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4.15 HAZARDOUS MATERIALS

INTRODUCTION

This section provides an overview of the concerns associated with the presence of potential soil and groundwater contamination from hazardous materials identified within the study area. The term hazardous materials is an all-inclusive term for materials that are regulated as solid waste, hazardous waste, and other wastes contaminated with hazardous substances, radioactive materials, petroleum fuels, toxic substances, and pollutants. The presence of contaminated soil and groundwater within the study area presents a liability concern for any potential right-of-way acquisition (full or partial) and could affect the project in terms of worker health and safety, cost, schedule, and agency and public relations, particularly if they are not identified prior to construction. Therefore, areas of contaminated soil and groundwater must be identified to evaluate several aspects of the proposed improvements including responsibility and management of contaminated soil and groundwater, engineering options to mitigate impacts, and activities associated with right-of-way acquisition.

Public concerns expressed through the public involvement process regarding Hazardous Materials include the disturbance of areas with historical soil and groundwater contamination during excavation activities near the Rocky Flats Environmental Technology Site (RFETS). Specific concerns include the historical plutonium plume in the eastern portion of the RFETS, historical solvent contamination along the south side of SH 72, historical cadmium contamination, and groundwater contamination in the area west of SH 93. The public expressed specific concern over the release of cadmium and plutonium into the air during excavation activities. A concern was also expressed by the public about ground disturbance activities that may release pollutants into the air in the vicinity of old mines, previous landfill areas, and gas storage areas. These concerns are addressed in **Section 4.15.1.1**, **Section 4.15.1.2**, and **Section 4.15.1.3**.

4.15.1 AFFECTED ENVIRONMENT

In support of the study, a Modified Phase I Environmental Site Assessment (MESA) was performed to evaluate whether properties within the study area had potential or known soil, groundwater, or surface water contamination (Environmental Resources Management [ERM, 2005]). The MESA was conducted in accordance with Standard E 1527-00 Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process of the American Standard for Testing and Materials (ASTM) (ASTM, 2000) and CDOT Modified Environmental Site Assessment Guidance (CDOT, 2003a). The ASTM E 1527-00 standard “is intended to permit a user to satisfy one of the requirements to qualify for the innocent landowner defense to the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA).”

Sites within the study area were assessed for recognized environmental conditions and potential environmental conditions. The ASTM defines recognized environmental conditions as “the presence or likely presence of any hazardous substances or petroleum products on a property under conditions that indicate an existing release, a past release, or a material threat of a release of any hazardous substances or petroleum products into structures on the property or into the ground, groundwater, or surface water of the property.” Recognized environmental conditions do not include *de minimis* conditions. ASTM defines *de minimis* conditions as “conditions that generally do not present a material risk of harm to public health or the environment and that generally would not be the subject of an enforcement action if brought to the attention of appropriate government agencies.” Sites within the study area with environmental conditions that may be present but could not be confirmed without additional inspection or investigation are referred to as “sites of concern.”



The methodology for conducting the MESA to identify sites with recognized environmental conditions and site of concern included:

- Performance of a limited “windshield survey” site reconnaissance within the study area for readily identifiable activities with potential hazardous materials concerns
- Review of readily available public documents identifying historical uses of sites within the study area
- Review of readily available local, state, and federal environmental agency databases within a maximum distance of one mile of the centerline of the proposed alternative alignments as set forth by ASTM Standard E 1517-00 (ASTM, 2000) and CDOT guidance (CDOT, 2003a)
- Screening of sites identified in the local, state, and federal environmental agency databases by distance from the proposed alternative footprints and estimated groundwater flow direction
- Ranking of sites identified in the local, state, and federal environmental agency databases based on known release of hazardous substances or petroleum products to the environment
- Review of previous CDOT investigations and other available records from local, state, and federal agencies for sites within the study area
- Interviews with relevant local, state, or federal agency regulatory staff regarding the potential for historical releases of hazardous substances or petroleum products on sites within the study area
- Identification of sites requiring additional evaluation or investigation to assist in alternative feasibility assessment, project design, right-of-way acquisition, and development of specific materials management or institutional controls required during construction

The limited site reconnaissance was conducted in June 2005 by Patricia Corbetta, geologist, and Stephanie Larsen, environmental scientist, with ERM. Areas along the alternative alignments were visually assessed from public right-of-way for evidence of chemical and petroleum use, storage, and discharges (ERM, 2005). The interior buildings, fenced areas, and rear lots were not inspected during site reconnaissance due to limited site access, size of the study area, and scope of the MESA.

The historical records review was performed using a variety of historical data resources, including Sanborn Fire Insurance Company maps, U.S. Geological Survey (USGS) topographical maps, and aerial photographs. Sanborn Fire Insurance Company maps have been produced since the late 1800s and provided a record of land use within the Golden area. USGS topographical maps have also been prepared since the late 1800s and were used to identify topographic and cultural features and changes in site and land development through chronological map editions. Aerial photographs have been collected since the 1940s and allow for direct observations of site conditions over a period of time.

Sites were also reviewed for local, state, and federal environmental agency database records (Environmental Data Resources [EDR], 2004). Approximately 2,100 sites were identified within the study area. These sites were then screened to determine if they were likely to adversely impact the proposed alternative footprints. The initial screening process consisted of distance from the alternative footprints (within 1,500 feet) and estimated regional groundwater flow. Regional groundwater flow was estimated to move from west to east, as detailed in the corresponding groundwater description (see **Section 4.8.1.2**). Sites that were located within 1,500 feet, potentially upgradient or cross-gradient of the alternative footprints, or had a high possibility of having impacted the study area based on site conditions were included in the screening and ranking process.

Following the initial site screening, sites were ranked with a low, medium, and high designation based upon the known environmental conditions and the potential for the site to have an adverse impact on the project alternatives. Sites with no to minimal indications of a potential existing release, past release, or material threat of a release of any hazardous substances or petroleum products into the ground (soil), groundwater, or surface water received a low ranking. Examples include residential sites or commercial sites with activities that do not require the use of hazardous substances or petroleum products (>55 gallons/year), Resource



Conservation and Recovery Information System (RCRIS) database hazardous waste generators with no reported violations, and facilities with above ground storage tanks (ASTs) or underground storage tanks (USTs) with no reported leaks or spills.

Sites received a medium ranking if they had moderate indications of a potential existing release, past release, or material threat of a release of any hazardous substances or petroleum products into the ground (soil), groundwater, or surface water. Examples include RCRIS database hazardous waste generators with reported violations, sites reported on the Emergency Response Notification System (ERNS) list, and facilities with leaking underground storage tanks (LUSTs).

Sites with indications of a potential existing release, past release, or material threat of a release of any hazardous substances or petroleum products into the ground (soil), groundwater, or surface water and the potential for large-scale migration from the contaminant source received a high ranking. Examples include National Priority List (NPL) or Superfund sites; Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS) sites; Resource Conservation and Recovery Act (RCRA) permitted treatment, storage, or disposal (TSD) facilities; RCRA Corrective Action Sites (CORRACTS); sites in the Colorado Voluntary Clean Up program (VCUP); and state active and historical solid waste landfills.

Following the environmental site ranking, the sites were screened again based on distance. Sites were identified within 500 feet of the build alternative footprints, from 500 to 1,000 feet, and from 1,000 to 1,500 feet of the build alternative footprints. A detailed review was conducted for sites located within 500 feet of the build alternative footprints that had a medium or high ranking and sites located between 500 feet and 1,000 feet with a high ranking. High ranked sites between 1,000 feet and 1,500 feet from the build alternative footprints were reviewed as necessary. The site screening and ranking process is discussed further in the MESA (ERM, 2005).

Sites with recognized environmental conditions and sites of concern within the study area are discussed below. Due to the size of the study area, current site conditions are discussed below in relation to the following portions of the study area: northern (Interlocken Area), central (Rocky Flats Area), and southern (Golden Area).

