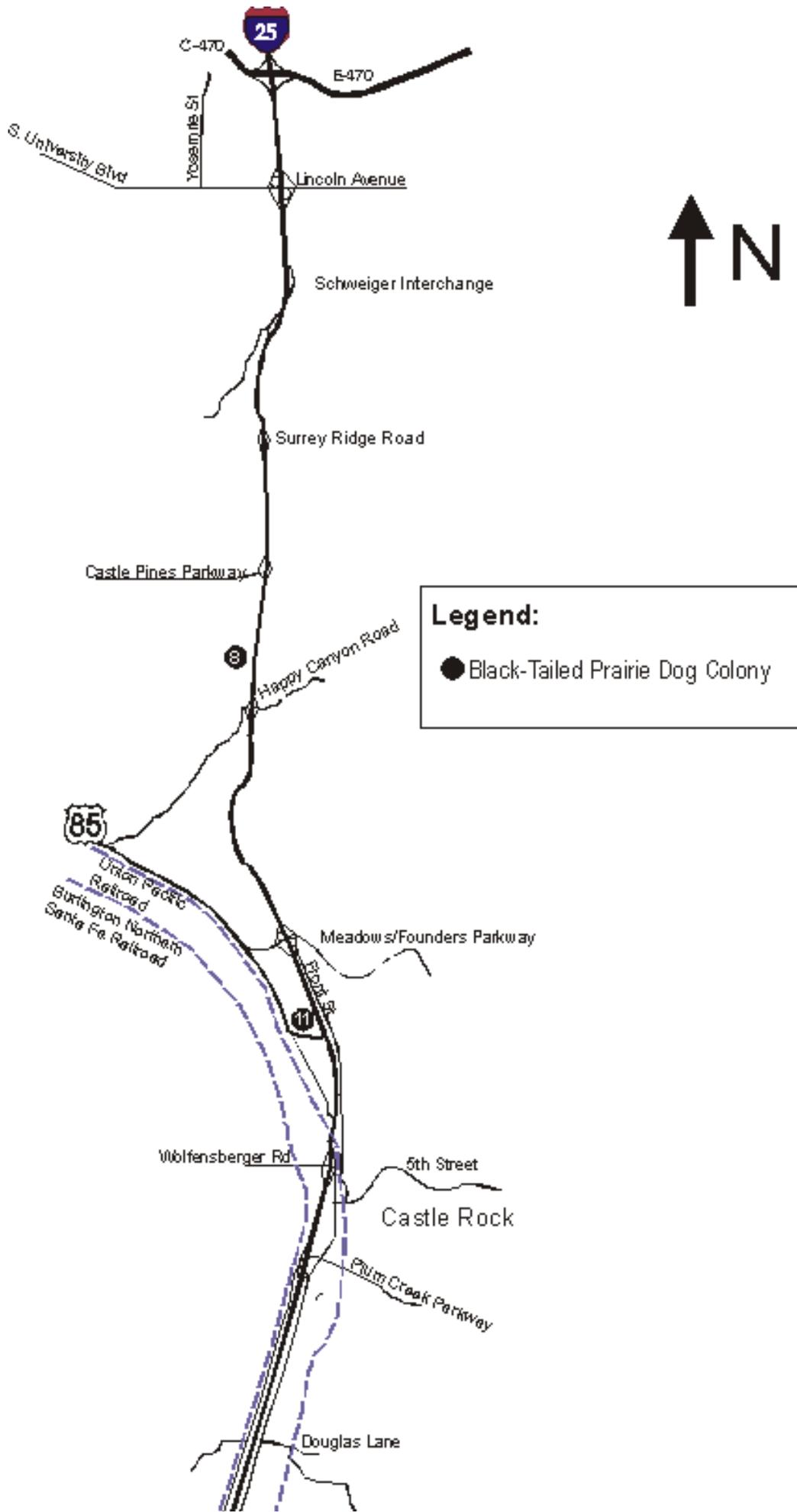
I-25 Corridor Threatened, Endangered, and Other Special-Status Species Impacts (Preferred Alternative)

Black-Tailed Prairie Dog (Warranted but Precluded and State Species of Concern). Black-tailed prairie dog habitat of 0.10 hectare (0.24 acre) is directly impacted by the Preferred Alternative (habitat impact calculations include permanent losses from road construction and a 3-meter [10-foot] temporary construction zone) as shown on Table 5.14. Black-tailed prairie dogs at Colony 6, Colony 8, and Colony 11, as shown on Figure 5.6a, are either permanently displaced or lost as a direct result of the Preferred Alternative.

Table 5.14
Potential Permanent, Direct Impacts to Special-Status Wildlife Species
Hectares (Acres)

		Preferred Alternative	Other Alternative
Black-Tailed Prairie Dog	I-25 Corridor	0.10 (0.24)	0.07 (0.18)
	US 85 Corridor	2.47 (6.1)	2.47 (6.1)
	Total	2.57 (6.34)	2.54 (6.28)
Preble's Meadow Jumping Mouse	I-25 Corridor	1.76 (4.36)	1.76 (4.36)
	US 85 Corridor	0	0
	Total	1.76 (4.36)	1.76 (4.36)

Figure 5.6a
I-25 Corridor Black-Tailed Prairie Dog
Habitat Impacts





Preble's Meadow Jumping Mouse (Threatened). Both temporary and permanent impacts from the Preferred Alternative are expected to affect jumping mouse populations and their habitat along the I-25 Corridor; however, no "taking" of this species is anticipated. The permanent impact area is approximately 1.76 hectares (4.36 acres), and the temporary impact area is expected to be approximately 0.51 hectare (1.29 acres). Permanent direct impacts are primarily caused by roadway widening, new slope toes, and bridge widening in the vicinity of East Plum Creek. Temporary impacts are due to the construction of a haul road and construction buffer zones. The majority of these impacts are expected to be to active season habitat, but some impacts occur to hibernation areas as well. The PMJM impacted habitat is shown on Figure 5.6b and Figure 5.6c. More complete descriptions of impacts to PMJM habitat are found in the *Preble's Meadow Jumping Mouse Biological Assessment for the South I-25 Corridor and US 85 Corridor Environmental Impact Statement*, October 2000.

Bald Eagle (Federal Threatened and State Threatened). Although loss of black-tailed prairie dog habitat (and black-tailed prairie dogs) is a secondary impact to bald eagles, any future loss along the Front Range should be considered a direct impact. This is due to the importance of black-tailed prairie dog colonies suitable for foraging eagles, and the persistent and accelerating loss of prairie dog habitat to development within bald eagle winter range. No nesting or critical habitat for the bald eagle is impacted by the Preferred Alternative.

Swift Fox (Federal Candidate and State Species of Concern). The APE does not contain typical swift fox habitat. No swift fox impacts are anticipated as a result of the Preferred Alternative.

Plains Sharp-Tailed Grouse (State Endangered). Plains sharp-tailed grouse occur at three sites within the scope of the project area. However, no known lek sites are directly impacted by proposed construction. No direct sharp-tailed grouse impacts are anticipated as a result of the Preferred Alternative.

Burrowing Owl (State Threatened). A single burrowing owl was recently reported outside the northern end of the study area near Park Meadows Mall west of I-25 and north of C-470. No occurrences of burrowing owls are documented within the APE, and thus no direct impacts to this species are anticipated as a result of the Preferred Alternative. CDOT will survey for burrowing owl presence in the project area one year prior to construction and additional surveys will be conducted prior to any earth moving activity.

American Peregrine Falcon (State Species of Concern). The project corridor does not contain peregrine nesting or critical habitat. The nearest active nesting pairs occur approximately 24.14 kilometers (15 miles) southwest of the town of Castle Rock and approximately 25.75 kilometers (16 miles) west of Sedalia. No peregrine falcon impacts are anticipated as a result of the Preferred Alternative.

Ferruginous Hawk (State Species of Concern). Due to the almost exclusive dependence of the ferruginous hawk on black-tailed prairie dogs, loss of black-tailed prairie dog habitat represents a direct impact to ferruginous hawks. Loss of black-tailed prairie dogs within the APE will particularly affect ferruginous hawks during the winter months, when food resources can be scarce.

Northern Leopard Frog (State Species of Concern). The northern leopard frog was observed in the I-25

Corridor APE by CDOW staff in 1999. Subsequent surveys, conducted by CDOT staff, have turned up negative for the presence of northern leopard frogs. In addition, northern leopard frogs were not encountered during construction of Climbing Lanes Phase I project. No impacts are anticipated as a result of the Preferred Alternative.

Northern Redbelly Dace (State Endangered), **Common Shiner** (State Threatened), **Brassy Minnow** (State Threatened), **Iowa Darter** (State Species of Concern). Plum Creek is potential habitat for the northern redbelly dace. The common shiner has been documented in West Plum Creek. East Plum Creek and Plum Creek are potential habitat for the common shiner. The brassy minnow may occur within the project area. The Iowa darter has been documented as occurring in Plum Creek. No direct impacts to these fish species are anticipated as a result of the Preferred Alternative.

US 85 Corridor Threatened, Endangered, and Other Special-Status Species Impacts (Preferred Alternative)

Impacts to the bald eagle, swift fox, plains sharp-tailed grouse, burrowing owl, American peregrine falcon, ferruginous hawk, northern redbelly dace, common shiner, brassy minnow, and Iowa darter are the same as those described for the I-25 Preferred Alternative.

Black-Tailed Prairie Dog (Warranted but Precluded and State Species of Concern). Approximately 2.47 hectares (6.1 acres) of black-tailed prairie dog habitat along the US 85 Corridor are impacted by the Preferred Alternative. Black-tailed prairie dogs at Colonies 1, 3, 5, 6, 7, 8, 9, 10, 11, and 12 as shown on Figure 5.6d, are either permanently displaced or lost as a direct result of the Preferred Alternative. The majority of this impact (1.6 hectares [3.9 acres]) occurs at Colony 8 and Colony 12.

Preble's Meadow Jumping Mouse (Threatened). Surveys for the jumping mouse were conducted within the US 85 APE, but no jumping mice were found. PMJM habitat is not impacted by the Preferred Alternative along the US 85 Corridor.

Other Alternative

The Other Alternative has similar impacts to special-status species as those described for the Preferred Alternative.

I-25 Corridor Threatened, Endangered, and Other Special-Status Species Impacts (Other Alternative)

The Other Alternative directly impacts 0.07 hectare (0.18 acre) of black-tailed prairie dog habitat within the US 85 Corridor, 0.03 hectare (0.074 acre) less than the Preferred Alternative. The additional impact under the Preferred Alternative occurs at Colony 6.

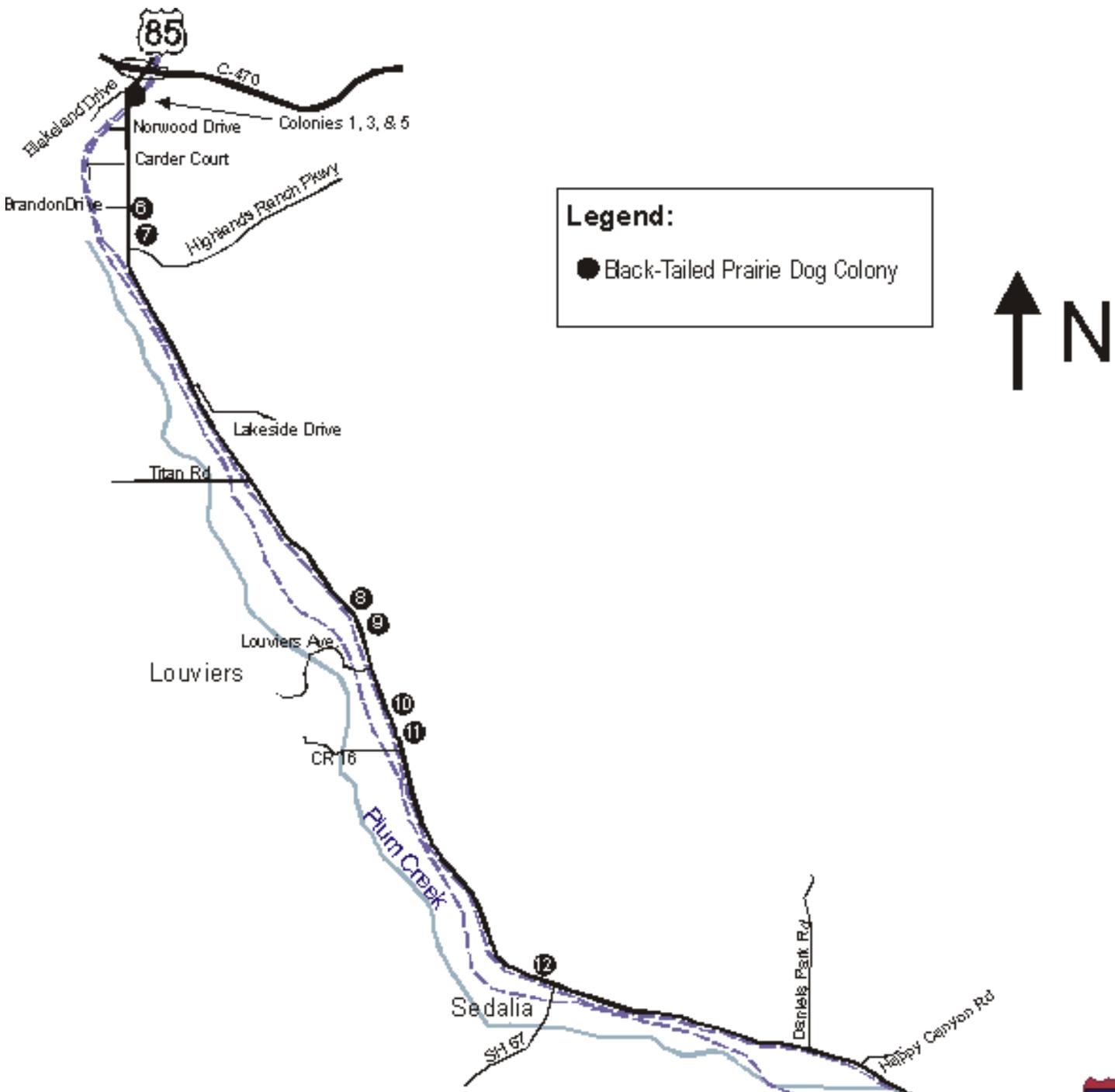
US 85 Corridor Threatened, Endangered, and Other Special-Status Species Impacts (Other Alternative)

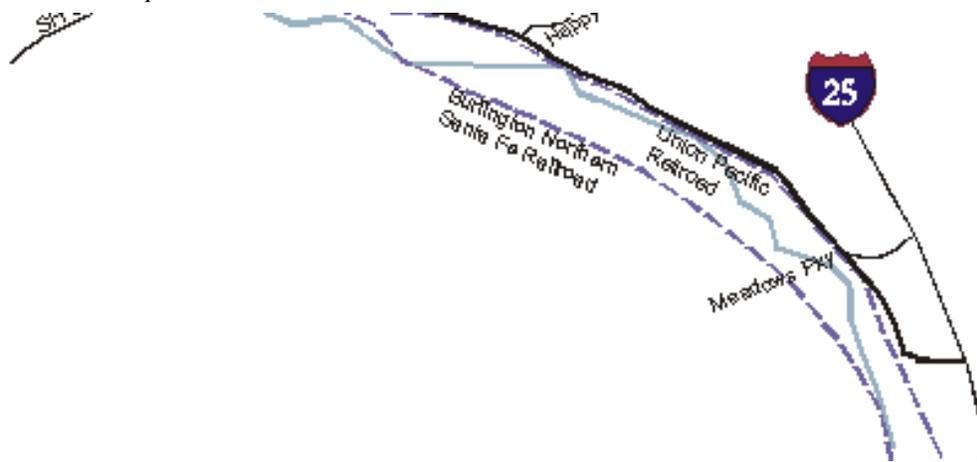
The Other Alternative directly impacts the same amount (2.47 hectares [6.1 acres]) of black-tailed prairie dog habitat along the US 85 Corridor as the Preferred Alternative.

Figure 5.6b
I-25 Corridor Preble's Meadow
Jumping Mouse Impacts

Figure 5.6c
I-25 Corridor Preble's Meadow
Jumping Mouse Impacts

Figure 5.6d
US 85 Corridor Black-Tailed Prairie Dog
Habitat Impacts





Threatened, Endangered, and Other Special-Status Species Secondary Impacts

Secondary impacts could occur to these and other special-status species, primarily as a result of:

- Reduction in black-tailed prairie dog colonies.
- Degradation of upland and aquatic/riparian habitat.
- Fragmentation of habitat.

Two special-status species have the potential to be secondarily impacted by loss of black-tailed prairie dogs and their habitat. Black-tailed prairie dogs are an important Front Range winter food source for the bald eagle. Burrowing owls require black-tailed prairie dog burrows for cover. Loss of black-tailed prairie dogs and their habitat due to the Preferred Alternatives are relatively small, and therefore, are not expected to cause substantial secondary impacts to ferruginous hawks, bald eagles, or burrowing owls.

The Preferred Alternative and Other Alternative result in an increase in impervious surface area, thereby increasing stormwater runoff, and potentially degrading aquatic and riparian habitats. Potential secondary impacts to the PMJM, northern leopard frog, northern redbelly dace, common shiner, brassy minnow, and Iowa darter may occur. Details on impervious surface increases for each alternative are described in Section 5.3.3.2, *Water Quality*.

Additionally, secondary impacts to PMJM populations may also occur due to increased traffic noise and vibration, and increased lighting from the project. Responses to these impacts are difficult to measure, but it is possible that mouse populations may react to changes in noise, lighting, or vibration by avoiding certain areas of habitat, moving nest site areas, moving hibernacula, changing breeding behavior, and increasing susceptibility to predation. The effects of noise on wildlife, including special-status species, will likely be negligible as most species within the APE habituate to noise levels projected for these corridors. The most serious extinction risk factor for small vertebrate populations is population isolation. However, because habitat impacts are on habitat edges and will not affect PMJM movement, the proposed actions for the Preferred Alternative does not result in additional isolation of PMJM populations in Castle Rock.

Threatened, Endangered, and Other Special-Status Species Cumulative Impacts

The cumulative effect to special-status species is a consideration for their listing under the ESA. Human activities exerting a cumulative impact on black-tailed prairie dog include rangeland conversion to farmland or urban development, poisoning, and shooting. In addition to these human factors, the introduction of the non-native sylvatic plague in 1908, which causes nearly 100 percent mortality to black-tailed prairie dog populations exposed to the bacteria, has had a widespread impact on the species throughout North America. Loss of black-tailed prairie dog habitat from planned or ongoing developments, combined with impacts from transportation projects, historic actions, and the threat of the sylvatic plague have likely contributed to the decline in this species, and the recent status elevation of black-tailed prairie dogs to warranted but precluded.

To better understand the Preferred Alternative's effect on wildlife communities it is necessary to assess cumulative impacts within the I-25 project corridor. The five Early-Action projects on I-25 will impact all five cover types. Grassland habitat has been or will be impacted by the Climbing Lanes Phase I project, Climbing Lanes Phase II project, and the Meadows/Founders Interchange project. Woodlands will be impacted by the Climbing Lanes Phase II project. Shrublands were impacted by the Climbing Lanes Phase I project. Riparian habitat will be impacted by the Wolfensberger Bridge and 5th Street Bridge projects; however, due to the presence of the Preble's Meadow Jumping Mouse in the these areas, full mitigation will offset impacts to the riparian communities in those areas. In addition, a small amount of riparian habitat along Happy Canyon Creek was impacted by the Climbing Lanes Phase I project. The urban cover type has been impacted by the Meadow/Founders Interchange project. Because of its urban nature, the I-25 Southeast Corridor transportation project is expected to impact grasses and landscaped areas within and adjacent to the ROW.

In addition to these other transportation projects, current and future development in the Chatfield Basin area may create barriers to wildlife movement, fragment habitat, cause habitat loss (including black-tailed prairie dog colonies, riparian and wetland areas) and, increase impervious surface runoff.

Four major residential development areas are planned for the I-25 Corridor and one along the US 85 Corridor. Combined with historic impacts, these current and foreseeable activities will further impact wildlife habitat. See Section 5.3.3.6, *Wildlife Impacts* for a more complete discussion of these impacts.

Land preservation in Douglas County is a beneficial cumulative impact to threatened, endangered, and other special-status species. From 1995 to 2000, the Douglas County Open Space and Natural Resource program has purchased over 6,680 hectares (16,500 acres). These areas, and other significant conservation areas in the vicinity of US 85, include Chatfield State Park, Highlands Ranch Conservation Area, Daniels Park, and Cherokee Ranch Foundation. Preservation of these areas may benefit black-tailed prairie dogs by reducing the total amount of cumulative habitat loss possible to them. Currently Douglas County is developing a Habitat Conservation Plan, which will aid land managers and planners in planning additional development and conservation areas within the county.

Habitat connectivity is a crucial component to maintaining the habitat quality and biological diversity of this resource. Decreasing permeability of the US 85 Corridor, coupled with loss and degradation of habitat associated with ongoing development, has the potential to undermine conservation area preservation efforts. Currently Douglas County is developing a Habitat Conservation Plan, which will aid land managers and planners in planning additional development and conservation areas within the county.

Human activities exerting a cumulative impact on PMJM habitat include residential and commercial development, highway construction, stream alteration, and grazing. Offsite impacts may also have caused

isolation of sites that rendered them unsuitable for PMJM. Residential developments proposed within the I-25 Corridor and US 85 Corridor (i.e., Meridian, Rampart Range, the Canyons, developments near Douglas Lane, and Highlands Ranch build-out) will likely not impact areas currently designated as mouse protection areas or potential mouse protection areas.

However, cumulative impacts to PMJM habitat are being caused by other transportation projects in Douglas County such as the Wolfensberger Road Interchange, the 5th Street Overpass, and the Wilcox Street Bridge replacement. All three projects occur in Castle Rock, along East Plum Creek. The combined cumulative impact to PMJM habitat is approximately 0.9 hectare (2.22 acres) as shown on Table 5.15. Each of these projects completed Biological Assessments that were submitted to the US Fish and Wildlife Service (USFWS) for review. Compensatory habitat mitigation, totaling approximately 1.35 hectares (3.34 acres), is required to minimize impacts. CDOT is currently proposing to install a series of check dams along East Plum Creek to enhance/restore existing PMJM habitat. If successful, this project could improve a significant amount of contiguous PMJM habitat.

Table 5.15
Impacts to Preble's Meadow Jumping Mouse Habitat in Castle Rock, Colorado

Project Name	Area of Impact hectares (acres)	Area of Mitigation hectares (acres)
Wolfensberger Road Interchange	0.21 (0.51)	0.31 (0.77)
5th Street Overpass	0.42 (1.04)	0.63 (1.56)
Wilcox Street Bridge	0.27 (0.67)	0.41 (1.01)
Total	0.9 (2.22)	1.35 (3.34)

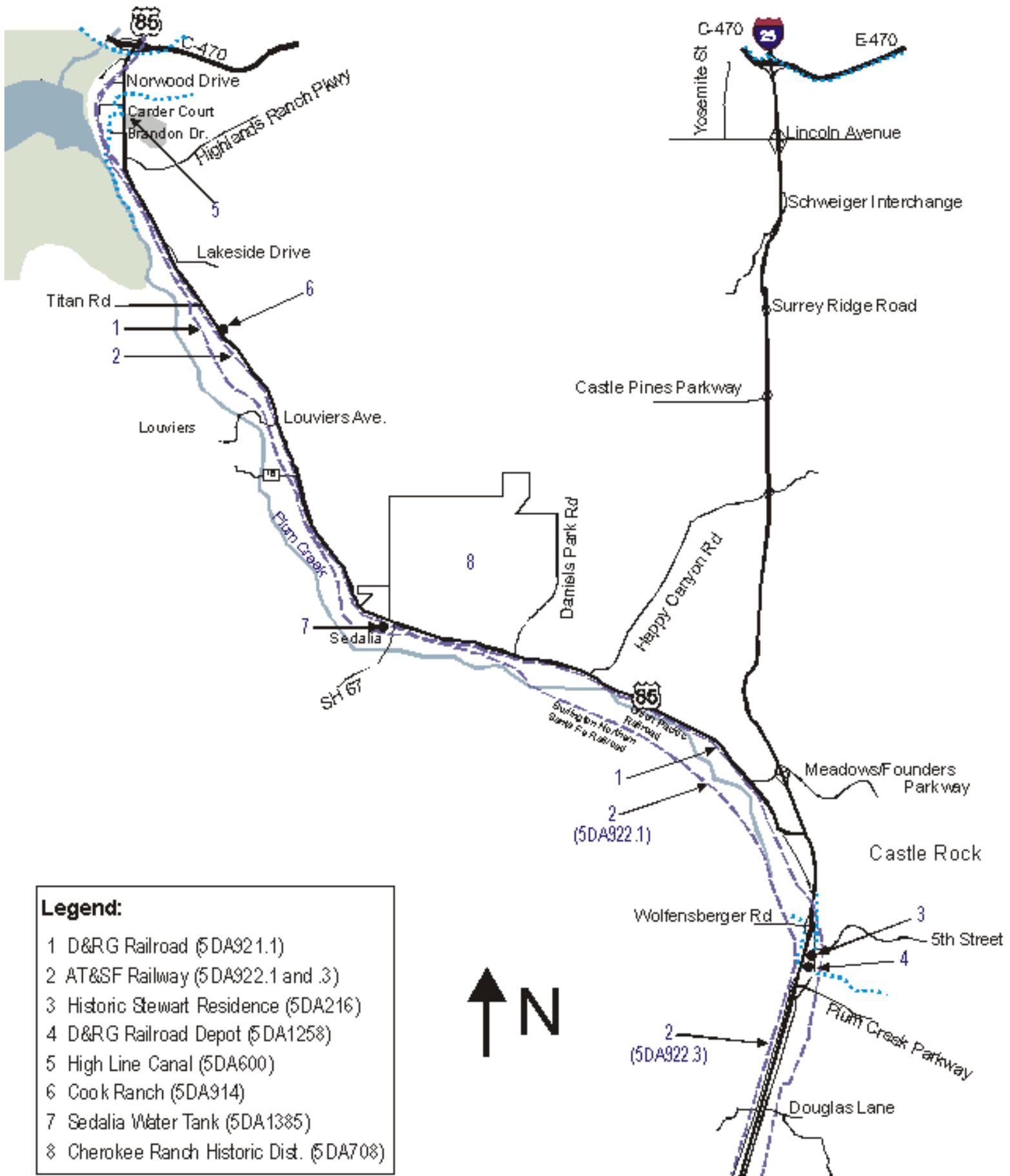
Other cumulative effects include the increase in impervious surface from the Preferred Alternative or Other Alternative combined with historic activities and those resulting from other previously described development projects. The cumulative effect of impervious surface in the corridors has the potential to degrade aquatic habitat quality in East Plum Creek and Plum Creek. For additional information on threatened and endangered species, see the *Special Status Plant and Animal Species Technical Report*, May 2000, amended November 2000, in the Technical Reports Volume of the *South I-25 Corridor and US 85 Corridor FEIS*.

5.3.3.10 Historical Resources Effects

Potential impacts to National Register of Historic Places (NRHP) eligible or listed historic architectural resources may occur as a result of structure demolition, highway construction and use (including both noise and ground-disturbing activities), or changes to a resource's setting. This section evaluates potential impacts to historic properties along the I-25 Corridor and the US 85 Corridor. The likelihood of impacts is evaluated based on the proximity of both temporary and permanent impact areas to significant (NRHP listed or eligible) historic properties. The total area of impact to each property is calculated, where appropriate, by overlaying proposed project area maps on parcel maps provided by Douglas County, as well as recent ROW survey mapping. Figure 5.7a shows all historic resources within the APE. Letters of conformance are included at the end of Chapter 6.0, *Section 4(f) Properties Evaluation*.

Figure 5.7a
Historic Resources within the I-25 Corridor and

US 85 Corridor Area of Potential Effect



Preferred Alternative and Other Alternative

This section considers potential effects to historic properties along the I-25 Corridor and the US 85 Corridor by the Preferred Alternative and the Other Alternative since the impacts are the same for both alternatives. Table 5.16, at the end of this section, summarizes effects to historic resources.

I-25 Corridor Historical Resource Impacts (Preferred Alternative and Other Alternative)

Denver and Rio Grande Railroad (5DA921.1)

Widening of I-25 impacts one historic resource (the D&RG Railroad). The D&RG Railroad, a NRHP eligible site, lies outside the APE from Douglas Lane until it crosses I-25 between Wolfensberger Road and the existing US 85/I-25 Interchange. Approximately 870 meters (2,850 feet) are impacted by road widening and reconstruction of the new railroad bridge where it crosses I-25. FHWA and the State Historic Preservation Officer (SHPO) have determined that this action will result in an adverse effect to the D&RG Railroad. The D&RG Railroad is protected under Section 4(f) of the Department of Transportation Act of 1966. For additional information, see Chapter 6.0, *Section 4(f) Evaluation*. Figure 5.7b shows the location of the potential impacts to the D&RG Railroad.

Denver and Rio Grande Railroad Depot (5DA216) and Stewart Residence (5DA1258)

The Preferred Alternative and Other Alternative do not affect the D&RG Railroad Depot or the Stewart Residence. The FHWA and the SHPO have determined that the proposed action results in no effect to these historic properties.

AT&SF Railway (5DA922.1 and 5DA922.3)

Impacts to Segment 1 of this resource are described in the next section, *US 85 Historical Resource Impacts*. The Preferred Alternative and Other Alternative do not impact Segment 3 of the AT&SF Railway. FHWA and SHPO have determined that this action results in no effect to Segment 3 of 5DA922.

US 85 Corridor Historical Resource Impacts (Preferred Alternative and Other Alternative)

High Line Canal (5DA600 and 5DA600.2)

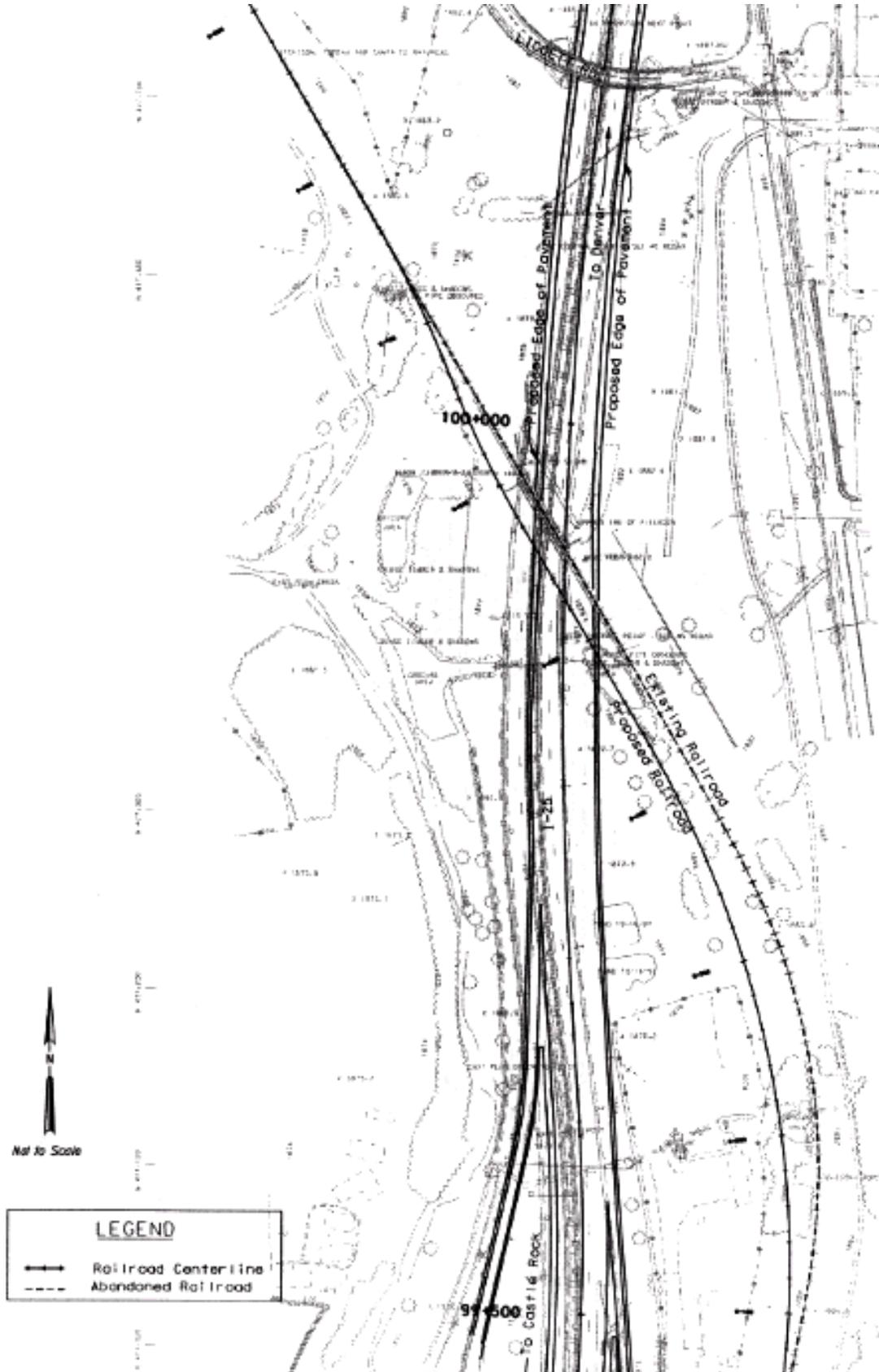
There is no impact to contributing segments of the High Line Canal by the Preferred Alternative and Other Alternative. FHWA and SHPO have determined that the proposed action results in no effect to the High Line Canal.

Cook Ranch (5DA914)

The Preferred Alternative and Other Alternative realign US 85 in the vicinity of Cook Ranch to avoid property take. The Preferred Alternative and Other Alternative do not impact the Cook Ranch

property. FHWA and SHPO have determined that the proposed action results in no effect to the Cook Ranch Property.

Figure 5.7b
Preferred Alternative and Other Alternative
Denver & Rio Grande Railroad (5DA921.1)





AT&SF Railroad (5DA922.1)

The Preferred Alternative and Other Alternative make improvements to the existing AT&SF Railroad crossing on SH 67. Improvements include widening and replacing the current road base, but the railroad crossing remains at-grade. The Preferred Alternative and the Other Alternative permanently impacts approximately 4.3 meters (14 feet) of the railroad including 2.7 meters (9 feet) west of SH 67 and 1.6 meters (6 feet) east of SH 67. The AT&SF Railroad is protected under Section 4(f) of the Department of Transportation Act of 1966. For additional information, see Chapter 6.0, *Section 4(f) Evaluation*. Figure 5.7c illustrates the impact to this resource. FHWA and SHPO have determined that this action results in no adverse effect to Segment 1 of the AT&SF Railway.

Sedalia Water Tank (5DA1385)

The Preferred Alternative and Other Alternative do not impact the Sedalia Water Tank. FHWA and SHPO have determined that this action results in no effect to the Sedalia Water Tank.

