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FINAL INSTITUTIONAL CONTROL IMPLEMENTATION AND ASSURANCE PLAN

VASQUEZ BOULEVARD/INTERSTATE 70 OPERABLE UNIT 1 – RESIDENTIAL SOILS DENVER, COLORADO

CERCLIS ID: CO0002259588

Prepared for:

U.S. Army Corps of Engineers, Omaha District
Omaha, Nebraska
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Environmental Protection Agency
Region 8
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USACE Contract No. W9128F-12-D-0003
Task Order No. 0002

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November 2016

VASQUEZ BOULEVARD/INTERSTATE 70
OPERABLE UNIT 1 – RESIDENTIAL SOILS
DENVER, COLORADO

Institutional Control Implementation and Assurance Plan

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List of Abbreviations and Acronyms

bgs	below ground surface
CB&I	CB&I Federal Services LLC
CDPHE	Colorado Department of Public Health and Environment
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
EPA	U.S. Environmental Protection Agency
ESD	Explanation of Significant Differences
IC	Institutional Control
ICIAP	Institutional Control Implementation and Assurance Plan
NPL	EPA Superfund National Priorities List
NTCRA	Non-Time Critical Removal Action
O&M	Operation and Maintenance
OU	Operable Unit
ppm	parts per million
RI	Remedial Investigation
ROD	Record of Decision
Site	VB/I-70 Superfund Site
TCRA	Time Critical Removal Action
USACE	U. S. Army Corps of Engineers
VB/I-70	Vasquez Boulevard and Interstate 70

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1.0 Introduction

This Institutional Control Implementation and Assurance Plan (ICIAP) was prepared by CB&I Federal Services LLC (CB&I) for the U.S. Army Corps of Engineers (USACE) and the U.S. Environmental Protection Agency (EPA) Region 8 addressing the Vasquez Boulevard and I-70 (VB/I-70) Superfund Site (Site) (ID: CO0002259588) in Denver, Colorado. The Site has been divided into three separate operable units (OUs). This ICIAP addresses OU1, which is the residential yards within the Site with levels of arsenic and/or lead in soil that present an unacceptable risk to human health. Investigation and response actions at OU1 were performed by EPA under the Superfund law. Remediation of OU1, including selection of Institutional Controls (ICs), was performed independent of OU2 and OU3.

Specifically, this ICIAP covers the following informational ICs, which were added to the OU1 remedy via the 2014 Explanation of Significant Differences (ESD) (EPA, 2014a) and were implemented in 2014 and 2015:

- Notice of Environmental Conditions/Notice of Potential Environmental Conditions filed in the property title records to notify present, prospective, and future owners of the potential for elevated arsenic or lead in the property soil.
- Annual informational letters mailed to each owner of record, as well as each property address (should there be a tenant), to ensure that both would be aware of the potential for soil contamination and to provide information on how to minimize the potential for exposure to potentially contaminated soil.

These informational ICs are required at the individual OU1 properties where EPA was not granted access to sample and/or remove soil.

As these informational ICs are already implemented, this ICIAP focuses on required maintenance activities, including identification of the response organizations. This ICIAP also includes information regarding potential modification or termination of the ICs. This ICIAP was designed to help ensure that the ICs continue to operate as intended. The ICIAP acts as the Operation and Maintenance (O&M) Plan for OU1 due to the nature and status of the remedy. This plan outlines O&M procedures. Colorado Department of Public Health and Environment (CDPHE) is the lead agency for O&M at OU1.

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2.0 Site Details

2.1 Site Description

The VB/I-70 Site is comprised of approximately 4.5 square miles, located in the north-central section of the city and county of Denver, Colorado. There are three OUs within the VB/I-70 Site. OU2 and OU3 are the former sites of the Omaha & Grant Smelter and the Argo Smelter sites respectively. The structures associated with these smelters have been demolished and the areas have been redeveloped with commercial businesses.

OU1 is defined as residential yards within the Site with levels of lead or arsenic in soil that present an unacceptable risk to human health. OU1 includes the Denver neighborhoods of Cole, Clayton, Swansea, and Elyria, as well as the southwest portion of the Globeville neighborhood and a northern section of the Curtis Park neighborhood (**Figure 1**). There are approximately 4,000 residential properties, 10 schools, and 7 parks located within the OU1 boundary. Most residences are single family dwellings; however, some multi-family homes and apartment buildings are also present. A number of commercial and industrial properties are within the boundaries of OU1 as well.

