

ATTACHMENT A

MEMORANDUM

TO: Scott Couch, IRWM Program Manager
FROM: Brad Satterwhite, Redevelopment Planner
DATE: March 25, 2010
SUBJECT: Executive Summary for Cleanup and Abatement Account Request-
El Monte Triangle, Sacramento, CA

EXECUTIVE SUMMARY

The Redevelopment Agency of the City of Sacramento (Agency), in collaboration with the Central Valley Regional Water Quality Control Board, is requesting **\$1,689,338** from the Cleanup and Abatement Account (CAA) to fund a soil vapor extraction system (SVE), a source area characterization, and a feasibility analysis for cleanup of high levels of Volatile Organic Chemicals (VOCs) of a Brownfield site located in the El Monte Triangle area of Sacramento, California.

Cleanup of the El Monte Triangle benefits water quality, eliminates a public health threat, allows redevelopment of blighted parcels in a strategic investment area in Sacramento, and contributes to the revitalization of a low-income neighborhood. The current property owner does not have the resources to address the issues at this contaminated property and has agreed to accept a lien on the property that will allow the Water Board to recoup costs after the property has been sold.

Extremely high levels of Trichloroethylene (TCE), of up to 150,000 µg/l, in groundwater in the source area indicates there is pure product or DNAPL at the site. Unabated, this source of TCE will continue to spread, resulting in an expanding down-gradient plume of unknown magnitude and extent (see Attachment 6). Groundwater in the area is a source of drinking water for the City of Sacramento who operates several wells down gradient.

The project will be overseen by the Regional Board and implemented in phases. The first phase is to immediately install an SVE system to start addressing the high levels of TCE in the soils in the source area. The system will also begin to address the TCE product in the groundwater by pulling out the overlying TCE vapor. However, additional cleanup methods for the DNAPL are critical to cleanup of the source area. The second phase, therefore, is to investigate the extent of the high concentration source area in the groundwater and the third phase is to determine what technology can be used for cleanup and how much it will cost.

Once this is determined, the Agency will seek additional funding through all available means to implement an appropriate technology to cleanup the source area. Without a cost estimate or cleanup method, there is no opportunity to

secure funding or move towards cleanup. It is therefore critical to do this work first. This will allow the Agency to begin further remediation of the contamination, apply for additional Brownfields grants, and partner with developers to incorporate identified site cleanup measures into project planning.

The potential magnitude of the cost and complexity of addressing the source area and subsequently the groundwater plume has precluded redevelopment of 23 acres and raises issues of environmental justice, as a Human Health Risk Assessment indicates that the soil vapor migration poses potential health hazards and cancer risks to residents in the nearby low-income neighborhood and employees of nearby businesses.

Cleanup of this site is important to the Agency's ability to redevelop this area. This area has extraordinary potential to exemplify smart growth and transit oriented development due to its location near a transit center. The Agency has applied over \$18 million dollars in the past ten years in this area, including making streetscape improvements along Del Paso Boulevard, developing catalytic projects such as the relocation of the News and Review Headquarters to the area, and spending over \$700,000 purchasing and investigation properties in the El Monte Triangle.

In Summary, funding of this project would not only start addressing significant groundwater pollution and the human health threat, but also support the Governor's and Cal EPA objectives for Brownfield cleanups and allow the City to redevelop the El Monte Triangle Redevelopment Area.

MEMORANDUM

TO: Scott Couch, IRWM Program Manager
FROM: Brad Satterwhite, Redevelopment Planner
DATE: March 23, 2010
SUBJECT: Request for Financial Assistance from the State Water Cleanup & Abatement Account for El Monte Triangle, Sacramento, CA

INTRODUCTION

The Redevelopment Agency of the City of Sacramento (Agency), in collaboration with the Central Valley Regional Water Quality Control Board (RWQCB), is pleased to provide the State Water Resources Control Board (SWRCB) with this funding support package for an A) *Interim Remedial Action Plan* and B) chlorinated solvent dense non-aqueous phase liquid (DNAPL) *Source Area Characterization and Interim Remediation Plan* for 2147 Barstow Street (Micheletti Property), located in the El Monte Triangle area of Sacramento, California (see Attachment 1).

The purpose of this request is to obtain funding from the State Water Pollution Cleanup and Abatement Account to address constituents of concerns (COCs) identified in the unsaturated soil, soil gas, and groundwater and perform an additional site characterization and pre-design studies for the high concentration source area located beneath the Micheletti Property (Site).

ISSUE

Historical industrial uses have resulted in a dissolved trichloroethylene (TCE) plume that extends northeast of the subject Site, a distance of at least 500 feet down-gradient (see Attachment 6). TCE, benzene, and 1,2-DCA detected in soil vapor (see Attachment 7) beneath the Site were found to exceed California Human Health Screening Levels (CHHSLs) and Regional Screening Levels (formerly EPA Preliminary Remediation Goals) for both commercial/industrial and residential land uses.

Based on a Human Health Risk Assessment conducted in 2002, contamination to groundwater poses potential health hazards and cancer risks within the source area. This contamination poses a threat to residents living in nearby homes and employees of nearby businesses and has hindered redevelopment of the area.

The proposed Interim Remedial Action Plan (IRAP) addresses the RWQCB's immediate concerns regarding health and human safety and will actively remove constituents of concern (COC) mass to eliminate potential human health risks to the surrounding residents and business employees via inhalation and ingestion

pathways and to support long-term protection of local groundwater. The IRAP will have a positive impact on both soil vapor and the plume of contaminated groundwater.