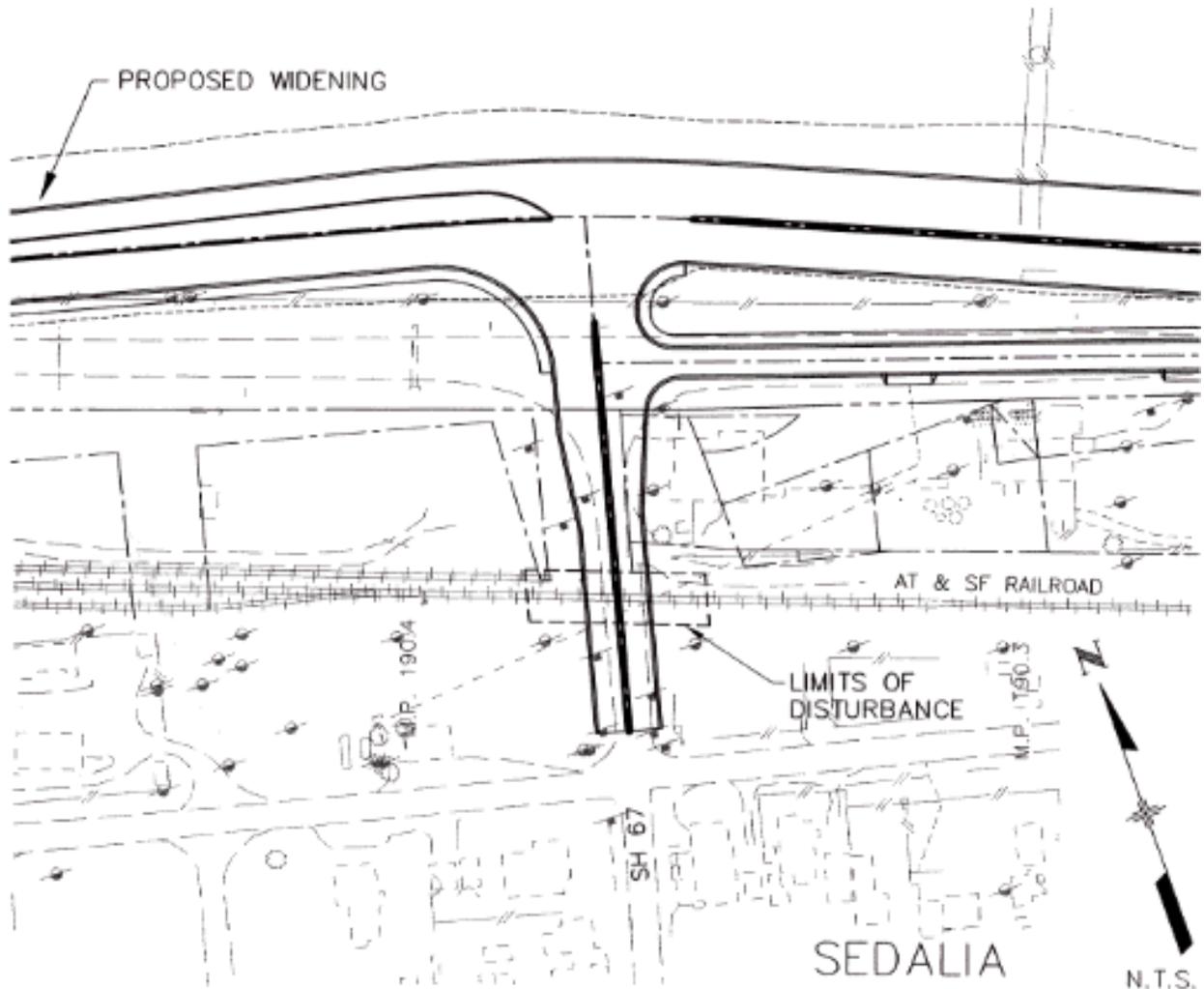
Cherokee Ranch Historic District (5DA708)

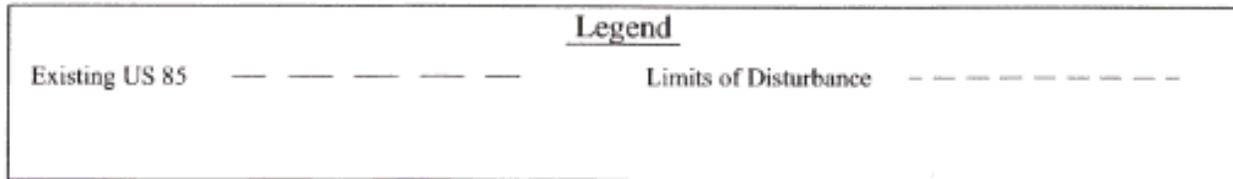
The Preferred Alternative and Other Alternative impact approximately 5.1 hectares (12.5 acres) of the Cherokee Ranch Historic District. In addition to the district, the Preferred Alternative and Other Alternative impact the original main gate and Rattlesnake Road. These were built between 1925 and 1926, and are both eligible as contributing elements of the historic district (Figure 5.7d, pages 1-4 at the end of this section). FHWA and SHPO have determined that this action results in an adverse effect on the historic gate and Rattlesnake Road. The Cherokee Ranch Historic District is protected under Section 4(f) of the Department of Transportation Act of 1966. For additional information, see Chapter 6.0, *Section 4(f) Evaluation*.

Table 5.16
Potential Historic Resource Impacts

Corridor	Historic Resource	No-Action Alternative	Preferred Alternative	Other Alternative
I-25	D&RG Railroad Depot (5DA216)	No effect	No effect	No effect
I-25	Stewart Residence (5DA1258)	No effect	No effect	No effect
I-25	D&RG Railroad (5DA921.1)	No effect	Adverse effect	Adverse effect
I-25	AT&SF Railway (5DA922) Segment 3	No effect	No effect	No effect
US 85	AT&SF Railway (5DA922) Segment 1	No effect	No adverse effect	No adverse effect
US 85	High Line Canal (5DA600)	No effect	No effect	No effect
US 85	Cook Ranch (5DA914)	No effect	No effect	No effect
US 85	Sedalia Water Tank (5DA1385)	No effect	No effect	No effect
US 85	Cherokee Ranch Historic District (5DA708)	No effect	Adverse effect	Adverse effect

Figure 5.7c
Preferred Alternative and Other Alternative
AT&SF Railway (5DA922.1) Potential Effects
US 85 at MP 190.4





[Figure 5.7d](#)
[Preferred Alternative and Other Alternative](#)
[Cherokee Ranch Historic District \(5DA708\)](#)
[US 85 Between MP 190.3 & MP 188.2](#)
[Page 1 of 4](#)

[Figure 5.7d \(cont.\)](#)
[Preferred Alternative and Other Alternative](#)
[Cherokee Ranch Historic District \(5DA708\)](#)
[US 85 Between MP 190.3 & MP 188.2](#)
[Page 2 of 4](#)

[Figure 5.7d \(cont.\)](#)
[Preferred Alternative and Other Alternative](#)
[Cherokee Ranch Historic District \(5DA708\)](#)
[US 85 Between MP 190.3 & MP 188.2](#)
[Page 3 of 4](#)

[Figure 5.7d \(cont.\)](#)
[Preferred Alternative and Other Alternative](#)
[Cherokee Ranch Historic District \(5DA708\)](#)
[US 85 Between MP 190.3 & MP 188.2](#)
[Page 4 of 4](#)

For additional information on historic resources, see the *Historic Resources Survey Interstate 25/SH 85 Douglas County, Colorado*; and *Historic Resources Technical Report*, May 2000, amended November 2000, and the *Review of the Sagnet (1998) Technical Report: Historic Resources*, March 1999, in the Technical Reports Volume of the *South I-25 Corridor and US 85 Corridor FEIS*.

5.3.3.11 Archaeological Resources Impacts

The Preferred Alternative and Other Alternative will not likely result in adverse effects to archaeological sites. This determination is contingent on site avoidance. Should avoidance not be possible, consultation will be reinitiated with the Native American Tribes and the SHPO. Site recommendations have been formulated in consultation with the SHPO. Archaeological letters of compliance are included in the Appendix of this document.

Preferred Alternative

I-25 Corridor Archaeological Resource Impacts (Preferred Alternative)

Three sites located in the I-25 Corridor may meet the criteria for listing on the NRHP. Test excavations to evaluate the nature and extent of buried cultural deposits have not been conducted in order to preserve the sites in place. If avoidance measures are not feasible test excavations will be required so that a comprehensive National Register significance evaluation can be completed. If any sites are determined eligible for the NRHP, a Memorandum of Agreement (MOA) will be developed and implemented prior to any construction in the site vicinity.

US 85 Corridor Archaeological Resource Impacts (Preferred Alternative)

One site on the US 85 Corridor may meet the criteria for listing on the NRHP. The site is located on the fringe of the project corridor and avoidance will therefore be possible.

Other Alternative

I-25 Corridor Archaeological Resource Impacts (Other Alternative)

The consequences of both alternatives are identical except for the following: one additional site evaluated may meet the criteria for NRHP listing. If this site cannot be avoided test excavations will be required so that a comprehensive National Register significance evaluation can be completed. If any sites are determined eligible for the NRHP, a Memorandum of Agreement (MOA) will be developed and implemented prior to any construction in the site vicinity.

US 85 Corridor Archaeological Resource Impacts (Other Alternative)

Consequences of the Other Alternative are the same as described in the Preferred Alternative.

Full documentation of archaeological resources is included in the following reports in the Technical Reports Volume of the *South I-25 Corridor and US 85 Corridor FEIS: Cultural Resources Management Report*, January 1999; *An Intensive Archaeological Resources Survey Along Interstate 25 and US Highway 85 In Arapahoe and Douglas Counties, Colorado*, December 1999; and *Survey Report Addendum for Colorado Department of Transportation Project IM 0252-317, Lincoln Avenue to South Castle Rock (I-25 Frontage Road and Interchange Development)*, April 2000.

5.3.3.12 Paleontological Resources Impacts

Periodic monitoring of highway construction will occur if additional fossil plant localities are uncovered. Plant remains weather quickly and can be discovered only in fresh excavations. Because of the moderate abundance of plant localities discovered during this and other surveys performed by CDOT and the Denver Museum of Nature and Science (DMNS), there is a strong possibility that new localities will be found as excavation creates new exposures that were previously obscured by vegetative cover. If any fossils are encountered during construction, a qualified paleontologist will be notified immediately to assess their scientific importance. Monitoring of areas (sites) identified herein will occur.

Preferred Alternative and Other Alternative

This section considers potential effects to paleontological resources along the I-25 Corridor and US 85 Corridor by the Preferred Alternative and Other Alternative since the impacts are the same for both alternatives.

I-25 Corridor Paleontological Resource Impacts (Preferred Alternative and Other Alternative)

One site, DMNS 1200, may be impacted by the Preferred Alternative and Other Alternative; however, previously unexcavated, but potentially fossiliferous areas immediately adjacent to the known areal extent of the locality will be impacted by the Preferred Alternative and Other Alternative. Five other sites were found along the I-25 Corridor: DMNS 916, 917, 2134, 2135, and "new" site. Mitigation measures implemented during construction of the CDOT I-25 Climbing Lanes Phase I project may preclude any future need to monitor or mitigate impacts to these five localities prior to or during construction.

Impacts to previously unrecorded, buried paleontological sites may result from the Preferred Alternative and Other Alternative along the I-25 Corridor.

US 85 Corridor Paleontological Resource Impacts (Preferred Alternative and Other Alternative)

One site, UCM 92164, will be impacted by the Preferred Alternative and Other Alternative. UCM 92164 has previously been partially excavated. Collections made to date are small and most likely do not include a statistically valid representative sample of the preserved paleoflora, so additional mitigation will be necessary.

Impacts to previously unrecorded, buried paleontological sites may result from the Preferred Alternative and Other Alternative along the US 85 Corridor.

Full documentation of paleontological resources is included in the following reports in the Technical Reports Volume of the South I-25 Corridor and US 85 Corridor FEIS: *CDOT Project #IM 0252-0317 Paleontological Survey of the I-25 Improvement Options Between Castle Pines and Lincoln Avenue and the Extended Burlington Northern Railroad Project Area*, April 2000; and *Paleontologic Resources Along the Southeast Interstate Corridor, Arapahoe and Douglas Counties, Colorado*, February 1999.

5.3.3.13 Prime and Unique Farmland Impacts

No Prime or Unique Farmlands exist within the APE. However, pockets of soils classified as High Potential Dry Cropland of Statewide Importance occur within both highway corridors and are impacted by the proposed alignments. Impacts to High Potential Dry Cropland occur mainly as direct impact to these areas. Secondary impacts to farmlands such as farmland fragmentation and land conversion from agriculture to urban uses are also of concern to the Natural Resources Conservation Service (NRCS). Additional farmland fragmentation is not of concern for this project due to the current existence of the transportation corridors. Cumulative impacts include the past, present, and planned future loss of farmlands of Statewide Importance. A Farmland Conversion Impact Rating (United States Department of Agriculture [USDA] Form AD-1006) has been completed and is included in the Appendix.

Preferred Alternative and Other Alternative

This section considers potential effects to statewide important farmlands along the I-25 Corridor and US 85 Corridor by the Preferred Alternative and Other Alternative since the impacts are the same for both alternatives.

I-25 Corridor Prime and Unique Farmland Impacts (Preferred Alternative and Other Alternative)

The Preferred Alternative and Other Alternative impact approximately 1.34 hectares (3.3 acres) to Bresser Sandy Loam soil (Table 5.17), which is considered High Potential Dry Cropland by the NRCS along the I-25 Corridor. The majority of the impacts would occur just north of the Meadows/Founders Interchange and between the existing I-25/US 85 junction and Wolfensberger Road in Castle Rock.

Conversion of these areas to non-agricultural uses will likely occur due to their proximity to urban areas such as the factory outlet stores and downtown Castle Rock. In fact, some of the areas containing High Potential Dry Cropland located just north of the Meadows/Founders Interchange have already been converted by the construction of the factory outlet stores.

US 85 Corridor Prime and Unique Farmland Impacts (Preferred Alternative and Other Alternative)

The Preferred Alternative and Other Alternative impact approximately 17.4 hectares (43 acres) to High Potential Dry Cropland soil types along the US 85 Corridor (Table 5.17). The majority of this impact occurs in the southern part of the US 85 transportation corridor, from approximately 2.7 kilometers (1.7 miles) north of Daniels Park Road, in the Cherokee Ranch area, south to the intersection of US 85 and Meadows Parkway. The areas in the vicinity of the Cherokee Ranch currently serve as rangeland for cattle grazing.

For additional information on prime and unique farmlands, see the *Farmland Technical Report*, May 2000, amended November 2000, in the Technical Reports Volume of the *South I-25 Corridor and US 85 Corridor FEIS*.

Table 5.17
Potential Statewide Important Farmlands Impacts
Hectares (Acres)

	Preferred Alternative	Other Alternative
I-25 Corridor	1.34 (3.3)	1.34 (3.3)
US 85 Corridor	17.4 (43)	17.4 (43)
Total	18.74 (46.3)	18.74 (46.3)

5.3.3.14 Noise Impacts

A noise study was conducted for the FEIS alternatives. The assessment identified noise-sensitive receptors based

on existing and predicted noise levels and was prepared in accordance with 23 CFR 772, Code of Federal Regulations. Because noise levels are sensitive to distances from roadways and relative elevations, additional noise assessments will be done during final design to determine exact locations and heights for constructed noise barriers. The purpose of this assessment is to compare the traffic noise impacts of the No-Action Alternative, the Preferred Alternative, and the Other Alternative; to estimate whether effective noise mitigation can be provided; to determine if the noise mitigation is reasonable and feasible; and to provide recommendations regarding noise mitigation.

This noise analysis focuses on the traffic noise generated by the vehicles traveling along I-25 and US 85. The Burlington Northern Santa Fe Railroad and the Union Pacific Railroad are located within the project area. Both railroads follow along the west side of US 85 to a point south of the existing I-25/US 85 Interchange. At this point, the Burlington Northern Santa Fe Railroad continues along the west side of I-25, and the Union Pacific Railroad crosses over to the east side of I-25 and continues south through Castle Rock. Noise levels were modeled at strategic locations to determine the effect the railroads have on the noise levels of sensitive receivers. At locations where the railroad alignment is close to the receiver, the noise generated by the train affects the noise levels more than the traffic noise. At locations where the railroad alignment is farther away from the receiver, the noise generated by the traffic affects the noise levels more than the noise generated by the train. The noise levels presented in this document do not take into account the noise generated from the trains. For more detailed information describing the effects that the trains have on noise levels, see the Appendix of the *South I-25 Corridor and US 85 Corridor FEIS Traffic Noise Analysis*, November 2000.

The Early-Action projects include the construction of noise barriers as a result of their individual noise analyses: *Climbing Lanes, Phase I Noise Technical Memorandum* and *Climbing Lanes, Phase II Noise Analysis, Douglas County, Colorado*, September 9, 1999. These barriers are included in the noise model as part of the FEIS noise analysis.

Existing noise levels are measured in the field during peak periods to determine the noise produced by traffic on I-25 and US 85, with noise from background sources being a minor component of the noise. Noise predictions are made with the STAMINA 2.0 (Colorado Emissions) computer model. This model is based on the FHWA method for predicting noise generated by constant speed highway traffic. Existing noise measurements are used to calibrate the noise model.

Inputs to the model include traffic volumes, vehicle speed, the distance between the receiver and road, and existing noise barriers. The receptor locations in the model are intended to represent individual or close groups of residences and businesses. Receivers were chosen for evaluation based on their proximity and likely impacts from the improvements associated with the Preferred Alternative and Other Alternative. Receivers more than 152 meters (500 feet) from the edge of the roadway cannot be adequately modeled or reasonably mitigated. Future noise was projected at the receivers for the alternatives based on future p.m. peak traffic conditions.

The FHWA's maximum noise level allowed is 67 dBA for residential areas and 72 dBA for commercial districts. CDOT defines noise 1 dBA below these levels (66 dBA for residential areas and 71 dBA for commercial districts) as approaching noise abatement criteria, and mitigation must be evaluated for these receivers. When determining noise impacts, CDOT also considers substantial noise increases. An increase of 10 dBA over existing conditions must be given abatement considerations. Proposed noise abatement can also be modeled with the STAMINA 2.0 program. Noise abatement was evaluated at locations where the noise levels approached the noise abatement criteria.

I-25 is being reconstructed from an asphalt surface to a concrete surface. Concrete road surfaces contain grooves called tinings, which change the pitch of the noise. The result is a different noise, which may be perceived as louder because it is a new sound (i.e., pitch). Tinings wear away after three to five years.

Noise Receivers

I-25 Corridor

Receivers along the I-25 Corridor modeled for noise impacts are shown on Figure 5.8a through Figure 5.8i, located at the end of this section. Noise barriers as a result of the Climbing Lanes Phase I Early-Action project have been constructed and are included in the existing noise model as well as all the future models. Noise barriers currently being included in the design of the Climbing Lanes Phase II Early-Action project are assumed to be in place and are included in the future models. A summary of noise levels at the receivers along the I-25 Corridor for the existing conditions, the No-Action Alternative, the Preferred Alternative, and the Other Alternative is shown on Table 5.18. Fifty-five receivers (representing 99 residences, 55 businesses, 6 hotels, 1 high school, and 1 historic building) were modeled along I-25. Some of the receivers represent a cluster of homes or a cluster of businesses (i.e., one receiver may represent 5 residences). Receivers with noise levels at or above the approaching noise abatement criteria (66 dBA for residences; 71 dBA for businesses) are represented by the shaded areas on Table 5.18. The number of receivers at or above 66 dBA is 2 for existing conditions, and 23 for the No-Action Alternative, 25 for the Preferred Alternative, and 25 for the Other Alternative.

Table 5.18
I-25 Corridor Existing (1998) and Future (2020) Noise Levels

Receiver	Number of Units Represented by the Receiver	Noise Activity Category Land-Use	Existing 1998 Noise Level	Future 2020 No-Action Alt. Noise Level	Future 2020 Pref./Build Alt. Noise Level	Noise Increase from Existing
A ¹	2	B: Residential	56.5	60.5	61.0	4.5
B ¹	3	B: Residential	56.5	60.5	61.0	4.5
C ¹	2	B: Residential	58.5	63.0	63.5	5.0
D ¹	2	B: Residential	59.0	63.5	64.0	5.0
E ¹	1	B: Residential	59.5	64.0	64.5	5.0
F ¹	1	B: Residential	60.0	64.0	65.0	5.0
G ¹	2	B: Residential	60.5	64.5	65.5	5.0
H ¹	4	B: Residential	59.0	63.0	64.0	5.0
I ¹	2	B: Residential	60.0	64.0	65.0	5.0
J ¹	5	B: Residential	58.5	63.0	63.5	5.0
K	1	B: Residential	64.5	69.5	70.0	5.5
L	1	B: Residential	63.0	67.5	68.0	5.0
M	2	B: Residential	62.0	66.5	67.0	5.0
N ²	3	B: Residential	65.0	65.0	64.5	-0.5
O ²	3	B: Residential	65.5	62.0	62.5	-3.0

P ²	3	B: Residential	62.5	64.0	64.5	2.0
Q ²	3	B: Residential	65.5	65.0	65.5	0.0
R ²	2	B: Residential	65.5	63.5	64.0	-1.5
S	3	B: Residential	64.0	68.5	69.0	5.0
T ³	3	B: Residential	61.0	65.0	65.5	4.5
U ³	6	B: Residential	61.5	64.5	65.0	3.5
V	1	B: Residential	63.5	67.0	67.5	4.0
W ²	3	B: Residential	63.0	60.0	60.5	-2.5
X ²	4	B: Residential	65.5	64.0	64.5	-1.0
Y	2	B: Residential	65.0	69.0	69.5	4.5
Z ²	2	B: Residential	65.0	64.5	65.0	0.0
AA	1	B: Residential	62.5	66.5	67.0	4.5
BB ⁴	5	B: Residential	58.0	63.0	63.5	5.5
CC ⁴	5	B: Residential	60.0	65.0	65.5	5.5
DD	1	C: Commercial	62.5	67.0	67.5	5.0
EE	2	B: Hotel	63.5	68.0	68.5	5.0
FF	22	C: Commercial	61.0	66.0	66.5	5.5
GG	4	B: Residential	65.0	68.5	69.0	4.0
HH	1	B: High School	62.0	65.5	66.5	4.5
II	8	C: Commercial	65.5	69.0	69.5	4.0
JJ	6	B: Residential	62.0	66.5	67.0	5.0
KK	2	B: Residential	65.0	69.5	70.0	5.0
LL	2	C: Commercial	70.0	74.5	75.0	5.0
MM	2	C: Commercial	69.5	74.0	74.5	5.0
NN	4	B: Residential/ Historic	68.0	72.5	73.0	5.0
OO	2	B: Residential	66.0	70.0	70.5	4.5
PP	3	B: Residential	65.0	69.5	70.0	5.0
QQ	2	C: Commercial	66.5	71.5	72.0	5.5
RR	1	B: Residential	65.0	70.0	70.5	5.5
SS	1	B: Residential	61.0	66.0	66.5	5.5
TT	1	B: Residential	60.0	65.0	65.5	5.5
UU	2	C: Commercial	66.0	70.0	70.5	4.5
VV	2	C: Commercial	65.0	70.0	70.5	5.5
WW	1	C: Commercial	68.0	72.5	73.0	5.0
XX	4	C: Commercial	69.0	73.5	74.0	5.0
YY	5	C: Commercial	62.0	66.0	66.5	4.5
ZZ	2	B: Hotel	63.5	68.0	69.0	5.5
AAA	2	C: Commercial	63.5	68.0	69.0	5.5
BBB	3	C: Commercial	65.5	70.5	71.0	5.5

CCC	1	B: Hotel	65.5	70.5	72.0	6.5
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Shaded Areas represent receivers exceeding the approaching noise abatement criteria (66 dBA for Residential and 71 dBA for Commercial).

¹Receivers are located behind existing Climbing Lanes, Phase I barriers

²Receivers are located behind future Climbing Lanes, Phase II barriers

³Receivers T and U are located behind existing berm in the Castle Pines Village area

⁴Receivers BB and CC are located behind existing 5 meter (16 feet) noise wall at Meadows/Founders Parkway

Several receivers (Table 5.18) have a lower future No-Action noise level than existing noise level due to the construction of noise barriers related to the Climbing Lanes Phase II project. The locations of the existing barriers and proposed Climbing Lanes Phase II barriers are shown on Figure 5.8d, Figure 5.8e, and Figure 5.8f.

US 85 Corridor

Receivers along the US 85 Corridor modeled for noise impacts are shown on Figure 5.8j through Figure 5.8q, located at the end of this section. A summary of noise levels at the receivers along the US 85 Corridor for existing conditions, the No-Action Alternative, the Preferred Alternative, and the Other Alternative is shown on Table 5.19. Thirty-eight receivers (representing 100 residences, 41 businesses, 1 motel, and 1 historic building) were modeled along US 85. Receivers with noise levels at or above the approaching noise abatement criteria (66 dBA for residential; 71 dBA for commercial) are represented on Table 5.19 in the shaded areas. The number of receivers at or above the approaching noise abatement criteria is four for existing conditions, nine for the No-Action Alternative, seven for the Preferred Alternative, and seven for the Other Alternative.

Three receivers, G, Q, and JJ, are proposed relocations as a result of the FEIS conceptual design. Four receivers, K, L, M, and N, are relocated as part of the Titan Road Early-Action project. Therefore, future noise levels are not shown for receivers G, K, L, M, N, Q, and JJ for the Preferred Alternative and Other Alternative. Although receiver Q is relocated, seven residences still remain in the area. These seven residences are represented by receiver Q_{new}.

No-Action Alternative

I-25 Corridor Noise Impacts (No-Action Alternative)

Twenty-three receivers (representing 32 residences, 6 hotels, 1 historic building, and 10 businesses) meet the approaching noise abatement criteria for the No-Action Alternative due to the increase in traffic volumes expected in 2020 as represented by the shaded areas on Table 5.18.

US 85 Corridor Noise Impacts (No-Action Alternative)

Nine receivers (representing 15 residences, 1 hotel, 1 historic building, and 3 businesses) meet the approaching noise abatement criteria for the No-Action Alternative due to the increase in traffic volumes expected in 2020 as represented by the shaded areas on Table 5.19.

Preferred Alternative and Other Alternative

This section considers potential impacts to noise receivers within the I-25 Corridor and US 85 Corridor by the Preferred Alternative and the Other Alternative since the impacts are the same for both alternatives.

I-25 Corridor Noise Impacts (Preferred Alternative and Other Alternative)

Twenty-five receivers are impacted as a result of the Preferred Alternative and Other Alternative. These 25 impacted receivers are comprised of the same 23 receivers impacted in the No-Action Alternative and 2 additional receivers, receivers HH and BBB (representing 1 high school and 3 businesses).

US 85 Corridor Noise Impacts (Preferred Alternative and Other Alternative)

Seven receivers (representing 15 residences) reach the approaching noise abatement criteria as a result of the Preferred Alternative.

Three receivers, G, Q, and JJ, are relocated as a result of the FEIS conceptual design. Four receivers, K, L, M, and N, are relocated as a result of the Titan Road Early-Action project. Therefore, future noise levels are not shown for receivers G, K, L, M, N, Q, and JJ.

As seen on Table 5.19, the noise levels for receivers W, X, Y, BB, and LL are lower or the same for the Preferred Alternative as compared to the No-Action Alternative. This decrease in noise levels is due to sections of US 85 that are realigned further away from the receivers. Receivers W, X, Y, and BB are located in Sedalia to the west of US 85. The reconstruction of the SH 67/US 85 Intersection realigns US 85 further away from receivers to the east and thus the noise levels decrease. Receiver LL represents a Section 4(f) property, the Cook Ranch property. US 85 is realigned away from Cook Ranch to the west to avoid impacts and therefore the noise level decreases.

Noise Mitigation

CDOT considers implementing noise abatement methods wherever the predicted future traffic noise levels meet or exceed the approaching noise abatement (66 dBA for residences; 71 dBA for commercial businesses) or where a substantial (10 dBA) increase in noise level occurs. Noise barriers are constructed only if they are feasible and reasonable to construct and are effective in sufficiently reducing the noise levels. Some factors used to determine feasibility and effectiveness include the following:

Table 5.19
US 85 Corridor Existing (1998) and Future (2020) Noise Levels

Receiver	Number of Units Represented by the Receiver	Noise Activity Category: Land-Use	Existing 1998 Noise Level	Future 2020 No-Action Alt. Noise Level	Future 2020 Pref./Build Alt. Noise Level	Noise Increase from Existing
A	11	C: Commercial	65.5	68.0	70.0	4.5
B	2	C: Commercial	62.5	64.5	66.0	3.5
C	7	C: Commercial	65.5	68.0	68.5	3.0

D	9	B: Residential	55.5	58.0	59.0	3.5
E	7	B: Residential	57.5	59.0	60.0	2.5
F	5	B: Residential	57.0	58.5	59.5	2.5
G	1	B: Residential	72.0	73.5	1	
H	4	B: Residential	60.5	62.0	63.0	2.5
I	4	B: Residential	59.5	61.5	62.5	3.0
J	1	B: Residential	64.0	66.0	66.5	2.5
K	1	B: Residential	68.5	70.0	2	
L	2	C: Commercial	66.5	67.5	2	
M	1	B: Residential	64.0	65.5	2	
N	2	B: Residential	64.0	65.5	2	
O	1	B: Residential	62.5	65.0	66.0	3.5
P	2	B: Residential	64.5	67.0	68.5	4.0
Q	9	B: Residential	68.5	71.0	3	
R	2	B: Residential	63.0	65.5	66.0	3.0
S	2	B: Residential	58.0	61.0	62.0	4.0
T	1	B: Residential	65.0	68.5	69.0	4.0
U	1	C: Commercial	55.0	58.0	59.0	4.0
V	3	B: Residential	57.0	60.0	61.0	4.0
W	2	B: Residential	56.5	58.0	57.5	1.0
X	2	B: Residential	58.0	59.5	59.5	1.5
Y	6	B: Residential	57.5	60.5	60.5	3.0
Z	3	C: Commercial	57.0	60.0	60.5	3.5
AA	8	B: Residential	57.0	58.5	58.0	1.0
BB	3	C: Commercial	69.5	71.0	65.0	-4.5
CC	1	B: Residential	68.0	69.5	70.0	2.0
DD	3	B: Residential	59.5	61.0	62.0	2.5
EE	1	B: Residential	62.0	63.0	64.5	2.5
FF	1	B: Residential	58.0	59.0	60.0	2.0
GG	1	C: Commercial	62.5	66.5	67.0	4.5
HH	22	B: Residential	54.5	58.5	60.0	5.5
II	3	C: Commercial	63.0	65.5	66.0	3.0
JJ	4	C: Commercial	68.0	70.5	1	
KK	4	C: Commercial	59.5	62.5	63.0	3.5
LL	1	B: Historic	65.0	67.5	65.0	0.0
Q _{new}	7	B: Residential	63.0	65.5	67.0	4.0

Shaded Areas represent receivers exceeding the approaching noise abatement criteria (66 dBA for Residential and 71 dBA for Commercial).

¹Receiver is being relocated as a result of the FEIS conceptual design

² Receiver is being relocated as part of the Titan Road Early-Action project

³Receiver is being relocated as a result of the FEIS conceptual design, receivers in the area are now represented

by Q_{new}

- Noise barriers should have a continuous length with no breaks or gaps for driveways or walkways.
- Effective noise mitigation should create an insertion loss (the difference in noise levels after mitigation and before mitigation) of 5 dBA or greater.
- An insertion loss in the range of 3 dBA to 5 dBA is considered marginally effective.
- An insertion loss in the range of 0 dBA to 3 dBA is considered not effective; mitigation within these areas is not likely to occur.
- Wherever noise abatement is warranted and determined feasible and reasonable, the property owner must be willing to accept the noise abatement measure.
- Economic analysis of the barrier should show cost effectiveness. The benefit of a barrier is considered to be \$3,000 per receiver per decibel reduction. The cost of a barrier should not exceed the benefit to be considered reasonable. A cost of \$3,500 per receiver per decibel reduction is considered marginally reasonable and additional local factors should be considered.

Federal regulations allow for construction of barriers even when receivers achieve less than the desirable 5 dBA insertion-loss goal. This is an important consideration when determining the average insertion loss for a neighborhood. These are special circumstances that require extensive input from the affected community and coordination with CDOT and FHWA. Other reasons to reduce the height or elimination of noise abatement measures would be to avoid enclosing a residence or business in an overbearing manner or to limit the encroachment of long shadows on driving lanes.

Other than noise level reduction (as discussed in this FEIS), other factors are taken into consideration upon recommending noise barriers. These factors include cost, viewshed, community value, constructability, and land use. These factors will be part of the noise analysis conducted during design.

Noise mitigation is only effective for homes and businesses within 150 meters (500 feet) from the edge of the roadway. Varying topography is another factor that can cause mitigation to be ineffective. The rolling terrain and sharp topography changes along the I-25 Corridor between Station 107+500 and Station 105+000 make it difficult to mitigate noise in certain locations. At locations where the receiver is located at a higher elevation than the roadway, the barrier is typically more effective next to the receiver. At locations where the receiver is located at a lower elevation than the roadway, the barrier is typically more effective next to the highway. Mitigation measures were modeled along the ROW line for both roadways.

Noise barriers were analyzed for the receivers along I-25 and US 85 that reach or exceed the approaching noise abatement criteria (66 dBA for residences; 71 dBA for commercial businesses). Twenty-five receivers (representing 32 residences, 13 businesses, 6 hotels, 1 historic building, and 1 high school) along I-25 and 7 receivers (representing 15 residences) along US 85 exceed the approaching noise abatement criteria with the construction of the Preferred Alternative and Other Alternative.

Second row receivers are included in the evaluation of mitigation. Second row receivers experience a noise reduction due to protection of the first row receivers. When evaluating mitigation, each second row receiver is assumed to experience a decrease in noise of 3 dBA.

Earthen berms are recommended as the best type of noise barrier to build because of the low construction and maintenance costs and to maintain the aesthetic landscape. Limited CDOT ROW along the I-25 Corridor and US 85 Corridor prevents the construction of berms for the majority of the barriers. Barriers 1, 3, 4, 5, 6, and 13 along the I-25 Corridor are the only barriers in which berms would fit within the CDOT ROW. No berms fit within the CDOT ROW along the US 85 Corridor. The noise barriers were modeled to determine if appropriate mitigation is feasible. Once a barrier is determined feasible, other considerations such as costs, viewsheds, land use, community values, and constructability need to be assessed before any mitigation is approved. The construction of any type of noise mitigation in the project area has not been determined and will not be determined until final design. Noise barrier recommendations based on a cost/benefit analysis are provided at the end of this section.

Preferred Alternative and Other Alternative Noise Mitigation

I-25 Corridor (Preferred Alternative and Other Alternative)

Noise barriers in the form of noise walls and earthen berms were analyzed for the 25 receivers that exceed the approaching noise abatement criteria (Receivers K, L, M, S, V, Y, AA, EE, GG, HH, JJ, KK, LL, MM, NN, OO, PP, QQ, RR, SS, WW, XX, ZZ, BBB, and CCC). Table 5.20 summarizes barrier effectiveness from the proposed mitigation along I-25. The shaded areas on Table 5.20 show the receivers that have effective barriers in terms of noise level reduction. The effective barriers are proposed mitigation and are in no way committed to being constructed until further analysis can be completed with the final roadway design.

With the mitigation measures implemented, the noise levels at all receivers (except receiver JJ) are under the noise abatement criteria. The noise barriers, however, are effective only if the insertion loss (reduction of noise level with the construction of a barrier) is 5 dBA or greater. Barriers with an insertion loss between 3 dBA and 4.9 dBA are considered marginally effective and other factors such as community values, safety, and cost should be considered. Barriers producing an insertion loss below 3 dBA are not considered effective in noise level reduction. Barriers 1, 3, 4, 5, 6, 7, 8, 11, 12, 13, 14, 15, 16, 17, and 18 are effective in noise reduction; Barriers 2 and 9 are marginally effective in noise reduction; and Barrier 10 is not effective in noise reduction as seen on Table 5.20. The width of CDOT ROW in the vicinity of B1, B3, B4, B5, B6, and B13 allows for these barriers to be constructed as earthen berms. Berms typically provide an extra 3 dBA reduction in noise levels as compared to noise walls.

Receivers W and X are located near B5 and although these receivers are not impacted receivers, they experience noise level reductions of 2 dBA and 5 dBA, respectively. Receiver UU is located behind B11 due to its proximity to the impacted receiver OO, and although receiver UU is not an impacted receiver, it does experience a noise level reduction of 6.0 dBA. Receiver AAA is located behind B17 due to its proximity to the impacted receiver ZZ, and although AAA is not an impacted receiver, it experiences a noise level reduction of 5 dBA.

The approximate locations, heights, and lengths of the proposed noise barriers are shown on Table 5.21.

Figure 5.8a through Figure 5.8i show the potential noise barrier locations along the I-25 Corridor.

