ENVIRONMENTAL ASSESSMENT

for proposed improvements to

56TH AVENUE

Quebec Street to Havana Street

STU M320-043 • 15759

DENVER
THE MILE HIGH CITY

DOT
DEPARTMENT OF TRANSPORTATION

U.S. Department of Transportation
Federal Highway Administration

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STU M320-043
15759

56TH AVENUE
QUEBEC STREET TO HAVANA STREET
DENVER, COLORADO

ENVIRONMENTAL ASSESSMENT

Submitted Pursuant to:
42 USC 4332 (2) (C)

Submitted by:
Colorado Department of Transportation

Prepared for:
US Department of Transportation
Federal Highway Administration

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CONTENTS

TABLES

FIGURES

SUPPORTING DOCUMENTS

The Supporting Documents contain data and information to support the assumptions and findings in this Environmental Assessment. The Supporting Documents are located on a CD on the back cover of the EA document.

- Agency Concurrence Letters
- Right of Way Information, Colorado Department of Transportation, State of Colorado
- Your Rights and Benefits as a Highway Relocatee, Relocation Assistance Program, Colorado Department of Transportation, State of Colorado
- Technical Reports (click on report to view)

  56th Avenue, Quebec Street to Havana Street, Environmental Assessment, **Air Quality Technical Report,** 03-11-08

  56th Avenue, Quebec Street to Havana Street, Environmental Assessment, **Drainage Report**, 05-14-08 (9MB)

  56th Avenue, Quebec Street to Havana Street, Environmental Assessment, **Modified Phase I Environmental Site Assessment**, 06-30-08

  56th Avenue, Quebec Street to Havana Street, Environmental Assessment, **Historic Resources Inventory**, 01-07-08

  56th Avenue, Quebec Street to Havana Street, Environmental Assessment, **Noise Impacts Technical Report,** 04-29-08 (7MB)

  56th Avenue, Quebec Street to Havana Street, Environmental Assessment, **Structural Selection Report, 56th Avenue Bridge Over Haul Road**, (Structure No. D-20-MB-790), 08-26-08

  56th Avenue, Quebec Street to Havana Street, Environmental Assessment, **Structural Selection Report 56th Avenue Bridge Over Havana Interceptor,** (Structure No. D-20-MB-785), 03-25-08

  56th Avenue, Quebec Street to Havana Street, Environmental Assessment, **Preliminary Subsurface Investigation and Pavement Design** (Draft), 03-12-08

  56th Avenue, Quebec Street to Havana Street, Environmental Assessment **Community Outreach and Agency Involvement,** 03-31-08

  56th Avenue, Quebec Street to Peña Boulevard, **Traffic and Safety Report,** 06-24-08

  56th Avenue, Quebec Street to Havana Street, Environmental Assessment, **Water Quality Report,** 04-24-08 (10MB)

  56th Avenue, Quebec Street to Havana Street, Environmental Assessment, **Concept Plans**, 2008-05-28.pdf **(86MB)**

ACRONYMS AND ABBREVIATIONS

#	number
<	less than
2035 RTP	*Fiscally Constrained 2035 Regional Transportation Plan* (DRCOG 2007)
ADT	average daily traffic
APCD	Air Pollution Control Division
BCC	Breeding birds of conservation concern
BMP	Best Management Practice
CAA	Clean Air Act
CCD	City and County of Denver
CDOT	Colorado Department of Transportation
CDOW	Colorado Division of Wildlife
CDPHE	Colorado Department of Public Health and Environment
CDPS	Colorado Discharge Permit System
CDWR	Colorado Division of Water Resources
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CGSWG	Colorado Grassland Species Working Group
CO	carbon monoxide
dBA	decibel (A-weighted scale)
DCE	dichloroethene
DRCOG	Denver Regional Council of Governments
EA	Environmental Assessment
EPA	U.S. Environmental Protection Agency
FEMA	Federal Emergency Management Agency
FHWA	Federal Highway Administration
FT	federally threatened
GCN	Species of greatest concern
I-#	Interstate # (e.g., I-25)
ID	identification
Leq	equivalent sound level
LOS	Level of Service
LWCF	Land and Water Conservation Fund
MBTA	Migratory Bird Treaty Act
MEP	Maximum Extent Practicable
MESA	Modified Phase 1 Environmental Site Assessment
mph	miles per hour
MS4	Municipal separate storm sewer system
MSAT	mobile source air toxics
N/A	not applicable
N_2O	nitrous oxide
NAAQS	National Ambient Air Quality Standards
NAC	noise abatement criteria
NEPA	National Environmental Policy Act of 1969
NPDES	National Pollutant Discharge Elimination System
NRHP	National Register of Historic Places
O_3	ozone
PM_{10}	particulate matter less than 10 micron size
$PM_{2.5}$	particulate matter less than 2.5 micron size

PMC	Program Management Contractor
ppm	parts per million
RMANWR	Rocky Mountain Arsenal National Wildlife Refuge
ROW	right-of-way
RTD	Regional Transportation District
RTP	Regional Transportation Plan
SE	State Endangered
SHPO	State Historic Preservation Office
SO_2	sulfur dioxide
SO_x	oxides of sulfur
ST	State Threatened
SWMP	Stormwater Management Plan
SACWSD	South Adams County Water & Sanitation District
TAZ	transportation analysis zones
TCE	trichloroethene
TDM	Transportation Demand Management
TNM	Traffic noise model
TIP	Transportation Improvement Program
TSM	Transportation System Management
TSS	Total Suspended Soilds
UDFCD	Urban Drainage & Flood Control District
URS	URS Corporation
US	United States
US #	United States Highway Number (e.g., US 36, US 287, etc.)
USC	United States Code
USDA	U.S. Department of Agriculture
USDOT	U.S. Department of Transportation
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
USPS	U.S. Postal Service
v/c	volume to capacity ratio
WQCC	Water Quality Control Commission
WQCD	Water Quality Control Division
WQCV	water quality capture volume

EXECUTIVE SUMMARY

Introduction

This Environmental Assessment (EA) identifies and evaluates the impacts of proposed multi-modal transportation improvements on 56th Avenue between Quebec Street and Havana Street in Denver, Colorado.

Project Location

The regional setting for the 56th Avenue project area is shown on Figure ES-1. The 56th Avenue project area is the two-mile section of 56th Avenue from Quebec Street to Havana Street. Located in the northeast quadrant of the City and County of Denver (CCD), 56th Avenue is one of the few east-west arterials serving this part of the metropolitan area.

Purpose and Need

The purpose of the proposed improvements is to meet forecast mobility and accessibility needs for users of all modes (including pedestrians, bicyclists, cars, buses, and trucks) on the existing 56th Avenue alignment.

The transportation needs of the project are:

- Manage future traffic congestion
- Promote multi-modal use of the corridor

Alternatives Considered

Alternatives were developed that directly responded to the project needs of managing future traffic congestion and promoting multi-modal use of the 56th Avenue corridor from Quebec Street to Havana Street.

Eight alternatives (Table ES-1) were developed that provide a reasonable range of improvement options.

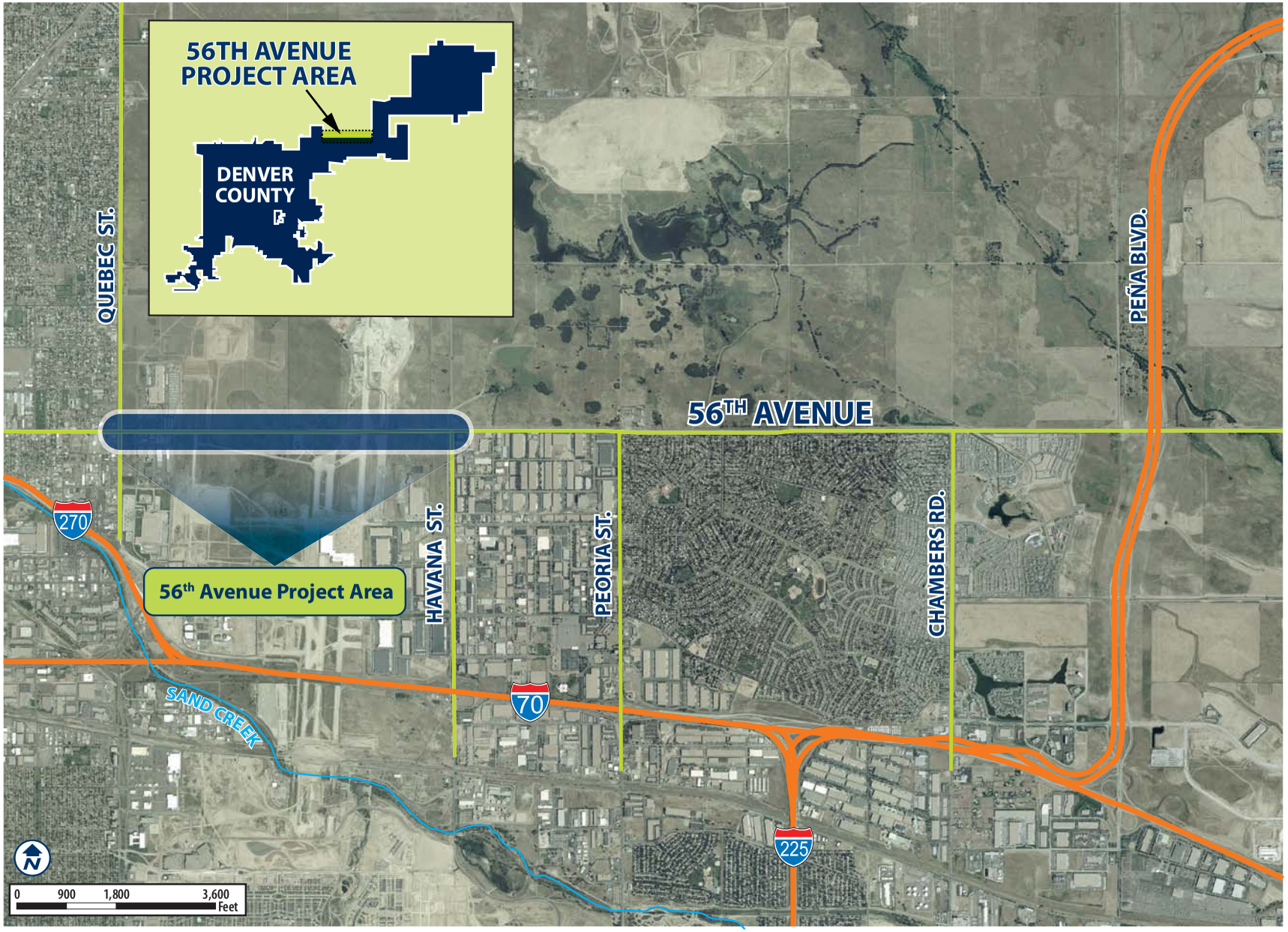
Table ES-1
Alternatives Considered for the 56th Avenue, Quebec Street to Havana Street, Environmental Assessment

Alternative	Description of Alternative	
	Quebec Street to Valentia Street	**Valentia Street to Havana Street**
1	No-Action	No-Action
2	TSM	TSM
3	**Existing** (5-lanes) Add Multi-use Path (south side)	Widen to **4** lanes
4	**Existing** (5-lanes) Add Multi-use Path (south side)	Widen to **4** lanes plus on-street bike lanes
5	**Existing** (5-lanes) Add Multi-use Path (south side)	Widen to **6** lanes*
6	**Existing** (5-lanes) Add Multi-use Path (south side)	Widen to **6** lanes plus on-street bike lanes*
7	Widen to **6** lanes	Widen to **6** lanes*
8	Widen to **6** lanes	Widen to **6** lanes plus on-street bike lanes*

Source: URS Corporation
Note: * For the 6 lane improvements, the west limit of the improvement is Spruce Street, rather than Valentia Street.

Preferred Alternative

The Preferred Alternative, *Alternative 7: Widen to Six Lanes, Quebec Street to Havana Street*, was identified as the alternative that best meets the purpose and need of the project and had manageable mitigation for the impacts. The proposed improvements include widening 56th Avenue and the construction of a multi-use path on the north and south sides of 56th Avenue.



Source: URS Corporation

56th Avenue Environmental Assessment
Quebec Street to Havana Street

FIGURE ES - 1
Project Area Map

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Affected Environment, Impacts, and Mitigation

The environmental assessment process considered a number of issues that were evaluated in detail and are presented in Section 3.0 Affected Environment, Impacts, and Mitigation of the document. Each section includes a discussion of the affected environment, the direct and indirect impacts of the No Action Alternative and the Preferred Alternative, and commitments to mitigate adverse impacts. The study limits of each resource are described within each section.

Those resources that were not present, or when evaluated were determined to have no direct or indirect impacts, are summarized in Section 3.7 Other Resources.

Land Use and Zoning

The Preferred Alternative for the 56th Avenue corridor is compatible with land use plans in the project area. The proposed improvements would increase mobility in the project area, allowing for better access to and from the area for future development of the Stapleton mixed-use urban center as well as current commercial and industrial properties.

Right-of-Way

The Preferred Alternative would require the acquisition of approximately 7.8 acres of additional right-of-way (ROW). Land from two private and four public properties would be acquired as either partial acquisitions or temporary easements. The proposed ROW acquisitions would not result in any full property acquisitions or relocations.

Water Quality

The study limits for water quality impacts are generally the immediate site of the roadway widening project and water bodies within the

project area, into which the runoff from the project would be collected and discharged. The majority of this project is on the former Stapleton Airport property. There is no existing drainage infrastructure within this part of the North Stapleton property at this time. The west end of the project is within an area that has already been redeveloped with existing stormwater drainage infrastructure.

Surface Water

The major changes to the local drainage patterns under the Preferred Alternative would be limited to an increase in impervious surfaces such as roadways, parking lots, rooftops, and driveways. The Preferred Alternative must comply with water quality permits and regulations. To comply with these permit requirements, two temporary retention ponds will be constructed near the existing haul road bridge (1800 feet west of Havana Street) to provide water quality treatment.

Groundwater

Data provided by the Rocky Mountain Arsenal National Wildlife Refuge (RMANWR) lists 11 monitoring wells that are located within 300 feet of the project area. No active groundwater wells would be directly impacted by the Preferred Alternative.

Biological Resources

Direct impacts to vegetation and habitat would primarily occur from vegetation clearing and earth moving for roadway construction. Wildlife habitat loss would result from replacement of existing habitat with the widened roadway and multi-use paths. Construction of the Preferred Alternative would affect 12.6 acres of prairie dog colonies. The Preferred Alternative would have no affect on federally listed threatened and endangered species.

Public Services and Utilities

Under the Preferred Alternative, several potential impacts to utilities could occur depending on final design. Several utilities are located directly within the lane widening area, including a gasoline pipeline, underground electric power lines, and a large natural gas pipeline.

Other Resources

During the EA process there were either minor, or no direct or indirect impacts for some evaluated resources, and consequently no cumulative impacts as a result of the Preferred Alternative. In some cases, the resources were not present within the project area. The following resources are discussed in Section 3.7 Other Resources: Farmlands, Floodplains, Socioeconomics, Environmental Justice, Wetlands and Waters of the U.S., Hazardous Materials, Historic Properties, Paleontological Resources, Archaeological Resources, Section 4(f) and 6(f) Properties, Geology and Soils, Aesthetics, Noise, Air Quality, and Bicyclists and Pedestrians.

Cumulative Impacts

A five-mile radius around the project area was used as the region of influence for this cumulative impacts assessment, and 20 years is the period considered for reasonably foreseeable future actions. To assess cumulative impacts, a list of past, present, and future projects within the project area was developed for consideration. These projects were assessed by resource area against the project list for cumulative impacts. Cumulative impacts are discussed for Land Use, Water Quality, and Biological Resources.

Mitigation and Commitments

A summary of the relevant and reasonable mitigation and commitments are listed in Table ES-2. Mitigation has only been proposed for those resources with direct impacts associated with the Preferred Alternative.

Table ES- 2
Summary of Proposed Project Mitigation and Commitments

Environmental Component		Mitigation
Land Use		No mitigation required. *During construction*: None
Right-of Way (ROW)		If ROW is required from private property owners, the owners will be treated fairly, consistently, equitably and are compensated at fair market value per Uniform Relocation Assistance and Real Property Acquisition Policies Act, 49 CFR 24, State statutes, and Colorado Department of Transportation (CDOT) policies and procedures. *During construction*: Obtain permission to enter property, complete work within designated work zone, and restore land to preconstruction conditions.
Water Quality		Implement Best Management Practices (BMPs) per CDOT Urban Storm Drainage Criteria Manual. Construct two temporary retention basins to capture 100% water quality capture volume (WQCV). *During construction*: BMPs per CDOT Erosion Control and Stormwater Quality Guide; Construction Colorado Discharge Permit System (CDPS) stormwater discharge permit; Section 402 dewatering permit; silt fence/erosion controls; Construct two water quality retention ponds; Minimal disturbance of vegetated areas and re-seeding as soon as practical; BMPs for material storage, re-fueling, and spill containment.
Biological Resources	Vegetation/ Wildlife	Implement CDOT re-vegetation practices; Implement CDOT Impacted Black-tailed Prairie Dog (BTPD) Policy, dated June 1, 2005; Implement Integrated Weed Management plan; Remove and bury topsoil prior to construction. *During construction*: Avoid impacting areas outside limits of construction; Conduct seeding immediately after the topsoil has been replaced. Survey area for BTPD colonies prior to construction; Coordinate manipulation of BTPD colonies with Colorado Department of Wildlife (CDOW) manager prior to disturbance of habitat; Vegetation and grasses will be replaced in disturbed areas to match existing conditions.
	Threatened & Endangered Species	No mitigation required. *During construction*: None
Public Services & Utilities		Utility locator service will be retained for proper marking of underground utilities. Utility owners/ operators will be notified and asked to confirm utility locations and potential conflicts. *During construction*: Accurate location and marking of utilities; Coordination with utility owners/operators; Coordination with emergency and law enforcement services regarding any potential road closures or delays; utility lines will be moved, avoided or rerouted to circumvent service disruption.

Source: URS Corporation

Community Outreach and Agency Involvement

The Community Outreach and Agency Involvement program was developed to build community awareness of the study; identify the issues and concerns of businesses, residents, community groups and other stakeholders; and engage the stakeholders in the development and screening of ideas for corridor improvements.

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1.0 PURPOSE AND NEED

1.1 Introduction

AGENCY PARTNERS

- City and County of Denver (CCD)
- Colorado Department of Transportation (CDOT)
- Federal Highway Administration (FHWA) — Lead Federal Agency

This Environmental Assessment (EA) identifies and evaluates the impacts of proposed multi-modal transportation improvements on 56th Avenue between Quebec Street and Havana Street in Denver, Colorado. This EA also describes the study process and addresses specific questions that have been raised during the public involvement process. This chapter identifies the Purpose and Need for action, documents the background and history of the project area, and describes the existing and future conditions along 56th Avenue.

The use of federal funds for improvements is a Federal Action that is subject to National Environmental Policy Act (NEPA) regulation (42 U.S.C. §§4321-4370c; 23 CFR 771; 40 CFR 1500-1508). This EA has been prepared in compliance with the Council on Environmental Quality (CEQ) regulations for implementing NEPA (40 CFR 1500 et seq.), FHWA's environmental impact and related regulations (23 CFR 771), the FHWA Technical Advisory T6640.8A (Guidance for Preparing and Processing Environmental and Section 4(f) documents), and other applicable laws.

Background and Context

Rocky Mountain Arsenal National Wildlife Refuge

Historically, two major developments have had the greatest influence on the 56th Avenue corridor: Stapleton International Airport and the Rocky Mountain Arsenal. Stapleton's active runways previously crossed the 56th Avenue alignment west of Havana Street, eliminating direct access along 56th Avenue from Quebec Street to Havana Street. Following the opening of Denver International Airport in 1995, the removal of the Stapleton airport-related facilities commenced, and the section of 56th Avenue from Quebec Street to Havana Street was constructed as a two-lane arterial.

North and east of the project area is the Rocky Mountain Arsenal National Wildlife Refuge (RMANWR). Formerly used for manufacturing chemical weapons and agricultural pesticides, RMANWR opened to the public in 2004 after extensive remediation.

Newer developments continue to shape the character of the project area, increasing the traffic demands on 56th Avenue and the surrounding traffic network. On the corridor's west end, Prairie Gateway is a 917-acre site that was acquired by Commerce City from the Rocky Mountain Arsenal on July 22, 2004.

Dick's Sporting Goods Park at Prairie Gateway

The project's development includes the recently constructed Dick's Sporting Goods Park, more than 20 soccer fields, and the new Commerce City civic center building. Future phases of the development will include a high school, commercial/retail development, and new parks and open space.

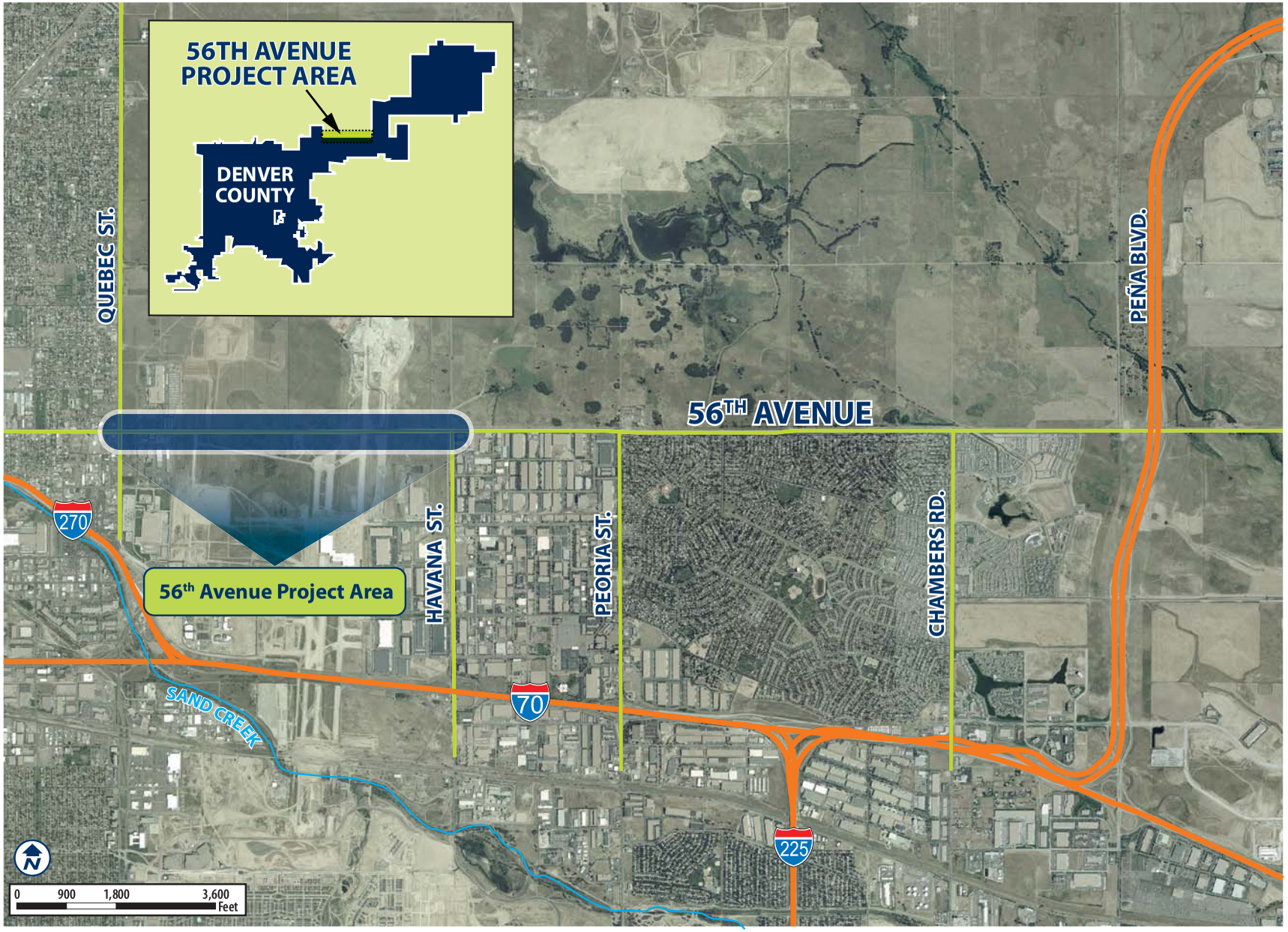
Redevelopment of the 4,700-acre Stapleton site as the nation's largest urban mixed-use in-fill development began soon after the opening of Denver International Airport. When completed, Stapleton will house 30,000 residents and provide employment for 35,000 workers.

East of the study corridor is the 4,500-acre Gateway planning area. Planning for this area incorporates the existing Green Valley Ranch neighborhood and considers the development opportunities created by the proposed East Corridor commuter rail line connecting downtown Denver with the Denver International Airport.

56th Avenue Corridor looking west

Project Location

The regional setting for the 56th Avenue project area is shown on Figure 1.1-1. The 56th Avenue project area is the two-mile section of 56th Avenue from Quebec Street to Havana Street. Located in the northeast quadrant of the City and County of Denver (CCD), 56th Avenue is one of the few east-west arterials serving this part of the metropolitan area.



Source: URS Corporation

56th Avenue Environmental Assessment
Quebec Street to Havana Street

FIGURE 1.1 - 1
Project Area Map

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EXISTING AND PROPOSED MAJOR LAND USES

- Prairie Gateway
- US Postal Service
- Denver Water
- Rocky Mountain Fire Academy
- Stapleton North Redevelopment
- ProLogis

The existing and proposed land uses in the corridor include the US Postal Service Bulk Mail facility, Prairie Gateway development, the Rocky Mountain Fire Academy, Stapleton Redevelopment area (currently undeveloped), and a warehouse distribution center (a planned development of ProLogis).

Several improvements to 56th Avenue were recently implemented as a part of the Prairie Gateway development. From Quebec Street to Valentia Street, the roadway was reconstructed to provide three westbound lanes, two eastbound lanes, and a raised median. Additional turn lanes were provided at the Quebec Street intersection. A new traffic signal was constructed at Valentia Street—a primary access to Dick's Sporting Goods Park. From Valentia Street to Havana Street, 56th Avenue remains a two-lane roadway.

1.2 Purpose of the Proposed Improvements

The purpose of the proposed improvements is to meet forecast mobility and accessibility needs for users of all modes (including pedestrians, bicyclists, cars, buses, and trucks) on the existing 56th Avenue alignment.

1.3 Need for Improvement

The transportation needs of the project are:

- Manage future traffic congestion
- Promote multi-modal use of the corridor

The transportation needs are described further in the following sections. Existing and planned intersecting north-south arterial and collector streets in the project area are shown on Figure 1.3-1.

Source: URS Corporation

56th Avenue Environmental Assessment
Quebec Street to Havana Street

FIGURE 1.3 - 1
56th Avenue Corridor Features

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Regional Transportation Plan

The metropolitan planning organization for the region is the Denver Regional Council of Governments (DRCOG). The DRCOG Board of Directors adopted the Metro Vision 2035 Regional Transportation Plan (RTP) in December 2007. This long-range RTP focuses on improving multi-modal transportation facilities, establishing inter-modal connections, and providing transportation programs and services. As part of the fiscally constrained 2035 RTP, widening of this portion of 56th Avenue to six lanes is anticipated by 2035.

Federal and local funding has been secured to implement corridor improvements.

Implementation will go forward only after public and agency review and if FHWA makes a decision to proceed based on the National Environmental Policy Act.

Project Funding

Approximately $17.4 million in federal and local funds for transportation improvements in the 56th Avenue corridor were secured by the CCD in 2007. Funds are designated to be used to:

- Complete the environmental documentation from Quebec Street to Havana Street;
- Complete the corridor study from Havana Street to Peña Boulevard; and
- Design and construct the proposed improvements between Quebec Street and Havana Street.

CCD has a Three Party Development Agreement among the CCD, SBC Metropolitan District, and ProLogis, that outlines commitments for right-of-way (ROW) dedication and funding for roadway improvements in the southwest quadrant of 56th Avenue and Havana Street.

CCD and the City of Commerce City also have signed an Intergovernmental Agreement (IGA), February 2007, which outlines the commitments of each party with respect to funding, ROW, and maintenance for improvements to 56th Avenue and Quebec Street.

Manage Future Traffic Congestion

Without improvements, *roadway sections* will have increased levels of traffic congestion.

Traffic modeling for 2035 was conducted to evaluate the forecast traffic conditions if no improvements were made in the 56th Avenue project area. The analysis of forecast conditions considered three primary traffic characteristics:

- Congestion on roadway sections
- Congestion at signalized intersections
- Corridor travel speed

The analysis determined that the existing capacity of 56th Avenue is inadequate to meet future travel demands associated with the growth and development of the area. Since 56th Avenue is a regional facility, increased development in the region, as well as the immediate corridor, will generate the increased traffic demand by 2035. Increased traffic volumes will result in greater levels of traffic congestion, which result in slower travel speeds and longer travel times. Mobility in the project area will be greatly reduced for all modes.