The DNAPL Source Area Characterization and Interim Remediation Plan will help further define the horizontal and vertical delineation of contamination in groundwater within the high contamination source area. Once the delineation is complete, a remedy can be developed to further remediate the area and the Agency will be better positioned to begin remediation with its own resources and seek additional brownfields grants for the contaminated area. The DNAPL, trapped beneath the groundwater, may result in contamination of the deeper water bearing zones which may be used as a source of drinking water for the City of Sacramento.

BACKGROUND

The El Monte Triangle comprises approximately 23 acres of industrial, commercial, and residential properties. The Site is located in the North Sacramento Redevelopment Area (RDA), to the south of the Arden-Garden connector, and to the west of Del Paso Boulevard. Additionally, the Site is located within a quarter mile of the Globe Light Rail Station and within the Northeast Line Light Rail Stations Plan area (see Attachment 2). Within this area, several parcels remain vacant and a substantial number are underutilized due to existing environmental contamination.

Over the past 20 years, various studies have identified extensive subsurface soil and groundwater contamination from prior industrial operations in the El Monte Triangle area, including two separate groundwater plumes of chlorinated volatile organic compounds (VOCs). Contaminants identified are petroleum products from underground storage tanks, heavy metals and chlorinated solvents used in manufacturing. Both plumes appear to be trending in a northeasterly direction, significantly impacting development potential of Agency-owned properties, existing vacant/underutilized parcels, and potentially affecting existing residential dwellings. The six primary contamination sites include Continental Chemical Company (CCC), McKesson Rawson, Atlas Metals, Lawson Mechanical (SHRA property), Colfax Yard and the Micheletti property (see Attachment 3).

The Agency's involvement in the El Monte Triangle dates back to 1990, with the purchase of 58 Arden Way (Lawson Mechanical) which is across the street and down-gradient of the Michelleti Site. This acquisition was to be the first of many potential acquisitions in the area in order to assemble parcels for a larger mixed-use, transit-oriented development in the future. Our site has remained vacant for over 20 years due to on- and off- site contamination issues affecting the area.

Regulatory history at the Site dates back to 1992, when the Sacramento Environmental Management Department (SCEMD) and the RWQCB conducted

a passive soil gas survey for the entire area. The results indicated the presence of chlorinated volatile organic compounds (VOCs) specifically PCE and TCE, across the El Monte Triangle with the highest concentrations in the alleyway adjacent to the Site and at the former CCC. An active soil gas survey was conducted in 1994 and 1996, with the same results. The results of the surveys triggered soil, groundwater, and soil gas investigations in 1999 and 2001 at the Site and surrounding properties. These investigations indicated that a chlorinated solvent dense non-aqueous phase liquid (DNAPL) source area, consisting of PCE and TCE, existed at the Site.

In 2002, the City of Sacramento conducted a Human Health Risk Assessment across the El Monte Triangle which indicated that contaminants in the soil and groundwater plume can result in unacceptable health hazards and cancer risks throughout the area (see Attachment 4 and 5). These findings were supported by a Preliminary Assessment (PA) performed by Tetra Tech in 2005, on behalf of the Agency.

In 2007, the Agency entered into a Polanco Act Oversight Agreement (OA) with the RWQCB for the El Monte area. The intent of the OA was to:

- Establish a mutually beneficial working relationship;
- Cooperatively address Brownfield properties in the area;
- Provide a flexible process based upon the Agency's desire to facilitate redevelopment of the Project Area;
- Require cleanup that results in property that is safe for redevelopment for proposed uses; and
- Provide liability relief for the Agency and property owners where allowed by law.

Following the OA, a Site Characterization Report was performed by Bureau Veritas (BV), on behalf of the Agency. The investigation further defined the vertical and lateral distribution of chlorinated VOCs in groundwater, provided analytical data for the development of human health risk assessments as they relate to indoor air, and provided data to assist in the analysis of remedial alternatives consistent with future redevelopment objectives.

Given the compelling information regarding the groundwater plume, in 2008, Arcadis, Inc prepared the *IRAP and Funding Support Package for DNAPL Source Area Characterization and Interim Remediation* on behalf of the Agency. Both reports were approved by the RWQCB and were submitted to the SWRCB as an enclosure to our application to the Cleanup and Abatement Account (see Attachment 11 and 12).

In order to ready the El Monte Triangle for redevelopment, the Agency has invested approximately \$340,000 since 2007 as part of the OA for environmental investigations related to the El Monte Triangle. In addition, \$360,000 was

invested to purchase and investigate other properties (not part of the OA) for a total investment of \$700,000 in the El Monte Area. Both the Agency and the RWQCB are unable to identify a viable responsible party for the contamination addressed by this application.

IMPACT TO COMMUNITY

First developed as a bedroom community in the 1940's, North Sacramento was a service oriented community that catered to local residents and outlying farms. In particular, North Sacramento's main corridor, Del Paso Boulevard, was a major thoroughfare to and from downtown. Auto-oriented businesses sprang up such as dry cleaners and gasoline service stations. In addition, North Sacramento provided cheap land in which to grow small industrial type businesses.

