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4.13 Hazardous Waste

This section discusses the potential for soil and groundwater contamination to be encountered in the project area. Areas of contaminated soil and groundwater must be identified so they can be avoided, if reasonably possible. Encountering soil and groundwater contamination during construction without prior knowledge may affect a project in terms of worker safety, cost, schedule, and agency and public relations. In addition, it is important to protect CDOT from liability for existing contamination that they may unknowingly acquire. Therefore, assessment and investigation of contamination concerns in the project area are an integral part of the CDOT project planning process.

The potential presence of soil and groundwater contamination has been considered during the screening of System Alternatives 1, 2, 3, and identification of the Preferred Alternative, to help in alternative selection and will be further considered during final design and right-of-way acquisition. As part of the final design, specific materials management procedures and controls will be developed for use during construction to ensure the protection of human health and the environment (CDOT, 1999).

A *Modified Environmental Site Assessment (MESA)* was performed in support of the Valley Highway EIS process (FHU, 2005h). The MESA was prepared based on the American Society for Testing and Materials (ASTM) *Standard Practice for Environmental Site Assessments* (ASTM, 2000), CDOT guidance (CDOT, 2002d), and through consultation with CDOT and CDPHE (FHU, 2003b). The purpose of the MESA is to identify recognized and potential environmental conditions in the project area that could adversely affect the project, to aid in effectively screening and evaluating the feasibility of system alternatives and aid in the right-of-way process.

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” (ASTM, 2000). The term **potential environmental conditions**, as used in this EIS, identifies properties where recognized environmental conditions may be present but could not be confirmed without additional inspection or investigation.

The methodology for conducting the MESA included:

- Performance of a limited reconnaissance of sites within the project area for readily identifiable site activities
- Review of readily available documents identifying historical uses of the sites within the project area
- Review of readily available local, state, and federal environmental agency databases within a maximum distance of one mile of the centerline of the project footprint of the combined alternatives as dictated by CDOT guidance (CDOT, 2002d) and ASTM Standard E1527-00 (ASTM, 2000)
- Screening of sites identified in the local, state, and federal environmental agency databases by distance and expected groundwater flow

- Ranking of sites identified in the local, state, and federal environmental agency databases based on known environmental site conditions
- Review of previous CDOT investigations and other available records from local, state, and federal agencies for sites within the project area
- Interviews with relevant agency and regulatory staff regarding the potential for historical releases of hazardous substances or petroleum products on sites within the project area
- Identification of sites requiring additional evaluation or investigation to assist in project alternative feasibility assessment, project design, right-of-way acquisition, and development of specific-materials management or institutional controls required during construction

Site reconnaissance was conducted in October, November, and December 2003, focusing on identifying visual areas of chemical and petroleum usage, storage, and discharges (FHU, 2005h). The visual reconnaissance of sites within the project area was conducted from public right-of-way. The interior of buildings, fenced areas, and rear lots were not inspected during the site reconnaissance due to limited access.

The records review (FHU, 2004j) was performed of a variety of historical data resources including Sanborn Fire Insurance Company maps, USGS topographical maps, and aerial photographs. Sanborn Fire Insurance Company maps have been produced since the late 1800s and provide a record of land use throughout the project area. USGS topographical maps also have been prepared since the late 1800s and were useful in identifying topographic and cultural features and changes in site development over a period of time. Aerial photographs have been collected since the 1930s and allow for direct observation of site conditions over a period of time.

Sites were also reviewed for local, state, and federal environmental agency database records (Environmental Data Resources, Inc. [EDR], 2003). Approximately 1500 sites were identified within one mile of the centerline of the alternatives. These sites were then screened to determine if they were likely to have had an adverse impact on the project area. The initial screening process consisted of distance from the project area (within 1000 feet) and expected direction of groundwater flow. Sites that were located within 1000 feet, potentially upgradient or cross-gradient to the combined project footprint, or with a high possibility of having impacted the project area based on site conditions were included in the screening and ranking process.

Following the initial site screening, sites were identified with the possibility of having impacted the project area based on distance and expected groundwater flow. Next, these sites were ranked based on known environmental site conditions. Sites with minimal indications of an 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 were ranked as "low." Sites with moderate indications of an 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 were ranked as "medium." Sites with a medium ranking included Resource Conservation and Recovery Act (RCRA) generators with violations, Emergency Response Notification System (ERNS) sites, and leaking underground storage tank (LUST) sites. Sites with the possibility of large-scale contaminant migration and a known existing or past release of a hazardous substance or petroleum product were ranked as "high."

Following the environmental site ranking, the sites were screened again based on distance. Sites were identified within 100 feet, from 100 feet to 500 feet, and from 500 feet to 1000 feet of the project area. A detailed review was conducted for sites located within 100 feet of the project area with an environmental condition ranking of either “high” or “medium” and sites from 100 feet to 500 feet with a “high” environmental ranking. The site screening and ranking process is discussed further in the *Modified Environmental Site Assessment* (FHU, 2005h).

4.13.1 Current Conditions

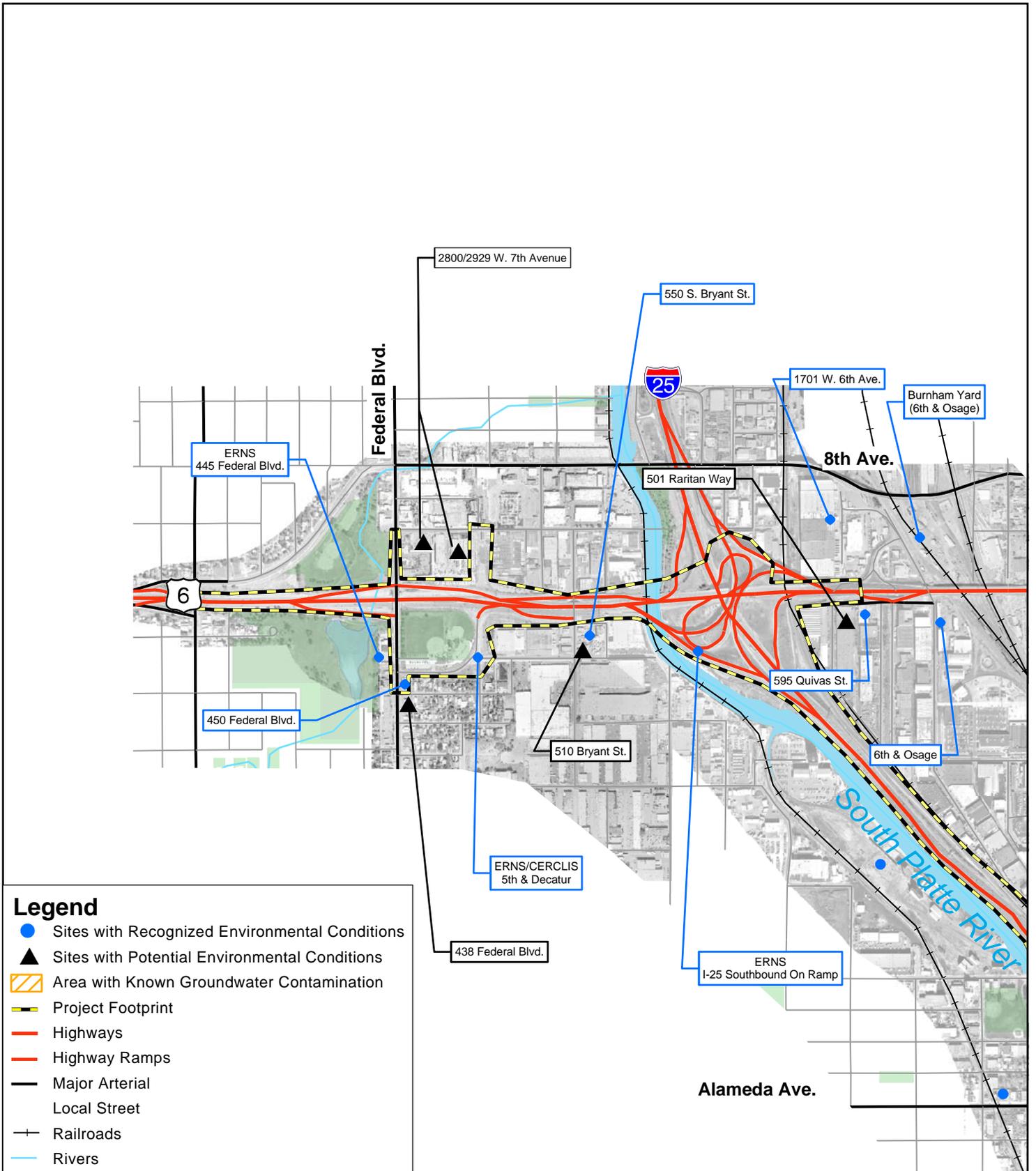
The project is located in an area with a long history of industrial and commercial land use. A total of 74 sites with recognized or potential environmental conditions were identified within or adjacent to the project area. Seventeen sites with potential environmental conditions were identified during the site reconnaissance, and 12 sites with potential environmental conditions were identified during the review of historical use information. Forty-five sites with either potential or recognized environmental conditions were identified during the database screening, and an additional two sites are identified during the detailed review. These sites are identified on **Figures 4.13-1, 4.13-2, and 4.13-3.**

Railroads were constructed through the project area in the 1870s and 1880s. Several railroad lines, including the Consolidated Main Line railroad corridor and numerous railroad sidings are located in the project area. As part of this EIS process, no evidence of potential soil and groundwater contamination was identified associated with the railroad tracks; however soil and groundwater contamination may exist along the railroad corridor due to undocumented events and an accumulation over time of drips, leaks, spills, and hydrocarbon exhaust residues from rail traffic.

Industrial and commercial facilities have been located in the project area since construction of the railroads. Industrial and commercial land uses have included, but are not limited to, rubber manufacturing, vehicle maintenance, mineral processing, aggregate mining, petroleum processing, fueling facilities, petroleum storage, lubricant manufacturing, lumber milling, coal storage, and warehouse distribution. Abandoned aggregate quarries along the South Platte River were historically used as landfills. Due to the long history of industrial and commercial land use, soil and groundwater contamination may be present throughout the project area.