THREE MEASURES OF CONGESTION

- Volume-to-capacity
- Intersection Level of Service
- Travel Speed/Travel Time

Congestion on Roadway Sections

One way to measure traffic congestion is to compare the capacity of a roadway to the number of motorists using that roadway. This comparison is called the volume-to-capacity (v/c) ratio. A v/c ratio of 1.0 or greater means that the roadway does not have the capacity to meet the traffic demand.

Table 1.3-1 shows existing and forecast traffic volumes and v/c ratios for both the morning (AM) and evening (PM) peak hours. Because the 56th Avenue section from Quebec Street to Valentia Street has a different roadway configuration than the Valentia Street to Havana Street section, two separate summaries were prepared to reflect the different traffic-carrying capacities of each section.

Traffic demand, estimated using the 2035 DRCOG regional transportation model, on the Quebec Street to Valentia Street section of 56th Avenue is constrained by the limited capacity of the adjacent Valentia Street to Havana Street section to the east. Even so, 2035 traffic volume on the Quebec Street to Valentia Street section is forecast to be nearly double that of today. With an estimated capacity of 2,100 vehicles per hour (1,050 vehicles per hour per lane x 2 through lanes in one direction) in the peak direction of this recently widened section, the computed v/c ratio shows it will be acceptably under-capacity in 2035.

The forecast traffic volume in 2035 will exceed the capacity (1,050 vehicles per hour) of the Valentia Street to Havana Street section, demonstrating the need for transportation improvements to meet future mobility demands. As shown in Table 1.3-1, the peak hour v/c ratio is about 1.2 which is considered unacceptable and will create severe traffic congestion on 56th Avenue.

Table 1.3-1
Roadway Congestion

Section - Peak Direction of Travel

	Quebec Street to Valentia Street (Capacity: 2,100 vehicles per hour)			
	AM Peak		**PM Peak**	
	Volume	**v/c Ratio**	**Volume**	**v/c Ratio**
Existing (2007)	618	0.29	806	0.38
2035 (No Action)	1,195	0.57	1,400	0.67
	Valentia Street to Havana Street (Capacity: 1,050 vehicles per hour)			
	AM Peak		**PM Peak**	
	Volume	**v/c Ratio**	**Volume**	**v/c Ratio**
Existing (2007)	701	0.67	772	0.74
2035 (No Action)	1,240	**1.18**	1,260	**1.2**

Source: URS Corporation
Notes:
- Existing traffic counts were collected May 2, 2007.
- v/c = volume/capacity
- AM peak is westbound; PM peak is eastbound

Congestion at Signalized Intersections

Without improvements, *signalized intersections* will experience increased levels of traffic congestion.

Measuring intersection operations is another way to identify anticipated traffic congestion in a corridor. Traffic engineers use the concept of Level of Service (LOS) to describe how well an intersection serves traffic demands. LOS is rated on a scale from A (highest or best) to F (lowest or worst). At signalized intersections operating at LOS A, delay is low for all motorists traveling through the intersection. LOS E represents the capacity of an intersection, and LOS F represents breakdown conditions, with long delays for motorists. LOS D is generally accepted as the desirable minimum service level for peak hour operations at urban intersections in the Denver region.

Table 1.3-2 summarizes the existing (2007) and forecast (2035) LOS for existing and proposed signalized intersections along 56th Avenue. If no improvements are made, congestion is forecast to increase to unacceptable levels at both the Quebec Street and Havana Street intersections, with peak-hour traffic forecast to operate at LOS E. Similarly, the future intersection of 56th Avenue and Central Park Boulevard is also forecast to operate at LOS E in the 2035 PM peak hours.

Table 1.3-2
Intersection Level of Service

Intersection	Level of Service			
	2007		2035	
	AM Peak	PM Peak	AM Peak	PM Peak
56th Avenue / Quebec Street	C	C	**E**	D
56th Avenue / Valentia Street	B	B	B	B
56th Avenue / Central Park Boulevard (future intersection)	n/a	n/a	D	**E**
56th Avenue / Havana Street	D	C	D	**E**

Source: URS Corporation
Notes:
- n/a = not applicable.
- Traffic signal warrants are not met at other existing and future intersections (Spruce Street, Uinta Street, Verbena Street, and Dallas Street) for the 2035 scenario.

The traffic and safety report (URS 2008f) discusses signal locations in more detail and can be found on the CD in the back cover of this document.

Without improvements, *travel speeds* will decrease.

Corridor Travel Speed

Another way to evaluate future traffic conditions is by considering travel speed. As travel speeds decline, travel time increases. Using the 2035 predicted traffic volumes, travel speeds were estimated (Table 1.3-3). If no improvements are made in the corridor, forecast travel speeds in the two-lane section between Valentia Street and Havana Street would decrease from current conditions by 9.6 miles per hour (mph) (an additional 48 seconds of travel time) and 13.0 mph (an additional 112 seconds of travel time) in the AM and PM peak hours, respectively.

Table 1.3-3
Travel Speed and Travel Time

	Section Travel Speed (Travel Time)			
	Between Quebec Street and Valentia Street (Peak Direction)		Between Valentia Street and Havana Street (Peak Direction)	
	AM Peak	PM Peak	AM Peak	PM Peak
Existing (2007)	36.4 mph (61 sec)	37.6 mph (59 sec)	36.4 mph (137 sec)	31.4 mph (158 sec)
2035 (No Action)	36.4 mph (61 sec)	37.6 mph (59 sec)	26.8 mph (185 sec)	18.4 mph (270 sec)
Difference	0.0 mph (0 sec)	0.0 mph (0 sec)	-9.6 mph (+48 sec)	-13.0 mph (+112 sec)

Source: URS Corporation
Notes:
- Travel speeds were extracted from the Synchro model simulation of section travel times and average vehicle delay at intersections.
- mph = miles per hour
- sec = seconds

PROMOTE MULTI-MODAL ACCESS
- Pedestrian
- Bicycle
- Bus

Promote Multi-Modal Use of the Corridor

Driving the need for improvements in and near the 56th Avenue project area are the existing and planned developments of Prairie Gateway, Stapleton North, Denver Business Center, the RMANWR, Montbello, Parkfield, and Green Valley Ranch. Corridor stakeholders value

opportunities to travel between the various activity centers without use of the automobile.

Multi-use path adjacent to Montbello neighborhood

Within the project area, on-street bike lanes are planned on the future Central Park Boulevard (See Figure 1.3-2). To the east of the project area, multi-use paths have already been constructed adjacent to the Montbello and Parkfield neighborhoods. A perimeter trail around the RMANWR is planned. Although there is no current bus service along 56th Avenue in the project area, local bus service within the adjacent Montbello neighborhood is provided by the Regional Transportation District (RTD). As part of the development of commuter rail improvements between downtown Denver and Denver International Airport, additional feeder bus routes may be programmed for 56th Avenue.

To meet stakeholder expectations, improvement options for 56th Avenue must support or advance the connectivity and function of proposed regional trail and bikeway systems and neighborhood bus service. Specifically, the improvements must provide or accommodate the development of a continuous pedestrian and bicycle system in the area by connecting existing and proposed multi-use paths and trails. Multi-use paths adjacent to 56th Avenue are needed to provide pedestrian access to existing and proposed bus routes.

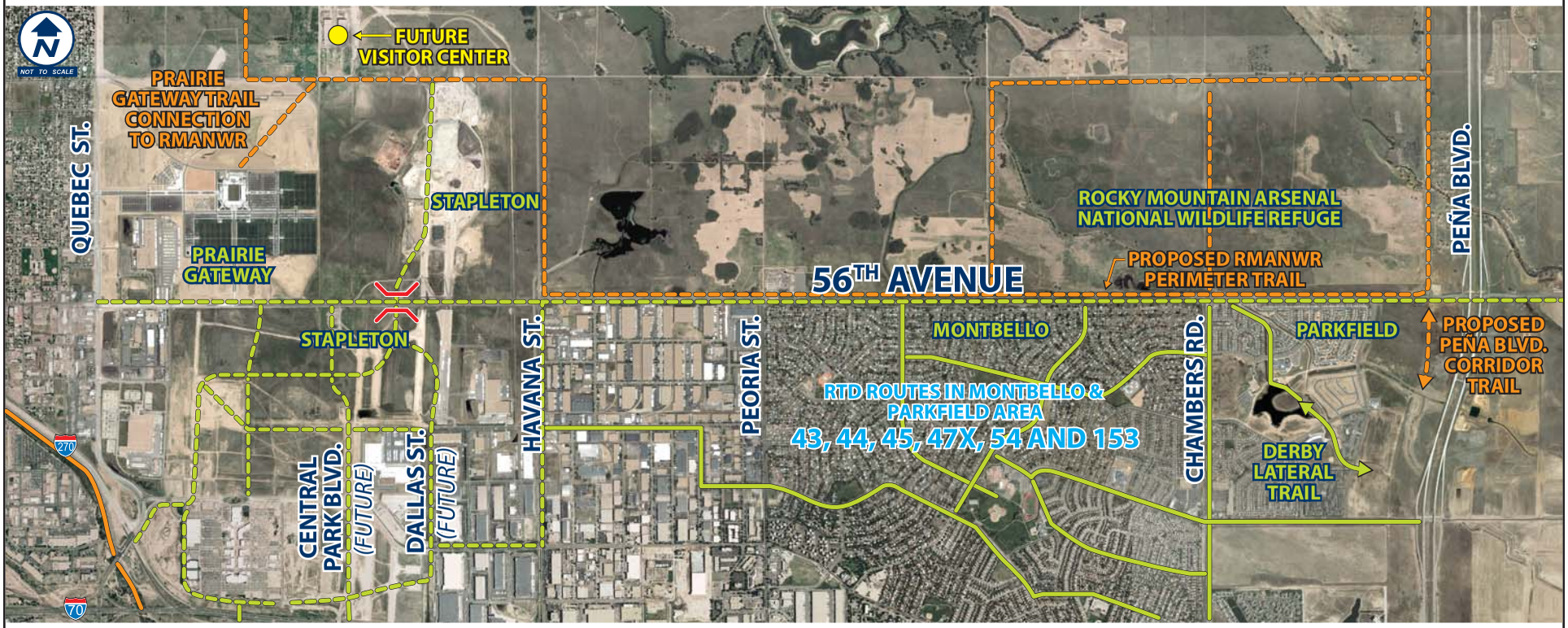
1.4 Previous 56th Avenue Studies

Several studies that contribute to an understanding of the corridor's past and future, as well as stakeholder visions for corridor improvements, have been completed for projects in and near the project area. These past studies are summarized in Table 1.4-1.

Table 1.4-1
Previous Studies of the 56th Avenue Corridor

Study	Completed	Findings or Recommendations of Interest to Project Area
Rocky Mountain Arsenal Final Environmental Impact Statement	1995	• Recommended a multi-use trail on the perimeter of the RMANWR.
East 56th Avenue Corridor Concept Plan	September 2004	• Proposed a six-lane roadway cross-section on 56th Avenue from Quebec Street to Peña Boulevard. • Supported on-street bicycle lanes and a raised median on 56th Avenue.
The Prairie Gateway and Stapleton Development Projects Regional Planning Taskforce White Paper	2005	• Supported the use of the existing bridge on 56th Avenue (at approximately Dayton Street) as a pedestrian-only, grade-separated crossing. • Supported the development of a pedestrian/bicycle corridor on the north and south sides of 56th Avenue from Quebec Street to the future Central Park Boulevard, continuing east (on the south side) to Havana Street.
56th Avenue Traffic Study relating to the Prairie Gateway Development Area	October 2005	• Recommended that 56th Avenue between Quebec Street and Valentia Street be widened to five lanes (two eastbound through lanes and three westbound lanes) by 2007. • Recommendations anticipated that 56th Avenue from Quebec Street to Havana Street would be widened to six lanes by 2025.
Stapleton Business Center North Master Plan	2006	• ProLogis proposes to construct six buildings for distribution warehouse and showroom/warehouse/office uses on a site in the southwest quadrant of 56th Avenue and Havana Street. • Proposed site access includes two limited-movement driveways along 56th Avenue and a new public street connection to 56th Avenue at Dallas Street.
North Stapleton Infrastructure Master Plan, Amendment 1	December 2006	• Addressed infrastructure issues for the implementation of mixed-use development in the Stapleton Redevelopment area north of I-70. • Recommended the widening of 56th Avenue to six lanes from Quebec Street to Havana Street.

Source: URS Corporation



Source: URS Corporation

56th Avenue Environmental Assessment
Quebec Street to Havana Street

FIGURE 1.4 - 1
Bicycle Routes, Trails, and RTD Bus Service

DENVER THE MILE HIGH CITY

1.5 Summary

The purpose of the proposed improvements is to meet forecast mobility and accessibility needs for users of all modes (including pedestrians, bicyclists, cars, buses, and trucks) on the existing 56th Avenue alignment. The transportation needs of the project are:

- Manage future traffic congestion
- Promote multi-modal use of the corridor

Traffic volumes are projected to increase on 56th Avenue. If improvements are not made, travel time and congestion in the project area will increase to unacceptable levels and mobility in the project area will be greatly reduced for all modes. These proposed improvements would relieve traffic congestion on the existing arterial roadway and promote multi-modal use by connecting existing and proposed multi-use paths and trails.

2.0 ALTERNATIVES CONSIDERED

2.1 Introduction

This chapter describes the process that was used to develop and evaluate a range of multi-modal transportation improvement alternatives. A two-tier screening process resulted in the identification of the Preferred Alternative.

2.2 Alternatives Development Process

RESPONDING TO PROJECT NEEDS

- Manage future traffic congestion
- Promote multi-modal use of the corridor

Alternatives were developed that directly responded to the project needs of managing future traffic congestion and promoting multi-modal use of the 56th Avenue corridor from Quebec Street to Havana Street.

A consideration in the development of alternatives for the corridor was the status of the Rocky Mountain Fire Academy on the south side of 56th Avenue between Roslyn Street and Spruce Street (see Figure 1.3-1 in Chapter 1). Widening of 56th Avenue in this short segment would require the relocation of facilities on the fire training site. The training facility may be relocated in the near future, at which time it would be more cost-effective to construct any widening improvements. To test the viability of this approach, several alternatives were developed that avoided any widening of the Roslyn Street to Spruce Street segment. Specifically, these alternatives would maintain the existing five-lane facility of 56th Avenue within this segment, regardless of improvement measures for other segments.

ALTERNATIVES

- No Action
- Transportation System Management (TSM)
- Six widening alternatives

Eight alternatives, as listed below and summarized in Table 2.2-1, were developed that provided a reasonable range of improvement options:

- Alternative 1: No Action
- Alternative 2: Transportation System Management (TSM)

- Alternative 3: Maintain existing five lanes, Quebec Street to Valentia Street; widen from two to four lanes, Valentia Street to Havana Street
- Alternative 4: Maintain existing five lanes, Quebec Street to Valentia Street; widen from two to four lanes with on-street bicycle lanes, Valentia Street to Havana Street
- Alternative 5: Maintain existing five lanes, Quebec Street to Spruce Street; widen to six lanes, Spruce Street to Havana Street
- Alternative 6: Maintain existing five lanes, Quebec Street to Spruce Street; widen to six lanes with on-street bicycle lanes, Spruce Street to Havana Street
- Alternative 7: Widen to six lanes, Quebec Street to Havana Street
- Alternative 8: Widen to six lanes, Quebec Street to Havana Street, with on-street bicycle lanes

Table 2.2-1
Alternatives

Alternative	Description of Alternative	
	Quebec Street to Valentia Street	**Valentia Street to Havana Street**
1	No-Action	No-Action
2	TSM	TSM
3	**Existing** (5-lanes) Add Multi-use Path (south side)	Widen to **4** lanes
4	**Existing** (5-lanes) Add Multi-use Path (south side)	Widen to **4** lanes plus on-street bike lanes
5	**Existing** (5-lanes) Add Multi-use Path (south side)	Widen to **6** lanes*
6	**Existing** (5-lanes) Add Multi-use Path (south side)	Widen to **6** lanes plus on-street bike lanes*
7	Widen to **6** lanes	Widen to **6** lanes*
8	Widen to **6** lanes	Widen to **6** lanes plus on-street bike lanes*

* For the 6 lane improvements, the west limit of the improvement is Spruce Street, rather than Valentia Street.

Alternatives 3 through 8 were defined to include a raised median and detached sidewalks or multi-use paths on the north and south sides of 56th Avenue (in the widened sections). A raised median is consistent with the design of the recently constructed improvements on 56th Avenue from Quebec Street to Valentia Street, and is also consistent with earlier planning studies for the 56th Avenue corridor, described in Section 1.4 of this document.

To promote pedestrian and bicycle use in the corridor, a multi-use path would be constructed along the south side of 56th Avenue from Quebec Street to Spruce Street (Figure 2.2-1) for each of the alternatives that retain the existing five-lane section from Quebec Street to Spruce Street (Alternatives 3 through 6). In the vicinity of the Rocky Mountain Fire Academy, Alternatives 3 through 6 were also defined to maintain the existing fence line south of 56th Avenue and construct a narrower (five-foot) sidewalk adjacent to the existing roadway.

Consistent with the purpose and need for this project, all of the "build" alternatives (Alternatives 2 through 8) are focused on improvements to the current alignment of 56th Avenue. All build alternatives are assumed to include the Transportation System Management (TSM) improvements as described in Alternative 2. Implementation of any of the proposed alternatives will not force the immediate need for improvements of roadways in the immediate area. Improvement of the Quebec Street to Havana Street segment will improve corridor access, safety, and traffic-carrying capacity of 56th Avenue even if other segments of 56th Avenue are not improved.

The build alternatives are shown on Figures 2.2-1 through 2.2-6, following the detailed description of each of the developed alternatives.

Alternative 1: No Action

The No Action alternative assumes the 56th Avenue roadway remains in its current configuration from Quebec Street to Havana Street. No roadway, sidewalk, or multi-use path construction projects are assumed for this alternative and acquisition of additional ROW is not required.

TRANSPORTATION SYSTEM MANAGEMENT (TSM)

- Coordinate existing signals
- Install new signals
- Enhance intersection vehicle flow
- Construct sidewalk and multi-use path
- Minor safety improvements

Alternative 2: Transportation System Management (TSM)

The TSM alternative includes measures to improve corridor operations and safety. These measures include coordinating existing traffic signals, installing new traffic signals, improving turn lanes to enhance traffic flow at intersections, and constructing missing segments of sidewalk or multi-use path. Minor projects to improve corridor safety are also considered. Minimal or no additional ROW would be required to implement the TSM alternative. Candidate locations for improvements include the existing intersections of 56th Avenue and:

- Quebec Street
- Roslyn Street
- Spruce Street
- Valentia Street
- Havana Street

Excluded from this alternative were major capacity improvements such as the widening of 56th Avenue to allow for additional through lanes.

ALTERNATIVE 3

- 5 lanes – Quebec Street to Valentia Street
- 4 lanes – Valentia Street to Havana Street
- Raised median
- Multi-use paths on both sides of roadway
- Additional ROW required

As an option to roadway widening, a variety of transportation demand management strategies were also considered in this alternative, such as increased bus service, encouragement of carpooling, and guaranteed ride home programs.

Alternative 3: Maintain Existing Five Lanes, Quebec Street to Valentia Street; Widen from Two to Four Lanes, Valentia Street to Havana Street

In this alternative (Figure 2.2-2), the five-lane cross-section from Quebec Street to Valentia Street would be maintained in its current configuration. From Valentia Street to Havana Street, 56th Avenue would be widened from two to four lanes. The alternative includes a raised

median (with left turn lanes) and detached multi-use paths on both the north and south sides of 56th Avenue. Additional ROW would be required on the north side of 56th Avenue, west of the future Central Park Boulevard, as noted on the figure.

With the raised median, access to intersecting north-south streets would be restricted to the following intersections:

- Quebec Street
- Roslyn Street
- Spruce Street
- Uinta Street (future)
- Valentia Street
- Verbena Street (future)
- Central Park Boulevard (future)
- Dallas Street (future)
- Havana Street

Intersections along 56th Avenue identified for future traffic signals when traffic volume warrants are met are: Spruce Street, Uinta Street, Verbena Street, Central Park Boulevard, and Dallas Street.

Alternative 4: Maintain Existing Five Lanes, Quebec Street to Valentia Street; Widen to Four Lanes with On-Street Bicycle Lanes, Valentia Street to Havana Street

ALTERNATIVE 5

- 5 lanes – Quebec Street to Spruce Street
- 6 lanes – Spruce Street to Havana Street
- Raised median
- Multi-use paths on both sides of roadway
- Additional ROW required

Alternative 4 provides the same elements as Alternative 3 with the following modification:

- On-street striped bicycle lanes (4-foot in width, excluding gutter pan) on each side of 56th Avenue (Figure 2.2-3).
- The multi-use paths described in Alternative 3 would be designated as sidewalks.

Alternative 5: Maintain Existing Five Lanes, Quebec Street to Spruce Street; Widen to Six Lanes, Spruce Street to Havana Street

In this alternative (Figure 2.2-4), the five-lane cross-section from Quebec Street to Spruce Street would be maintained in its current configuration. From Spruce Street to Havana Street, 56th Avenue would

be widened to six lanes. The alternative includes a raised median (with left turn lanes) and detached multi-use paths on both the north and south sides of 56th Avenue. Additional ROW acquisition would be required on the north and south sides of 56th Avenue as noted on Figure 2.2-4.

With the raised median, access to intersecting north-south streets is restricted to the following intersections:

- Quebec Street
- Roslyn Street
- Spruce Street
- Uinta Street (future)
- Valentia Street
- Verbena Street (future)
- Central Park Boulevard (future)
- Dallas Street (future)
- Havana Street

Intersections along 56th Avenue identified for future traffic signals when traffic volume warrants are met are: Spruce Street, Uinta Street, Verbena Street, Central Park Boulevard, and Dallas Street.

Alternative 6: Maintain Existing Five Lanes, Quebec Street to Spruce Street; Widen to Six Lanes with On-Street Bicycle Lanes, Spruce Street to Havana Street

Alternative 6 provides the same design elements as Alternative 5 with the following modification:

- On-street striped bicycle lanes (four-foot in width, excluding gutter pan) on each side of 56th Avenue (Spruce Street to Havana Street) (Figure 2.2-5).
- The multi-use paths described in Alternative 5 would be designated as sidewalks.

ALTERNATIVE 7

- 6 lanes – Quebec Street to Havana Street
- Raised median
- Multi-use paths on both sides of roadway
- Additional ROW required

Alternative 7: Widen to Six Lanes, Quebec Street to Havana Street

In this alternative, the five-lane cross-section from Quebec Street to Valentia Street would be widened to provide an additional lane from Roslyn Street to Valentia Street (figure 2.2-6). The existing eastbound

right turn lane from Quebec Street to Roslyn Street would be converted to a through lane. New traffic signals would be installed (when traffic volume or safety warrants are met) at Spruce Street. Between Valentia Street and Havana Street, the six-lane widening improvements are the same as those defined for Alternative 5.

Alternative 8: Widen to Six Lanes, Quebec Street to Havana Street, with On-Street Bicycle Lanes

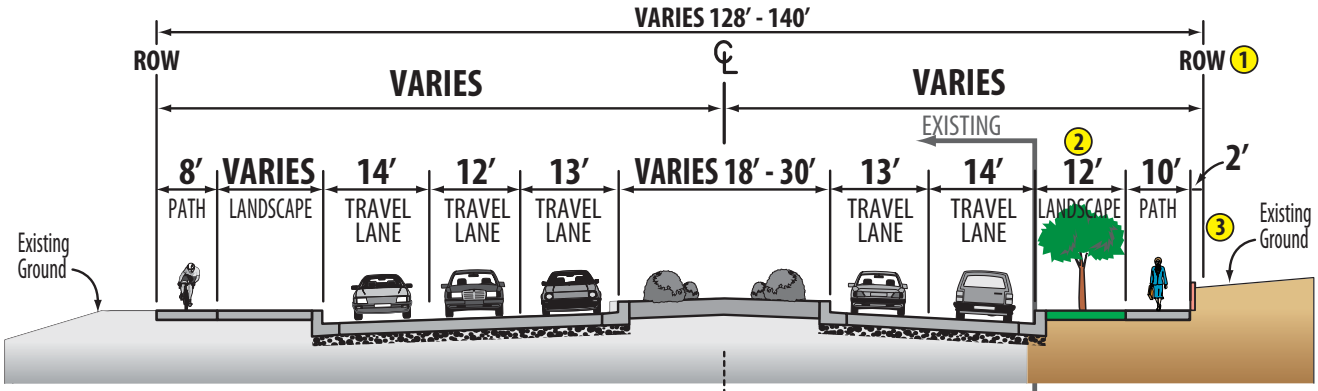
Alternative 8 provides the same design elements as Alternative 7 with the following modification:

- On-street bicycle lanes (four-foot in width, excluding gutter pan) on each side of 56th Avenue (Valentia Street to Havana Street).
- The multi-use paths described in Alternative 7 will be designated as sidewalks.

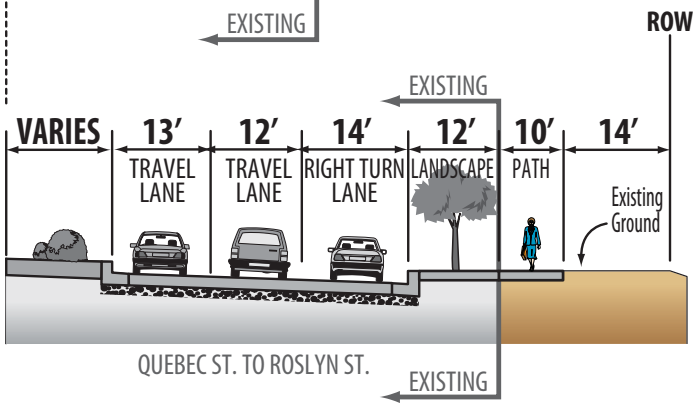
DESIGN CONCEPT: CONSTRUCT MULTI-USE PATH QUEBEC ST. TO SPRUCE ST., SOUTH SIDE

(APPLIES TO ALTERNATIVES 3 THROUGH 6)

TYPICAL SECTION, LOOKING EAST



1. 0′ to 12.5′ (varies) of additional ROW required on south side of 56th Avenue for landscape buffer and multi-use path, Spruce St. to Valentia St.
2. 7′ landscape buffer in front of Rocky Mountain Fire Academy on south side of 56th Avenue.
3. Retaining wall behind multi-use path, as needed, Roslyn St. to Spruce St.



Source: URS Corporation

56th Avenue Environmental Assessment
Quebec Street to Havana Street

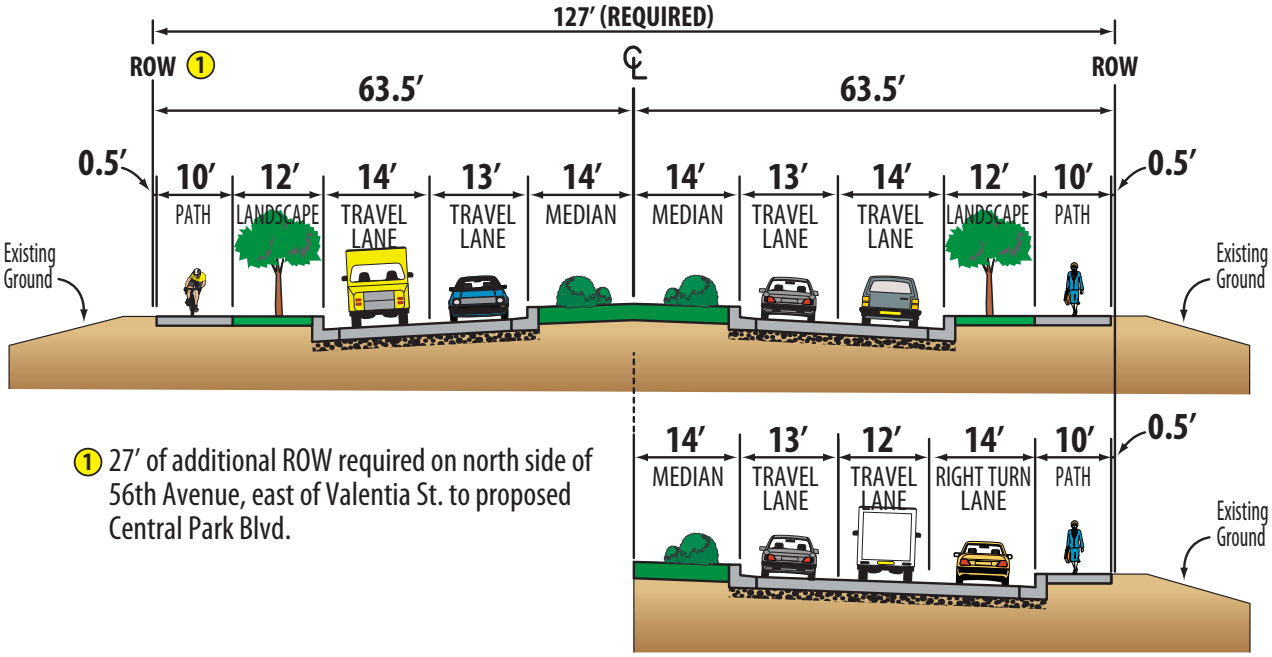
FIGURE 2.2 - 1
Design Concept: Construct Multi-use Path
Quebec St. to Spruce St., South Side

DENVER THE MILE HIGH CITY

DESIGN CONCEPT: WIDEN TO 4 LANES VALENTIA ST. TO HAVANA ST.