However, as time went on, Del Paso Boulevard became a less important route for travelers and businesses and residents began moving farther away from the City. Employment and poverty grew and household income and property values began to decline. The area was left with a substandard infrastructure and utility system, a poor street grid system, contaminated sites, and a deteriorating building stock.

To combat these problems the North Sacramento Redevelopment Area (RDA) was established in 1992. Since its Plan adoption, the Agency has championed many successful projects and programs in the redevelopment area in order to close the gap between the redevelopment area and the larger community. However, many blighting conditions still remain such as hazardous waste contamination, high vacancy rates, inadequate commercial facilities, and higher crime rates and unemployment. A sample of the economic and physical issues facing the redevelopment area include:

- 63% of RDA residents are below the 200% poverty level, while the City average is 41%*;
- 14% of residents are unemployed, while the City average is 8%*;
- 6.2% residential vacancy rate in 2Q2008, while only 3.1% in the City**;
- and
- 20.7% commercial vacancy rate in 2Q2008, while only 11.8% in the City**.

**U.S. Census, 2000*

***USPS data*

In addition to the factors identified above, a substantial number of parcels affected by the contamination remain vacant and underutilized due to the contamination surrounding the El Monte Triangle. The horizontal and vertical limits of the existing plume have not been fully defined. This contamination poses a threat to human health and has hindered redevelopment in the area.

TCE, benzene, and 1,2-DCA detected in soil vapor (see Attachment 7) beneath the Site were found to exceed California Human Health Screening Levels (CHHSLs) for both commercial/industrial and residential land uses. In addition, a 2007 soil vapor survey detected a TCE concentration of 28,000 µg/m³, at the source area, which is a factor of 5-6 above Regional Screening Levels (formerly EPA PRG) for residential and commercial TCE.

Based on a Human Health Risk Assessment conducted in 2002, contamination to groundwater poses potential health hazards (see Attachment 4) and cancer risks (see Attachment 5) within the source area. A dissolved TCE plume with high level of concentrations indicate DNAPL is present beneath the Site and extends from west of the Site to the northeast, a distance of at least 500 feet down-gradient of the Site and across Arden Way into a low-income residential neighborhood. In addition, the City of Sacramento has drinking wells that are located downgradient of the contaminated plume and are potentially threatened by this contamination.

Attachment 10 provides a brief summary of available soil, soil vapor, and groundwater data for the El Monte Triangle.

RESPONSIBLE PARTY ACTIVITY IN EL MONTE TRIANGLE

The subject Site is located in the middle of the El Monte Triangle (see Attachment 1). The contamination emanating from the site has migrated at least 500 feet down-gradient which is impeding development of the larger area. The Agency and the RWQCB strongly believe that cleanup of this site is pivotal to redevelopment of the El Monte Triangle.

The six primary contamination sites (see Attachment 3) in El Monte Triangle and the status of each:

- 2170 Acoma Street, A-1 Plating Company
Deed restriction placed on site in 2008 for former metals contamination in soil. The site was cleaned to commercial/industrial standards. Residence uses currently prohibited.
- 2175 Acoma Street, Continental Chemical Company (CCC)
This site was closed for a UST in 2000, but has remained open for releases of volatile organic compounds detected down-gradient of the site. A VOC plume has migrated off-site and groundwater is impacted with VOC concentrations above water quality objectives. This plume appears to have co-mingled with the larger plume emanating from the Michelletti Site. Assessment of the VOC plume is underway.
- 2189 Acoma Street, McKesson Rawson
Property owners are currently working with Central Valley Water Board staff to address soil and groundwater affected by gasoline constituents associated with a former underground gasoline storage tank. The

owners of the McKesson Rawson site and the CCC site have been collaborating on assessment.

- 30 Arden Way, Atlas Metals
Listed as a Sacramento County Contaminated Site, listed in the Water Board SLIC database.
- 58 Arden Way, Lawson Mechanical (Agency owned)
The Agency is currently working with Central Valley Water Board Staff and the previous property owners to address benzene contamination in soil vapor and groundwater, resulting from a former LUST. The Agency has utilized data from this site and from the Michelletti Site for the respective investigations.
- 2225 Colfax Street, Colfax Yard
The site was closed for a LUST in 1994. The case was reopened by the RWQCB in 2008, based on benzene detections discovered in soil vapor nearby. Assessment at the site is currently underway.

RWQCB EFFORTS IN EL MONTE TRIANGLE

The Agency and the RWQCB share the mission to revitalize and reuse brownfield properties and to address known or perceived environmental contamination in order to provide significant benefits to the economy and health of the community. Governor Schwazenegger has made Brownfields cleanup a priority in his Environmental Action Plan to provide for the evaluation and redevelopment of underutilized sites to accommodate desirable mixed use, compact development and urban in-fill growth.

The RWQCB is working diligently with the financially-viable, responsible parties in the El Monte Triangle to address the various sources of contamination. Unfortunately, the owner of the Michelletti property (the largest contributor to the contamination problem in the El Monte Triangle) does not have the financial capability to address the contamination. However, the owner is willing to accept a lien on his property for the cost of any funds awarded from the Cleanup and Abatement Account.

The Agency recognized this situation as an impediment to redevelopment of the entire El Monte Triangle and entered into a Polanco Act Oversight Agreement (OA) with the RWQCB with the intent to establish a mutually beneficial working relationship and cooperatively address Brownfield properties in the area. Both the Agency and the RWQCB have devoted significant staff time and funds working on this project, including more than 1,000 hours of RWQCB staff time since 2007.