Table 5.20
Effectiveness of Mitigation Measures along the I-25 Corridor

Barrier	Receiver	Noise Activity Category: Land-Use	Existing 1998 Noise Level	Future 2020 Preferred Alt. Noise Level	Future 2020 Mitigated Noise Level	Insertion Loss
B1	K	B: Residential	64.5	70.0	64.5	5.5
B1	L	B: Residential	63.0	68.0	64.0	4.0
B2	M	B: Residential	62.0	67.0	63.5	3.5
B3	S	B: Residential	64.0	69.0	62.5	6.5
B4	V	B: Residential	63.5	67.5	62.5	5.0
B5	Y	B: Residential	65.0	69.5	61.0	8.5
B6	AA	B: Residential	62.5	67.0	61.5	5.5
B7	EE	B: Hotel	63.5	68.5	62.0	6.5
B8	GG	B: Residential	65.0	69.0	64.0	5.0
B9	HH	B: High School	62.0	66.5	62.5	4.0
B10	JJ	B: Residential	62.0	67.0	66.0	1.0
B11	KK	B: Residential	65.0	70.0	65.5	4.5
B11	LL	C: Commercial	70.0	75.0	61.5	13.5
B11	MM	C: Commercial	69.5	74.5	66.5	8.0
B11	XX	C: Commercial	69.0	74.0	62.5	11.5
B12	NN	B: Residential/ Histori	68.0	73.0	65.5	7.5
B12	OO	B: Residential	66.0	70.5	64.5	6.0
B12	UU	C: Commercial	66.0	70.5	64.5	6.0
B13	PP	B: Residential	65.0	70.0	63.0	7.0
B14	QQ	C: Commercial	66.5	72.0	65.5	6.5
B15	RR	B: Residential	65.0	70.5	64.5	6.0
B15	SS	B: Residential	61.0	66.5	63.0	3.5
B16	WW	C: Commercial	68.0	73.0	68.0	5.0
B17	ZZ	B: Hotel	63.5	69.0	64.0	5.0
B17	AAA	C: Commercial	63.5	69.0	64.0	5.0
B18	BBB	C: Commercial	65.5	71.0	65.0	6.0
B18	CCC	B: Hotel	65.5	72.0	65.5	6.5

Highlighted barriers are considered effective in noise level reduction.

Table 5.21
Proposed Noise Barriers along the I-25 Corridor

Barrier Feature						
Barrier #	Barrier Type	Approximate Height	Approximate Length	Approx. Station #s	Receivers Covered	Receivers Represented
Barrier 1	Earthen Berm	4.2 m (14 ft.)	735 m (2,411 ft)	106+965 to 107+430	K and L	2 residences
Barrier 2	Earthen Berm	4.2 m (14 ft.)	110 m (361 ft)	107+280 to 107+390	M	2 residences
Barrier 3	Earthen Berm	4.2 m (14 ft.)	185 m (607 ft)	105+860 to 106+050	S	3 residences
Barrier 4	Earthen Berm	4.2 m (14 ft.)	60 m (197 ft)	104+97 to 105+100	V	1 residence
Barrier 5	Earthen Berm	4.2 m (14 ft.)	305 m (1,001 ft)	104+520 to 104+830	Y	2 residences
Barrier 6	Earthen Berm	5.0 m (16.5 ft.)	340 m (1,115 ft)	104+000 to 104+345	AA	1 residence
Barrier 7	Masonry Wall	4.2 m (14 ft.)	100 m (328 ft)	102+990 to 103+090	EE	2 hotels
Barrier 8	Masonry Wall	6.0 m (19 ft.)	200 m (656 ft)	100+700 to 100+900	GG	4 residences
Barrier 9	Masonry Wall	6.0 m (19 ft.)	315 m (1,033 ft)	100+340 to 100+650	HH	1 high school
Barrier 10	Masonry Wall	6.0 m (19 ft.)	295 m (968 ft)	99+100 to 98+800	JJ	6 residences
Barrier 11	Masonry Wall	6.0 m (19 ft.)	580 m (1,903 ft)	98+700 to 99+300	KK, LL, MM, and XX	1 residence, 1 hotel, 7 businesses, and 7 second row
Barrier 12	Masonry Wall	5.0 m (16.5 ft.)	280 m (919 ft)	98+400 to 98+680	NN, OO, and UU	5 residences, 2 businesses, 1 historic building, and 11 second row
Barrier 13	Earthen Berm	5.0 m (16.5 ft.)	310 m (1,017 ft)	98+190 to 98+500	PP	3 residences
Barrier 14	Masonry Wall	4.2 m (14 ft.)	225 m (738 ft)	96+200 to 96+450	QQ	2 businesses
Barrier 15	Masonry Wall	4.2 m (14 ft.)	390 m (1,280 ft)	95+250 to 95+650	RR and SS	2 residences
Barrier 16	Masonry Wall	4.2 m (14 ft.)	130 m (427 ft)	97+350 to 97+500	WW	1 business and 1 second row
Barrier 17	Masonry Wall	6.0 m (19 ft.)	245 m (804 ft)	102+500 to 102+750	ZZ and AAA	2 hotels and 2 businesses
Barrier 18	Masonry Wall	4.2 m (14 ft.)	600 m (1,969 ft)	117+400 to 118+000	BBB and CCC	3 businesses and 1 hotel

The cost effectiveness of the barriers was analyzed. In consideration of each potential noise barrier, the cost for mitigation is considered reasonable if it does not exceed \$3,000 per receiver per decibel reduction. This value is considered the benefit of the barrier. Mitigation is considered marginally cost effective if it costs between \$3,000 and \$3,500 per receiver per decibel reduction. Barriers that reduce the noise level by 3 dBA or more (i.e. effective and marginally effective barriers) are considered in the cost/benefit analysis. The 18 barriers shown on Table 5.21 have been modeled and all barriers except Barrier 10, are at least marginally effective in noise reduction. These barriers are considered for the cost/benefit analysis.

Table 5.22 shows the 15 barriers that were analyzed for cost effectiveness. The costs do not include ROW costs.

As seen on Table 5.22, the only marginally cost effective barrier is Barrier 3. The costs of the noise barriers used for this analysis were obtained from CDOT data books and the Climbing Lanes Phase I project which just completed the construction of noise barriers.

Table 5.22
Cost Effectiveness of Noise Barriers for the I-25 Corridor

Barrier	Type of Barrier	Height	Length	Total Insertion Loss	Unit Cost per sq m	Barrier Cost	Cost per Decibel Reduction
1	Earthen Berm	4.3 m (14 ft)	735 m (2,411 ft)	9.5	\$76	\$235,935	\$24,835
2	Earthen Berm	4.3 m (14 ft)	110 m (361 ft)	7.0	\$76	\$35,950	\$5,136
3	Earthen Berm	4.3 m (14 ft)	185 m (607 ft)	19.5	\$76	\$59,385	\$3,045
4	Earthen Berm	4.3 m (14 ft)	60 m (197 ft)	5.0	\$76	\$19,260	\$3,852
5	Earthen Berm	4.3 m (14 ft)	305 m (1,001 ft)	17.0	\$76	\$97,905	\$5,759
6	Earthen Berm	5.0 m (16.4 ft)	340 m (1,115 ft)	5.5	\$110	\$187,000	\$34,000
7	Masonry Wall	4.3 m (14 ft)	100 m (328 ft)	13.0	\$267	\$112,140	\$8,626
8	Masonry Wall	6.0 m (19 ft)	200 m (656 ft)	20.0	\$267	\$320,400	\$16,020
9	Masonry Wall	6.0 m (19 ft)	315 m (1,033 ft)	4.0	\$267	\$504,630	\$126,158
11	Masonry Wall	6.0 m (19 ft)	580 m (1,903)	135.0	\$267	\$929,160	\$6,883
12	Masonry Wall	5.0 m (16.4 ft)	280 m (919 ft)	87.0	\$267	\$373,800	\$4,297
13	Earthen Berm	5.0 m (16.4 ft)	310 m (1,017 ft)	21.0	\$110	\$170,500	\$8,119
14	Masonry Wall	4.3 m (14 ft)	225 m (738 ft)	13.0	\$267	\$252,315	\$19,409
15	Masonry Wall	4.3 m (14 ft)	390 m (1,280 ft)	9.5	\$267	\$437,346	\$46,036
16	Masonry Wall	4.3 m (14 ft)	130 m (427 ft)	8.0	\$267	\$145,782	\$18,223
17	Masonry Wall	6.0 m (19 ft)	245 m (804 ft)	20.0	\$267	\$392,490	\$19,625
18	Masonry Wall	4.3 m (14 ft)	600 m (1,969 ft)	24.5	\$267	\$672,840	\$27,463

Highlighted barriers are considered cost/beneficial

ROW costs are not included

US 85 Corridor (Preferred Alternative and Other Alternative)

Noise barriers in the form of noise walls were analyzed for the seven receivers that exceed the approaching noise abatement criteria (Receivers J, O, P, Qnew, R, T, and CC). The large amount of land that berms require prevents the construction of berms along the US 85 Corridor due to limited CDOT ROW. Table 5.23 summarizes barrier effectiveness from the proposed mitigation along US 85. The shaded areas on Table 5.23 show the receivers that have effective barriers in terms of noise level reduction. The effective barriers are proposed mitigation and are in no way committed to being constructed until further analysis can be completed with the final roadway design.

Table 5.23
Effectiveness of Mitigation Measures along the US 85 Corridor

Barrier	Receiver	Noise Activity Category: Land-Use	Existing Noise Level	Future 2020 Preferred Alt. Noise Level	Future 2020 Mitigated Noise Level	Insertion Loss
B1	J	B: Residential	64.0	66.5	60.0	6.5
B2	O	B: Residential	62.5	66.0	61.0	5.0
B3	P	B: Residential	64.5	68.5	63.0	5.5
B4	R	B: Residential	63.0	66.0	63.0	3.0
B5	T	B: Residential	65.0	69.0	63.5	5.5
B6	CC	B: Residential	68.0	70.0	65.0	5.0
B7	Qnew	B: Residential	63.0	67.0	62.0	5.0

Highlighted barriers are considered effective in noise reduction

All barriers, except B4, are effective barriers because the insertion loss is 5 dBA or greater. B4 is marginally effective in noise reduction. The approximate locations, heights, and lengths of the noise barriers are shown on Table 5.24. Figure 5.8j through Figure 5.8q (located at the end of this section) show the potential noise barrier locations along the US 85 Corridor.

Table 5.24
Proposed Noise Barriers along the US 85 Corridor

Barrier #	Barrier Type	Barrier Feature			Receivers Covered	Receivers Represented
		Approximate Height	Approximate Length	Approximate Milepost		
Barrier 1	Masonry Wall	3.7 m (12 ft)	111 m (365 ft)	196.9	J	1 residence
Barrier 2	Masonry Wall	4.2 m (14 ft)	236 m (775 ft)	195.9	O	1 residence
Barrier 3	Masonry Wall	2.4 m (8 ft)	238 m (780 ft)	195.6	P	2 residences & 1 second row
Barrier 4	Masonry Wall	4.2 m (14 ft)	105 m (345 ft)	193.9	R	2 residences & 1 second row
Barrier 5	Masonry Wall	3.0 m (10 ft)	114 m (375 ft)	191.2	T	1 residence
Barrier 6	Masonry Wall	3.0 m (10 ft)	155 m (510 ft)	189.7	CC	1 residence
Barrier 7	Masonry Wall	4.2 m (14 ft)	279 m (915 ft)	194.1	Qnew	7 residences

The freight railroad tracks of the Burlington Northern Santa Fe Railroad and Union Pacific Railroad are located between US 85 and receivers J and R. The traffic noise at these two locations can be mitigated effectively at receiver J and marginally effectively at receiver R. However, the proposed barriers (B1 and B4) will not reduce the noise from the trains at these locations.

The cost effectiveness of the barriers was analyzed. In consideration of each potential noise barrier, the cost for mitigation is considered reasonable if it does not exceed \$3,000 per receiver per decibel reduction. This value is considered the benefit of the barrier. Mitigation is considered marginally reasonable if it costs between \$3,000 and \$3,500 per receiver per decibel reduction. Barriers that reduce the noise level by 3 dBA or more (i.e. effective and marginally effective barriers) are considered in the cost/benefit analysis. The seven barriers shown on Table 5.24 have been modeled and all barriers are at least marginally effective in noise reduction. All seven noise barriers are considered for the cost/benefit analysis.

Table 5.25 shows the seven barriers that were analyzed for cost effectiveness. The costs do not include

ROW costs. As shown on Table 5.25, none of the barriers are cost effective. The costs of the noise barriers used for this analysis were obtained from the Climbing Lanes Phase I project which just completed the construction of noise barriers.

Table 5.25
Cost Effectiveness of Noise Barriers for the US 85 Corridor

Barrier	Type of Barrier	Height	Length	Total Insertion Loss	Unit Cost per sq m	Barrier Cost	Cost per Decibel Reduction
1	Masonry Wall	3.7 m (12 ft)	111 m (365 ft)	6.5	\$267	\$109,657	\$16,870
2	Masonry Wall	4.2 m (14 ft)	235 m (775 ft)	5.0	\$267	\$263,529	\$52,706
3	Masonry Wall	2.4 m (8 ft)	238 m (780 ft)	17.0	\$267	\$152,510	\$8,971
4	Masonry Wall	4.2 m (14 ft)	105 m (345 ft)	9.0	\$267	\$117,747	\$13,083
5	Masonry Wall	3.0 m (10 ft)	114 m (375 ft)	5.5	\$267	\$91,314	\$16,603
6	Masonry Wall	3.0 m (10 ft)	155 m (510 ft)	5.0	\$267	\$124,155	\$24,831
7	Masonry Wall	4.2 m (14 ft)	279 m (915 ft)	35.0	\$267	\$312,871	\$8,939

ROW costs are not included

Summary of Results

The results of the traffic noise impacts analysis conducted for the South I-25 Corridor and US 85 Corridor FEIS project include:

Preferred Alternative and Other Alternative I-25 Corridor Noise Analysis Summary

- Noise barriers discussed in this FEIS are currently proposed but are not certain future actions. These barriers will be re-evaluated at the time of final design. Other elements than noise level reductions will be considered in the determination of the construction of noise barriers including viewshed, land use, sight-distance, wildlife habitat, the location of historic buildings, and topography of the area.
- Twenty-three receivers will have noise levels exceeding the approaching noise abatement criteria (66 dBA for residences and 71 dBA for businesses) in year 2020 if noise barriers are not constructed.
- Barriers 1, 3, 4, 5, 6, and 13 are effective with regard to noise reduction. The barriers are in the form of earthen berms.
- Barrier 2 is marginally effective with regard to noise reduction but is not considered reasonable with regard to cost. This barrier is in the form of an earthen berm.
- Barriers 7, 8, 11, 12, 14, 15, 16, 17, and 18 are effective with regard to noise reduction but are not considered reasonable with regard to costs. The barriers are in the form of masonry walls.
- Barrier 9 is marginally effective with regard to noise reduction, but is not considered reasonable with regard to cost. This barrier is in the form of a masonry wall.
- Barrier 10 is not effective with regard to noise reduction and was not evaluated for cost/benefit.

- Barrier 3 is effective with regard to noise reduction and is considered reasonable with regard to cost. This barrier is the only recommended barrier along the I-25 Corridor.

Preferred Alternative and Other Alternative US 85 Corridor Noise Analysis Summary

- Noise barriers discussed in this FEIS are currently proposed but are not certain future actions. These barriers will be re-evaluated at the time of final design. Other elements that will be considered in the determination of the construction of noise barriers include viewshed, land use, sight-distance, wildlife habitat, and the location of historic buildings.
- Seven receivers will have noise levels exceeding the approaching noise abatement criteria (66 dBA for residences and 71 dBA for businesses) in year 2020 if noise barriers are not constructed.
- Barrier 1 is effective with respect to traffic noise reduction; however, it will not mitigate noise generated by trains. Barrier 1 is not considered reasonable with regard to cost. This barrier is in the form of a masonry wall.
- Barriers 2, 3, 5, 6, and 7 are effective with regard to noise reduction, but are not considered reasonable with regard to costs. These barriers are in the form of masonry walls.
- Barrier 4 is marginally effective with regard to traffic noise reduction and will not reduce train noise. Barrier 4 is not considered reasonable with regard to costs. This barrier is in the form of a masonry wall.
- No barriers achieve effective noise level reduction and reasonable cost. No barriers are recommended along the US 85 Corridor.

Since the horizontal and vertical alignment may shift during final design, another noise analysis will be completed at that time to determine if mitigation recommendations require changes.

Full documentation of noise is included in the *South I-25 Corridor and US 85 Corridor FEIS Traffic Noise Analysis*, November 2000.

[Figure 5.8a](#)

[I-25 Corridor Noise Receiver and Potential Barrier Locations](#)

[Figure 5.8b](#)

[I-25 Corridor Noise Receiver and Potential Barrier Locations](#)

[Figure 5.8c](#)

[I-25 Corridor Noise Receiver and Potential Barrier Locations](#)

[Figure 5.8d](#)

[I-25 Corridor Noise Receiver and Potential Barrier Locations](#)

[Figure 5.8e](#)

[I-25 Corridor Noise Receiver and Potential Barrier Locations](#)

[Figure 5.8f](#)

[I-25 Corridor Noise Receiver and Potential Barrier Locations](#)

[Figure 5.8g](#)

[I-25 Corridor Noise Receiver and Potential Barrier Locations](#)

[Figure 5.8h](#)

[I-25 Corridor Noise Receiver and Potential Barrier Locations](#)

[Figure 5.8i](#)

[I-25 Corridor Noise Receiver and Potential Barrier Locations](#)

[Figure 5.8j](#)

[US 85 Corridor Noise Receiver and Potential Barrier Locations](#)

[Figure 5.8k](#)

[US 85 Corridor Noise Receiver and Potential Barrier Locations](#)

[Figure 5.8l](#)

[US 85 Corridor Noise Receiver and Potential Barrier Locations](#)

[Figure 5.8m](#)

[US 85 Corridor Noise Receiver and Potential Barrier Locations](#)

[Figure 5.8n](#)

[US 85 Corridor Noise Receiver and Potential Barrier Locations](#)

[Figure 5.8o](#)

[US 85 Corridor Noise Receiver and Potential Barrier Locations](#)

[Figure 5.8p](#)

[US 85 Corridor Noise Receiver and Potential Barrier Locations](#)

[Figure 5.8q](#)

[US 85 Corridor Noise Receiver and Potential Barrier Locations](#)

5.3.3.15 Visual Character Impacts

Visual quality is evaluated for form, line, color, and texture. Foreground and middle ground views are generally

more sensitive than background. Well-known landmarks or visual elements providing strong visual contrast with their surroundings, such as water bodies, large buildings, and mountain ranges, are also sensitive to change in visual quality.

Preferred Alternative

I-25 Corridor Visual Character Impacts (Preferred Alternative)

Proposed improvements to the I-25 Corridor included in this project have limited impact on the visual quality of the corridor.

In the northern area, from the C-470/E-470 Interchange to Meadows/Founders Parkway, the Preferred Alternative widens I-25 from the existing three lanes in each direction to four lanes. No changes are planned to the existing bridges. Views to the east and west remain unchanged, other than changes to the roadbed itself. Between Meadows/Founders Parkway and Douglas Lane, the Preferred Alternative widens I-25 from the existing two lanes in each direction to three lanes. Acceleration and deceleration lanes are provided on both sides of I-25. The impact on the visual environment is minimal because the widening is primarily in the existing I-25 median. Other elements of the Preferred Alternative that may affect the visual character of the I-25 Corridor include:

- **Reconstruction of the Schweiger Interchange.** The reconstruction of the Schweiger Interchange into a half-movement interchange, is constructed with I-25 crossing over Schweiger, limiting visual impact to I-25 travelers. No additional structures are planned over I-25 that may limit views in the area.
- **Reconstruction of the Surrey Ridge Road Interchange.** The reconstruction of the Surrey Ridge Road Interchange into a three-quarter-movement interchange, is constructed with I-25 crossing over Surrey Ridge Road, limiting visual impact to I-25 travelers. No additional structures are planned over I-25 that may limit views to Pikes Peak to the south.
- **Construction of a 500-space car pool lot.** Construction of a 500-space car pool lot at the Castle Pines Parkway Interchange is at-grade with limited visual impact to travelers or local residents. Lighting may be added at the car pool lot as well as at interchanges, which could change the visual character. Lighting design uses hooded features and downward directional lighting design.
- **The Union Pacific Railroad Overpass.** The Union Pacific Railroad Overpass, located between the Liggett Road Overpass and the Wolfensberger Road Interchange, is relocated to the south. The overpass has a longer span than the existing to accommodate the widened I-25 typical section. This results in greater girder depths with the possible use of a truss-type bridge. The views do not change with this additional girder depth.
- **Minor realignment.** A minor realignment of I-25 to the east occurs between Wolfensberger Road and Liggett Road. This improvement does not impact the visual environment of the area since the realignment is minor and the highway already exists in the area.
- **Reconstruction of bridges over Plum Creek and Plum Creek Parkway.** Reconstruction requires the widening and rehabilitation of the bridges over Plum Creek and Plum Creek Parkway. The open space and

bikeway in this area need architectural treatment on the widened bridge structures that is more compatible with the surrounding visual character. Lighting may be upgraded at the interchanges, which could alter the visual character of the corridor. The design of the bridgeway is made to meet the architectural character of the area and lighting is designed for minimal impact to visual integrity.

US 85 Corridor Visual Character Impacts (Preferred Alternative)

The Preferred Alternative reconstructs US 85 to three lanes in each direction from C-470 to Highlands Ranch Parkway and two lanes in each direction from Highlands Ranch Parkway to Meadows Parkway. Widening of the roadway results in the loss of roadside vegetation due to roadside cuts and retaining walls to the east of the roadway. The loss of roadside vegetation has a minimal adverse effect upon the quality of views from the roadway as the primary viewshed is to the west into the Plum Creek floodplain and the Rampart Mountain Range. The view of the road by the permanent residents is moderately changed as a result of the additional pavement. The primary residential areas are located east of US 85 on the higher bluff area with the road located below them. Beneficial aesthetic effects result from improved roadway surface and curb and gutter as the existing roadway has limited access control. The existing roadway has poorly defined shoulders and has lost roadside vegetation due to vehicles traveling off the paved surface throughout the US 85 Corridor. Other elements of the Preferred Alternative that may affect the visual character of the US 85 Corridor include:

- **SH 67/US 85 Intersection Reconfiguration and frontage road.** The intersection of US 85/SH 67 is improved by extending SH 67 to the north with a full-movement signalized intersection. A frontage road is constructed in the southeast quadrant of the US 85/SH 67 Intersection for business access. The proposed intersection improvements at US 85 and SH 67 result in beneficial aesthetic improvements. The relocation of the intersection to the north and construction of the business access frontage road to the east improves the aesthetic quality of this area. The separation between the frontage road and US 85 creates opportunities for a landscaped buffer area providing relief from the extensive paving that exists today. The location of the new intersection to the north of US 85 is in gently sloping grassland topography. The relocated intersection has minimal adverse effect on the view to the north for drivers on US 85 and from the adjacent businesses. Views of the intersection and frontage road from Sedalia's downtown, further west of SH 67, are obstructed by the approach vertical curve.
- **Bicycle/pedestrian facilities along US 85.** The bicycle/pedestrian facilities generally follow the US 85 alignment and therefore have minimal visual effect. A detached bicycle/pedestrian facility is located between Blakeland Drive and Highlands Ranch Parkway and between Daniels Park Road and Meadows Parkway. Between Blakeland Drive and Highlands Ranch Parkway, the user's view is primarily directed across the roadway to the Plum Creek floodplain and the Rampart Mountain Range. Drivers on US 85 can see the bicycle/pedestrian facility, but this would have minimal visual effect because the view is to the west. Residents adjacent to the bicycle/pedestrian facility between Daniels Park Road and Meadows Parkway view the facility as an extension of the roadway section with minimal additional visual impact.
- **Minor realignment.** A minor realignment of US 85 to the west occurs at the Cook Ranch property, approximate MP 195.4. The realignment relocates four businesses in the area, which changes the visual character of the area.
- **High Line Canal Trail grade-separated crossing under US 85.** Grade separation of the High Line Canal

Trail has passageways under US 85, minimizing obstructions to roadside views.

- **Enhanced wildlife crossings.** The improved wildlife crossings have passageways under US 85 minimizing obstructions to roadside views.

Other Alternative

I-25 Corridor Visual Character Impacts (Other Alternative)

In the northern area, from the C-470/E-470 Interchange to Meadows/Founders Parkway, the Other Alternative widens I-25 from the existing three lanes in each direction to four lanes. A two-lane frontage road on the east side of I-25 is constructed between Rampart Range and Castle Pines Parkway. The frontage road is in the foreground of all vistas to the east of I-25 in this section. Between Meadows/Founders Parkway and Douglas Lane, the Preferred Alternative widens I-25 from the existing two lanes in each direction to three lanes. Acceleration and deceleration lanes are provided on both sides of I-25. The impact on the visual environment is minimal because the widening is primarily in the existing I-25 median. Other elements of the Other Alternative that may affect the visual character of the I-25 Corridor include:

- **A new interchange at the Rampart Range Development.** The construction of the Rampart Range Interchange, coupled with the associated development, impacts the visual character of the I-25 Corridor to the immediate south of the Lincoln Avenue Interchange on both sides of I-25. This is consistent with the *Douglas County Master Plan*, 1992, that has identified this area being part of the "Primary Urbanization Area". Planned development includes high-density urban infrastructure similar to what is seen further to the north in the Southeast Business District (SEBD).
- **Removal of the Schweiger Interchange ramps.** The elimination of the ramps at the Schweiger Road Interchange has minimal impact on the visual character of the I-25 Corridor.
- **Full diamond interchange at Surrey Ridge Road.** Reconstruction of the interchange at Surrey Ridge Road to a standard diamond configuration is constructed with I-25 crossing over Surrey Ridge Road using the existing underpass. This does not increase the visual impacts to I-25 travelers.
- **East-side frontage road.** An east-side frontage road between Castle Pines Parkway and Rampart Range changes the view for I-25 travelers by adding a road that previously did not exist.
- **Partial cloverleaf interchange in the southeast quadrant of Castle Pines Parkway.** Reconstructing the interchange with the addition of a partial cloverleaf (loop) has minimal visual impacts.
- **Construction of a 500-space car pool lot.** Construction of a 500-space car pool lot at the Castle Pines Parkway Interchange is at-grade, with limited visual impact to travelers or local residents. Lighting may be added at the car pool lot as well as at interchanges, which could change the visual character. Lighting design uses hooded features and downward directional lighting design.
- **Happy Canyon Road Bridge widening.** Widening of Happy Canyon Road over I-25 has minimal impact to views in the area. The bridge does not appear different traveling under it on I-25, but is wider when

traveling over I-25.

- **Minor realignment.** A minor realignment of I-25 to the east occurs between Wolfensberger Road and Liggett Road. This improvement does not impact the visual environment of the area since the realignment is minor and the highway already exists in the area.
- **The Union Pacific Railroad Overpass.** The Union Pacific Railroad Overpass, located between the Liggett Road Overpass and the Wolfensberger Road Interchange, is relocated to the south. The overpass has a longer span than the existing to accommodate the widened I-25 typical section. This results in greater girder depths with the possible use of a truss-type bridge. The views do not change with this additional girder depth.

US 85 Corridor Visual Character Impacts (Other Alternative)

The Other Alternative extends the widening of US 85 to three lanes in each direction from C-470 to Titan Road. Visual impacts are similar to the Preferred Alternative, the primary difference being the width of the roadway, between Highlands Ranch Parkway and Titan Road.

For additional information on visual character, see the *Visual Resource Technical Memorandum South I-25 Corridor and US 85 Corridor*, May 2000, amended November 2000, in the Technical Reports Volume of the *South I-25 Corridor and US 85 Corridor FEIS*.

Photo Simulations

Figure 5.9 illustrates the existing and proposed view (Other Alternative) of I-25 at Surrey Ridge, looking north. The proposed view shows I-25 widened to four lanes in each direction and the frontage road to the east of I-25.

Figure 5.9
Existing and Proposed View of I-25 Corridor at Surrey Ridge (looking north)
(Other Alternative)



Figure 5.10 illustrates the existing and proposed view (Preferred Alternative and Other Alternative) of I-25 at Castle Pines Parkway, looking north. The proposed view shows the existing noise wall (recommended in the Climbing Lanes, Phase I project) and I-25 widened to four lanes in each direction

Figure 5.11 illustrates the existing and proposed view (Preferred Alternative and Other Alternative) of I-25 at Castle Pines Parkway, looking north. The proposed view shows the car pool lot and I-25 widened to four lanes in each direction

Figure 5.12 illustrates the existing and proposed view (Preferred Alternative and Other Alternative) at Happy Canyon Road, looking south. The proposed view shows I-25 widened to four lanes in each direction and the

earthen berms (recommended in the Climbing Lanes projects). The view of Pikes Peak and other mountain ranges is not impacted as seen on this illustration.

Figure 5.13 illustrates the existing and proposed view (Preferred Alternative and Other Alternative) of I-25 at 5th Street looking north. The proposed view shows the completion of the 5th Street Overpass Early-Action project and the widening of I-25 to three lanes in each direction. I-25 is widened to the inside, eliminating the grass median as shown on this illustration.

Figure 5.14 illustrates the existing and proposed view (Other Alternative) of US 85, looking north to Highlands Ranch Parkway. The proposed view shows US 85 widened to three lanes in each direction. The retaining walls around the transmission towers prevent the relocation of the towers as shown on the proposed view.

Figure 5.15 illustrates the existing and proposed view (Other Alternative) of US 85 looking south from Lakeside Drive. The proposed view shows a retaining wall along the east side of US 85. There are minimal impacts to the residents living in the Chatfield Estates development.

Figure 5.16 illustrates the existing and proposed view (Preferred Alternative and Other Alternative) of US 85 looking north at the Sedalia Intersection (SH 67). The proposed view shows the frontage road located in the southwest quadrant in front of several Sedalia businesses.

Figure 5.17 illustrates the existing and proposed view (Preferred Alternative and Other Alternative) of US 85 at Meadows Parkway, looking north. The proposed view shows US 85 with the additional left-turn lanes and acceleration/deceleration lanes. A bicycle/pedestrian facility located along the east side of US 85 is also illustrated.

Figure 5.10
Existing and Proposed View of I-25 Corridor at Castle Pines Parkway (looking north)
(Preferred Alternative and Other Alternative)



Figure 5.11
Existing and Proposed View of Castle Pines Parkway Car Pool Lot (looking north)
(Preferred Alternative and Other Alternative)



Figure 5.12
Existing and Proposed View of I-25 Corridor at Happy Canyon Road (looking south)
(Preferred Alternative and Other Alternative)



Figure 5.13
Existing and Proposed View of I-25 Corridor at 5th Street Overpass (looking south)
(Preferred Alternative and Other Alternative)



Figure 5.14
Existing and Proposed View of US 85 Corridor at Highlands Ranch Parkway
(looking north)
(Other Alternative)



Figure 5.15
Existing and Proposed View of US 85 Corridor at Lakeside Drive (looking south)
(Other Alternative)



Figure 5.16
Existing and Proposed View of US 85 Corridor at SH 67 (looking north)
(Preferred Alternative and Other Alternative)



Figure 5.17
Existing and Proposed View of US 85 Corridor at Meadows Parkway (looking north)
(Preferred Alternative and Other Alternative)





5.3.3.16 Potential Hazardous Waste Sites Impacts

Recognized and potential hazardous waste sites within 60 meters (200 feet) of the existing CDOT ROW are identified. This distance was selected as a reasonable limit for investigation in recognition of evidence that hazardous substances can migrate above or below ground from their sources. A recognized hazardous waste site is defined as "the presence or likely presence of any hazardous substances or petroleum products on a property under conditions that indicate an existing release, a past release, or a material threat of a release of any hazardous substances or petroleum products into the structures, ground, groundwater, or surface water of the property." Potential hazardous waste sites are sites that have not been identified as a material threat, but due to future construction activities, materials management issues may need to be addressed.

Preferred Alternative

I-25 Corridor Potential Hazardous Waste Sites Impacts (Preferred Alternative)

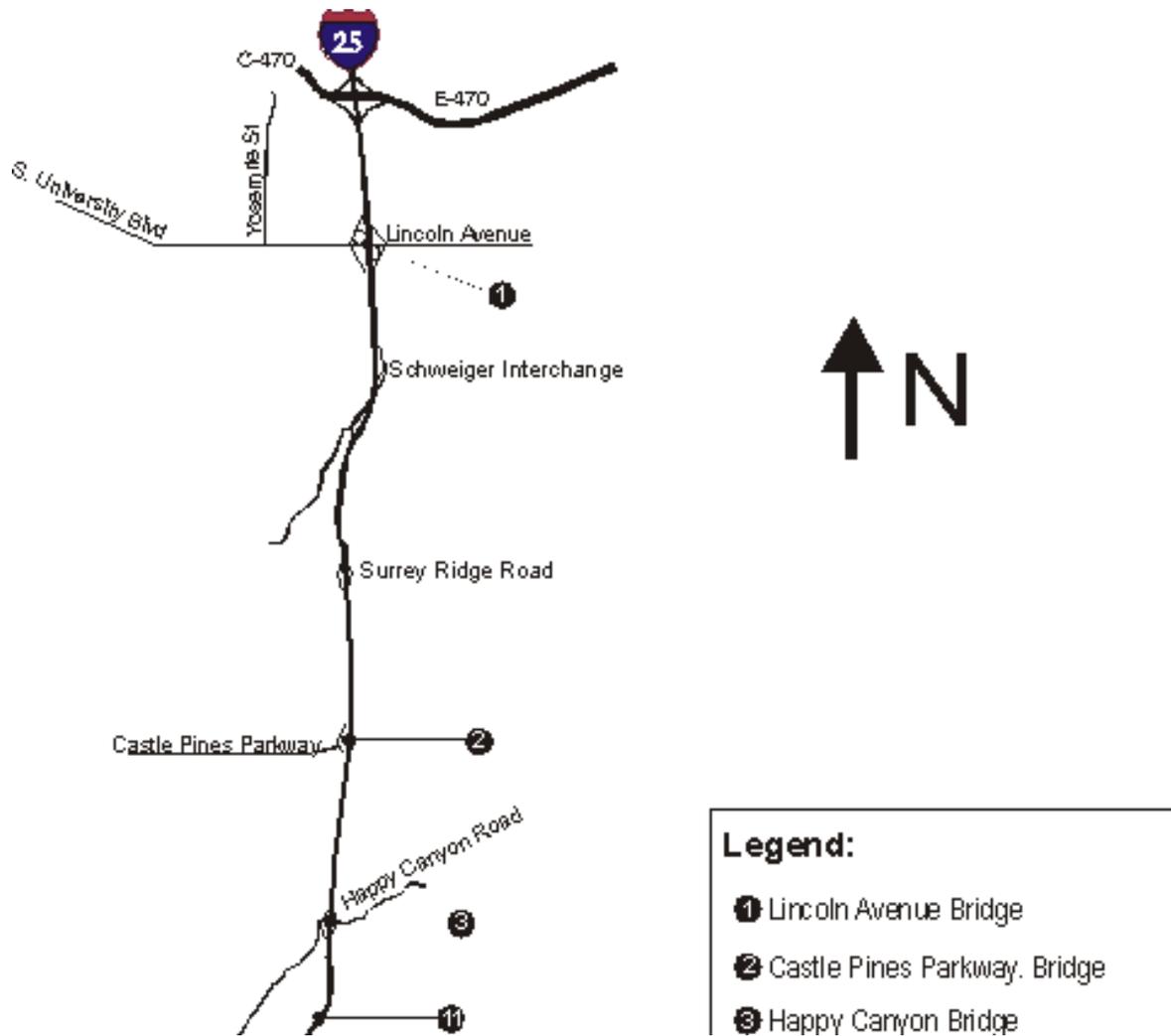
During an initial site assessment (ISA) of the I-25 Corridor, 17 sites have been identified as recognized hazardous waste sites. A list of all the recognized hazardous sites is shown on Table 5.26 with the recommendation for each site. Sites on Table 5.26 labeled as "no impact" are either out of the APE or have been investigated and require no further action. Eleven sites will require further investigation through a preliminary site investigation (PSI) to determine the extent of subsurface contamination. Locations of these sites are shown on Figure 5.18a.