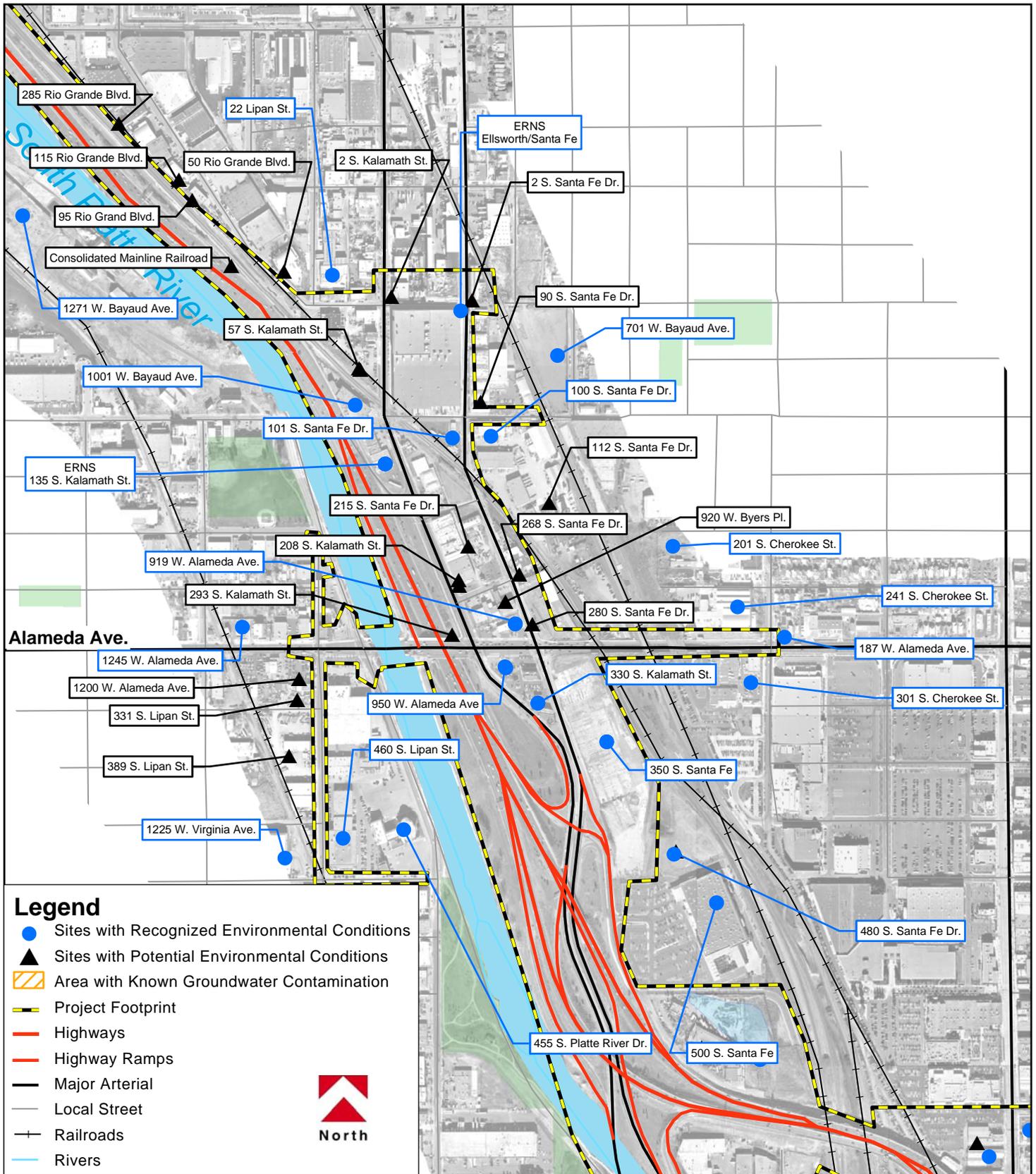
Several areas of known contaminated soil and groundwater are located in the project area. Chlorinated solvent and petroleum contaminated soil and groundwater are located in the vicinity of the Broadway and I-25 interchange. Petroleum contaminated soil and groundwater are also present east of the I-25 and US 6 interchange. Several active LUST sites, RCRA corrective action sites (CORRACTS), and Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) sites are located in the project area.

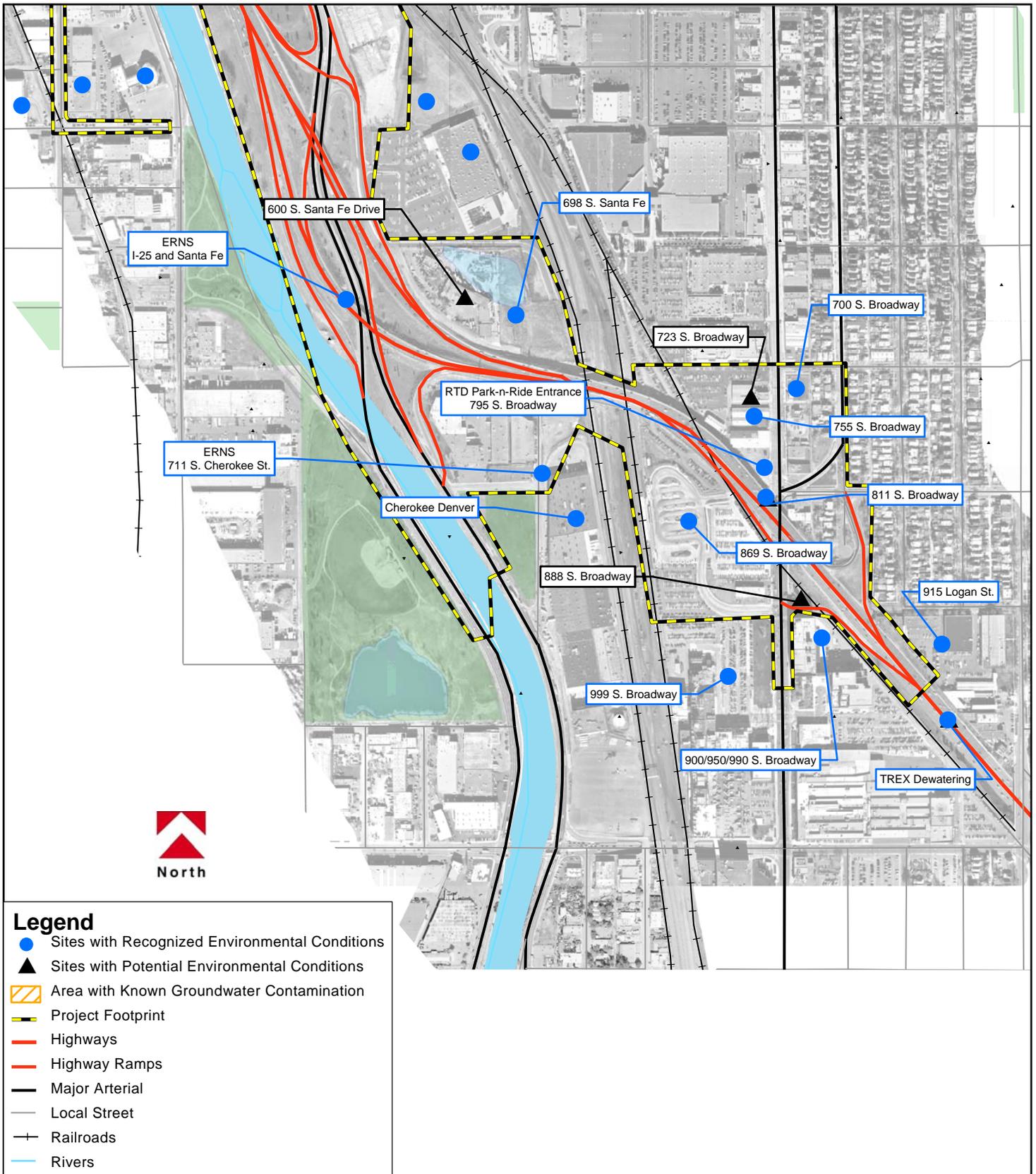
Known petroleum, chlorinated solvent, radionuclide, and heavy metals contaminated soil and groundwater are present along Santa Fe Drive and Kalamath Street in the vicinity of Alameda Avenue. Several active LUST sites are located south of US 6 along Federal Boulevard and Bryant Street and along Alameda Avenue near Cherokee Street and Lipan Street. Areas of known groundwater contamination are identified on **Figures 4.13-1, 4.13-2, and 4.13-3.**



**Sites with Environmental Conditions
Northern Project Area**

0 500 1,000 2,000 Feet





**Sites with Environmental Conditions
Southern Project Area**

Five historical fill and landfill areas identified in the database search and during the detailed file review are included in **Table 4.13-1**. An additional potential fill/landfill area, the former Lake Archer reservoir and canal, is not included in **Table 4.13-1** because it has not been identified as an environmental condition by local, state, and federal environmental agencies. Lake Archer was constructed in 1878 to provide water to Denver. Water was diverted from the South Platte River through a ditch that extended from approximately southeast of the existing I-25 and Alameda Avenue interchange to Lake Archer. Lake Archer was bounded on the north by 7th Avenue, on the south by Bayaud Avenue, on the east by 7th Street (later Osage Street), and on the west by the Denver & Rio Grande and the Atchison, Topeka, and Santa Fe railroad tracks.

In the late 1930s/early 1940s, Lake Archer and the canal were in-filled, and Rio Grande Boulevard, Raritan Way, and Quivas Street were platted. The content of the fill material for Lake Archer and the canal is unknown; however, it may have included municipal and industrial debris. Several known historical landfills are located in the area of the former Lake Archer and the canal, as depicted on **Figure 4.13-4**.