REVITALIZATION EFFORTS IN NORTH SACRAMENTO

Over the past few years, the Agency has primarily focused its revitalization efforts on property acquisitions, environmental clean up, public infrastructure

improvements, and the development of catalytic projects as part of the larger effort to redevelop Del Paso Boulevard into a vibrant high density transit oriented development area. The focus on improvements and acquisitions is consistent with the broader vision outlined in the Northeast Line Plan (see Attachment 2), as well as the North Sacramento Redevelopment Area Five-Year Implementation Plan—to create a vibrant, mixed-use transit center.

The Agency's redevelopment emphasis has been particularly focused around the Globe Light Rail Station and transforming the south end of the Boulevard into a vibrant and pedestrian friendly environment. Most of the sites suited for redevelopment had a component of environmental contamination which had to be addressed prior to development. Such efforts include:

- Environmental cleanup at 2001/2089 Acoma Street (~600 feet from Subject Site) accompanied by the Sacramento Employment and Training Agency relocating their headquarters into a new building that was formerly the site of a blighted factory. This project brought 300 new employees to the Boulevard.
- Assessment and environmental closure at 1124/1132 Del Paso Boulevard (~700 feet from Subject Site) accompanied by the News and Review Company relocating their headquarters to a fully rehabilitated building on the boulevard.
- Environmental cleanup is currently underway at 1000 Del Paso Boulevard (~650 feet from the Subject Site)-the site of a former gasoline service station. The proposed use is a mixed-use, transit-oriented development.
- Environmental assessment and cleanup at 58 Arden Way (~100 feet from the Subject Site) as part of the larger redevelopment effort in the El Monte Triangle.

Despite investing over \$18 million on the Boulevard, over the past ten years, the Agency regularly encounters environmental constraints on properties that must be resolved before development can occur.

Additionally, the Agency is currently working with the Department of Toxic Substances Control (DTSC) to address similar contamination issues within the Swanston/Royal Oaks LRT area, also part of the Northeast Line Plan and approximately one mile from the subject Site.

As of March 2009, the Agency had investigated/remediated 11 properties within a mile of the El Monte Triangle. These properties include Agency initiated projects or ones that the Agency is collaborating with an oversight agency and/or a private party. The Agency has expended close to \$1 million on investigation and remediation of contamination issues in the North Sacramento Redevelopment Area since 2006.

VISION FOR EL MONTE TRIANGLE

El Monte Triangle sits within a quarter-mile radius of the Globe Light Rail Station which is a part of the City of Sacramento's Northeast Line Light Rail Stations Plan. Globe is envisioned as a vibrant, mixed-use, transit-oriented development that builds upon its unique location as a gateway to North Sacramento and the American River Parkway.

Goals of the El Monte Triangle:

- Develop higher density, mixed-use neighborhood;
- Increase the number of residents within the project area to increase potential business for existing businesses and attract future neighborhood-serving businesses;
- Provide a safe and inviting connection to the Sacramento Northern Bike Trail, which is part of the larger American River Parkway;
- Increase transit ridership; and
- Reduce blight.

The Agency and the City of Sacramento plan to achieve these goals through environmental remediation, property acquisition/assembly, infrastructure improvements, and site development/development partnerships.

EL MONTE TRIANGLE PROPOSED TIMELINE	
Community Visioning and Planning	2005-2008
-NE Line Light Rail Stations Plan approved	2008
Environmental Assessment and Remediation	1989-2015
-Oversight Agreement signed with RWQCB	2007
-58 Arden Way (Lawson Mechanical/Agency owned) remediation	2011-2013
-2147 Barstow Street (Michelleti Site) remediation	2010-2013
Future Property Acquisition and Assembly (if nec)	2012-2020
-Agency purchases 58 Arden Way	1990
Infrastructure Improvements	2015-2020
-Improved neighborhood main streets	2015-2020
-Planned on-street bike route	2015-2020
Site Development/Development Partnership	2018-2025

CONCLUSION

The Redevelopment Agency has invested over \$18 million on the El Monte area and Del Paso Boulevard. Given the limited funds available for all aspects of redevelopment, there are not enough financial resources to address the delineation and cleanup of contaminated properties. Additionally, due to the budget crisis in the State of California, the Agency recently lost significant tax

increment revenue and is faced with potentially losing additional local resources in the years to come.

The Agency is committed to remediating contaminated sites, protecting the health of residents in the area, and developing quality high density mixed use projects both on the Boulevard and eventually in the El Monte area. Redevelopment of the El Monte Triangle presents a strategic opportunity to transform the area around the Globe Light Rail Station into a vibrant, mixed-use transit district.