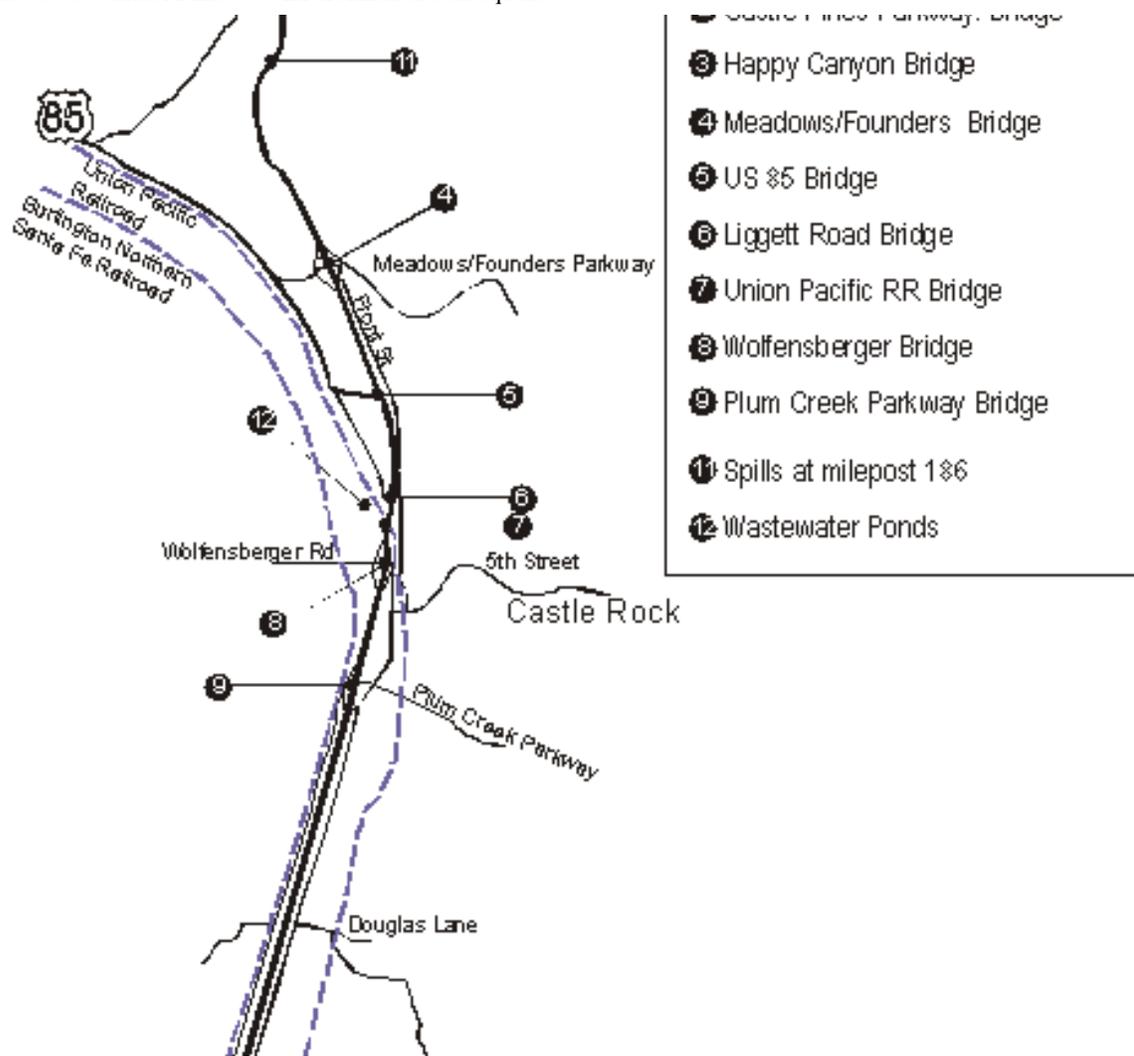
Table 5.26
Recognized Hazardous Waste Sites along the I-25 Corridor

Site No.	Site Identification	Recommendation for the Preferred Alternative and Other Alternative
1	Lincoln Avenue Bridge	Requires further investigation
2	Castle Pines Parkway Bridge	Requires further investigation
3	Happy Canyon Road Bridge	Requires further investigation
4	Meadows Parkway Bridge	Requires further investigation
5	US 85 Bridge	Requires further investigation
6	Liggett Road Bridge	Requires further investigation
7	Union Pacific Railroad Bridge	Requires further investigation
8	Wolfensberger Road Bridge	Requires further investigation
9	Plum Creek Parkway Bridge	Requires further investigation
10	CDOT Maintenance Facility	No impact
11	Spills on I-25	Requires further investigation
12	Former Wastewater Ponds	Requires further investigation
13	Sinclair, Diamond Shamrock, and Texaco Leaking Underground Storage Tank (LUST) Sites	No impact
14	Amoco LUST Site	No impact
15	Former Naylor Landfill	No impact
16	Burgess Motors LUST Site	No impact
17	Former Rainbow Laundry Center LUST Site	No impact

Note: Further investigation (PSI) is needed for some sites once the preferred alternative is identified to determine the nature and extent of subsurface contamination.

Figure 5.18a
I-25 Corridor Recognized Hazardous Waste Impacted Sites





Nineteen potential hazardous waste sites were identified along the corridor. A list of the potential hazardous sites is shown on Table 5.27 with the recommendation for each site. Sites labeled on Table 5.27 as "no impact" are either out of the APE or have been investigated and require no further action. Five sites will require further investigation during the final design phase to determine whether the site is contaminated. Locations of these sites are shown on Figure 5.18b.

Table 5.27
Potential Hazardous Waste Sites along the I-25 Corridor

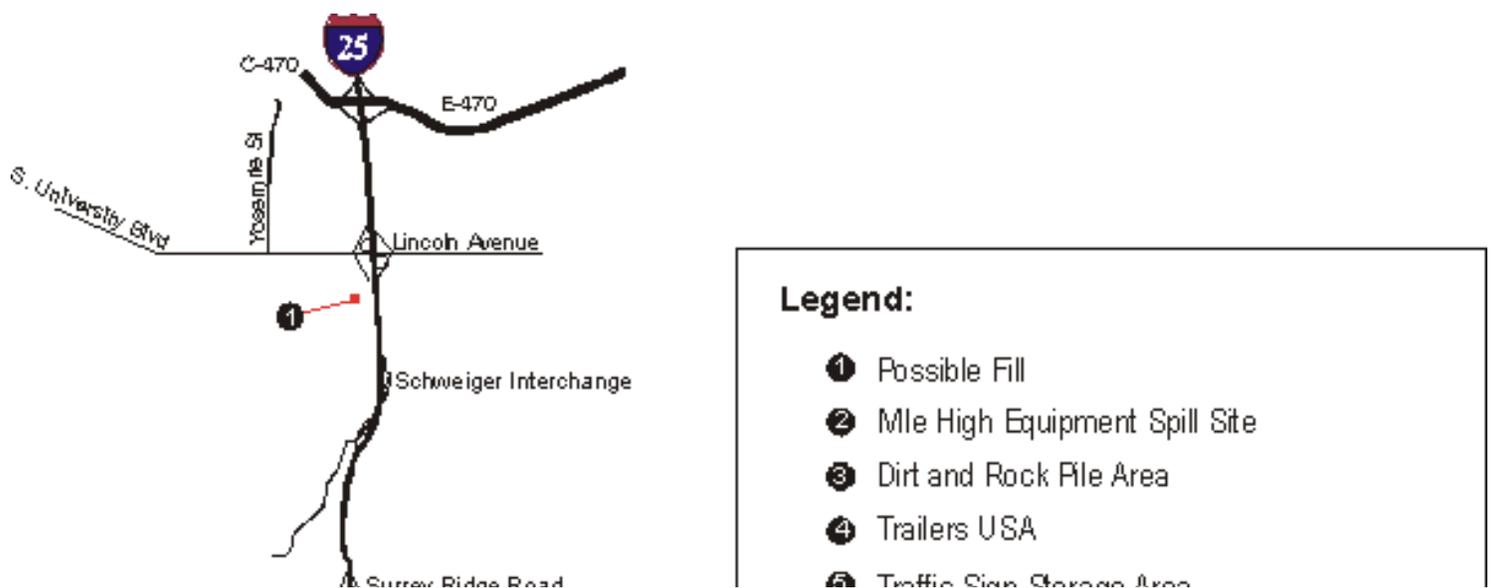
Site No.	Site Identification	Recommendation for the Preferred Alternative and Other Alternative
1	Possible Fill	No impact
2	Mile High Equipment LUST Spill Site	No impact
3	Dirt and Rock Pile Area	Requires further investigation
4	Trailers USA	No impact
5	Traffic Sign Storage Area	No impact
6	Bayer Tire Store	No impact
7	Mobile Home Sales Lot	Requires further investigation
8	Car Dealership	No impact
9	Phillips 66 Gas Station	Requires further investigation
10	Western Gasoline Station	No impact
11	Fill Dirt and Disturbed Soil Area	Requires further investigation
12	Abandoned Railroad Station	No impact
13	Self Service Gasoline Station	Requires further investigation
14	Western Truck Stop	No impact
15	Medved Brutyn Ford	No impact
16	Sreiber Equipment	No impact
17	Former Douglas County Justice Center	No impact
18	Andrews Addition Landfill	No impact
19	SW of Brick Facility Landfill	No impact

Note: Further investigation is needed for Sites 3,7,9,11,& 13 to determine whether the site contains hazardous waste.

US 85 Corridor Potential Hazardous Waste Sites Impacts (Preferred Alternative)

During a modified environmental site assessment (MESA) of the US 85 Corridor, 8 sites were identified as recognized hazardous waste sites. A list of all recognized hazardous sites is shown on Table 5.28 with the recommendation for each site. Further investigation for the Denver Rio Grande Western Railroad LUST site is not required since the LUST site is located too far away to impact the US 85 ROW. Six sites will require further investigation through a site assessment/site investigation to determine the nature and extent of subsurface contamination. The locations of these sites are shown on Figure 5.19a.

Figure 5.18b
I-25 Corridor Potential Hazardous Waste Impacted Sites



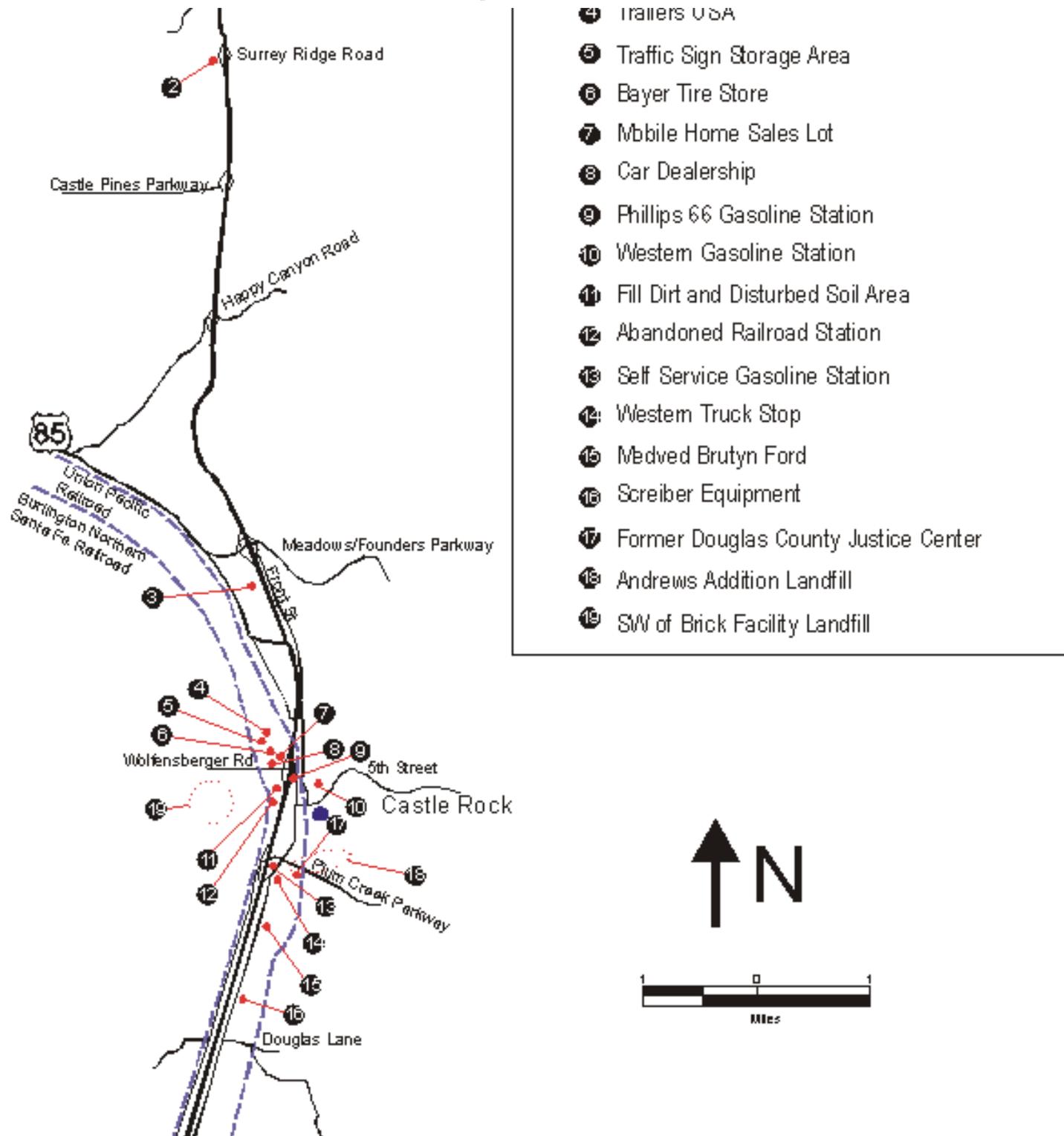


Figure 5.19a
US 85 Corridor Recognized Hazardous Waste
Impacted Sites

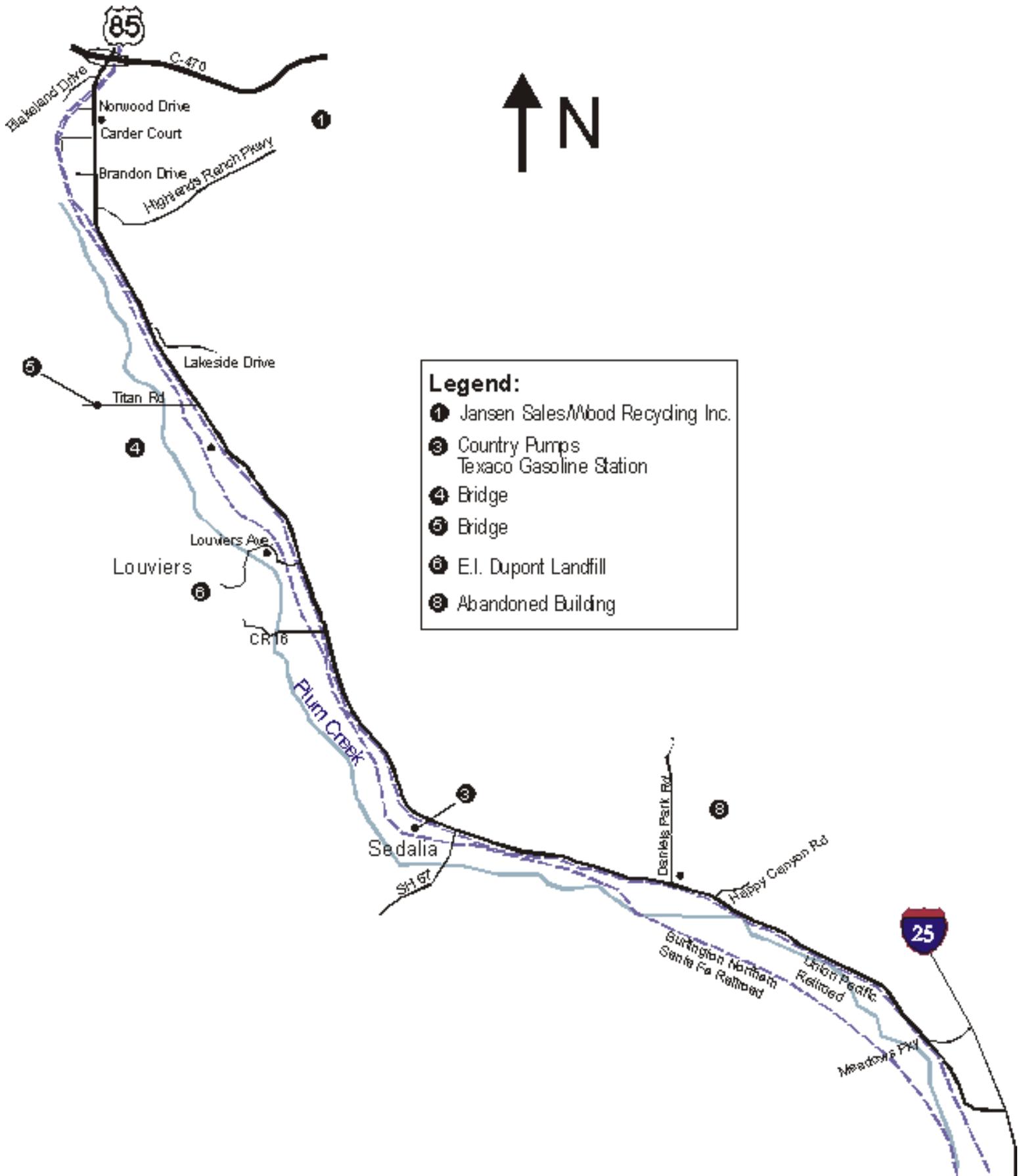


Table 5.28
Recognized Hazardous Waste Sites along the US 85 Corridor

Site No.	Site Identification	Recommendation for the Preferred Alternative and Other Alternative
1	Jansen Sales/Wood Recycling Inc.	Requires further investigation
2	Denver Rio Grande Western Railroad LUST site	No impact
3	Country Pumps Texaco gasoline station	Requires further investigation
4	Bridge	Requires further investigation
5	Bridge	Requires further investigation
6	E.I. Dupont Landfill	Requires further investigation
7	Conoco LUST site (Beemans Gas and Grocery)	No impact
8	Abandoned building (possible former gasoline station)	Requires further investigation

Note: Further investigation is needed for Sites 1, 3, 4, 5, 6 & 8, once the Preferred Alternative is identified to determine the nature and extent of subsurface contamination.

Fifty-one potential hazardous waste sites are identified along the US 85 Corridor. A list of all potential hazardous sites is shown on Table 5.29 with the recommendation for each site. Sites with no impact are out of the APE. Twenty-five sites will require further investigation during the final design phase to determine whether the site is contaminated. Locations of these sites are shown on Figure 5.19b.

Full documentation of potential hazardous waste sites is included in the *Phase I Environmental Site Assessment: I-25 Corridor; Lincoln Avenue to Castle Rock*, January 1999, and in the *Modified Phase I Environmental Site Assessment: SH 85 Corridor; C-470 to I-25*, July 1999.

Table 5.29
Potential Hazardous Waste Sites along the US 85 Corridor

Site No.	Site Identification	Recommendation for the Preferred Alternative and Other Alternative
1	Cooley Gravel Company	Requires further investigation
2	General Contractors	Requires further investigation
3	Goodyear Tire and Rubber	Requires further investigation
4	Diamond Shamrock 1161	Requires further investigation
5	Former Underground Storage Tank	Requires further investigation
6	Western Paving	Requires further investigation
7	Santa Fe Big Lift	No impact
8	Marcy Gulch Wastewater Treatment Plant	No impact
9	All American Jeep 4-Wheel Drive	No impact
10	Steve Golden	Requires further investigation
11	Resco Roofing	Requires further investigation
12	Littleton Auto Body	Requires further investigation
13	Arapahoe Acres Nursery	No impact
14	Flanagan Ready-Mix	Requires further investigation
15	All-Quip Rental Sales, Inc.	Requires further investigation
16	Plum Creek Elementary School	No impact
17	Lockheed Martin Astronautics	No impact
18	WR Grace	No impact
19	Colorado DS Enterprises, Inc.	Requires further investigation
20	Split Rail Fence Company	No impact
21	Rivera's Chatfield Auto Repair	Requires further investigation
22	Yard at Matchbox Bar and Grill	Requires further investigation
23	Hotline Auto Salvage Yard	No impact
24	Truck Rail Handling, Inc.	Requires further investigation
25	Possible 1991 Asbestos Spill	Requires further investigation
26	Shattuck Chemical Company	Requires further investigation
27	ERS Constructors	Requires further investigation
28	Green By Nature	No impact
29	Arapahoe Acres/John Werling/Gary McElroy	No impact
30	Versa Tech of Denver, Inc.	Requires further investigation
31	RV and Boat Storage	Requires further investigation
32	Septic Waste Hauling and Tanks Storage	Requires further investigation
33	ABB C-E Services, Inc.	No impact
34	Eco-Salvage	No impact
35	Front Range Tire Recycle Landfill	No impact
36	McKnight Equipment	No impact
37	Sedalia Grille	Requires further investigation
38	Winfrey Concrete	No impact
39	Sedalia Landfill	No impact
40	Sedalia Transfer Station	No impact
41	Jarre Canyon Mart, Inc.	No impact
42	Intermountain REA	No impact
43	Douglas County Schools Service Center	No impact
44	Plum Creek Wastewater Authority	No impact
45	Douglas County Public Works	No impact
46	Bronson Bratton, Inc.	Requires further investigation
47	Tri-Valley Gas Co.	Requires further investigation
48	Woerner Engineering, Inc.	Requires further investigation
49	WTCI Titan Earth Station	No impact
50	Zimkor Industries	No impact
51	Douglas County Recycle	No impact

Note: Further investigation is needed for some sites to determine whether the site contains hazardous waste.

Other Alternative

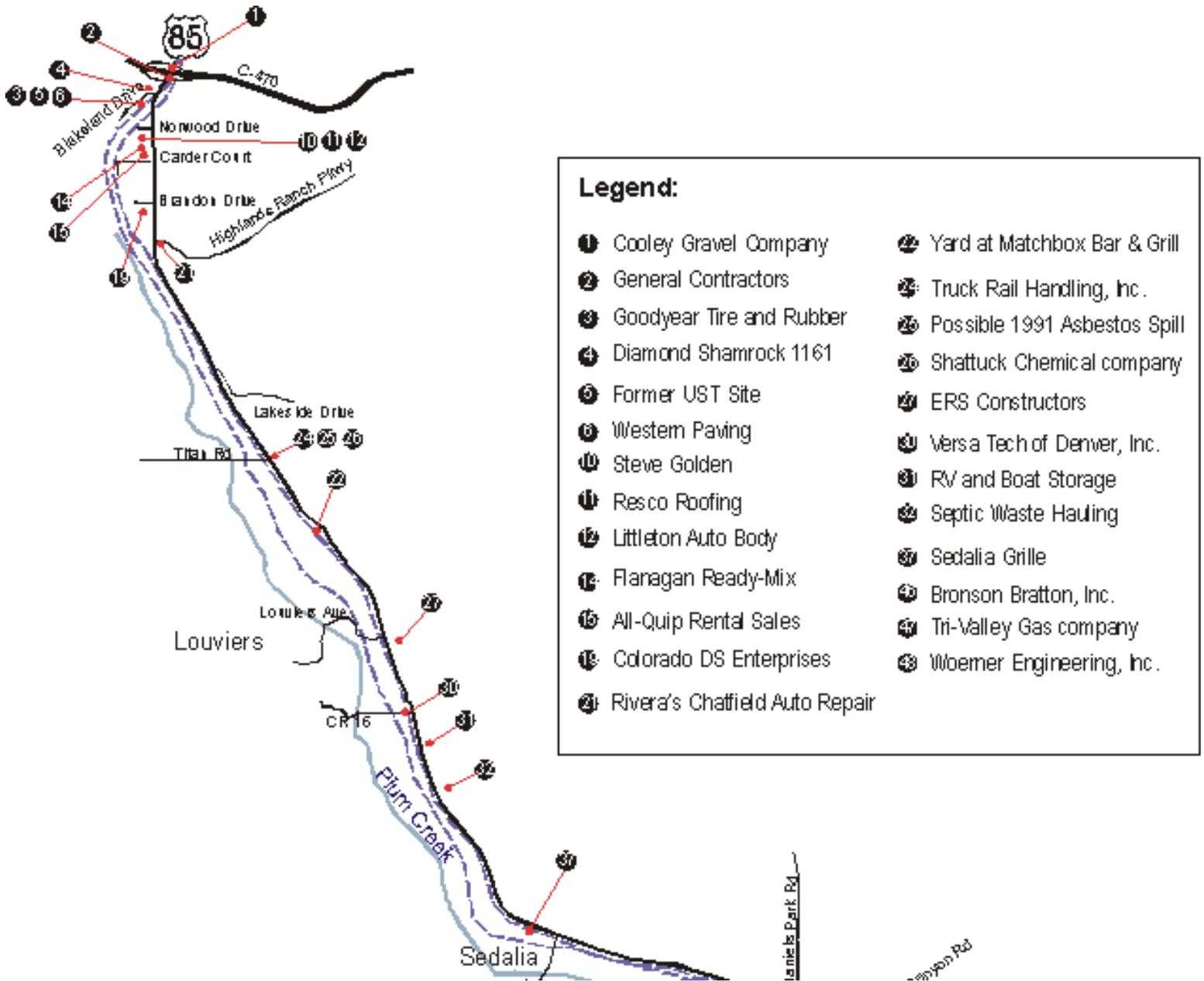
I-25 Corridor Potential Hazardous Waste Sites Impacts (Other Alternative)

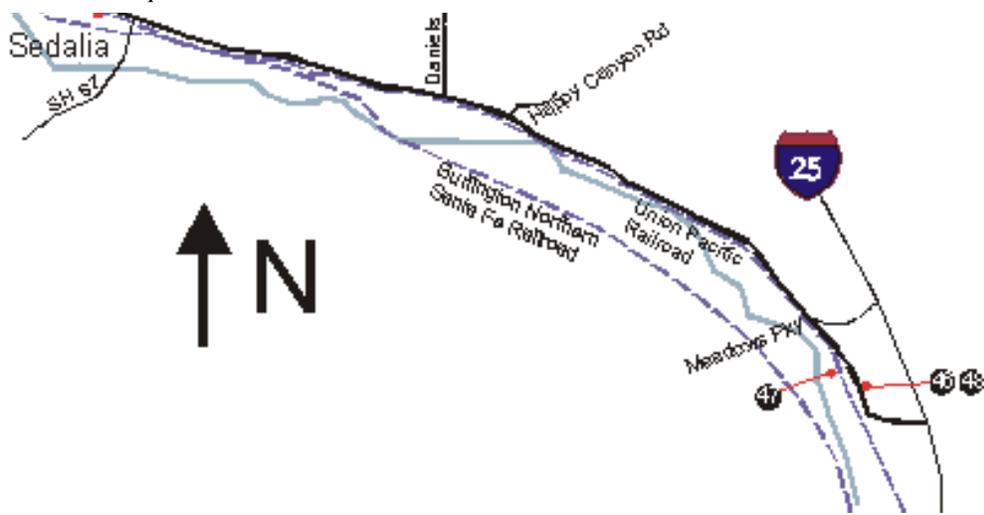
Hazardous waste impacts anticipated as a result of the Other Alternative are the same as described in the Preferred Alternative.

US 85 Corridor Potential Hazardous Waste Sites Impacts (Other Alternative)

Hazardous waste impacts anticipated as a result of the Other Alternative are the same as described in the Preferred Alternative.

Figure 5.19b
US 85 Corridor Potential Hazardous Waste
Impacted Sites





5.3.3.17 Energy Impacts

Construction Energy

Each build alternative has construction energy impacts of two types: (1) energy needed to build the transportation improvements, primarily resulting from earthwork, and the erection of retaining walls and bridges; and (2) energy wasted by vehicles delayed by construction activities. The No-Action Alternative, by definition, has no construction energy requirements.

Delays to highway traffic due to construction are minimized by construction phasing. Congestion energy requirements are offset in the long-term by fuel savings due to reduced congestion and improved operational efficiency on the widened highway.

Operational Energy

All of the build alternatives substantially reduce operational energy requirements for the South I-25 Corridor and US 85 Corridor because they reduce congestion and improve the LOS of I-25 and US 85.

Emissions are correlated to energy use and are affected by operational efficiency. Lower capacity facilities incapable of meeting demand result in increased deceleration, acceleration, and idling during peak traffic period. These congested periods increase in duration when demand exceeds capacity. When a facility increases its capacity to meet the demand projected through the transportation plan and program, the congestion is mitigated and the vehicle can operate in a more fuel-efficient mode. Congested travel produces significantly more emissions on a per-mile basis than continuous traffic flow.

5.3.3.18 Temporary Construction Impacts

Temporary construction impacts are addressed by corridor.

Preferred Alternative

I-25 Corridor Temporary Construction Impacts (Preferred Alternative)

Highway construction creates a potential for increasing dust, noise, water runoff, traffic congestion, and access restriction to residences and buildings.

The majority of air emissions during construction will be fugitive dust (PM₁₀) from the excavation of soil and backfill. All contractors are required to obtain a construction permit and develop a fugitive emissions particulate emissions control plan to be implemented during construction in accordance with the Colorado Air Quality Control Commission Regulation No. 1, Part 3D, and Regulation No. 3, Applicable Permit Requirements.

Major construction components on the I-25 Corridor include roadway widening and interchange modifications. Widening activities through Castle Rock require replacement of the bridges over Plum Creek, Plum Creek Parkway, and the Union Pacific Railroad overpass.

In the section of I-25 from Lincoln Avenue to Meadows/Founders Parkway, the mainline widening requires only the addition of an outside shoulder (the existing shoulder is converted into a travel lane). The roadway is currently constructed with three, 3.6-meter (12-foot) lanes plus a 3.6-meter (12-foot) outside shoulder. The existing outside shoulder will be used for the fourth lane, and a new shoulder is constructed. Anticipated construction impacts from this widening consist primarily of closing the existing shoulder to provide the construction platform to build the new shoulder.

Reconstruction of the Schweiger Interchange, Surrey Ridge Road Interchange, and modifications to the Castle Pines Parkway Interchange (including the car pool lot) require careful planning to minimize traveler delay and maintain access to I-25.

Reconstruction, realignment (between Wolfensberger Road and Liggett Road), and widening of I-25 through Castle Rock requires complex construction staging to maintain highway and interchange operations. Construction sequencing, overall construction timeframe, and construction delivery methods have not been determined; they will depend on a critical path analysis and available funding.

Construction impacts to the Union Pacific Railroad and the Burlington Northern Santa Fe Railroad are expected from the construction of a new railroad bridge to the south of the existing bridge.

The Plum Creek bike path will be temporarily impacted during construction, yet the bike path will remain operational throughout the construction.

US 85 Corridor Temporary Construction Impacts (Preferred Alternative)

Highway construction presents the potential for increasing dust, noise, water runoff, traffic congestion, and restriction of access to residences and buildings.

The majority of air emissions during construction will be fugitive dust (PM₁₀) from the excavation of soil and backfill. All contractors are required to obtain a construction permit and develop a fugitive emissions particulate emissions control plan to be implemented during construction in accordance with the Colorado Air Quality Control Commission Regulation No. 1, Part 3D, and Regulation No. 3, Applicable Permit Requirements.

Major construction components on the US 85 Corridor include roadway widening and reconstruction, the construction of a frontage road in Sedalia, the construction of bicycle and pedestrian facilities, the construction of the grade-separated High Line Canal Trail, and the enhancements of wildlife crossings.

Construction of the frontage road in Sedalia has minimal impact to traffic operations on US 85. The new US 85 alignment will be constructed first; traffic is then placed on the new alignment while the frontage road is constructed on the existing alignment. Several business located along the existing US 85 alignment may be impacted during construction of the Sedalia frontage road because their access must be altered.

Reconstruction of US 85 requires complex construction staging to maintain highway operations. Construction sequencing, overall construction timeframe, and construction delivery methods have not been determined; they will depend on a critical path analysis and available funding.

During construction of the new accesses throughout US 85, temporary impacts will occur to drivers accessing those areas.

Other Alternative

I-25 Corridor Temporary Construction Impacts (Other Alternative)

Highway construction creates a potential for increasing dust, noise, water runoff, traffic congestion, and access restriction to residences and buildings.

The majority of air emissions during construction will be fugitive dust (PM₁₀) from the excavation of soil and backfill. All contractors are required to obtain a construction permit and develop a fugitive emissions particulate emissions control plan to be implemented during construction in accordance with the Colorado Air Quality Control Commission Regulation No. 1, Part 3D, and Regulation No. 3, Applicable Permit Requirements.

Major construction components on the I-25 Corridor include roadway widening, construction of a frontage road between Castle Pines Parkway and Rampart Range, and interchange modifications. Widening activities through Castle Rock require replacement of the bridges over Plum Creek, Plum Creek Parkway, and the Union Pacific Railroad overpass.

In the section of I-25 from Lincoln Avenue to Meadows/Founders Parkway, the mainline widening requires only the addition of an outside shoulder (the existing shoulder is converted into a travel lane). The roadway is currently constructed with three, 3.6-meter (12-foot) lanes plus a 3.6-meter (12-foot) outside shoulder. The existing outside shoulder will be used for the fourth lane, and a new shoulder is constructed. Anticipated construction impacts from this widening consist primarily of closing the existing shoulder to provide the construction platform to build the new shoulder.

Construction of the frontage road between Castle Pines Parkway and Rampart Range has minimal impact to traffic operations on I-25. The road is constructed on an entirely new alignment. Intersections with the east-west roads require some traffic control for the east-west roadways.

Reconstruction of the Surrey Ridge Road Interchange, construction of a new interchange at Rampart Range, modifications (car pool lot and southeast quadrant loop ramp) to the Castle Pines Parkway Interchange, and widening of the Happy Canyon Bridge, require careful planning to minimize traveler delay and maintain access to I-25.

Reconstruction, realignment (between Wolfensberger Road and Liggett Road), and widening of I-25 through Castle Rock require complex construction staging to maintain highway and interchange operations. Construction sequencing, overall construction timeframe, and construction delivery methods have not been determined; they will depend on a critical path analysis and available funding.

Construction impacts to the Union Pacific Railroad and the Burlington Northern Santa Fe Railroad are expected from the construction of a new railroad bridge to the south of the existing bridge.

The Plum Creek bike path will be temporarily impacted during construction, yet the bike path will remain operational throughout the construction.

US 85 Corridor Temporary Construction Impacts (Other Alternative)

Highway construction presents the potential for increasing dust, noise, water runoff, traffic congestion, and restriction of access to residences and buildings.

The majority of air emissions during construction will be fugitive dust (PM₁₀) from the excavation of soil and backfill. All contractors are required to obtain a construction permit and develop a fugitive emissions particulate emissions control plan to be implemented during construction in accordance with the Colorado Air Quality Control Commission Regulation No. 1, Part 3D, and Regulation No. 3, Applicable Permit Requirements.

Major construction components on the US 85 Corridor include roadway widening and reconstruction, the construction of a frontage road in Sedalia, the construction of bicycle and pedestrian facilities, the construction of the grade-separated High Line Canal Trail, and the enhancements of wildlife crossings.

Construction of the frontage road in Sedalia has minimal impact to traffic operations on US 85. The new US 85 alignment will be constructed first; traffic is then placed on the new alignment while the frontage road is constructed on the existing alignment. Several business located along the existing US 85 alignment may be impacted during construction of the Sedalia frontage road because their access must be altered.

Reconstruction of US 85 requires complex construction staging to maintain highway operations. Construction sequencing, overall construction timeframe, and construction delivery methods have not been determined; they will depend on a critical path analysis and available funding.

During construction of the new accesses throughout US 85, temporary impacts will occur to drivers accessing those areas.

5.3.3.19 Secondary Impacts

Secondary impacts are reasonably foreseeable, project-induced impacts that are removed from the project in time and/or space.