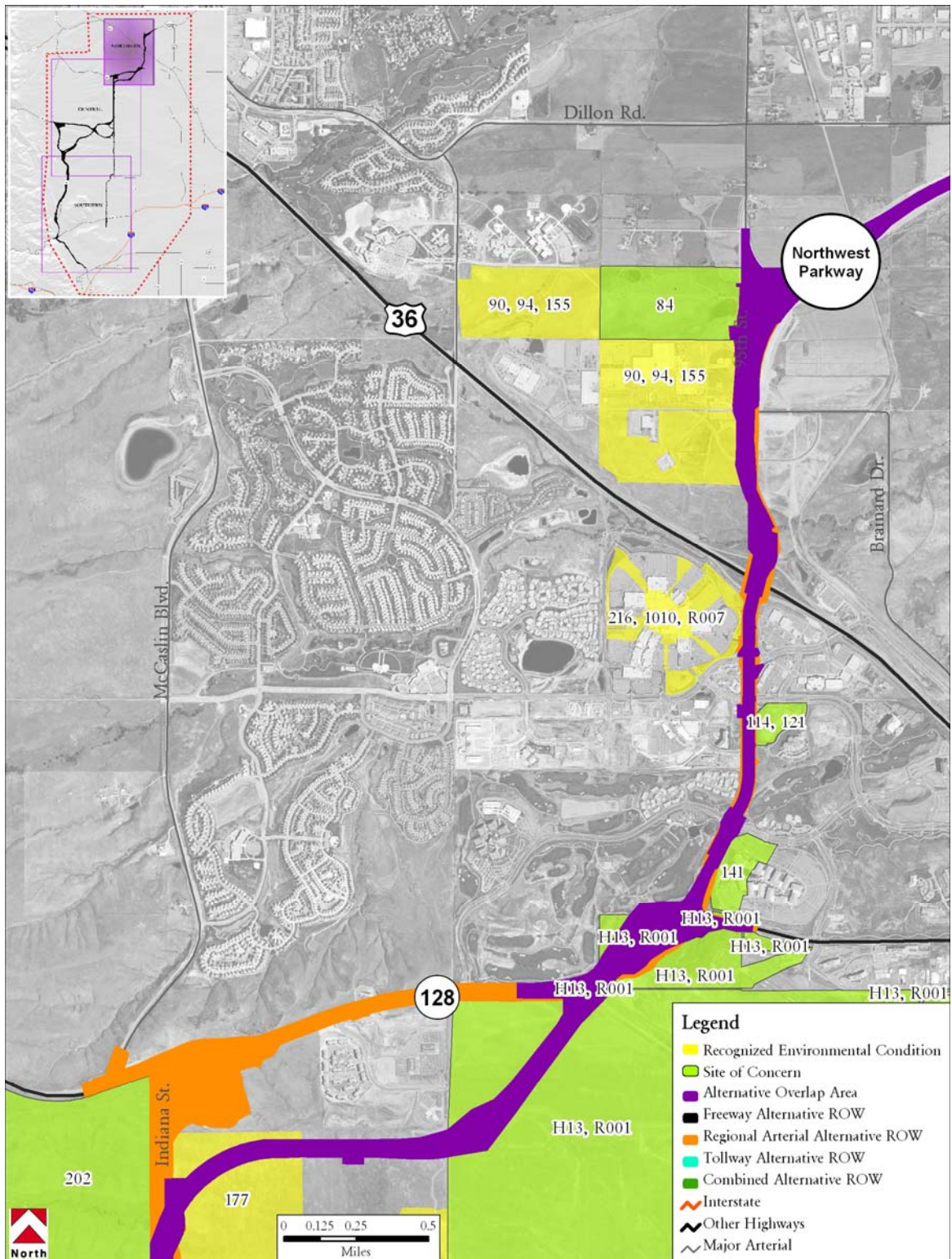
4.15.1.1 NORTHERN PORTION

The northern portion includes the Interlocken Area, Superior, and Broomfield and extends from the western terminus of Northwest Parkway near 96th Street to the northeast corner of RFETS south of the intersection of SH 128 and Indiana Street. Sites of concern and sites with recognized environmental conditions are identified in this section (see **Figure 4.15-1**).

This area has historically been used for ranching purposes. Abandoned coalmines are located to the east of the western terminus of Northwest Parkway. Mining issues in the study area are further discussed (see **Section 4.19**). At the northern extent of this portion, the BNSF railroad tracks cross the Northwest Parkway. No evidence of potential soil and groundwater impacts associated with the railroad tracks and crossings were identified during the site reconnaissance. However, impacts to soil and groundwater along the railroad corridor may exist due to undocumented events and an accumulation of drips, leaks, spills, and hydrocarbon exhaust residue over time. Based on the unknown conditions along the railroad corridor, the railroad right-of-way is a site of concern.

Several areas of known contaminated soil and groundwater have been identified in the northern portion of the study area. Lead-contaminated soils, associated with a former pistol and rifle shooting range, are located to the west of Interlocken Loop. Although remediated, soils containing low levels of lead from this site were used as fill in nearby road construction. LUST sites are present in the northern portion that may impact soil or groundwater quality in the study area. More recently, the area in general has developed as commercial and retail use, which includes nearby gasoline stations and other service related businesses. No substantial areas of contaminated soil or groundwater were identified along the proposed alternative alignment footprints.

Figure 4.15-1 Sites of Concern and Sites with Recognized Environmental Conditions- Northern Portion



Source: Compiled by FHU, 2006.



4.15.1.2 CENTRAL PORTION

The central portion consists of the Rocky Flats Area, Westminster, and Arvada and includes the area between Indiana Street and SH 93 from SH 128 south to 64th Parkway. SH 72 and 82nd Avenue (Leyden Road) extend east-west from Indiana Street to SH 93. The Indiana Street section of the Combined Alternative (Recommended Alternative) between SH 72 and 64th Avenue is also included in the central portion. Sites of concern and sites with recognized environmental conditions are identified in this section (see **Figure 4.15-2**).

A number of landfills are located in this portion. The BFI Foothills landfill is an active solid waste site located at SH 93 and Leyden Road. No identified groundwater or methane concerns are identified with this site. Historical landfills with known methane are located in the Leyden Road and Indiana Street area in addition to 68th Avenue and Joyce Street.

The Union Pacific railroad parallels the south side of SH 72 and is located between SH 72 and Barbara Gulch. The railroad track crosses Indiana Street just south of the intersection of Indiana Street and SH 72 to the east, and crosses SH 93 just south of the intersection of SH 93 and SH 72 to the west. No evidence of soil and groundwater impacts were identified as associated with the railroad tracks during the site reconnaissance. However, impacts to soil and groundwater along the railroad corridor may exist due to undocumented events and an accumulation of drips, leaks, spills, and hydrocarbon exhaust residue over time. Based on the unknown conditions along the railroad corridor, this is a site of concern.

This area also has a mining history that includes coal, uranium, aggregate, and clay prospecting and development (see **Section 4.19**).

ROCKY FLATS ENVIRONMENTAL TECHNOLOGY SITE (RFETS)

RFETS consists of approximately 6,262 acres between SH 128 and SH 72, and between SH 93 and Indiana Street. Former U.S. Department of Energy (DOE) operations at RFETS included the production of nuclear weapons parts (1951 to 1989) and fabrication of stainless steel components (1951 to 1992). Approximately 384 acres near the center of the site are referred to as the former Industrial Area where many of the on-site structures and operations were located. The Industrial Area is approximately 1.5 miles west of Indiana Street and north of SH 72. The remaining acreage surrounding the Industrial Area is referred to as the former Buffer Zone. The Buffer Zone borders Indiana Street to the west and is located approximately 0.5 mile north of SH 72.

Remediation of historical site operations, which includes activities with hazardous substances such as uranium, plutonium, other metals and chlorinated hydrocarbons, has been ongoing at this site since 1992. The site has undergone an Independent Validation and Verification process to ensure that on-site contaminants and cleanup actions have met standards and action levels set forth in the Rocky Flats Cleanup Agreement (RFCA). After remediation efforts were physically completed in October of 2005, the Department of Energy (DOE) transferred management of the site from the Environmental Management unit to the Legacy unit. Upon the finalized site closure in July 2007, the jurisdiction and control over most of the land was transferred to USFWS to be operated as the Rocky Flats National Wildlife Refuge as set forth in the Rocky Flats National Wildlife Refuge Act of 2001. DOE will maintain authority of certain parts of the Industrial Area where contaminants still exist and are undergoing long-term remediation.

Both the CDPHE and the EPA monitor and evaluate air, surface water, groundwater, and soil conditions at RFETS, in addition to implementing remedial actions. Remedial investigations have indicated that elevated levels of hazardous substances, including radionuclides, metals, and chlorinated hydrocarbons have been released to the environment.



Historical on-site structure fires and material releases have resulted in radionuclide contamination of surface soils within the Industrial Area, Buffer Zone, and properties to the east of Indiana Street. Plutonium-239/240 and americium 241 have been identified as the primary contaminants in surface soil in the vicinity of the Northwest Corridor study area (DOE, 1997b) (see **Figure 4.15-3** and **Figure 4.15-4**). Plutonium concentrations in surface soil in the vicinity of Indiana Street range from less than 0.2 picoCuries per gram (pCi/g) to 10 pCi/g (DOE, EPA, and CDPHE, 1996). Americium concentrations range from 0.04 pCi/g to 0.9 pCi/g (DOE, EPA, and CDPHE, 1996). These concentrations are above background levels found in the environment. Plutonium environmental background levels in the Rocky Flats Area have been determined as 0.09 pCi/g (DOE, 1997a; DOE 1997b). Although above background, these levels are below the Rocky Flats Clean-up Agreement (RFCA) action levels for plutonium and americium in surface soil, which are 50 pCi/g and 74 pCi/g, respectively (DOE, EPA, and CDPHE, 2003). The action levels were calculated to be protective of a wildlife refuge worker, a rural resident in the event the land use was not restricted to a wildlife refuge, and ecological resources (DOE, EPA, and CDPHE, 2003).