3.0 Operable Unit 1

3.1 Characteristics and History

Historically, the VB/I-70 Site location was a major smelting center for the Rocky Mountain West. The Omaha & Grant Smelter, the Argo Smelter, and the ASARCO Globe Smelter all previously operated in the area refining gold, silver, cadmium, copper, lead, and zinc (CB&I, 2015).

The smelter sites came to the attention of EPA as a result of studies directed by the CDPHE at the ASARCO Globe Smelter – a separate site from VB/I-70. These studies indicated elevated concentrations of arsenic and/or lead were present in the soils of some residential properties in the Swansea and Elyria area due to historical smelter operations. Subsequent investigations indicated that arsenic contamination might also be present as a result of application of lawn care products.

In March of 1998, following a request for assistance from the CDPHE, EPA began investigating the nature and extent of metals contamination at the OU1 Site with an extensive soil sampling effort. Soils were sampled in the residential yards, schools, and playgrounds in Swansea, Elyria, and the northern half of the Cole and Clayton neighborhoods. Based on the results of this sampling effort and meetings with community members, EPA defined a study area that included all of the Swansea, Elyria, Cole, Clayton, and portions of Globeville neighborhoods. Based on

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results from the sampled properties, EPA determined that the residential properties located within this study area contained concentrations of arsenic and/or lead at levels that could present unacceptable health risks to residents with long term exposures. Consequently, on July 22, 1999, EPA added the VB/I-70 Site to the EPA Superfund National Priorities List (NPL).

Following the addition of the VB/I-70 Site to the NPL, the EPA began a large residential-soil remedial investigation (RI) in August of 1999. Over 3,000 of the approximately 4,000 properties at the Site were sampled, resulting in an estimated 850 residential properties with concentrations of lead and/or arsenic high enough to require remediation.

To protect young children from adverse health effects related to short-term (sub-chronic) exposure, EPA conducted Time Critical Removal Action (TCRA) efforts (soil removal and backfill with clean soil) for 18 OU1 properties in 1998 and 30 properties in 2000. The action level for the TCRAs was average arsenic soil concentration greater than 450 parts per million (ppm) and/or lead soil concentration greater than 2,000 ppm. These action levels were established by an Action Memorandum issued in September 1998 for the effort.

EPA also conducted a Non-Time Critical Removal Action (NTCRA) at OU1 (soil removal and backfill with clean soil) to address the properties that present the highest risk of adverse health effects to children and adult residents. The NTCRA was conducted in 2003 at 133 properties with arsenic soil concentrations greater than the action level of 240 ppm and/or lead soil concentrations greater than the action level of 540 ppm. These action levels were established by an Action Memorandum issued in March 2003 for the effort. The properties not addressed by the NTCRA were included in the list of properties to be addressed by the subsequent remedial action.

The EPA released a Proposed Plan outlining its preferred clean-up option for the remaining OU1 properties in May 2002. Extensive public comments were received requesting EPA lower the soil concentration clean-up levels from 240 ppm to 70 ppm for arsenic and from 540 ppm to 400 ppm for lead to match the cleanup levels adopted for the Globe Site. The adjusted cleanup levels were within the range of preliminary remediation goals identified in the Feasibility Study (MFG, 2001) based on results of the Baseline Risk Assessment (EPA, 2001). A new clean-up alternative that included the lower clean-up levels was published in May 2003. A Record of Decision (ROD) detailing EPA's final clean-up decision for OU1 was then issued on September 25, 2003 (EPA, 2003). The selected cleanup remedy for OU1 consisted of the following three components:

1) Soil sampling
2) Soil removal
3) Informational institutional controls

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3.1.1 Soil Sampling

Prior to the ROD, approximately 75 percent of the residential properties within the VB/I-70 Site boundary had been sampled for arsenic and lead. Because the spatial pattern of arsenic and lead contamination is variable throughout the Site, it was not possible to assess if a specific property required a soil removal without data from that property. Therefore, a program of on-going soil sampling was included in the remedy for residential properties that had not been adequately tested.