A benefit of the project is improved mobility throughout the corridors. The result of improved mobility and travel times on an existing roadway cannot with any reasonable assurance lead to additional development. Any induced growth would be constrained by the amount of building permits allowed to be approved by the city/county in their respective land use plans. Douglas County is a desirable area as a residential community with or without roadway improvements. The per capita income of Douglas County is one of the highest of all counties in the state and the historic and future growth trends are among the largest in the nation. Impacts to the economy or to the cost of housing are more likely to have impacts to the county's growth.

Secondary air quality impacts that may result from changes in the pattern of land use, population density or growth rate include:

- Increased emissions from natural gas space and hot-water heating systems installed in new residential, commercial, recreational and industrial facilities
- Increased emissions from new commercial and industrial facilities that provide increased employment in the region
- Increased emissions from electric generating systems in the air quality region needed to serve the projected growth
- Increased emissions from new home heating fireplaces and out door barbecue appliances
- Increased emissions from additional lawn mower usage

These secondary or indirect impacts are accounted for in the development and implementation of the SIP, which combines these impacts with the transportation related impacts to ensure compliance with the NAAQS.

Water resources and wetlands may have potential secondary impacts from roadway maintenance. Sediment and salt from snowplows during winter months may impact streams and wetland resources.

Increased runoff is the main secondary impact to water quality and quantity that could occur as a result of both the Preferred Alternative and Other Alternative. This impact is due to an increase in impervious surface area (i.e., pavement). Potential specific secondary impacts caused by higher peak discharges include increased erosion, sedimentation, and ability to transport contaminants commonly associated with urban watersheds.

Secondary impacts to wetlands are expected to be insignificant. Potential sources of secondary impacts include changes in drainage patterns or runoff volumes, increased inputs of non-point source pollution (e.g., sand, salt, etc.) contained in stormwater runoff, and degradation of wetland habitat due to increased noise levels. Secondary impacts related to runoff are expected to be minimal due to adherence of the contractor to mandatory Douglas County and CDOT regulations governing stormwater management. Wildlife that uses wetland habitat in proximity to the highways most likely habituate to increased noise levels.

Wildlife may have potential secondary impacts from the Preferred Alternative and Other Alternative. These

impacts include habitat fragmentation, habitat degradation, impacts to wildlife that use black-tailed prairie dog colonies, and impacts to aquatic/riparian communities due to increased runoff. Noxious weed invasion and wildlife displacement due to increased noise levels are also of concern under these alternatives. The projected increased traffic volumes associated with the reconstruction of US 85 may reduce wildlife permeability among open space areas and habitat may become more fragmented. This is of special concern for ungulates, which are highly mobile, and currently cross at-grade.

Adverse secondary impacts to threatened, endangered, and other special status-species are expected to be negligible. The majority of potential secondary impacts to these special-status species arise from their dependence on the black-tailed prairie dog or the degradation of aquatic and riparian habitat. Direct or indirect loss of black-tailed prairie dogs may secondarily impact special-status species associated with them, including the bald eagle, ferruginous hawk, and burrowing owl. However, impact to black-tailed prairie dog colonies is relatively small, and so adverse secondary impact to these species is expected to be negligible. Predicted increases in impervious surface may generate more runoff within the project area that could impact aquatic and riparian habitats important to the PMJM, northern leopard frog, northern redbelly dace, common shiner, brassy minnow, and Iowa darter. Douglas County and CDOT/FHWA regulations and guidelines on stormwater management are expected to prevent adverse secondary impacts from occurring to aquatic and riparian habitat in East Plum Creek and Plum Creek.

5.3.3.20 Cumulative Impacts

Cumulative impacts are impacts on the environment that result from the incremental impact of the action when added to other past, present, and reasonably foreseeable future action regardless of responsible agency or person.

The past, present, and reasonably foreseeable future actions were determined based on the current TIP and proposed developments within the study corridor. The actions that are considered included in this FEIS cumulative impacts discussion are:

- I-25 Climbing Lanes, Phase I (CDOT Action)
- I-25 Climbing Lanes, Phase II (CDOT Action)
- Meadows/Founders Interchange (CDOT Action)
- 5th Street Overpass (CDOT Action)
- Wolfensberger Interchange (CDOT Action)
- US 85 and I-25 Interchange (CDOT Action)
- Titan Road (CDOT Action)
- Douglas Lane Interchange (Private Developer and Local Entities Action)
- Wilcox Street Bridge (Town of Castle Rock Action)

- Highlands Ranch Development (Private Action)
- Canyon Development (Private Developer Action)
- Meridian Development (Private Developer Action)
- Rampart Range Development (Private Developer Action)
- Douglas Lane Development (Private Developer Action)
- Preservation of Land (Douglas County Action)

Climbing Lanes, Phase I

This project provides one additional lane in each direction along I-25 between Lincoln Avenue and Castle Pines Parkway designated (but not restricted) as climbing lanes for slow-moving vehicles. The I-25 configuration after the completion of this project is six lanes between Lincoln Avenue and Castle Pines Parkway. This project was completed in October 2000.

Climbing Lanes, Phase II

This project extends the Climbing Lanes Phase I project to Meadows/Founders Parkway. The I-25 configuration after the completion of this project is six lanes between Castle Pines Parkway and Meadows/Founders Parkway. This project is currently under construction and is scheduled to be completed in September 2002.

Meadows/Founders Parkway Interchange

This project improved the existing diamond interchange deficiencies by constructing a partial cloverleaf interchange. This project was completed 1999.

Wolfensberger Road

This project improves the existing I-25 interchange deficiencies by removing and replacing the south half of the Wolfensberger Road Bridge over I-25 and Plum Creek. This project is designed, but construction has been delayed due to a shortfall of funding.

US 85/I-25 Interchange

This project removes the existing US 85/I-25 Interchange ramps and reroutes traffic through the improved Meadows/Founders Parkway/I-25 Interchange. An overpass is constructed at the existing interchange location to connect the east side of Castle Rock to the west side. This project is designed, but construction has been delayed due to a shortfall of funding.

5th Street Overpass

This project improves the local Castle Rock transportation network by providing an overpass from 5th Street on the east side of I-25 to Park Street on the west side of I-25. This project began construction in October 2000 and is scheduled to be completed by Fall 2001.

US 85 and Titan Road Grade-Separated Intersection

This project improves existing safety deficiencies of the railroad crossings by constructing a grade-separated intersection at US 85 and Titan Road and by providing grade separations with Titan Road and the Burlington Northern Santa Fe Railroad and Union Pacific Railroad. With the proposed design, traffic crossing the existing Union Pacific Railroad tracks at the existing at-grade crossing will be limited to local business access. Construction is scheduled to begin in October 2001.

Douglas Lane Interchange

This project provides a new interchange along I-25 at Douglas Lane, approximately 1,450 meters (4,750 feet) south of Plum Creek Parkway. The interchange design is a single-point urban interchange. Funding for the Douglas Lane Interchange will be provided through the cooperative efforts of Douglas County, the Town of Castle Rock, and private entities.

Wilcox Street Bridge (Town of Castle Rock)

This project replaces the existing two-lane bridge over East Plum Creek with a five-lane structure. The new bridge is a single-span structure that includes shoulders and attached sidewalks. Existing piers currently located in the East Plum Creek channel are removed as a result of the single-span structure. This project is being completed by the Town of Castle Rock and construction is scheduled to begin in Spring 2001.

Highlands Ranch Development (Private Developer Action)

Construction began on the Highlands Ranch Development in 1981. The development is located approximately 19 km (12 miles) south of Denver in northern Douglas County. Over 5,261 hectares (13,000 acres) of the community's 8,900 hectares (22,000 acres) have been set aside as open space, parks and community facilities linked by a 35 km (22-mile) trail system - with an additional 32 km (20 miles) planned for walking, jogging and bicycling. The trails provide a link between neighborhoods for transportation and recreation purposes. The Highlands Ranch Metropolitan Districts currently manage and maintain the open space and the Highlands Ranch Community Association operates the recreation centers. More than 650 hectares (1,600 acres) of the master plan are designated for business properties. Currently, Highlands Ranch has over 1,000 businesses ranging from corporate headquarters to research and development facilities, light industrial and commercial outlets. Approximately 36,700 residential units are planned.

Canyon Development (Private Developer Action)

The Canyons is a proposed development just east of I-25 and north of Castle Rock. The development is being constructed in two phases. There is a 1,420-hectare (3,500-acre) phase north of Crowfoot Valley Road and a 810 hectare (2,000 acre) phase south of Crowfoot Valley Road. The current plan does not include any commercial development, but it does include 2,676 home sites. The build out is proposed over the next 20 years with

approximately 600 units being constructed in the next 5 years. Orientation of the houses is on east facing slopes approximately 0.8 kilometers (0.5 miles) east of I-25. Provisions for a 369 hectare (912 acre) golf course, pedestrian trails, and an equestrian center have been included in a proposal that recommends 1,363 hectares (3,366 acres) be set aside for open space.

Meridian Development (Private Developer Action)

Meridian International Business Center totals approximately 580 hectares (1,430 acres) in size and is proposed primarily for business center purposes. The majority of the development is bounded by of I-25 Lincoln Avenue, Peoria Street, and E-470. Approximately 17 hectares (41 acres) of the development extends north of E-470. This land is also planned primarily for business center purposes. Approximately 75 hectares (190 acres) of the Meridian Development extends south of Lincoln. This portion of the development includes 250 single-family homes (10.6 units per hectare [4.3 units per acre]) and 500 multifamily units (40.3 units per hectare [16.3 units per acre]), with a total of approximately 1,500 units.

Rampart Range Development (Private Developer Action)

The Rampart Range Development project covers 1,420 hectares (3,500 acres). Approximately 10,085 housing units and 200 hectares (530 acres) of commercial space south of Lincoln Avenue on both sides of I-25 are proposed. Rampart Range would be similar to Lone Tree or Highlands Ranch along the edges, but include more densely packed commercial, retail and residential areas around a City Center area on the east-side of I-25. The property is scheduled for a 30 to 40-year build-out.

Douglas Lane Developments (Private Developer Action)

Crystal Valley Ranch Development

The Crystal Valley Ranch Development (approximately 590 hectares [1,455 acres]) is located 1.6 kilometers (1 mile) east of the proposed I-25/Douglas Lane Interchange. Approximately 3,475 residential units will be built making the density approximately 5.9 units/hectare (2.3 units/acre). These density figures were reduced approximately 40 percent over the original proposal. The site layout calls for construction of 2,000 single family homes and 1,475 multi-family units. The site layout has approximately 16 hectares (40 acres) set aside for residential low density. This residential low-density land use has not reached final agreement, and it may revert to a resort hotel or small corporate business center before the plan is approved. The scheduled build-out for this property is 15 years. As part of the build-out conditions, roadway connections between Douglas Lane and South Lake Gulch Road are proposed.

Lanterns Development

The Lanterns Development, comprised entirely of single-family homes, will be constructed immediately east of the proposed Douglas Lane/I-25 Interchange. The development size is approximately 345 hectares (850 acres) and will include 540 home sites. The proposed density is approximately 1.6 units/hectare (0.6 units/acre). Construction is scheduled to commence in 2002 and finish in 2012.

Dawson Ridge

The Dawson Ridge Development is proposed for construction on the southwest side of the proposed Douglas Lane/I-25 Interchange. This approximately 765-hectare (1,900-acre) tract will contain approximately 6,700 single-family homes and 1,200 multi-family units. Expected density for this tract is 10.3 units/hectare (4.2 units/acre). Construction of this development will start in Spring 2002 with build-out in 20-30 years.

Preservation of Land (Douglas County Action)

The Douglas County Open Space Program was created in 1994 with the passage of a sixth of a cent sales and use tax. Through revenues generated by the tax, the County seeks to improve the quality of life for its residents by protecting important wildlife habitats, agricultural lands, scenic vistas, community buffers, recreational opportunities, and other open space values.

In 1994, the voters of Douglas County approved a ballot initiative creating the Open Space, Trails, and Parks Sales and Use Tax. This tax generates over \$6 million annually for the preservation of open space, the creation of trails, and the development of parks. In 1999, approximately \$4.1 million of the total revenue generated by the tax was specifically allocated toward the preservation of open space.

Douglas County seeks to protect open space by accomplishing a variety of conservation objectives, including:

- Preservation of important wildlife habitat and movement corridors
- Perpetuation of the County's rural landscape and agricultural heritage;
- Creation of community buffers
- Protection of scenic views, historic properties, and archaeological resources
- Enhancement of recreational opportunities

Douglas County works with the towns of Castle Rock, Parker, and Larkspur, the beneficiaries of a municipal share back incorporated into the sales and use tax, to implement the towns' parks, trails and open space goals.

In addition, the County has and will continue to work with a wide range of partners to implement its conservation goals, including: American Farmland Trust, Cherokee Ranch and Castle Foundation, Colorado Cattlemen's Agricultural Land Trust, Colorado Division of Wildlife, Colorado Division of Parks and Outdoor Recreation, Colorado Open Lands, Douglas County Land Conservancy, Great Outdoors Colorado, South Suburban Parks and Recreation District, The Conservation Fund, The Trust for Public Land and United States Forest Service.

To date, Douglas County and its partners have successfully preserved over 15,000 hectares (37,000 acres) of land. The county has participated in land acquisition in each of its five priority areas.

The Southeast Corridor project is not included in the cumulative discussion because this project is to the north of the South I-25 Corridor and US 85 Corridor study area. The Southeast Corridor is in an urban growth boundary located north of our corridor. Cumulative impacts from projects within that growth boundary are discussed in the

Southeast Corridor FEIS.

The cumulative impacts discussion includes the following critical environmental resources within the South I-25 Corridor and US 85 Corridor EIS study area:

- Socioeconomic
- Air Quality
- Wetlands
- Water Quality
- Threatened and Endangered Species
- Wildlife

Socioeconomics

Cumulative impacts include the incremental growth and increased governmental complexity of a region within the context of all other inter-related effects of all other relevant projects. An analysis of socioeconomic cumulative impacts takes into consideration impacts resulting from other transportation projects as well as major impacts from other developments that might use the transportation system in the foreseeable future. However, growth will occur in Douglas County regardless of the proposed transportation improvements. The county anticipates a population increase of roughly 180 percent by the year 2020.

Douglas County is home to approximately 60,000 residences, containing over 172,000 people. More than three times this many residences are zoned for residential development in the future; 189,000 units of land are zoned for residential development on over 142,000 hectares (350,000 acres) of land. Approximately 57,000 or 30 percent of these units are within the County's primary urbanization area (PUA), located mainly in the extreme north part of the county. Individual developments in the PUA include Highlands Ranch (36,700 planned units), Meridian (1,500 planned units) and Rampart Range (10,085 planned units).

Other large master planned areas of development include the Town of Castle Rock with 65,000 planned units, the High Plateau area near I-25 with 1,200 planned units (includes Happy Canyon, Oak Hills and Surrey Ridge), and the West Plum Creek area further south near I-25 with 6,167 planned units. The Canyons development will also be located in the High Plateau area, to the east of I-25. Although the exact number of planned units has not been approved by the County, it is estimated that at least 10,000 residential units will be built in this development. Within the West Plum Creek subarea, located south of Castle Rock near I-25, the largest planned development is Douglas Park, with 3,493 planned units. The Chatfield subarea, along US 85, has a total of 867 planned units. Less development is planned for the US 85 Corridor than the I-25 Corridor.

The county planning process controls the rate of growth in the county. In the past, the county has exhibited concern about the scale of several developments and has worked with the developers to reduce the number of planned units while increasing the amount of land set aside for infrastructure, recreation, and open space. Ultimately, the county will determine the level of growth desired, and may not allow development of all of the

zoned units.

Douglas County is already easily accessible from the northern Denver metropolitan area by existing transportation facilities including I-25 and US 85. Improvements to the I-25 Corridor and US 85 Corridor do not stimulate growth, rather they are responding to the proposed land use.

For additional information on wetland cumulative impacts, see Section 5.3.2.8, *Socioeconomic Cumulative Impacts*.

Air Quality

The direct air quality cumulative impacts from other transportation related impacts from past, present and foreseeable future projects are accounted for during the conformity analysis of the RTP. The indirect air quality cumulative impacts are accounted for in the development and federal approval of the SIP, which incorporates the analyses of transportation (direct) and non-transportation (indirect) related emissions, and ensures compliance with the NAAQS.

For additional information on air quality cumulative impacts, see Section 5.3.3.1, *Air Quality Impacts*.

Wetlands

Cumulative impacts to wetlands have occurred, and are occurring, in Douglas County due to land conversion. However, other transportation projects in the area, and the reconstruction and widening of the I-25 Corridor and the US 85 Corridor are not expected to contribute substantially to the cumulative loss of wetlands in Douglas County. This is due to CDOT's and FHWA's commitment to avoidance, minimization, and compensatory wetland mitigation.

For additional information on wetland cumulative impacts, see Section 5.3.3.4, *Wetland Impacts*.

Water Quality

Cumulative impacts may generate from Douglas County developments within the South I-25 Corridor and US 85 Corridor study area. Cumulative impacts to Plum Creek and Cherry Creek water quality are possible in the short-term because multiple construction activities, both road and non-road, may occur simultaneously. However, Douglas County's erosion control criteria and CDOT's erosion control manual will keep sedimentation at historic levels over the long term, and the combination of proper drainage design and reduced vehicle wear are expected to reduce contaminants transported to Waters of the US.

An increase in impervious surfaces associated with mainline widening and selected alternatives will generate additional runoff volume during storm events. Consequently, 100-year flood surface elevations downgradient from the project area could change. This type of secondary impact is primarily of concern as a cumulative impact, especially when combined with the rapid rate of urbanization occurring in Douglas County. The customary measures taken by CDOT to preserve historic drainage patterns and to minimize increased runoff associated with this project will therefore be of special importance in preventing significant cumulative impacts to 100-year floodplains. Temporary impacts due to construction in the floodplains will be minimized through BMPs.

Residential, commercial, and industrial development in the Cherry Creek and Chatfield Basins are contributing elements to cumulative impacts to water quality. Combined with the Preferred Alternative and Other Alternative, historic impacts may contribute to the cumulative degradation of water quality in the Chatfield and Cherry Creek Basins. Recognizing the importance of water quality and quantity, it is expected that Douglas County and CDOT/FHWA regulations, guidelines, and BMPs on stormwater management and runoff can minimize the cumulative impacts to water resources in Douglas County.

For additional information on water quality cumulative impacts, see Section 5.3.3.2, *Water Quality Impacts*.

Threatened, Endangered, and Other Special-Status Species

Due to their role in grassland ecosystems, the cumulative loss of black-tailed prairie dog colonies is of concern in the areas where they still occur. The widening and reconstruction of both highways, combined with planned residential and commercial development in the area represent a cumulative loss of black-tailed prairie dogs.

Cumulative impacts to PMJM habitat have and are occurring along the Front Range of Colorado. The cumulative effect of the Preferred Alternative, the Other Alternative, and all current and future unrelated actions on PMJM habitat will be offset by strict conservation measures required by the USFWS.

For additional information on threatened, endangered, and other special-status species cumulative impacts, see Section 5.3.3.9, *Threatened, Endangered, and Other Special-Status Species Impacts*.

Wildlife

As roads and highways are reconstructed and upgraded, impacts on wildlife will increase as traffic increases. Potential impacts include direct habitat loss, mortality, displacement through avoidance of areas affected by increased traffic and human presence. All of these impacts currently exist under the No-Action Alternative.

Cumulative impacts to wildlife occur primarily as a loss of habitat and habitat fragmentation. Large residential developments along both highway corridors are currently planned and potentially impact important habitat such as black-tailed prairie dog colonies and riparian areas, and could increase runoff into Plum Creek and East Plum Creek. Continued development may eventually cause a shift in species composition from the existing grassland specialists such as ferruginous hawks and burrowing owls, to suburban generalists such as European starlings, and raccoons. This type of shift can lead to a loss in regional biodiversity.

For additional information on wildlife cumulative impacts, see Section 5.3.3.6, *Wildlife Impacts*.

5.4 SUMMARY OF IMPACTS

Information presented in this chapter is summarized in tables for the Preferred Alternative (Table 5.30) and the Other Alternative (Table 5.31).

Table 5.30
Preferred Alternative Summary of Impacts

Resource	I-25 Corridor	US 85 Corridor
Neighborhood	None	None
Environmental Justice	None	None
Relocation	None	Nine relocations
Right-of-Way	10.1 ha (25.0 ac)	49.4 ha (122 ac)
Recreational Resources	None	Centennial Trail: 2 m (6.5 ft) High Line Canal Trail: 124 m (410 ft) Spring Gulch: 0.2 ha (0.6 ac)
Land Use	Changes to higher density use	Changes to higher density use
Air Quality	None	None
Water Quality and Quantity	Minimal impacts to water quality Impervious area: 1,048,801 m ² (11,285,096 ft ²)	Potential improvements to water quality Impervious Area: 711,452 m ² (7,655,223 ft ²)
Vegetation	73.6 ha (182 ac)	68 ha (169 ac)
Wetlands	0.10 ha (0.25 ac) wetlands 0.19 ha (0.48 ac) Other Waters of US	0.10 ha (0.25 ac) wetlands 0.46 ha (1.14 ac) Other Waters of the US
Geology	None	None
Wildlife	67.5 ha (166.8 ac) loss of habitat	61.0 ha (151 ac) loss of habitat
Wild and Scenic Rivers	None	None
Floodplains	Happy Canyon Creek #1 and #2, Tributary A, Tributary D, Hangman's Gulch, and East Plum Creek #1 and #2 are expected to be directly impacted	Marcy Gulch, No Name #1, No Name #2, No Name #3, Indian Creek, Tributary A, Tributary B, and Tributary C are expected to be directly impacted
Threatened, Endangered, and Other Special-Status Species	Black-tailed prairie dog: 0.10 ha (0.24 ac) PMJM: 1.76 ha (4.36 ac)	Black-tailed prairie dog: 2.47 ha (6.1 ac)
Historic Resources	D&RG RR: 870 m (2,850 ft)	AT&SF Railway: 4.3 m (14 ft) Cherokee Ranch: 5.1 ha (12.5 ac)
Section 4(f) Properties	D&RG RR: 870 m (2,850 ft)	High Line Canal Trail: 124 m (410 ft) Spring Gulch: 0.2 ha (0.6 ac) AT&SF Railway: 4.3 m (14 ft) Cherokee Ranch: 5.1 ha (12.5 ac) Cherokee Ranch Conservation Easement: 6.5 ha (15.9 ac)
Archaeological Resources	Potential impacts to two sites	Potential impacts to one site
Paleontological Resources	Potential impacts to one site	Potential impacts to one site
Prime and Unique Farmland	No Prime and Unique Farmland impacts 1.34 ha (3.3 ac) of High Potential Dry Cropland	No Prime and Unique Farmland impacts 17.4 ha (43.0 ac) of High Potential Dry Cropland
Noise	25 receivers	7 receivers
Visual Character	Change in visual character	Change in visual character
Hazardous Waste Sites	Further investigation needed	Further investigation needed

Table 5.31
Other Alternative Summary of Impacts

Resource	I-25 Corridor	US 85 Corridor
Neighborhood	None	None
Environmental Justice	None	None
Relocation	None	Nine relocations
Right-of-Way	28.9 ha (71.4 ac)	51.4 ha (127 ac)
Recreational Resources	None	Centennial Trail: 2 m (6.5 ft) High Line Canal Trail: 124 m (410 ft) Spring Gulch: 0.2 ha (0.6 ac)
Land Use	Changes to higher density use	Changes to higher density use
Air Quality	None	None
Water Quality and Quantity	Minimal impacts to water quality Impervious area: 1,191,194 m ² (12,817,247 ft ²)	Potential improvements to water quality Impervious Area: 732,544 m ² (7,882,178 ft ²)
Vegetation	104.1 ha (257.4 ac)	70.5 ha (174.2 ac)
Wetlands	0.15 ha (0.38 ac) wetlands 0.35 ha (0.85 ac) Other Waters of the US	0.10 ha (0.25 ac) wetlands 0.46 ha (1.14 ac) Other Waters of the US
Geology	None	None
Wildlife	98 ha (242.2 ac) loss of habitat	63.1 ha (156 ac) loss of habitat
Wild and Scenic Rivers	None	None
Floodplains	Happy Canyon Creek #1 and #2, Tributary A, Tributary D, Hangman's Gulch, and East Plum Creek #1 and #2 are expected to be directly impacted	Marcy Gulch, No Name #1, No Name #2, No Name #3, Indian Creek, Tributary A, Tributary B, and Tributary C are expected to be directly impacted
Threatened, Endangered, and Other Special-Status Species	Black-tailed prairie dog: 0.07 ha (0.18 ac) PMJM: 1.76 ha (4.36 ac)	Black-tailed prairie dog: 2.47 ha (6.1 ac)
Historic Resources	D&RG RR: 870 m (2,850 ft)	AT&SF Railway: 4.3 m (14 ft) Cherokee Ranch: 5.1 ha (12.5 ac)
Section 4(f) Properties	D&RG RR: 870 m (2,850 ft)	High Line Canal Trail: 124 m (410 ft) Spring Gulch: 0.2 ha (0.6 ac) AT&SF Railway: 4.3 m (14 ft) Cherokee Ranch: 5.1 ha (12.5 ac) Cherokee Ranch Conservation Easement: 6.5 ha (15.9 ac)
Archaeological Resources	Potential impacts to three sites	Potential impacts to one site
Paleontological Resources	Potential impacts to one site	Potential impacts to one site
Prime and Unique Farmland	No Prime and Unique Farmland impacts 1.34 ha (3.3 ac) of High Potential Dry Cropland	No Prime and Unique Farmland impacts 17.4 ha (43 ac) of High Potential Dry Cropland
Noise	25 receivers	7 receivers
Visual Character	Change in visual character	Change in visual character
Hazardous Waste Sites	Further investigation needed	Further investigation needed

6.0 SECTION 4(f) EVALUATION

TABLE OF CONTENTS

<u>Section</u>	<u>Page</u>
<u>6.0 SECTION 4(f) EVALUATION</u>	1
<u>6.1 INTRODUCTION</u>	1
<u>6.2 PROPOSED ACTION</u>	2
<u>6.2.1 No-Action Alternative</u>	2
<u>6.2.2 Preferred Alternative</u>	2
<u>6.2.3 Other Alternative</u>	4
<u>6.3 SECTION 4(f) PROPERTIES</u>	5
<u>6.3.1 I-25 Corridor Section 4(f) Properties Potentially Affected</u>	6
<u>6.3.2 US 85 Corridor Section 4(f) Properties Potentially Affected</u>	8
<u>6.4 IMPACTS TO SECTION 4(f) PROPERTIES</u>	9
<u>6.4.1 No-Action Alternative Section 4(f) Properties Impacts</u>	9
<u>6.4.2 Preferred Alternative and Other Alternative Section 4(f) Properties Impacts</u>	9
<u>6.5 AVOIDANCE ALTERNATIVES</u>	14
<u>6.5.1 No-Action Alternative Avoidance Measures</u>	22
<u>6.5.2 Preferred Alternative and Other Alternative Avoidance Measures</u>	22
<u>6.6 MEASURES TO MINIMIZE HARM</u>	23
<u>6.6.1 No-Action Alternative Measures to Minimize Harm</u>	24
<u>6.6.2 Preferred Alternative and Other Alternative Measures to Minimize Harm</u>	24
<u>6.7 COORDINATION</u>	26
<u>6.8 FINAL SECTION 4(f) STATEMENT</u>	26

6.1 INTRODUCTION

Section 4(f) of the Department of Transportation Act of 1966 (49 U.S.C. 303), declares that "It is the policy of the United States Government that special effort should be made to preserve the natural beauty of the countryside and public park and recreation lands, wildlife and waterfowl refuges, and historic sites."

Section 4(f) applies to publicly owned lands that are managed as parks and recreation areas, wildlife or waterfowl refuges, and to all significant historic sites regardless of ownership. Section 6(f) applies to lands and improvements that are purchased under the Land and Water Conservation Fund. No Section 6(f) properties are within the study area and, therefore, Section 6(f) is not included in this evaluation.

Impacts to Section 4(f) properties resulting from the need to improve the I-25 Corridor and US 85 Corridor must be avoided if possible. If avoidance is not feasible and prudent, then all possible planning to minimize harm to

these properties must be included in the project, in compliance with Section 4(f) of the Department of Transportation Act of 1966 P.L. 89-670, 80 Stat. 934 (as amended 1983, 1987).

Section 4(f) specifies that the Secretary (of Transportation) may approve a transportation program or project (other than any project for a park road or parkway under Section 204 of Title 23) requiring the use of publicly owned land of a public park, recreation area, or wildlife and waterfowl refuge, or land of an historic site of national, state, or local significance (as determined by the federal, state, or local officials having jurisdiction over the park, area, refuge, or site) only if:

- There is no prudent and feasible alternative to using that land
- The program or project includes all possible planning to minimize harm to the park, recreation area, wildlife and waterfowl refuge, or historic site resulting from such use.

The FHWA has adopted regulations on Section 4(f) to guide implementation of this section of federal law. These regulations are outlined in 23CFR 771.135 and discuss when the FHWA may rule that a property is protected under Section 4(f). This regulation clarifies that the requirements of Section 4(f) apply to publicly owned land of a public park, recreation area, wildlife or waterfowl refuge. It also discusses that Section 4(f) applies to significant historic sites only when they are on or eligible for the National Register of Historic Places (NRHP) and any land from an historic site of national, state, or local significance unless the FHWA determines otherwise. Historic properties are eligible for the NRHP if they meet one or more of the following criteria:

- a. are associated with events that have made a significant contribution to the broad patterns of our history
- b. are associated with lives of persons significant in our past
- c. embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction
- d. have yielded, or may be likely to yield, information important in prehistory or history

NRHP sites are also protected by Section 106 of the National Historic Preservation Act (NHPA). This act requires federal agencies to consult with the State Historic Preservation Officer (SHPO) and the Advisory Council on Historic Preservation (ACHP) regarding the effect of their undertaking on historic properties. This Section 4(f) Evaluation summarizes and incorporates the ongoing results of this consultation process.

None of the archaeological sites have been determined eligible for the NRHP, therefore, they are not included in this evaluation. The identified paleontological sites are not located on federal lands, are not listed on the NRHP, and are thus not considered Section 4(f).

The FHWA (Division Administrator) is responsible for determining that this project meets criteria and procedures set forth in this regulation.

6.2 PROPOSED ACTION

The purpose of the South I-25 Corridor and US 85 Corridor Environmental Impact Statement (EIS) is to develop a transportation solution that addresses transportation capacity inadequacies and safety problems in the I-25 Corridor and US 85 Corridor, while avoiding or minimizing adverse environmental impacts. Refer to Chapter 1.0, *Purpose and Need*, for a complete description of the purpose and need for this project.

FHWA, in conjunction with the Colorado Department of Transportation (CDOT), proposes to widen and improve 27.2 kilometers (17 miles) of I-25 between C-470 at milepost (MP) 195 and the southern limit of Castle Rock at MP 178, and 25.8 kilometers (16 miles) of US 85 between C-470 at MP 200 and Castle Rock MP 184. Figure 6.1 shows the project vicinity map. The Final EIS (FEIS) proposes three alternatives for the I-25 Corridor and the US 85 Corridor. These alternatives are briefly described here. For a complete description of the alternatives refer to Chapter 2.0, *Alternatives*.

6.2.1 No-Action Alternative

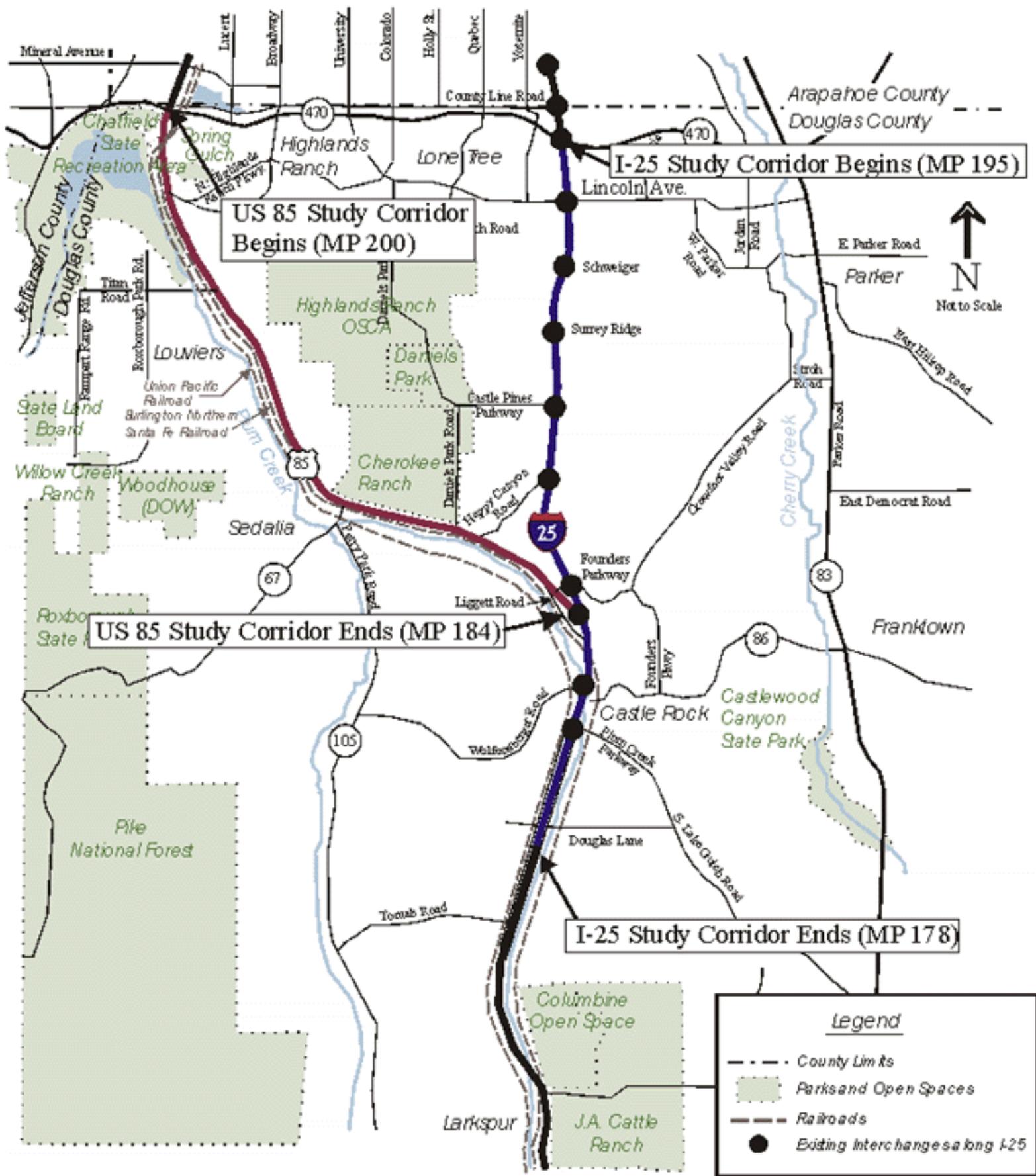
This alternative includes no major improvements other than previously committed Early-Action projects, the Douglas Lane Interchange, and minor safety and maintenance improvements.