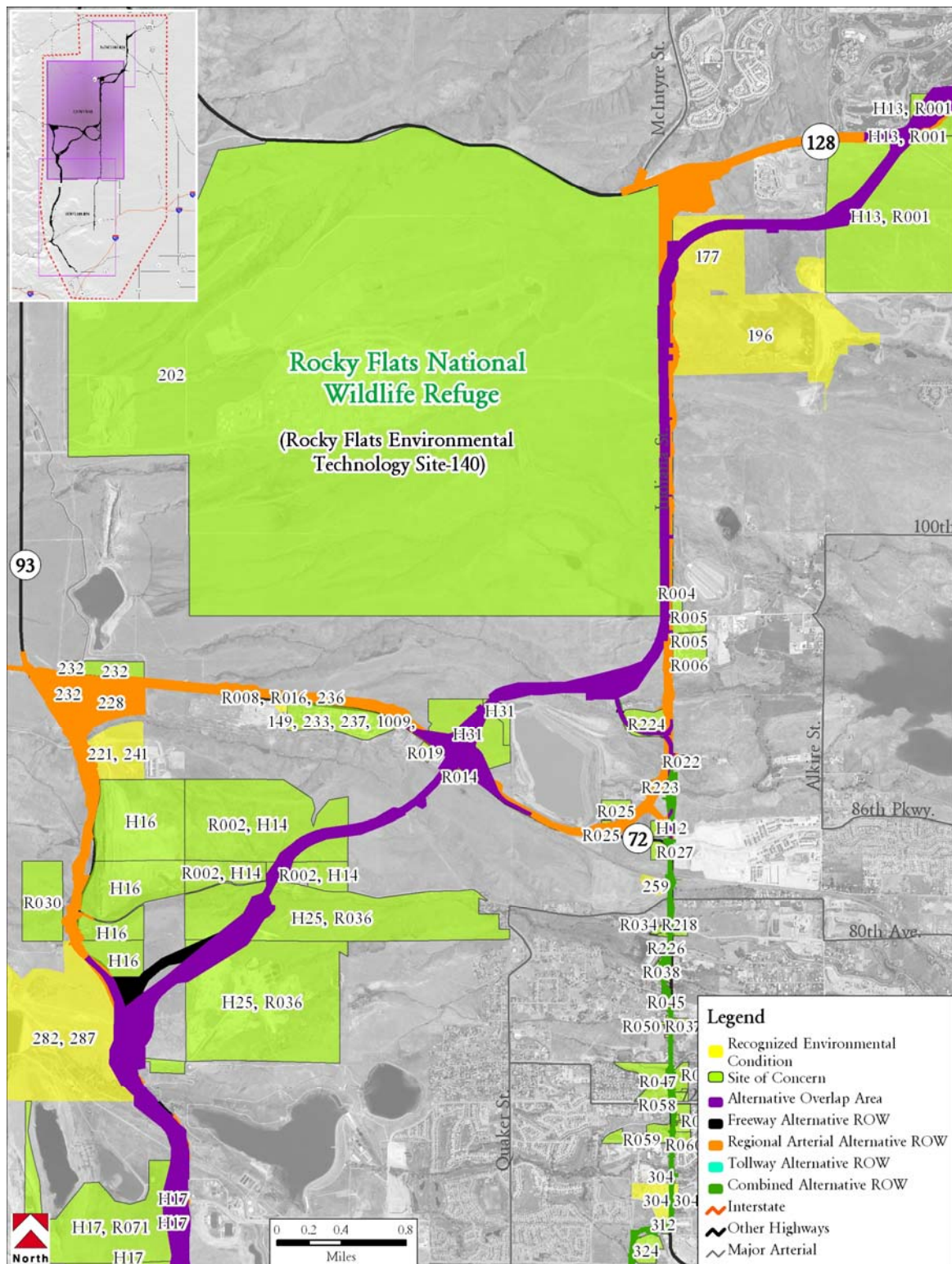
Surface soil east of Indiana Street also contains concentrations of plutonium and americium. This area comprises the only off-site Operable Unit (OU) 3. These soils were investigated as part of the OU 3 RCRA Facility Investigation/Remedial Investigation (RFI/RI) and the OU 3 Corrective Action Decision/Record of Decision (CAD/ROD) (DOE, 1997b). The highest concentration of plutonium, which was approximately 6.5 pCi/g, occurred in a surface soil sample located approximately 0.3 mile east of the intersection of the east access road and Indiana Street. The concentration of americium, which was 0.5 pCi/g, was identified in a surface soil sample immediately east of the same intersection (DOE, 1997b). These concentrations were considered protective of human health and the environment and a no action determination was made. The First Five-Year Review for this OU in 2002 concluded that these concentrations are still protective of human health and the environment (DOE, 2002b).

Other affected media within RFETS includes groundwater, surface water, and sediment. Groundwater plumes containing volatile organic compounds (VOCs), nitrates, and uranium do not extend to any of the property boundaries and are not expected to impact the proposed build alternatives (DOE, 2004b). Recent sampling data (March 2005) indicates radionuclide exceedences have occurred in surface water and sediment samples along Woman Creek and Walnut Creek drainages in close proximity to Indiana Street (DOE, 2005a). A system of continuous air monitoring stations is located along the RFETS property perimeter. Since at least 1998, no radionuclide exceedences have occurred.

ROCKY FLATS INDUSTRIAL PARK

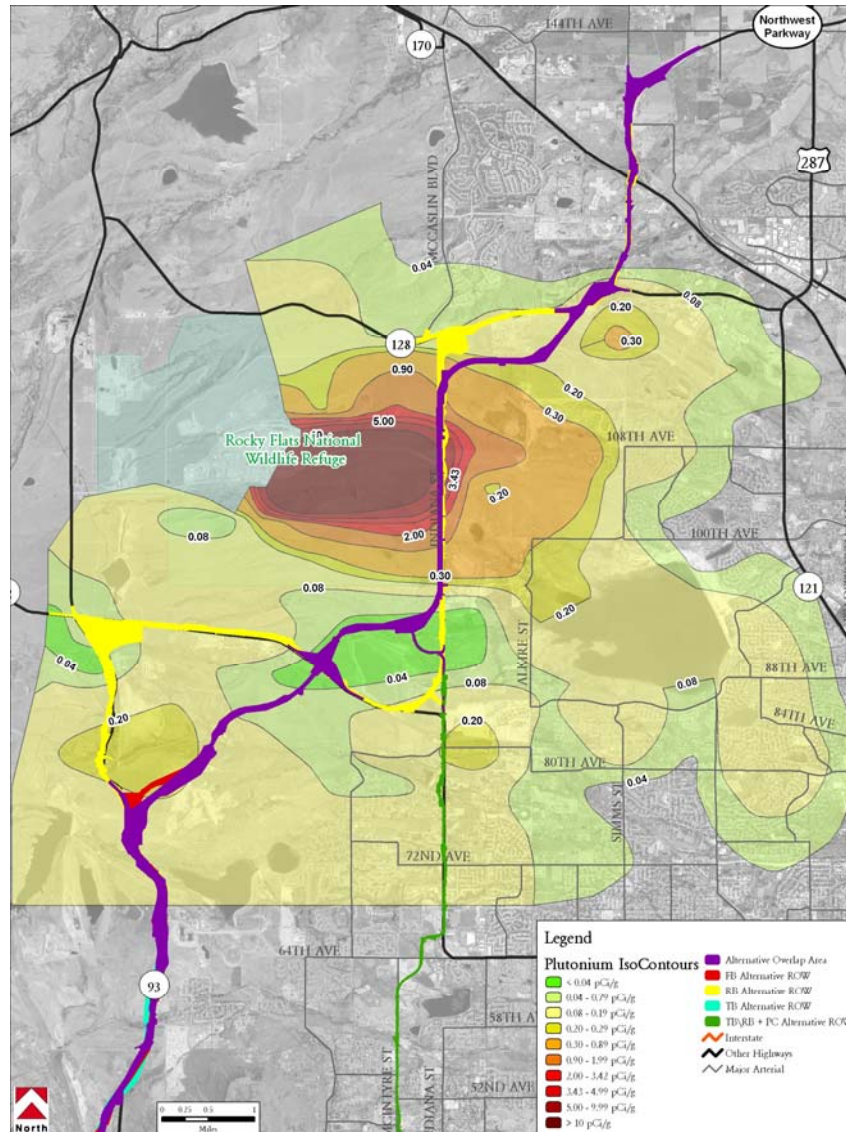
Additional industrial property uses in the central portion of the study area, known as the Rocky Flats Industrial Park, have been concentrated along SH 72 between SH 93 and Indiana Street. Known VOC and metal contaminated soil and groundwater are present in the vicinity of the Rocky Flats Industrial Park. Contaminated groundwater has migrated off-site and onto property on the north side of SH 72. Industrial use and petroleum tanks have led to contaminated soils and groundwater on properties to the west of Rocky Flats Industrial Park and the section along Indiana Street south to 64th Avenue.

Figure 4.15-2 Sites of Concern and Sites with Recognized Environmental Conditions-Central Portion



Source: Compiled by FHU, 2006.

Figure 4.15-3 Plutonium IsoContours in the Northwest Corridor Study Area



Notes: ¹Polygons were created from isocontours, which were created in Dynamic Graphics using kriged data from M. Iggy Litaor, EG&G Geosciences January 1995, as mapped in the 1996 Final RFI/RI report.

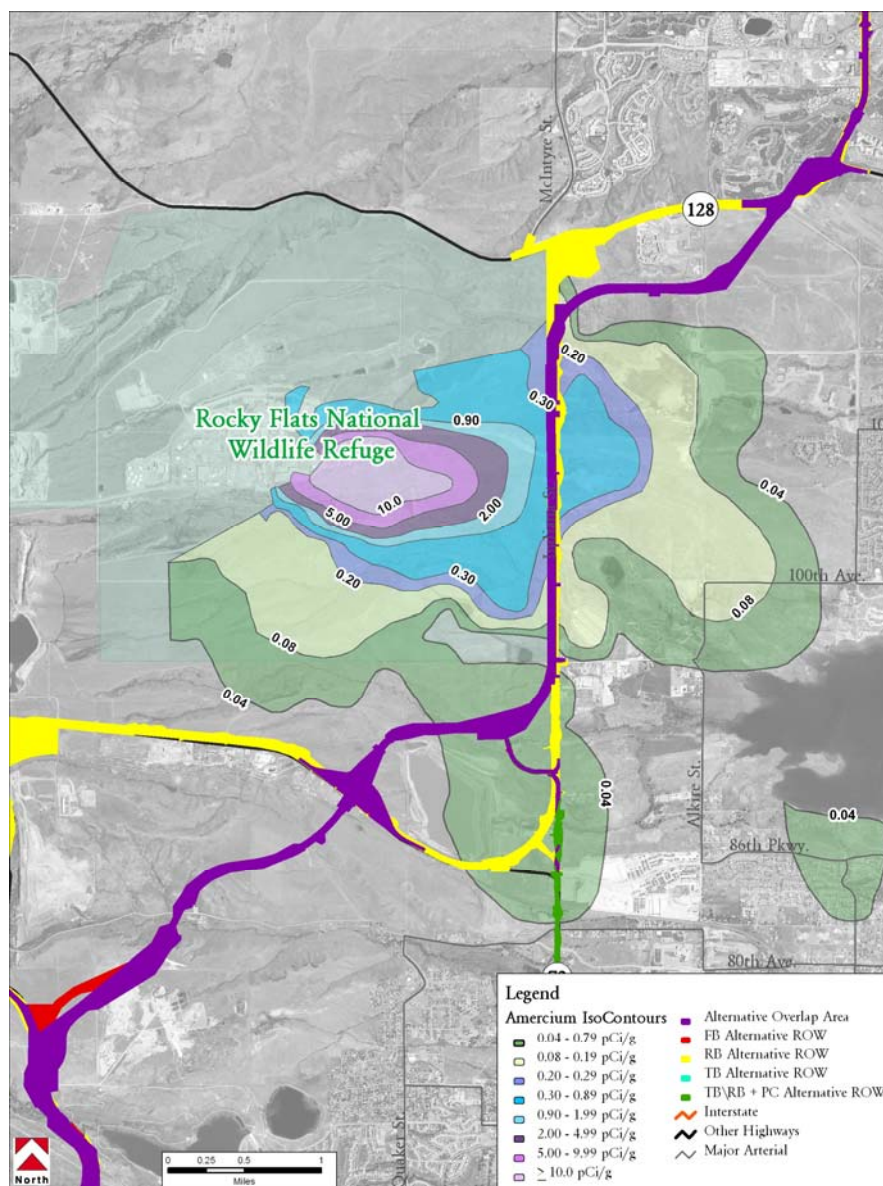
²In order to close the polygon shapefiles, the open-ended isocontours were closed by connecting their end points. ERM made no attempt to extrapolate or interpret data other than what was provided in the original figure in the Final RFI/RI report. Information obtained from Water Quality Control Commission Regulations #93 and #94. Available at:

<http://www.cdphe.state.co.us/op/wqcc/OtherRegs/93-94/Final9394.html>
(accessed August 31, 2005).

Source: US Department of Energy. June 1996. *Final RFI/RI Report OU 3 (OU 3 Offsite Areas)*; Figure 4-6A.



Figure 4-15-4 Americium IsoContours in the Northwest Corridor Study Area



Notes: ¹Polygons were created from isocontours, which were created in Dynamic Graphics using kriged data from M. Iggy Litaor, EG&G Geosciences January 1995, as mapped in the 1996 Final RFI/RI report.

²In order to close the polygon shape files, the open-ended isocontours were closed by connecting their end points. ERM made no attempt to extrapolate or interpret data other than what was provided in the original figure in the Final RFI/RI report. Information obtained from Water Quality Control Commission Regulations #93 and #94. Available at:

<http://www.cdphe.state.co.us/op/wqcc/OtherRegs/93-94/Final9394.html>
(accessed August 31, 2005).

Sources: US Department of Energy, June 1996. Final RFI/RI Report OU3 (OU 3 Offsite Areas)
Figure 4-6B.



4.15.1.3 SOUTHERN PORTION

The southern portion includes the Golden Area and extends from 64th Parkway south to C-470. The McIntyre Street section of the Combined Alternative (Recommended Alternative) between 64th Avenue and SH 58 is also included in the southern portion. Sites of concern and sites with recognized environmental conditions are identified in this section (see **Figure 4.15-5**).

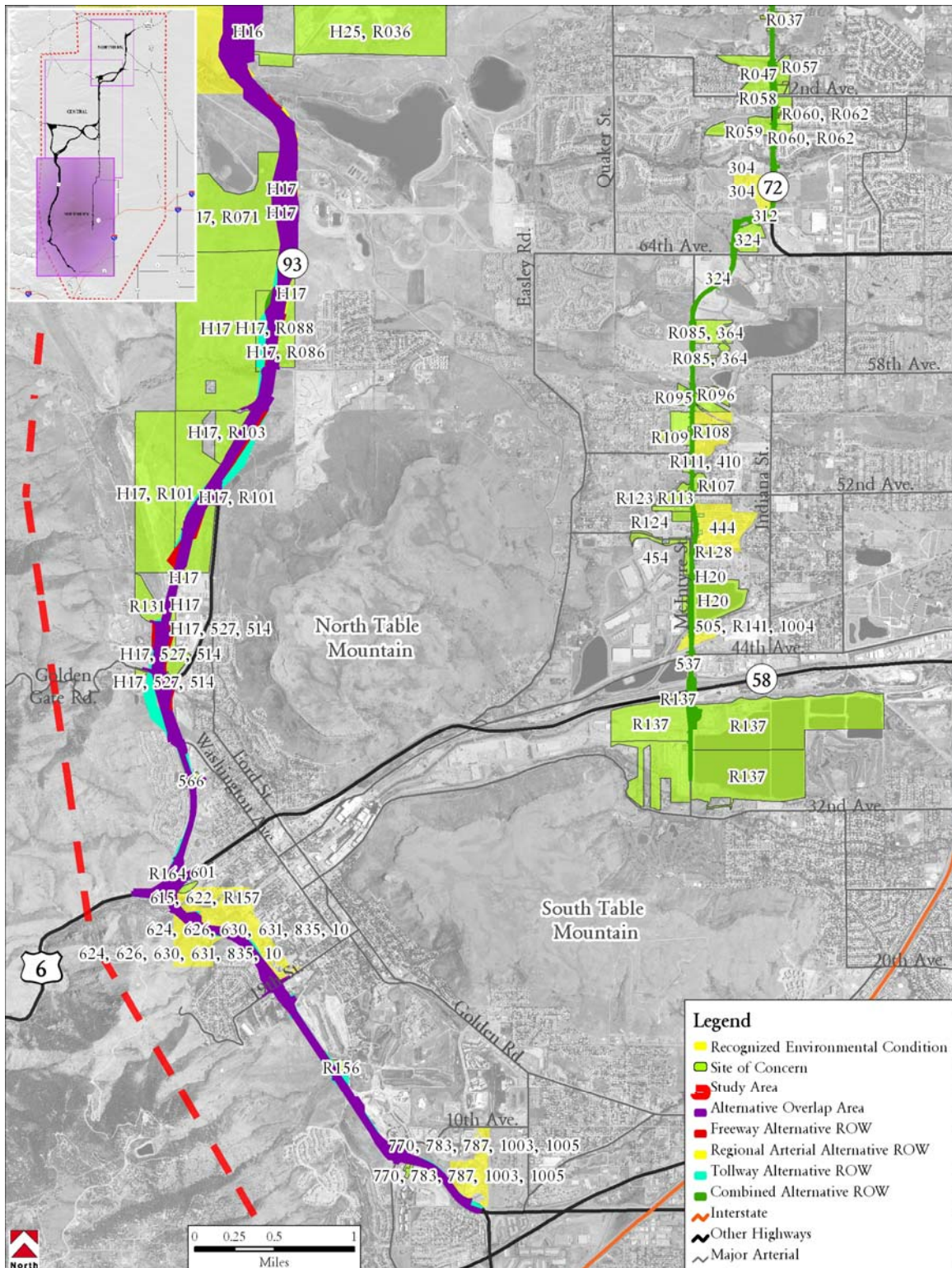
Former mining and industrial properties were located along SH 93 immediately north of Golden. Several of the mined areas were subsequently used for waste disposal and became landfill sites resulting in contaminated soil and groundwater and methane gas generation. Waste rock from historical mining was observed along this route (see **Section 4.19**). Industrial properties were located in the vicinity of Pine Ridge Road and SH 93, which has led to localized areas of soil and groundwater contamination.

Industrial land use occurs along McIntyre Street from approximately 60th Avenue south to SH 58. Known VOC-contaminated groundwater and soil are located in the vicinity of the former Colorado School of Mines Research Institute and Cyprus Amax Research and Development site. Industrial and commercial property use increases between 48th Avenue and SH 58 on McIntyre Street, and soil and groundwater in this area have been impacted with petroleum and VOC contaminants. The area along McIntyre Street and SH 58 has numerous historical and active aggregate quarries.

The BNSF railroad tracks extend from downtown Golden northeast across SH 58 and then along McIntyre Street at 44th Avenue. No evidence of potential soil and groundwater impacts were identified associated with the railroad tracks and crossings during the site reconnaissance. However, impacts to soil and groundwater along the railroad corridor may exist due to undocumented events and an accumulation of drips, leaks, spills, and hydrocarbon exhaust residue over time. Based on the unknown conditions along the railroad corridor, this is a site of concern.



*Figure 4.15-5 Sites of Concern and Sites with Recognized Environmental Conditions-
Southern Portion*



Source: Compiled by FHU, 2006.



4.15.2 ENVIRONMENTAL CONSEQUENCES

To determine the environmental consequences of the No Action Alternative and proposed build alternatives, sites of concern and sites with recognized environmental conditions were evaluated based upon the potential or recognized release, past release, or material threat of a release of any hazardous substances or petroleum products into the soil, groundwater, or surface water (see **Table 4.15-1**). Impacts were evaluated to determine whether they directly or indirectly impact a build alternative. Direct impacts are associated with right-of-way acquisition sites that have potential or recognized (current or historic) environmental conditions. Indirect impacts are associated with sites of concern and sites with recognized environmental conditions within the study area that have potential or recognized environmental conditions that are not associated with right-of-way acquisition but may lead to potential impacts associated with materials management, worker health and safety, or final engineering design. Therefore, areas of contaminated soil and groundwater must be identified for planning efforts related to properties (sites) within the study area so that avoidance or mitigation measures can be implemented when reasonably possible.

Based upon the CDOT right-of-way acquisition process, recommendations were made regarding sites of concerns and sites with recognized environmental conditions. These recommendations are both included and further discussed (see **Table 4.15-1** and **Section 4.15.3**). Recommendations include conducting an Initial Site Assessment (ISA), a Preliminary Site Investigation (PSI), or preparing a Materials Management/Health & Safety (MM/H&S) plan.