(APPLIES TO ALTERNATIVE 3)

TYPICAL SECTION, LOOKING EAST



① 27′ of additional ROW required on north side of 56th Avenue, east of Valentia St. to proposed Central Park Blvd.

Source: URS Corporation

56th Avenue Environmental Assessment
Quebec Street to Havana Street

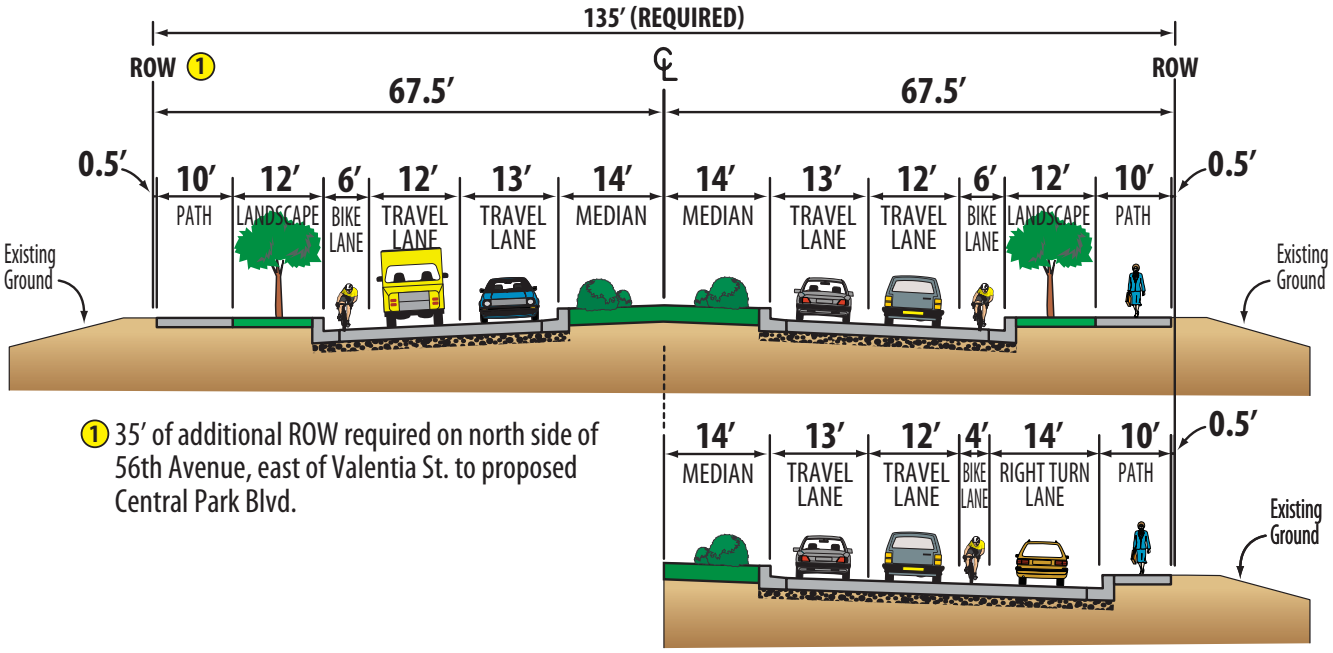
FIGURE 2.2 - 2
Design Concept: Widen to 4 Lanes
Valentia St. to Havana St.

DENVER THE MILE HIGH CITY

DESIGN CONCEPT: WIDEN TO 4 LANES WITH BIKE LANES VALENTIA ST. TO HAVANA ST.

(APPLIES TO ALTERNATIVE 4)

TYPICAL SECTION, LOOKING EAST



① 35′ of additional ROW required on north side of 56th Avenue, east of Valentia St. to proposed Central Park Blvd.

Source: URS Corporation

56th Avenue Environmental Assessment
Quebec Street to Havana Street

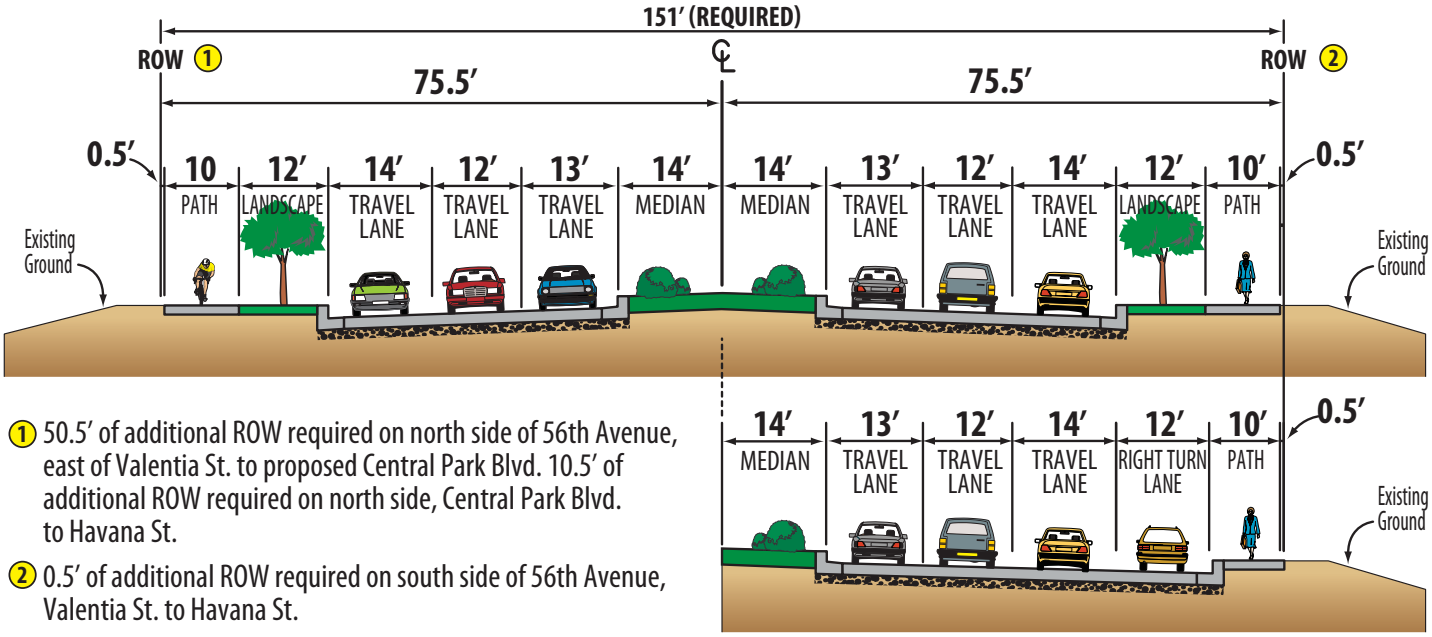
FIGURE 2.2 - 3
Design Concept: Widen to 4 Lanes with Bike Lanes Valentia St. to Havana St.

DENVER THE MILE HIGH CITY

DESIGN CONCEPT: WIDEN TO 6 LANES SPRUCE ST. TO HAVANA ST.

(APPLIES TO ALTERNATIVES 5 AND 7)

TYPICAL SECTION, LOOKING EAST



① 50.5′ of additional ROW required on north side of 56th Avenue, east of Valentia St. to proposed Central Park Blvd. 10.5′ of additional ROW required on north side, Central Park Blvd. to Havana St.

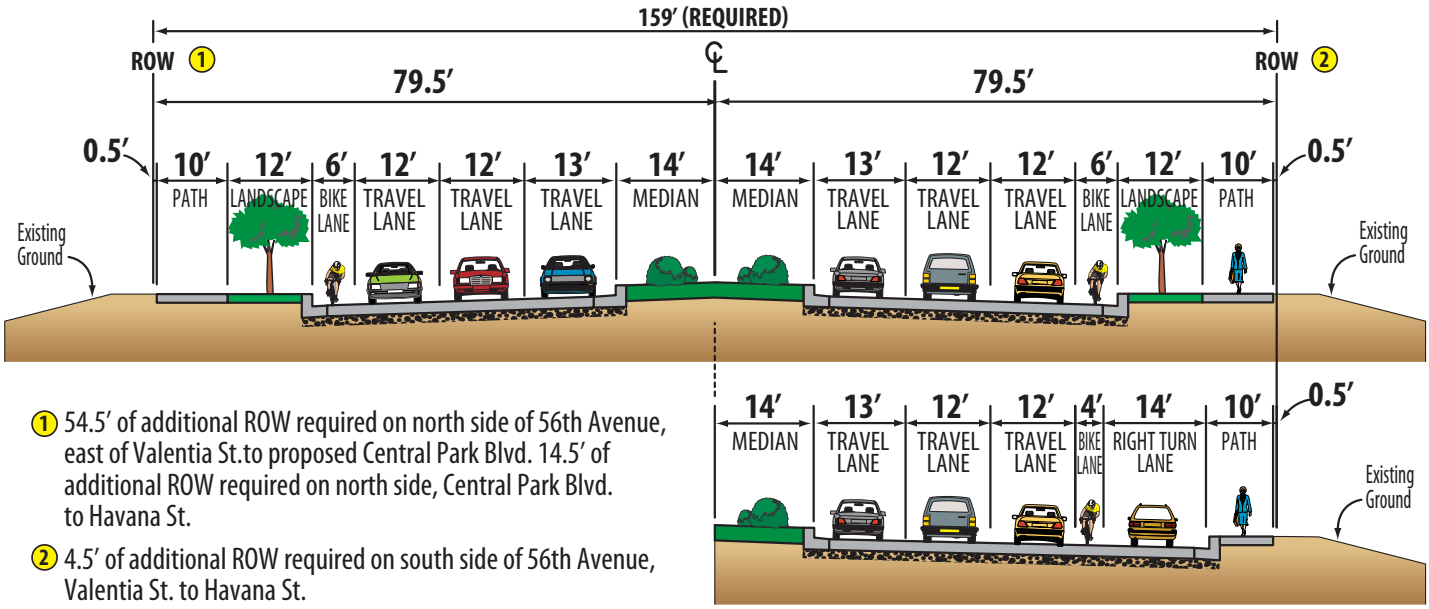
② 0.5′ of additional ROW required on south side of 56th Avenue, Valentia St. to Havana St.

Source: URS Corporation

DESIGN CONCEPT: WIDEN TO 6 LANES WITH BIKE LANES SPRUCE ST. TO HAVANA ST.

(APPLIES TO ALTERNATIVES 6 AND 8)

TYPICAL SECTION, LOOKING EAST



① 54.5′ of additional ROW required on north side of 56th Avenue, east of Valentia St.to proposed Central Park Blvd. 14.5′ of additional ROW required on north side, Central Park Blvd. to Havana St.

② 4.5′ of additional ROW required on south side of 56th Avenue, Valentia St. to Havana St.

Source: URS Corporation

56th Avenue Environmental Assessment
Quebec Street to Havana Street

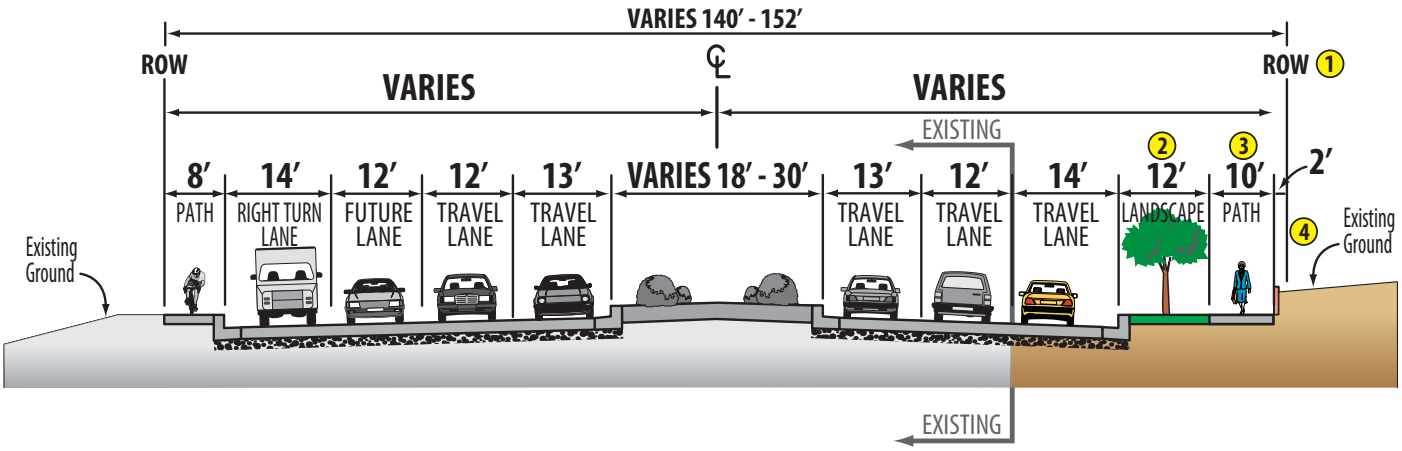
FIGURE 2.2 - 5
Design Concept: Widen to 6 Lanes with Bike Lanes Spruce St. to Havana St.

DENVER THE MILE HIGH CITY

DESIGN CONCEPT: WIDEN TO 6 LANES QUEBEC ST. TO VALENTIA ST.

(APPLIES TO ALTERNATIVE 7)

TYPICAL SECTION, LOOKING EAST



① 8′ to 20′ (varies) of additional ROW required on south side of 56th Avenue for landscape buffer and multi-use path, Spruce St. to Valentia St.

② No landscape buffer in front of Rocky Mountain Fire Academy on south side of 56th Avenue.

③ 5′ sidewalk in front of Rocky Mountain Fire Academy on south side of 56th Avenue.

④ Retaining wall behind multi-use path, as needed, Roslyn St. to Spruce St.

Source: URS Corporation

2.3 Screening Process and Identification of Preferred Alternative

TWO-TIER SCREENING PROCESS

- Fatal-flaw Screening
- Detailed Screening

Two levels of screening were applied to the proposed alternatives. The initial level of screening was based on "fatal flaw" screening criteria. Surviving alternatives were then retained for the second level of screening that evaluated each alternative against a series of policy, engineering, environmental, and traffic engineering criteria.

The No Action alternative is carried forward through the entire screening process for detailed comparison to the Preferred Alternative.

Fatal Flaw Screening

The intent of fatal flaw screening was to eliminate all non-viable alternatives prior to more detailed investigations and screening. Fatal flaw screening criteria included:

- Does not meet purpose and need, and/or
- Has unacceptable environmental impacts, and/or
- Is not practical or feasible (extraordinary cost or complexity)

The results of the fatal flaw screening are summarized on Table 2.3-1. *Alternative 2: TSM Alternative* did not meet the purpose and need for the corridor and was eliminated from further consideration. Specifically, the alternative did not provide corridor capacity improvements to meet the purpose and need of managing forecasted future traffic and mobility demands on 56th Avenue.

Table 2.3-1 Initial (Fatal Flaw) Screening of Alternatives

Alternative	Description of Alternative		Fatal Flaw (Pass/Fail) Screening Criteria		
	Quebec Street to Valentia Street	Valentia Street to Havana Street	Meets Purpose and Need?	Environmental Impacts	Practical and Feasible? (No extraordinary cost or complexity)
1	No-Action	No-Action	N/A	N/A	N/A
2	TSM	TSM	**FAIL**	**PASS**	**PASS**
3	**Existing** (5-lanes) Add Multi-use Path (south side)	Widen to **4** lanes	**PASS**	**PASS**	**PASS**
4	**Existing** (5-lanes) Add Multi-use Path (south side)	Widen to **4** lanes plus on-street bike lanes	**PASS**	**PASS**	**PASS**
5	**Existing** (5-lanes) Add Multi-use Path (south side)	Widen to **6** lanes	**PASS**	**PASS**	**PASS**
6	**Existing** (5-lanes) Add Multi-use Path (south side)	Widen to **6** lanes plus on-street bike lanes	**PASS**	**PASS**	**PASS**
7	Widen to **6** lanes	Widen to **6** lanes	**PASS**	**PASS**	**PASS**
8	Widen to **6** lanes	Widen to **6** lanes plus on-street bike lanes	**PASS**	**PASS**	**PASS**

Source: URS Corporation

Detailed Screening

Eleven detailed screening evaluation criteria in four categories

Following the fatal flaw screening, all remaining alternatives were evaluated against eleven detailed screening criteria. The criteria were grouped into the following areas and the results are detailed in Table 2.3-2.

- Policy
- Engineering and Construction
- Environmental Resources
- Traffic Engineering

A description of the scoring criteria in each category, with the scoring guidance, follows.

Policy Criteria

- Conformance with DRCOG 2035 Plan
- Provides for and Connects Bicycle and Pedestrian Facilities
- Consistent with CCD Bicycle System Practices

The **Policy** criteria included:

Conformance with the DRCOG 2035 Plan: The DRCOG Metro Vision 2035 plan proposes the improvement of 56th Avenue to a six-lane arterial from Quebec Street to east of Peña Boulevard. Alternatives that provided for six lanes from Quebec Street to Havana Street scored higher than alternatives that provided fewer than six lanes.

Provides for Multi-Modal Access: Each alternative was evaluated for the provision and connectivity of bicycle and pedestrian facilities along 56th Avenue. Alternatives that provided on-street bicycle lanes and off-street continuous multi-use paths scored higher than alternatives with only off-street or non-continuous facilities.

Consistency with CCD Bicycle System Practices: The City and County of Denver's bicycle system includes off-street bicycle trails and on-street bicycle lanes on two- and four-lane roadways. On-street bicycle lanes on six-lane arterials are not consistent with current City practice. Alternatives that provided bicycle facilities that were consistent with current City practices were scored higher than alternatives that were inconsistent with City bicycle lane design practices.

Engineering and Construction Criteria

- Meets City Design Standards
- Within Construction Budget
- Amount of ROW Required

The **Engineering and Construction** criteria included:

Design Criteria: The alternatives were evaluated for meeting City standards for multi-use paths and roadway widths. As a minimum, City and County of Denver standards for arterial roadways, like 56th Avenue, specify an 8-foot width for multi-use paths and an 11-foot width for roadway lanes. Alternatives that

met or exceeded minimum widths scored higher than alternatives that did not meet standards.

Probable Construction Costs: The construction cost of each alternative was evaluated in comparison to an estimated project budget of $15 to $20 million. Alternatives with concept-level cost estimates within the project budget scored higher than alternatives that were estimated to exceed the available funds.

ROW Required: The alternatives were evaluated on the need for additional acreage along 56th Avenue for proposed improvements. Alternatives that required no additional ROW scored higher than alternatives requiring additional ROW.

As discussed in Chapter 3, Affected Environment, Impacts, and Mitigation, a comprehensive investigation into corridor environmental resources was conducted. From that investigation, it was determined that the preliminary impacts to two corridor environmental resources were sufficiently varied to provide insights for the screening process. The **Environmental Resources** criteria included:

Environmental Resources Criteria

- Land Use
- Wildlife (Black-tailed Prairie Dog) Habitat

Land Use: Past studies of the 56th Avenue corridor, described in the previous chapter, defined the expectations of corridor residents and developers for six lanes on 56th Avenue.

Previous development plans and transportation studies along 56th Avenue were based on the assumption that 56th Avenue would provide six lanes to support future development demands. Alternatives that provided for six lanes from Quebec Street to Havana Street scored higher than alternatives that provided fewer than six lanes.

Table 2.3-2
Detailed Screening of Alternatives

	Description		Policy			Engineering and Construction			Environmental Resources		Traffic Engineering		
Alternative	Quebec Street to Valentia Street	Valentia Street to Havana Street	Conformance with DRCOG 2035 Plan	Provides for Multi-modal Access	Consistency with City on-street bike lane practices	Design Criteria	Probable Construction Costs	Right-of-Way Required	Land Use	Wildlife Habitat	Roadway Congestion	Intersection Operations	Travel Speed
1	No-Action	No-Action	-	-	-	-	+	+	-	+	-	-	-
2	Limited Intersection Improvements	Limited Intersection Improvements											
3	Existing (5-lanes) Add Multi-Use Path (south side)	Widen to **4** lanes	-	0	+	+	0	0	-	0	0	0	0
4		Widen to **4** lanes plus on-street bike lanes	-	+	-	+	0	0	-	0	0	0	0
5		Widen to **6** lanes	-	0	+	+	0	0	0	0	+	0	0
6		Widen to **6** lanes plus on-street bike lanes	-	+	-	+	0	0	0	0	+	0	0
7	Widen to **6** lanes	Widen to **6** lanes	+	0	+	-	0	0	+	0	+	0	+
8		Widen to **6** lanes plus on-street bike lanes	+	+	-	-	0	0	+	0	+	0	+

Policy

Conformance with DRCOG 2035 Plan

+ Consistent with plan for six-lanes on 56th Avenue
- Not consistent with plan for six-lanes on 56th Avenue

Multi-modal access

+ Provides on- and off-street facilities for bikes and pedestrians
0 Provides off-street facilities for bikes and pedestrians
- Provides some, but not continuous, off-street facilities for bikes and pedestrians

Consistency with City on-street bike lane practices

+ Meets current City practice of providing off-street facility on major arterials
- Either no off-street facilities provided or inconsistent with current City practices (City does not currently install bike lanes on major arterials)

Engineering & Construction

Design Criteria

+ Meets current City standards for roadway and sidewalk widths
- Does not meet current City standards for roadway and sidewalk widths

In the Quebec to Valentia section, a full-width sidewalk cannot currently be constructed on the south side with the six-lane alternatives.

Probable Construction Cost

+ No cost
0 Within City budget ($20 million or less)
- Exceeds City budget (More than $20 million)

Construction cost excludes right-of-way cost, design and construction engineering

ROW

+ No *right-of-way* required
0 5 acres or less of *right-of-way* required
- More than 5 acres of *right-of-way* required

For the alternatives, right-of-way requirement varies from 1.7 to 4.9 acres

Source: URS Corporation

Environmental Resources

Land Use

+ Supports community expectation for six-lanes on 56th Avenue
0 Partially supports expectation for six-lanes on 56th Avenue
- Does not support expectation for six-lanes on 56th Avenue

Wildlife Habitat (Prairie Dog Relocations)

+ No prairie dog relocation is required
0 10 acres or less of prairie dog relocation is required
- More than 10 acres of prairie dog relocation is required

There are 5.4 acres of wildlife habitat in the existing street right-of-way. For the alternatives, relocation requirements vary from 6.1 to 7.7 acres.

Traffic Engineering

Roadway Congestion (volume/capacity ratio)

+ Under capacity (v/c < 0.9)
0 Near capacity (0.9 < v/c < 1.0)
- Overcapacity (v/c > 1.0)

Intersection Operations (level of service [LOS])

+ All signalized intersections operate at LOS D or better in 2035
0 Most signalized intersections operate at LOS D or better in 2035
- Most signalized intersections operate poorer than LOS D in 2035

56th Ave./Quebec intersection operates at poorer than LOS D during peak hours (2035).

Travel Speed

+ > 35 mph
0 25 - 35 mph
- < 25 mph

Wildlife Habitat: Black-tailed Prairie Dogs are the primary wildlife species of interest in the project area. Each alternative was evaluated on the acreage of prairie dog habitat impacted by improvements. Alternatives that required no prairie dog relocation scored higher than alternatives requiring relocation.

Traffic Engineering Criteria

- Roadway Volume to Capacity Ratio
- Intersection Operations
- Average Travel Speed

The **Traffic Engineering** criteria included:

Roadway Congestion: The ratio of the forecast traffic demand to the roadway's peak direction capacity (volume/capacity or "v/c" ratio) was computed for each alternative. Alternatives with a v/c ratio less than 0.9 ("under-capacity") scored highest; alternatives with a v/c ratio greater than 1.0 ("over-capacity") scored the lowest.

Intersection Operations: Forecast peak hour operations at signalized intersections in the study corridor were compared for each alternative, using the level of service measures described in Chapter 1. Alternatives that were forecast to allow most signalized intersections to operate at LOS D or better scored higher than alternatives that were forecast with poor operations at most intersections. The traffic and safety report (URS 2008f) can be found on the CD in the back cover of this document.

Travel Speed: The transportation analysis model of the corridor provided an estimate of peak hour, peak direction travel speeds. Alternatives with forecast average speeds closer to the posted speed limit of 40 miles per hour (mph) scored higher than alternatives with lower average speeds.

Each alternative was then scored against each criterion using a "+," "0," or "-" scale. The results of the scoring are shown on Table 2.3-2.

Key Findings

- Six lanes provide superior mobility
- Each "build" alternative is within budget

Key findings from the scoring process included:

- The No Action alternative did not meet the purpose and need, achieve the mobility goals for the corridor, was not in conformance with the DRCOG 2035 plan, and did not meet stakeholder expectations for corridor improvements.
- Alternatives that provided for six lanes in the corridor provided superior mobility performance as compared to the four-lane options.
- Each of the "build" alternatives can be constructed within the City's construction funding. ROW and environmental impacts were comparable among all of the "build" alternatives. Although the ROW requirements vary slightly for each alternative, the adjacent land to be acquired is public and private ROW and can be easily acquired with minimal disruption.

PREFERRED ALTERNATIVE

- Conforms with DRCOG 2035 RTP
- Provides pedestrian and bicycle access
- Meets all City design standards
- Is within the construction budget
- ROW can be readily acquired
- Wildlife impacts can be mitigated
- Provides acceptable traffic operations

Preferred Alternative

The Preferred Alternative, *Alternative 7: Widen to Six Lanes, Quebec Street to Havana Street*, was identified as the alternative that best meets the purpose and need of the project and had manageable impacts and/or mitigation. The primary reasons for identifying Alternative 7 as the Preferred Alternative included:

- A six-lane cross-section is in conformance with the DRCOG 2035 Regional Transportation Plan and meets the expectations of corridor stakeholders for future improvements.
- The alternative provides for pedestrian and bicycle access in the corridor through the provision of continuous multi-use paths on the north and south sides of 56th Avenue. For six-lane arterials, the provision of off-street (rather than on-street) trails is consistent with City and County of Denver practice.

- When fully constructed, the design elements of Alternative 7 will meet all City roadway and multi-use path design standards.
- Alternative 7 can be constructed with the City's currently anticipated construction funding.
- ROW to implement the needed roadway, landscape and multi-use path improvements can be readily acquired.
- Impacts to the Black-tailed Prairie Dog colonies can be readily mitigated.
- The proposed improvements would provide for acceptable traffic operations when tested against forecast 2035 traffic conditions.

Physical features on the site of the existing Rocky Mountain Fire Academy (south of 56th Avenue, between Roslyn Street and Spruce Street), precludes the construction of the Preferred Alternative with full-width (10-foot) multi-use paths and landscape buffer. The Academy is expected to relocate in the near-term; to that end, construction of the sixth lane adjacent to the Academy would be deferred until it is relocated. In the interim, a sidewalk would be constructed adjacent to 56th Avenue between Roslyn Street and Spruce Street. Between Spruce Street and Havana Street, the six-lane improvements, including detached multi-use paths and landscape buffers, would be constructed.

Forecast year (2035) traffic operations were tested with the interim roadway configuration between Roslyn Street and Spruce Street. During both peak hours in 2035, the intersection of Spruce Street/56th Avenue (signalized) was forecast to operate at acceptable levels (LOS D or better). The primary difference in operations is in the vehicle queues that develop between Spruce Street and Quebec Street. With only two eastbound lanes, eastbound vehicle queues at Spruce Street are forecast to extend in excess of 1,000 feet. The queues are not expected to impact the operations at the Quebec Street/56th Avenue intersection.