6.2.2 Preferred Alternative

The Preferred Alternative consists of various improvements to the I-25 Corridor and US 85 Corridor such as mainline widening, mainline realignment, and interchange reconfiguration. All Early-Action projects and the Douglas Lane Interchange are included in this alternative. Major components of the Preferred Alternative along the I-25 Corridor include:

- Eight lanes (six through lanes and two climbing lanes) between C-470 and Meadows/Founders Parkway
- Six lanes between Meadows/Founders Parkway and Douglas Lane

Figure 6.1
I-25 Corridor and US 85 Corridor Vicinity Map



- Reconstruction of the Schweiger Interchange into a half diamond (improve northern ramps and remove southern ramps)

- Reconstruction of the Surrey Ridge Interchange into a three-quarter diamond (improve southern ramps and northbound entrance ramp; remove southbound exit ramp)
- Car pool lot (accommodating 500 spaces) in northeast quadrant of the I-25 and Castle Pines Parkway Interchange
- Minor I-25 realignment to the east between Wolfensberger Road and Liggett Road
- Construction of a new Union Pacific Railroad bridge south of the existing bridge

Major components of the Preferred Alternative along the US 85 Corridor include:

- Six lanes between C-470 and Highlands Ranch Parkway
- Four lanes between Highlands Ranch Parkway and Meadows Parkway
- US 85/State Highway (SH) 67 Intersection reconfiguration
- Sedalia frontage road
- US 85 minor realignment at Cook Ranch (MP 195.4)
- Bicycle/pedestrian facility along US 85
- Grade-separated crossing under US 85 for High Line Canal
- Enhanced wildlife crossings

6.2.3 Other Alternative

The Other Alternative consists of all elements included in the Preferred Alternative and additional improvements along the I-25 Corridor and US 85 Corridor. Some of the additional improvements include actions that will be funded by other agencies or private sectors. All Early-Action projects and the Douglas Lane Interchange are included in this alternative. Major components of the Other Alternative along the I-25 Corridor include:

- Eight lanes (six through lanes and two climbing lanes) between C-470 and Meadows/Founders Parkway
- Six lanes between Meadows/Founders Parkway and Douglas Lane
- Diamond interchange at proposed Rampart Range Development
- Reconstruction of the Surrey Ridge Interchange to a diamond interchange
- Removal of Schweiger Interchange ramps

- Frontage road on the east side of I-25 from Castle Pines Parkway to proposed Rampart Range Interchange (connection provided to Surrey Ridge Road and Schweiger)
- Castle Pines Parkway Interchange reconstruction with loop ramp in southeast quadrant
- Car pool lot (accommodating 500 spaces) in northeast quadrant of the I-25 and Castle Pines Parkway Interchange
- Happy Canyon Road Bridge widening
- Minor I-25 realignment to the east between Wolfensberger Road and Liggett Road
- Construction of a new Union Pacific Railroad bridge south of the existing bridge

Major components of the Other Alternative along the US 85 Corridor include:

- Six lanes between C-470 and Titan Road
- Four lanes between Titan Road and Meadows Parkway
- US 85/SH 67 Intersection reconfiguration
- Sedalia frontage road
- US 85 minor realignment at Cook Ranch (MP 195.4)
- Bicycle/pedestrian facility along US 85
- Grade-separated crossing under US 85 for High Line Canal
- Enhanced wildlife crossings

6.3 SECTION 4(f) PROPERTIES

Seventeen properties within the area of potential effect (APE) are protected under Section 4(f). The proposed improvements do not result in a Use or Constructive Use of land from 11 of these properties. Properties within the APE not impacted by any of the alternatives or improvement options include:

- Centennial Trail
- Castle Rock Baseball Field and Park Complex
- Front Street Trail

- East Plum Creek Trail
- Stewart Residence (5DA1258)
- Denver and Rio Grande (D&RG) Railroad Depot (5DA216)
- Chatfield State Park
- High Line Canal (5DA600)
- Chatfield East Park
- Cook Ranch (5DA914)
- Sedalia Water Tank (5DA1385)

The above properties are not impacted by the project, and are not discussed in this Final Section 4(f) Properties Evaluation. Two properties, Cook Ranch (5DA914) and a segment of the High Line Canal (5DA600), were included in the Draft Section 4(f) Evaluation, but have been removed from the Final Section 4(f) Evaluation.

High Line Canal (5DA600). FHWA and SHPO have determined that the proposed action results in no effect to the High Line Canal. This segment of the High Line Canal where the canal passes beneath US 85 in a concrete culvert has officially been determined a non-contributing segment of the High Line Canal.

Cook Ranch (5DA914). As described in the Supplemental Section 4(f) Evaluation, none of the alternatives in the FEIS will take property from Cook Ranch. The Preferred Alternative and the Other Alternative realign US 85 away from the property. The FHWA and SHPO have determined that this will have no effect to Cook Ranch.

Six Section 4(f) properties may be affected by the FEIS alternatives. Figure 6.2 and Table 6.1 identify these properties.

Table 6.1
Section 4(f) Properties Potentially Affected

Property Number*	Property Name	Corridor Location	Property Type
1	Denver and Rio Grande Railroad (5DA921.1)	I-25	Historic
2	High Line Canal Trail	US 85	Recreation
3	Spring Gulch Equestrian Facility	US 85	Recreation
4	Cherokee Ranch Conservation Easement	US 85	Wildlife refuge
5	Cherokee Ranch Historic District (5DA708)	US 85	Historic
6	Atchison, Topeka & Santa Fe Railway (5DA922.1)	US 85	Historic

*Property number corresponds to numbers on Figure 6.2.

6.3.1 I-25 Corridor Section 4(f) Properties Potentially Affected

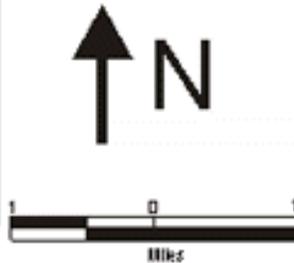
6.3.1.1 Denver and Rio Grande Railroad (5DA921.1)

The D&RG Railroad, currently operating as the Union Pacific Railroad, runs parallel to the west side of US 85 throughout most of the project area. It generally follows Plum Creek between Douglas County's northern boundary and Castle Rock. At Castle Rock, it crosses I-25 and then continues south. It is a standard gauge rail constructed of steel and timber with concrete and timber bridges. The standard gauge rail replaced the original narrow gauge rail in 1881. The D&RG held a virtual monopoly on the lucrative trade between Colorado Springs and Denver until 1881, when the railroad agreed to share its line with the Atchison, Topeka and Santa Fe (AT&SF) Railway. Over the years, the railroad contributed greatly to the growth of Douglas County ranching as well as merchandising, lumbering, and coal mining. The railroad remains in operation today and retains much of its original alignment throughout the Plum Creek valley. This segment of the D&RG Railroad is eligible for the NRHP because of its connection to the early transportation and development of the area, and because it follows the original right-of-way (ROW) and maintains integrity of design (Criterion a). Segment 5DA922.3 is not affected by the project and is not discussed in this Final Section 4(f) Evaluation.

Figure 6.2
Section 4(f) Properties within the I-25 Corridor and US 85 Corridor



Legend:	
1	D&RG Railroad (5DA921.1)
2	High Line Canal Trail
3	Spring Gulch Equestrian Facil.
4	Cherokee Ranch Conservation Easement
5	Cherokee Ranch Historic Dist. (5DA708)
6	AT&SF Railway (5DA922.1)



6.3.2 US 85 Corridor Section 4(f) Properties Potentially Affected

6.3.2.1 High Line Canal Trail

The High Line Canal Trail is approximately 120 kilometers (75 miles) long, and follows the High Line Canal. It includes both paved and unpaved segments and is used for walking, running, biking, and horseback riding. The trail crosses US 85 at-grade approximately 1.1 kilometers (0.7 mile) south of C-470, at MP 199.6. The trail begins at Waterton Canyon and the South Platte River and extends to I-70 and Tower Road. This section of the trail is unpaved and is maintained by the Highlands Ranch Metro District.

6.3.2.2 Spring Gulch Equestrian Facility

Spring Gulch Equestrian Facility encompasses 42.5 hectares (105 acres) and is open to the public for equestrian training and competitive activities. It is located on the east side of US 85 at MP 199.0. In 1999, 8,565 visitors used the facility. The property is owned by the United States Army Corps of Engineers (USACE), is leased to Colorado State Parks, and is maintained and operated by Chatfield State Park. Access to the facility is from US 85. This facility is divided into two distinct areas by a flood control dam built by the USACE. The upper area, where most of the recreation occurs, is not visible from US 85. The lower area, adjacent to US 85, consists of the access road, a few jumps, and a trail that loops around the dam back to the upper recreation area. The land directly adjacent to US 85 is very steep and is not used for recreation.

6.3.2.3 Cherokee Ranch Conservation Easement

The Cherokee Ranch Conservation Easement includes 1,270.8 hectares (3,140 acres) of Cherokee Ranch north of US 85. The property borders US 85 for approximately 3.2 kilometers (2 miles) in the vicinity of Sedalia between approximately MP 190.7 and MP 188.3. This property is privately owned with a publicly owned no-build easement. While not officially designated as a wildlife refuge, it is included in this evaluation due to its current use as a potential refuge. Approximately 400 elk live on Cherokee Ranch year-round. In addition, an active golden eagle nest has been documented on the ranch. The purchase of this conservation easement was part of

Douglas County's overall plan to maintain community buffers through open space and support the region's biologically diverse environment.

6.3.2.4 Cherokee Ranch Historic District (5DA708)

Cherokee Ranch Historic District includes approximately 1,330 hectares (3,280 acres). The district borders US 85 for approximately 3.2 kilometers (2 miles) in the vicinity of Sedalia between approximately MP 190.4 and MP 188.3. It was listed on the NRHP in 1994 because of its significant association with local exploration and settlement of the area, as well as the property's wide variety of types, periods, and methods of construction (Criterion a and Criterion c). Twenty-six contributing and 10 non-contributing resources are within the historic district. Two contributing resources exist within the APE. The first is a decorative stone and wrought iron gate at the ranch entrance in Sedalia. The gate was designed by Burnam Hoyt between 1925 and 1926. It consists of two stone piers on either side of Rattlesnake Road connected to a stone wall. A sign supported by two metal poles bears the name "Cherokee Ranch." A ponderosa pine is planted on each side of the gate. The second contributing resource is Rattlesnake Road. It is the original road leading into the ranch, and was built by Elmer Blunt and his son Ray in 1924. The road has never been paved and is no longer in use.

6.3.2.5 Atchison, Topeka, and Santa Fe Railway (5DA922.1)

The AT&SF Railway, currently operating as the Burlington Northern Santa Fe Railroad, runs parallel to the west side of US 85 throughout most of the project area. It is a standard gauge rail constructed of steel track on wooden ties set in rock ballasts. The grade is approximately 1.2 meters (4 feet) high and 7.6 meters (25 feet) across. These segments, built in 1887, are a significant portion of the AT&SF company line into Denver from Colorado Springs and Pueblo. The AT&SF's entry into the Colorado market enhanced the state's transportation and accessibility to the rest of the nation, and provided competition to other lines. These segments of the AT&SF Railway are eligible for the NRHP because of their connection to the area's early transportation and development, and because they follow the original ROW and maintain the integrity of design (Criterion a).

6.4 IMPACTS TO SECTION 4(f) PROPERTIES

Two types of impacts to designated Section 4(f) properties require evaluation and determination:

- A direct impact to a Section 4(f) property (park or historic property) resulting from taking of a portion of or all of the property
- Any action by the project, while not amounting to a direct taking, that would "substantially impair" the current use of the resource by such intrusions as ecology, noise, air, or visual impacts, as well as vibration impacts, could constitute a "constructive use" of the Section 4(f) property.

An evaluation of impacts to those Section 4(f) properties identified in Table 6.1 is presented by corridor. Two linear properties, the D&RG Railroad (5DA921.1) and the AT&SF Railway (5DA922.1) pass through both corridors. For a complete description of the alternatives, refer to Chapter 2.0, *Alternatives*. Coordination for this project has occurred with representatives of CDOT, FHWA, SHPO, Douglas County, Colorado State Parks, Town of Castle Rock, USACE, and various local agencies and private groups.

Six Section 4(f) properties within the project area require land acquisition by the project. Table 6.2 summarizes

the Section 4(f) properties land acquisition required.

6.4.1 No-Action Alternative Section 4(f) Properties Impacts

No properties protected under Section 4(f) are taken by the No-Action Alternative.

6.4.2 Preferred Alternative and Other Alternative Section 4(f) Properties Impacts

6.4.2.1 I-25 Corridor Section 4(f) Properties Impacts

This section considers potential impacts to the one Section 4(f) property within the I-25 Corridor APE (D&RG Railroad) by the Preferred Alternative and the Other Alternative.

Table 6.2
Section 4(f) Properties Land Acquisition

Property Name	Figure Number	Corridor Location	Property Type	Project Take
Denver and Rio Grande Railroad (5DA921.1)	6.3	I-25/US 85	Historic	870 m (2,850 ft)
High Line Canal Trail	6.4	US 85	Recreation	124 m (410 ft)
Spring Gulch Equestrian Facility	6.5	US 85	Recreation	0.2 ha (0.6 ac)
Cherokee Ranch Conservation Easement	6.6	US 85	Wildlife Refuge	6.5 ha (15.9 ac)
Cherokee Ranch Historic District (5DA708)	6.6	US 85	Historic	5.1 ha (12.5 ac)
AT&SF Railway (5DA922.1)	6.7	I-25/US 85	Historic	4.3 m (14 ft)

Denver and Rio Grande Railroad (5DA921.1) at MP 182.3

The Preferred Alternative and the Other Alternative result in acquisition from the D&RG Railroad. The existing railroad bridge over I-25 is not wide enough to accommodate the proposed expansion of I-25 to six lanes. Therefore, a new bridge is included in the Preferred Alternative and Other Alternative to be constructed approximately 14 meters (46 feet) south of the existing bridge. This requires the realignment of the railroad resulting in demolition of the existing (non-contributing) bridge and approximately 215 meters (705 feet) of the existing railroad bed. An additional 655 meters (2,145 feet) of the railroad bed will be abandoned. In all, 870 meters (2,850 feet) of the historic railroad bed is taken by this project. Figure 6.3 shows impact locations. The FHWA and SHPO have determined that this action will result in an adverse affect on the historic railroad bed.

6.4.2.2 US 85 Corridor Section 4(f) Properties Impacts

This section considers potential impacts to Section 4(f) properties along US 85 by the Preferred Alternative and the Other Alternative. The proposed improvements to US 85 result in a use of land from five properties protected by Section 4(f).

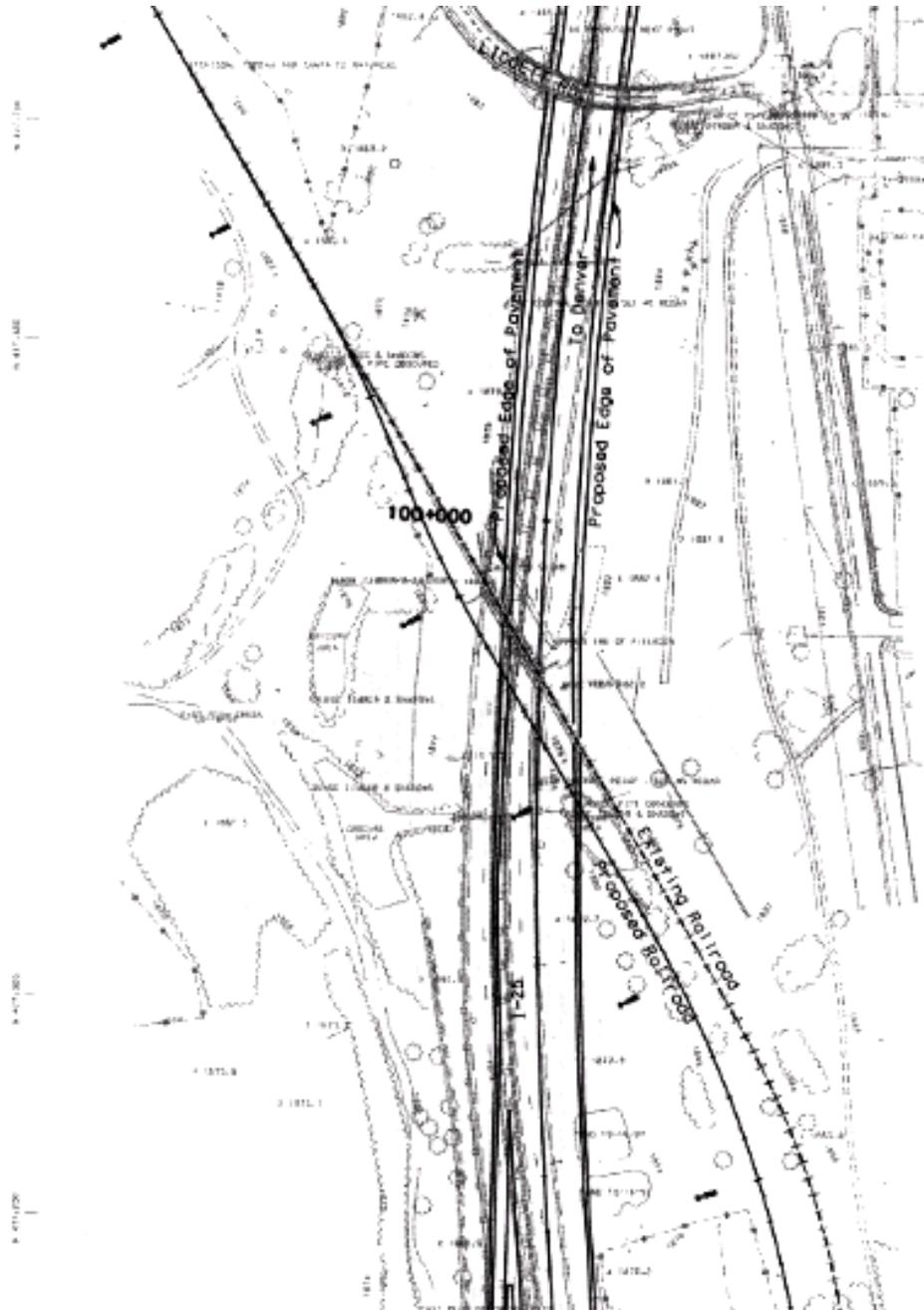
High Line Canal Trail

The Preferred Alternative and the Other Alternative take approximately 124 meters (410 feet) of the High Line Canal trail including 47 meters (155 feet) west of US 85 and 77 meters (255 feet) east of US 85. This take is approximately 0.1 percent of the entire trail. The Preferred Alternative and the Other Alternative include a grade-separated bicycle/pedestrian facility under US 85 at this location. Figure 6.4 illustrates the impact locations.

Spring Gulch Equestrian Facility

The Preferred Alternative and the Other Alternative take approximately 0.2 hectare (0.6 acre) of the Spring Gulch Equestrian Facility where it borders US 85. This take is approximately 0.6 percent of the entire facility. The land directly impacted under this alternative is not used for equestrian recreation, as it is a steep embankment. Figure 6.5 identifies the area of impact to the Spring Gulch Equestrian Facility.

Figure 6.3
Preferred Alternative and Other Alternative
Denver and Rio Grande Railroad Potential Impacts (5DA921.1)



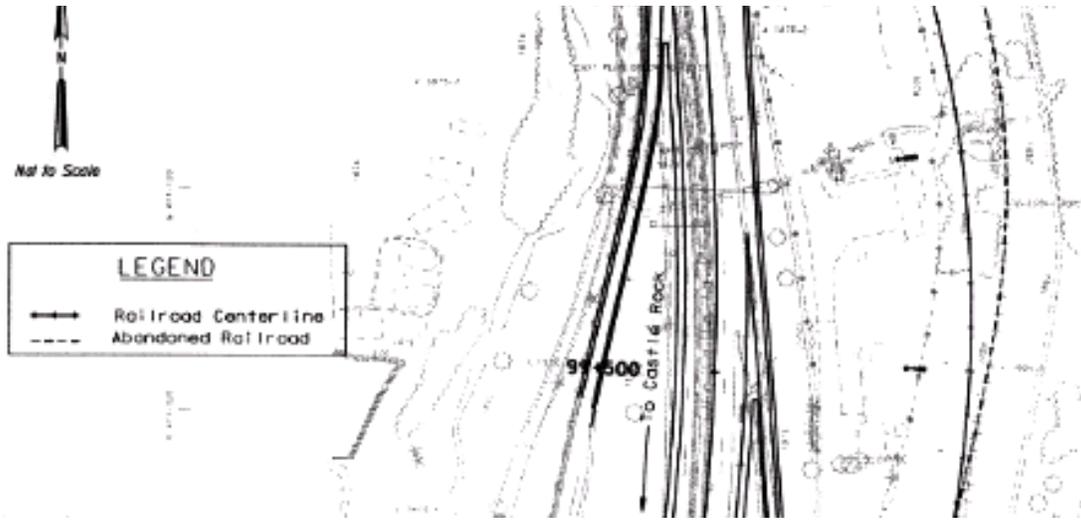
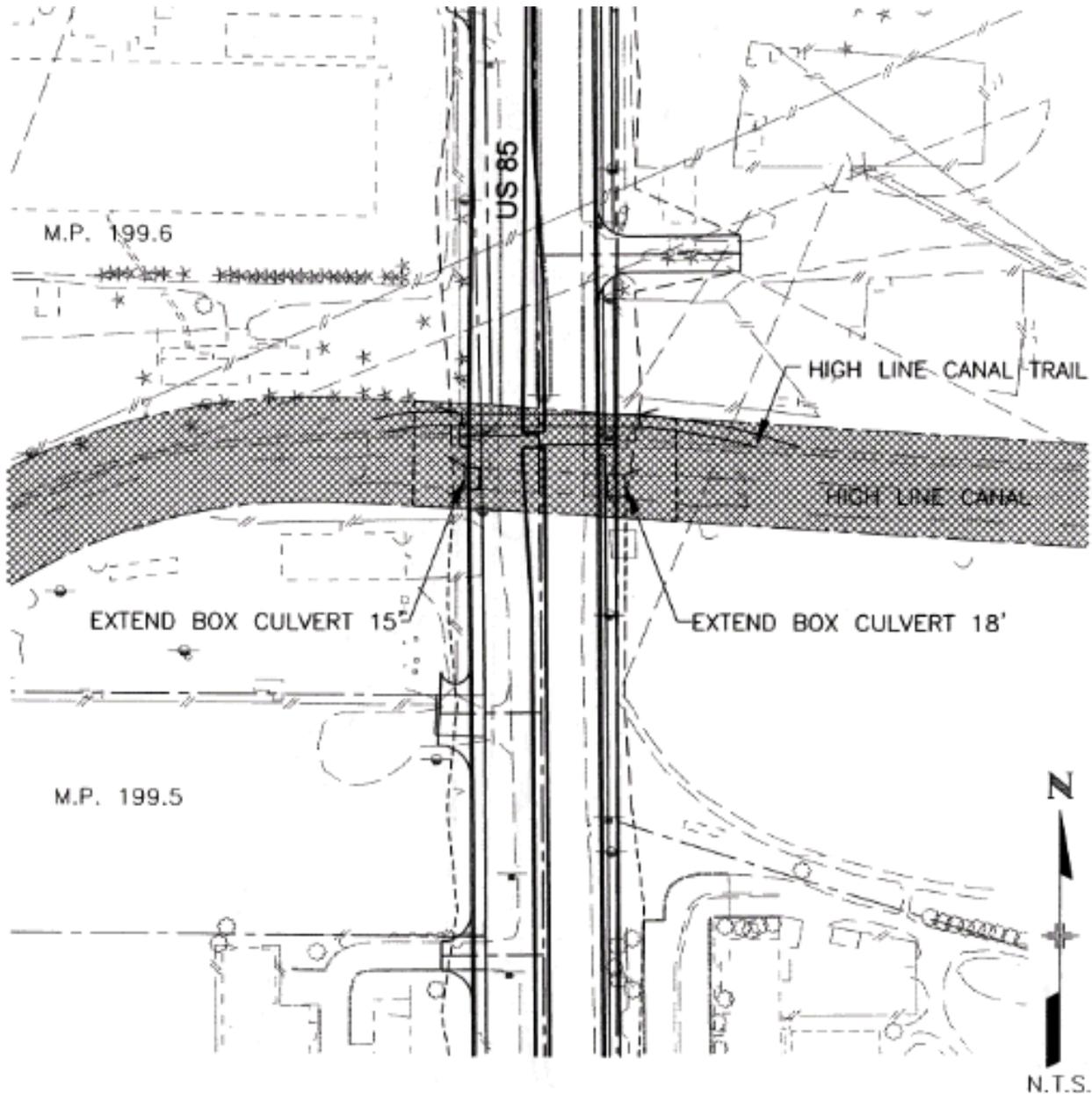


Figure 6.4
Preferred Alternative and Other Alternative
High Line Canal and High Line Canal Trail Potential Impacts
US 85 at MP 199.55



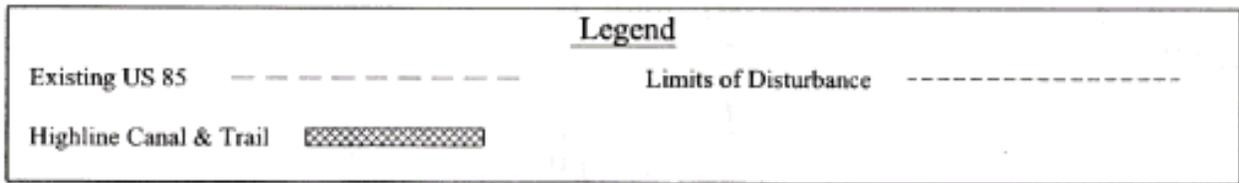
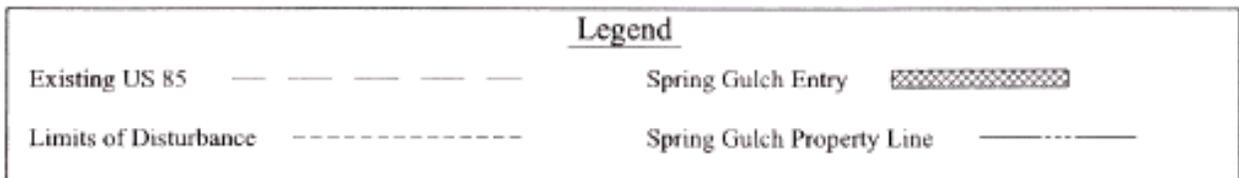
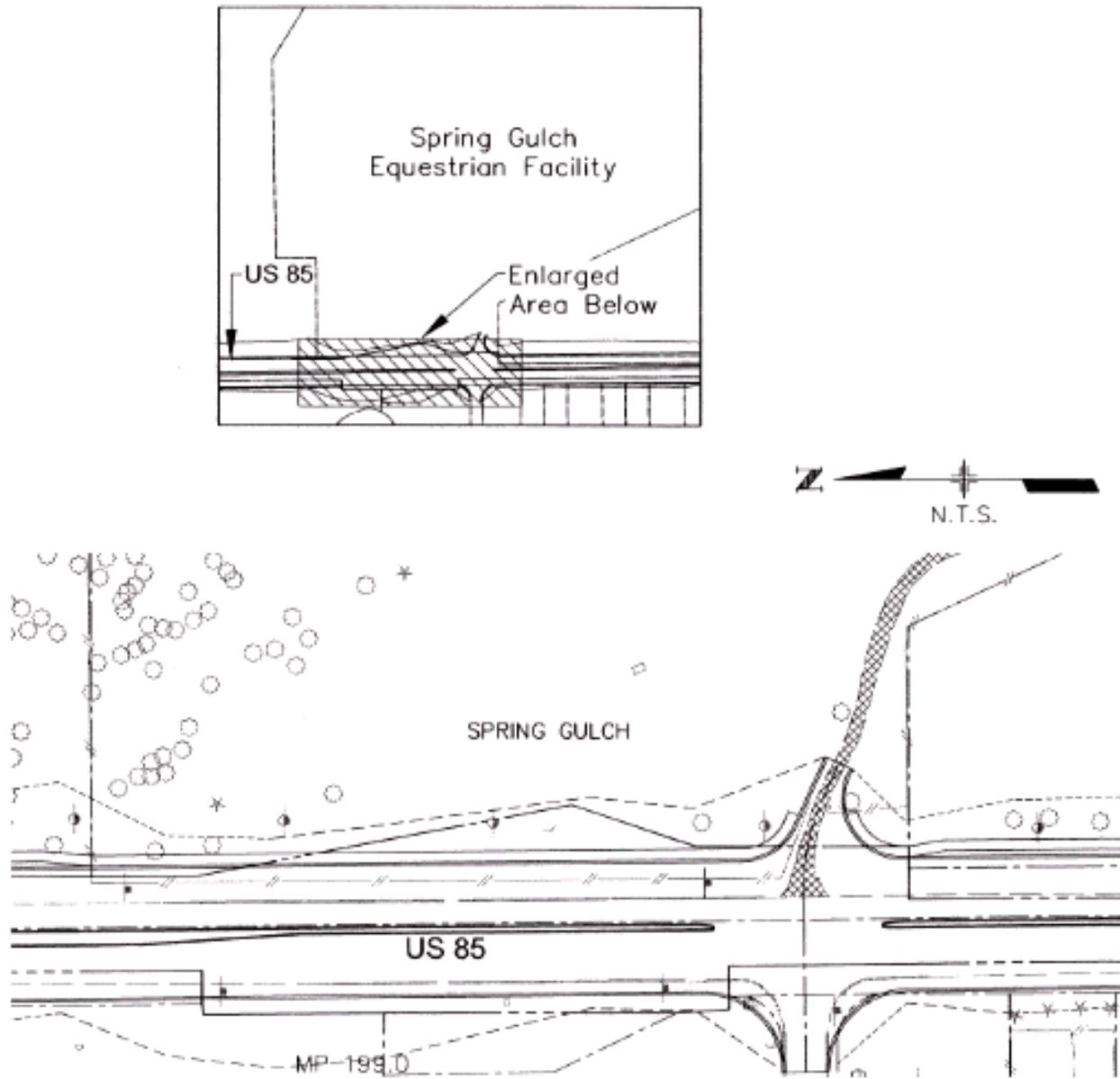


Figure 6.5
Preferred Alternative and Other Alternative
Spring Gulch Equestrian Facility Potential Impacts
US 85 at MP 199



Cherokee Ranch Conservation Easement

The Preferred Alternative and the Other Alternative take approximately 6.4 hectares (15.7 acres) of the Cherokee Ranch Conservation Easement. This take is approximately 0.5 percent of the entire easement. Figure 6.6a through Figure 6.6e identify the area of impact to the Cherokee Ranch Conservation Easement.

Cherokee Ranch Historic District (5DA708)

The Preferred Alternative and the Other Alternative take approximately 5.1 hectares (12.5 acres) of this site, including an historic gate and a segment of road. This take is approximately 0.4 percent of the entire district. The original main gate and a segment of Rattlesnake Road, both built between 1925 and 1926, and contributing elements of the district, are within the construction zone. Figure 6.6a through Figure 6.6e identify the area of impact to the Cherokee Ranch Historic District. The FHWA and SHPO have determined that this action will result in an adverse affect on the original main gate and on the Rattlesnake Road.

Atchison, Topeka & Santa Fe Railway (5DA922.1)

The Preferred Alternative and the Other Alternative proposed improvements to the existing railroad crossing on SH 67 and result in a take of property. These improvements include widening and replacing the current road base. The railroad crossing remains at-grade. The future build alternatives take approximately 4.3 meters (14 feet) of the railroad including approximately 2.7 meters (9 feet) west of SH 67 and approximately 1.6 meters (5 feet) east of SH 67. Total impacts, including temporary construction, are approximately 21.3 meters (69.9 feet) west of the existing roadway and 18.3 meters (60 feet) east of the existing roadway. Figure 6.7 identifies the area of impact to the AT&SF Railway. The FHWA and SHPO have determined that this action will result in no adverse affect to historic properties because the overall use and historic value of the railroad will not change.

6.5 AVOIDANCE ALTERNATIVES

Properties protected under Section 4(f) must not be taken unless there is no feasible and prudent alternative to the use of such land. In addition, the program or project must include all planning to minimize harm to Section 4(f) properties.

An evaluation process considered more than 80 different alternatives for I-25 and US 85 and reduced the number of alternatives to those that are most reasonable and best able to meet the project objectives. This evaluation process has involved extensive public/agency coordination since the project began in October 1998. Coordination included meetings with community groups, agencies, developers, landowners, special interest groups, and the general public. The alternatives evaluated in this FEIS are those determined to best meet the purpose and need of this project (see Chapter 1.0, *Purpose and Need*), while avoiding, to the maximum extent possible, impacts to Section 4(f) properties.

This section evaluates measures and alternatives that may be available to avoid impacts to Section 4(f) properties. Avoidance alternatives for each resource are listed by corridor.

[Figure 6.6a](#) [Preferred Alternative and Other Alternative](#)

Cherokee Ranch Conservation Easement and Historic District (5DA708)

US 85 Between MP 190.6 and MP 190.3

(1 of 5)

Figure 6.6b

Preferred Alternative and Other Alternative

Cherokee Ranch Conservation Easement and Historic District (5DA708)

US 85 Between MP 190.3 and MP 188.2

(2 of 5)

Figure 6.6c

Preferred Alternative and Other Alternative

Cherokee Ranch Conservation Easement and Historic District (5DA708)

US 85 Between MP 190.3 and MP 188.2

(3 of 5)

Figure 6.6d

Preferred Alternative and Other Alternative

Cherokee Ranch Conservation Easement and Historic District (5DA708)

US 85 Between MP 190.3 and MP 188.2

(4 of 5)

Figure 6.6e

Preferred Alternative and Other Alternative

Cherokee Ranch Conservation Easement and Historic District (5DA708)

US 85 Between MP 190.3 and MP 188.2

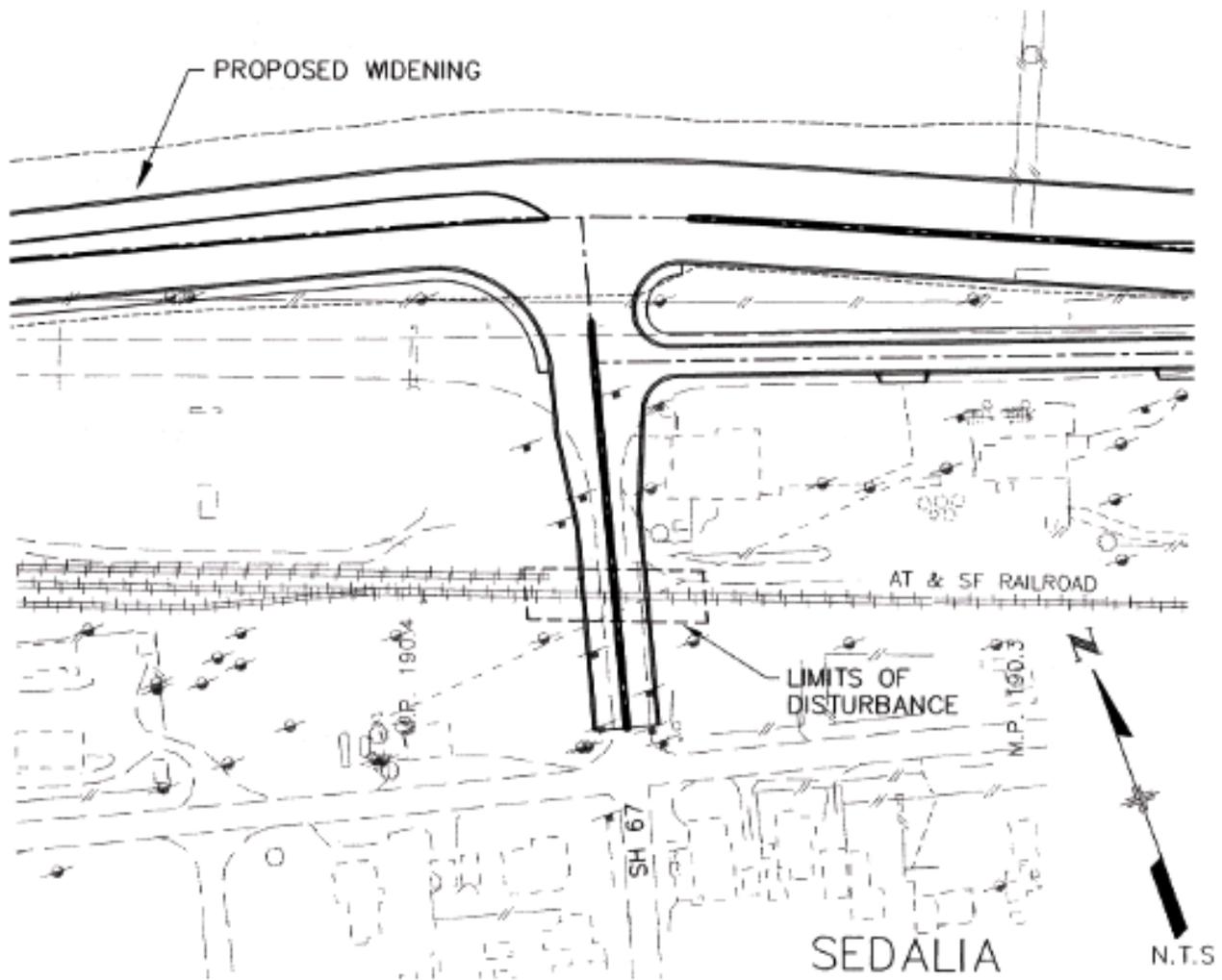
(5 of 5)

Figure 6.7

Preferred Alternative and Other Alternative

Atchison, Topeka & Santa Fe Railway (5DA922.1) Potential Effects

US 85 at MP 190.4



Legend	
Existing US 85	-----
Limits of Disturbance	-----

6.5.1 No-Action Alternative Avoidance Measures

No properties protected under Section 4(f) are impacted under the No-Action Alternative. Therefore, no avoidance measures are required.