Table 4.15-1 Summary of Sites of Concern and Sites with Recognized Environmental Conditions

Site Identification Number	Parcel Identification Number	Environmental Conditions	Right-of-Way Acquisition P=Partial F=Full	Description	Alternatives				Mitigation		
					Freeway	Regional Arterial	Tollway	Combined (Recommended)	ISA	PSI	MMP and H&S
90, 94, 155	1575-20-0-00-024	Recognized	P	UST. LUST. RCRIS-SQG. ERNS. Manufactures products associated with electronic information storage, unknown chemical and/or petroleum use, storage or disposal practices.	X	X	X		X	X	X
84	1575-20-0-00-031	Concern	P	RCRIS-SQG. No violations reported. Unknown material handling and storage practices.	X		X		X		
216, 1010, R007	1575-29-4-01-001	Recognized	P	Former TOSCO site. Ralston Development Corp. is a UST and LUST site. Residual petroleum-contaminated soil and groundwater may be present. Vertech Treatment Systems is a RCRIS-SQG (no violations reported). Historically used for oil shale processing research and includes a large-scale pilot plant facility for testing oil-shale technology. Detention/settling ponds located on the east side of the property along with a cracking tower and multiple structures.	X	X	X		X	X	X
H13, R001	1575-32-3-00-013	Concern	P	Rocky Mountain Metropolitan Airport runways (formerly Jefferson County Airport). Unknown petroleum and chemical use, storage, or disposal practices.	X	X	X	X	X		
	1575-32-3-00-018		F		X	X	X	X	X		
	1575-33-3-00-029		P		X		X	X	X		
	29-041-99-001		P		X	X	X	X	X		
114, 121	1575-33-2-11-002	Concern	P	AST. UST. No leaks or spills reported. Unknown site conditions.	X		X	X	X		



Site Identification Number	Parcel Identification Number	Environmental Conditions	Right-of-Way Acquisition P=Partial F=Full	Description	Alternatives				Mitigation		
					Freeway	Regional Arterial	Tollway	Combined (Recommended)	ISA	PSI	MMP and H&S
141	157533314001	Concern	P	AST. No leaks or spills reported. Unknown site conditions.	X	X	X	X	X		
177	171706300001	Recognized	P	ERNS.	X	X	X	X			X
196	171706400003	Recognized	P	Historical Landfill.	X	X	X	X		X	X
202	20-131-00-001	Concern	P	UST. No leaks or spills reported. Unknown site conditions.	X	X	X	X	X		
232	20-211-00-003	Concern	P	RCRIS-SQG. No violations reported. Unknown material handling and storage practices.		X			X		
228	20-213-00-004	Recognized	F	RCRIS-SQG (one violation reported). Conducts mining activities on site. Unknown site conditions.		X			X		X
221, 241	20-214-00-001	Recognized	P	State permitted active landfill (BFI Foothills Landfill).		X			X	X	X
149, 233, 237, 1009	20-224-01-001	Concern	P	RCRIS-SQG. No violations reported. Unknown material handling and storage practices.		X	X		X		
R008, R016, 236	20-224-01-002	Recognized	P	LUST. Residual petroleum impact soil and groundwater may be present.		X			X	X	X
	20-224-01-003		P			X			X	X	X
R019	20-233-01-001	Concern	P	Store and convert vans to Weiscraft recreational vehicles. Unknown site conditions.			X		X		X
H31	20-234-00-001	Concern	P	General land disturbance; unknown site conditions.	X		X	X	X		
	20-234-00-003		P	West of Welton Reservoir.	X		X	X	X		

Site Identification Number	Parcel Identification Number	Environmental Conditions	Right-of-Way Acquisition P=Partial F=Full	Description	Alternatives				Mitigation		
					Freeway	Regional Arterial	Tollway	Combined (Recommended)	ISA	PSI	MMP and H&S
R023	20-234-00-002	Concern	F	Large partially buried AST observed at the northwest corner of the reservoir.	X	X	X	X	X		X
R014	20-234-01-003	Concern	F	Manufacturers of plastic injected molded telephone components. Unknown site conditions. Proto-Tel property.				X	X		X
	20-234-01-003		P		X	X	X		X		X
R224	20-244-00-005	Concern	P	Ranch/Farm. Multiple structures; equipment storage, land disturbance; unknown hazardous material or petroleum use, storage, or disposal practices.	X			X	X		
R223	20-251-01-001	Concern	F	Multiple structures; material and equipment storage; unknown site conditions.		X		X	X		X
R025	20-251-01-005	Concern	P	Ranch/Farm. Equipment storage, general land disturbance; unknown site conditions		X			X		
H12	20-251-01-007	Concern	P	Aggregate mining. Possible landfill site.		X		X	X		
	20-251-01-008		F					X	X		
	20-251-01-008		P			X			X		
R027	20-251-01-018	Concern	P	Multiple structures; material and equipment storage; unknown site conditions.				X	X		
259	20-254-00-002	Recognized	P	CERCLIS-NFRAP. Historical landfill. Methane gas detected. Potential soil and groundwater contamination. Leyden Landfill/Leyden Road Landfill.				X	X	X	X
R034	20-254-00-008	Concern	P	Ranch/Farm. Unknown hazardous material or petroleum use, storage, or disposal practices.				X	X		



Site Identification Number	Parcel Identification Number	Environmental Conditions	Right-of-Way Acquisition P=Partial F=Full	Description	Alternatives				Mitigation		
					Freeway	Regional Arterial	Tollway	Combined (Recommended)	ISA	PSI	MMP and H&S
R035	20-254-00-009	Concern	F	Ranch/Farm. Unknown hazardous material or petroleum use, storage, or disposal practices.				X	X		
R002, H14	20-271-00-001	Concern	P	Former Leyden Mine. Historic underground coal mine until 1950 and natural gas storage. Potential methane concerns. General land disturbance; potential dumpsites.			X	X	X	X	X
	20-273-00-001		P		X		X	X	X	X	X
	20-274-01-001		P		X		X	X	X	X	X
H25, R036	20-274-00-004	Concern	P	Historic quarry (Pioneer Sand & Gravel Quarry). Large disturbed excavated and filled area. Settling ponds/northeast corner of mined area. Dump located northwest of ponds. An operations area consisting of equipment storage, ASTs, 55-gallon drums and debris is located at the northwest corner of the site.	X		X	X	X		X
	20-342-00-004		P		X		X	X	X		X
H16	20-281-00-001	Concern	P	General land disturbance.		X			X		
	20-284-00-001		P			X			X		
	20-284-00-003		P			X			X		
	20-331-00-002		P			X			X		
R030	20-283-00-001	Concern	P	Multiple structures; equipment storage; unknown hazardous material or petroleum use, storage or disposal practices. Unknown site conditions.		X			X		



Site Identification Number	Parcel Identification Number	Environmental Conditions	Right-of-Way Acquisition P=Partial F=Full	Description	Alternatives				Mitigation		
					Freeway	Regional Arterial	Tollway	Combined (Recommended)	ISA	PSI	MMP and H&S
282, 287	20-333-00-001	Recognized	P	Landfill, UST, AST. Multiple structures; unknown site conditions; Ralston sludge drying beds located to south of structures. North Table Mountain Water & Sanitation property. Ralston Sludge Drying Bed Facility/Ralston Reservoir.	X	X	X	X	X	X	X
R226	20-361-00-001	Concern	F	Ranch/Farm. Multiple structures; equipment storage; unknown hazardous material or petroleum use, storage, or disposal practices.				X	X		X
R038	20-361-00-002	Concern	F	Ranch/Farm. Multiple structures; equipment storage; unknown hazardous material or petroleum use, storage, or disposal practices.				X	X		X
R225	20-361-00-004	Concern	P	Ranch/Farm. Unknown hazardous material or petroleum use, storage, or disposal practices.				X	X		
R042	20-361-00-007	Concern	F	Ranch/Farm. Multiple structures; equipment storage; unknown hazardous material or petroleum use, storage, or disposal practices.				X	X		X
R045	20-361-00-008	Concern	P	Ranch/Farm. Multiple structures; equipment storage; unknown hazardous material or petroleum use, storage, or disposal practices.				X	X		
R050	20-361-00-011	Concern	F	Ranch/Farm. Multiple structures; equipment storage; unknown hazardous material or petroleum use, storage, or disposal practices.				X	X		X
	20-364-00-001		P					X	X		



Site Identification Number	Parcel Identification Number	Environmental Conditions	Right-of-Way Acquisition P=Partial F=Full	Description	Alternatives				Mitigation		
					Freeway	Regional Arterial	Tollway	Combined (Recommended)	ISA	PSI	MMP and H&S
R020	20-361-00-013	Concern	F	Unknown hazardous material or petroleum use, storage, or disposal practices.				X	X		X
R056	20-364-00-002	Concern	F	Ranch/Farm. Unknown hazardous material or petroleum use, storage, or disposal practices.				X	X		X
	20-364-00-003		F					X	X		X
R053	20-364-00-004	Concern	F	Ranch/Farm. Multiple structures; equipment storage; unknown hazardous material or petroleum use, storage, or disposal practices.				X	X		X
R047	20-364-00-008	Concern	P	Ranch/Farm. Multiple structures; equipment storage; unknown hazardous material or petroleum use, storage, or disposal practices.				X	X		
R004	29-183-00-001	Concern	P	Ranch/Farm. Multiple structures; equipment storage; unknown hazardous material or petroleum use, storage, or disposal practices.	X		X	X	X		
R006	29-192-00-007	Concern	P	Ranch/Farm. Unknown hazardous material or petroleum use, storage, or disposal practices.		X			X		
R005	29-192-00-008	Concern	P	Nursery. Large equipment storage; unknown herbicide/pesticide and petroleum use, storage or disposal practices.		X			X		
	29-192-00-009		P		X		X	X	X		
R022	29-193-00-003	Concern	P	Multiple structures; equipment storage, land disturbance; unknown hazardous material or petroleum use, storage, or disposal practices.		X		X	X		