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3.0 AFFECTED ENVIRONMENT, IMPACTS, AND MITIGATION

3.1 Introduction

ORGANIZATION OF CHAPTER 3

The environmental assessment process considered a number of issues that were evaluated in detail and are presented in the sections that follow. Each section includes a discussion of the affected environment, the direct and indirect impacts of the No Action Alternative and the Preferred Alternative, i.e., Alternative 7 as described in Chapter 2, and commitments to mitigate adverse impacts. The study limits of each resource are described within each section.

Direct impacts are those that occur at the same time and place as the project. Indirect impacts are those impacts that are reasonably foreseeable and caused by the project, but occur later in time or are farther removed from the project.

Those resources that were not present or when evaluated were determined to have no direct or indirect impacts are summarized in Section 3.7 Other Resources.

Cumulative impacts were studied only for those resources determined to have direct or indirect impacts. The analysis shows that the resources discussed in the Cumulative Impacts section (Section 3.10) are expected not to contribute to cumulative impacts because effects are expected to be minor, of very short duration, beneficial, and/or have no potential to be additive when considered with other past, present, and reasonably foreseeable future actions.

3.2 Land Use and Zoning

Affected Environment

Current land use and zoning in the project area is a mix of commercial and light industrial properties (Figures 3.2-1 and 3.2-2).

Future plans will increase population in both employment and residential capacities. In particular, the Stapleton redevelopment area will be a mixed-use center capable of supporting more than 35,000 jobs and 30,000 new residents upon build out.

From Roslyn Street to Spruce Street there is a United States Postal Service (USPS) facility and a Denver Water facility on the north side of 56th Avenue (Figure 1.3-1). Also on the north side, from east of Quebec Street to the future Central Park Boulevard is Prairie Gateway, a development that includes the recently constructed Dick's Sporting Goods Park. The Rocky Mountain Fire Academy is located on the south side of 56th Avenue. The future Stapleton development is also planned in this area.

From the future Central Park Boulevard to the east, the project area is mainly vacant land. There are remnants of the old Stapleton Airport runway and a few large piles of recycled concrete from the old airport. There is a small portion of land currently being used as a recycling center on the southeast corner of 56th Avenue and the future Central Park Boulevard. The south side is the future Stapleton North Development. The ProLogis complex is located in the southwest corner of 56th Avenue and Havana Street.

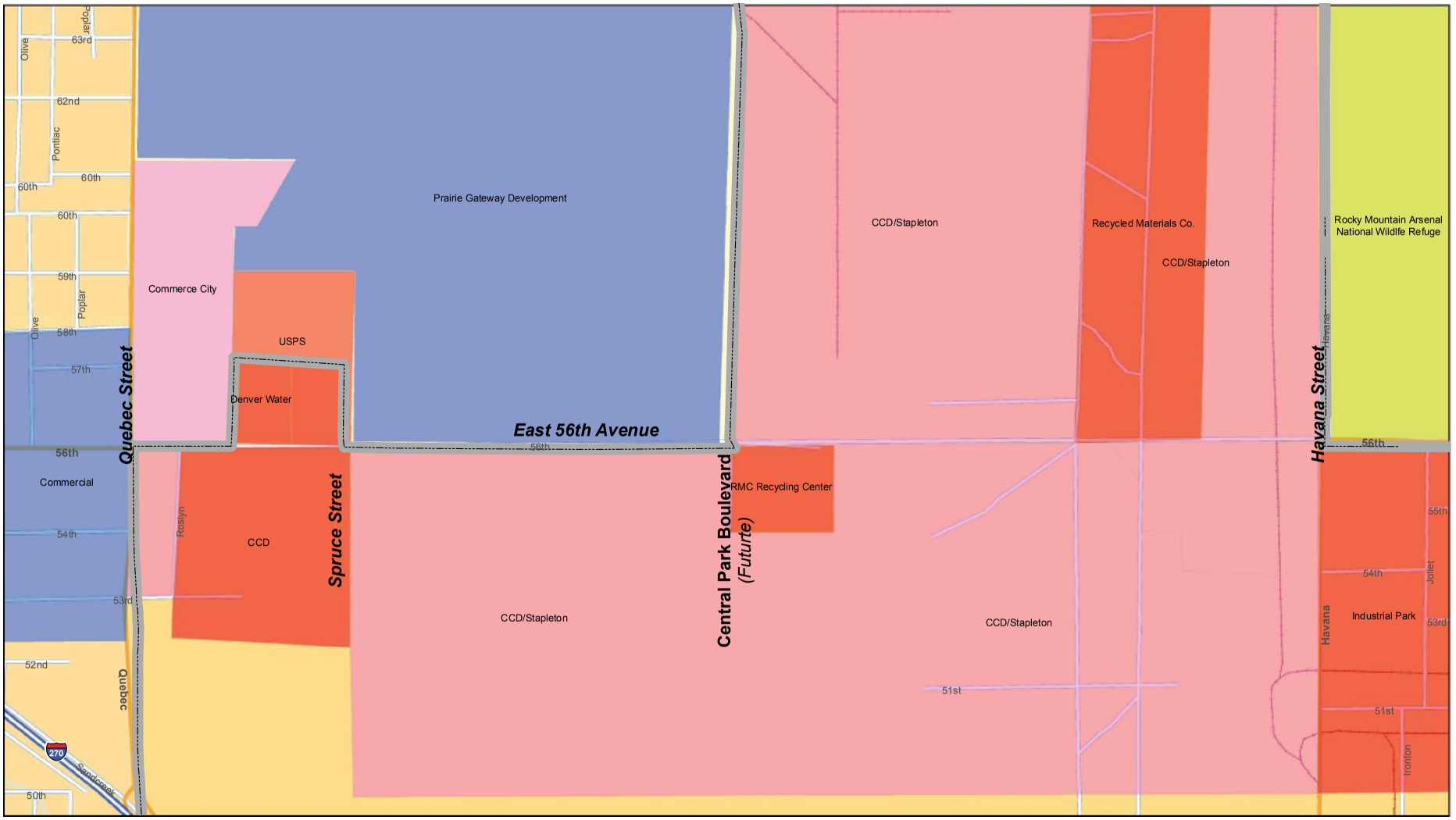
Near Havana Street, on the north side of 56th Avenue, is the Rocky Mountain Arsenal National Wildlife Refuge (RMANWR) property which remains largely vacant. This land is owned by the United States of America, and is therefore not zoned by the county.

The **No Action Alternative** is not compatible with future land use plans.

Direct Impacts

No Action Alternative

The No Action Alternative is not compatible with future land use plans. Land use plans include the development of mixed-use centers and will result in increased population and traffic in the project area.



Legend

Land Use Type

- Commercial
- Industrial
- Open Space
- Vacant
- County Boundary

0 0.125 0.25 0.5 0.75 1 Miles

Source: URS Corporation

56th Avenue Environmental Assessment
Quebec Street to Havana Street

FIGURE 3.2 - 1
General Existing Land Use

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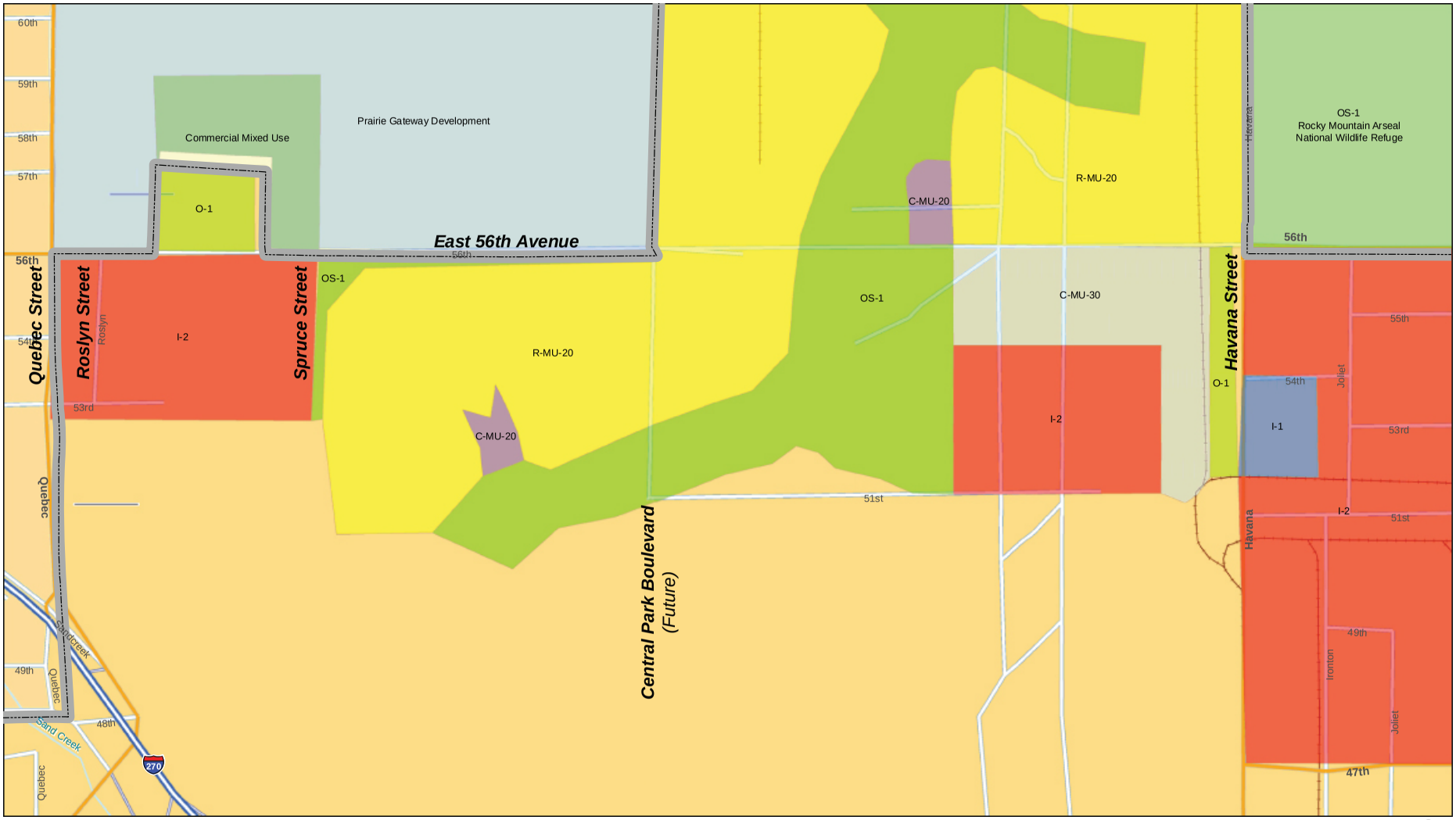

Source: URS Corporation

56th Avenue Environmental Assessment
Quebec Street to Havana Street

FIGURE 3.2 - 2
Current Zoning

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The current zoning is not in conflict with the No Action Alternative. No direct impacts or major concerns regarding zoning were identified.

The **Preferred Alternative** improves access to current and forecast land uses in the corridor.

Preferred Alternative

The Preferred Alternative for the 56th Avenue corridor is compatible with land use plans in the project area. The proposed improvements would increase mobility in the project area, allowing for better access to and from the area for future development of the Stapleton mixed-use urban center as well as current commercial and industrial properties.

Traffic demand along 56th Avenue will increase in the future, resulting in the need to provide workers, residents, and visitors better access. Local and regional plans, including the Stapleton and Prairie Gateway mixed-use developments, are in place to help guide this increase in urban activity. These plans assume a six-lane arterial on 56th Avenue.

The current zoning is not in conflict with the Preferred Alternative.

Indirect Impacts

The No Action Alternative is not compatible with current land use plans. The Preferred Alternative is compatible with, and will reinforce, future land use plans in the project area. Both alternatives would not result in any indirect land use impacts.

Mitigation

No land use mitigation is proposed.

3.3 Right-of-Way

Affected Environment

Portions of 19 parcels are located within the project area. The existing ROW varies in width from 70 feet to 170 feet. East of Havana Street, a 100-foot wide strip of land north of existing 56th Avenue ROW was

dedicated from the RMANWR to the City and County of Denver (CCD) in 2004 for transportation purposes.

Direct Impacts

No Action Alternative

No direct ROW impacts would be associated with the No Action Alternative.

Preferred Alternative

The Preferred Alternative would require the acquisition of approximately 7.8 acres of additional ROW. Land from two private and four public owners would be acquired as either partial acquisitions or temporary easements. This includes property for two retention ponds that were identified after the screening process. Therefore, the ROW being acquired is greater than that shown in Table 2.3-2. The proposed ROW acquisitions would not result in any full property acquisitions or relocations.

Indirect Impacts

There are no indirect impacts associated with the No Action or Preferred Alternatives.

Mitigation

Should property be acquired from private owners, CCD will comply with the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, as amended. Two brochures, *Right of Way Information* and *Your Rights and Benefits as a Highway Relocatee, Relocation Assistance Program*, have been provided by the CDOT to help explain the process and can be found on a CD on the back cover of this EA document.

For any person(s) whose real property interests may be impacted by this project, the acquisition of those property interests will comply fully with the Uniform Relocation Assistance and Real Property Acquisition

Policies Act of 1970, as amended, (Uniform Act). The Uniform Act is a federally mandated program that applies to all acquisitions of real property or displacements of persons resulting from federal or federally assisted programs or projects. It was created to provide for and ensure the fair and equitable treatment of all such persons. To further ensure that the provisions contained within this act are applied "uniformly," CDOT requires Uniform Act compliance on any project for which it has oversight responsibility regardless of the funding source. Additionally, the Fifth Amendment of the United States Constitution provides that private property may not be taken for a public use without payment of "just compensation." All impacted owners will be provided notification of the acquiring agency's intent to acquire an interest in their property including a written offer letter of just compensation specifically describing those property interests. A Right of Way Specialist will be assigned to each property owner to assist them with this process.

In certain situations, it may also be necessary to acquire improvements that are located within a proposed acquisition parcel. In those instances where the improvements are occupied, it becomes necessary to "relocate" those individuals from the subject property (residential or business) to a replacement site. The Uniform Act provides for numerous benefits to these individuals to assist them both financially and with advisory services related to relocating their residence or business operation. Although the benefits available under the Uniform Act are far too numerous and complex to discuss in detail in this document, they are available to both owner occupants and tenants of either residential or business properties.

In some situations, only personal property must be moved from the real property and this is also covered under the relocation program. As soon as feasible, any person scheduled to be displaced shall be furnished with a general written description of the displacing Agency's relocation program which provides, at a minimum, detailed information related to eligibility requirements, advisory services and assistance, payments,

and the appeal process. It shall also provide notification that the displaced person(s) will not be required to move without at least 90 days advance written notice. For residential relocatees, this notice cannot be provided until a written offer to acquire the subject property has been presented, and at least one comparable replacement dwelling has been made available. Relocation benefits will be provided to all eligible persons regardless of race, color, religion, sex or national origin. Benefits under the Act, to which each eligible owner or tenant may be entitled, will be determined on an individual basis and explained to them in detail by an assigned Right of Way Specialist.

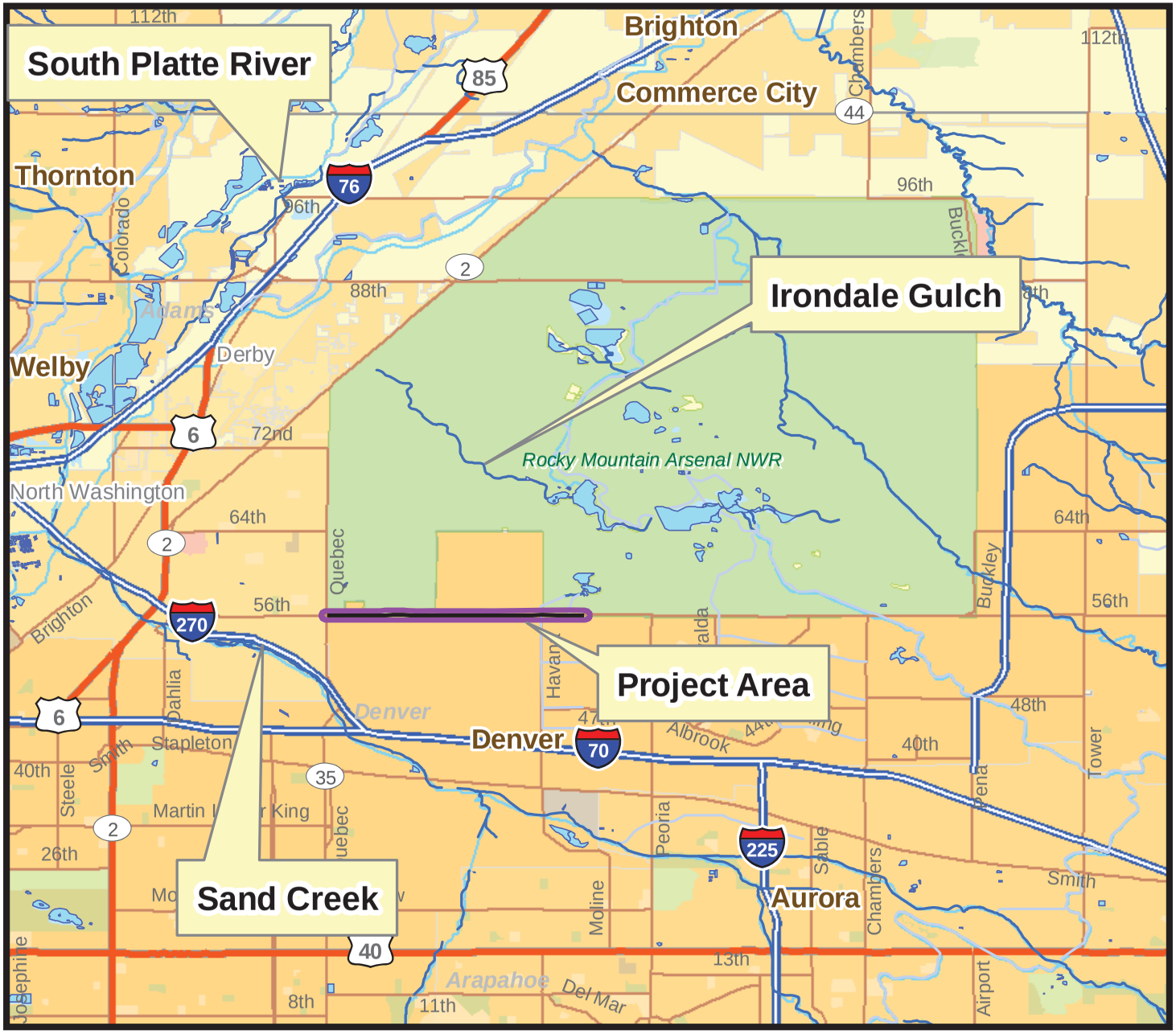
3.4 Water Quality

Affected Environment

The 56th Avenue project area is located within the South Platte River Watershed (Figure 3.4-1). This large watershed encompasses more than 4,000 square miles. The 56th Avenue project area is on the watershed boundary between Irondale Gulch to the north and Sand Creek to the south. Both Irondale Gulch and Sand Creek are east bank tributaries to the South Platte River.

The terrain throughout the project area is flat to gently rolling, sloping predominantly to the north and west. Some depression areas (areas with no positive drainage to a major natural water course) exist in the area as remnants of aeolian land forms in a generally urban environment.

The study limits for water quality impacts are generally the immediate site of the roadway widening project and water bodies within the project area, into which the runoff from the project would be collected and discharged. The majority of this project is on the former Stapleton Airport property. Existing drainage infrastructure within this part of the North Stapleton property consists of a few small diameter culverts at this time. The west end of the project is within an area that has already



Source: URS Corporation

56th Avenue Environmental Assessment
Quebec Street to Havana Street

FIGURE 3.4 - 1
Map of Rivers and Streams

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been redeveloped, and includes stormwater drainage infrastructure including storm sewer and two retention ponds.

Relevant Regulations

The primary federal regulatory drivers for current stormwater quality programs are Phase I and Phase II Stormwater Regulations under the Clean Water Act (CWA), which require regulated entities to acquire a NPDES permit for their stormwater discharges. The United States Environmental Protection Agency's (USEPA) stormwater NPDES regulations specify that entities required to have Municipal Separate Storm Sewer (MS4) permits must comply with the requirement to control the discharge of pollutants to the maximum extent practicable. The Colorado Department of Public Health and Environment (CDPHE) has jurisdiction over the NPDES permit program in Colorado.

MS4 permits allow municipalities and other public entities to discharge stormwater from facilities that exist at the time the permit is issued. New developments over one acre need to acquire a separate construction NPDES permit, and they need to be designed in accordance with local regulations, as described below. Design of new developments should also take into account the terms of the MS4, because once the structure is complete, it will fall under the maintenance portion of the MS4. In general,

> *"The (MS4) permittee must develop, implement, and enforce a Colorado Discharge Permit System (CDPS) Stormwater Management Program, …, designed to reduce the discharge of pollutants from their MS4 to the maximum extent practicable (MEP), to protect water quality, and to satisfy the appropriate water quality requirements of the Colorado Water Quality Control Act (25-8-101 et seq., C.R.S.) and the Colorado Discharge Permit Regulations (61). Implementation of best management practices (BMPs) consistent with the*

provisions of the CDPS Stormwater Management Program and the other requirements in this permit constitutes compliance with the standard of reducing pollutants to the MEP" (CDPHE 2008a).

Construction sites for new developments that are larger than 1 acre must obtain a Construction Stormwater NPDES permit from the CDPHE. This permit requires the preparation of a Construction Stormwater Management Plan for each site. Depending on the site size or other factors, a numeric standard may be required from the CDPHE for a construction site. If groundwater dewatering is required for construction, a Notice of Intent for groundwater dewatering must be filed with the Colorado Division of Water Resources, and a permit to discharge the water must be obtained from the CDPHE. Sampling of the discharge water must be performed, and if the discharge water is determined by the CDPHE to be contaminated, then a second permit for Groundwater Remediation must be obtained from the CDPHE. Construction sites that would require a permit with a numeric standard are not expected for this project.

The Safe Drinking Water Act, also a regulatory driver for projects such as this, was originally passed by Congress in 1974 to protect public health by regulating the nation's public drinking water supply. Amended in 1986 and 1996, the law requires many actions to protect drinking water and its sources such as rivers, lakes, reservoirs, springs, and groundwater wells. The Colorado Primary Drinking Water Regulations assure the safety of public drinking water supplies and enable the State of Colorado to assume responsibility for enforcing the standards established by the federal Safe Drinking Water Act. These regulations are maintained and enforced by the Water Quality Control Division (WQCD) of the CDPHE. The 56th Avenue corridor crosses several jurisdictional boundaries including the City and County of Denver, Commerce City, and unincorporated Adams County. Each of these jurisdictions is in the process of developing programs that address the

CDPS MS4 permit requirements. The City and County of Denver and Commerce City have individual MS4 permits. The other jurisdictions fall under the Statewide General Permit (COR-0900000). The City of Denver's compliance with post-construction storm water quality requirements for new projects often includes the installation of permanent structural BMPs on site, such as are proposed for this project.

Surface Water

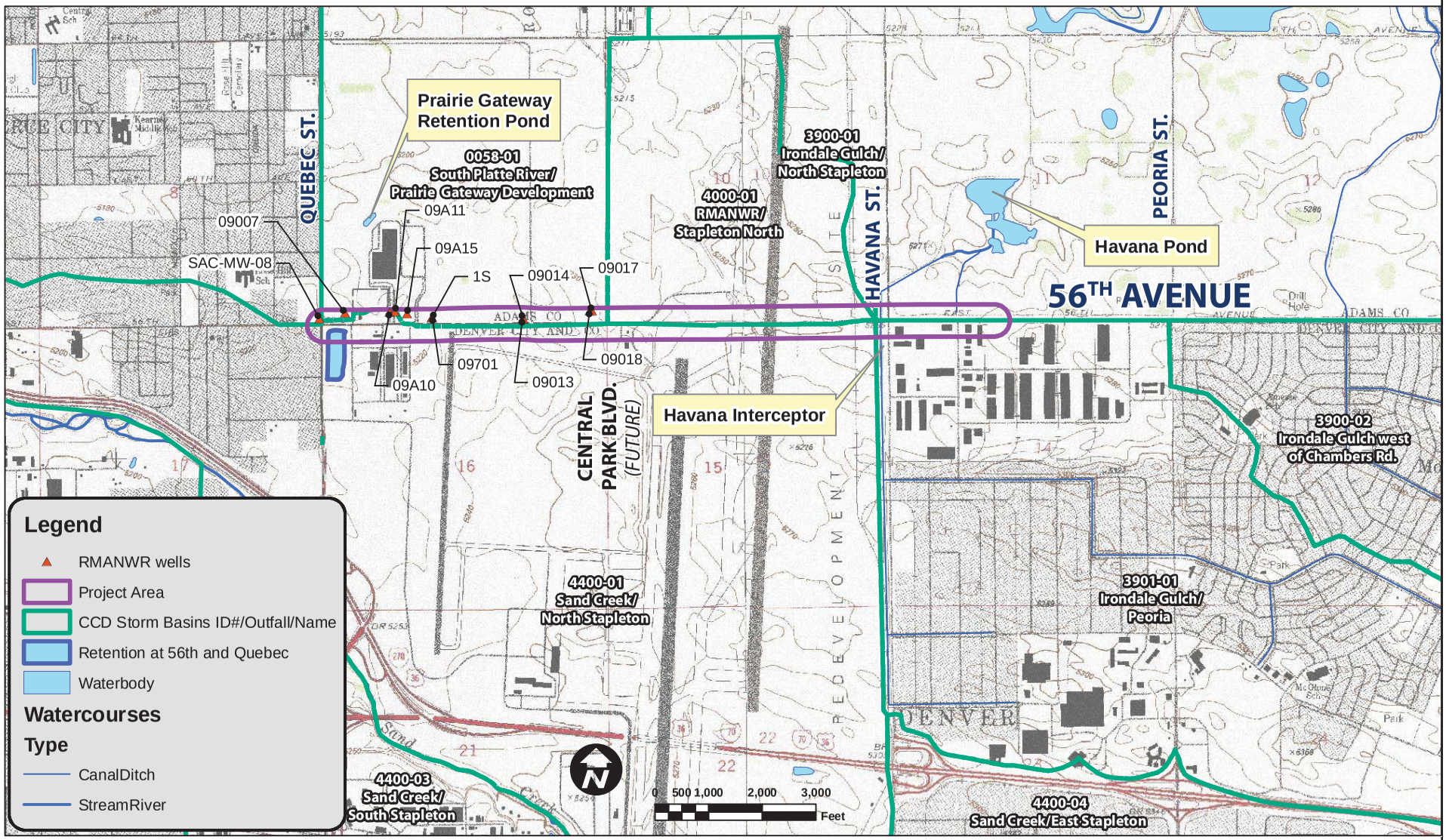
This section evaluates stream, rivers, lakes, and ditches within the project area. No perennial streams and irrigation ditches exist within the project area.

The eastern end of the project area initially drains to the west, and then to the north via one intermittent drainage way, the Havana Interceptor. This concrete-lined channel drains stormwater runoff from the south to the north and crosses under 56th Avenue just west of Havana Street. The Havana Interceptor empties into the Havana Pond, located one-half mile to the northeast within the RMANWR property.

Four major storm drainage basins exist in or partially within the project area as defined by the *Denver Storm Drainage Master Plan.* These basins are Basin 0058-01 (Prairie Gateway), Basin 3900-01 (Irondale Gulch-Stapleton East Section 10), Basin 4000-01 (Stapleton West Section 10), and Basin 4400-01 (North Stapleton). These areas are shown in Figure 3.4-2.

Groundwater

Data provided by the RMANWR lists 11 monitoring wells that are located within 300 feet of the project area, (Figure 3.4-2), and are described in Table 3.4-1. Five of these wells are listed as closed and abandoned, and two are listed as being unable to locate. No active wells listed by the Colorado Division of Water Resources (CDWR) are located in the project area.



Source: URS Corporation, CCD Denver Water Quality Management Plan

56th Avenue Environmental Assessment
Quebec Street to Havana Street

FIGURE 3.4 - 2
Major Storm Drainage Basins

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Table 3.4-1
Groundwater Wells in the Project Area

Site ID	Well Owner	Well Status*	Status Date	Well Description	Comments
09013	US Army	Canceled	2002-11-04		Unable to Locate During Summer 2002 Field Recon
09014	US Army	Canceled	2002-11-04		Unable to Locate During Summer 2002 Field Recon
SAC-MW-08	SACWSD	Open		SACWSDMW-08	
1S	US Army	Closed	2003-07-09		Closed By PMC During Well Abandonment Project
09701	US Army	Closed	2003-07-09		Closed By PMC During Well Abandonment Project
09A15	US Army	Canceled	1989-08-04		
09007	US Army	Closed	1997-11-26		
09A10	US Army	Canceled	1989-08-04		
09A11	US Army	Canceled	1989-08-04		
09018	US Army	Closed	2003-07-09		Closed By PMC During Well Abandonment Project
09017	US Army	Closed	2003-07-09		Closed By PMC During Well Abandonment Project

Source: URS Corporation
Notes:
- Canceled = out of use; could not find or known to be destroyed.
- Closed = no longer existing
- Open = functioning with use or plans for use.
- Data provided by RMANWR
- SACWSD = South Adams County Water & Sanitation District
- PMC = Program Management Contractor

Direct Impacts

No Action Alternative

Under the No Action Alternative, the untreated stormwater would continue to be collected into the Havana Interceptor, into stormwater drains and inlets located between Quebec Street and Spruce Street, and into depressed areas with no positive drainage. No direct impacts to the receiving waters are anticipated with this alternative.