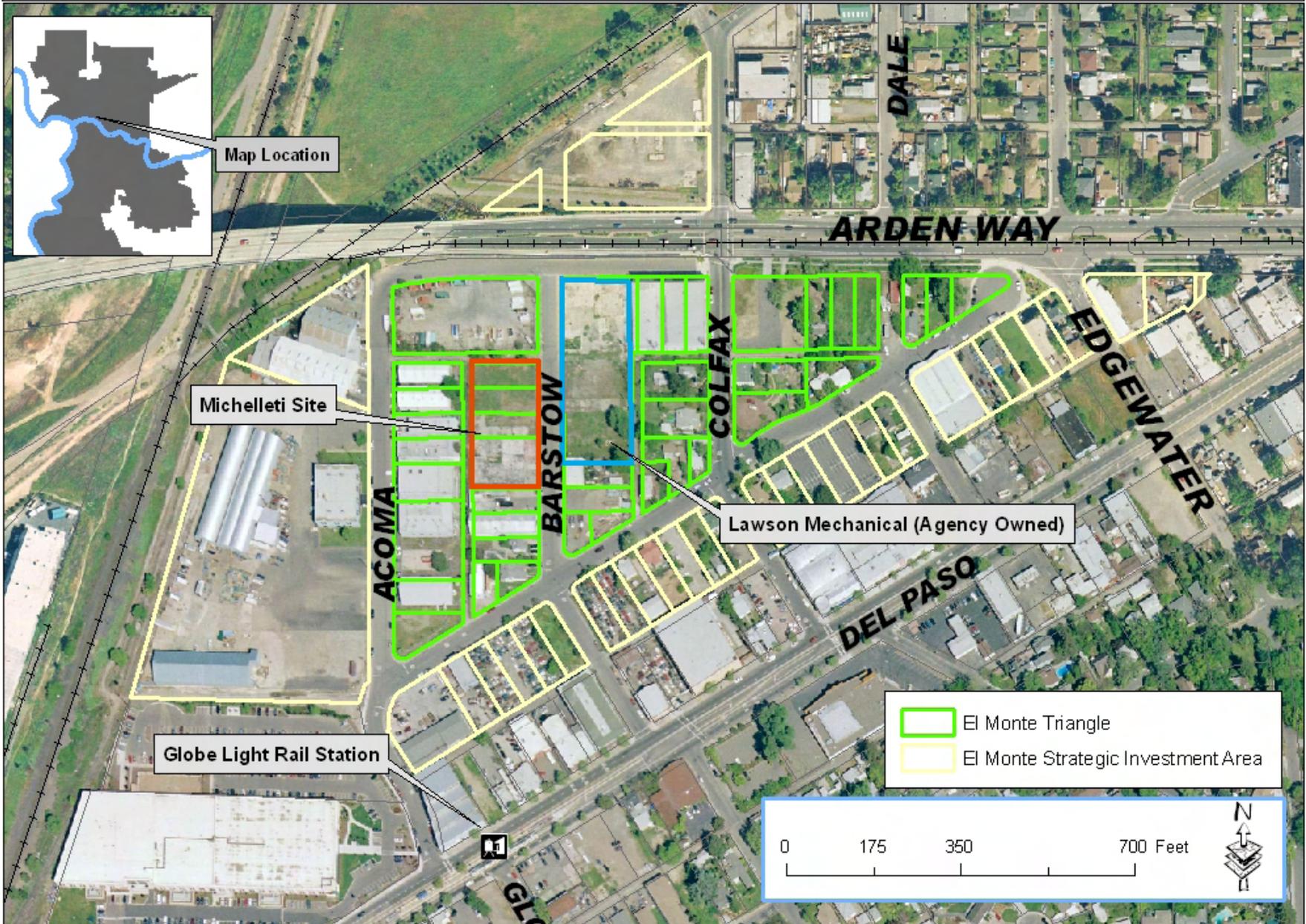
Given the significant contamination on the Michelletti site and surrounding El Monte area, staff requests funding from the Water Board to not only reduce the health risks to surrounding residents and employees, but also further delineate the issues facing the area.

List of Attachments:

- Attachment 1:** El Monte Triangle Location Aerial
- Attachment 2:** NE Light Rail Plan Area
- Attachment 3:** Contamination Contributors in El Monte Triangle
- Attachment 4:** Contour of Potential Health Hazards
- Attachment 5:** Contour of Potential Cancer Risks
- Attachment 6:** Groundwater Plume Contour Map
- Attachment 7:** Soil Vapor Plume Contour Map
- Attachment 8:** Redevelopment Efforts
- Attachment 9:** Photo Log of Area
- Attachment 10:** CAA Request Forms
- Attachment 11:** IRAP Proposal
- Attachment 12:** DNAPL Source Area Characterization Funding Support Package