Table 4.13-1 Summary of Sites with Potential and Recognized Environmental Conditions

Type of Environmental Condition	Property Address	Environmental Conditions
Potential ¹	600 S. Santa Fe Drive	Manufacturing facility. USTs and ASTs. No leaks or spills reported. Unknown material handling and disposal practices.
Potential	50 Rio Grande Boulevard.	Construction supply. Fenced yard with a variety of vehicles, heavy equipment, and materials stored. No leaks or spills reported. Unknown site conditions.
Potential	95 Rio Grande Boulevard	Construction company. FINDS. RCRA Small Quantity Generator - no violations reported. Fenced yard with a variety of vehicles, heavy equipment, and materials stored. No leaks or spills reported. Unknown site conditions.
Potential	115 Rio Grande Boulevard	Commercial building. UST permanently closed at property. No leaks or spills reported. Unknown site conditions.
Potential	285 Rio Grande Blvd.	Commercial building. FINDS. RCRA Small Quantity Generator - no violations reported. USTs permanently closed at property. No leaks or spills reported. Unknown site conditions.
Potential	Consolidated Main Line Railroad tracks parallel I-25 from Ellsworth Avenue to US 6	No leaks or spills reported. Impacts to soil and groundwater along the railroad corridor due to undocumented events and an accumulation of drips, leaks, and spills over time.
Recognized	811 S. Broadway	Existing Northbound I-25 Broadway Viaduct. Historical gasoline filling station. USTs discovered and removed in June 2006. Residual petroleum impacted soil and chlorinated solvent and petroleum impacted groundwater may be on site.
Potential	888 S. Broadway	Vacant lot (formerly Jimmy Java's). Historical gasoline filling station. Located in area with known chlorinated solvent and petroleum impacted groundwater.
Potential	293 S. Kalamath St.	Existing Northbound I-25 at Alameda Avenue. Historical gasoline filling station. Area excavated during construction of existing I-25 in the 1950s.
Potential	723 S. Broadway	Retail building. Historical automotive-related use in the 1950s. Unknown hazardous material management.
Recognized ²	Area between Bayaud Avenue and Alameda Avenue, east of Consolidated Main Line railroad	Landfill. Artificial fill. Unknown groundwater contamination or potential methane. Identified as 4S-68W-10SW on Figure 4.13-4 .
Recognized	Area between Quivas and Osage Streets along 4th Avenue	Landfill. Unknown use or contents. Unknown site conditions (potential groundwater contamination and methane). Identified as 4S-68W-09NE on Figure 4.13-4 .
Potential	57 S. Kalamath	Vacant lot. Formerly Tetrault Iron Works Co. (manufactured crushers, stamp mills, and concentrators). Located adjacent to the Consolidated Main Line railroad tracks. Unknown site conditions.
Recognized	915 S. Logan Street	United States Postal Service. USTs. LUST. Unknown material handling and disposal practices.
Recognized	755 S. Broadway	Automotive repair and service facility. Former United Engineers & Contractors and 723 Co. LUST. Residual petroleum impacted soil on site.

**Table 4.13-1 Summary of Sites with Potential and Recognized Environmental Conditions
(Continued)**

Type of Environmental Condition	Property Address	Environmental Conditions
Recognized	900/950/990 S. Broadway	Former Gates Rubber Company, Ford Motor Company, and Shwadyer Trunk (Samsonite) manufacturing facilities. FINDS. RCRA Large Quantity Generator-violations reported. ERNS. UST. LUST. Known chlorinated solvent contamination of soil and groundwater. VCUP recently initiated. In the 1948 aerial photo a potential materials storage/landfill area is located on the northern portion of the property.
Recognized	999 S. Broadway	Former Gates Rubber Company manufacturing facility. VCUP. Known chlorinated solvents and petroleum impacted soil and groundwater on the property and in the vicinity of I-25.
Recognized	698 S. Santa Fe Drive	Former Prest-O-Lite company and Linde Gases of the West (manufacturers of acetylene gas). FINDS. RCRA Small Quantity Generator - no violations reported. UST. LUST. Unknown site conditions.
Recognized	869 S. Broadway	RTD park-n-Ride. Former Burkhardt Storage Facility. FINDS. RCRA Small Quantity Generator-no violations reported. LUST. Petroleum and lead contaminated soil and chlorinated solvent impacted groundwater on the property.
Recognized	795 S. Broadway	RTD park-n-Ride Entrance. FINDS. RCRA Small Quantity Generator-no violations reported. UST. LUST. Residual petroleum impacted soil and chlorinated solvent and petroleum impacted groundwater may be on site.
Recognized	700 S. Broadway	Automotive service facility. Former Econo Lube-N-Tube. FINDS. RCRA Small Quantity Generator-no violations reported. UST. LUST. Residual impacted soil may be located on the property.
Recognized	22 Lipan Street	Laboratory. FINDS. RCRA Conditionally Exempt Small Quantity Generator-no violations reported. UST. LUST. Residual impacted soil may be located on the property.
Recognized	1271 W. Bayaud Avenue	Former General Chemical. UST. LUST. RCRA-Small Quantity Generator. ERNS. VCUP. Known heavy metal contaminated soil and groundwater on the site.
Recognized	Area of the Santa Fe Drive and I-25 Interchange 800 S. Cherokee Street	Landfill. Artificial fill. Unknown groundwater contamination or potential methane. Identified as 64S-68W-15SW3 and 4S-68W-15SW4 on Figure 4.13-4.
Recognized	135 S. Kalamath Street	ERNS.
Recognized	I-25/Santa Fe Drive	ERNS.
Recognized	711 S. Cherokee Street	ERNS.
Potential	501 Raritan Way	Commercial building. USTs permanently closed at property. No leaks or spills reported. Unknown site conditions.



**Table 4.13-1 Summary of Sites with Potential and Recognized Environmental Conditions
(Continued)**

Type of Environmental Condition	Property Address	Environmental Conditions
Potential	510 Bryant Street	Gas station. USTs currently in use at property. No leaks or spills reported. Unknown site conditions (located adjacent to a LUST site).
Potential	438 Federal Boulevard	Gas station. USTs currently in use at property. No leaks or spills reported. Unknown site conditions (located adjacent to a LUST site).
Potential	2800/2929 W. 7th Avenue	Denver Public Schools Hilltop Bus Terminal. USTs. No leaks or spills reported. Unknown material handling and disposal practices.
Recognized	500 Julian Street	Landfill. Unknown use or contents. Unknown site conditions (potential groundwater contamination and methane). Identified as 4S-68W-08NW on Figure 4.13-4 .
Recognized	500 Alcott Street	Landfill. Unknown use or contents. Unknown site conditions (potential groundwater contamination and methane). Identified as 4S-68W-08NE2 on Figure 4.13-4 .
Recognized	450 Federal Boulevard	Automotive repair and supply facility. Former gas station. Former location of Charles Yamaguchi Property/KOK Auto Repair & Body Shop. UST. LUST. Known petroleum impacted soil and groundwater on the property.
Recognized	550 Bryant Street	Rental truck facility. FINDS. RCRA Conditionally Exempt Small Quantity Generator - no violations reported. UST. LUST. Known petroleum impacted soil and groundwater on the property.
Recognized	595 Quivas Street	Commercial building. Former location of Conrads Inc. UST. LUST. Residual petroleum impacted soil may be located on the property.
Recognized	1701 W. US 6	Warehouse. LUST. UST. ERNS. Known petroleum impacted soil and groundwater on site.
Recognized	UPRR - Burnham Yard	US 6 & Osage Street. ERNS. Known petroleum impacted groundwater in area and vicinity of US 6/I-25 interchange.
Recognized	5th Avenue & Decatur Street	PCB-Capacitor Cleanup. CERCLIS. RCRA Small Quantity Generator-no violations reported. FINDS. ERNS. No additional information available. Unknown site conditions.
Recognized	Southbound Ramp US 6 to I-25	ERNS.
Recognized	In alley behind 445 Federal Boulevard	ERNS.
Recognized	490 Osage Street	Landfill. Unknown use or contents. Unknown site conditions (potential groundwater contamination).
Recognized	500 Osage Street	Manufacturing facility. FINDS. UST. LUST. Related to the US 6 & Osage UPRR-Burnham Yard ERNS site. Known petroleum impacted groundwater and soil in area and vicinity of US6/I-25 interchange.

**Table 4.13-1 Summary of Sites with Potential and Recognized Environmental Conditions
(Continued)**

Type of Environmental Condition	Property Address	Environmental Conditions
Potential	268 S. Santa Fe Drive	Automotive repair and supply facility. FINDS. No leaks or spills reported. Unknown material handling and disposal practices.
Potential	208 S. Kalamath Street	Former Heavenly Daze restaurant. FINDS. RCRA Small Quantity Generator - no violations reported. USTs permanently closed at property. No leaks or spills reported. Unknown site conditions.
Potential	331 S. Lipan Street	Commercial building. Fenced yard with a variety of vehicles, heavy equipment, and materials stored. No leaks or spills reported. Unknown site conditions.
Potential	389 S. Lipan Street	Commercial building. FINDS. RCRA Small Quantity Generator - no violations reported. UST. Fenced yard with a variety of vehicles, heavy equipment, electrical transformers, and materials stored. No leaks or spills reported. Unknown site conditions.
Potential	920 West Byers Place #A	Former Shamrock Ind. Laundry & Dry Cleaning. Historical laundry and dry cleaning operations. Unknown material handling and disposal practices.
Recognized	1001 W. Bayaud Avenue	Light industrial/commercial building. FINDS. RCRA Small Quantity Generator-violations reported. Landfill. Unknown use or contents. Unknown site conditions. Former location of the Crauel Manufacturing and Vinegar Co./Leo Vinegar & Sales Co. Unknown site conditions. Located adjacent to the Consolidated Main Line railroad.
Recognized	166 S. Kalamath Street	Landfill. Unknown use or contents. Unknown site conditions (potential groundwater contamination and methane).
Potential	1200 W. Alameda Avenue	Automotive dealer. FINDS. RCRA Small Quantity Generator - no violations. Historical automotive-related use in the 1920s. Unknown hazardous material management. Historical gasoline filling station in the 1940s. Unknown site conditions.
Potential	2 S. Kalamath Street	Commercial building. Historical paint dealership, National Lead Company, in the 1950s/1960s. Unknown hazardous material management.
Potential	80 S. Santa Fe Drive	Former location of Monument Works. Unknown site conditions.
Potential	280 S. Santa Fe Drive.	Construction supply. Former location of Six Star Lubricants Co. (a lubricant manufacturer). Unknown site conditions.
Recognized	101 S. Santa Fe Drive	Vacant lot [former gasoline filling station and Barter Machinery & Supply (Lot B)]. Barter Machinery & Supply (Lot B) CERCLIS. NFRAP. RCRA CORRACTS. Potential PCB and lead contaminated soil along railroad. Historical gasoline filling station.
Potential	112 S. Santa Fe Drive	Manufacturing facility. FINDS. RCRA Small Quantity Generator-violations reported. UST. No leaks or spills reported. Unknown site conditions.