The soil sampling program began with the identification of properties that required sampling. Once access had been obtained from the property owner to conduct the sampling, soil samples were collected from the property and analyzed for arsenic and lead. The results were provided to the property owner and evaluated to determine if a soil removal was needed.

3.1.2 Soil Removal

Soil removals occurred at properties that had arsenic and/or lead soil concentrations greater than the following action levels, as specified in the OU1 ROD:

- Highest arsenic concentration from the three composite soil samples taken from the property was greater than 70 ppm.
- Average lead concentration from the three composite soil samples taken from the property was greater than 400 ppm.

The soil removal activities included excavation of all accessible soils to a depth of 12 inches,[1] backfilling the excavation with clean soil, off-site disposal of the excavated soil, restoration of remediation yard features, and landscaping in accordance with the homeowner agreed upon restoration plan. Exterior lead-based paint assessments were conducted for all properties that received soil removal due to elevated lead concentrations. Exterior lead-based paint abatement was completed for all properties that the peeling of lead-based paint on the property was sufficient to cause potential recontamination of the soil above the remedial action level.

EPA performed soil removals in 2003 through 2008, addressing approximately 800 properties. In 2008, the soil removal component of the remedy was considered complete. However, at that time, approximately 190 properties were unaddressed because the owners had not granted access to EPA to sample the property or to complete the soil removal if the EPA soil sampling results were above the remedial action levels (EPA, 2008). It was not cost effective for EPA to keep open the option for sampling and cleanup for these unaddressed properties into the indefinite future. Therefore, EPA, with support from CDPHE, decided to implement a process of notices of environmental conditions with annual informational letters at each of the unaddressed properties

[1] The soil removal depth was determined during the Remedial Investigation/Feasibility Study. The results of these studies found that lead and arsenic concentrations in soil reduced with depth, and at 6 inches in depth, lead and arsenic concentrations in soil were below levels of health concern. Therefore, removal of 12 inches of soils from residential properties was determined to be sufficient to remove the site contaminants.

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to address the risk/potential risk from arsenic and/or lead in soil. Notices of environmental conditions and annual informational letters were added to the OU1 remedy as informational ICs via an ESD, which was signed on September 30, 2014 (EPA, 2014).

In 2012, EPA decided that before implementing notices of environmental conditions on the unaddressed properties, it would offer the owners one more opportunity to have their properties sampled and/or remediated. Almost 50 percent of the properties had changed ownership between 2006 and 2012 (without a process in place to notify the new property of the contamination/possible contamination on the property) and EPA did not feel it was appropriate to implement notices of environmental conditions without offering these property owners the opportunity to have their property addressed. An additional 99 properties were sampled in 2012 through 2015 and an additional 26 properties were remediated in 2013 through 2015 (EPA, 2013).

Despite EPA's efforts, 45 properties remained unsampled and 10 properties remained unremediated (soil sampling data exceeded the remedy action levels) because the property owners failed to respond to or denied EPA's request for access; these properties have potential/known contamination unacceptable to human health.

3.1.3 Informational Institutional Controls

A community health program was specified in the OU1 ROD as part of the remedy. Although not styled as such in the ROD, EPA considers the community health program to be an informational IC. The community health program was available in 2004 through 2008, when the soil sampling and removal components of the remedy were initially considered complete (EPA, 2008).

The community health program was developed in consultation with an advisory stakeholders group for the VB/I-70 Site, and implemented by the City and County of Denver. The community health program consisted of two activities: providing biomonitoring services for children and conducting community outreach. Participation in one or both of the program activities was strictly voluntary, and there was no charge to eligible residents and property owners for any of the services offered by the community health program.

With the completion of the community health program, EPA added notices of environmental conditions with annual informational letters to the OU1 remedy in 2014 via the ESD; these informational ICs were added to address the remaining unsampled/unremediated properties.

For the residential properties where EPA has not sampled, a Notice of Potential Environmental Conditions was filed with the City and County of Denver Clerk and Recorders Office in the title records. For properties where soil removal was not conducted even though it is required based on EPA's soil sampling results for lead and/or arsenic, a Notice of Environmental Conditions was filed with the City and County of Denver Clerk and Recorders Office in the title records. EPA

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filed these notices in 2014 and 2015 for the 55 remaining unaddressed properties to notify present, prospective, and future owners of the potential for elevated levels of lead or arsenic in the property soil. EPA provided a copy of the filed notice to each property owner of record. **Table 1** lists the property address where the notices have been filed, as well as the notice filing date and identification.