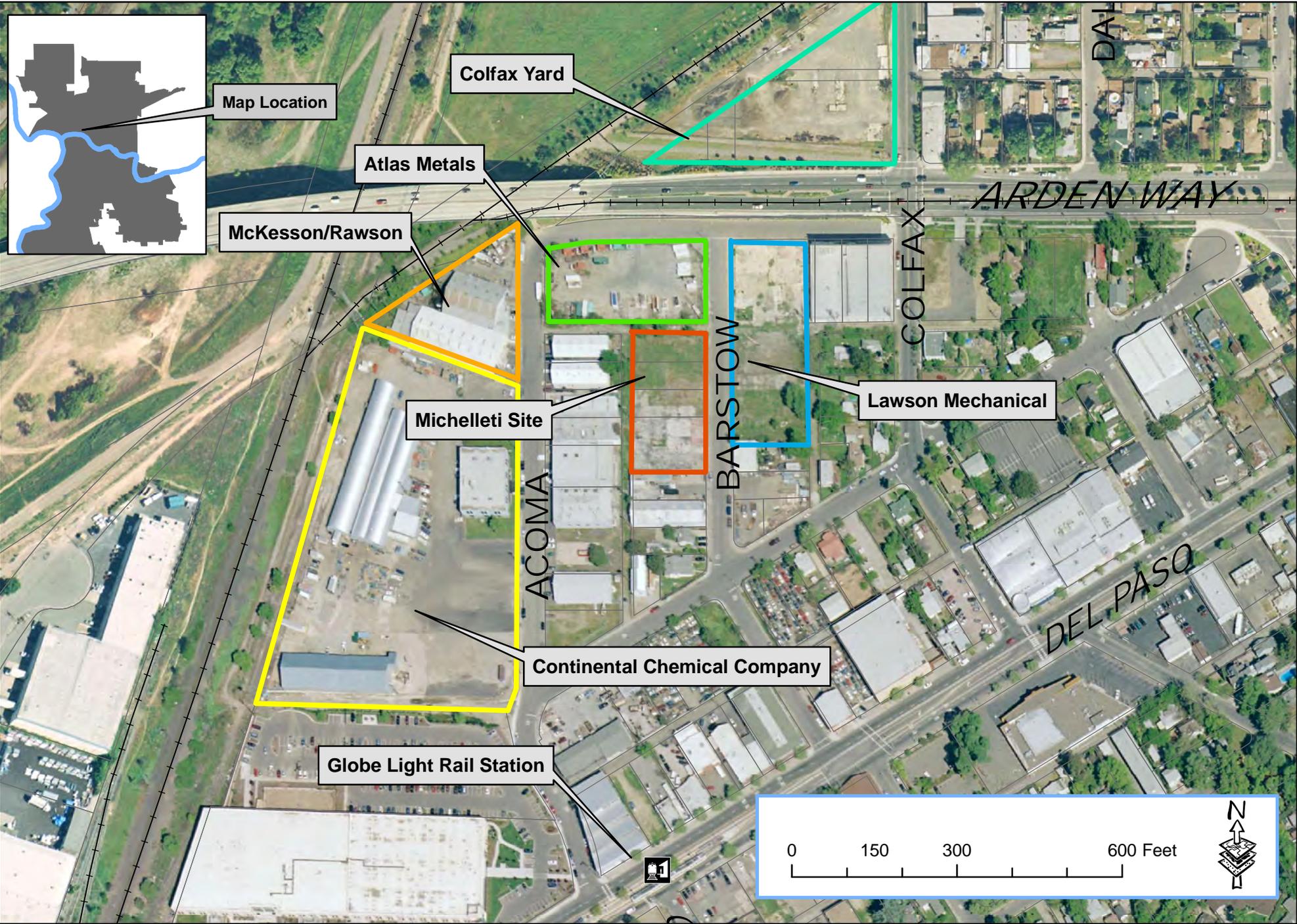
El Monte Strategic Investment Area North Sacramento Redevelopment Area



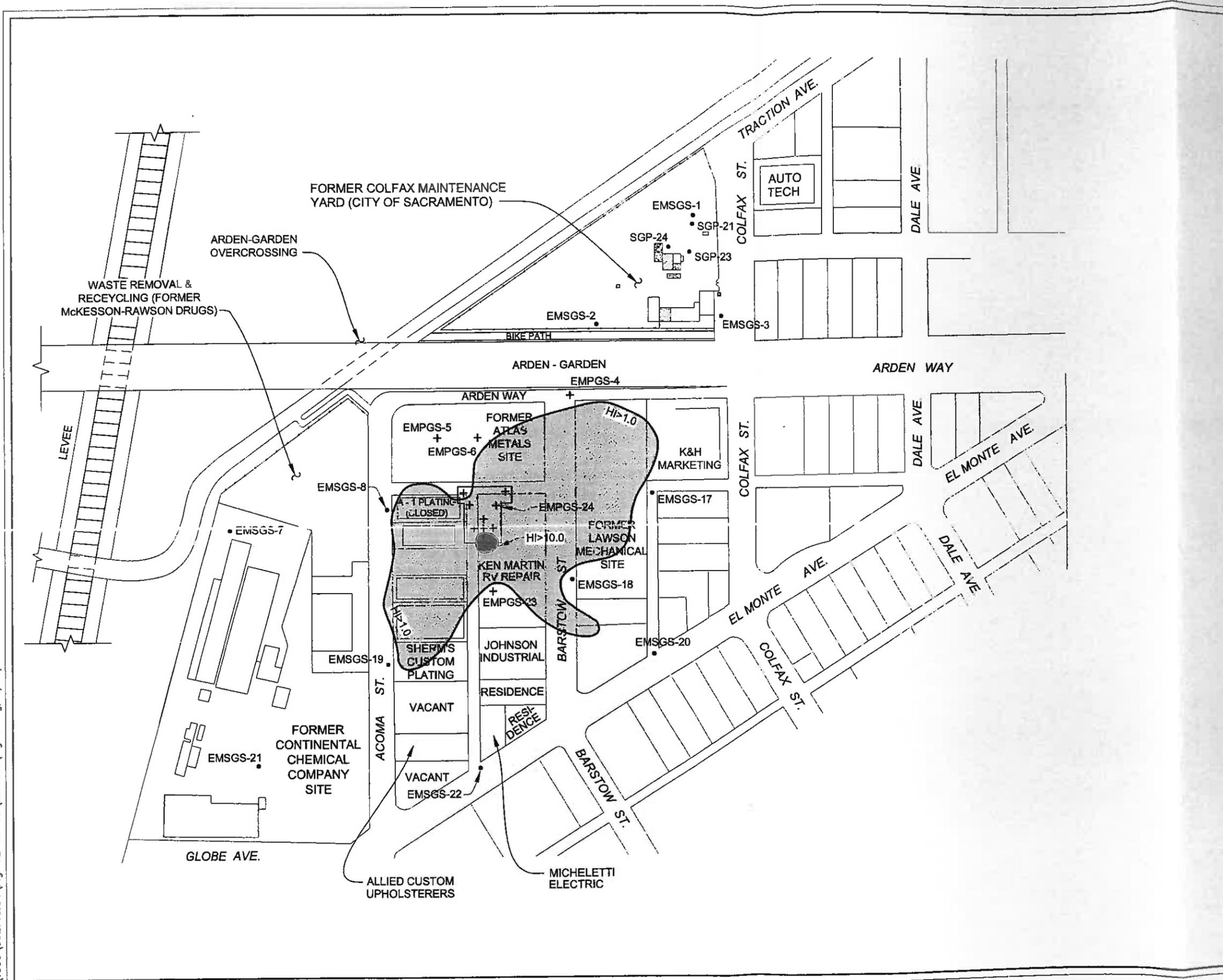
Six Primary Contamination Sites - El Monte Triangle