No direct impacts to surface or groundwater features would occur.

Preferred Alternative

The major changes to the local drainage patterns under the Preferred Alternative would be limited to an increase in impervious surfaces such as roadways, parking lots, rooftops, and driveways. This increase is

estimated to be approximately 13.09 acres. The FHWA Driscoll Method was used to screen the impact of the proposed roadway runoff on local surface waters into classes of mitigation. For this analysis, two heavy metals (copper and zinc) were evaluated. Copper and zinc are the best indicators of highway pollution runoff. Concentrations of lead contaminants are no longer evaluated since the advent of unleaded gasoline. Four subcatchments were modeled, which included the existing and proposed conditions based on the four outfall locations expected for the Preferred Alternative. Two of the subcatchments outfall to existing regional retention ponds—one in the City and County of Denver and the other in Prairie Gateway.

The remaining two subcatchments outfall into the North Stapleton redevelopment area where regional detention facilities are proposed. Table 3.4-2 presents the total loads estimated by the Driscoll Model. Although the percentage increase is large for Pond #1 SW and Pond #2 NE, the actual load is small. Therefore, the results of this water quality evaluation show that the Preferred Alternative would have no direct impact on surface water quality.

Table 3.4-2
Driscoll Model Annual Mass Loading at Station Sites

56th Ave Subcatchments		Existing NW Pond	Existing Quebec Pond	Pond #1 Southwest	Pond #2 Northeast
Ultimate Receiving Stream after Retention.		S. Platte	Sand Creek	Sand Creek	S. Platte
Approximate Annual Mass Load of **copper** from Runoff to Receiving Stream (pounds/year)	No Action	1.31	0.60	0.21	0.31
	Preferred Alternative	1.52	0.67	0.99	1.09
Approx. Percent Increase		**16%**	**12%**	**371%**	**252%**
Approximate Annual Mass Load of **zinc** from Runoff to Receiving Stream (pounds/year)	No Action	7.99	3.63	0.76	1.13
	Preferred Alternative	9.28	4.06	1.57	1.72
Approx. Percent Increase		**16%**	**12%**	**107%**	**52%**

Source: URS Corporation

Changes to the local drainage patterns as a result of the Preferred Alternative will not have a direct impact on surface water quality. No

active groundwater wells would be directly impacted by the Preferred Alternative.

Indirect Impacts

There would be no indirect surface water quality and groundwater well impacts as a result of the No Action or Preferred Alternatives.

Mitigation

The Preferred Alternative must comply with water quality permits and regulations. Phase I MS4 Permit compliance with post-construction stormwater quality requirements for the City and County of Denver for new projects includes the installation of permanent structural BMPs on site, such as retention ponds which are proposed for this project.

Phase II MS4 permit requirements for Adams County and Commerce City are to develop, implement, and enforce a stormwater management program, and implement the following six minimum control measures:

- Public education
- Public involvement
- Illicit discharge detection and elimination
- Construction site runoff control
- Post-construction runoff control
- Good housekeeping practices

Two retention ponds will be constructed to provide water quality treatment.

To comply with the permit requirement for post-construction controls, two additional retention ponds will be constructed near the proposed haul road bridge (Figure 3.4-3) to provide water quality treatment for the improved roadway.

The mitigation plan includes using the existing retention basins, as well as constructing two new water quality retention basins (Figure 3.4-3).

Source: URS Corporation

56th Avenue Environmental Assessment
Quebec Street to Havana Street

FIGURE 3.4 - 3
Proposed Storm Water Retention Basins

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The two new retention ponds that are to provide permanent water quality treatment are temporary because they are on land that is to be developed. If and when development occurs, these retention ponds will be removed and runoff from 56th Avenue will be combined with runoff from the development and discharged into regional detention and water quality facilities designed to meet City of Denver drainage criteria. These basins, located on City and County of Denver property, would capture 100 percent of the water quality capture volume for the 100-year storm event and would remain in operation until adequate stormwater infrastructure, which includes adequate water quality treatment measures, has been installed by the North Stapleton Development project.

To comply with the MS4 permit requirement for construction site runoff controls to prevent surface water quality impacts, a NPDES Construction Activities Stormwater Discharge Permit would be acquired from the City of Denver and CDPHE. This is for construction projects that disturb at least one acre of ground. The City of Denver would prepare a Stormwater Management Plan (SWMP), and obtain the permit. The contractor would be responsible for implementing the SWMP and complying with the terms and conditions of the permit to control stormwater runoff during construction of the project.

3.5 Biological Resources

Vegetation: Affected Environment

Vegetation data was collected primarily from field observations in May, September, and October 2007; combined with use of detailed (1 inch = 200 feet) aerial photographs. Additional data was collected and reviewed using existing sources, including maps, databases, publications, and agency information. The field study limits included lands located within 300 feet of the centerline of 56th Avenue except where limited by access restrictions.

Vegetation Types and Habitat

There are seven vegetation types present within the study limits. Nearly all of the vegetation has been altered by past human activities. The past agricultural, transportation, industrial and commercial activities have all played a role in creating the existing vegetation composition within the project area. However, there are small areas of remnant, but degraded, native vegetation. Two-thirds of the area consists of grasslands and prairie dog habitat. The vegetation is characterized as follows:

1) **Grassland**: This habitat occupies much of the project area, and occurs on both sides of 56th Avenue. The grassland community includes a mixture of perennial and annual, native and non-native species, and has developed from long-term natural succession or seeding of former agricultural lands. Only one small area, on the southwest corner of the RMANWR, appears to be remnant native prairie grassland. The grassland primarily consists of grasses that grow to about two feet tall. Both introduced and native species forbs occur and are common throughout and dominant as patches. Common species include the following:

   - Native grass species: western wheatgrass, purple threeawn, and sand dropseed. Blue grama is also common or dominant in some areas.
   - Introduced grass species: smooth brome, crested wheatgrass, cheatgrass, and Japanese brome.
   - Introduced forbs: alfalfa, field bindweed, annual ragweed, common mullein, Russian thistle, kochia, cowpen daisy, prickly lettuce, horseweed, and tumble mustard.

- Native forbs: common sunflower, prickly poppy, silvery tansy aster, western ragweed, and hairy false goldenaster.

2) **Savanna**: In this habitat, woody species, including plains cottonwood, Siberian elm, rubber rabbitbrush, and black locust, are common in some areas and create patches of a savanna-like plant community within the perennial grassland.

3) **Tree groves**: Tree groves include larger clusters of trees in upland areas, not associated with streams or flowing ditches. One small area is present within the project area, dominated by plains cottonwood trees.

4) **Prairie dog habitat**: This habitat occurs on both sides of 56th Avenue, mainly east of Valentia Street. Prairie dog habitat is dominated by weedy forb species that are either eaten or cut short by the prairie dogs. Common vegetation species include field bindweed, Russian thistle, kochia, curly dock, and cowpen daisy.

5) **Urban habitat**: This habitat includes buildings, pavement areas, and other un-vegetated areas mixed with lawns, horticultural trees and shrubs, and small disturbed areas dominated by weedy vegetation. Common species include Kentucky blue grass, common dandelion, green ash, and cottonwood.

6) **Disturbed habitat**: This habitat includes areas that have been previously cleared of vegetation and are currently either sparsely vegetated or occupied by weedy species, such as kochia, cheatgrass, field bindweed, Russian thistle, and the common sunflower. The vegetation may grow to be four-feet tall or higher in favorable sites, but is often mowed to a shorter height.

7) **Aquatic habitat**. This habitat includes a stormwater detention pond located on the southeast corner of the intersection of Quebec Street and 56th Avenue. The Havana Street Interceptor located west of Havana Street is a concrete-lined channel with very shallow water flow.

There are no rare or sensitive plant communities in the Project Area.

Sensitive Plant Communities

There are no plant communities present that are considered to be rare or sensitive based on botanical features.

Noxious Weeds

Noxious Weeds are plant species not native to Colorado and are regulated under state law because they have negative impacts on crops, native plant communities, livestock, and/or the management of natural or agricultural areas. Colorado currently has 78 species listed as noxious weeds (Colorado Department of Agriculture 2007a). CDOT adheres to this noxious weed list.

Under the permanent rules for the administration and enforcement of the Colorado Noxious Weed Act, state-listed species are placed into one of three categories.

- **List A** species are designated for eradication, and require prevention of seed production or development of reproductive propagules.
- **List B** species are managed by the state noxious weed management plan, with the goal of stopping the continued spread of these species.
- **List C** species are those for which the State, in consultation with other parties, would develop management plans with the goal of supporting jurisdictions that choose to require management of those species. Each county in the project area also maintains a list of noxious weeds that are a local priority.

Table 3.5-1 provides a list of noxious weeds as defined by the counties and known or likely to occur in the project area, based on field studies. Several of these species are considered to be invasive at the RMANWR. In addition, annual rye, kochia and Russian thistle are considered to be invasive (Rocky Mountain Arsenal 2007a).

Field bindweed and cheatgrass are distributed throughout most grassland areas and prairie dog habitats. Field bindweed is often dominant in prairie dog habitat. Common mullein is also widely distributed and dominates the vegetation in several patches of dozens or hundreds of mullein plants. Other noxious weeds are relatively uncommon.

Table 3.5-1
Noxious Weeds Observed in Project Area

Common Name	Scientific Name	Noxious Weed Listing		Occurrence in Project area
		Colorado State Weed Status[1]	County Lists[2]	
Canada thistle	*Cirsium arvense*	B	D, A	One small patch observed
Common mullein	*Verbascum thapsus*	C	D	Several large and dense patches observed, plus scattered individuals, mostly in grassland and disturbed habitat
Diffuse knapweed	*Centaurea diffusa*	B	D, A	Observed in one area, may occur elsewhere in grassland habitat
Downy brome (cheatgrass)	*Bromus tectorum*	C	D	Common, some relatively dense areas
Field bindweed	*Convolvulus arvensis*	C	D, A	Common in most grassland areas and in prairie dog colonies
Hoary cress	*Cardaria draba*	B	D	Not observed, likely to occur
Leafy spurge	*Euphorbia esula*	B	D, A	One patch observed
Musk thistle	*Carduus nutans*	B	D, A	Occasional individuals
Puncture vine	*Tribulus terrestris*	C	D	Occasional in mowed areas and roadside
Redstem filaree	*Erodium cicutarium*	B	Not listed	Occasional to dominant in small patches, mostly in mowed areas and road edges
Russian olive	*Elaeagnus angustifolia*	B	D	Occasional individuals
Scotch thistle	*Onopordum acanthium*	B	D, A	Several small patches

Source: Colorado Department of Agriculture, City and County of Denver, Adams County, and URS Corporation
Notes:
1. Colorado Department of Agriculture 2007a
2. D = City and County of Denver (Colorado Department of Agriculture 2007b), A = Adams County (Adams County Cooperative Extension 2007)

Direct Impacts

No Action Alternative

The No Action alternative would result in no change in vegetation or habitats. Small areas of noxious weeds, including puncture vine and field bindweed, would continue to occur along the edges of the maintained ROW.

Preferred Alternative

Vegetation Communities/Habitats

Direct impacts to vegetation and habitat would primarily occur from vegetation clearing and earth moving for roadway construction. Most impacts would be permanent, as the former habitat would be replaced by the lane expansions and multi-use path construction (Table 3.5-2). Portions of the impacted areas would be only temporarily impacted during construction and would be revegetated after construction.

Table 3.5-2
Direct Impacts to Vegetation/Habitats

Alternative	Acres of Direct Impact to Habitats							
	Grassland	Prairie dog habitat	Savanna	Tree Grove	Urban	Disturbed	Aquatic	All Habitats
No Action	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Preferred Alternative								
Permanent	6.1	8.8	0.01	<0.01	16.1	1.5	0.03	32.5
Temporary	4.5	3.6	0.07	0.03	1.6	0.5	0.01	10.3
Total	**10.6**	**12.4**	**0.07**	**0.03**	**17.7**	**2.0**	**0.04**	**42.8**

Source: URS Corporation

Most of the impacts would occur in urban, grassland, and prairie dog habitats. Impacts to urban habitat would primarily occur in the existing ROW. Grassland and prairie dog habitats would mostly be affected on the north side of 56th Avenue. The Havana Interceptor has one small

area mapped as aquatic habitat that would be affected. None of the other affected habitats are considered rare or sensitive. About 20 percent of the affected area would be used temporarily during construction and would be revegetated at the end of construction. Impacts to savanna habitat may include loss of a few trees.

Noxious Weeds

An integrated noxious weed management plan will be prepared during final design and implemented during construction.

Project-related construction may introduce new noxious weeds into the project area or increase the abundance of existing noxious weeds. Construction activities include mobilization of construction vehicles, excavation and transport of borrow material and topsoil, land clearing, and reclamation. Removal of existing vegetation and disturbance of soils encourages germination of weed seeds and spread of roots and seeds. Airborne seeds from noxious weeds present in areas adjacent to the project may germinate in areas where vegetation has been removed. After construction, noxious weeds can persist or become established in reclaimed areas. Noxious weeds that are present in the construction ROW can spread into adjacent lands. Impacts from noxious weeds are primarily an issue when they have the potential to spread to open space, sensitive areas, agricultural lands, or riparian areas. The only sensitive area near 56th Avenue is the RMANWR, located at the eastern end of the project area. The RMANWR has an active weed management program, and impacts from this project are likely to be minor or negligible. Outside of the RMANWR, much of the available land adjacent to the 56th Avenue project area is likely to be modified during future development.

There are no List A species present in the project area. List B species, which are managed by Denver and Adams Counties, include Canada thistle, diffuse knapweed, musk thistle, Russian olive, and Scotch thistle (URS, 2008). These species generally occur in small and scattered groups, and occur in only a small portion of the project area. The most common noxious weeds are common mullein and field bindweed, which are List C species. Common mullein occurs in a number of large patches

adjacent to the project area, and field bindweed is a dominant or co-dominant species found along much of the north side of 56th Avenue, particularly in prairie dog habitat.

Indirect Impacts

The No Action and Preferred Alternatives would not result in any adverse indirect impacts to vegetation.

Mitigation

MITIGATION STRATEGIES

- Erosion Control
- Re-seeding
- Replacement in Kind
- Use of BMPs

The following mitigation strategies will be used to limit impacts to vegetation during construction.

- Installation of silt fences, erosion logs, temporary berms, and other BMPs will be used to prevent degradation of habitats adjacent to the construction area by transport of eroded sediment.
- Areas of temporary disturbance within the ROW will be seeded with an appropriate mixture of native grasses and forbs; and shrubs will be planted where appropriate.
- All landscaping, such as trees, shrubs, lawns, perennials, and in some cases, native grasses, will be replaced in kind where it is removed.
- The construction contractor must be trained and have previous experience in avoidance and the proper use of BMPs.

An integrated Noxious Weed Management Plan will be developed during final design. This plan will be implemented during construction and will include identification of noxious weeds in the project area, weed management goals and objectives, and preventive and control methods. Preventive measures include the following:

- Contractors' vehicles will be inspected before they are used for construction to ensure they are free of soil and debris capable of transporting noxious weed seeds or roots.

- Noxious weeds observed in and near the construction area at the start of construction will be treated with herbicides or physically removed to prevent seeds from blowing into disturbed areas during construction.
- Periodic surveys will occur during the construction period to identify and treat noxious weed populations that have developed.
- Potential areas of topsoil salvage will be assessed for presence and abundance of noxious weeds prior to salvage. Topsoil from heavily infested areas will either be treated by spraying, taken offsite, or buried during construction.
- Areas of temporary disturbance will be reclaimed in phases throughout construction and seeded using a permanent native seed mixture. If areas are complete and permanent seeding cannot occur due to the time of year, mulch and mulch tackifier will be used for temporary erosion control until seeding can occur.
- Only certified weed-free mulch and bales will be used.

Weed control will use the principles of integrated pest management to treat target weed species efficiently and effectively by using a combination of two or more management techniques (biological, chemical, mechanical, and/or cultural). Weed control methods will be selected based on the management goal for the species, the nature of the existing environment, and the methods recommended by Colorado State University, County Weed Boards, and other weed experts. The presence of important wildlife habitat or threatened and endangered species will be considered when choosing control methods.

Wildlife: Affected Environment

Information on wildlife was obtained from existing sources, including maps, databases, publications, and agency information; from field studies conducted in May, September and October 2007; and from review of detailed aerial photographs. The field study limits included

lands within 300 feet of the centerline of 56th Avenue, except where limited by access restrictions.

Wildlife Habitats and Species

The most important wildlife habitats in the project area are prairie dog colonies and grasslands. Impacts to prairie dog colonies are discussed in more detail in Threatened, Endangered, and Sensitive Species. Relatively little wildlife use is associated with disturbed areas. The project area is located near the RMANWR, and includes a small portion of the RMANWR property on the northeast corner of Havana Street and 56th Avenue. The proximity of the RMANWR may result in higher levels of wildlife use than is typical for similar habitats in the Denver metropolitan area.

Mule deer and white-tailed deer are the largest mammals known to occur in the project area. The north side of 56th Avenue is mapped as a mule deer winter concentration area, and the east half of the project area is a mule deer resident population (NDIS, 2007). Mule deer are considered common on the RMANWR, with a population estimated at 530 animals in 1996 (USFWS, 1996). Mule deer are also likely to occur south of 56th Avenue, particularly in grasslands where trees are present. The small portion of the RMANWR in the project area near Havana and 56th is considered to be within overall range for white-tailed deer (NDIS, 2007), although white-tailed deer are considered to be uncommon on the RMANWR, occurring mostly in riparian areas (USFWS, 1994a). Bison have recently been reintroduced to the RMANWR, but the reintroduction area is outside of the project area.

Other common mammal species found in grassland habitats at RMANWR include the coyote, badger, desert cottontail, black-tailed jackrabbit, black-tailed prairie dog, thirteen-lined ground squirrel, plains pocket gopher, meadow vole, deer mouse, western harvest mouse, Ord's kangaroo rat, hispid pocket mouse, plains pocket mouse, northern grasshopper mouse, and house mouse. Most of these species are also

likely to occur in grassland habitats and/or prairie dog colonies in the remainder of the project area. The most common bat species is the big brown bat, based on studies at RMANWR (Everette et al, 2001).

Raptors include hawks, eagles, falcons, and owls. No raptor nests were observed in the project area during the field survey. Species that may nest include red-tailed hawks, Swainson's hawk, American kestrel, great-horned owl, and burrowing owl. The red-tailed hawk, Swainson's hawk and great-horned owl nest primarily in trees. Kestrels nest in a variety of settings including kestrel nest boxes in the RMANWR. Burrowing owls nest mostly in prairie dog burrows. Wintering and migrating raptor species include bald eagles, ferruginous hawk, rough-legged hawks, northern harrier, red-tailed hawk, and prairie falcon.

The bird species that occur in the project area include species adapted to grasslands, grasslands with scattered trees, prairie dog colonies, and urban and rural habitats. Common bird species include house sparrow, European starling, rock pigeon, mourning dove, northern flicker, black-billed magpie, barn swallow, western meadowlark, horned lark, American robin, red-winged blackbird, western kingbird, eastern kingbird, common grackle, house finch, killdeer and Canada goose.

The aquatic habitat is limited to a stormwater detention pond located on the southeast corner of Quebec Street and 56th Avenue. Canada geese, mallards, and killdeer were observed at this pond on October 1, 2007, and are the species most likely to be encountered at any season. No fish species are known to be present.

Several species of reptiles and amphibians are reported to be common in grasslands at the RMANWR (USFWS, 1994b), and are also likely to be common in grasslands in the project area. They include plains spadefoot toad, lesser earless lizard, many-lined skink, western bull snake and prairie rattlesnake.

Sensitive Habitats and Wildlife Corridors

The RMANWR provides important habitat for a variety of species. Across from Havana Street, the RMANWR property and sensitive habitat continues on the north side of 56th Avenue past the east end of the project area. Black-tailed prairie dog colonies are also sensitive habitats because of their importance as habitat for a number of other species. There are no wildlife corridors within the project area.

Direct Impacts

No Action Alternative

The No Action Alternative would result in no change in wildlife habitats or populations. An unknown but probably small number of animals would continue to be killed crossing the road. Chain-link fencing limits animal movement in some areas, but prairie dog colonies occur immediately adjacent to the roadway in some areas.

Preferred Alternative

Several types of impacts may be associated with roadway widening, including habitat loss, habitat degradation, disturbance (avoidance and displacement), and direct mortality. There would be no affects to wildlife corridors.

Habitat loss would result from replacement of existing habitat with the widened roadway and multi-use paths. Acres of direct permanent impacts by habitat type are presented in Table 3.5-2. The proposed 56th Avenue corridor improvements would not cause a new division of previously contiguous habitat. It would result in a wider roadway and more frequent traffic that would discourage wildlife movements and could result in some increased mortality if animals did cross the road. Impacts are likely to be minor because existing fences already limit movement. Currently, a tall chain-link has been installed along the north side of the corridor along the property of the RMANWR, and along

much of the remaining RMANWR property area to serve as a barrier limiting wildlife movement.

Construction activity is likely to temporarily displace animals from the construction zone due to noise, human presence, and heavy equipment. Impacts would be temporary and would not affect long-term use of the areas by wildlife.

Direct wildlife mortality of small terrestrial and burrowing animals could occur during construction-related ground clearing and earth-movement, as well as from traffic (road kill) during both construction and operation. These impacts are expected to be minor.

Impacts to various types of wildlife are discussed below:

WILDLIFE EVALUATED IN THIS STUDY

- Black-tailed Prairie Dogs
- Raptors
- Other Migratory Birds
- Aquatic Species

Raptors. No active raptor nests were observed within the study limits, and no impacts are expected. The project would affect relatively few trees that could be potential nesting sites for tree nesting raptors. If a nesting pair of raptors was present at the time of construction, they potentially could be directly impacted by removal of nests within the construction area, disturbance to the nesting pair or young at nests occurring in adjacent areas, and by disturbance or displacement of individuals from foraging and/or nesting areas. An increase in traffic and noise could also affect the use of adjacent habitats during operation, although the raptor species that nest in urban areas are likely to become habituated to this environment. Direct loss of foraging habitat would decrease the availability of important prey species, but reduction in prey populations would be localized and is unlikely to affect raptor populations.

Other Migratory Birds. The impacts to birds from construction and operation would include direct loss of habitat, displacement during construction, and mortality from vehicle collisions. Nearly all bird species present in the project area are protected by the Migratory Bird Treaty Act (MBTA), a federal act that prohibits destruction or

disturbance of active nests that would result in loss of eggs or young without a permit from the USFWS. Most wild birds, including raptors, are protected under the MBTA, except for non-native species that include house sparrow, rock dove, and European starling. Vegetation clearing, earth-moving, and other construction activities have the potential to destroy nests of bird species protected under the MBTA. However, the vegetation in the project area is likely to provide nesting habitat for a relatively limited number of species, because the affected habitats consist primarily of low-growing herbaceous vegetation, and only limited amounts of trees and shrubs would be affected.

Aquatic Species. There are no direct impacts to the stormwater detention pond habitat. The Havana Interceptor provides minimal, if any, habitat for aquatic species, and impacts from construction and operation would be negligible.

MITIGATION FOR MIGRATORY BIRDS

- Avoid land-clearing during breeding season if possible
- Conduct bird nest surveys—avoid nests if possible

Indirect Impacts

The No Action and Preferred Alternatives would not have adverse indirect impacts to wildlife habitat or populations.

Mitigation

Impacts to nesting migratory birds, including raptors, will be avoided using the following mitigation strategies.

- Raptor nest surveys will be conducted during an appropriate season (generally May 1 through June 1) to determine presence of active raptor nests. If an active nest is located in or near the project area, Colorado Division of Wildlife (CDOW) will be contacted regarding use of seasonal buffers to prevent disturbance to nesting birds during construction.
- Land-clearing activities in natural habitats will be timed to avoid the breeding season (primarily April through August, but differs according to species) to avoid impacts to active bird nests. Trees in the construction footprint will be cleared prior to March 1 or after

August 15 to prevent raptors (and other birds) from nesting on site and to avoid the taking of or disturbance to active nests during the breeding season.

- If land-clearing operations cannot be avoided during the breeding season, a survey for nesting birds will be conducted prior to construction. If no active nests are present, construction may proceed. If active nests are found that cannot be avoided during the period when eggs or young birds are present, construction will be suspended until the USFWS is contacted with the results of the survey and a plan of action is developed.

Threatened, Endangered, and Sensitive Species: Affected Environment

This section addresses species that are listed, proposed, or candidate species under the federal Endangered Species Act, species listed as endangered or threatened by the State of Colorado, and other species that are considered of special concern, rare, or vulnerable from recent studies. Information was obtained from existing sources, including maps, databases, publications, and agency information; from evaluation of habitat suitability during field studies conducted in May, September and October 2007, and from review of detailed aerial photographs.

Federally Listed Threatened and Endangered Species

Federally listed threatened or endangered species are protected under the Endangered Species Act. A list of federally endangered, threatened, proposed and candidate species applicable, was obtained from the USFWS (USFWS, 1994a and 1994b). Table 3.5-3 presents information on federally listed threatened or endangered species that may occur in the project area.

There are no federally listed threatened and endangered species expected to occur in the project area.

Table 3.5-3
Threatened and Endangered Species

Common Name	Scientific Name	Status[1]	Habitat[2]	Potential For Occurrence
Birds				
Mexican spotted owl	*Strix occidentalis lucida*	FT, ST	Mixed conifer forests and narrow, shady cool canyons at 4,400 to 6,800 feet	Not present, no suitable habitat
Mammals				
Black-footed ferret	*Mustela nigripes*	FE, SE	Prairie dog colonies	Suitable habitat, but does not occur. Project area is in USFWS block clearance area
Preble's meadow jumping mouse	*Zapus hudsonius preblei*	FT, ST	Occurs along Front Range of northern Colorado and southern Wyoming mostly in riparian areas along perennial streams	Not present, no suitable habitat
Plants				
Ute ladies'-tresses	*Spiranthes diluvialis*	FT	Sub-irrigated alluvial soils along streams, open meadows on floodplains	Not present, no suitable habitat

Source: Compiled by URS Corporation
Notes:
1. Status: FE = Federal endangered, FT = Federal threatened, (USFWS 2007a, b); SE = State endangered, ST=State threatened (CDOW, 2007a)
2. Sources: Andrews and Righter 1992, Kingery 1998, Fitzgerald, Meaney and Armstrong 1994, NDIS 2007

None of these species are expected to occur. The USFWS (USFWS, 2007a, b) also lists five additional federally listed species occurring in Nebraska that may be affected by projects in Denver and Adams counties that involve water depletions in the South Platte River. The species include the interior least tern, piping plover, whooping crane, pallid sturgeon, and western prairie fringed orchid. The 56th Avenue project does not involve depletions to the South Platte River system and these species are not discussed further.

Other Special Status Species

Other special status species include species considered by the Colorado Division of Wildlife as endangered, threatened, or of special concern (CDOW, 2007a), USFWS species of conservation concern (USFWS, 2002),

"species of greatest conservation need" in Colorado's Comprehensive Wildlife Strategy (CDOW, 2005), and species considered rare or vulnerable by the Colorado Natural Heritage Program. Table 3.5-4 presents a list of the Other Special Status Species that may occur in the project area, excluding those already addressed in Table 3.5-3.

The bald eagle, burrowing owl, and black-tailed prairie dog are known to occur and are discussed in more detail below. In addition, a number of special status bird species are expected to occur regularly during migration, wintering and foraging. There are no special status plant species likely to occur. Ferruginous hawk and black-tailed prairie dogs are focus species addressed in *Conservation Plan for Grassland Species in Colorado* (CDOW and CGSWG, 2003).

Bald eagles were formerly listed as a federally threatened species. Although they have been de-listed, they are still protected under the Bald and Golden Eagle Protection Act, and are a state-listed threatened species in Colorado. The RMANWR is a major roosting area for wintering bald eagles, where one nest is known to exist on the east side of the refuge, at a location greater than 0.5 mile from the project area. The bald eagles forage at reservoirs and prairie dog colonies. Wintering bald eagles may occur along 56th Avenue from December to February, but are more likely to use sites with less human activity. No bald eagle nests or activity were observed in the project area.