The annual informational letters are to be sent to each owner of record, as well as each property address, for the unaddressed properties. The annual informational letters provide specific informational that EPA has on the property and how to minimize the potential for exposure to potentially contaminated soil. Drafting and mailing of the annual informational letters started in 2015.

3.2 Response Action Summary

A brief summary of the response action at OU1 is provided in Section 3.1 as part of the characteristics and history description. Further details regarding the OU1 remedial action are provided in the Remedial Action Report (CB&I, 2016).

3.3 Contaminant of Concern

The chemicals of concern at OU1 are arsenic and lead in the shallow soil (less than 6 inches below ground surface [bgs]).

3.4 Current Site Information

3.4.1 Parcel Ownership/Occupancy Information

All the properties included in OU1 are privately owned residencies. **Table 1** summarizes the property addresses where the notices of environmental conditions and annual informational letters are required and have been implemented.

3.4.2 Property Interest and Resource Ownership

There are currently no additional property interests at OU1 that may impact the ICs.

3.4.3 Current and Reasonably Anticipated Future Site Land Use

OU1 is currently residential in nature. The VB/I-70 Site covers an area of approximately 4.5 square miles which includes schools, parks, and retail businesses and over 4000 residences. The VB/I-70 Site is developed with very little vacant land available. In discussions with the City and County of Denver, there are no reasonably foreseeable changes in the future land use of the VB/I-70 Site.

3.4.4 Stakeholders

There are currently no additional stakeholders other than EPA, CDPHE, and the residents in OU1.

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3.5 Site Mapping

Mapping of OU1 site boundary and features are shown in **Figure 1. Plate 1** shows the locations of the remaining unaddressed OU1 properties; these properties have the notice of environmental conditions and annual information letters implemented.

4.0 Institutional Control Instruments

4.1 Key Components

4.1.1 Institutional Control Objectives

The objectives of the informational ICs for OU1 are as follows:

> *Reduce or control human exposure to potentially contaminated soil on these properties by providing information regarding the potentially contaminated soils to current and future property owners or tenants.*

4.1.2 Instrument Duration

The individual notices of environmental conditions with annual information letters are anticipated to be in-place perpetually at the properties because the arsenic and/or lead concentrations potentially present an unacceptable risk to human health.

4.2 Instrument Categories

ICs are typically divided into four distinct categories: proprietary controls, government controls, enforcement documents, and informational devices. The notices of environmental conditions and annual informational letters for OU1 are informational ICs. No use restrictions are associated with these informational devices.

5.0 Institutional Control Maintenance

The following maintenance activities are required for the notices of environmental conditions and annual information letters:

- Monitoring of the ICs
- Review of property records for the properties that have either a recorded Notice of Potential Environmental Conditions or a recorded Notice of Environmental Conditions
- Preparation and mailing of the annual informational letters

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CDPHE is responsible for completing these required maintenance activities. CDPHE completed the 2016 annual mailing letters in September. EPA had previously completed the annual mailing letters in June, 2015.

EPA is responsible for conducting five-year reviews.

6.0 Institutional Control Enforcement

The notices of environmental conditions and annual informational letters at OU1 are informational ICs and do not have an enforceable component.

7.0 Institutional Control Modification and Termination

If an event occurs that could lead to a modification, this plan should be reviewed and revised accordingly to ensure the ICs at the properties continue to provide adequate protection. EPA is responsible for determining the need for and completing the modification of this document. An evaluation of the ICs protectiveness will also be completed as part of the recurring Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) five-year reviews to be conducted for the VB/I-70 Site. Five Year Reviews are required because the arsenic and/or lead concentration present/potentially present at the OU1 unaddressed properties do not allow for unlimited use/unrestricted exposure (EPA 2009, 2014b). EPA will conduct the next five year review in 2019.

Termination of ICs may occur if:

- For properties where the sampling results exceed the remedial action level for arsenic and/or lead: the soil removal component of the remedy is implemented, which involves excavating all accessible soil to a depth of 12 inches and properly disposing of the excavated soil off-site.
- For unsampled properties: the soil sampling component of the remedy is completed and the results do not exceed the action levels for arsenic and lead.