6.5.2 Preferred Alternative and Other Alternative Avoidance Measures

6.5.2.1 I-25 Corridor Avoidance Measures

Denver and Rio Grande Railroad (5DA921.1) at MP 182.3

The Preferred Alternative and the Other Alternative result in a use of property from the D&RG Railroad. Because the railroad and I-25 cross one another at this point in Castle Rock and because the existing piers are preventing

widening of I-25, no other feasible alternatives that avoid use of this resource are available.

No prudent and feasible alternatives that meet the purpose and need of this project and that avoid impacting this resource are available.

6.5.2.2 US 85 Corridor Avoidance Measures

High Line Canal Trail

The Preferred Alternative and the Other Alternative result in a use of property from the High Line Canal Trail. Because the trail follows the High Line Canal (which passes beneath US 85 in a concrete culvert at this location) and crosses the highway at-grade, moving the alignment in any direction does not avoid the use of land. Any improvements in this area result in a use of trail property.

No prudent and feasible alternatives that meet the purpose and need of this project and that avoid impacting this resource are available.

Spring Gulch Equestrian Facility

The Preferred Alternative and the Other Alternative result in a use of property from the Spring Gulch Equestrian Facility along US 85. The property taken under both alternatives is at the base of a steep embankment; this property is not currently used for equestrian training. Use of this property does not impact operation of the facility. Moving the alignment to the west impacts a functional segment of the High Line Canal, potentially impacts the High Line Canal Trail, and requires the removal of several large warehouse/commercial buildings along US 85.

No prudent and feasible alternatives that meet the purpose and need of this project and that avoid impacting this resource are available.

Cherokee Ranch Conservation Easement

The Preferred Alternative and the Other Alternative result in a use of land from the Cherokee Ranch Conservation Easement. Shifting the alignment to the south to avoid the conservation easement is not feasible for two reasons. First, a left-turn storage length of 73.2 meters (240 feet) is required on SH 67 between US 85 and the Burlington Northern Santa Fe Railroad tracks. This storage length is based on projected (2020) traffic volumes at the SH 67/US 85 Intersection. This storage must be located between the railroad and the intersection to avoid forcing vehicles to stop on the railroad tracks. By shifting the US 85 alignment to the south, this storage length is not accommodated, thus creating a safety hazard. In addition, three businesses border US 85 in Sedalia. Moving the alignment to the south requires the relocation of these businesses. Sedalia is a small rural community and these businesses are an integral part of the town. Their removal causes disruption to community cohesiveness. Alternatives to move the railroad line were examined but were determined not prudent due to costs (approximately \$19 million, not including ROW) and community and business disruption.

No prudent and feasible alternatives that meet the purpose and need of this project and that avoid impacting this resource are available.

Cherokee Ranch Historic District (5DA708)

The Preferred Alternative and the Other Alternative result in a use of land from the Cherokee Ranch Historic District. Shifting the alignment to the south to avoid the Historic District is not feasible for two reasons. First, a left-turn storage length of 73.2 meters (240 feet) is required based on projected traffic volumes at the SH 67 and US 85 Intersection. This storage must be located between the railroad and the intersection to avoid forcing vehicles to stop on the railroad tracks. By shifting the US 85 alignment to the south, this storage length is not accommodated, thus creating a safety hazard. In addition, three businesses border US 85 in Sedalia. Moving the alignment to the south requires removing these buildings. Sedalia is a small rural community and these businesses are integral to the town. The building removal would cause disruption to community cohesiveness. Alternatives to move the railroad line were examined but were determined not prudent due to costs (approximately \$19 million, not including ROW) and community and business disruption.

No prudent and feasible alternatives that meet the purpose and need of this project and that avoid impacting this resource are available.

Atchison and Santa Fe Railway (5DA922.1) at SH 67

The Preferred Alternative and the Other Alternative result in a use of the land from the AT&SF Railway. The railroad runs the full length of US 85; therefore, moving the road to another location does not avoid impacts to this resource. Passing over or under the railroad is not feasible due to the close proximity of homes and business and the intersection of SH 67 and US 85.

No prudent and feasible alternatives that meet the purpose and need of this project and that avoid impacting this resource are available.

6.6 MEASURES TO MINIMIZE HARM

This section discusses measures to minimize harm and mitigate the impacts of the FEIS alternatives on each Section 4(f) property determined to be required for the transportation improvements. All properties protected by Section 4(f) that are used by a federal transportation project must include all possible planning to minimize harm to those properties if they cannot be avoided by a feasible and prudent alternative. Table 6.3 at the end of this section summarizes the measures for minimizing harm and the mitigation for each property impacted by the alternatives.

6.6.1 No-Action Alternative Measures to Minimize Harm

No property protected under Section 4(f) is taken under the No-Action Alternative; therefore, there are no measures to minimize harm.

6.6.2 Preferred Alternative and Other Alternative Measures to Minimize Harm

6.6.2.1 I-25 Corridor Measures to Minimize Harm

Denver and Rio Grande Railroad (5DA921.1) at MP182.3

Efforts to minimize harm by the Preferred Alternative and Other Alternative to this Section 4(f) property include:

- Ensuring that the railroad segment in the impact area has been fully documented prior to construction
- Ensuring that the areas temporarily disturbed by construction will be restored to their original condition
- Providing just compensation for all land acquisitions

6.6.2.2 US 85 Corridor Measures to Minimize Harm

High Line Canal Trail

Efforts to minimize harm by the Preferred Alternative and the Other Alternative to this Section 4(f) property include:

- Designing the alternatives with the least possible ROW width to minimize taking part of the trail
- Enhancing the trail with a grade-separated trail crossing of US 85
- Ensuring that the areas temporarily disturbed by construction will be restored to their original condition
- Providing just compensation for all land acquisitions

Spring Gulch Equestrian Facility

Efforts to minimize harm by the Preferred Alternative and the Other Alternative to this Section 4(f) property include:

- Designing the alternatives with the least possible ROW width to minimize taking part of the resource
- Coordinating construction with facility operation to produce the least amount of disturbance possible to use of the facility
- Realigning the portion of the fence that is impacted
- Relocating overhead utilities
- Realigning entrance gate and signing to the area
- Replacing disturbed vegetation
- Paving the driveway entrance 15 meters (50 feet) from US 85 to provide safe exit of longer vehicles
- Providing a left-turn lane into the facility from southbound US 85

- Providing just compensation for all land acquisitions

Cherokee Ranch Conservation Easement

Efforts to minimize harm by the Preferred Alternative and the Other Alternative to this Section 4(f) property include:

- Designing the alternatives with the least possible ROW width to minimize use of property from the Cherokee Ranch Conservation Easement
- Enhancing wildlife crossings along US 85 and Cherokee Ranch
- Ensuring that the areas temporarily disturbed by construction will be restored to their original condition using Douglas County seed mix for reseeded
- Providing just compensation for all land acquisitions

Cherokee Ranch Historic District (5DA708)

Efforts to minimize harm by the Preferred Alternative and the Other Alternative to this Section 4(f) property include:

- Designing the alternatives with the least possible ROW width to minimize use of property from the Cherokee Ranch Historic District
- Preserving the historic gate and its immediate landscaping by moving it to a new location beyond the construction zone (implement through a memorandum of agreement with the SHPO)
- Ensuring that this feature of the historic district has been fully documented prior to moving
- Ensuring that the areas temporarily disturbed by construction will be restored to their original condition
- Providing just compensation for all land acquisitions

Atchison, Topeka and Santa Fe Railway (5DA922.1)

Efforts to minimize harm by the Preferred Alternative and the Other Alternative to this Section 4(f) property include:

- Designing the alternatives with the least possible ROW width to minimize use of property from the D&RG Railroad.
- Providing just compensation for all land acquisitions

In addition to the mitigation strategies listed in this document, the FHWA and CDOT will continue to take all steps necessary to reduce and minimize impacts to the Section 4(f) properties during the design phase. Measures may include constructing and replacing sidewalks and appropriate landscaping within the corridors.

6.7 COORDINATION

This project and the alternatives under consideration have been coordinated over the past two years with the Town of Castle Rock, Douglas County, SHPO, Colorado State Parks, USACE, and other agencies responsible for the administration of Section 4(f) properties within the South I-25 Corridor and US 85 Corridor EIS project area. In addition to the public meetings, several smaller staff-level coordination meetings were held with Douglas County and Castle Rock representatives to explain the project's alternatives and impacts in greater detail. An informal meeting with SHPO staff to discuss the alternatives and the impacts on historic Section 4(f) properties was conducted on March 30, 2000.

Meetings were also held with the Castle Rock Historic Preservation Council on March 30, 2000, and the USACE on April 5, 2000. Several meetings were held with trails groups to discuss planning and impacts. Coordination letters are located at the end of this Final Section 4(f) Properties Evaluation.

6.8 FINAL SECTION 4(f) STATEMENT

Based upon the above considerations, it is determined that there are no feasible and prudent alternatives to the use of land from the D&RG Railroad, the High Line Canal Trail, the Spring Gulch Equestrian Facility, the AT&SF Railway, Cherokee Ranch Conservation Easement, or Cherokee Ranch Historic District, and the proposed action includes all possible planning to minimize harm to these Section 4(f) properties resulting from such use.

Table 6.3 Proposed Mitigation to Impacted Section 4(f) Properties within the I-25/US 85 Corridors Project Area

Property Name	Corridor Location	Property Type	Proposed Mitigation
D&RG Railroad (5DA921.1) at MP 182.3 Eligible to the NRHP under Criterion a and Criterion c	I-25	Historic	Design alternative with the least possible ROW width to minimize impact from overpass construction. Ensure this segment of the railroad has been fully documented prior to construction. Ensure that areas temporarily disturbed by construction are restored to their original condition.
High Line Canal Trail	US 85	Recreation	Design alternative with least possible ROW width to minimize take of property from the High Line Canal Trail. Enhance trail with potential grade-separated trail crossing of US 85. Ensure that areas temporarily disturbed by construction are restored to their original condition.
Spring Gulch Equestrian Facility	US 85	Recreation	Design alternative with the least possible ROW width to minimize taking part of the resource. Coordinate construction with facility operation to produce the least amount of disturbance possible to use of the facility. Realign the portion of the fence that is impacted. Relocate overhead utilities. Realign the entrance gate and signing to the area. Replace disturbed vegetation. Provide a left-turn lane into the facility from southbound US 85. Pave the entrance 15 meters (50 feet) from US 85 to provide safer exit for long vehicles.
Cherokee Ranch Conservation Easement	US 85	Wildlife Refuge	Design alternative with least possible ROW width to minimize take of property. Narrow road cross sections through area. Enhance wildlife crossings along US 85 and Cherokee Ranch. Ensure that areas temporarily disturbed by construction are restored to their original condition using Douglas County seed mix for reseeding.
Cherokee Ranch Historic District (5DA708) Two contributing resources impacted by the Build Alternative: Main Gate & Rattlesnake Road Nominated under Criterion a	US 85	Historic	Design alternative with least possible ROW width to minimize take of property. Remove pedestrian bike trail on the north side of US 85 to reduce the use of property. Narrow road cross sections through area. Preserve the historic gate and its immediate landscaping by moving it to a new location beyond the construction zone. Implement mitigation measures through a memorandum of agreement with the SHPO. Ensure that this feature of the historic district has been fully documented prior to moving including photographic recordation. Ensure that areas temporarily disturbed by construction are restored to their original condition using Douglas County seed mix for reseeding.
AT&SF Railway (5DA922.1) Eligible to NRHP, Criterion a	US 85	Historic	Design alternative with least possible ROW width to minimize take of property.

7.0 MITIGATION

TABLE OF CONTENTS

<u>Section</u>	<u>Page</u>
<u>7.0 MITIGATION</u>	1
<u>7.1 INTRODUCTION</u>	1
<u>7.2 SOCIOECONOMIC</u>	1
<u>7.2.1 Neighborhood</u>	1
<u>7.2.2 Environmental Justice</u>	1
<u>7.2.3 Relocation</u>	1
<u>7.2.4 Right-of-Way Acquisition</u>	2
<u>7.2.5 Recreational Resources</u>	2
<u>7.2.6 Land Use and Zoning</u>	3
<u>7.3 PHYSICAL IMPACTS</u>	3
<u>7.3.1 Air Quality</u>	3
<u>7.3.2 Water Quality and Quantity</u>	3
<u>7.3.3 Vegetation</u>	5
<u>7.3.4 Wetlands</u>	6
<u>7.3.5 Geology</u>	8
<u>7.3.6 Wildlife</u>	8
<u>7.3.7 Wild and Scenic Rivers</u>	9
<u>7.3.8 Floodplains</u>	10
<u>7.3.9 Threatened, Endangered, and Other Special-Status Species</u>	11
<u>7.3.10 Historic Resources</u>	12
<u>7.3.11 Section 4(f) Properties</u>	13
<u>7.3.12 Archaeological Resources</u>	13
<u>7.3.13 Paleontological Resources</u>	13
<u>7.3.14 Prime and Unique Farmland</u>	14
<u>7.3.15 Noise</u>	14
<u>7.3.16 Visual Character</u>	14
<u>7.3.17 Hazardous Waste Sites</u>	15
<u>7.3.18 Energy</u>	15
<u>7.3.19 Temporary Construction</u>	15
<u>7.3.20 Secondary Impacts</u>	16

7.1 INTRODUCTION

This chapter discusses potential mitigation options for the environmental impacts identified in Chapter 5.0, *Environmental Consequences*, for both the Preferred Alternative and the Other Alternative. The final mitigation measures will be presented as part of the Selected Alternative that will be developed in the Record of Decision (ROD).

7.2 SOCIOECONOMIC

7.2.1 Neighborhood

No neighborhood impacts are anticipated as a result of the Preferred Alternative or the Other Alternative; therefore, mitigation is not required.

7.2.2 Environmental Justice

No environmental justice impacts are anticipated as a result of the Preferred Alternative or the Other Alternative; therefore, mitigation is not required.

7.2.3 Relocation

Relocations will be conducted in accordance with the *Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970*, as amended (1989). Relocation brochures are available without discrimination to all residents and businesses that are required to relocate. The Act includes assistance to re-establish a business operation and to secure comparable replacement housing. It also provides for "housing of last resort" in the event that comparable housing cannot be secured at the time that the project is scheduled to proceed. Both residential and business relocations will be completed on a case-by-case basis, taking into consideration the circumstances of the displaced resident or property and the status of the project. The process includes initial property appraisal, determination of just compensation, negotiations, payment, relocation, and rights under eminent domain. Benefits under the Act, to which each eligible owner or tenant may be entitled (including early [or hardship] acquisition), will be determined on an individual basis and explained to them in detail, in addition to information regarding their financial options.

No relocations are anticipated as a result of the Preferred Alternative or the Other Alternative along the I-25 Corridor. Nine relocations are required along US 85 based on the conceptual design of the Preferred Alternative and the Other Alternative; six sites are commercial, and three are residential.

The conceptual design will be refined in developing the Selected Alternative for US 85. Once the Selected Alternative is defined, it will be presented in the ROD, scheduled to be signed in the spring of 2001. Once the ROD is signed, design and construction may begin. Based on the design of the Selected Alternative, these ten relocations may or may not be required. Also, under the current funding scenario, improvements to the entire corridor may take up to 20 years to construct. Due to these two factors, property acquisition will not likely start until immediately prior to construction.

7.2.4 Right-of-Way Acquisition

The right-of-way (ROW) acquisition process follows the *Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970*, as amended (1989). The process provides for fair and equitable treatment of those properties that will be acquired. The process includes initial property appraisal, determination of just compensation, negotiations, payment, and rights under eminent domain. The ROW acquisition process, which involves authorization of final ROW plans, parcel appraisal, and acquisition of the needed parcels to construct the project, begins during final design. In many cases, the ROW acquisition process continues just prior to the start of construction. The Federal Highway Administration (FHWA); however, will not release construction funds until the Colorado Department of Transportation (CDOT) demonstrates they are nearly complete with the ROW acquisition process. Completion of the ROW process lasts 1-2 years for projects involving many acquisitions and approximately 6 months for projects with few acquisitions.

7.2.5 Recreational Resources

No mitigation measures for recreational resources are associated with the Preferred Alternative and Other Alternative along the I-25 Corridor.

A more friendly bicycle environment is created in conjunction with the Preferred Alternative and the Other Alternative along the US 85 Corridor. Currently no sidewalk or bikeway exists along US 85. The shoulders are between 0.6 meters (2 feet) and 2.4 meters (8 feet) wide, thus making it difficult to bike on the current configuration. Improvement alternatives include a grade-separated crossing for pedestrians and bicycles at the High Line Canal Trail and an improved crossing for the Centennial Trail. The current crossing of the Centennial Trail at the C-470 Interchange has been improved by extending the trail south to Blakeland where bicycles and pedestrians can cross at the traffic signal.

An analysis was completed to determine the opportunities available for a detached bicycle/pedestrian facility. In some areas, a detached bicycle/pedestrian facility does not fit due to the environmental impacts the facility causes. The Preferred Alternative and the Other Alternative include:

- An attached facility in the form of a sidewalk from C-470 to Blakeland Drive
- A detached facility from Blakeland Drive to Highlands Ranch Parkway
- An attached facility in the form or a widened shoulder from Highlands Ranch Parkway to Titan Road
- An attached facility in the form of a sidewalk from IREA to Daniels Park Road
- A detached facility from Daniels Park Road to Meadows Parkway

CDOT will maintain the bikeway/shoulder with regular sweeping.

7.2.6 Land Use and Zoning

Land acquired by CDOT will be used as a transportation corridor. This acquisition will be minimal; therefore, mitigation is not required.

7.3 PHYSICAL IMPACTS

7.3.1 Air Quality

No substantial air quality impacts are projected as a result of the Preferred Alternative or the Other Alternative; therefore, mitigation is not required.

7.3.2 Water Quality and Quantity

CDOT is concerned with erosion, sedimentation, and stormwater runoff impacts to both water resources and water quality resulting from highway construction activities. CDOT recognizes that the best approach for avoiding impacts is to ensure sufficient distance between the road alignment and Waters of the US, follow terrain contours to avoid headcutting and other erosion/slope stability issues, and locate the transportation corridor away from high erosion hazard areas. It is not always possible to completely avoid impacts to wetlands and Other Waters of the US. These potential impacts are considered during planning and design phases of CDOT projects and mitigated through the use of best management practices (BMPs), which are implemented as temporary or permanent project features. The following paragraphs identify mitigation measures that will be implemented for both the I-25 Corridor and the US 85 Corridor to mitigate direct, secondary, and cumulative water quality impacts to an acceptable level during construction and operation and maintenance (O&M) of the Selected Alternative presented in the ROD.

CDOT will comply with appropriate federal (e.g., Clean Water Act sections 401, 402, and 404) and state legislation (e.g., Colorado Water Quality Control Act, Title 25, Article 8, CRS) to ensure that project-related impacts do not result in additional water quality degradation over current conditions. CDOT will also take reasonable steps to comply with local regulations or special requirements. Examples of local requirements include Douglas County Erosion Control Criteria and the Chatfield Reservoir and Cherry Creek Reservoir Control Regulations. Douglas County's erosion control criteria limit the release of sediment to historic levels plus 15 percent during construction activities, and sediment discharges must return to historic levels after construction. The Chatfield Reservoir and Cherry Creek Reservoir Control Regulations require the implementation of erosion and sediment control BMPs to prevent nonpoint source pollution (i.e., phosphorus loading) of Cherry Creek and Chatfield Reservoirs. Potential construction-related impacts to water resources and water quality will be further reduced by adherence to conditions included in any United States Army Corps of Engineers (USACE) Section 404 permit and the Colorado Discharge Permit System (CDPS) general permit that will be issued to cover construction-related stormwater discharges (Construction Stormwater Discharge Permit).

CDOT will obtain a Construction Stormwater Discharge Permit(s) for the Selected Alternative presented in the ROD. This permit is currently required for construction activities that disturb more than 2 hectares (5 acres). After 2002, the permit will be required for disturbing more than 0.405 hectare (1 acre). The Construction Stormwater Discharge Permit requires preparation of a Stormwater Management Plan (SWMP), site inspections every 14 days, and specific erosion control and pollution prevention requirements. The SWMP is project-specific and will be prepared during the design phase. The SWMP will specify and describe BMPs needed to mitigate any potential adverse impacts to surface water quality resulting from construction activities in the I-25 Corridor and US 85 Corridor. The use of BMPs is crucial during the construction phase to prevent the transport of phosphorus

into the Chatfield Reservoir and Cherry Creek Reservoir and to prevent adverse water quality impacts to rare aquatic species or habitat in Plum Creek and East Plum Creek. Erosion and sedimentation BMPs can be used to control phosphorus loading to surface waters. During construction, CDOT will use the following BMPs to prevent the transport of sediment and other contaminants in stormwater runoff:

- Install perimeter erosion control measures (e.g., straw bales, filter fences, or vegetated buffer strips) as required in environmentally sensitive areas prior to grading.
- Divert clean water runoff during construction.
- Time ground-disturbing activities at erosion-prone sites or sites adjacent to Waters of the US shall be minimized during the wet spring months when saturated soils are susceptible to compaction and movement, and when surface and groundwater levels are at their highest.
- Sequence and stage construction so that no area remains exposed for an unnecessarily long time. Cleared areas should be stabilized before other areas are disturbed.
- Implement stabilization BMPs (e.g., mulching, cover crops, erosion control blankets, or a combination depending on local site conditions) after grading.
- Rip and till soils that have been over-compacted by heavy equipment to break up restrictive layers; then harrow or roll to firm the seedbed prior to revegetation. Soil surfaces will be treated to lessen wind damage to young plants and promote moisture retention and surface water infiltration.
- Develop and carry out a regular maintenance schedule for erosion and sediment control practices.
- Use spill prevention and containment measures at storage sites.
- Develop and implement a schedule for regular collection and disposal of waste material.
- Locate appropriate concrete washout areas well away from Waters of the US, riparian areas, or floodplains.

Additional project development specific BMPs will be detailed in the SWMP created for the Selected Alternative.

In addition to adhering to the SWMP, the construction contractor will also adhere to CDOT water quality and erosion control management specifications. As the project progresses, the Colorado Division of Wildlife (CDOW) will be consulted on specific water quality mitigation to avoid impacts to rare fish species inhabiting, or with habitat, in Plum Creek and East Plum Creek. Construction-related impacts to water quality will be mitigated by minimizing the number of piers placed in Waters of the US. Bridges will be anchored outside the bed and banks of East Plum Creek and other project area tributaries, whenever possible.

Drainage systems are expected to be the primary means for mitigating potential impacts to water resources and water quality from operation and maintenance of the selected alternatives. Final design of the selected

alternatives will include appropriately sized drainage structures and stormwater quality management BMPs to minimize any project related water quantity or quality impacts (i.e., phosphorus loading) to downstream surface waters. The Chatfield and Cherry Creek Reservoir Control Regulations set goals of 50 percent reductions in nonpoint source phosphorus loading from upstream watersheds. BMPs that control sedimentation and erosion, such as those previously described, can be used to reduce phosphorus in stormwater. In addition, Douglas County Storm Drainage Design and Technical Criteria recommend the use of detention basins followed by filtration or rapid infiltration to meet phosphorus reduction goals, where prudent.

CDOT will use a combination of stormwater quality management BMPs, including detention and infiltration basins, to protect downstream water quality, channel stability, and property owners from adverse stormwater impacts. Selection of stormwater quality management BMPs will depend on local topography, drainage area size, available land, proximity to Waters of the US, and the final designs for the selected alternatives. CDOT may be required to purchase additional right-of-way to accommodate permanent mitigation measures (e.g., detention and infiltration facilities). Lastly, good road maintenance and cleaning and stabilization of roadside ditches will reduce pollutant loadings from these sources.

7.3.3 Vegetation

Impacts to native vegetation have been minimized where possible. For example, along US 85 ROW take has been minimized along the entire alignment. Sideslope grades were adjusted, and guardrails and retaining walls were incorporated into the design. Construction BMPs in accordance with CDOT's *Erosion Control and Stormwater Quality Guide*, 1995, and as directed by CDOT, will be implemented to minimize unavoidable impacts to native vegetation. These BMPs will include, but are not limited to, the following:

- Fencing of construction zone and access points at specific locations to limit impacts outside the project area.
- Develop landscape management practices to avoid the removal of vegetation where possible.
- Implementing temporary and permanent erosion control measures such as revegetating disturbed areas with native grasses, mulching, erosion control blankets, sediment basins, erosion bales, and silt fences.
- Grading and seeding incrementally to reduce soil loss during construction. Native grasses should be used in seed mixes. Native shrub species should be added to the seed mix in areas where conflicts with maintenance can be avoided.
- Using native grass species. For areas identified as having moderate to high erosion potential, fast-growing, non-native cover species should be included in the seed mix to minimize soil loss while native species establish. Seeding rates will be determined by CDOT.
- Rounding of ditches and slopes to prevent unnecessary erosion.
- Inventorying and mapping, prior to construction, state listed noxious weeds in the ROW and adjacent areas of both corridors using North America Weed Management (NAWMA) protocols. The mapping must be compatible with the current CDOT geographic information system (GIS).

- Analyzing the potential spread of identified noxious weeds due to construction activities.
- Developing and implementing a site-specific integrated pest management plan (IPMP) that focuses on the prevention and elimination of noxious weed species in the project area.
- Measures such as coordination with other agencies; appropriate herbicide selection and timing of herbicide spraying; using backpack herbicide sprayers in or around sensitive areas (e.g., wetlands or riparian areas); cleaning equipment between sites to reduce the spread of noxious weeds; hand pulling, stripping, and removing topsoil; re-seeding areas with native seed, may be included in the IPMP.
- Using certified weed-free mulch and inspecting as regulated by the Weed Free Forage Act (Title 35, Article 27.5, CRS).
- Reseed vegetation as necessary to maintain good erosion control practices.

Shrubland, woodland, and riparian areas will be denoted on the construction plans. Impacted shrubs and trees will be replaced contingent upon water availability and ROW maintenance.

7.3.4 Wetlands

In accordance with Clean Water Act Section 404 (b)(1) Guidelines, wetland mitigation is identified as avoidance, minimization, and compensatory mitigation. These guidelines stress the avoidance of adverse impacts to wetlands with the goal of no overall net loss of wetland functions. Consideration for avoidance and minimization of impact to wetlands will be given throughout the design and construction process. However, because avoidance is not possible across an entire alignment, mitigation includes minimizing or compensating unavoidable impacts.

Design features such as alignment shifts and construction alternatives (e.g., retaining walls and steeper side slopes) were considered to avoid or minimize impacts to wetlands and Other Waters of the US. For example, impacts to wetlands may be minimized by using a steeper catch slope. Currently, the catch slope is at 4:1 (4 horizontal, 1 vertical). Where possible, this slope may be adjusted to a 2:1 with the addition of a guardrail. The avoidance of many of the non-jurisdictional wetlands in ditches is not possible due to their location adjacent to the roadways. Similarly, the avoidance of Other Waters of the US is not possible due to their crossing of the highways.

Implementation of BMPs discussed in the *Erosion Control and Stormwater Quality Guide*, 1995, minimizes impacts to wetlands and Other Waters of the US. Specific measures to reduce erosion and maintain water quality will be identified by CDOT and include the following:

- Grading and seeding incrementally to reduce soil loss during construction. Native grasses should be used in seed mixes. Non-native cover species should be added to the seed mix when reseeding areas of moderate to high erosion potential to minimize soil loss while native species establish.
- Temporary fencing wetlands during construction. A 0.9-meter (3-foot) offset from the wetland boundary will be used when possible.

- Diverting clean water runoff during construction.
- Using soil stabilization practices such as rounding of ditches and slopes, erosion control blankets, re-seeding with native species, and mulching impacted areas to reduce erosion.
- Installing structural BMPs such as silt fences and erosion bales in impacted areas to reduce off-site siltation.
- Developing an emergency spill response program and implementing spill-prevention practices, such as locating staging areas, and fuel and hazardous construction material storage sites well away from wetlands and Other Waters of the US to reduce risks from accidental spillage and leaching.
- Disposing of surplus fill in non-wetland areas designated by CDOT.
- Timing construction in and around open water to occur, if possible, in late fall and winter when water levels are low, soil compaction is minimal, and vegetation is dormant.
- Fencing trees and shrubs to prevent damage and spare existing trees in impacted wetlands when possible.

Impacts to Other Waters of the US will be mitigated through the restoration of the original topography. Compensatory wetland mitigation will occur at a ratio of 1:1 as close to the site of impact as possible. Water rights issues will be considered during the final selection of mitigation sites.

Two methods of compensatory wetland mitigation are restoration of existing degraded wetlands and wetland creation. Wetland mitigation will occur within the riparian area adjacent to East Plum Creek in Castle Rock. Two potential additional wetland mitigation areas are Newlin Gulch located on I-25, and Spring Gulch located on US 85. These areas were chosen for their proximity to sites of impact and their favorable hydrological conditions for wetland creation.

Due to channel incision along East Plum Creek, the water table is no longer connected to the adjacent floodplain. Wetland mitigation is complicated along East Plum Creek by the presence of the federally threatened Preble's Meadow Jumping Mouse (PMJM). Wetland mitigation in this area will consist of a series of three 1.2-meter (4-foot) tall check dams. Currently, CDOT has committed to these three check dams. Additional dams may be constructed by CDOT in the future. These dams are designed to raise water levels in the surrounding floodplain thereby reconnecting hydrophytic vegetation with the water table. The check dams will be constructed of sheet piling and will extend into the adjacent floodplain terraces at, or just below, the ground surface to prevent failure of the check dams during flood events. Design features of the check dams include a low-flow notch and plunge pools just below each check dam, which are expected to improve aquatic habitat diversity along this reach of East Plum Creek.

The three check dams will be located at the newly constructed 5th Street Bridge, just below where the Town of Castle Rock sewer line crosses the stream, and another at a midpoint between these two fixed points. In addition to wetland restoration, the check dam at the Town of Castle Rock sewer line will help to protect the pipe from breakage during high-flow events. The total amount of wetland mitigation area achieved will be determined through the monitoring of 18 shallow groundwater wells. Wetland restoration in this area will be accomplished through the re-establishment of wetland hydrology and will consist of soil saturation within the top 0.3 meter (12

inches) of the soil surface for 18 consecutive days during the growing season (12.5 percent of the growing season).

Compensatory wetland mitigation may also occur at Newlin Gulch on I-25 and at Spring Gulch on US 85. Newlin Gulch was used for wetland mitigation for the Climbing Lanes Phase II Early-Action project. Opportunities for additional wetland mitigation exist there through the re-grading and expansion of existing wetland areas. Similarly, wetlands at Spring Gulch may be expanded by regrading existing sideslopes to permit saturation/inundation of adjacent areas.

Although not required by USACE, non-jurisdictional wetlands (temporary impacts) will be mitigated in the newly created ditches when possible, adjacent to the site of impact, by broadcast seeding these areas with a wetland seed mix specified by CDOT.

7.3.5 Geology

No geological impacts are anticipated as a result of the Preferred Alternative or the Other Alternative; therefore, mitigation is not required.

7.3.6 Wildlife

Habitat fragmentation and barriers to connectivity among areas of high quality wildlife habitat (i.e., conservation areas) are the primary wildlife concern. Because I-25 already poses a substantial barrier to wildlife movement, and several conservation areas exist on both sides of the US 85 Corridor (see Chapter 4.0, *Affected Environment*), wildlife habitat along US 85 is a higher priority than it is along I-25. Therefore, compensatory mitigation for habitat conversion will be most effective, and should occur, within the US 85 Corridor. Mitigation for lost habitat and permeability among habitats will be coordinated with the CDOW and will include:

- Providing mitigation for riparian habitat losses. Woody riparian vegetation will be mitigated at a replacement ratio of 1:1 where water requirements can be met for planting riparian vegetation. Mitigation will include enhancement and/or reclamation, and will consist of revegetation (i.e., cottonwood and willow plantings, snowberry, etc.) and reseeding with native grass and forb species specified by CDOT.
- CDOT will work with the Douglas County Open Space program to identify the protection, restoration, or enhancement of important habitat.
- Enlarging wildlife crossings at tracking stations 1 and 3 (MP 195.2 and MP 189.7) to accommodate deer and elk movement across US 85. These sites will also be enhanced with shrub plantings to facilitate wildlife movement.
- Enhancing shrub cover in other drainages (in addition to tracking stations 1 and 3) with existing structures used as wildlife crossing points to improve east-west connectivity in other areas along US 85.
- Maintaining existing hydraulic structures (i.e., concrete box culverts, bridges, etc.) where practical to facilitate movement of carnivores or mid-sized mammals, even if they are no longer needed for water movement.

- Installing fencing to funnel wildlife through selected wildlife crossings will be determined in consultation with the CDOW.
- Promoting the use of wildlife crossing structures through the use of native materials as substrate. Native substrate (i.e., coarse sand) should be used inside the wildlife crossing structures, and materials such as rip-rap should be avoided as possible at structure inlets and outlets where possible.
- Installing signage in areas of known wildlife crossings. Considering use of modern methods to reduce driver habituation to wildlife crossing signs. CDOT will consult with the CDOW as to the proper signage type and location.
- Resize and clean existing culverts along US 85 to allow for the potential movement of small wildlife.
- CDOT commits to ongoing dialogue with the appropriate agencies in respect to the dynamic nature of wildlife behavior and management. This dialogue will allow CDOT to more effectively tailor the broad commitments summarized herein to the actual field conditions.

CDOT will coordinate with the CDOW, Douglas County Open Space, and the Chatfield Basin Conservation Network during the design phase of the wildlife crossing enhancements at Tracking Stations 1 and 3 (MP 195.2 and MP 189.7) in order to determine if any additional wildlife crossing enhancements are needed.

Installing noise walls, retaining walls, jersey barriers, and curbs could create additional barriers to wildlife permeability. CDOT will consult with the CDOW, Douglas County Open Space, and the Chatfield Basin Conservation Network during design in areas of known wildlife movement.

7.3.7 Wild and Scenic Rivers

No wild and scenic rivers are within the I-25 Corridor and US 85 Corridor study area; therefore, mitigation is not required.

7.3.8 Floodplains

All practical measures to minimize harm to floodplains are incorporated in the Preferred Alternative and the Other Alternative for both the I-25 Corridor and the US 85 Corridor. Little to no change to historic drainage patterns is expected within, or downgradient from, the area of potential effect (APE). Impacts to the floodplain are minimized by following standard stream crossing design criteria, avoiding direct impacts on stream channels, and adjusting the alignment where possible. Bridge and roadway designs seek to minimize impacts to floodplains in compliance with Federal Highway Administration (FHWA) requirements, including efforts to span 100-year floodplains. Final designs will adhere to CDOT drainage criteria for both minor and major hydraulic structures, as well as following all Federal Emergency Management Agency (FEMA) requirements. The Selected Alternative, which will be defined in the ROD, will also avoid the longitudinal and significant encroachment in the floodplains.