**Table 4.13-1 Summary of Sites with Potential and Recognized Environmental Conditions
(Continued)**

Type of Environmental Condition	Property Address	Environmental Conditions
Recognized	100 S. Santa Fe Drive. 701 W. Bayaud Avenue	Manufacturing facility. Former location of S.A.D. Holford (manufactured grease traps and ash pits) Clean Heat Fuel Co. (a coal yard), and Barter Machinery & Supply. CERCLIS-NFRAP. RCRA CORRACTS. Potential PCB and lead contaminated soil along railroad. UST. LUST. Residual petroleum soil contamination may be present.
Recognized	2 S. Santa Fe Drive	Commercial building. Former Consolidated Cut Stone & Granite Co. FINDS. RCRA Small Quantity Generator-violations reported. ERNS. Unknown site conditions.
Potential	215 S. Santa Fe Drive	Commercial building. Fenced yard with a variety of vehicles, heavy equipment, and materials stored. No leaks or spills reported. Unknown site conditions.
Recognized	241 S. Cherokee Street	Studio. Former Oswald Machine Co. (general machinists), Eversman Manufacturing (land level manufacturers), Davis and Son Manufacturing (oil fountain manufacturers), Continental Can Company (can producer), and Colorado Paint Co. FINDS. RCRA Small Quantity Generator-no violations reported. CERCLIS-NFRAP. UST. Unknown site conditions.
Recognized	301 S. Cherokee Street	Pharmaceutical company. Former William Russel Coal Yard and Chevrolet Motor. FINDS. RCRA Large Quantity Generator-violations reported. UST. ERNS. Unknown site conditions.
Recognized	480 S. Santa Fe Drive	Automotive repair and service facility. Former United States Gasoline Corporation (oil reclaiming plant) and Robinson Brick Company/Denver Radium –CERCLA. FINDS. RCRA Small Quantity Generator-no violations reported. UST. LUST. Known heavy metal and radionuclide contaminated soil and groundwater in the vicinity.
Recognized	500 S. Santa Fe Drive	Retail center. CERCLA. FINDS. RCRA Small Quantity Generator-no violations reported. UST. LUST. Known heavy metal and radionuclide contaminated soil and groundwater.
Recognized	350 S. Santa Fe Drive	Vacant lot (former RTD Alameda facility). FINDS. RCRA Small Quantity Generator-no violations reported. UST. AST. LUST. Residual petroleum soil and groundwater contamination may be present.
Recognized	330 S. Kalamath Street	Gas station. (former Total Petroleum). FINDS. UST. LUST. Known petroleum contaminated soil and groundwater on the property.
Recognized	950 W. Alameda Avenue	Restaurant (former Chevron gas station). LUST. Known petroleum contaminated soil and groundwater on the property.
Recognized	919 W. Alameda Avenue	Former Amoco gas station. Historical gasoline filling station. FINDS. RCRA Conditionally Exempt Small Quantity Generator-no violations reported. UST. LUST. Known petroleum contaminated soil and groundwater on the property.
Recognized	201 S. Cherokee Street	Manufacturing facility. (former Cherokee Solvents). FINDS. RCRA Small Quantity Generator. CERCLIS-NFRAP. ERNS. Unknown site conditions.
Recognized	187 W. Alameda Avenue	Automotive repair and service facility. (former KOK Oil Co./KOK Phillips). FINDS. UST. LUST. Known petroleum contaminated soil and groundwater on the property.

**Table 4.13-1 Summary of Sites with Potential and Recognized Environmental Conditions
(Continued)**

Type of Environmental Condition	Property Address	Environmental Conditions
Recognized	1245/1253 W. Alameda Avenue	Gas station. (former A-B Petroleum and U-Gas-UM). ERNS. UST. FINDS. LUST. Known petroleum contaminated soil and groundwater on the property.
Recognized	460 S. Lipan Street	Automotive repair and service facility. FINDS. RCRA Small Quantity Generator-no violations reported. LUST. Potential landfill. Unknown site conditions.
Recognized	1225 W. Virginia	Manufacturing facility. UST. LUST. Residual petroleum impacted soil and groundwater may be present.
Recognized	Ellsworth and Santa Fe	ERNS.
Recognized	455 South Platte River Drive	Church (former Happy Church). CERCLIS-NFRAP. Former municipal landfill. Known high levels of methane present. Unknown groundwater conditions. Identified as 4S-68W-16NE on Figure 4.13-4 .

Source: FHU, 2004j

¹ A **recognized environmental condition** is "the presence or likely presence of any hazardous substances or petroleum products on a property under conditions that indicated an existing release, a past release, or 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" (ASTM, 2000).

² A **potential environmental condition** identifies a property where recognized environmental conditions may be present but could not be confirmed without additional inspection or investigation.

AST – aboveground storage tank

CERCLA – Comprehensive Environmental Response, Compensation, and Liability Act

CERCLIS – Comprehensive Environmental Response, Compensation, and Liability Information System

CORRACTS – corrective action

ERNS – Emergency Response Notification System

FINDS – facility index system

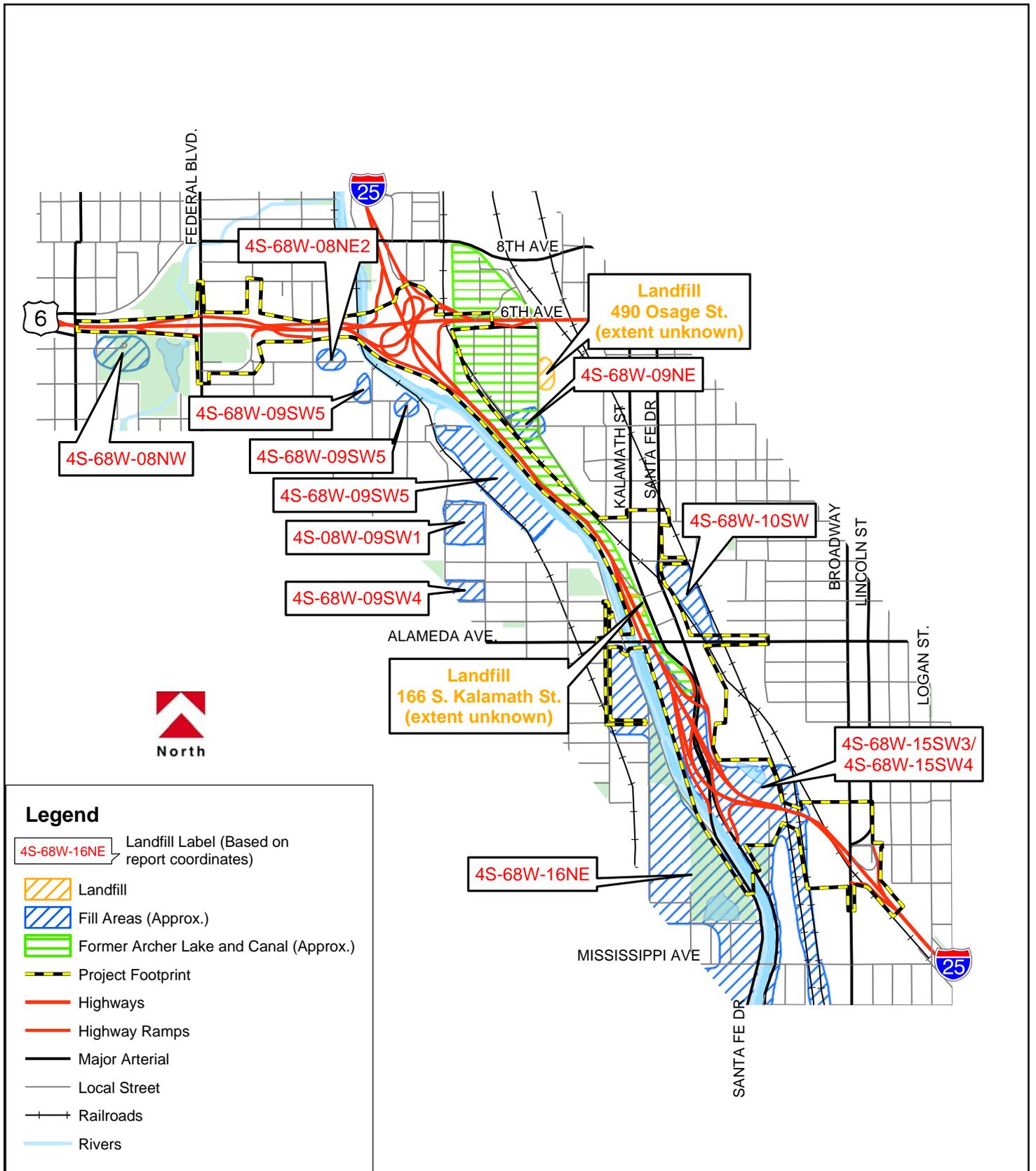
LUST – leaking underground storage tank

NFRAP – no further remedial action planned

PCB – polychlorinated biphenyls

RCRA – Resource Conservation and Recovery Act

UST – underground storage tank



Source: Pinyon Engineering , 1997

Historical Fill/Landfill Areas

Figure 4.13-4

4.13.2 Consequences of the Alternatives

Sites with potential and recognized environmental conditions were identified throughout the project area. These sites included National Priority List (NPL) sites, Comprehensive Response Compensation and Liability Information System (CERCLIS) sites, Resource Conservation and Recovery Information System (RCRIS) sites, CORRACTS sites, ERNS sites, CDPHE Voluntary Cleanup Program (VCUP) sites, as well as sites containing aboveground storage tanks, underground storage tanks, LUSTs and landfills.

4.13.2.1 NO ACTION ALTERNATIVE

The No Action Alternative would not result in construction affecting sites with potential or recognized environmental conditions.

4.13.2.2 CONSEQUENCES COMMON TO SYSTEM ALTERNATIVES 1, 2, 3, AND THE PREFERRED ALTERNATIVE

This section discusses hazardous waste impacts common to each of the System Alternatives 1, 2, 3, and the Preferred Alternative. –

I-25 Improvements

The I-25 mainline portion of the Valley Highway Project extends from Logan Street to US 6 and includes the Broadway, Santa Fe Drive, and Alameda Avenue interchanges. Sites with recognized or potential environmental conditions in the area of the I-25 and Broadway interchange include four closed LUST sites, two historical gasoline filling stations, the RTD park-n-Ride (former Burkhardt Steel facility), and the former Gates site. Soil in the vicinity of the interchange is known to be contaminated with petroleum products, trichloroethylene (TCE), arsenic, and lead. Groundwater in the vicinity of the interchange is known to be contaminated with TCE, benzene, and toluene. As shown on **Figure 4.13-4**, the interchange is also located on a historical fill area with potential soil and groundwater contamination and methane concerns. It is anticipated that soil contaminated with petroleum, chlorinated solvent, and heavy metals and groundwater contaminated with chlorinated solvent and petroleum would be encountered during construction in the area of the Broadway and I-25 interchange.

The I-25 and Santa Fe Drive interchange is located west of Broadway near the South Platte River. One closed LUST site, two ERNS sites, the Cherokee Denver CDPHE VCUP site, and the facility at 600 S. Santa Fe Drive (a site with potential environmental conditions) are located in the vicinity of the interchange. In addition, the interchange is located on a historical fill area with potential soil and groundwater contamination and methane concerns (see **Figure 4.13-4**). Contaminated soil and groundwater could be encountered during construction in the area of the Santa Fe Drive and I-25 interchange.