CDPHE is responsible for determining, in consultation with EPA, the need for IC termination at an individual property and for filing a Withdrawal Notice to remove the Notice of Potential Environmental Conditions/Notice of Environmental Conditions. CDPHE is also responsible for removing such a property from the list for the annual informational letters.

8.0 References

CB&I Federal Services LLC (CB&I). 2015. *Final Sampling and Construction Site Report Addendum*. Report amended by CB&I for USACE, Omaha District, Contract No. W9128F-12-D-0003. November.

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EPA. 2013. *Remedial Design Work Plan for Soil Sampling and Remediation Program, Operable Unit 1, Vasquez Boulevard/Interstate 70 Superfund Site, Denver, Colorado*. Originally prepared by MFG, Inc. and Tetra Tech EM Inc. Edited by Shaw Environmental & Infrastructure, Inc. July.

EPA. 2014 a. *Explanation of Significant Differences, Operable Unit 1, Vasquez Boulevard/Interstate 70, City and County of Denver, Colorado*. September.

EPA. 2014 b. *Second Five-Year Review, Vasquez Boulevard/I-70 Superfund Site, City and County of Denver, Colorado, CERCLIS ID CO0002259588*. September.

MFG Inc. (MFG). 2001. *Feasibility Study Report for Operable Unit 1, Vasquez Boulevard/Interstate 70 Superfund Site, Denver, Colorado*. October.

TABLES

TABLE 1 PROPERTIES WITH FILED NOTICES OF ENVIRONMENTAL CONDITIONS
VB/I-70 OU1 Superfund Site
Denver, Colorado

Address	Soil Sampled	Highest Arsenic Sample Results (ppm)	Average Lead Concentration (ppm)	Soil Removal Required	Soil Removal Complete	NEC/NPEC Filed Recorded Date	NEC/NPEC Filed Reception Number
1526 E 35TH AVE	No					6/25/2014	2014074078
1633 E 33RD AVE	No					6/25/2014	2014074079
2626 BRUCE RANDOLPH AVE	No					6/25/2014	2014074080
2736 E 44TH AVE	No					6/25/2014	2014074081
3227 MILWAUKEE ST #5	No					6/25/2014	2014074082
3242 WILLIAMS ST	No					6/25/2014	2014074105
3244 HIGH ST	No					6/25/2014	2014074106
3311 SAINT PAUL ST	Yes	90	237	Yes	No	7/24/2014	2014088507
3324 ELIZABETH ST	No					6/25/2014	2014074109
3326 MARION ST	No					6/25/2014	2014074110
3351 GAYLORD ST	Yes	470	477	Yes	No	6/25/2014	2014074066
3421 VINE ST	Yes	297	250	Yes	No	6/25/2014	2014074067
3430 JACKSON ST	Yes	76	77	Yes	No	6/25/2014	2014074069
3434 GARFIELD ST	No					6/25/2014	2014074111
3439 WILLIAMS ST	No					6/25/2014	2014074112
3500 BRUCE RANDOLPH AVE	No					6/25/2014	2014074114
3514 WILLIAMS ST	No					6/25/2014	2014074115
3518 MARION ST	Yes	19	417	Yes	No	6/25/2014	2014074070
3526 GAYLORD ST	No					6/25/2014	2014074117
3528 COLUMBINE ST	No					6/25/2014	2014074118
3541 STEELE ST	Yes	76	212	Yes	No	6/25/2014	2014074072
3541-3547 COLUMBINE ST	No					6/25/2014	2014074119
3548 MARION ST	Yes	23	436	Yes	No	6/25/2014	2014074073
3611 MILWAUKEE ST	No					6/25/2014	2014074121
3620 CLAYTON ST	No					6/25/2014	2014074122
3624 GILPIN ST	Yes	75	248	Yes	No	6/25/2014	2014074075
3624-3626 JOSEPHINE ST	No					6/25/2014	2014074123
3626 MADISON ST	No					6/25/2014	2014074124
3700 GAYLORD ST	No					6/25/2014	2014074127
3701 YORK ST	No					6/25/2014	2014074128
3737 FILLMORE ST	No					6/25/2014	2014074129
3753 FRANKLIN ST	No					6/25/2014	2014074130
3811 MADISON ST	No					6/25/2014	2014074131
3928 STEELE ST	Yes	80	170	Yes	No	6/25/2014	2014074076
3986 ADAMS ST	No					6/25/2014	2014074132
4114 STEELE ST	No					6/25/2014	2014074133
4115 GARFIELD ST	No					6/25/2014	2014074134
4344 STEELE ST	Yes	148	130	Yes	No	5/23/2014	2014059506
4431 ELIZABETH ST	No					6/25/2014	2014074135
4447 COOK ST VCNT	No					6/25/2014	2014074136
4611 CLAYTON ST	No					6/25/2014	2014074137
4644 WILLIAMS ST	No					7/24/2014	2014088509
4653 COLUMBINE ST	No					6/25/2014	2014074138
4657 COLUMBINE ST	No					6/25/2014	2014074139