Table 3.5-4
Other Special Status Species

Common Name	Scientific Name	Status[1]	Habitat[2]	Potential for Occurrence[3]
Birds				
Bald eagle	*Halaeetus Leucocephalus*	Federally Protected, ST	Large lakes, rivers, and prairie dog colonies, especially in winter	RMA is a winter foraging area, uncommon at other seasons. May occur occasionally in study area but not likely to forage along roadside.
Burrowing owl	*Athene cunicularia*	ST	Grasslands, usually in association with prairie dog colonies	Suitable habitat is present. No known nests.
Ferruginous hawk	*Buteo regalis*	SC, BCC, GCN	Grasslands and shrublands, common migrant and winter resident	Uncommon during winter and migration, forages at prairie dog colonies. Reported as common in fall, winter, and spring at RMANWR.
Golden eagle	*Aquila chrysaetos*	GCN	Grasslands, shrublands, pinyon-juniper and ponderosa pine.	May occur during foraging or wintering, reported as uncommon in all seasons at RMANWR.
Northern harrier	*Circus cyaneus*	BCC, GCN	Nests in marshes and grassy areas with dense cover, forages over grasslands, agricultural areas and marshes	May occur during migration and winter in grassland habitat. Reported as uncommon in all seasons at RMANWR.
Prairie falcon	*Falco mexicanus*	BCC, GCN	Nests on cliffs or bluffs in open areas, migrates across Colorado	May occur during winter and foraging, reported as common in winter and uncommon during spring, winter and fall at RMANWR, rare in summer.
Short-eared owl	*Asio flammeus*	GCN	Grassland, marshes, shrub-steppe and agricultural land	Potentially present, reported as rare in all seasons at RMANWR.
Swainson's hawk	*Buteo swainsoni*	GCN	Nests and forages in grasslands with scattered trees.	Common from May to September, could nest in project area.
Loggerhead shrike	*Lanius ludovicianus*	GCN	Nests in isolated trees or shrubs in rural areas and grassland	Likely to occur in grassland with scattered trees. Reported as uncommon in spring, summer and fall at RMANWR.
Virginia's warbler	*Verimivora virgniae*	GCN	Nests in shrublands, occurs in shrublands, riparian and urban areas during migration	May occur during migration. Reported as uncommon in spring, rare in fall at RMANWR.
Brewer's sparrow	*Spizella breweri*	GCN	Nests in sagebrush and other shrublands, occurs in many habitats during migration, including riparian, urban, and weedy areas	May occur during migration. Reported as uncommon in spring and summer at RMANWR.
Cassin's sparrow	*Aimophila cassinii*	BCC, GCN	Grassland and shortgrass prairie with shrubs or small trees	May occur in grassland and savanna habitat. Reported as uncommon in summer at RMANWR, rare in spring and fall.
Harris' sparrow	*Zonotricha querula*	GCN	Wooded or brushy riparian, agricultural and urban areas	May occur during migration or winter, but suitable habitat is very limited. Reported as rare in spring, summer and winter at RMANWR.
Lark bunting	*Calamospiza melanocorys*	BCC, GCN	Nests on short-grass plains, migrates through all of eastern Colorado	May nest in grassland. Reported as common in spring and summer at RMANWR.
Vesper sparrow	*Pooecetes gramineus*	GCN	Nests in grasslands and open shrublands, common migrant in grasslands, shrublands, open riparian areas	Likely to during migration. Reported as uncommon in spring and common in fall at RMANWR.
Mammals				
Black-tailed prairie dog	*Cynomys ludovicianus*	SC, GCN	Native and non-native grasslands, abandoned agricultural land	Large prairie dog colonies are present in project area.

Source: Compiled by URS Corporation

Notes:

1. Status: BCC = breeding birds of conservation concern in Bird Conservation Region 18 (shortgrass prairie) (USFWS 2002),
   GCN = species of greatest conservation need in Colorado (CDOW, 2005),
   SC = State of Colorado special concern (CDOW, 2007a).
   ST = State Threatened
2. Sources: Andrews and Righter 1992, Kingery 1998, Fitzgerald, Meaney and Armstrong 1994, NDIS 2007, Hammerson 1999.
3. RMANWR information from species lists (USFWS 1994a,b; RMANWR 2007b).

The burrowing owl is one of the focus species addressed in the *Conservation Plan for Grassland Species in Colorado* (CDOW and CGSWG, 2003). Burrowing owls are considered fairly common in eastern Colorado. They are generally dependent on the presence of burrowing mammals, and occur primarily in active black-tailed prairie dog colonies in eastern Colorado. Burrowing owls tend to have higher rates of nesting success and lower rates of nest depredation, and are more likely to return to nest in larger black-tailed prairie dog colonies and colonies with higher numbers of prairie dogs (CDOW and CGSWG, 2003). They exhibit a moderate to high level of nest site fidelity, and typically reuse traditional nesting areas, but not the same burrows. Burrowing owls are present in Colorado from about mid-March to the end of October, and winter in Texas, Oklahoma and other states. Nesting occurs from early April to early August. No burrowing owls are known to occur in the project area, but they may be present.

Black-tailed prairie dog colonies occur along the north side of the existing 56th Avenue for about one mile, and on the south side for about 0.3 mile. The black-tailed prairie dog colonies extend to the edge of the existing ROW and beyond the limits of the project area. This is a keystone species that provides important habitat and a food source for a number of other species. The prairie dog colony on the east end of the project area is partly within the existing RMANWR fence line. The areas occupied by prairie dogs and their populations can vary dramatically, with large decreases every few years after plague events. For example, the area occupied by prairie dogs on the RMANWR ranged from a high of about 4,700 acres to as low as 22 acres, between 1986 and 2002 (Hoogland, 2006).

Within the project area, a study by CCD in 2008 (City and County of Denver, Animal Care and Control, 2008) reported much smaller colonies than were found in 2007. Since the year 2000, black-tailed prairie dogs found on the west side of the old Stapleton Airport runways have

extended their colonies eastward about 300 feet on the south side and 800 feet on the north side of 56th Avenue. The CCD Animal Care and Control study did not report any prairie dog colonies east of the old runways, where they now occupy approximately 1,500 feet on the north side of 56th Avenue. In addition, black-tailed prairie dog colony expansion has increased to the north and south of 56th Avenue since the year 2000.

Direct Impacts

No Action Alternative

The No Action alternative would result in no change in wildlife habitats or populations, except those that occur naturally. Prairie dog colonies and populations would continue to expand and contract in response to the presence or absence of plague epidemics.

Preferred Alternative

Federally Listed Endangered and Threatened Species

The Preferred Alternative would have no effects on federally listed threatened and endangered species.

Other Special Status Species

Bald eagle. Although the RMANWR is a major activity area for wintering bald eagles with one nest, the bald eagles are likely to occur only sporadically in the project area because of traffic and human activity, and a lack of good perch trees. Bald eagles may be displaced during foraging, which would be a negligible to minor direct impact.

Burrowing Owl. Burrowing owls are not known to occur in the project area, but could occupy portions of the prairie dog colonies. Surveys will be conducted prior to construction to determine if there are active nests present in the project area. Appropriate mitigation measures will be taken to prevent the loss of nesting habitat and disturbance to individuals.

Black-tailed Prairie Dog. This species is a state species of special concern, and is also the subject of the CDOT *Impacted Black-tailed Prairie Dog Policy* (CDOT, 2005). Construction of the Preferred Alternative would affect 12.6 acres of prairie dog colonies, including 9.3 acres in CCD, and 3.3 acres in Adams County. Permanent impacts are areas that would be covered by an impervious surface such as concrete. Temporary impacts are construction areas that will be revegetated and prairie dogs may repopulate. Impacts would occur mostly on the north side of the road and would result in a decrease in size of prairie dog colonies that extend far outside of the project area. No prairie dog colonies would be eliminated by construction of the Preferred Alternative. Table 3.5-5 summarizes the direct impact to black-tailed prairie dog colonies, by county, as result of the Preferred Alternative.

Table 3.5-5
Direct Impacts to Black-tailed Prairie Dog Colonies

Type of Impact	Acres of Direct Impact		
	Denver County	Adams County	Total
Permanent	6.9	2.0	8.9
Temporary	2.4	1.3	3.7
Total	9.3	3.3	12.6

Source: URS Corporation

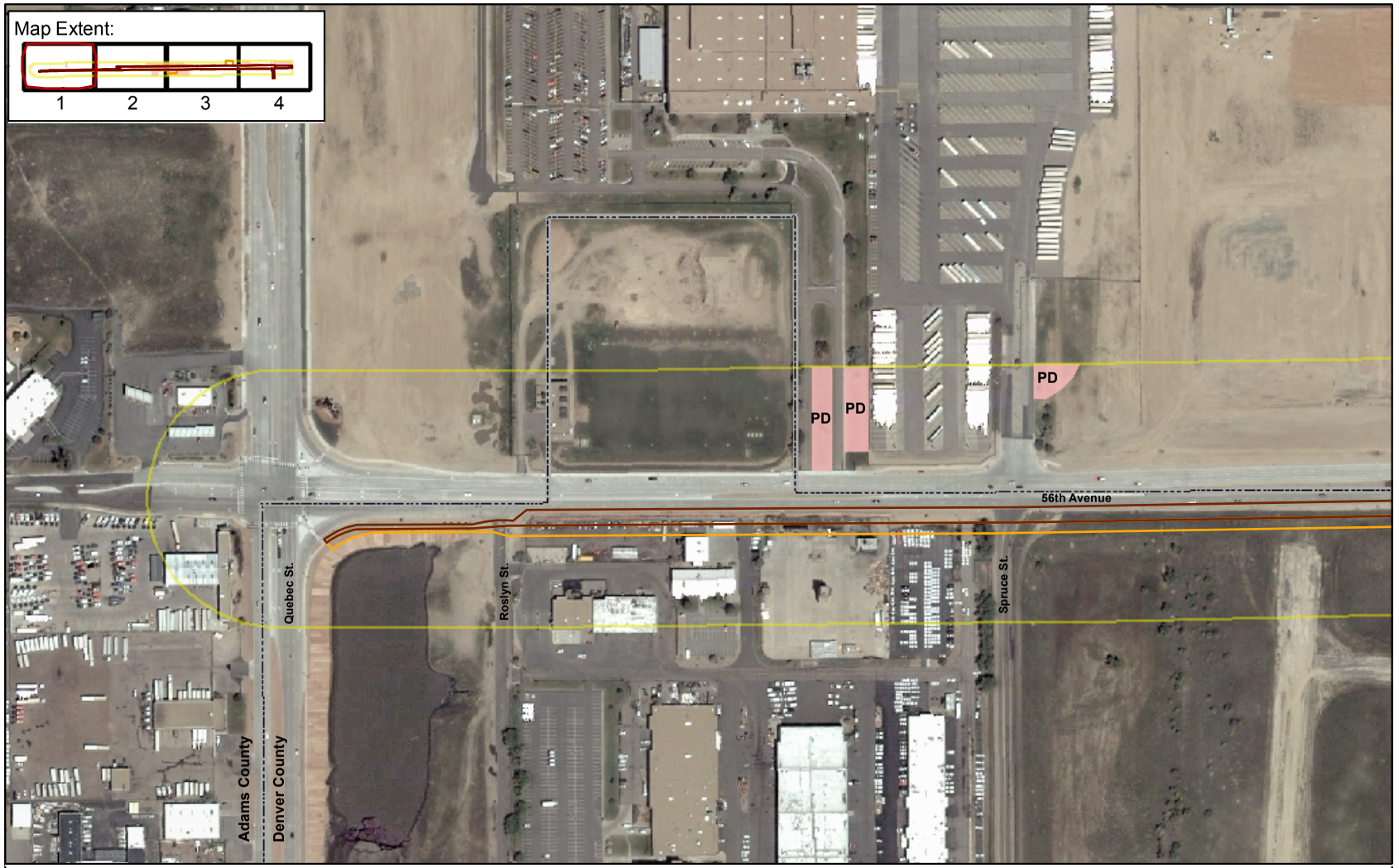
Accurate estimates of the number of prairie dogs that would be affected are not available. The affected prairie dogs occur in two colonies shown in Figures 3.5-1 through 3.5-4. The western colony extends about 0.5 mile along the north side of 56th Avenue, starting about 700 feet east of Valentia Street and extending eastward to near the old runways. The western colony continues along the south side of 56th Avenue west of the old runways. Most of this colony is in Denver County, but the western portion is in Adams County. The eastern colony begins on the east side of the old runways and extends eastward on the north side of 56th Avenue for about 0.5 mile, past Havana Street to the east end of the project area on the RMANWR property. Most of this colony is also in Denver County, but the portions east of Havana Street are in Adams County.

An attempt was made to count the prairie dogs in these areas on December 5, 2007. The western colony north of 56th Avenue had at least 46 prairie dogs, and the west half of the eastern colony had at least 25 animals. Recorded densities of black-tailed prairie dogs in the literature, based on mark-recapture studies, range from about 3 to 28 prairie dogs per acre (Hoogland, 2006).

Colony density doubles when juveniles appear above the ground in the spring, and a rough estimate of typical density is 10 prairie dogs per acre before emergence of juveniles, and 20 adults, yearlings, and juveniles per acre after emergence (Hoogland, 2006). Based on these typical densities, approximately 79 to 158 prairie dogs would be in the affected area in City and County of Denver, and 25 to 50 prairie dogs in Adams County. Prairie dogs would be removed from areas of both permanent and temporary construction impacts.

Direct impacts to prairie dog colonies beyond these boundaries are not anticipated. The amount of affected prairie dog colonies and estimated populations are likely to change from year to year, and are likely to be different by the time construction begins. The acreage of impacted colonies and an estimated number of prairie dogs in the affected area will be recalculated and quantified during the final design phase of the Preferred Alternative.

Other Special Status Species. Fourteen special status bird species may occur occasionally or regularly in the project area (see Table 3.5-4). Several of these bird species could nest in grassland areas that would be affected by the project, including Swainson's hawk, loggerhead shrike, Cassin's sparrow, lark bunting, and lazuli bunting. Nests of these species and other migratory birds are protected under the Migratory Bird Treaty Act. The other nine special status bird species are likely to occur in winter, migration, and/or foraging, and nesting activities would not be affected. All of the bird species would have minor losses of habitat, and may be displaced from the project area during construction.

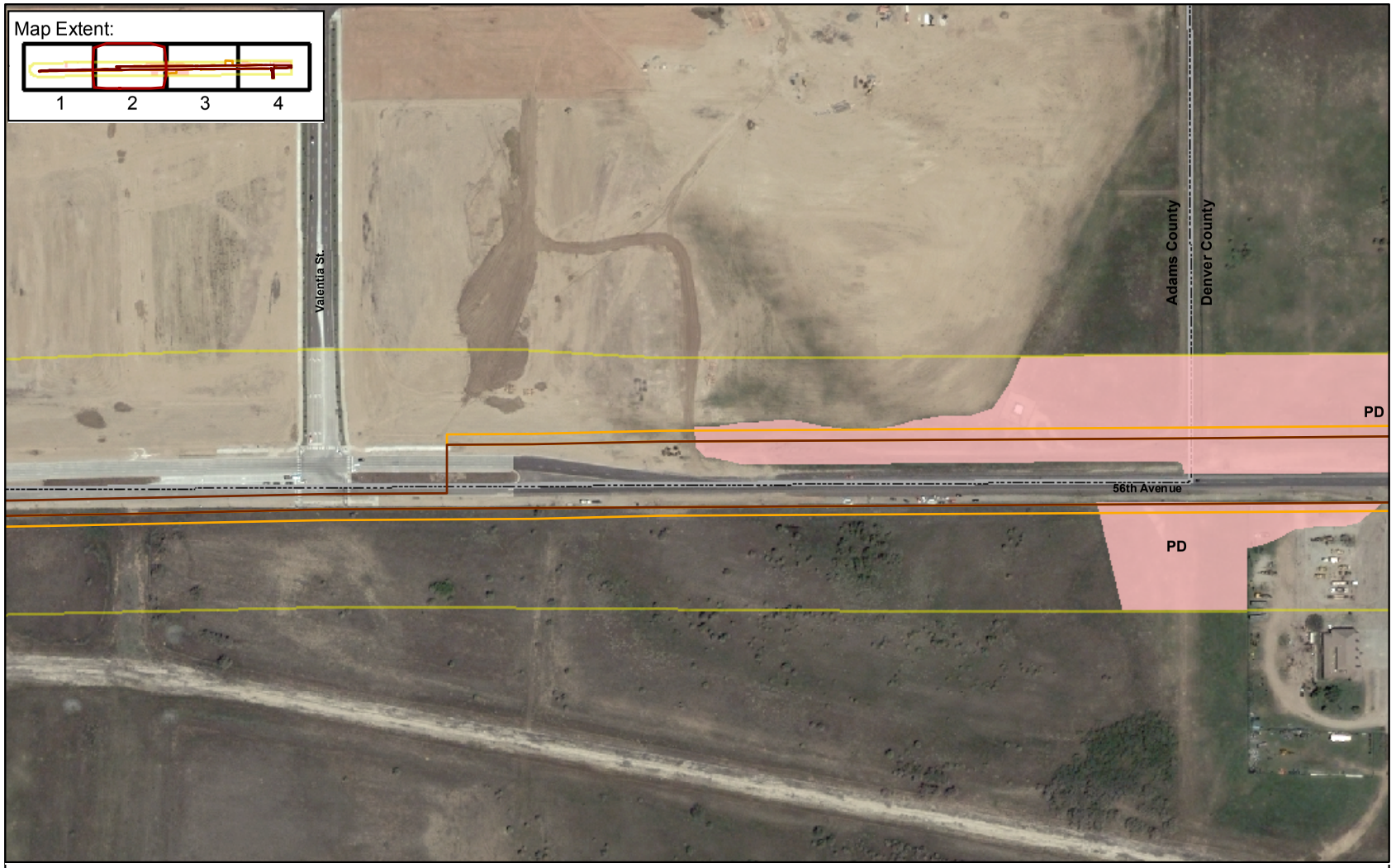


Source: URS Corporation

56th Avenue Environmental Assessment
Quebec Street to Havana Street

FIGURE 3.5 - 1
Black-tailed Prairie Dogs - Map 1 of 4

DENVER THE MILE HIGH CITY

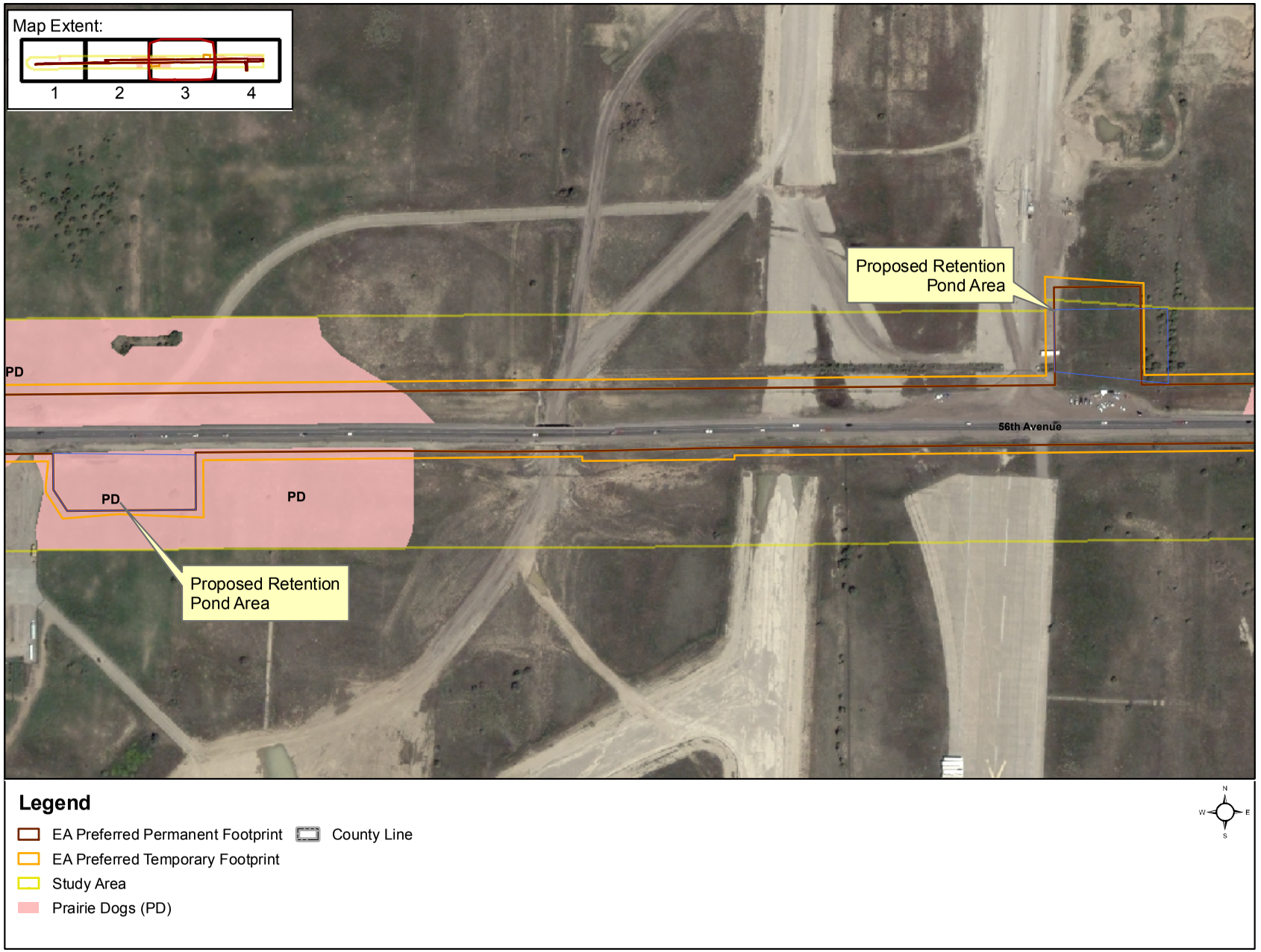


Source: URS Corporation

56th Avenue Environmental Assessment
Quebec Street to Havana Street

FIGURE 3.5 - 2
Black-tailed Prairie Dogs - Map 2 of 4

DENVER
THE MILE HIGH CITY

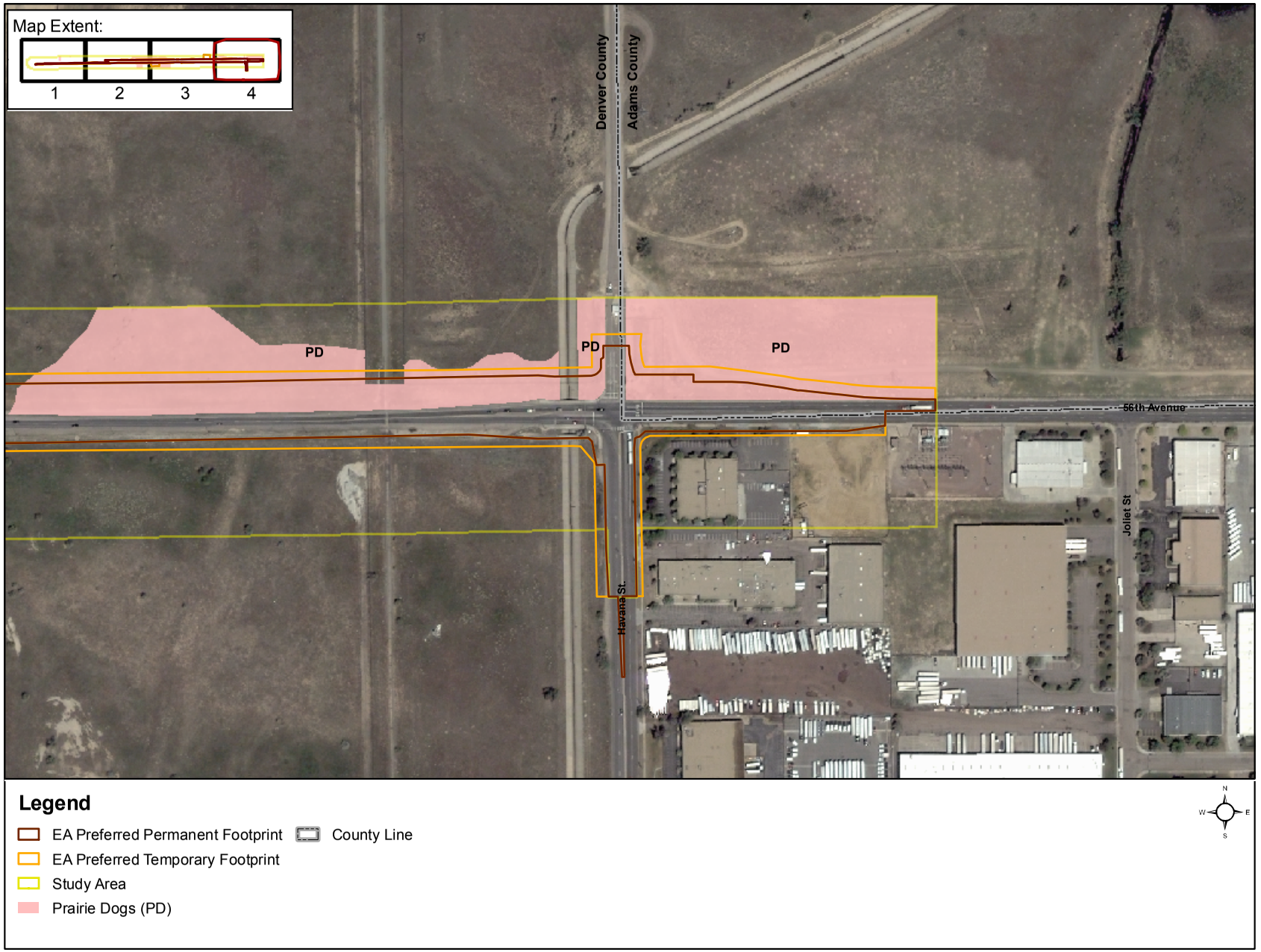


Source: URS Corporation

56th Avenue Environmental Assessment
Quebec Street to Havana Street

FIGURE 3.5 - 3
Black-tailed Prairie Dogs - Map 3 of 4

DENVER THE MILE HIGH CITY



Source: URS Corporation

56th Avenue Environmental Assessment
Quebec Street to Havana Street

FIGURE 3.5 - 4
Black-tailed Prairie Dogs - Map 4 of 4

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Indirect Impacts

The No Action and Preferred Alternatives would not result in indirect impacts to wildlife habitats or populations, except those that occur naturally.

Mitigation

Burrowing Owls

Impacts will be avoided by implementation of the procedures in Recommended Survey Protocol and Actions to Protect Nesting Burrowing Owls (CDOW, 2007b). Surveys will be conducted prior to construction to determine presence of burrowing owls in prairie dog colonies that would be affected by the project, and to determine locations of active nests. Surveys will be conducted for any construction activities in prairie dog colonies between March 15 and October 31. Construction will be avoided within 150 feet of burrows used by burrowing owls, between March 15 and October 31.

Black-tailed Prairie Dogs

The project will comply with the CDOT *Impacted Black-tailed Prairie Dog Policy* (CDOT, 2005) and the CDOT *Black-tailed Prairie Dog Relocation Guidelines* (CDOT, 2002). Projects involving more than two acres of prairie dog habitat are required to follow the CDOT process as described in the policy:

1) CDOT projects will be designed and constructed to avoid and minimize impacts to prairie dog colonies greater than two acres in area;

2) If a colony is less than two acres, but has the potential to expand into areas that are currently inactive (i.e., not constrained), the available and accessible habitat will be the determining size of the area to be considered;

3) In order to foster a heightened sense of CDOT's ecological stewardship by the public, projects involving towns less than two acres in area, will be designed and constructed to avoid and minimize impacts, which may include the relocation of prairie dogs, so long as doing so will not increase the impacts to other resources (e.g. wetlands, historical properties, environmental justice issues, archeological sites, etc.) and is not cost prohibitive;

4) The area of prairie dog colonies that will be affected by a project will be calculated before construction begins;

5) Relocation efforts for prairie dog colonies greater than two acres shall be conducted in accordance with CRS 35-7-203, as well as any other applicable laws or regulations;

6) If a relocation site cannot be located for colonies larger than two acres, the prairie dogs will be captured and donated to raptor rehabilitation facilities, or turned over the USFWS for the black-footed ferret reintroduction program;

7) At no time will CDOT authorize earth-moving activities that result in the burying of living prairie dogs. If needed, humane techniques for the killing of prairie dogs within a colony < 2 acres in size, will be obtained from CDOW;

8) Coordination with the Colorado Division of Wildlife's District Wildlife Manager whose area the project is in, will be initiated before any manipulation of prairie dogs or their colonies begins;

9) Due to the possibility of disease vectoring, until further notice, coordination with the Food and Drug Administration will be initiated if any prairie dogs, dead or alive, are to be transported. Colorado law requires special permission if relocated prairie dogs are to cross county lines. Without this approval, the RMANWR would only be able to take prairie dogs from the Adams County portion of the project area. CCD currently has no available

relocation sites (Weinstein, 2007), and Adams County also has no available alternative relocation sites if RMANWR is unable to accept the prairie dogs from the project area (Peterson, 2007). Any capture, movement, or relocation would be done under permit from the CDOW. Further identification of relocation options and a decision would be made during the final design phase.