The I-25 and Alameda Avenue interchange is located west of Santa Fe Drive and Kalamath Street. Three active LUST sites, two closed LUST sites, and the Denver Radium CERCLA site (formerly Robinson Brick) are located east of the interchange. The interchange is also located in the vicinity of a historical fill area and the Lake Archer canal with potential soil and groundwater contamination and methane concerns. The fill material for the Lake Archer canal is unknown but may have included municipal and industrial debris. Soil in the vicinity of the interchange is

known to be contaminated with petroleum products and arsenic, lead, and zinc. Groundwater in the vicinity of the interchange is known to be contaminated with benzene, ethylbenzene, toluene, xylenes, cadmium, manganese, uranium, zinc, and radionuclides. Contamination is expected to be encountered during replacement of the I-25 and Alameda Avenue interchange and the coffer dam along I-25 including, soil contaminated with petroleum, heavy metals, and landfill debris, and groundwater contaminated with petroleum, heavy metals, and radionuclides.

The Consolidated Main Line railroad tracks parallel the existing I-25 highway from approximately Ellsworth Avenue to US 6. As part of System Alternatives 1, 2, 3, and the Preferred Alternative these tracks will be relocated toward the east. Although no evidence of potential soil and groundwater impacts were identified, contaminated soil and groundwater may exist due to undocumented events and an accumulation over time of drips, leaks, spills and hydrocarbon exhaust residue from rail traffic. Contaminated soil and groundwater may be encountered during relocation of the railroad.

As shown on **Figure 4.13-4**, the former Lake Archer reservoir and canal were located east of the existing I-25 highway. The canal extended from approximately southeast of the existing I-25 and Alameda Avenue interchange to Lake Archer. Lake Archer was bounded on the north by 7th Avenue, on the south by Bayaud Avenue, on the east by Osage Street, and on the west by the Consolidated Main Line railroad tracks. The Lake Archer reservoir and canal were potentially used as municipal and industrial landfills. Several known landfills are located in the area of the former reservoir and canal. A landfill was identified at 1001 W. Bayaud Avenue and another landfill is located near the intersection of 3rd Avenue and Quivas Street. Contaminated soil and groundwater contamination may be located east of the existing I-25 highway in the area of the former Lake Archer reservoir and canal.

The Santa Fe Drive viaduct and the Alameda Avenue bridges over I-25 would be replaced as part of System Alternatives 1, 2, 3, and the Preferred Alternative. A lead-based paint survey was not conducted for these structures. Given the age of these structures, lead-based paint may be present. Lead-based paint is a worker and public safety concern.

US 6 Improvements

The US 6 portion of the Valley Highway Project extends from Quivas Street in the east across I-25 and Federal Boulevard to Knox Court in the west. The US 6 portion of the project includes improvements to the I-25, Bryant Street, and Federal Boulevard interchanges.

The I-25 and US 6 interchange is located west of the Union Pacific Burnham Shops (the former Denver & Rio Grande rail yard), the Rio Grande LUST site, and the former Lake Archer. Three closed and one active LUST sites and the active Union Pacific–Burnham Shops ERNS spill are located in the vicinity of the interchange. The interchange is also located near the Lake Archer reservoir with potential soil and groundwater contamination and methane concerns. The fill material for the Lake Archer reservoir is unknown but may have included municipal and industrial debris. A diesel-contaminated groundwater plume is located west of the interchange. Landfill debris, contaminated soil and groundwater, and methane may be encountered in the area of the I-25 and US 6 interchange.

The US 6 and Bryant Street interchange is located north of a closed LUST site with known soil and groundwater contamination, and an UST site. Soil and groundwater contaminated with petroleum are located southeast of the US 6 and Bryant Street interchange.

The US 6 and Federal Boulevard interchange is located north of an active LUST site, a second UST along Federal Boulevard, and an ERNS/CERLIS site at 5th Avenue and Decatur. Soil and groundwater contaminated with petroleum are known to occur south of the US 6 and Federal Boulevard interchange. Contaminated soil and groundwater may also be encountered in the area of 5th Avenue and Decatur.

Several known landfill areas are located south of US 6 along the 500 block between 5th Avenue and US 6. The contents of these landfills are unknown, and soil and groundwater contamination and methane concerns exist.

The US 6 bridge over the South Platte River would be replaced as part of each alternative, including the Preferred Alternative. A lead-based paint survey was not conducted for this structure. Given the age of the structure, lead-based paint may be present.

Santa Fe / Kalamath Improvements

The Santa Fe/Kalamath improvements portion of the Valley Highway Project includes improvements to Santa Fe Drive, Kalamath Street, Alameda Avenue, Lipan Street, and Virginia Avenue, installation of a collector-distributor road south of Alameda Avenue and east of Santa Fe Drive, and construction of grade separations along Santa Fe Drive and Kalamath Street at the Consolidated Main Line railroad tracks.

The Santa Fe/Kalamath improvements are located in an area with a long history of industrial and commercial land use. Along Santa Fe Drive and Kalamath Street from I-25 north to Ellsworth Avenue, and west from Cherokee Street to I-25 are two CERCLIS – No Further Remediation Action Planned (NFRAP) sites, the Denver Radium CERCLA site (formerly Robinson Brick), two closed LUST sites, three active LUST sites, one RCRA CORRACTS site, a RCRA large-quantity generator, several ERNS sites, and various sites with potential environmental conditions. Soil south of Alameda Avenue is known to be contaminated with petroleum products and arsenic, lead, and zinc. Groundwater in the vicinity of the Kalamath and Santa Fe Drive intersections with Alameda Avenue is known to be contaminated with benzene, ethylbenzene, toluene, xylenes, cadmium, manganese, uranium, zinc, and radionuclides.

The improvements west of I-25 along Alameda Avenue, Lipan Street, and Virginia Avenue are located in an area with one active LUST site, two closed LUST sites, a CERCLIS site, several sites with potential environmental conditions, and a known landfill area with methane concerns. Contaminated soil and groundwater may be encountered in this area.

The collector-distributor road south of Alameda Avenue and east of Santa Fe Drive is located adjacent to the Denver Radium CERCLA site (formerly Robinson Brick), which includes the an automobile service facility and the former RTD bus maintenance facility. Within the parking lot of the Home Depot store, heavy metals-impacted soils have been capped and remain in-place on the site. The area north of the Home Depot parking lot and west of the automobile service facility contains an area of consolidated thorium-impacted soils that is demarcated by a

geotextile barrier. These areas may be encountered during installation of the collector-distributor road.

The Santa Fe Drive and Kalamath Street grade separations under the Consolidated Main Line railroad tracks would require soil excavation and potentially encounter contaminated groundwater. Petroleum, polychlorinated biphenyls (PCBs), and lead-contaminated soil are known to be located along the railroad tracks east of the proposed grade separation and may be encountered at the grade separation. (Information about groundwater in the area is limited, however it may be contaminated.)

4.13.2.3 SYSTEM ALTERNATIVE 1

System Alternative 1 would involve the relocation of 25 businesses. An asbestos survey was not conducted of structures to be demolished following right-of-way acquisition. Asbestos is a worker and public safety concern.

Of the properties to be partially or completely acquired for System Alternative 1 right-of-way, 14 properties have potential or recognized environmental conditions (see **Table 4.13-2**). Additional property-specific information on potential and recognized environmental conditions is included in the MESA report (FHU, 2004j).

As part of System Alternative 1, Decatur Street would extend north from US 6 to 7th Avenue. Decatur Street is located east of the Denver Public Schools Service Building and Denver Public Schools Hilltop Bus Terminal. Although no spills or leaks were reported at this facility, site conditions are unknown and potential environmental conditions may exist due to the number of USTs at the site and unknown hazardous materials storage and handling practices.

Additional hazardous waste impacts of System Alternative 1 are also common to System Alternatives 2, 3, and the Preferred Alternative and are discussed in **Section 4.13.2.2**.

Table 4.13-2 Recommendations for Additional Assessment / Investigation – System Alternative 1

Type of Environmental Condition	Address	Full or Partial Purchase	Environmental Conditions	Recommendations			Comments
				ISA ¹	PSI ²	RI/FS ³	
Recognized	1001 W. Bayaud Avenue	Full	Light industrial/commercial building. FINDS. RCRA Small Quantity Generator-violations reported. Landfill. Unknown use or contents. Former location of the Crauel Manufacturing and Vinegar Co./Leo Vinegar & Sales Co. Unknown site conditions. Located adjacent to the Consolidated Main Line railroad.	X	X		Located in area of former Lake Archer canal.
Potential	135 S. Kalamath St.	Full	Light industrial/commercial building. ERNS. Located in area of former Lake Archer canal and potential landfill.	X	X		
Potential	101 to 125 S. Kalamath Street	Full	Commercial/retail center with tenants ranging from interior design to printing services. Located in area of former Lake Archer canal and potential landfill.	X	X		
Potential	501 Raritan Way	Partial	Commercial building. USTs permanently closed at property. No leaks or spills reported. Unknown site conditions.	X			
Recognized	755 S. Broadway	Partial	Automotive repair and supply facility. Former United Engineers & Contractors and 723 Co. LUST. Residual petroleum impacted soil on site.	X	X		Additional investigation may be necessary for right-of-way acquisition.
Recognized	350 S. Santa Fe Drive	Partial	Vacant lot (former RTD Alameda facility). FINDS. RCRA Small Quantity Generator-no violations reported. UST. AST. LUST. Residual petroleum soil and groundwater contamination may be present.	X	X		
Recognized	919 W. Alameda Avenue	Partial	Former gas station. Historic gasoline filling station. FINDS. RCRA Conditionally Exempt Small Quantity Generator-no violations reported. UST. LUST. Known petroleum contaminated soil and groundwater on the property.	X	X		This site is an active LUST. Coordination with OPS would be required.