Under the direction of CDOT, the implementation of BMPs identified in the *Erosion Control and Stormwater Quality Guide*, 1995, minimizes impacts to floodplains. Specific measures include the following:

- Coordinating with Douglas County and local governments concerning issues related to floodplain encroachment.
- Developing and implementing a SWMP for each project phase, which will contain measures preventing the inadvertent transport of noxious weeds into the construction site by heavy equipment and fill dirt.
- Installing detention basins, infiltration beds, or other structural controls to reduce and minimize the effects of increased runoff due to substantial increases in impervious surfaces (see Section 7.3.2, *Water Quality*).
- Grading and seeding incrementally to reduce soil loss during construction. Native grasses should be used in seed mixes. Native shrub seeds should be included in the seed mix where conflicts with maintenance will not occur.
- Using fast-growing non-native grass species in areas identified as having moderate to high erosion potential to minimize soil loss while slow-growing native species establish.
- Providing ditch and slope rounding to prevent unnecessary erosion.
- Excluding construction vehicles from entering wetland areas by installing temporary fencing.
- Diverting clean water runoff during construction.
- Identifying and using appropriate concrete washout areas well away from floodplains to ensure polluted water does not leave the site.
- Using soil stabilization practices (such as erosion control blankets and mulching impacted areas) to reduce erosion.
- Installing structural BMPs (such as silt fences and erosion bales downgradient from impacted areas) to reduce off-site siltation.
- Developing an emergency spill response program and implementing spill prevention practices (such as locating staging areas and fuel and hazardous construction material storage sites well away from floodplains) to reduce risks from accidental spillage and leaching.
- Fencing existing shrubs and trees to avoid damage. Replacing trees where maintenance and water requirements can be met.
- Managing noxious weeds is a serious concern and is discussed in Section 7.3.3, *Vegetation*.

7.3.9 Threatened, Endangered, and Other Special-Status Species

Threatened, endangered, and other special-status species are especially sensitive to impacts due to their low population densities, or minimal amounts of suitable habitat remaining to them. The PMJM and black-tailed

prairie dogs are two special-status species with habitat within the APE that will be directly impacted by the Preferred Alternative or Other Alternative. Mitigation of secondary impacts to aquatic habitat is described in Section 7.3.2, *Water Quality*.

Impact to PMJM habitat has been avoided or minimized where possible. The I-25 Corridor is realigned 14 meters (46 feet) to the east between Ligget Road and Wolfensberger Road to avoid impacts to PMJM habitat. Impacts to PMJM habitat are also minimized by widening I-25 to the inside, adjusting sideslopes to 3:1 and 2:1 grades instead of the typical 4:1 grades used on transportation projects, by minimizing construction zones and access roads, by scheduling construction in these areas during the hibernation period (October 15 to April 30), and by not permitting night-time work. Compensatory mitigation for the PMJM habitat will include:

- Restoring habitat that will be temporarily disturbed during construction (on-site restoration). General restoration measures will include in-kind replacement of disturbed vegetation and reconstruction of original slope contours where this would benefit restoration efforts.
- Restoring or enhancing habitat that has been degraded by non-project actions (i.e., check dams on East Plum Creek).
- Protecting habitat of off-site areas within Douglas County.

Due to channel incision along East Plum Creek, the water table in the adjacent floodplain has dropped dramatically over the past few years. PMJM habitat mitigation in this area will consist of a series of three 1.2-meter (4-foot) tall check dams. Currently, CDOT has committed to these three check dams. Additional dams may be constructed by CDOT in the future. The check dams are designed to reconnect the water table to the surrounding floodplain and riparian vegetation. The check dams will be constructed of sheet piling and will extend into the adjacent floodplain terraces at or just below the ground surface to prevent failure of the check dams during flood events. Design features of the check dams include a low flow notch and plunge pools just below each check dam, which are expected to improve aquatic habitat diversity along this reach of East Plum Creek. The three check dams will be located at the newly constructed 5th Street Bridge, just below where the Town of Castle Rock sewer line crosses the stream, and another at midpoint between these two fixed points. In addition to PMJM habitat enhancement, the check dam at the Town of Castle Rock sewer line will help protect the pipe from breakage during high-flow events.

The *Preble's Meadow Jumping Mouse Biological Assessment for the South I-25 Corridor and US 85 Corridor Environmental Impact Statement*, October 2000, contains more detailed information on PMJM mitigation.

Impacts to black-tailed prairie dog colonies were reduced along US 85 by minimizing ROW take along the entire alignment; this involved adjusting sideslopes and incorporating guardrails and retaining walls into the design. Compensatory mitigation for black-tailed prairie dog habitat conversion might include:

- Relocating black-tailed prairie dogs, where possible, to inactive colonies within the APE, or relocating a colony in accordance with Senate Bill 99-111 requirements.
- Purchasing or otherwise protecting (e.g. conservation easement) land, where possible, containing active black-tailed prairie dog colonies adjacent to undisturbed habitat. Protected black-tailed prairie dog habitats should be equal in size to habitat lost from the Preferred Alternative or Other Alternative.

- Contributing financially or in-kind services for the preservation of black-tailed prairie dog habitat equal in size to habitat lost from the Selected Alternative. Work with Douglas County Open Space, Chatfield Basin Conservation Network, and CDOW to identify key parcels for protection.
- Black-tailed prairie dogs may be turned over to the United States Fish and Wildlife Service (USFWS).

Prior to construction, the USFWS and the CDOW will review the final mitigation measures for species under their respective jurisdictions. Final mitigation measures may include additional information on timing of construction activities, steeper sideslopes, or other means of reducing impacts.

7.3.10 Historic Resources

This section considers mitigation for Historic Resources impacted by the Preferred Alternative and the Other Alternative along the I-25 Corridor and the US 85 Corridor.

D&RG Railroad (5DA921.1)

The segment of the D&RG Railroad impacted by the project will be recorded prior to the beginning of construction on the I-25 Corridor, and prior to the demolition of the property so that there will be a permanent record of its present appearance in history. Recordation shall consist of Level II documentation as determined in consultation with the State Historic Preservation Officer (SHPO). All documentation must be accepted by the SHPO prior to the start of construction. Copies of documentation will be provided to the SHPO and to a local archive designated by the SHPO. Information will include historic research and documentation and archivally stable photographs of the property.

Cherokee Ranch Historic District (5DA708)

The historic gate and segment of Rattlesnake Road impacted by the project will be recorded prior to the beginning of construction on the US 85 Corridor, and prior to the demolition or displacement of the properties so that there will be a permanent historic record of their present appearance. Recordation shall consist of Level II documentation as determined in consultation with the SHPO. All documentation must be accepted by the SHPO prior to the start of construction. Copies of the documentation will be provided to the SHPO, the Cherokee Ranch and Castle Foundation, and to a local archive designated by the SHPO. Information will include historic research and documentation and archivally stable photographs of the property.

Once the above-mentioned documentation is complete, the original Main Gate to Cherokee Ranch will be moved to a new location on Rattlesnake Road. The final location of the gate will be determined through consultation with the Cherokee Ranch and Castle Foundation Board of Directors, and the SHPO.

7.3.11 Section 4(f) Properties

A discussion of mitigation measures for impacts to Section 4(f) properties is included in Chapter 6.0, *Section 4(f) Properties Evaluation*. These measures will be adopted by the FHWA with the completion of the South I-25

Corridor and US 85 Corridor ROD.

7.3.12 Archaeological Resources

When a Selected Alternative alignment for the South I-25 Corridor and US 85 Corridor ROD is developed, the CDOT staff archaeologist will compare it to previously studied alternative alignments. If any inconsistencies occur between the previous alternative alignment and the Selected Alternative alignment to be constructed, on-the-ground reconnaissance will be conducted as necessary to document that the Selected Alternative alignment has been adequately evaluated and that no archaeological resources determined to be significant by the SHPO will be adversely affected. Should any evidence of archaeological resources be discovered during construction, work in that vicinity will be stopped until the CDOT staff archaeologist can completely evaluate the significance of the finding according to criteria established for the National Register of Historic Places.

7.3.13 Paleontological Resources

Construction of the Preferred Alternative or Other Alternative may adversely affect, by burial, the presently known areal extent of fossil locality DMNS 1200, but all reasonable and prudent efforts will be made to avoid such adverse effects. Construction of the Preferred Alternative or Other Alternative will adversely affect, by construction excavation, previously unexamined, but potentially fossiliferous areas immediately lateral to and stratigraphically above the known areal extent of the locality. Prior to construction of the Preferred Alternative or Other Alternative, test excavation(s) will be conducted to determine, as accurately as possible, the horizontal and vertical extent of DMNS 1200 within the boundaries of the Preferred Alternative or Other Alternative.

Test excavation(s) will also be conducted in CDOT rights-of-way in areas adjacent to the known lateral extent of DMNS 1200, but outside of the proposed impact area of the Preferred Alternative and Other Alternative, in an effort to designate an alternate location(s) for continued future scientific study of the DMNS 1200 paleoflora. Adverse effects to those portions of the site that will be destroyed by construction excavation proposed as part of the Preferred Alternative and Other Alternative will be mitigated by salvage excavation prior to construction of the Preferred Alternative or Other Alternative.

Construction of the Preferred Alternative and Other Alternative will adversely affect fossil locality UCM 92164. Adverse effects will be mitigated by salvage excavation of a statistically valid representative sample of the preserved paleoflora prior to construction of the Preferred Alternative or Other Alternative.

Once design plans for any and all future construction projects permitted by the approval of this EIS are finalized, the CDOT staff paleontologist will examine them to estimate the required scope of construction monitoring work, if any. A special note requiring a paleontological monitor during construction (similar to those attached to the standard specifications for past projects requiring paleontological monitoring during construction) will be attached to the specifications for any future construction project(s) permitted by the approval of this EIS for which final design plans indicate the likelihood of affect to Denver Formation subsurface outcrop.

If any paleontological resources are uncovered along the alignment corridor during construction, work in the immediate vicinity will cease. The CDOT staff paleontologist will be notified, and the material will be evaluated by a qualified paleontologist and coordinated with the SHPO.

7.3.14 Prime and Unique Farmland

Prime and unique farmland does not exist within the APE. Statewide important farmland soil does exist. By minimizing sideslope grades, impacts to these areas of High Potential Dry Cropland along US 85 have been minimized by the Preferred Alternative and the Other Alternative. Increased farmland fragmentation along US 85 will be avoided by maintaining existing underpasses used by farm machinery. The prevention and elimination of noxious weeds is discussed in Section 7.3.3, *Vegetation*.

7.3.15 Noise

Noise abatement in the form of noise walls and earthen berms was evaluated along the I-25 Corridor and US 85 Corridor. Section 5.3.3.14, *Noise Impacts* presents the mitigation types, locations, and effectiveness for the receivers at or approaching the noise level abatement criteria (66 dBA for residences and 71 dBA for commercial businesses). One noise barrier is recommended and will be re-evaluated during final design.

7.3.16 Visual Character

In addition to the effort to minimize roadway width, other measures will be taken to offset potential impacts and potentially enhance the visual quality of the corridor. Landscaping treatments using native grasses and slope flattening will be included in the plans. The roadway is designed to blend with the natural setting, conforming to the line and form of the adjacent terrain and natural setting.

7.3.17 Hazardous Waste Sites

Further evaluation of potential hazardous waste sites will continue prior to property acquisition (once a Selected Alternative is selected) and during preliminary highway design. The Selected Alternative will avoid potentially contaminated areas whenever practical. However, where avoidance is not feasible, further site investigation will be required and will be coordinated with the affected property owner. Necessary cleanup plans are coordinated with appropriate agencies and landowners.

The inclusion of environmental specifications in the construction bid package will address worker health and safety during construction and contractor requirements.

7.3.18 Energy

No energy impacts are anticipated as a result of the Preferred Alternative or the Other Alternative; therefore, mitigation is not required.

7.3.19 Temporary Construction

The following measures are recommended to mitigate temporary construction impacts:

- Working closely with all affected individuals and businesses through a public information program during the project development phase and continuing through construction.
- Encouraging contractors to schedule construction activities during daytime hours to minimize noise

impacts, in accordance with Douglas County and Town of Castle Rock noise ordinances. Discouraging weekend work, with the exception of activities best suited for off-peak hours.

- Controlling fugitive dust emissions to within acceptable levels. Contractors will be required to use dust suppression techniques (such as wetting) to prevent excessive releases of fugitive dust.
- Mitigating water quality impacts by adhering to the requirements of stormwater permits issued for the project, through the application of standard CDOT erosion control measures and through the implementation of BMPs (e.g. temporary berms, detention ponds, and settling ponds will be used to control runoff and protect water quality during construction).
- Using temporary erosion control measures during construction and requiring permanent revegetation in disturbed areas.
- Using straw or other mulching material to minimize soils erosion during construction.
- Handling unforeseen construction impacts by using a review process and BMPs.

7.3.20 Secondary Impacts

The potential indirect disruptive, or quality-of-life, impacts that may occur over the long term have been, or will be, considered during the zoning and comprehensive planning process of the local jurisdictions. As these projects come closer to being finalized, the county and communities will have additional opportunities to address specific quality-of-life concerns in the zoning process and site plan review.

7.3.21 Cumulative Impacts

Cumulative impacts are impacts on the environment resulting from the incremental impact of a project when added to other past, present, and reasonably foreseeable future actions (regardless of responsible agency or person).

Habitat restoration for the PMJM, as a result of non-project actions (other projects or cumulative actions), is mitigated by constructing check dams. The check dams will be installed on East Plum Creek. Other habitat restoration in Sellers Gulch, and a former upland grassland along East Plum Creek, are also under consideration as mitigation sites. It is anticipated that the check dams will promote the riparian vegetation that serves as PMJM habitat that has been degraded due to previous projects and could be further intensified by the proposed improvements.

CDOT-implemented mitigation measures will prevent the proposed projects from further contributing to the cumulative degradation of water quality in the Chatfield and Cherry Creek basins, reducing the potential cumulative impact. Proper implementation of construction BMPs and adherence to all applicable regulations will minimize impacts to water quality during the construction phase of the proposed projects. Cross culverts and other drainage structures will be appropriately sized to maintain hydrologic connections across the project corridors. Stormwater detention basins will improve water quality and maintain stormwater runoff to historic levels. Particulates and other contaminants will settle in stormwater detention basins.

The state will continue to work with local agencies that can influence growth and promote the benefits of controls that incorporate environmental protection into all planned development.

8.0 LIST OF PREPARERS

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SECTION 4(f) EVALUATION

Laura Ziemke, Science Applications International Corporation (experience listed above).

NOISE ANALYSIS

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Ms. Hess holds a B.S. degree in Civil and Environmental Engineering and has 3 years experience in transportation planning and engineering.

Michelle McGinn, PBS&J (experience listed above).

VISUAL QUALITY ANALYSIS AND COMPUTER SIMULATIONS

Ann Poitra, Poitra Visual Communications, LLC.

Matt Poitra, Poitra Visual Communications, LLC.

POTENTIAL HAZARDOUS WASTE SITES

Bruce A. Bush, ARCADIS Geraghty & Miller.

Mr. Bush holds a B.S. in Geology and M.S. in Resource Planning and is a Certified Environmental Professional. He is a regulatory specialist and has 16 years experience providing environmental consulting services.

REPORT WRITERS/EDITORS

Chuck Attardo, PBS&J.

Mr. Attardo holds a B.S. degree in Biology. He has 11 years experience working in the environmental and transportation fields.

Catherine Hess, formerly with PBS&J (experience listed above).

Yvette Marquez, formerly with PBS&J.

Ms. Marquez holds a B.A. degree in Art. She has 6 years experience in graphic design.

Michelle McGinn, PBS&J (experience listed above).

Keli Paul, PBS&J

Ms. Paul holds a M.S. degree in Urban Planning. She has 2 years experience in transportation planning.

Jennifer Salisbury, formerly with PBS&J (experience listed above).

Barry Schulz, PBS&J (experience listed above).

Rachel Henrichs, PBS&J.

Mrs. Henrichs has 4 years experience as an administrative assistant.

EIS PROJECT MANAGEMENT TEAM

The Project Management Team is an advisory group made up of the directly affected agencies (CDOT, DRCOG, Douglas County, and Castle Rock) and the consultant team. The primary role of the Project Management Team is to provide guidance, insights, and input to the consulting team throughout the EIS process.

Stan Brown
Town of Castle Rock DRCOG

Steve Rudy
DRCOG

Wes Goff
CDOT Region 1

Tom Schilling
InterMountain/RKH

Cecelia Joy
CDOT Region 1

Barry Schulz
PBS&J

Fred Koch
Douglas County

Joe Tasset
(formerly with CDOT Region 1)

Pat Noyes
Pat Noyes & Associates

Terri Tiehen
CDOT Region 1

Matt Reay
(formerly with CDOT Region 1)

Mary Jo Vobejda
CH2M Hill

EIS TECHNICAL COMMITTEE

The Technical Committee is comprised of agency staff who review technical issues associated with the EIS, coordinate the process with their agencies and elected officials, and provide technical input into the planning process.

Jack Baier
Public Utilities Commission

Janet Gerak
CDOT

Tom Schilling
Intermountain/RKH

David Beckhouse
Federal Transit Agency

Wes Goff
CDOT Region 1

Ron Sperl
Federal Highway Administration

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City of Lone Tree

Joe Tasset
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Jim Bumanglag
CDOT Region 6

Pam Hutton
CDOT Region 1

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CDOT DTD

Larry Corcoran
Douglas County

Ray Jantzen
Public Utilities Commission

Dean Van DeWege
CDOT Manager of Project
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(formerly with Douglas County)

Cecelia Joy
CDOT Region 1

Becky Vickers
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Steve Fender
Federal Railroad Administration

Don Moore
Douglas County

Edrie Vinson
Federal Highway Administration

Andrea Garcia

Scott Sands

(formerly with Regional
Transportation District)

Administration

Dave Weber
CDOW

Bob Garcia
CDOT Region 1

Bill Scheuerman
CDOT Region 1

CORRIDOR COORDINATION TEAM

The Corridor Coordination Team is comprised of CDOT Early-Action Project Managers and the consultant team. The Corridor Coordination Team is responsible for coordinating all CDOT projects in the South I-25 Corridor and US 85 Corridor project area.

Deb Angulski, CDOT
Chuck Binford, CDOT
Carrie DeJiacomo, CDOT
Bob Garcia, CDOT
Wes Goff, CDOT
Cecelia Joy, CDOT
Pat Noyes, Pat Noyes and Associates

Matt Reay (formerly with CDOT)
Bill Scheuerman, CDOT
Tom Schilling, Intermountain/RKH
Barry Schulz, PBS&J
Joe Tasset (formerly with CDOT)
Terri Tiehen, CDOT
Mary Jo Vobejda, CH2M Hill

EIS ISSUES TEAM

The Issues Team consists of representatives from the various affected interests, community groups, and the general public. The role of the Issues Team is to provide input into the EIS process and to help assess and review recommendations throughout the subsequent phases.

Darrell Adams
C. Roger Addlesperger
Michael Anderson
R.V. Bailey
Art Ballah
Don Bellum
Al Block
Steve Boand
Carol Brown
Lisa Clark
Philancy Comeau
Judy Crenshaw
Galen R. Crowder
Jen Dice
Steve & Tammy DiPasquale
Sally Dolan
Jeanne Erickson
Scottie Erihstrup
Jon Esty
Karl Ferguson
Richard Fleming
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Paul Hellmund
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Deborah Johnson
Randy Johnson
Don Larrick
Leslie H. Lilly
Chuck Loerwald
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Kitty Migaki
Steve Myers
Linda Nuzum
Jimmy & Linda Orlovski
Mike Paras
Mayor Al Parker
John Pope
Steve Powell
Pam Ridler
Hal Ruth
Elaine Sawyer
Bill Schroeder

Glen R. Smith
Ray Sperger
Toby Sprunk
Herb & Tilly Teets
Kenneth Torp
Jim Travis
John Valerio
Hank Vanderryst
Brian R. Vogt
Bill Walker
Kelly Wark
N. Earl Warren
Paul Wilken
Fred Young

Marty Lea Garcia
Burl & Sherry German
Scott S. Gratrix
Paul Grenney
DeWayne Hansen

Joe & Delita Schubarth
John Sieber
Sierra Club
Dave Simons

ECOLOGICAL RESOURCES TECHNICAL ADVISORY COMMITTEE

The Ecological Resources Technical Advisory Committee (ERTAC) is comprised of agency and interest groups concerned about the potential ecological impacts that could occur as part of the South I-25 Corridor and US 85 Corridor EIS. The role of the ERTAC was to facilitate communication and coordination regarding various ecological issues within the Chatfield Basin and Cherry Creek Basin, which need to be considered during the EIS process.

Debra Angulski, CDOT
Ron Benson, Douglas County
Brad Buckner, Colorado State Parks
Russ Clayshulte, DRCOG
Wilson Crumpacker, Chatfield Network
Brooke Fox, Douglas County Open Space
Brian Gray, CDOW
Paul Hellmund, CBCN
Robert Henke, SAIC
Scott Hoover, CDOW
Andy Hough, CDOW
Michelle McGinn, PBS&
Kristine Meiring, CDOT

Don Moore, Douglas County Planning
Steve Ormiston, Shea Homes
Arlene Raskin
Bill Schroeder, IREA
Ray Sperger, South Suburban Parks
Toby Sprunk, Douglas County Open Space
Terri Tiehen, CDOT
Lee Thormahlen, Cherokee Ranch
Dave Weber, CDOW
Christopher West, Douglas County Land Development
Kent Wiley, Chatfield State Park
Roland Wostl, CDOT

9.0 LIST OF RECIPIENTS OF FEIS

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Lincoln, NE 68501

Chatfield Basin Conservation Network
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100 Third Street
Castle Rock, CO 80104

Cherokee Ranch
5111 N. Daniels Park Road
Sedalia, CO 80135

City of Lone Tree
6399 S Fiddlers Green Cr., Ste. 102
Greenwood Village, CO 80111

Colorado Division of Wildlife
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Denver, CO 80216

Colorado State Parks
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Denver Regional Council of Government
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Denver, CO 80211

Douglas County
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Castle Rock, CO 80104

Federal Railroad Administration
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Lakewood, CO 80228

Federal Transit Administration
216 16th Street, Suite 650
Denver, CO 80202

National Parks Service
P.O. Box 25287

Public Utilities Commission
Logan Tower, Office Level 2
1580 Logan St.
Denver, CO 80203

Regional Transportation District
1600 Blake Street
Denver, CO 80202

South Suburban Parks & Recreation
6631 S University Blvd.
Littleton, CO 80121

Town of Castle Rock
680 N. Wilcox
Castle Rock, CO 80104

Union Pacific Railroad
1400 West 52nd Avenue
Denver, CO 80221

US Army Corps of Engineers
9307 State Highway 121
Littleton, CO 80213

US Environmental Protection Agency
999 - 18th St., Suite 500
Denver, CO 80202

US Fish and Wildlife Service
P.O. Box 25486 Denver Federal Center
Denver, CO 80225

Denver, CO 80225

10.0 AVAILABILITY OF TECHNICAL REPORTS

Several sections of the South I-25 Corridor and US 85 Corridor Final Environmental Impact Statement (FEIS) are summaries of technical memorandums and reports prepared by members of the study team. The technical reports are based on the conceptual design of the alternatives presented in the FEIS.

ALTERNATIVE EVALUATION

Alternatives Evaluation Process – South I-25 Corridor and US 85 Corridor EIS, March 2000, prepared by Catherine Hess, Steve Mikesell, Jennifer Salisbury, and Michelle McGinn, PBS&J.

TRAFFIC ANALYSIS

I-25/U.S. 85 Corridor Existing Traffic Operations – South I-25 Corridor EIS, September 1999, prepared by Pam Fischhaber, PBS&J.

I-25/U.S. 85 Corridor Existing Traffic Operations Addendum – South I-25 Corridor EIS, May 2000, prepared by Pam Fischhaber, PBS&J.

I-25/U.S. 85 Corridor No-Action Future Traffic Operations – South I-25 Corridor EIS, May 2000, prepared by Pam Fischhaber and Jeremy Hanak, PBS&J.

I-25/U.S. 85 Corridor Future (2020) Traffic Operations – South I-25 Corridor and US 85 Corridor EIS, November 2000, prepared by Jennifer Salisbury and Michelle McGinn, PBS&J.

FUTURE TRANSPORTATION DEMAND

Travel Demand Forecast Model Memorandum – South I-25 Corridor and US 85 Corridor DEIS, June 2000, prepared by Brian Hoeft, CH2M Hill.

Travel Demand Forecast Model Memorandum – South I-25 Corridor and US 85 Corridor FEIS, October 2000, prepared by CH2M Hill.

SOCIOECONOMICS

Socioeconomic Technical Memorandum South I-25 Corridor and US 85 Corridor EIS, May 2000, amended November 2000, prepared by Sam Atencio and Frank Turina, CH2M Hill.

RECREATION

Recreation Technical Report South I-25 Corridor and US 85 Corridor EIS, May 2000, amended November 2000, prepared by SAIC.

AIR QUALITY

Air Quality Analysis South I-25 Corridor and US 85 Corridor DEIS, June 2000, prepared by Ron Ostop, CH2M Hill.

Air Quality Analysis South I-25 Corridor and US 85 Corridor FEIS, November 2000, prepared by Ron Ostop, CH2M Hill.

WATER QUALITY AND FLOODPLAINS

Floodplain and Drainage Assessment Technical Report South I-25 Corridor and US 85 Corridor EIS, May 2000, amended November 2000, prepared by SAIC.

VEGETATION

Vegetation Technical Report South I-25 Corridor and US 85 Corridor EIS, May 2000, amended November 2000, prepared by SAIC.

WETLANDS

Wetland Technical Report South I-25 Corridor and US 85 Corridor EIS, May 2000, amended November 2000, prepared by SAIC.

GEOLOGY

Geology Technical Memorandum South I-25 Corridor and US 85 Corridor DEIS, May 2000, prepared by Jeff Benson and Frank Turina, CH2M Hill.

Geology Technical Memorandum South I-25 Corridor and US 85 Corridor FEIS, October 2000, prepared by Jeff Benson and Frank Turina, CH2M Hill.

WILDLIFE

Wildlife Technical Report South I-25 Corridor and US 85 Corridor EIS, May 2000, amended November 2000, prepared by SAIC.

South I-25/US 85 Wildlife Tracking and Habitat Connectivity, October 2000, prepared by SAIC.

THREATENED AND ENDANGERED SPECIES

Special Status Plant and Animal Species Technical Report South I-25 Corridor and US 85 Corridor EIS, May 2000, amended November 2000, prepared by SAIC.

Preble's Meadow Jumping Mouse Biological Assessment for South I-25 Corridor and US 85 Corridor Environmental Impact Statement, Douglas County, Colorado, October 2000, prepared by Ensign

Technical Services.

HISTORICAL/CULTURAL RESOURCES

Historic Resources Survey Interstate 25/State Highway 85, Douglas County, Colorado. August 20, 1998, prepared by Front Range Research Associates, Inc.

Historic Resources Technical Report South I-25 Corridor and US 85 Corridor EIS, May 2000, amended November 2000, prepared by SAIC.

Review of the Sugnet (1998) Technical Report: Historic Resources, March 1999, prepared by SAIC.

ARCHAEOLOGY

Cultural Resource Management Report Southeast Corridor EIS, January 1999, prepared by Gregory Newberry and Mark Sullivan, Powers Elevation Co., Inc.

An Intensive Archaeological Resources Survey Along Interstate 25 and US Highway 85 In Arapahoe and Douglas Counties, Colorado, December 1999, prepared by O. D. Hand, CDOT.

Survey Report Addendum for Colorado Department of Transportation Project IM 0252-317, Lincoln Avenue to South Castle Rock (I-25 Frontage Road and Interchange Development), April 2000, prepared by Dan Jepson, CDOT.

PALEONTOLOGY

CDOT Project #IM 0252-0317 Paleontological Survey of the I-25 Improvement Options Between Castle Pines and Lincoln Avenue and the Extended Burlington Northern Railroad Project Area, April 2000, prepared by SAIC.

Paleontologic Resources Along the Southeast Interstate 25 Corridor, Arapahoe, and Douglas Counties, Colorado, February 1999, prepared by Dr. Emmett Evanoff, University of Colorado Museum.

PRIME AND UNIQUE FARMLANDS

Farmland Technical Report South I-25 Corridor and US 85 Corridor EIS, May 2000, amended November 2000, prepared by SAIC.

TRAFFIC NOISE

South I-25 Corridor and US 85 Corridor DEIS Traffic Noise Analysis, May 2000, prepared by Catherine Hess and Michelle McGinn, PBS&J.

South I-25 Corridor and US 85 Corridor FEIS Traffic Noise Analysis, November 2000, prepared by Catherine Hess and Michelle McGinn, PBS&J.

VISUAL CHARACTER

Visual Resource Technical Report South I-25 Corridor and US 85 Corridor, May 2000, amended November 2000, prepared by Jeff Benson and Sam Atencio, CH2M Hill.

HAZARDOUS WASTE

Phase I Environmental Site Assessment: I-25 Corridor; Lincoln Avenue to Castle Rock, January 1999, prepared by Arcadis Geraghty & Miller.

Modified Phase I Environmental Site Assessment, July 1999, prepared by Arcadis Geraghty & Miller.

ENVIRONMENTAL SURVEYING

Interstate 25 and U.S. Highway 85 Environmental Surveys and Studies, November 1998, prepared by Sugnet and Associates.

OTHER REPORTS

The Construction Bypass: Commuter Rail Between Castle Rock and Mineral Avenue, January 2000, prepared by John Valerio.

Railroad Relocation Study, July 1999, prepared by Jennifer Salisbury and Steve Sandvik, PBS&J.

South I-25 Corridor Interchange Study, January 2000, prepared by CH2M Hill.

Draft US 85 Access Management Plan, June 2000, prepared by PBS&J.

Final US 85 Access Management Plan, February 2001, prepared by PBS&J.

The South I-25 Corridor and US 85 Corridor Transportation Demand Management Program Report, December 2000, prepared by Michelle McGinn, PBS&J.

The technical reports are available for agency and public review at the following locations:

City of Lone Tree
6399 S Fiddlers Green Cr., Ste. 102
Greenwood Village, CO 80111

Colorado Department of Transportation
Arapahoe Residency
359 Inverness Drive South, Suite K
Englewood, CO 80112

Colorado Department of Transportation
Office of Environmental Services
1325 S Colorado Boulevard, Suite B400
Denver, CO 80222

Colorado Department of Transportation Region 1
18500 E Colfax Avenue
Aurora, CO 80010

Douglas County Planning Department
100 Third Street
Castle Rock, CO 80104

Federal Highway Administration
555 Zang Street, Room 250
Lakewood, CO 80228

Highlands Ranch Library
9292 West Ridgeline
Highlands Ranch, CO 80129

Lone Tree Library
8827 Lone Tree Parkway
Lone Tree, CO 80124-8961

Louviers Library
7885 Louviers Boulevard
Louviers, CO 80131-9900

Parker Library
10851 South Crossroads Drive
Parker, CO 80134-9081

PBS&J
5500 Greenwood Plaza Blvd., Suite 150
Greenwood Village, CO 80111

Philip S. Miller Library
961 S Plum Creek Road
Castle Rock, CO 80104

Town of Castle Rock
100 Wilcox Street
Castle Rock, CO 80104

11.0 INDEX

	<u>Page</u>
Acquisition	5-5, 7-2
Affected Environment	4-1
Agency Involvement	2-1
Air Quality	4-23, 5-13, 5-136, 7-3
Alternatives	S-4, 2-1
Alternative Evaluation Criteria	2-6
Alternative Evaluation Process	2-3, 2-100
Archaeological Resources	4-78, 5-71, 7-13
Atchinson, Topeka and Santa Fe Railroad	4-75, 5-62, 6-9
Best Management Practices (BMP's)	5-31, 7-3
Bicycle and Pedestrian Facility	1-29, 2-79, 4-10
Burlington Northern Santa Fe Railroad	1-29
C-470/I-25 Interchange	2-118
Car pool lot	2-98
Castle Rock	2-91
Chatfield Basin Conservation Network	2-2
Cherokee Ranch	4-78, 5-64, 6-8
Congestion	S-7, 3-11, 3-15
Congestion Management System (CMS)	1-15
Construction Impacts	5-128, 7-15
Cost Analysis	2-20, 2-26, 2-88
Crash Analysis	1-23
Cumulative Impacts	5-133, 7-16
Demographics	4-2
Denver and Rio Grande Railroad	4-73, 5-62, 6-6
Design	2-13, 2-45
Development	4-6
Douglas Lane Interchange	S-13, 1-10
Early-Action Projects	S-12, 1-7, 5-1
Ecological Resources Technical Advisory Committee	2-3
Economic Development	1-29
Economics	4-8
Energy	5-128, 7-15
Environmental Justice	4-3, 5-4, 7-1

Farmlands	4-81, 5-73, 7-14
Fixed-Guideway	2-93
Floodplains	4-60, 5-46, 7-9
Geology	4-39, 5-41, 7-8
Groundwater	4-27
Growth	3-3, 4-1
Hazardous Waste	4-88, 5-120, 7-15
Historic Resources	4-72, 5-60, 7-12
Impact Summary	5-140
Income	4-5
Interchange Study	1-10, 2-95
Issues Team	2-2
ITS	2-118
Land Use	1-30, 4-16, 5-10, 7-3
Level of Service	1-16, 3-10
Lifestyle	4-6
Long-Term Vision	2-91
Low-Income Population	4-5
Meridian Development	S-14, 1-31, 4-16
Metro Vision	4-22, 5-10
Minority Population	4-3
Mitigation	S-11, 5-78, 6-26, 7-1
Mobility	1-28
No-Action Alternative	S-4, 2-6, 3-7, 3-11, 5-1, 6-2
Noise	4-82, 5-74, 7-14
Open Space	4-22, 4-49
Other Alternative	S-5, 2-45, 3-9, 3-15, 6-4
Other I-25 Corridor Improvement Options	2-125, 6-4
Other US 85 Corridor Improvement Options	2-127, 6-4
Paleontological Resources	4-80, 5-72, 7-13
Permits and Approvals	5-2
Physical Environment	4-23
Plan Sheets	2-125
Population	1-30, 3-5, 4-2
Preble's Meadow Jumping Mouse	4-65, 5-53
Preferred Alternative	S-4, 2-13, 3-7, 3-13, 6-2
Prime and Unique Farmland	4-81, 5-73, 7-14
Problem Statement	S-3, 1-1

Project History	1-3
Project Management Team	2-2
Project Objectives	S-3, 1-3
Public Involvement	2-1
Purpose and Need	S-1, 1-1
Railroad Relocation	2-122, 2-123
Rampart Range	1-10, 5-109
Recreation	4-10, 5-7, 7-2
Regional Transportation Plan	S-4, 4-22, 5-18
Relocation	5-4, 7-1
Right-of-Way	5-5, 7-2
Roadway Deficiencies	1-25
Safety	1-22
Schweiger Interchange	2-19, 2-48
Secondary Impacts	5-131, 7-16
Section 4(f) Resources	4-72, 5-60, 6-1, 7-13
Sedalia	2-20, 2-54
Socioeconomics	4-1, 5-2, 5-136, 7-1
State Historic Preservation Officer	4-73, 5-62, 6-2
Supporting measures	2-97, 2-99
Surrey Ridge Road Interchange	2-19, 2-48
System Linkages	1-28
Technical Committee	2-2
Temporary Construction	5-128, 7-15
Threatened and Endangered Species	4-63, 5-51, 5-138, 7-11
Titan Road	1-9
Traffic Characteristics	1-11
Traffic Operations	1-16, 3-10
Traffic Volumes	1-11, 1-25, 3-5
Trails	2-79, 4-10
Transit Demand	3-15
Transit Rail Demonstration Project	2-98
Transportation Demand Management	2-26, 2-97
Transportation Management	2-106, 2-108, 2-118
Transportation Model	3-1
Travel Demand	S-7, 3-1, 3-5
Typical Sections	2-9, 2-11, 2-15, 2-19, 2-47, 2-52, 2-95
Union Pacific Railroad	1-29

Visual Character	4-83, 5-106, 7-14
Vegetation	4-30, 7-5
Water Quality and Quantity	4-26, 5-29, 5-137, 7-3
Website	2-1
Wetlands	4-32, 5-35, 5-137, 7-6
Wild and Scenic Rivers	4-60, 5-46, 7-9
Wildlife	4-48, 5-41, 5-138, 7-8
Wildlife Crossings	2-84
Zoning	4-16, 5-10