Site Identification Number	Parcel Identification Number	Environmental Conditions	Right-of-Way Acquisition P=Partial F=Full	Description	Alternatives				Mitigation		
					Freeway	Regional Arterial	Tollway	Combined (Recommended)	ISA	PSI	MMP and H&S
R218	29-303-00-003	Concern	P	Multiple structures; material and equipment storage; unknown site conditions.				X	X		
R051	29-312-00-015	Concern	P	Ranch/Farm. Multiple structures; equipment storage; unknown hazardous material or petroleum use, storage, or disposal practices.				X	X		
R037	29-313-00-002	Concern	P	Unknown hazardous material use, storage, or disposal practices.				X	X		
R055	29-313-00-003	Concern	P	Multiple structures; equipment storage; unknown hazardous material or petroleum use, storage, or disposal practices. Small Engine Repair property.				X	X		
R057	29-313-00-010	Concern	P	Ranch/Farm. Multiple structures; equipment storage; unknown hazardous material or petroleum use, storage, or disposal practices.				X	X		
R058	29-313-00-013	Concern	P	Ranch/Farm. Unknown hazardous material or petroleum use, storage, or disposal practices.				X	X		
R059	30-011-00-019	Concern	P	Farm. Multiple structures; unknown hazardous material or petroleum use, storage, or disposal practices.				X	X		
304	30-014-00-001	Recognized	P	School bus fleet with fueling area. LUST, UST, RCRIS-CESQG (no violations reported). Jefferson County Public Schools North Transportation.				X	X	X	X
	30-014-00-002		P					X	X	X	X



Site Identification Number	Parcel Identification Number	Environmental Conditions	Right-of-Way Acquisition P=Partial F=Full	Description	Alternatives				Mitigation		
					Freeway	Regional Arterial	Tollway	Combined (Recommended)	ISA	PSI	MMP and H&S
312	30-014-00-006	Recognized	F	RCRIS-SQG (violation reported), AST. Arvada Fire Protection District property.				X	X		X
R081	30-014-00-007	Concern	F	Equipment storage; unknown herbicide/pesticide use, storage, or disposal practices. Fortunato Gardens property.				X	X		X
0, 324	30-014-01-001	Concern	P	Located in the vicinity of a former landfill; potential methane gas concerns. Arvada Landfill property.				X		X	X
	30-121-06-011		P					X		X	X
R071, H17	30-043-00-001	Concern	P	Farm. Multiple structures; equipment storage; unknown hazardous material or petroleum use, storage or disposal practices. Unknown site conditions. Numerous sites along Highway 93. Potential dumpsites. Potential methane concerns.	X	X	X	X	X	X	X
H17	30-044-00-001	Concern	F	Numerous sites along Highway 93. Potential dumpsites. Potential methane concerns.	X	X	X		X	X	X
	30-044-00-002		F		X	X	X	X	X	X	X
	30-091-00-001		P		X	X	X	X	X	X	X
	30-091-00-002		P			X			X	X	X
	30-212-03-001		P		X	X	X	X	X	X	X
	30-212-10-001		P		X				X	X	X
	30-212-11-001		F				X		X	X	X



Site Identification Number	Parcel Identification Number	Environmental Conditions	Right-of-Way Acquisition P=Partial F=Full	Description	Alternatives				Mitigation		
					Freeway	Regional Arterial	Tollway	Combined (Recommended)	ISA	PSI	MMP and H&S
R088, H17	30-091-00-003	Concern	F	Residence. Multiple structures; equipment storage; unknown hazardous material or petroleum use, storage or disposal practices. Unknown site conditions. Numerous sites along Highway 93. Potential dumpsites. Potential methane concerns.			X	X	X	X	X
	30-091-00-003		P		X	X			X	X	X
R086, H17	30-094-00-001	Concern	P	Recycling and debris piled in yard; potential uncontrolled dumping; unknown site conditions. The Golden Peaks Milk House property. Numerous sites along Highway 93. Potential dumpsites. Potential methane concerns.	X	X	X	X	X	X	X
R103, H17	30-161-00-001	Concern	P	Ranch/Farm. Multiple structures; equipment storage; unknown hazardous material or petroleum use, storage, or disposal practices. Numerous sites along Highway 93. Potential dumpsites. Potential methane concerns	X		X	X	X	X	X



Site Identification Number	Parcel Identification Number	Environmental Conditions	Right-of-Way Acquisition P=Partial F=Full	Description	Alternatives				Mitigation		
					Freeway	Regional Arterial	Tollway	Combined (Recommended)	ISA	PSI	MMP and H&S
H17, R101	30-163-00-001	Concern	P	Evidence of historical underground mining and waste rock disposal. Unknown site conditions. Numerous sites along Highway 93. Potential dumpsites. Potential methane concerns			X	X	X	X	X
	30-163-00-002		P		X	X	X	X	X	X	X
H17, 514, 527	30-212-00-004	Concern	F	AST. RCRIS-SQG (no violations reported). Numerous sites along Highway 93. Potential dumpsites. Potential methane concerns	X	X	X	X	X	X	X
	30-212-00-012		P		X	X	X	X	X	X	X
R085, 364	30-121-05-001	Concern	P	RCRIS-SQG (no violations reported). Former research and development for metals mining, multiple structures exist on site, including laboratories; ground disturbance. Unknown site conditions. Amax Research and Development Center property.				X	X		
	30-124-00-004		P					X	X		
R095	30-123-00-006	Concern	P	Ranch/Farm. Multiple structures; equipment storage; unknown hazardous material or petroleum use, storage, or disposal practices.				X	X		
R096	30-124-00-023	Concern	P	Ranch/Farm. Multiple structures; equipment storage; unknown hazardous material or petroleum use, storage, or disposal practices.				X	X		
R097	30-124-00-024	Concern	P	Ranch/Farm. Multiple structures; equipment storage; unknown hazardous material or petroleum use, storage, or disposal practices.				X	X		



Site Identification Number	Parcel Identification Number	Environmental Conditions	Right-of-Way Acquisition P=Partial F=Full	Description	Alternatives				Mitigation		
					Freeway	Regional Arterial	Tollway	Combined (Recommended)	ISA	PSI	MMP and H&S
R099	30-124-00-025	Concern	P	Ranch/Farm. Multiple structures; equipment storage; unknown hazardous material or petroleum use, storage, or disposal practices.				X	X		
R100, 399	30-131-00-004	Recognized	P	ERNS. Produces various compost blends to grow mushrooms. Multiple structures on site; equipment storage, unknown hazardous material or petroleum use, storage, or disposal practices.				X	X		X
R108	30-131-00-005	Concern	P	Ranch/Farm. Multiple structures; equipment storage; unknown hazardous material or petroleum use, storage, or disposal practices.				X	X		
R111, 410	30-131-00-008	Recognized	P	ERNS. Ranch/Farm. Multiple structures; equipment storage; unknown hazardous material or petroleum use, storage, or disposal practices.				X	X		
R107	30-131-00-011	Concern	P	Ranch/Farm. Multiple structures; equipment storage; unknown hazardous material or petroleum use, storage, or disposal practices.				X	X		
R109	30-132-00-016	Concern	P	Ranch/Farm. Multiple structures; equipment storage; unknown hazardous material or petroleum use, storage, or disposal practices.				X	X		
R117	30-132-00-042	Concern	F	Ranch/Farm. Multiple structures; equipment storage; unknown hazardous material or petroleum use, storage, or disposal practices.				X	X		X



Site Identification Number	Parcel Identification Number	Environmental Conditions	Right-of-Way Acquisition P=Partial F=Full	Description	Alternatives				Mitigation		
					Freeway	Regional Arterial	Tollway	Combined (Recommended)	ISA	PSI	MMP and H&S
R118	30-132-00-043	Concern	F	Ranch/Farm. Unknown hazardous material or petroleum use, storage, or disposal practices.				X	X		X
R229	30-132-05-003	Concern	F	Ranch/Farm. Unknown hazardous material or petroleum use, storage, or disposal practices.				X	X		X
R115	30-132-05-005	Concern	F	Ranch/Farm. Multiple structures; equipment storage; unknown hazardous material or petroleum use, storage, or disposal practices.				X	X		X
R104, R106	30-132-08-001	Concern	P	Large nursery. Equipment storage; unknown herbicide/pesticide hazardous material or petroleum use, storage, or disposal practices.				X	X		
	30-132-08-003		F					X	X		
R113	30-133-00-001	Concern	P	Ranch/Farm. Unknown hazardous material or petroleum use, storage, or disposal practices.				X	X		
R123	30-133-00-007	Concern	F	Ranch/Farm. Unknown hazardous material or petroleum use, storage, or disposal practices.				X	X		X
R124	30-133-00-008	Concern	P	Ranch/Farm. Unknown hazardous material or petroleum use, storage, or disposal practices.				X	X		
R126	30-133-00-009	Concern	P	Ranch/Farm. Unknown hazardous material or petroleum use, storage, or disposal practices.				X	X		
454	30-133-02-006	Concern	P	RCRIS-SQG. No violations reported. Unknown material handling and storage practices.				X	X		
H35	30-134-01-011	Concern	F	Greenhouse/nursery. Unknown herbicide/pesticide use, storage, or disposal practices.				X	X		X
H35	30-134-01-014		F					X	X		X
H35	30-134-01-015		F					X	X		X