Table 4.13-2 Recommendations for Additional Assessment / Investigation – System Alternative 1 (continued)

Type of Environmental Condition	Address	Full or Partial Purchase	Environmental Conditions	Recommendations			Comments
				ISA ¹	PSI ²	RI/FS ³	
Recognized	950 W. Alameda Avenue	Partial	Restaurant (former Chevron gas station). LUST. Known petroleum contaminated soil and groundwater on the property.	X	X		This site is an active LUST. Coordination with OPS would be required.
Potential	215 S. Santa Fe Drive	Full	Fenced yard with a variety of vehicles, heavy equipment, and materials stored. No leaks or spills reported. Unknown site conditions.	X			Additional investigation may be necessary for right-of-way acquisition.
Potential	268 S. Santa Fe Drive	Partial	Automotive repair and supply facility. FINDS. No leaks or spills reported. Unknown material handling and disposal practices.	X			Additional investigation may be necessary for right-of-way acquisition.
Potential	39 to 57 S. Kalamath Street	Full	Vacant Lot. Former Tetrault Iron Works Co. Unknown site conditions.	X			
Potential	438 Federal Blvd.	Partial	Gas station. UST. Unknown site conditions.	X			
Recognized	450 Federal Blvd.	Partial	Automotive repair and supply facility. Former gas station. UST. LUST. Known petroleum impact soil and groundwater.	X	X		This site is an active LUST. Coordination with OPS would be required.
Potential	2800/2929 W. 7th Ave.	Partial	Denver Public Schools Hilltop Bus Terminal. USTs. No leaks or spills reported. Unknown material handling and disposal practices.	X			Additional investigation may be necessary for right-of-way acquisition.

Source: FHU, 2004j

¹ Initial site assessment (ISA) recommended.

² Preliminary site investigation (PSI) recommended.

³ Remedial investigation/feasibility study (RI/FS) recommended.

AST – aboveground storage tank

LUST – leaking underground storage tank

ERNS – Emergency Response Notification System

OPS – Colorado Department of Labor and Employment Division of Oil and Public Safety

FINDS – facility index system

RCRA – Resource Conservation and Recovery Act

UST – underground storage tank

4.13.2.4 SYSTEM ALTERNATIVE 2

System Alternative 2 involves the relocation of 51 businesses. An asbestos survey was not conducted of structures to be demolished following right-of-way acquisition. Asbestos is a worker and public safety concern.

Of the properties to be partially or completely acquired for System Alternative 2 right-of-way, 19 properties have potential or recognized environmental conditions (see **Table 4.13-3**). Additional property-specific information on potential and recognized environmental conditions is included in the MESA report (FHU, 2005h).

It is anticipated that soil and groundwater contaminated with solvents and petroleum would be encountered during construction of the tunnel from southbound Broadway to southbound I-25. This area is the focus of an on-going groundwater clean up action. The base of the tunnel is at or near the expected depth of groundwater in the area. Contaminated groundwater impacting the tunnel would be a long-term concern.

The Consolidated Maine Line railroad bridge and several associated structures over Alameda Avenue would be replaced as part of System Alternative 2. A lead-based paint survey was not conducted for these structures. Given the age of these structures, lead-based paint may be present. Lead-based paint is a worker and public safety concern.

Additional hazardous waste impacts to System Alternative 2 are also common to System Alternatives 1, 3, and the Preferred Alternative and are discussed in **Section 4.13.2.2**.

Table 4.13-3 Recommendations for Additional Assessment / Investigation – System Alternative 2

Type of Environmental Condition	Address	Full or Partial Purchase	Environmental Conditions	Recommendations			Comments
				ISA ¹	PSI ²	R/FS ³	
Recognized	1001 W. Bayaud Ave.	Full	Light industrial/commercial building. FINDS. RCRA Small Quantity Generator-violations reported. Landfill. Unknown site conditions. Former location of the Crauel Manufacturing and Vinegar Co./Leo Vinegar & Sales Co. Unknown site conditions. Located adjacent to the Consolidated Main Line railroad.	X	X		Located in area of former Lake Archer canal.
Potential	101 to 125 S. Kalamath St.	Full	Commercial/retail center with tenants ranging from interior design to printing services. Located in area of former Lake Archer canal and potential landfill.	X	X		
Potential	135 S. Kalamath St.	Full	Light industrial/commercial building. ERNS. Located in area of former Lake Archer canal and potential landfill.	X	X		
Potential	501 Raritan Way	Partial	Commercial building. USTs. Unknown site conditions.	X			
Recognized	755 S. Broadway	Partial	Automotive repair and supply facility. Former United Engineers & Contractors and 723 Co. LUST. Residual petroleum impacted soil on site.	X	X		Additional investigation may be necessary for right-of-way acquisition.
Recognized	350 S. Santa Fe Drive	Partial	Vacant lot (former RTD Alameda facility) FINDS. RCRA Small Quantity Generator-no violations reported. UST. AST. LUST. Residual petroleum soil and groundwater contamination may be present.	X	X		
Recognized	500 S. Santa Fe Drive	Partial	Retail center. CERCLA. FINDS. RCRA Small Quantity Generator-no violations reported. UST. LUST. Known heavy metal and radionuclide contaminated soil and groundwater.	X	X		Coordination with CDPHE would be required.
Potential	600 S. Santa Fe Drive	Partial	Manufacturing facility. USTs. No leaks or spills reported. Unknown material handling and disposal practices.	X			
Recognized	698 S. Santa Fe Drive	Partial	Former manufacturers of acetylene gas. FINDS. RCRA Small Quantity Generator. UST. LUST. Unknown site conditions.	X			

Table 4.13-3 Recommendations for Additional Assessment / Investigation – System Alternative 2 (continued)

Type of Environmental Condition	Address	Full or Partial Purchase	Environmental Conditions	Recommendations			Comments
				ISA ¹	PSI ²	RI/FS ³	
Recognized	330 S. Kalamath Street	Full	Gas station. (former Total Petroleum gas station). FINDS. UST. LUST. Known petroleum contaminated soil and groundwater on the property.	X	X		This site is an active LUST. Coordination with OPS would be required.
Potential	920 W. Byers	Full	Warehouse. Former location of Shamrock Industrial laundry and dry cleaning.	X	X		
Recognized	919 W. Alameda Avenue	Full	Former Amoco gas station. Historic gasoline filling station. FINDS. RCRA Conditionally Exempt Small Quantity Generator-no violations reported. UST. LUST. Known petroleum contaminated soil and groundwater on the property.	X	X		This site is an active LUST. Coordination with OPS would be required.
Recognized	950 W. Alameda Avenue	Full	Restaurant. (former Chevron gas station). LUST. Known petroleum contaminated soil and groundwater on the property.	X	X		This site is an active LUST. Coordination with OPS would be required.
Potential	268 S. Santa Fe Drive	Full	Automotive repair and service facility. FINDS. No leaks or spills reported. Unknown material handling and disposal practices.	X			Additional investigation may be necessary for right-of-way acquisition.
Potential	280 S. Santa Fe Drive	Full	Construction supply Former location of Six Star Lubricants. Unknown site conditions.	X			
Recognized	301 S. Cherokee St.	Partial	Pharmaceutical company. FINDS. RCRA – Large quantity generator. UST. ERNS. Unknown site conditions.	X			
Potential	215 S. Santa Fe Drive	Full	Fenced yard with a variety of vehicles, heavy equipment, and materials stored. No leaks or spills reported. Unknown site conditions.	X			Additional investigation may be necessary for right-of-way acquisition.
Potential	39 to 57 S. Kalamath St.	Full	Vacant Lot .Former Tetrault Iron Works Co. Unknown site conditions.	X			
Recognized	450 S. Federal Blvd.	Partial	Automotive repair and supply facility. Former gas station. UST. LUST. Known petroleum impact soil and groundwater.	X	X		This site is an active LUST. Coordination with OPS would be required.

Source: FHU, 2004j

¹ Initial site assessment (ISA) recommended

² Preliminary site investigation (PSI) recommended

³ Remedial investigation/feasibility study (RI/FS) recommended

AST – aboveground storage tank

CDPHE – Colorado Department of Public Health & Environment

CERCLA – Comprehensive Environmental Response, Compensation, and Liability Act

ERNS – Emergency Response Notification System

FINDS – facility index system

LUST – leaking underground storage tank

OPS – Colorado Department of Labor and Employment Division of Oil and Public Safety

RCRA – Resource Conservation and Recovery Act

UST – underground storage tank

4.13.2.5 SYSTEM ALTERNATIVE 3

System Alternative 3 involves the relocation of 38 businesses. An asbestos survey was not conducted of structures to be demolished following right-of-way acquisition. Asbestos is a worker and public safety concern.

Of the properties to be partially or completely acquired for System Alternative 3 right-of-way, 13 properties have potential or recognized environmental conditions, as shown in **Table 4.13-4**. Additional property specific information on potential and recognized environmental conditions is included in the MESA report (FHU, 2005h).

The Consolidated Main Line railroad bridge and several associated structures over Alameda Avenue would be replaced as part of System Alternative 3. A lead-based paint survey was not conducted for these structures. Given the age of these structures, lead-based paint may be present. Lead-based paint is a worker and public safety concern.

Along Santa Fe Drive and Kalamath Street near Alameda Avenue is the Denver Radium CERCLA site (formerly Robinson Brick), one closed LUST site, three active LUST sites, a RCRA large-quantity generator, and several ERNS sites. Soil south of Alameda Avenue is known to be contaminated with petroleum products and arsenic, lead, and zinc. Groundwater in the vicinity of the Kalamath Street and Santa Fe Drive intersections with Alameda Avenue is known to be contaminated with benzene, ethylbenzene, toluene, xylenes, cadmium, manganese, uranium, zinc, and radionuclides. Contaminated soil and groundwater would be encountered during construction. The base of the grade separation is at or near the expected depth of groundwater in the area.

Additional hazardous waste impacts associated with System Alternative 3 are common to System Alternatives 1, 2, and the Preferred Alternative and are discussed in **Section 4.13.2.2**.