Nesting Sensitive Bird Species

Mitigation will be the same as described for nesting migratory birds in Section 3.5 Wildlife.

3.6 Public Services and Utilities

Affected Environment

The project area contains many different types of utilities and services. The location of these utilities and services were identified and confirmed by information provided by the owners/operators of each service.

The existing utilities generally run parallel to 56th Avenue and are located within the existing ROW. The utilities that extend the full length of the project area are:

- One 33-inch Metro Wastewater sanitary line
- Two Xcel Energy underground electric lines
- One 20-inch Xcel Energy gas line
- One 42-inch Denver Water line
- One 6-inch Rocky Mountain Pipeline gasoline pipeline

Other utilities in the project area that run only a partial distance are:

- One Qwest telephone line

- One Xcel Energy overhead electric line
- One 36-inch South Adams County Water and Sanitation stormwater line
- One 36- to 48-inch Denver Wastewater stormwater line

Rocky Mountain Pipeline plans to add an 8-inch gasoline line within one to two years.

Direct Impacts

No Action Alternative

The No Action Alternative would not impact any utilities or existing services.

Preferred Alternative

Under the Preferred Alternative, several potential impacts to utilities could occur depending on final design. Several utilities are located directly within the lane widening area, including a gasoline pipeline, underground electric power lines, and a large natural gas pipeline.

Multiple utility lines would likely have to be moved within the allotted easements. Relocating utilities may require temporary lane closures, restrictions and construction delays.

Indirect Impacts

There would not be any indirect impacts to Public Service and utilities resulting from either the No Action or Preferred Alternatives.

Mitigation

Utility locator services will be retained for proper marking of underground utilities. Utility owners/operators will be notified and asked to confirm locations and potential conflicts.

During construction, all streets and highways will remain open, although there may be temporary lane closures and construction delays. The contractor will coordinate with all emergency providers to ensure that they are aware of construction activities and any potential delays.

EVALUATED RESOURCES WITH *NO* DIRECT OR INDIRECT IMPACTS

- Farmlands
- Floodplains
- Noise
- Socio-economics
- Environmental Justice
- Wetlands
- Hazardous Materials
- Historic & Archaeological Resources
- Paleontological Resources
- Native American Consultation
- Section 4(f)/6(f) Properties
- Pedestrian & Bicycle Facilities
- Geology & Soils
- Air Quality
- Aesthetics

3.7 Other Resources

This section of the EA evaluated resources for which there are either minor, or no direct or indirect impacts, and consequently no cumulative impacts as a result of the Preferred Alternative. In some cases, the resources were not present within the project area.

Farmlands

The Adams County Soils Survey (NRCS, 2007c; USDA, 1974) and the Prime and Unique Farmland map of Adams County (NRCS, 2007b; NRCS, 2007c; USDA, 1974) were reviewed for the project area. There is no farmland map, or soil survey, for CCD because it is considered to be an urban area. A windshield survey was completed of the project area to confirm the current land uses.

There are no farmlands in the project area. All of the land has either been developed or previously disturbed.

Floodplains

There are no regulated floodplains in the Project Area.

There are no Federal Emergency Management Agency (FEMA) regulated floodplains in the project area, and no major drainageways. There is no cross drainage that will be affected by the roadway. No floodplains exist within the project area; therefore, neither the Preferred Alternative nor the No Action Alternative would directly impact any floodplains.

Noise

A noise analysis was completed in accordance with the CDOT noise guidelines (CDOT, 2002). The CDOT noise guidelines are consistent with those of the FHWA (23 CFR 772) and have been approved by the FHWA

for use on Federal-aid projects in Colorado. CDOT guidelines establish noise abatement criteria and design requirements for noise mitigation. The guidelines state that noise mitigation should be considered for any receptor or group of receptors where predicted traffic noise levels, using future traffic volumes and roadway conditions, equal or exceed CDOT's Noise Abatement Criteria (NAC). The guidelines also state that noise mitigation should be considered for any receptors where predicted noise levels for future conditions are greater than existing noise levels by 10 A-weighted decibels (dBA) or more. Because the sensitivity of human hearing varies with frequency, an A-weighting system is commonly used when measuring environmental noise. Sound levels measured using this system are called A-weighted sound levels and are expressed in decibel (dB) notation as dBA.

Noise Contours

A validated Traffic Noise Model (TNM) was used to predict existing year (2007) and design year (2035) traffic noise levels along 56th Avenue.

TNM predicted the location of the existing 66 dBA noise contours to be approximately 75 feet north and south of the center-line of 56th Avenue.

Similarly, a validated TNM model was used to predict the location of the 66 dBA noise level contour and the 71 dBA noise level contour for the Preferred Alternative. Seventy-one dBA is CDOT's NAC for commercial properties. In the design year 2035, the noise model determined that, where unobstructed by buildings, the 71 dBA noise level contour lies approximately 95 feet from the center-line of 56th Avenue, while the 66 dBA contour lies approximately 195 feet from the center-line of 56th Avenue. Figure 3.7-1 shows the location of the 71 dBA and 66 dBA noise level contours for design year roadway and traffic conditions.

Noise Receivers

Aerial photographs and field visits confirmed that there are no sensitive receptors located within the project area.

Figure 3.7-1 shows that there are a number of commercial properties with predicted noise levels higher than 71 dBA. However, there are no active outdoor use areas at any of these facilities that would benefit from noise abatement.

Noise mitigation is not required.

There are no direct noise impacts to residences, parks or recreational areas, or to any commercial developments as a result of the Preferred Alternative, therefore noise mitigation is not required. A detailed noise technical report (Hankard, 2008) was completed for this project and can be found on a CD in the back cover of this document.

Socioeconomics

Current Social and Economic Information

Socioeconomic data for the year 2000 by Census Block Group was obtained from the U.S. Census Bureau (2007). This data was collected for an area within one-half mile of 56th Avenue between Quebec and 1,000 feet east of Havana Street. While this location is planned for development as part of Stapleton, there currently is no population in the project area.

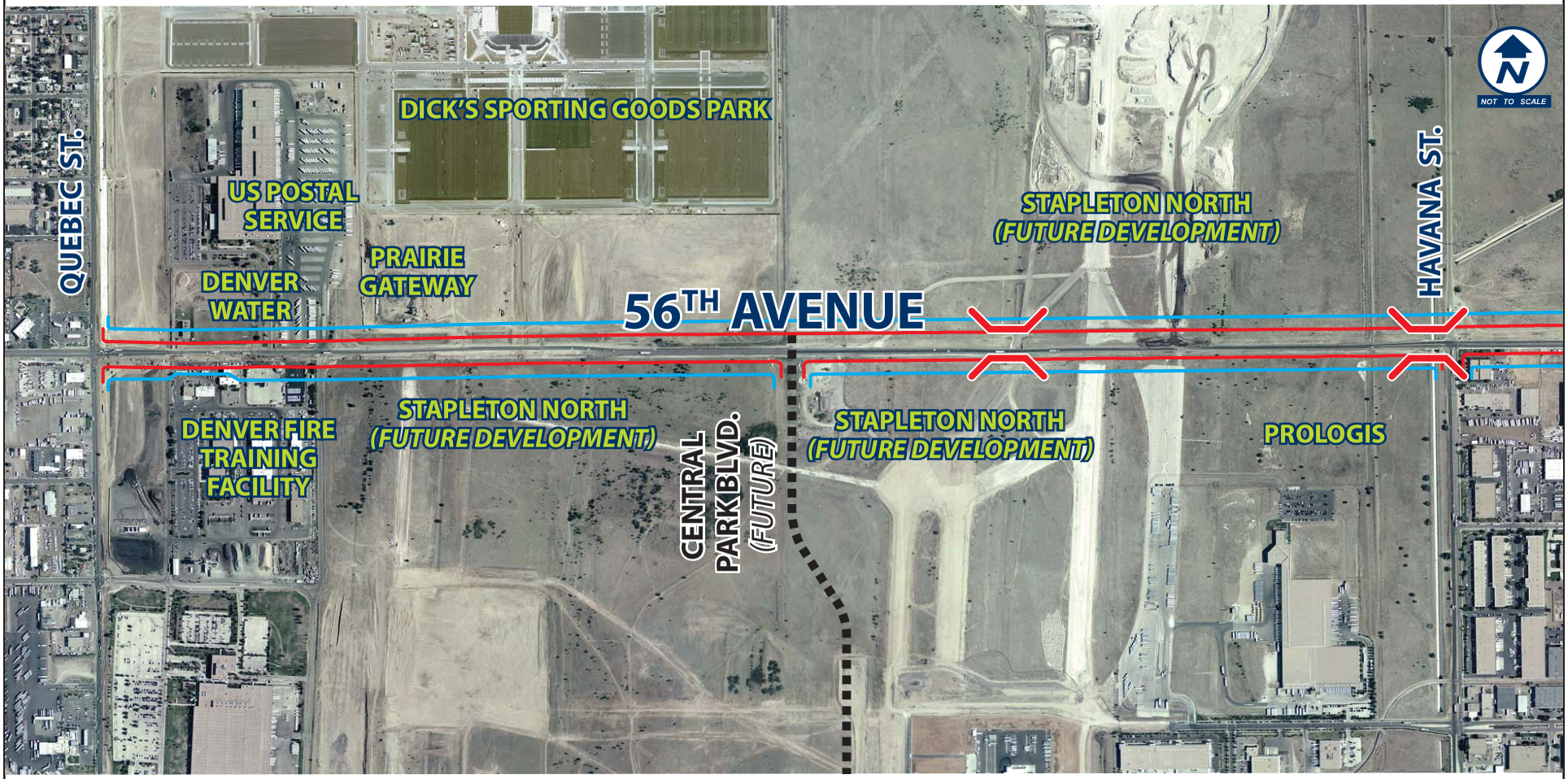
Future Social and Economic Information

Population, household and employment data for the year 2035 was obtained from DRCOG. Using this data, in the year 2035, it is estimated that approximately 3,149 people will live within the study limits in 2,336 households in the year 2035. The number of people employed in the study limits is projected at 4,920. Table 3.7-1 displays the 2005 and 2035 population, household, and employment numbers and the percentage change over a period of 30 years.

Table 3.7-1
Projected Socioeconomic Characteristics for 2035

Data Type	2005	2035	% Change
Population	872*	3,149	261 %
Number of Households	533*	2,336	338 %
Employment	3,691	4,920	33 %

Source: DRCOG TAZ data 2005 and 2035. Data compiled by URS Corporation.
Note: Population in these TAZs are located outside of the project area.



Source: URS Corporation

56th Avenue Environmental Assessment
Quebec Street to Havana Street

FIGURE 3.7 - 1
56th Avenue 2035 Noise Level Contours for the Preferred Alternative

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Planned Developments

Two large-scale developments are primarily responsible for the increase in numbers shown in Table 3.7-1. Prairie Gateway on the north side of 56th Avenue, and Stapleton, which encompasses both the north and south sides of 56th Avenue, are in the early stages of planning and/or construction.

Development of the property would occur with or without the Preferred Alternative. The Preferred Alternative would not result in any negative social or economic impacts within the project area.

Environmental Justice

Environmental Justice refers to social equity in sharing the benefits and burdens of specific projects or programs. Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, mandates that federal agencies consider Environmental Justice in decision-making.

There is no population within the study limits; therefore there are no impacts to minority households or households in poverty as a result of this project.

Data from the State of Colorado Office of Economic Development and International trade was used to research and locate minority owned businesses that might be impacted by the Preferred Alternative. The results of the database search did not identify any minority owned businesses within the project area.

Wetlands

There are no wetlands or waters of the U.S. in the Project Area.

Wetlands located within the project area were surveyed following the guideline and criteria of the 1987 Corps of Engineers Wetlands Delineation Manual (Environmental Library, 1987).

A detailed field investigation was completed in June, 2007 to identify the surface areas and number of wetlands present in the project area. The results of the field investigation found no wetlands or waters of the U.S. in the project area.

Hazardous Materials

Site-specific materials management plans will be in place and implemented if hazardous materials are encountered during construction.

In accordance with Federal Highway Administration and CDOT guidance (CDOT, 2003), the potential for roadway projects to impact hazardous material sites was evaluated, as well as the potential for a hazardous materials site to impact the highway project. The sites identified during a recent Modified Phase I Environmental Site Assessment (MESA) (Pinyon Environmental Engineering Resources, Inc., 2008a) were ranked based on such information as proximity to the corridor, known or suspected contamination, ground-water flow direction, and other available information. Based on the impact evaluation, two *High* and 14 *Moderate* ranked sites were identified within the project area.

Conclusions

Based on the findings of the MESA, no sites were identified which would directly impact the No Action or Preferred Alternatives with respect to construction activities terminating more than five feet above the ground-water elevation. Two sites, Scotts Liquid Gold and the CCD Roslyn Street Facility, were identified with the potential to impact road and bridge construction at depths of 30 feet, the groundwater surface elevation. A site specific materials management plan would be prepared during final design to identify any potential hazardous materials and specify remedial actions.

Historic and Archaeological Resources

No historic or archeological resources would be affected.

Historic Resources

A reconnaissance survey (URS, 2008g) was conducted to locate and record historic properties, and to evaluate the eligibility of those

resources for listing on the National Register of Historic Places (NRHP). The survey included a literature and records search for previously recorded historic resources in the project area at the Office of Archaeology and Historic Preservation. A reconnaissance survey of the project area was also conducted. No historic resources were identified during the surveys within the limits of the project area. Consultation with the State Historic Preservation Officer (SHPO) regarding historic resources was initiated by letter on February 22, 2008, and the SHPO issued concurrence with the Determination of Eligibility and Effect on March 18, 2008 (see Supporting Documents located on a CD on the back cover of this EA document).

Archaeological Resources

An archaeological resource inventory for the project was conducted in September and October of 2007, and February 2008, resulting in the re-evaluation of one previously recorded historic archaeological site and the new documentation of one prehistoric isolated find (Hand 2007; Jepson 2008). Both resources were evaluated as not eligible for listing on the NRHP. Consultation with SHPO for archeological resources occurred in October 2007 and March 2008 (see Supporting Documents located on a CD on the back cover of this EA document).

Consequently, no historic or archeological resources would be affected by the No Action or Preferred Alternatives.

Construction would proceed in accordance with CDOT Standard Specifications 107.23, which stipulates that all work will halt if buried or cultural remains are exposed during any phase of work. In the event of a discovery, the CDOT Staff Archeologist will be contacted to evaluate the find and coordinate with SHPO and other agencies or entities, as appropriate. Work in the area of discovery shall not resume until the CDOT Archeologist has provided clearance to proceed.

Paleontological Resources

On November 10, 2007, a CDOT Staff Paleontologist performed an on-the-ground reconnaissance for paleontological resources for the 56th Avenue project. The survey limits included a corridor width that varied between 180 and 350 feet wide. One potentially fossiliferous unnamed eolian sand exposure was found in an arroyo or old borrow ditch south of the existing 56th Avenue alignment. No fossils were found in the examined exposure.

No paleontological resources would be affected.

The No Action or Preferred Alternatives would have no impacts on known paleontological resources; the probability that either alternative would have impacts on presently buried paleontological resources is very low. Therefore, a paleontological clearance with no attached mitigation stipulations is recommended for this project. If paleontological resources are uncovered during future project(s) construction, the CDOT Staff Paleontologist will be notified immediately.

Native American Consultation

Consultation with Native American tribes was completed.

Section 106 of the National Historic Preservation Act (as amended) and the Advisory Council on Historic Preservation regulations (36 CFR 800.2[c][2][ii]) mandate that federal agencies coordinate with interested Native American tribes in the planning process for federal undertakings. Consultation with Native American tribes recognizes the government-to-government relationship between the United States government and sovereign tribal groups. In that context federal agencies must acknowledge that historic properties of religious and cultural significance to one or more tribes may be located on ancestral, aboriginal, or ceded lands beyond modern reservation boundaries.

In October 2007, FHWA contacted 12 federally recognized tribes with an established interest in Adams and Denver Counties, Colorado and invited them to participate as consulting parties. Only the Northern Cheyenne

Tribe responded to the solicitation, accepting the invitation to consult and requesting a copy of the archaeological resources survey report. Upon reviewing the report, however, the tribe indicated it had no interest in the project or in being a consulting party. None of the remaining tribes elected to reply, and therefore no tribal governments participated in the project under the auspices of the NHPA. All pertinent correspondence related to the consultation process is included in the Supporting Documents. As a result of these actions, FHWA has fulfilled its legal obligation for tribal consultation under federal law.

Section 4(f) and 6(f) Properties

Section 4(f) of the U.S. Department of Transportation (USDOT) Act (49 USC 303) requires federal projects to preserve publically owned park and recreational lands, wildlife and waterfowl refuges, and historic sites. Section 4(f) has been part of Federal law since 1966.

The RMANWR is located on the north side of 56th Avenue, between Havana Street and Pena Boulevard. No other public parks, recreation lands or refuges are located in the project area.

Section 4(f) Properties

The RMANWR is located within the project area, on the north side of 56th Avenue between Havana Street and Peña Boulevard. Used to produce chemical weapons during the 1940s and 50s, the site was designated as a wildlife refuge in 1992 and is now managed by the U.S. Fish and Wildlife Service (USFWS). The refuge is open to the public several days a week. Activities on the RMANWR include hiking, wildlife viewing, seasonal fishing, and nature tours.

Right-of-way for the improvements will be contained within the 100-foot dedication of right-of-way that occurred with the legislation establishing the Rocky Mountain Arsenal National Wildlife Refuge. Therefore, the use of the dedicated ROW for transportation improvements would not be an impact to a Section 4(f) resource. No right-of-way impacts are expected.

There are no other public parks, recreational lands, wildlife refuges or historic properties listed on or eligible for the National Register of Historic Places (NRHP) located in the project area.

Section 6(f) Properties

A review of the Land and Water Conservation Fund (LWCF) database was completed for this project. No properties financed by LWCF are located in the project area.

Pedestrian and Bicycle Facilities

Currently there are no designated trails or bike routes located in the project area. Recent construction of the Dick's Sporting Goods Park and the 56th Avenue/Valentia Street intersection improvements include new multi-use paths on the north side of 56th Avenue. Multi-use path connectivity remains discontinuous throughout the project area.

According to the Denver Bike Map (CCD, 2006) there are several proposed bicycle routes within the project area. At least three off-street routes would be located on 56th Avenue. Two of these routes would continue to the east along 56th Avenue. The third would turn north or south and continue along Havana Street. Two proposed roads within the Stapleton Development, Central Park Boulevard and Verbena Street, are expected to have on-street bike lanes that end at 56th Avenue. The route along the future Central Park Boulevard would be a continuation of the Denver Bike Map grid route number D-19.

Implementation of the **Preferred Alternative** will enhance pedestrian and bicycle access in the corridor.

The Preferred Alternative would enhance the area for pedestrians by providing multi-use paths along both sides of 56th Avenue between Quebec and Havana Streets. At the intersections with traffic signals, crosswalks with pedestrian ramps would be provided to allow pedestrians and bicyclists to safely cross the roadways on each leg of the intersection. All multi-use paths and pedestrian ramps would be Americans with Disabilities Act compliant. The Preferred Alternative

would not result in any direct impacts to pedestrian and bicycle facilities.

Geology and Soils

Geology

Published geologic maps were used to identify natural, unconsolidated surficial deposits over the project area. These eolian sand deposits are typified as windborne soils consisting generally of non-stratified clay, fine sandy silt, and fine sand. Deposits are reported to be 10 feet to 20 feet in thickness, but have been mapped to extend up to 50 feet thick in some places. The underlying bedrock is the Denver-Arapahoe Formation, which dips slightly to the east.

Research and analysis did not identify any adverse impacts to geological sources or geologic hazards in the project area.

Soils

Soil borings were completed to determine subsurface conditions. The subsoils mostly consisted of silty to clayey sands with occasional sandy clays. Two boring locations near the existing haul road bridge (1800 feet west of Havana Street) encountered very hard, medium to high plasticity, silty to sandy claystone at approximately 57 feet that continued to the maximum depths explored of approximately 70 to 75 feet. Groundwater levels were observed in two of the four bridge boring locations at approximately 30 feet of depth after 24 days and 25 days. While no expansive soils were encountered, engineering solutions, such as over-excavation of these material or lime stabilization, or equal, will be implemented to address this problem if encountered.

AIR QUALITY POLLUTANTS OF CONCERN

- Carbon Monoxide
- Particulates
- Ozone

Air Quality

National air quality policies are regulated through the Federal Clean Air Act of 1970 (Act). As required by the Act, the U.S. Environmental Protection Agency (EPA) established national ambient air quality

standards (NAAQS) (standards) for six criteria air pollutants: ozone (O_3), carbon monoxide (CO), PM_{10} (particulate matter 10 micrometers in diameter and smaller) and $PM_{2.5}$ (particulate matter 2.5 micrometer in diameter and smaller), sulfur dioxide (SO_2), nitrogen dioxide (NO_2), and lead. The NAAQS represent levels that allow for avoidance of specific adverse health and welfare effects associated with each pollutant. The Colorado Department of Health and Environment (CDPHE) has adopted the NAAQS, so there are no ambient air quality standards specific to Colorado.

The EPA has delegated authority to the CDPHE to administer many of the requirements of the Act. Within the CDPHE, the Air Pollution Control Division (APCD) oversees air quality policies. The State Implementation Plan (SIP) establishes emission limits for different categories of polluters, such as motor vehicles. In order to achieve the emission reductions necessary for compliance, Metropolitan Planning Organizations are required to demonstrate that transportation plans and programs stay within these budgets. This is done through the transportation conformity process through a Memorandum of Agreement (MOA) with the APCD and CDOT.

CO and PM_{10} are the two main pollutants of concern when assessing the air quality impacts of transportation projects in the Denver metropolitan area. These pollutants are the main focus of this section.

The Denver metropolitan area is in an attainment/maintenance area for CO and PM_{10}. The project is in a nonattainment area for O_3. Due to the status of these three pollutants in the Denver area, and CDOT and FHWA oversight, this project is subject to a conformity analysis.

The air quality technical report prepared for this project (Pinyon Environmental Engineering Resources, Inc., 2008b) includes a more detailed discussion on the regulations, pollutants of concern including ozone and mobile source air toxics (MSATs), carbon monoxide hot-spot

and particulate matter PM_{10} evaluation methods, and air quality analysis results and can be found on the CD in the back cover of this document.

Affected Environment

An air quality analysis was performed for the signalized intersections along 56th Avenue to assess whether the Preferred Alternative meets the requirements of conformity.

The APCD operates a network of ambient air quality monitoring stations within the Denver/Boulder area. The only criteria pollutant that exceeded the standard at a station near the project area was O_3 in 2003 at the 2325 Irving Street Station. The standard was also exceeded for $PM_{2.5}$ in 2005 at the 4650 Columbine Street Station. However, since the $PM_{2.5}$ standard is based on a three year average, this did not result in a violation of the National Ambient Air Quality Standards (NAAQS).

Mobile Source Air Toxics

In addition to the NAAQS, EPA also regulates air toxics and CDOT provides guidance on this topic (CDOT, 2007b). Mobile Source Air Toxics (MSATs) are a subset of the 188 air toxics defined by the Act. MSATs are compounds emitted from highway vehicles and non-road equipment. Some toxic components are present in fuel and are emitted to the air when the fuel evaporates or passes through the engine unburned. Other toxics are emitted from the incomplete combustion of fuels or as secondary combustion products. Metal toxics result from engine wear or from impurities in oil and gasoline. The EPA has identified six priority MSATs: acetaldehyde, benzene, formaldehyde, diesel exhaust, acrolein, and 1, 3 butadiene (EPA, 2001).

The analysis of air toxics is an emerging field. The U.S. Department of Transportation (DOT) and EPA are currently working to develop and evaluate the technical tools necessary to perform air toxics analysis, including improvements to emissions models and air quality dispersion models. Limitations with the existing modeling tools preclude

performing the same level of analysis that is typically performed for other pollutants, such as CO.

Although accurate quantitative methods do not exist to estimate the health impacts of MSATS, it is possible to qualitatively assess future MSAT emissions. However, 40 CFR 1502.22(b) requires FHWA to address four provisions:

1. A statement that such information is incomplete or unavailable;

2. A statement of the relevance of the incomplete or unavailable information to evaluating reasonably foreseeable significant adverse impacts on the human environment;

3. A summary of existing credible scientific evidence which is relevant to evaluating the reasonably foreseeable significant adverse impacts on the human environment; and

4. The agency's evaluation of such impacts based upon theoretical approaches or research methods generally accepted in the scientific community.

These provisions are addressed as follows:

1. Project specific MSAT analysis is an emerging field and the science has not been fully developed and is therefore unavailable. FHWA is aware that MSATs released to the environment may cause some level of pollution. What is not scientifically definable is an accurate level of human health or environmental impacts that may result from the construction of new transportation facilities or modification of existing facilities.

   Project level MSAT risk assessment involves four major steps: emissions modeling, dispersion modeling to estimate ambient

concentrations resulting from the estimated emissions, exposure modeling to estimate human exposure to the estimated concentrations, and then final determination of health impacts based on the estimated exposure. Each of these steps is currently encumbered by technical shortcomings that prevent a formal determination of the MSAT impacts of this project. The emissions model (MOBILE 6.2) is based on limited data raising concerns over the accuracy of the final estimates. Further, the particulate emissions rates from MOBILE 6.2 are not sensitive to vehicle speed, which is an important determinant of emissions rates (this is a shortcoming for diesel particulate matter, but not the remaining priority MSATs), or acceleration. Given uncertainties in the emissions estimation process, subsequent calculated concentrations would be equally uncertain. However, beyond this, the available dispersion models have not been successfully validated for estimating ambient concentrations of particulate matter or reactive organic MSATs. Available exposure models are not well designed to simulate roadside environments. Finally, the toxicity value of at least one of the priority MSATs, that of diesel particulate matter, has not been nationally established, which would prevent the determination of health impacts of this pollutant even if the other necessary tools were available. Thus, current scientific techniques, tools, and data make it impossible to accurately estimate actual human health or environmental impacts from MSATs that would result from a transportation project.

2. Without this project-specific MSATs analysis, it is impossible to quantitatively evaluate the air toxic impacts at the project level. Therefore, this unavailable or incomplete information is very relevant to understanding the "significant

adverse impacts on the human environment," since the significance of the likely MSAT levels cannot be assessed.

3. Research into the health impacts of MSATs is ongoing. For different emission types, there are a variety of studies that show that some either are statistically associated with negative health outcomes through epidemiological studies (frequently based on emissions levels found in occupational settings), or that animals demonstrate negative health outcomes when exposed to large doses. There have been other studies and papers that suggest MSATs have health impacts. However, noting that unresolved issues still remain, the Health Effects Institute, a non-profit organization jointly funded by EPA and industry, has undertaken a major series of studies to determine whether MSAT hot spots exist and what the health implications are if they do. The final summary of these studies is not expected to be completed for several more years.

   Recent studies have been reported to show that close proximity to roadways is related to negative health outcomes, particularly respiratory problems. Yet these studies are often not specific to MSATs. Instead they have encompassed the full spectrum of both criteria pollutants and other pollutants. Thus it is impossible to determine whether MSATs are responsible for the health outcomes.

   There is also considerable literature on the uncertainties associated with the emissions modeling process. The most significant of these is an assessment conducted by the National Research Council of the National Academy of Sciences, entitled "Modeling Mobile-Source Emissions" (2000). This review noted numerous problems associated with the then current models, including the predecessor to

the current MOBILE 6.2 model. The review found that "significant resources will be needed to improve mobile source emissions modeling." The improvements cited include model evaluation and validation, and uncertainty analysis to raise confidence in the model's output. While the release of MOBILE 6.2 represents an improvement over its predecessor, the MSAT emission factors have not been fully validated due to limits on dispersion modeling and monitoring data. The MOBILE 6.2 model is currently being updated and its results will not be evaluated and validated for several years.

4. Even though there is no accepted model or accepted science for determining the impacts of project specific MSATs, as noted above, EPA predicts that its national control programs will result in meaningful future reductions in MSAT emissions, as measured on both a per vehicle mile and total fleet basis. FHWA believes that these projections are credible, because the control programs are required by statute and regulation.