Site Identification Number	Parcel Identification Number	Environmental Conditions	Right-of-Way Acquisition P=Partial F=Full	Description	Alternatives				Mitigation		
					Freeway	Regional Arterial	Tollway	Combined (Recommended)	ISA	PSI	MMP and H&S
444	30-134-01-016	Recognized	P	ERNS.				X	X		X
R128	30-134-01-017	Concern	P	Ranch/Farm. Multiple structures; equipment storage; unknown hazardous material or petroleum use, storage, or disposal practices.				X	X		
R131	30-212-00-011	Concern	P	Evidence of historical surface mining and waste rock disposal. Unknown site conditions.			X		X		
H20	30-241-02-001	Concern	F	Unknown site conditions.				X	X		
	30-241-02-015		P					X	X		
	30-242-01-019		F					X	X		
R144, 505	30-241-02-031	Recognized	F	LUST. Vehicle repair shop. Unknown hazardous material or petroleum use, storage, or disposal practices.				X	X	X	X
0, 505, 1004, R141	30-241-02-032	Recognized	P	VCP, LUST, UST, AST, RCRIS-SQG (no violations reported), ERNS. Former Trucking Terminal I/II, Davila Trucking, Colorado Utility Trailer Sales/Golden Properties Ltd.				X	X	X	X
	30-242-00-001		P	Former location of Coors Tank Farm. The tank farm has been removed. Currently, the facility washes out and repairs railcars and truck trailers; unknown site conditions and hazardous material or petroleum use, storage, or disposal practices.				X	X	X	X
483, 505	30-242-01-021	Concern	P	RCRIS-SQG (no violations reported).				X	X		
537	30-243-00-001	Recognized	F	CORRACTS. CERCLIS. RCRIS-SQG (violations reported).				X	X	X	X



Site Identification Number	Parcel Identification Number	Environmental Conditions	Right-of-Way Acquisition P=Partial F=Full	Description	Alternatives				Mitigation		
					Freeway	Regional Arterial	Tollway	Combined (Recommended)	ISA	PSI	MMP and H&S
R137	30-243-00-012	Concern	P	Gravel pit ponds and fill areas. These ponds are used for process water storage for the Coors facility. Unknown site conditions.				X	X		
	30-251-00-014		P					X	X		
	30-252-00-021		P					X	X		
244	30-244-04-007	Recognized	P	Gas station. LUST. UST.				X	X	X	X
566	30-282-10-009	Concern	P	Gas station. UST.	X	X	X	X	X		
601	30-283-00-002	Concern	P	UST.	X	X	X	X	X		
624, 626, 630, 631, 835, 1002	30-331-00-002	Recognized	P	CERCLIS. LUST. UST. RCRIS-SQG (violations reported). ERNS.	X	X	X	X	X		X
615, 622, R157	30-332-00-001	Recognized	P	ERNS. Water and sanitation departments. Multiple structures. Unknown site conditions.	X	X	X	X	X		X
R164	30-332-00-002	Concern	P	Multiple structures. Unknown site conditions.		X	X	X	X		
R060, R062	39-062-00-001	Concern	P	Ranch/Farm. Unknown hazardous material or petroleum use, storage, or disposal practices.				X	X		
	39-062-00-003		P					X	X		
	39-062-00-004		F					X	X		
	39-062-00-005		P					X	X		
	39-062-00-006		P					X	X		
R061	39-062-00-002	Concern	F	Ranch/Farm. Unknown hazardous material or petroleum use, storage, or disposal practices.				X	X		X
304, R078	39-063-00-001	Recognized	P	LUST. UST. RV and trailer maintenance business. Welding sign observed. Unknown site conditions; unknown hazardous materials or petroleum use, storage, or disposal practices.				X	X		X



Site Identification Number	Parcel Identification Number	Environmental Conditions	Right-of-Way Acquisition P=Partial F=Full	Description	Alternatives				Mitigation		
					Freeway	Regional Arterial	Tollway	Combined (Recommended)	ISA	PSI	MMP and H&S
770, 783, 787, 1003, 1005	40-023-00-012	Recognized	P	LUST. UST. RCRIS-SQG (no violations reported)	X	X	X	X	X		X
R156	40-032-00-004	Concern	P	Residence. Multiple structures. Unknown site conditions.			X		X		
R170	40-034-09-218	Concern	P	Dry cleaners, unknown site conditions.	X	X	X	X	X		
	40-034-09-219		P				X		X		



4.15.2.1 NO ACTION ALTERNATIVE

There would be no impacts under the No Action Alternative to or from sites with recognized environmental conditions or sites of concern.

4.15.2.2 FREEWAY ALTERNATIVE

DIRECT IMPACTS

The Freeway Alternative would require the acquisition of nine parcels designated as sites with recognized environmental conditions, and 34 parcels designated as sites of concern. Information concerning these sites and other less important sites with recognized environmental conditions and sites of concern including a detailed discussion of these sites are available (see **Table 4.15-1** and **Northwest Corridor Supporting Technical Document-Modified Environmental Site Assessment**).

The Freeway Alternative parallels the eastern boundary of the RFETS and crosses an area of known plutonium and americium contamination in surface soils associated with the former operations at the RFETS. Direct impacts associated with RFETS include encountering residual surficial soil contamination. Several studies show that the soil contaminant levels are below risk-based action levels to protect human health (DOE, 1997a; DOE 1997b; DOE, 2002a; DOE, 2002b). The 2003 Annual Report for the Rocky Flats Citizen Advisory Board identified the action level for plutonium and americium in surface soils to be 50 pCi/g and 76 pCi/g respectively. These levels are dependent on the depth and risk calculations for a wildlife refuge worker (RFCAB, 2003). Contamination was determined to be primarily within the upper 3 centimeters (cm) of the surface soils with levels decreasing with increasing depth (DOE, 1997a; DOE 1997b). Further details concerning previous studies of radionuclide contamination of surface soils at RFETS can be found (see **Northwest Corridor Supporting Technical Document-Modified Environmental Site Assessment**).

As indicated in the RFCA, the protection of surface water is the basis for making soil and groundwater accelerated response action decisions, so that at the completion of all cleanup activities, surface water leaving RFETS should be of sufficient quality to support all uses. The surface water standards follow Colorado Basic Standards and Methodologies for Surface Water (5 CCR 1002-31) and site-specific standards established by the CDPHE Water Quality Control Commission (WQCC). Numeric values for plutonium and americium are risk-based and follow the statewide basic standards of 0.15 picoCuries per liter (pCi/L) for each. RFCA establishes source evaluation and mitigation actions in the event these levels are exceeded. Accordingly, contaminated groundwater has not migrated off the former RFETS site and the eastern extent of contaminated groundwater is approximately 1.25 miles west of the alternative footprint. Surface water quality studies indicated that trace levels of plutonium were present and attributed to on-site remedial activities that may have disturbed surficial soils containing plutonium (DOE, 2005a and RFCAB, 2003). Further details concerning previous studies of radionuclide contamination of surface water at RFETS can be found (see **Northwest Corridor Supporting Technical Document-Modified Environmental Site Assessment**).

INDIRECT IMPACTS

Indirect impacts are not associated with right-of-way acquisition but they could lead to potential impacts associated with materials management and worker health and safety. The Freeway Alternative would require excavation during construction in the vicinity of the Rocky Flats Industrial Park. Known heavy metal soil contamination and VOC soil and groundwater contamination is present in the area. CDOT would coordinate with EPA and CDPHE throughout final design and construction.



4.15.2.3 TOLLWAY ALTERNATIVE

DIRECT IMPACTS

The Tollway Alternative would require the acquisition of nine parcels designated as sites with recognized environmental conditions, and 41 parcels designated as sites of concern. Information concerning these sites and a detailed discussion of these sites is available (see **Table 4.15-1** and **Northwest Corridor Supporting Technical Document-Modified Environmental Site Assessment**).

The Tollway Alternative parallels the eastern boundary of the RFETS and crosses an area of known plutonium and americium contamination in surface soils associated with the former operations at the RFETS. Several studies show that the contaminant levels are below residential risk-based levels. Contamination was determined to be primarily within the upper 3 centimeters (cm) of the surface soils with levels decreasing with increasing depth. Contaminated groundwater has not migrated off the former RFETS site and the eastern extent of contaminated groundwater is approximately 1.25 miles west of the alternative footprint. Surface water quality studies indicated that trace levels of plutonium were present and attributed to on-site remedial activities that may have disturbed surficial soils containing plutonium. Direct impacts associated with RFETS include encountering residual surficial soil contamination.

Differences (greater than 5 feet) in cut depths may also occur in the area that extends from the C-470 ramps at US 6 extending a mile north of 64th Avenue. Cut depths associated with this alternative range from 40 to 75 feet and may increase the potential to encounter contaminated soil and groundwater or methane gas in the vicinity of the sites of concern and sites with recognized environmental conditions listed in **Table 4.15-1**.

INDIRECT IMPACTS

Indirect impacts are not associated with right-of-way acquisition but they could lead to potential impacts associated with materials management and worker health and safety. The Tollway Alternative would require excavation during construction in the vicinity of the Rocky Flats Industrial Park. Known heavy metal soil contamination and VOC soil and groundwater contamination is present in the area. CDOT would coordinate with EPA and CDPHE throughout final design and construction.

4.15.2.4 REGIONAL ARTERIAL ALTERNATIVE

DIRECT IMPACTS

The Regional Arterial Alternative would require the acquisition of 13 parcels designated as sites with recognized environmental conditions, and 36 parcels designated as sites of concern. Information concerning these sites and other less important sites with recognized environmental conditions and sites of concern including a detailed discussion of these sites are available (see **Table 4.15-1** and **Northwest Corridor Supporting Technical Document-Modified Environmental Site Assessment**).