Table 4.13-4 Recommendations for Additional Assessment / Investigation – System Alternative 3

Type of Environmental Condition	Address	Full or Partial Purchase	Environmental Conditions	Recommendations			Comments
				ISA ¹	PSI ²	RI/FS ³	
Recognized	1001 W. Bayaud Ave.	Full	Light industrial/commercial building. FINDS. RCRA Small Quantity Generator-violations reported. Landfill. Unknown site conditions. Former location of the Crauel Manufacturing and Vinegar Co./Leo Vinegar & Sales Co. Unknown site conditions. Located adjacent to the Consolidated Main Line railroad.	X	X		Located in area of former Lake Archer canal.
Potential	101 to 125 S. Kalamath St.	Full	Commercial/retail center with tenants ranging from interior design to printing services. Located in area of former Lake Archer canal and potential landfill.	X	X		
Potential	135 S. Kalamath St.	Full	Light industrial/commercial building. ERNS. Located in area of former Lake Archer canal and potential landfill.	X	X		
Potential	501 Raritan Way	Partial	Commercial building. USTs. Unknown site conditions.	X			
Recognized	755 S. Broadway	Partial	Automotive repair and service facility. Former United Engineers & Contractors and 723 Co. LUST. Residual petroleum impacted soil on site.	X	X		Additional investigation may be necessary for right-of-way acquisition.
Recognized	350 S. Santa Fe Drive	Partial	Vacant lot (former RTD Alameda facility). FINDS. RCRA Small Quantity Generator-no violations reported. UST. AST. LUST. Residual petroleum soil and groundwater contamination may be present.	X	X		
Recognized	330 S. Kalamath Street	Full	Gas station (former Total Petroleum gas station) FINDS. UST. LUST. Known petroleum contaminated soil and groundwater on the property.	X	X		This site is an active LUST. Coordination with OPS would be required.
Potential	280 S. Santa Fe Drive	Full	Construction supply. Former location of Six Star Lubricants. Unknown site conditions.	X			



Table 4.13-4 Recommendations for Additional Assessment / Investigation – System Alternative 3 (continued)

Type of Environmental Condition	Address	Full or Partial Purchase	Environmental Conditions	Recommendations			Comments
				ISA ¹	PSI ²	RI/FS ³	
Potential	215 S. Santa Fe Drive	Full	Fenced yard with a variety of vehicles, heavy equipment, and materials stored. No leaks or spills reported. Unknown site conditions.	X			Additional investigation may be necessary for right-of-way acquisition.
Potential	268 S. Santa Fe Drive	Full	Automotive repair and service facility. FINDS. No leaks or spills reported. Unknown material handling and disposal practices.	X			Additional investigation may be necessary for right-of-way acquisition.
Potential	39 to 57 S. Kalamath St.	Full	Vacant Lot. Former Tetrault Iron Works Co. Unknown site conditions.	X			
Potential	438 S. Federal Blvd.	Partial	Gas station. UST. Unknown site conditions.	X			
Recognized	450 S. Federal Blvd.	Partial	UST. LUST. Known petroleum impact soil and groundwater.	X	X		This site is an active LUST. Coordination with OPS would be required.

Source: FHU, 2004j

¹ Initial site assessment (ISA) recommended.

² Preliminary site investigation (PSI) recommended.

³ Remedial investigation/feasibility study (RI/FS) recommended.

AST – aboveground storage tank

FINDS – facility index system

RCRA – Resource Conservation and Recovery Act

UST – underground storage tank

ERNS – Emergency Response Notification System

LUST – leaking underground storage tank

OPS – Colorado Department of Labor and Employment Division of Oil and Public Safety

4.13.2.6 PREFERRED ALTERNATIVE

Of the properties to be partially or completely acquired for Preferred Alternative right-of-way, thirteen properties have potential or recognized environmental conditions, as shown in **Table 4.13-4**. Additional property specific information on potential and recognized environmental conditions is included in the MESA report (FHU, 2005h).

An asbestos survey was not conducted of structures to be demolished following right-of-way acquisition. Given the age of structures in the area, asbestos may be present. Asbestos is a worker and public safety concern.

The Federal Boulevard bridge over I-25 and the Alameda Avenue bridge over the South Platte River would be replaced as part of the Preferred Alternative. A lead-based paint survey was not conducted for these structures. Given the age of these structures, lead-based paint may be present. Lead-based paint is a worker and public safety concern.

Additional hazardous waste impacts associated with the Preferred Alternative that are common to System Alternatives 1, 2, and 3 are discussed in **Section 4.13.2.2**.

Table 4.13-5 Recommendations for Additional Assessment / Investigation – Preferred Alternative

Type of Environmental Condition	Address	Full or Partial Purchase	Environmental Conditions	Recommendations			Comments
				ISA ¹	PSI ²	RI/FS ³	
Recognized	1001 W. Bayaud Avenue	Full	Light industrial/commercial building. FINDS. RCRA Small Quantity Generator-violations reported. Landfill. Unknown use or contents. Former location of the Crauel Manufacturing and Vinegar Co./Leo Vinegar & Sales Co. Unknown site conditions. Located adjacent to the Consolidated Main Line railroad. Located in area of former Lake Archer canal.	X	X		
Potential	135 S. Kalamath St.	Full	Light industrial/commercial building. ERNS. Located in area of former Lake Archer canal and potential landfill.	X	X		
Potential	101 to 125 S. Kalamath St.	Full	Commercial/retail center with tenants ranging from interior design to printing services. Located in area of former Lake Archer canal and potential landfill.	X	X		
Potential	215 S. Santa Fe Drive	Full	Fenced yard with a variety of vehicles, heavy equipment, and materials stored. No leaks or spills reported. Unknown site conditions.	X			Additional investigation may be necessary for right-of-way acquisition.
Potential	39 to 57 S. Kalamath Street	Full	Vacant Lot. Former Tetrault Iron Works Co. Unknown site conditions.	X			Additional investigation may be necessary for right-of-way acquisition.
Potential	501 Raritan Way	Partial	Commercial building. USTs permanently closed at property. No leaks or spills reported. Unknown site conditions.	X			
Recognized	755 S. Broadway	Partial	Automotive repair and service facility. Former United Engineers & Contractors and 723 Co. LUST. Residual petroleum impacted soil on site.	X			

Table 4.13-5 Recommendations for Additional Assessment / Investigation – Preferred Alternative (continued)

Type of Environmental Condition	Address	Full or Partial Purchase	Environmental Conditions	Recommendations			Comments
				ISA ¹	PSI ²	RI/FS ³	
Recognized	350 S. Santa Fe Drive	Partial	Vacant lot (former RTD Alameda facility). FINDS. RCRA Small Quantity Generator-no violations reported. UST. AST. LUST. Residual petroleum soil and groundwater contamination may be present.	X			
Recognized	500 S. Santa Fe Drive	Partial	Retail center. CERCLA. FINDS. RCRA Small Quantity Generator-no violations reported. UST. LUST. Known heavy metal and radionuclide contaminated soil and groundwater.	X	X		Coordination with CDPHE would be required.
Recognized	919 W. Alameda Avenue	Partial	Former Amoco gas station. Historic gasoline filling station. FINDS. RCRA Conditionally Exempt Small Quantity Generator-no violations reported. UST. LUST. Known petroleum contaminated soil and groundwater on the property.	X	X		This site is an active LUST. Coordination with OPS would be required.
Recognized	950 W. Alameda Avenue	Partial	Restaurant (former Chevron gas station). LUST. Known petroleum contaminated soil and groundwater on the property.	X	X		This site is an active LUST. Coordination with OPS would be required.
Potential	268 S. Santa Fe Drive	Partial	Automotive repair and service facility. FINDS. No leaks or spills reported. Unknown material handling and disposal practices.	X			Additional investigation may be necessary for right-of-way acquisition.
Recognized	450 S. Federal Blvd.	Partial	Automotive repair and supply facility. Former gas station. UST. LUST. Known petroleum impact soil and groundwater.	X	X		This site is an active LUST. Coordination with OPS would be required.

Source: FHU, 2004j

¹ Initial site assessment (ISA) recommended.

² Preliminary site investigation (PSI) recommended.

³ Remedial investigation/feasibility study (RI/FS) recommended.

AST – aboveground storage tank

FINDS – facility index system

RCRA – Resource Conservation and Recovery Act

UST – underground storage tank

ERNS – Emergency Response Notification System

LUST – leaking underground storage tank

OPS – Colorado Department of Labor and Employment Division of Oil and Public Safety

4.13.3 Mitigation Measures

The project is located in an area with a long history of industrial and commercial land use. Although scattered residences are located throughout the area, historic industrial and commercial processes have influenced the project area. Soil and groundwater contamination may be present throughout the project area. Encountering soil and groundwater during construction without prior knowledge can affect the project in terms of cost, schedule, and agency and public relations. In addition, the acquisition of properties with contaminated soil and groundwater by CDOT for right-of-way can lead to liability concerns related to remediation of those properties. The following sections discuss the recommended avoidance, minimization, and mitigation measures for System Alternatives 1, 2, 3, and the Preferred Alternative.

4.13.3.1 NO ACTION ALTERNATIVE

No mitigation measures are necessary, since the No Action Alternative would result in no impacts to or from sites with recognized or potential environmental conditions .

4.13.3.2 MITIGATION MEASURES COMMON TO SYSTEM ALTERNATIVES 1, 2, 3, AND THE PREFERRED ALTERNATIVE

This section discusses mitigation measures for hazardous waste impacts common to each of System Alternatives 1, 2, 3, and the Preferred Alternative.

Right-of-Way Acquisition

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

- Initial Site Assessment (ISA): The ISA is similar to a MESA or Phase I Environmental Site Assessment and involves a site reconnaissance, historical land use review, and database search. An ISA is performed on properties that are to be acquired by or dedicated to CDOT.
- Preliminary Site Investigation (PSI): The PSI is an investigation performed on properties with potential environmental conditions. A PSI involves a drilling/sampling and analytical program to determine preliminary information regarding environmental conditions on the property. The objective of the PSI 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.
- Remedial Investigation/Feasibility Study (RI/FS): The RI/FS is a detailed, comprehensive investigation that further delineates the magnitude of contamination on a property. The RI/FS details the mitigation and clean-up strategies and provides cost estimates for the clean-up and mitigation of a 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 are identified in **Tables 4.13-2, 4.13-3, and 4.13-4.**

Known Soil and Groundwater Contamination

Several areas of known contaminated soil and groundwater are located in the project area:

- Broadway and I-25 interchange
- Santa Fe Drive and Kalamath Street intersections with Alameda Avenue
- Cherokee Street and Alameda Avenue intersection
- Lipan Street and Alameda Avenue intersection
- East of the US 6 and I-25 interchange
- South of US 6 along Bryant Street and Federal Boulevard

In addition, historical landfills and fill areas are located throughout the project area.

A PSI will be conducted along the project corridor prior to final design to identify soil and groundwater contamination that may affect feasibility and final design. The investigation would be focused on areas with known soil and groundwater contamination, as well as areas where little or no information is available on potential environmental conditions related to hazardous waste, such as the area of the Santa Fe Drive and Kalamath Street grade separation with the Consolidated Main Line railroad.

Contaminated Materials Management

A materials handling plan and a health and safety plan, as required by Section 250.03 of the *CDOT Standard Specifications for Road and Bridge Construction* (CDOT, 1999) will be used throughout the project area. The materials handling plan and health and safety plan will be based on the findings of the corridor-wide PSI and any relevant information that is identified during the right-of-way acquisition process.

Prior to demolition of any structures or removal of utility lines, an asbestos and miscellaneous hazardous materials survey will be conducted at each property. Materials abatement will be conducted, as necessary, according to Section 250, Environmental, Health, and Safety Management, of the *CDOT Standard Specifications for Road and Bridge Construction* (CDOT, 1999) and relevant Occupational Safety and Health Administration (OSHA) and other regulatory requirements.