Direct Impacts

Hot-spot Analysis

Forecast carbon monoxide concentrations will not exceed federal standards.

Carbon monoxide hot spot modeling was completed for signalized intersections with a 2035 forecast LOS D or worse, for the No Action and Preferred Alternatives during the AM and PM peak hours. The study limits for air quality encompasses the major intersections within a one-half mile of the center line.

Hourly average CO concentrations are predicted to not exceed the NAAQS one-hour standard of 35 parts per million (ppm) for both the No Action and Preferred Alternatives. To obtain values to compare to the 8-hour CO NAAQS, a persistence factor of 0.57, an altitude correction factor of 1.13, and a background CO concentration of 3 ppm was

applied to the model results. The resulting CO concentrations did not exceed 5.7 ppm for the No Action and Preferred Alternatives, and were below the 8-hour NAAQS of 9 ppm. Table 3.7-2 summarizes the 2035 signalized intersection LOS and CO hot-spot analysis results.

PM_{10} Analysis

Forecast changes to PM_{10} are insignificant.

The greatest impact to PM_{10} as a result of this project is expected to occur during construction. Since this is a temporary impact, it is in Section 3.8, General Construction Impacts and Mitigation (CDOT, 2007).

Permanent air quality impacts can result from changes in traffic volume and congestion. Since the Preferred Alternative would add capacity to 56th Avenue, it is expected to increase total traffic volume and decrease congestion. These changes in volume and congestion are expected to offset each other, so that traffic-related changes to PM_{10} would be insignificant.

Under the No Action Alternative, the 2035 traffic congestion is expected to be worse than the Preferred Alternative. The DRCOG 2035 No Action travel demand model did not show an increase in vehicles miles traveled when compared to the Preferred Alternative model. Therefore, no increase in PM_{10} emissions or violations of NAAQS is anticipated.

Table 3.7-2
2035 Carbon Monoxide Hot-spot Analysis Results

Intersection of 56th Ave and:	Level of Service (LOS)[1]				8-hour Carbon Monoxide (ppm)[2, 3]			
	No Action		Preferred Alternative		No Action		Preferred Alternative	
	AM	PM	AM	PM	AM	PM	AM	PM
Quebec Street	E	D	E	F	5.70	5.64	5.70	5.51
Spruce Street	NS	NS	B	A	N/A	N/A	N/A	N/A
Valentia Street	B	B	B	A	N/A	N/A	N/A	N/A
Central Park Boulevard (future)	D	E	C	C	4.09	4.09	N/A	N/A
Dallas Street	NS	NS	B	B	N/A	N/A	N/A	N/A
Havana Street	D	E	D	C	4.29	4.29	4.42	N/A
Peoria Street	E	D	C	C	3.97	4.03	N/A	N/A

Source: URS Corporation and Pinyon Environmental Engineering Resources, Inc.
Notes:
- [1] Hot spot analysis is required for each intersection with a 2035 LOS D or worse
- [2] The 8-hour maximum for carbon monoxide is 9 ppm
- [3] Results include a background carbon monoxide level of 3 ppm
- AM/PM = morning/evening rush hours
- NS = No signal
- N/A = Not applicable – only signalized intersections with forecast LOS D or worse were analyzed.

Regional Conformity

The regional evaluation of transportation projects to determine conformity with the CAA is carried out by DRCOG. The DRCOG models transportation systems and air quality to ensure that in the aggregate, existing and proposed projects will meet the NAAQS.

Individual projects can demonstrate regional conformity by being part of both a conforming RTP and a Transportation Improvement Program (TIP). Projects listed in the TIP are very likely to occur over the next few years. Improvements to 56th Avenue are included in the air quality conformity assessment for the fiscally constrained 2035 RTP. Similarly, the project is in the conformity network for the current 2008-13 TIP; therefore, the project is in regional conformity.

The No Action Alternative is not consistent with air quality conformity assessment for the fiscally constrained 2035 RTP; therefore, this alternative does not meet regional conformity requirements.

Aesthetics

A visual resource inventory of the project area was conducted during the summer and fall of 2007 that included field visits, study of aerial photographs, regional maps and other agency documents. The inventory process is based on guidelines set forth by the CDOT NEPA Manual (2007) and applicable laws, regulations and guidance.

The project area consists of a combination of industrial, commercial and open space with the following landscape or hardscape features:

- Industrial spaces or large distribution facilities inside gated, chain-link fence, gravel entryways with little or no landscaping
- Commercial property with tree-lined boulevards
- Wide areas of native prairie grass/noxious weed mix adjacent to roadway and up to the right-of way

The dominant cultural modifications consist of large warehouses with semi-truck parking areas, an expanding large event center and the remains of the Stapleton International Airport.

The **Preferred Alternative** would not substantially change the existing visual setting.

Impacts to visual resources are based on the existing visual integrity of the resource, the visible physical changes that would occur to the resource, and the importance of the visual environment to the use of the resource. The existing visual setting would remain for the No Action Alternative. The Preferred Alternative would not substantially change the existing visual setting. Disturbed areas would be re-vegetated or would become part of the roadway section. Landscape areas would be in accordance with CCD project requirements. Context sensitive design would be used to complement the appearance of adjacent properties.

There would be no disruption to locally important view sheds. No adverse visual impacts are anticipated as a result of the Preferred Alternative.

3.8 General Construction Impacts and Mitigation

SHORT-TERM CONSTRUCTION IMPACTS OF THE PREFERRED ALTERNATIVE

- Untreated Stormwater Runoff
- Wildlife
- Air Quality
- Traffic Congestion
- Access Restrictions

Introduction

The No Action Alternative would have no construction impacts, as no construction activities would occur. The construction of the Preferred Alternative is anticipated to create short-term impacts. These impacts, described below include the potential for untreated stormwater runoff, wildlife impacts, air quality, transportation system, and restricted access to businesses. Mitigation for potential impacts is addressed following the specific impact.

Water Quality

Impacts

The proposed construction would present construction-related erosion and sediment control issues related to earthwork and loss of vegetation. The resulting bare surfaces would be highly susceptible to erosion from rain and wind. The erosion and sediment effects on water quality would be relatively short-lived as numerous BMP's would be implemented to mitigate adverse impacts.

STORMWATER MANAGEMENT TECHNIQUES DURING CONSTRUCTION

- Erosion Prevention
- Sediment Control
- Pollution Prevention
- Minimize Disturbance to Vegetation
- Revegetation of Disturbed Areas.

Mitigation

A stormwater management plan (SWMP) would be prepared during the design phase of the project, as per Water Quality Control Division (WQCD) guidelines. The SWMP would include detailed designs of the BMPs to be implemented at the site and a plan describing when and where each BMP would be implemented during phases of construction. Construction site stormwater runoff control would meet the ordinance

requirements of CCD MS4 permit requirements. Construction BMPs may include:

- Erosion prevention, including using temporary soil stabilizers (terracing, mulching, blankets) and structures such as berms or swales, to prevent and/or slow runoff across disturbed areas and/or to divert runoff to sediment traps or basins.
- Sediment control measures, including straw bales, silt fences, sediment traps, and/or sediment basins.
- Pollution prevention measures, including construction material and water management, and measures to prevent spills into watercourses.
- Minimal disturbance of vegetated areas and staging of such disturbance.
- Disturbed areas will be revegetated, as quickly as possible, after completion of construction activities in disturbed areas.

Wildlife

Impacts

The proposed construction would minimally impact the black tailed prairie dog colonies located along the project corridor.

Mitigation

The CDOT *Impacted Black-tailed Prairie Dog Policy* (CDOT, 2005) and the CDOT *Black-tailed Prairie Dog Relocation Guidelines* (CDOT, 2002) has been used as guidance in determining appropriate actions for impacts on the prairie dog colonies. In order to minimize impacts to individual prairie dogs from construction activities, a visual barrier will be installed between the impacted burrows and undisturbed portions of the colony prior to construction. With the visual barrier in place, the burrow openings inside the construction limits will be collapsed. This

process will discourage the prairie dogs from re-establishing in the collapsed burrows and will likely result in more abandoned locations within the prairie dog colonies. The CDOW District Wildlife Manager must be contacted prior to manipulation of prairie dogs or their colonies.

Air Quality

Impacts

Construction activities from excavation, grading, and fill activities could increase local fugitive dust emissions. Airborne fugitive dust particles have a relatively large particle size (>100 micrometers in diameter) and typically settle within 30 feet of their source. The smaller particles could travel as much as several hundred feet depending on the wind speed.

Mitigation Measures

Construction air quality impacts would be controlled by implementing the following measures:

- Wetting exposed soils and soil piles for dust suppression.
- Covered trucks hauling soil and other fine materials.
- Stabilized and covered stock pile areas.
- Re-vegetation of exposed areas.
- Minimization of off-site tracking of mud and debris by washing construction equipment and temporary stabilization.
- Limit vehicle speed of construction-related equipment when off road.

Transportation System

Impacts

The transportation system would be disrupted during construction. Traffic would be shifted traffic during the various stages of construction, which would result in changes to business access.

Mitigation Measures

Mitigation measures to minimize the impacts of traffic circulation during construction include:

- Development of a traffic control and management plan.
- Travel lanes will remain open, although temporary lane closures may be necessary.
- Coordination of construction activities to reduce traffic congestion caused by overloading local streets.
- Maintenance of access to local businesses and residences at all times.
- Provide public notices announcing major lane shifts or temporary closures.

3.9 Permits and Clearances

The construction contractor will be required to obtain construction permits from the CDOT, CDPHE, Urban Drainage & Flood Control District (UDFCD), and other jurisdictions and agencies to verify compliance with the protection of water bodies. The following permits may be required:

- Colorado Discharge Permit System (CDPS) issued by CDPHE for stormwater discharge
- MS4 Stormwater Permit issued by CDPHE
- Burrowing owl clearance survey required by CDOW if impacting black-tailed prairie dog colonies between March 15 and October 31

- Construction access permits for traffic control
- Property access and local permits as required

3.10 Cumulative Impacts

Introduction

Cumulative impacts are defined by the Council on Environmental Quality (CEQ) as:

"…the impacts on the environment which result from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions and regardless of what agency (federal or non-federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time" (40 CFR 1508.7).

A cumulative impact analysis is based on a number of assumptions. CEQ guidance limits the cumulative impact analysis to "important issues of national, regional, or local significance" (CEQ 1997). Therefore, not all issues identified for impact assessment in this EA are analyzed for cumulative effects. Because of the wide geographic scope of a cumulative assessment and the variety of activities assessed, cumulative impacts are commonly examined at a more qualitative and less detailed level than are direct impacts.

Methodology

CUMULATIVE IMPACT ANALYSIS

- Five-Mile Radius Around Project Area
- 20-Year Time Horizon

A five-mile radius around the project area was used as the region of influence for this cumulative impacts assessment, and 20 years is the period considered for reasonably foreseeable future actions. To assess cumulative impacts, a list of past, present, and future projects within the project area was developed for consideration. These projects were assessed by resource area against the project list for cumulative impacts.

Several resources did not have direct or indirect impacts as a result of the Preferred Alternative. Because the project is part of a conforming Regional Transportation Plan and would have no measurable increase in regional vehicle miles traveled, cumulative air quality impacts were not considered. Therefore, cumulative impacts for the following resources are not discussed in this section.

- Farmlands
- Floodplains
- Socioeconomics
- Environmental Justice
- Wetlands and Waters of the U.S.
- Hazardous Materials
- Historic Properties
- Paleontological Resources
- Archaeological Resources
- Section 4(f) and 6(f) Properties
- Geology and Soils
- Aesthetics
- Noise
- Air Quality
- Bicyclists and Pedestrians

Cumulative impacts are discussed for the following resources:

- Land Use
- Water Quality
- Biological Resources

Actions Considered In The Cumulative Impact Analysis

The projects and other activities evaluated for cumulative impacts analysis include the Prairie Gateway, RMANWR, Stapleton Airport, Montbello, Parkfield, Green Valley Ranch, and Stapleton residential developments, I-70 roadway and rail improvements, and ProLogis.

Green Valley Ranch, and the Stapleton Airport redevelopment are discussed in Chapter 1. The Montbello and Parkfield developments are located south of 56th Avenue to the east of the project area and west of Pena Boulevard. Montbello is an established community of approximately 8,634 homes. Parkfield, just east of Montbello, is a more recent residential development that continues to expand. Both areas have an extensive social network and sense of community. The I-70 corridor, located approximately 2 miles to the south of 56th Avenue, contains a four-lane interstate and the BNSF rail line. Improvements to both of these facilities are being evaluated in separate EIS documents. The I-70 roadway corridor is considering four alternatives, which include expansion on the existing alignment or realignment and expansion onto I-270, as well as the addition of toll lanes. The I-70 rail improvements are planned by RTD as part of the FasTracks program, with the implementation of commuter rail service expected by 2017. The ProLogis distribution center, located south of 56th Avenue at Havana Street, contains an industrial development with space leased to manufacturers, retailers, and transportation companies.

Land Use

Historically, the project area has been at the edge of the urban Denver metropolitan area. Past uses such as Stapleton Airport and the RMANWR did not maintain the area in pristine condition, but they did delay urbanization and development of large portions of the project area. In the future, much of the currently undeveloped land within the project area would be developed.

The creation of Denver International Airport and de-commissioning of Stapleton airport was a major factor in cumulative effects on land use within the project area. This action created development opportunities for local jurisdictions such as CCD (Stapleton redevelopment), Commerce City (Prairie Gateway), and Adams County. In addition, creation of the RMANWR will have a major impact on future land use changes, creating recreational opportunities for local citizens as well as visitors to the region.

Water Quality

Due to the amount of development in the project area, there may be cumulative impacts to water quality. Residential, commercial, and industrial development would increase impervious areas, resulting in increased peak flows during precipitation events and base flows from irrigation. Increased flows of both surface and groundwater would likely change water quality constituents and concentrations with drainage basins in the project area. Greater amounts of contaminated runoff from developed areas may be carried into Sand Creek and the South Platte River.

Soil erosion and sedimentation during construction should cause only short-term impacts to water quality due to the use of BMPs.

Biological Resources

Vegetation

The majority of the project area is grassland, with small tree groves in upland areas and along streams and ditches. The majority of vegetation in the project area is a mixture of perennial and annual, native and non-native species. Due to past activities, there are only small areas of native vegetation outside of the RMANWR. Present and foreseeable future projects will develop virtually the entire project area, except for the RMANWR. This activity may increase the spread of noxious weeds.

Wildlife and Threatened and Endangered Species

Many of the past uses of the project area prevented the urbanization and associated development that would have destroyed habitat for many native species, such as prairie dogs and bald eagles. In the future, development would reduce the amount of habitat available for use by wildlife within the project area. Some development, such as open space within the residential developments, may reduce these impacts. These developments could also provide connections to other large areas of habitat, such as the RMANWR.

Conclusion

In general, the 56th Avenue project would respond to increased regional development, provide increased access to these improvements, and improve mobility in the corridor. The proposed modifications to 56th Avenue would not result in substantive direct and indirect impacts for land use, water quality, and biological resources. In addition, when combined with impacts as disclosed under the cumulative impacts section, this project will not result in adverse impacts.

3.11 Mitigation and Commitments

A summary of the relevant and reasonable mitigation and commitments are listed in Table 3.11-1. Mitigation has only been proposed for those resources with direct impacts associated with the Preferred Alternative.

Table 3.11-1
Summary of Proposed Project Mitigation and Commitments

Environmental Component		Mitigation
Land Use		No mitigation required. *During construction*: None
Right-of Way		If ROW is required from private property owners, the owners will be treated fairly, consistently, equitably and are compensated at fair market value per Uniform Relocation Assistance and Real Property Acquisition Policies Act, 49 CFR 24, State statutes, and CDOT policies and procedures. *During construction*: Obtain permission to enter property, complete work within designated work zone, and restore land to preconstruction conditions.
Water Quality		Implement BMPs per CDOT Urban Storm Drainage Criteria Manual. Construct two temporary retention basins to capture 100% WQCV. *During construction*: BMPs per CDOT Erosion Control and Stormwater Quality Guide; Construction CDPS stormwater discharge permit; Section 402 dewatering permit; Silt fence/erosion controls; Construct two water quality retention ponds; Minimal disturbance of vegetated areas and re-seeding as soon as practical; BMPs for material storage, re-fueling, and spill containment.
Biological Resources	Vegetation/ Wildlife	Implement CDOT re-vegetation practices; Implement CDOT Impacted Black-tailed Prairie Dog Policy, dated June 1, 2005; Implement Integrated Weed Management plan; Remove and bury topsoil prior to construction. *During construction*: Avoid impacting areas outside limits of construction; Conduct seeding immediately after the topsoil has been replaced. Survey area for BTPD colonies prior to construction; Coordinate manipulation of BTPD colonies with CDOW Wildlife manager prior to disturbance of habitat; Vegetation and grasses will be replaced in disturbed areas to match existing conditions.
	Threatened & Endangered Species	No mitigation required. *During construction*: None
Public Services & Utilities		Utility locator service will be retained for proper marking of underground utilities. Utility owners/ operators will be notified and asked to confirm utility locations and potential conflicts. *During construction*: Accurate location and marking of utilities; Coordination with utility owners/operators; Coordination with emergency and law enforcement services regarding any potential road closures or delays; utility lines will be moved, avoided or rerouted to circumvent service disruption.

Source: URS Corporation

Best Management Practices (BMPs) that are intended to minimize impacts associated with the proposed action during construction are summarized in Table 3.11-2.

Table 3.11-2
Summary of Proposed Project BMPs

Environmental Component	BMPs
Farmlands	No mitigation required. *During construction*: None
Noise	No mitigation required. *During construction*: Restrict construction activities after 10 p.m. ands before 7 a.m.; schedule noise intensive construction activities to occur simultaneously; Use of well-maintained equipment (particularly with regard to mufflers); Place noise blankets on equipment and use quiet-use generators.
Socioeconomics	No mitigation required. *During construction*: None
Environmental Justice	No mitigation required. *During construction*: None
Wetlands	No mitigation required. *During construction*: None
Hazardous Materials	No mitigation required. *During construction*: Prepare material handling plan if contaminated soils and ground water are encountered during bridge construction; Implement BMPs for storage of fuels and lubricants; Spill prevention, control, and cleanup response.
Historic and Archaeological Resources	No mitigation required. *During construction*: Any subsurface paleontological discovery will result in an immediate halt in construction activities in the area and notification to CDOT, SHPO, and FHWA. Construction activities will not resume until all materials have been evaluated and adequate measures have been taken for their protection.
Paleontological Resources	No mitigation required. *During construction*: Any subsurface cultural or archaeological discovery will result in an immediate halt in construction activities in the area and notification to CDOT, SHPO, and FHWA. Construction activities will not resume until all materials have been evaluated and adequate measures have been taken for their protection.
Native American Consultation	No mitigation required. *During construction*: None
Section 4(f) and 6(f) Properties	No mitigation required. *During construction*: None
Bicyclists & Pedestrians	No mitigation required. *During construction*: Include restrictions to bicyclists and pedestrians in traffic control plans; construct a continuous multi-purpose path during the early stages of design
Geology and Soils	Salvage topsoil. *During construction*: Salvage topsoil.
Air Quality	No mitigation required. *During construction*: Proper construction scheduling to lessen impacts; Cover loads; Wet disturbed soils and soil piles; stabilize and cover stock pile areas; minimize off-sire tracking of mud by washing construction equipment & use temporary stabilization; limit vehicle speed of construction related equipment.
Aesthetics	No mitigation required. *During construction*: Revegetation with native species; store equipment in designated areas; promptly remove stock piles and avoid purchasing and storing materials on-site for extended periods. Context sensitive design would be used to complement the appearance of adjacent properties.
Transportation & Circulation System	No mitigation required. *During construction*: During construction, traffic on all streets will remain open, though temporary lane closures will be necessary. Prepare a traffic control plan, maintain access to businesses per CCD and CDOT requirements; maintain two lanes of traffic during special events; Coordinate with RTD to minimize impacts during construction.

Source: URS Corporation

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4.0 COMMUNITY OUTREACH AND AGENCY INVOLVEMENT

The Community Outreach and Agency Involvement program was developed to build community awareness of the study; identify the issues and concerns of businesses, residents, community groups, resource agencies and other stakeholders; and engage the stakeholders in the development and screening of ideas for corridor improvements (Intermountain Corporate Affairs, 2008).

PUBLIC OUTREACH

- Open Houses
- Neighborhood Groups
- Business Community

4.1 Public Outreach

The project team held a series of meetings with individuals, businesses, neighborhood groups and the community. The primary method for public outreach was the two formal public meetings, using an "open house" format, that were conducted at key milestones during the study process. In addition, town hall meetings were held with neighborhood organizations, and one-on-one meetings with representatives of the area business community were conducted.

Public Open Houses

A public scoping meeting was held on June 7, 2007. The purpose of the meeting was to introduce attendees to the study, provide an overview of the study process, and solicit initial opinions on the community's issues and concerns.

June 7, 2007 Open House

The open house format included a formal presentation and question and answer session. Attendees inspected display boards and talked to study team members about various environmental and technical aspects of the project. The formal presentation was introduced by Councilman Michael Hancock and was conducted by the project team. After the question and answer session, attendees were able to give verbal and written comments to study team members.

The values and opinions that were expressed included:

- A general consensus of the need for improvements along 56th Avenue.
- An understanding of the construction funding limitations of the project.
- A desire to see bicycle trails incorporated into the project and access to the wildlife refuge enhanced.
- A general concern about increased traffic noise and the need for noise mitigation.

The 40-plus comments received were recorded, collected and entered into a comment matrix.

The second public meeting was held on December 6, 2007, and was scheduled during the development and screening of alternatives process. The purpose of the second public meeting was to:

- Review overall planning of the 56th Avenue corridor from Quebec Street to Peña Boulevard, and outline the scope of the more detailed environment assessment of the Quebec Street to Havana Street section.
- Review and describe alternative roadway improvement options that were developed in response to the environmental scoping process.
- Recommend a preferred alternative. At this meeting, the public was asked to comment on the project team's recommendation that the preferred alternative is to widen 56th Avenue to six lanes with a raised median and detached multi-use paths.
- Seek guidance and feedback from attendees on other issues of concern.

The format of the second public meeting closely followed the first with an open house format supplemented with a formal presentation and question and answer session. Informal, one-on-one meetings with the attendees were encouraged to allow for a more detailed discussion of the alternatives and the screening process.

At the request of the project team, representatives of those organizations planning projects adjacent to the project area attended the public meeting and brought display boards of their own. Projects that were represented included the RMANWR, Stapleton Redevelopment, and Prairie Gateway.

Over thirty comments were received and recorded during this public meeting. Since the public meeting included a review of alternatives for the section of 56th Avenue immediately east of Havana Street, many of the comments that were received are of interest but are not directly applicable to this Environmental Assessment. Comments reflected the following major topics:

- Attendees concurred in the designation of the Quebec Street to Havana Street section for the detailed environmental assessment process, with a corridor study planning process for the Havana Street to Peña Boulevard section of 56th Avenue.
- There was general consensus on the recommended preferred alternative.
- There were a few concerns about the required changes in local access, including emergency response, if a raised median is constructed in the section of 56th Avenue east of Havana Street.
- Additional traffic signals in the corridor are desired and the potential locations and requirements for future traffic signals were reviewed.

- There is continued interest in access from the neighborhoods to the wildlife refuge and bike trails.
- Traffic noise and the likelihood of further traffic congestion were mentioned as concerns.

Neighborhood Outreach

In addition to the formal public meetings, the project team conducted an outreach plan to neighborhood organizations. Representatives of the project team attended town hall meetings conducted by Councilman Michael Hancock, and provided project updates and solicited input on study issues from the following organizations:

- Montbello United Neighbors
- Far Northeast Neighbors
- 50+ Club of Green Valley Ranch
- Green Valley Ranch Homeowners Association
- Gateway Metro Citizens Group
- Stapleton United Neighbors
- Northern Airport Corridor Association
- Northern Corridor Coalition
- Denver County Democrats District 7

Business Community

One-on-one meetings with representatives of the area business community were conducted. Presentations were made to the Black Chamber of Commerce and the Far Northeast Business Association. Both organizations supported transportation improvements in the 56th Avenue corridor.

Outreach to other businesses with interests in the 56th Avenue corridor included:

- ProLogis
- Stapleton Redevelopment Corporation
- Forest City Stapleton
- Xcel Energy
- Kaneb Energy
- Sand Creek Greenway Foundation
- Kroenke Sports Enterprise
- American Realty Trust

4.2 Agency Outreach

In addition to the primary agency participants (City and County of Denver, Colorado Department of Transportation, and Federal Highway Administration), agencies included in the scoping and outreach process included:

- U.S. Army
- U.S. Army Reserve
- U.S. Fish and Wildlife Service
- U.S. Environmental Protection Agency
- U.S. Army Corps of Engineers
- U.S. Postal Service
- Public Utilities Commission
- Regional Transportation District
- Urban Drainage & Flood Control District
- Metropolitan Wastewater District

- South Adams County Water and Sanitation District
- Denver Regional Council of Governments
- Adams County
- City of Aurora
- City of Brighton
- City of Commerce City
- Denver Fire Department
- Denver Water Department
- Denver International Airport
- Native American Tribes

One-on-one meetings with a number of agency representatives were conducted. In addition, formal briefings of the 56th Avenue project were provided at the regularly scheduled meetings of the Northeast Metro Win-Win Coalition. Started in 1997 to facilitate informal, collaborative dialogue of area stakeholders, the Northeast Metro Win-Win Coalition now regularly engages a wide range of public agencies, developers and others with an interest in the northeast quadrant, with a focus on issues related to land use, drainage, open space/trails, and transportation.

Outreach to the Northeast Metro Win-Win Coalition included several briefings to the Coalition's steering committee, and meetings with the Coalition's transportation subcommittee and the open space/trails subcommittee.

Issues identified during the agency outreach process included:

- Current operations and the possible relocation of the Rocky Mountain Fire Academy
- Timing of improvement

- Relocation of water, gas, electric and sewerage utilities, or construction of such new utilities
- Plans for a RMANWR perimeter trail and trailheads
- Right of way issues affecting Adams County and Commerce City
- Storm drainage basin improvement plans

4.3 Public Information Outreach Techniques

KEY OUTREACH TECHNIQUES

- Fact Sheet and Flyers
- Newsletters
- Web Page
- Paid Media

The public outreach team used several very targeted methods to reach the corridor stakeholders, including door flyers, newsletters, paid media, and a study web page. These materials contained information for both the 56th Avenue EA and Corridor Study.

Fact Sheet and Flyers

The project team produced and distributed bilingual fact sheets and flyers to build awareness of the project and to invite interested citizens to attend the public meetings/open houses. Over 5,000 flyers were distributed door-to-door in the Montbello neighborhood. Meeting notices were also distributed to recreation centers, fire stations, schools, retail establishments, and government offices in the Montbello, Parkfield, and Green Valley Ranch neighborhoods.

Newsletters

The project team used printed and electronic newsletters to inform stakeholders and to communicate progress in the process. With the permission and coordination of Councilman Hancock's office, articles were placed in two of his newsletters to introduce the project, invite public participation and update constituents on the progress. This newsletter was mailed to every household in his council district—approximately 6,000 households.

Information about the public meetings was also distributed through the Stapleton Intranet, an electronic newsletter received by more than 7,000 households and businesses in the Stapleton neighborhood.

Web Page

The project team also created and maintained a project web page on the City and County of Denver's (CCD) website. This web page was periodically updated with contact information and summary updates on project progress. The project team also monitored an opinion line for callers.

Paid Media

The project team inserted paid meeting notice advertisements into several newspapers that serve the Montbello, Green Valley Ranch, Parkfield, and Stapleton neighborhoods. Because of the significant Hispanic population in the corridor, ads in bilingual newspapers were also in Spanish.

Public Meeting Notice
Now Faith Christian Center

Other

Notices were displayed on the marquees of both public meeting venues, the Now Faith Christian Center and Montbello High School, several days prior to the event. The Black Chamber of Commerce also sent a notice to its e-mail list.

4.4 Neighborhood Outreach Strategy

The project team devised and implemented a culturally sensitive and creative outreach strategy for neighborhoods near the project area using traditional and non-traditional approaches which included:

- Notification, pre-briefing and close coordination with Black Ministerial Alliance
- Bilingual flyer distribution to six neighborhood churches

- Bilingual flyer distribution to the all-Spanish language Church of the Ascension
- Bilingual flyer distribution in Gateway Center Carniceria
- Guided study process by responding to the opinions heard in a timely manner
- Ensured input from the public outreach process was documented and reflected in the scoping and alternatives analysis
- Acquisition of a general acceptance of the project prior to moving forward on study tasks

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