INDIRECT IMPACTS

Indirect impacts are not associated with right-of-way acquisition but they could lead to potential impacts associated with materials management and worker health and safety. The Regional Arterial Alternative would require excavation during construction in the vicinity of the Rocky Flats Industrial Park. Known heavy metal soil contamination and VOC soil and groundwater contamination is present in the area. CDOT would coordinate with EPA and CDPHE throughout final design and construction.

4.15.2.5 COMBINED ALTERNATIVE (RECOMMENDED ALTERNATIVE)

DIRECT IMPACTS

The Combined Alternative (Recommended Alternative) would require the acquisition of 19 parcels designated as sites with recognized environmental conditions, and 100 parcels designated as sites of concern. Information concerning these sites and other less important sites with recognized environmental conditions and sites of concern including a detailed discussion of these sites are available (see **Table 4.15-1** and **Northwest Corridor Supporting Technical Document-Modified Environmental Site Assessment**). Hazardous materials concerns associated with the project are discussed.



INDIRECT IMPACTS

Indirect impacts are not associated with right-of-way acquisition but they could lead to potential impacts associated with materials management and worker health and safety. The Combined Alternative (Recommended Alternative) would require excavation during construction in the vicinity of the Rocky Flats Industrial Park. Known heavy metal soil contamination and VOC soil and groundwater contamination is present in the area. CDOT would coordinate with EPA and CDPHE throughout final design and construction.

4.15.3 SUGGESTED MITIGATION

Implementation of the following suggested mitigation would result in the minimization of environmental impacts related to the disturbance of sites with recognized environmental conditions or sites of concern.

4.15.3.1 RIGHT-OF-WAY ACQUISITION

The process of identifying, evaluating, and mitigating hazardous waste during right-of-way acquisition is used in Chapter 3 of the CDOT *Right-of-Way Manual* (CDOT, 2003b). Projects requiring right-of-way or easements follow these guidelines in order to avoid, to the greatest extent possible, acquisition of contaminated property and to ensure protection for employees, workers, and the community prior to, during, and after construction. The suggested right-of-way acquisition process for sites with potential and recognized environmental conditions includes:

- Site reconnaissance, historical land use review, and database search should be performed on properties that are to be acquired.
- An investigation performed on properties with potential environmental conditions. It should involve a drilling/sampling and analytical program to determine preliminary information regarding environmental conditions on the property. The objective is to assist in the decision making process regarding the potential liability associated with acquiring a property and to provide information regarding health and safety issues for construction workers and the public.
- A detailed, comprehensive investigation that further delineates the magnitude of contamination on a property. It details the mitigation and clean-up strategies and provides an estimate of cost for the cleanup and mitigation of contaminated property.

It is important to note that a PSI or RI/FS may be recommended based on the findings of an ISA. Sites where a PSI or RI/FS are expected to be required have been identified above (see **Table 4.15-1**).

4.15.3.2 CONTAMINATED SOIL AND GROUNDWATER MANAGEMENT

Several direct and indirect impacts from soil and groundwater contamination were identified in the study area. Prior to construction, additional assessments in accordance with the CDOT Right-of-Way acquisition protocols may be conducted at sites with known soil or groundwater contamination to determine the presence of direct or indirect impacts to the alternative footprints.

Areas with known soil contamination may require hazardous waste and solid waste management. A materials handling plan for contaminated media should be prepared prior to construction. Any required permitting, waste profiling, and manifesting for off-site disposal of contaminated soil should be described in the materials handling plan.

Water collected in excavations due to seepage of groundwater or collection of surface water runoff typically requires a construction dewatering permit regardless of the water quality. The permit is issued by the CDPHE Water Quality Control Division in accordance with Section 402 of the Clean Water Act/Colorado Discharge Permit System. Discharge of groundwater to a municipal storm sewer may also require a discharge permit from the respective municipality. For sites where groundwater treatment is necessary to improve water quality, routine operation, maintenance, monitoring, and regulatory reporting requirements are usually needed to meet compliance standards.



Sites with existing remedial measures such as environmental media monitoring stations (i.e., sediment, surface water, groundwater, and air) and engineered controls (i.e., capped waste facilities) may require coordination with applicable regulatory agencies to avoid, minimize, or mitigate impacts from the project.

4.15.3.3 REGULATED MATERIALS CLEARANCE

Environmentally regulated materials may be present in buildings and structures that may be demolished as part of the project. Prior to demolition of any structures, an asbestos, lead-based paint, and miscellaneous hazardous materials survey should be conducted at each parcel where applicable. Regulated materials abatement should be conducted and in accordance with relevant Occupational Safety and Health Administration (OSHA) regulatory details. Basic regulatory requirements for the type of materials that may be encountered in the study area are summarized in this section.

AST AND UST MANAGEMENT

AST and UST sites should be acquired for right-of-way in all four build alternatives. A detailed review of Office of Public Safety (OPS) files related to these properties should identify the results of any site investigations conducted, remedial systems or actions installed at the properties, and quarterly monitoring requirements. In the event that any of these sites are identified as having active leaking tanks, coordination with OPS may be required prior to parcel acquisition. If site characterization and/or remediation have not been completed, it may be required by OPS to complete these activities after acquisition. The OPS requirements may include:

- Removal of any underground storage tanks.
- Excavation and management of petroleum contaminated soil.
- Modifications to or redesign of remediation systems.
- Replacement of any monitoring wells destroyed during construction.
- Long-term groundwater monitoring.

During the right-of-way acquisition process, additional properties may require similar actions depending on the results of the Initial Site Assessments.

ASBESTOS AND MATERIALS CONTAINING LEAD-BASED PAINT

By law, all friable asbestos-containing materials (ACM) must be removed from structures, including bridges, prior to demolition and soils if encountered in excavated landfill or building debris, buried utilities, or other ACM. The contractor performing the asbestos abatement is required to be licensed to perform such work and obtain permits from the CDPHE. Improper abatement can lead to release of asbestos in soils and the need for soil remediation.

Third party certification is required to document that the abatement was completed in accordance with regulatory requirements. The certification is needed to obtain the demolition permits for the structures. All ACM must be bagged and labeled for transport and disposal at a facility permitted to accept ACM.

Lead-based paint may need to be removed prior to demolition if the lead is leachable at concentrations greater than regulatory levels. Where lead-based painted surfaces would be removed via torching, additional health and safety monitoring requirements are applicable.

OTHER REGULATED MATERIALS

Prior to demolition, regulated materials must be removed from any structures and appropriately recycled or disposed. Bills of lading or waste manifests may be completed to document proper management of these materials. Typical materials include PCB-containing ballasts, fluorescent bulbs, mercury-containing equipment (i.e., switches, meters), electronic equipment, containerized regulated liquids such as paints, solvents, oil, grease, chemicals, pesticides, and herbicides, and CFC-containing equipment (equipment must be emptied before equipment is removed).



4.15.3.4 HEALTH AND SAFETY PLANS

Prior to construction activities, health and safety plans for hazardous materials should be developed. In addition, some site-specific requirements may be applicable as discussed in this section.

LANDFILL/MINE GAS MANAGEMENT

Because construction may occur overlying and within 1,000 feet of abandoned landfills or coal mines within the study area, the health and safety plan may need to include assessing and monitoring air quality at all utility trenches, drainage structures, and similar underground construction (i.e., caissons) areas prior to and during intrusive activities to assure worker safety. Under 29 Code of Federal Regulations (CFR) Part 1926.651(g) Specific Excavation Requirements, Hazardous Atmosphere, OSHA requires testing the atmosphere of excavations greater than four feet in depth before employees enter the excavation where oxygen deficient (less than 19.5 percent oxygen) environments exist or could reasonably be expected to exist. OSHA also requires that precautions be taken to prevent employee exposure to atmospheres containing less than 19.5 percent oxygen and other hazardous atmospheres.

Monitoring equipment should be capable of meeting the set standards of one percent of the lower explosives limit for flammable gas with an instrument measurement increment of one percent and 19 percent oxygen with an instrument measurement increment of 0.1 percent.

RFETS

A site-specific risk assessment may be needed to document that the project would not pose an unacceptable risk to human health and the environment during and after construction. In addition, a site-specific materials management plan and health and safety plan may be required for construction in the RFETS area where impacted surface water and sediment may be present in Woman Creek and Walnut Creek crossings and where soils contain low concentrations of actinides. Such plans typically include a description of engineering controls needed to prevent contaminant mobilization and cross contamination within and outside the alternative footprint during construction, personnel protective equipment and protocols needed for worker health and safety, and monitoring requirements needed to demonstrate that activities are protective of human health and the environment.

4.15.4 SUMMARY OF IMPACTS

The total number of hazardous waste sites identified within the study area for each build alternative is summarized (see **Table 4.15-2**). In addition, parcel and environmental information were summarized previously in this discussion (see **Table 4.15-1**) in order to compare alternatives regarding the total number and types of impacts. Recommendations for additional assessment are also summarized.



Table 4.15-2 Summary of Hazardous Materials Impacts Associated with Right-of-Way Acquisition (Full and Partial)

Impacts	Alternative			
	Freeway	Tollway	Regional Arterial	Combined (Recommended)
Parcel Information				
Recognized Environmental Conditions ¹	9	9	13	19
Sites of Concern ²	34	41	36	100
Total	43	50	49	119
Alternative Ranking (Least to Greatest)	1	3	2	4

Notes: ¹Recognized Environmental Conditions – Sites within the study area with the presence or likely presence of any hazardous substances or petroleum products under conditions that indicate an existing release, a past release, or a material threat of a release of any hazardous substances or petroleum products into structures on the property or into the ground, groundwater, or surface water of the property.

²Sites of Concern – Sites within the study area with environmental conditions that may be present but could not be confirmed without additional inspection or investigation.



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