The Santa Fe Drive viaduct and the Alameda Avenue bridges over I-25, US 6 bridge over the South Platte River, and the Consolidated Main Line railroad bridge over Alameda Avenue are potentially coated in lead-based paint. A lead-based paint survey will be performed prior to demolition. If lead or heavy metals-based paint is identified, heavy metals-based paint management as required by Section 250.04 of the *CDOT Standard Specifications for Road and Bridge Construction* (CDOT, 1999), will be performed.

4.13.3.3 SYSTEM ALTERNATIVE 1

This section discusses mitigation measures for hazardous waste impacts associated with System Alternative 1.

Right-of-Way Acquisition

Fourteen properties with potential or recognized environmental conditions will be partially or completely acquired for System Alternative 1 right-of-way. **Table 4.13-2** includes the recommended requirements for right-of-way acquisition. The CDOT right-of-way process is discussed in **Section 4.13.3.2**.

Known Soil and Groundwater Contamination

Three active LUST sites would be acquired for right-of-way for System Alternative 1 (see **Table 4.13-2**). In conjunction with final design, a detailed review of OPS files related to these properties would identify the results of any additional site investigations conducted at these properties, remedial systems or actions installed at the properties, and quarterly monitoring requirements. Prior to acquisition of these properties, coordination with OPS will be required. If site characterization and/or remediation has not been completed, CDOT 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 ISAs.

4.13.3.4 SYSTEM ALTERNATIVE 2

This section discusses mitigation measures for hazardous waste impacts associated with System Alternative 2.

Right-of-Way Acquisition

Nineteen properties with potential or recognized environmental conditions would be partially or completely acquired for System Alternative 2 right-of-way. **Table 4.13-3** includes recommended requirements for right-of-way acquisition. The CDOT right-of-way process is discussed in **Section 4.13.3.2**.

Known Soil and Groundwater Contamination

System Alternative 2 includes a grade separation of southbound Broadway to southbound I-25, using either a tunnel or flyover. If a tunnel were selected, it would be located in an area of known groundwater contamination and on-going investigation and remediation. Concentrations of benzene and TCE exceeding Colorado groundwater standards have been identified in the area. Groundwater benzene concentrations in bedrock wells ranged from 1.0 parts per billion (ppb) to 17,000 ppb (Cherokee Denver, 2003a). Groundwater TCE concentrations ranged from 2.0 ppb to 52,000 ppb (Cherokee Denver, 2003b; CCD, 2004d). The Colorado Basic Standard for groundwater for both TCE and benzene is 5.0 ppb (CDPHE, 1999).

The Cherokee Denver LLC site is undergoing site characterization, and the site has been divided into operable units. VCUP applications are being prepared for the site, and two operable units have been accepted into the CDPHE VCUP. As part of the VCUP, a remedial action, such as installation of a remediation system, will be conducted on the Cherokee Denver site to manage off-site groundwater contamination. In addition, the TCE contaminated groundwater is being investigated on the east side of Broadway (CCD, 2004d). The U.S. EPA Region 8 Superfund Regional Response Team is also investigating TCE contaminated groundwater in the vicinity of Logan Street and I-25 (CCD, 2004d). Remedial actions have not been identified for these areas.

As shown by the number of investigations being conducted in the area, several sources of TCE are located in the vicinity of the I-25 and Broadway interchange. Depending on these results, additional investigations may be required to determine the feasibility of this alternative. Current investigation/remediation results would be reviewed. The base of the tunnel would be at or below the groundwater table and is expected to encounter contaminated soil and groundwater.

Based on the hazardous waste impacts associated with the tunnel, CDOT would coordinate with EPA, CDPHE, and the City and County of Denver Department of Environmental Health throughout alternative selection and final design. Contaminated groundwater could potentially seep into the tunnel structure. Final design of the tunnel would require a drainage system to ensure groundwater and stormwater do not commingle. Contaminated groundwater would need to be contained, conveyed, and treated before any discharge to surface or groundwater. A Section 402 permit (Clean Water Act/Colorado Discharge Permit System) would be required from the CDPHE Water Quality Control Division in order to discharge treated groundwater. A permit would also be needed to discharge groundwater or stormwater from sumps. Contaminated groundwater would be collected separately and require long-term management. Long-term management would require either an on-site treatment system for discharge into the storm sewer system or collection of the groundwater and management of the contaminated groundwater off-site at a RCRA treatment facility. Discharge of groundwater to a City and County of Denver storm sewer will require a discharge permit from the City and County of Denver Wastewater Management Division. Treatment systems would require routine monitoring and reporting to the CDPHE Water Quality Control Division along with routine operation and maintenance activities.

Construction of the tunnel would require hazardous waste and solid waste management. A site-specific materials handling plan, as required by Section 250.03 of the *CDOT Standard Specifications for Road and Bridge Construction* (CDOT, 1999), would be prepared for construction of the tunnel. A health and safety plan would also be prepared and would need to

address the construction technique and potential hazards to be encountered during construction.

A portion of the Home Depot CERCLA Superfund site would be acquired for right-of-way for System Alternative 2. A remedial action has been implemented for the property, which is Operable Unit 9 of the Denver Radium Superfund site. The parking lot of the Home Depot store caps heavy metal contaminated soils that remain in-place on the site, and an area of consolidated thorium contaminated soils are located north of the Home Depot store.. Heavy metal and radionuclide contaminated groundwater is present on the site and downgradient off the site toward I-25 and the South Platte River. As part of the remedial action, CDPHE conducts annual groundwater and surface water monitoring.

Prior to final design, a detailed file review of the Home Depot site would be conducted. The objective of the file review would be to maximize avoidance of the remedial action and determine any site-specific concerns and design requirements. CDOT would coordinate with CDPHE on final design and any changes to the Home Depot site. In addition, CDOT would assume liability for any changes that affect the remedial action.

Four active LUST sites would be acquired for right-of-way for System Alternative 2 (see **Table 4.13-3**). In conjunction with final design, a detailed review of OPS files related to these properties would identify the results of any additional site investigations conducted at these properties, remedial systems or actions installed at the properties, and quarterly monitoring requirements. Prior to acquisition of these properties, coordination with OPS would be required. If site characterization and/or remediation has not been completed, CDOT 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 ISA.

4.13.3.5 SYSTEM ALTERNATIVE 3

This section discusses mitigation measures for hazardous waste impacts associated with System Alternative 3.

Right-of-Way Acquisition

Thirteen properties with potential or recognized environmental conditions would be partially or completely acquired for System Alternative 3 right-of-way. **Table 4.13-4** includes recommended requirements for right-of-way acquisition. The CDOT right-of-way process is discussed in **Section 4.13.3.2**.

Known Soil and Groundwater Contamination

It is anticipated that groundwater and soil contaminated with petroleum, heavy metals, and radionuclides would be encountered during construction of the grade separation at Alameda Avenue for a combined Santa Fe Drive and Kalamath Street, and contaminated groundwater would be a long-term concern. Three active LUST sites adjacent to the Santa Fe Drive and Kalamath Street and Alameda Avenue intersection. Concentrations of benzene exceeding Colorado groundwater standards have been identified in the area. Benzene concentrations ranging from 17.7 ppb to 390 ppb have been reported in groundwater in the vicinity of the intersection (Higgins & Associates, 2001; Delta, 2003). The Home Depot CERCLA Superfund site is located southeast and upgradient of the area. Elevated concentrations of cadmium, manganese, uranium, zinc, radium 226, radium 228, and gross alpha radionuclides have been reported in groundwater downgradient of the Home Depot CERCLA Superfund site (CDPHE, 2003c).

Prior to final design of the grade separation, a RI/FS would be conducted by CDOT. The objective of the RI/FS would be to identify the vertical and horizontal extent of soil and groundwater contamination along the extent of the grade separation. Based on preliminary design, the base of the grade separation would be at or below the groundwater table and is expected to encounter contaminated soil and groundwater. Based on the hazardous waste impacts associated with the grade separation, CDOT would coordinate with EPA, CDPHE, and the City and County of Denver Department of Environmental Health throughout final design.

Contaminated groundwater could potentially seep into the grade separation structure. Final design of the grade separation would require a drainage system to ensure groundwater and stormwater do not commingle. Contaminated groundwater would need to be contained, conveyed, and treated before any discharge to surface or groundwater. A Section 402 permit (Clean Water Act/Colorado Discharge Permit System) would be required from the CDPHE Water Quality Control Division in order to discharge treated groundwater. A permit would also be needed to discharge groundwater or stormwater from sumps. Contaminated groundwater would be collected separately and require long-term management. Long-term management would require either an on-site treatment system for discharge into the storm sewer system or collection of the groundwater and management of the contaminated groundwater off-site at a RCRA treatment facility. Discharge of groundwater to a City and County of Denver storm sewer would require a discharge permit from the City and County of Denver Wastewater Management Division. Treatment systems would require routine monitoring and reporting to the CDPHE Water Quality Control Division along with routine operation and maintenance activities.

Construction of the grade separation would require hazardous waste and solid waste management. A site-specific materials handling plan, as required by Section 250.03 of the *CDOT Standard Specifications for Road and Bridge Construction* (CDOT, 1999), would be prepared. A health and safety plan would also be prepared to address potential hazards to be encountered during construction.

Two active LUST sites would be acquired for right-of-way for System Alternative 3 (See **Table 4.13-3**). In conjunction with final design, a detailed review of OPS files related to these properties would identify the results of any additional site investigations conducted at these properties, remedial systems or actions installed at the properties, and quarterly monitoring requirements. Prior to acquisition of these properties, coordination with OPS would be required.

If site characterization and/or remediation has not been completed, CDOT 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.

4.13.3.6 PREFERRED ALTERNATIVE

This section discusses mitigation measures for hazardous waste impacts associated with the Preferred Alternative.

Right-of-Way Acquisition

Thirteen properties with potential or recognized environmental conditions will be partially or completely acquired for Preferred Alternative right-of-way. **Table 4.13-4** includes recommended requirements for right-of-way acquisition. The CDOT right-of-way process is discussed in **Section 4.13.3.2**.

Prior to right-of-way acquisition, the MESA will be updated to reassess sites with potential and recognized environmental conditions.

Known Soil and Groundwater Contamination

Three active LUST sites would be acquired for right-of-way for System Alternative 3 (See **Table 4.13-4**). In conjunction with final design, a detailed review of OPS files related to these properties would identify the results of any additional site investigations conducted at these properties, remedial systems or actions installed at the properties, and quarterly monitoring requirements. Prior to acquisition of these properties, coordination with OPS would be required. If site characterization and/or remediation has not been completed, CDOT 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 ISA.