TABLE 1 PROPERTIES WITH FILED NOTICES OF ENVIRONMENTAL CONDITIONS
VB/I-70 OU1 Superfund Site
Denver, Colorado

Address	Soil Sampled	Highest Arsenic Sample Results (ppm)	Average Lead Concentration (ppm)	Soil Removal Required	Soil Removal Complete	NEC/NPEC Filed Recorded Date	NEC/NPEC Filed Reception Number
4675 HIGH ST	No					7/16/2015	2015098106
4677 HIGH ST	No					7/16/2015	2015098103
4679 HIGH ST	No					7/16/2015	2015098104
4685 HIGH ST	No					7/16/2015	2015098105
4735 MILWAUKEE ST	No					6/25/2014	2014074141
4780 SAINT PAUL CT	No					6/25/2014	2014074142
4823 STEELE ST	No					6/25/2014	2014074143
4976 FILLMORE ST	No					6/25/2014	2014074144
5017 ADAMS ST	No					6/25/2014	2014074145
5125 STEELE ST	No					6/25/2014	2014074146
5190 MILWAUKEE ST	No					6/25/2014	2014074147

Notes

Lead and arsenic were characterized by three composite samples collected at each property.

Acronyms

AVE	avenue
CT	court
E	east
NEC	notice of environmental conditions
NPEC	notice of potential environmental conditions
OU1	Operable Unit 1
ppm	part(s) per million
ST	street
VB/I-70	Vasquez Boulevard and Interstate 70

FIGURES

Figure 1: Vasquez Blvd. and I-70 Superfund Site Boundary Map

Denver County, Colorado

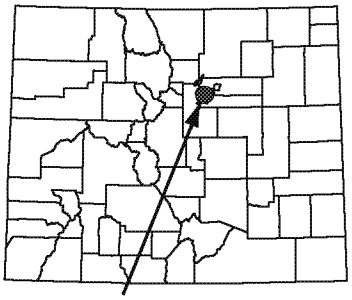
NPL Boundary

Operable Unit Boundary

0 1,000 2,000 Feet

0 250 500 Meters

N



Map Date: January 14, 2011

Map Projection: UTM, Meters, 13 North, NAD83

Data Sources: *Boundaries* - U.S. EPA Region 8 (2011); *Imagery* - USDA NAIP 1-meter aerial photo (2009).

*Boundaries are based on the nature and extent of contamination and are subject to change.

PLATES

LEGEND

- NO FURTHER ACTION
- NOTICE OF POTENTIAL ENVIRONMENTAL CONDITIONS FILED - SAMPLING OUTSTANDING
- NOTICE OF ENVIRONMENTAL CONDITIONS FILED - SOIL REMOVAL OUTSTANDING
- COUNTY LINE

DATA SOURCES:

IMAGERY - ESRI: WORLD TOPO MAP
PARCELS - CITY AND COUNTY OF DENVER (2003)
PARCEL STATUS - U.S. EPA REGION 8 (2015)

STATUS DATE: JULY 16, 2015

N

0 175 350 700 Feet

PROJECTION: GCS NORTH AMERICAN DATUM, NAD 83
SCALE 1 : 4,200 ONE INCH = 350 FEET

PLATE 1

VASQUEZ BLVD AND I-70 OU1
PROPERTIES WITH FILED NOTICES OF ENVIRONMENTAL CONDITIONS

CBI

By: TFB G:\170_Vasquez\GIS_Documents\Project_Maps\ICAP\70_001_Plate1_ICAP_20160819.mxd 6/6/2008 9:36:57 AM