Attachment 3



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LEGEND

- EMSGS-4 + PROFILE SOIL GAS SURVEY LOCATIONS
- EMSGS-1 • SHALLOW SOIL GAS SURVEY LOCATIONS

Notes:

- 1. Locations Are Approximate
- HI>1.0 - Hazard Index

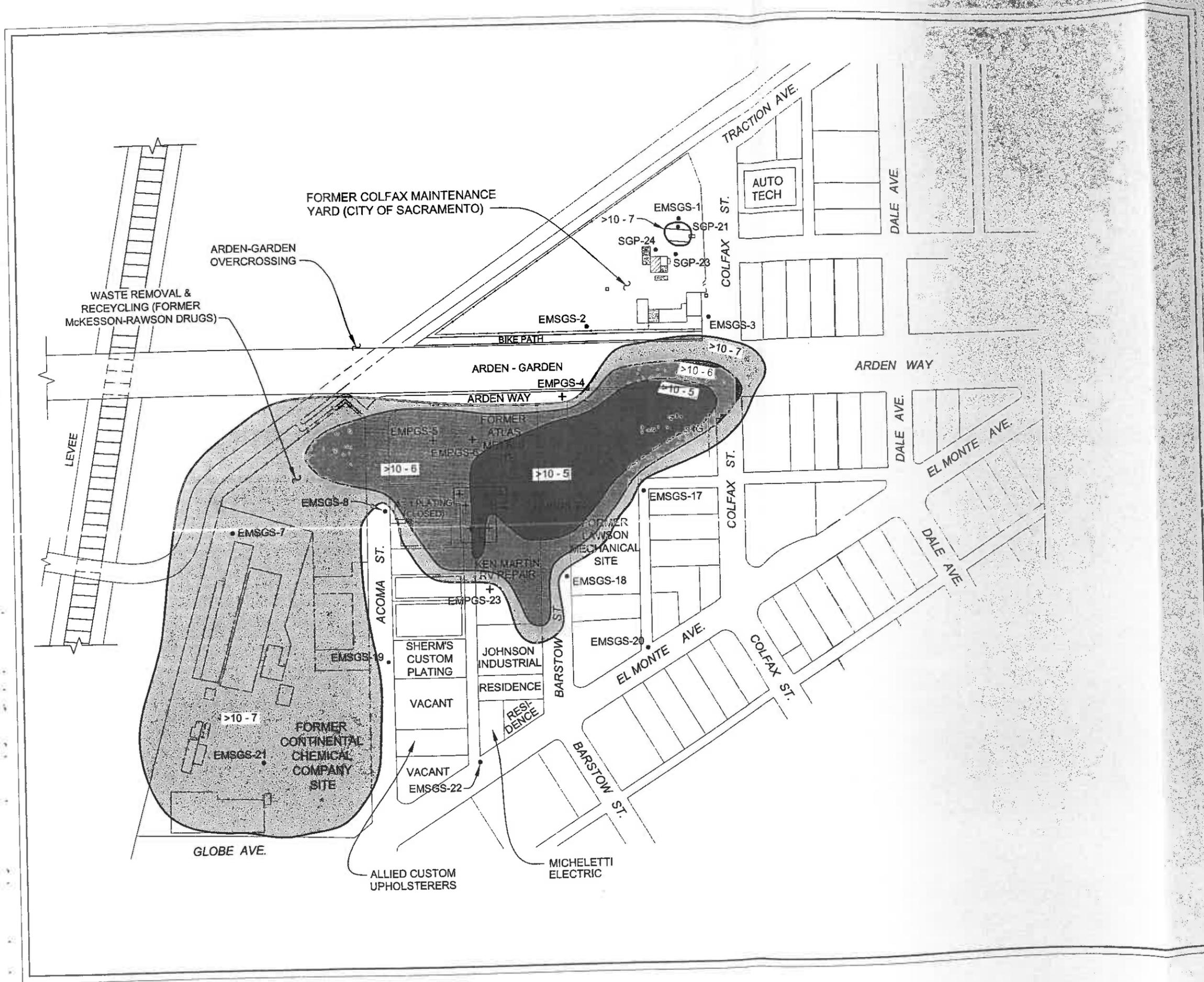


NOT TO SCALE

Kennedy/Jenks Consultants

City of Sacramento
Human Health Risk Assessment
El Monte Area

CONTOUR OF POTENTIAL
HEALTH HAZARDS



LEGEND

- EMPSG-4 PROFILE SOIL GAS SURVEY LOCATIONS
- EMSGS-1 SHALLOW SOIL GAS SURVEY LOCATIONS

Notes:

- 1. Locations Are Approximate
- >10-7 - Cancer Risk Level



NOT TO SCALE

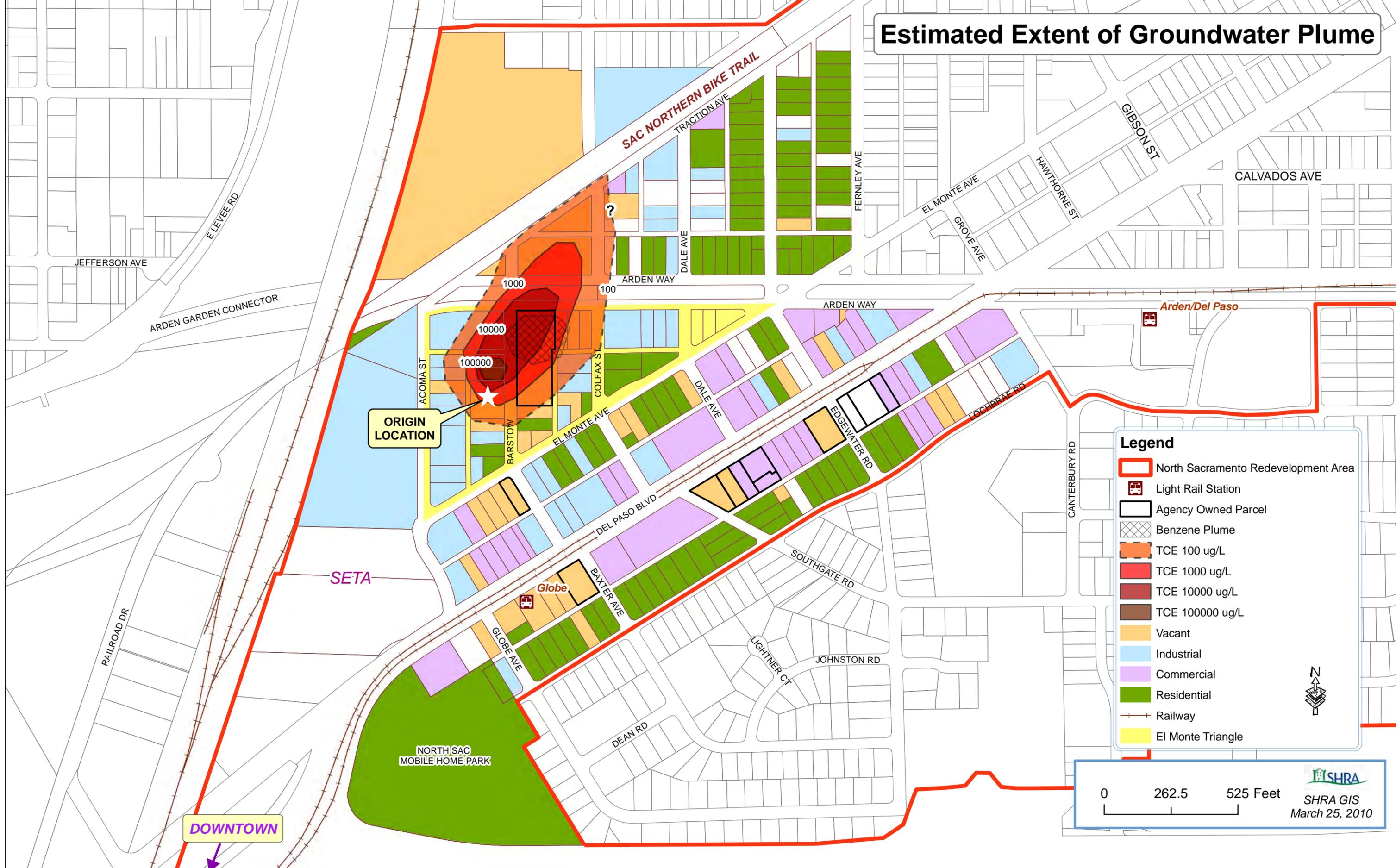
Kennedy/Jenks Consultants

City of Sacramento
Human Health Risk Assessment
El Monte Area

CONTOUR OF POTENTIAL
CANCER RISKS

K/J 962710.04
Figure 4

Estimated Extent of Groundwater Plume



Legend

- North Sacramento Redevelopment Area
- Light Rail Station
- Agency Owned Parcel
- Benzene Plume
- TCE 100 ug/L
- TCE 1000 ug/L
- TCE 10000 ug/L
- TCE 100000 ug/L
- Vacant
- Industrial
- Commercial
- Residential
- Railway
- El Monte Triangle

0 262.5 525 Feet

SHRA GIS
March 25, 2010

DOWNTOWN

ORIGIN LOCATION

Arden/Del Paso

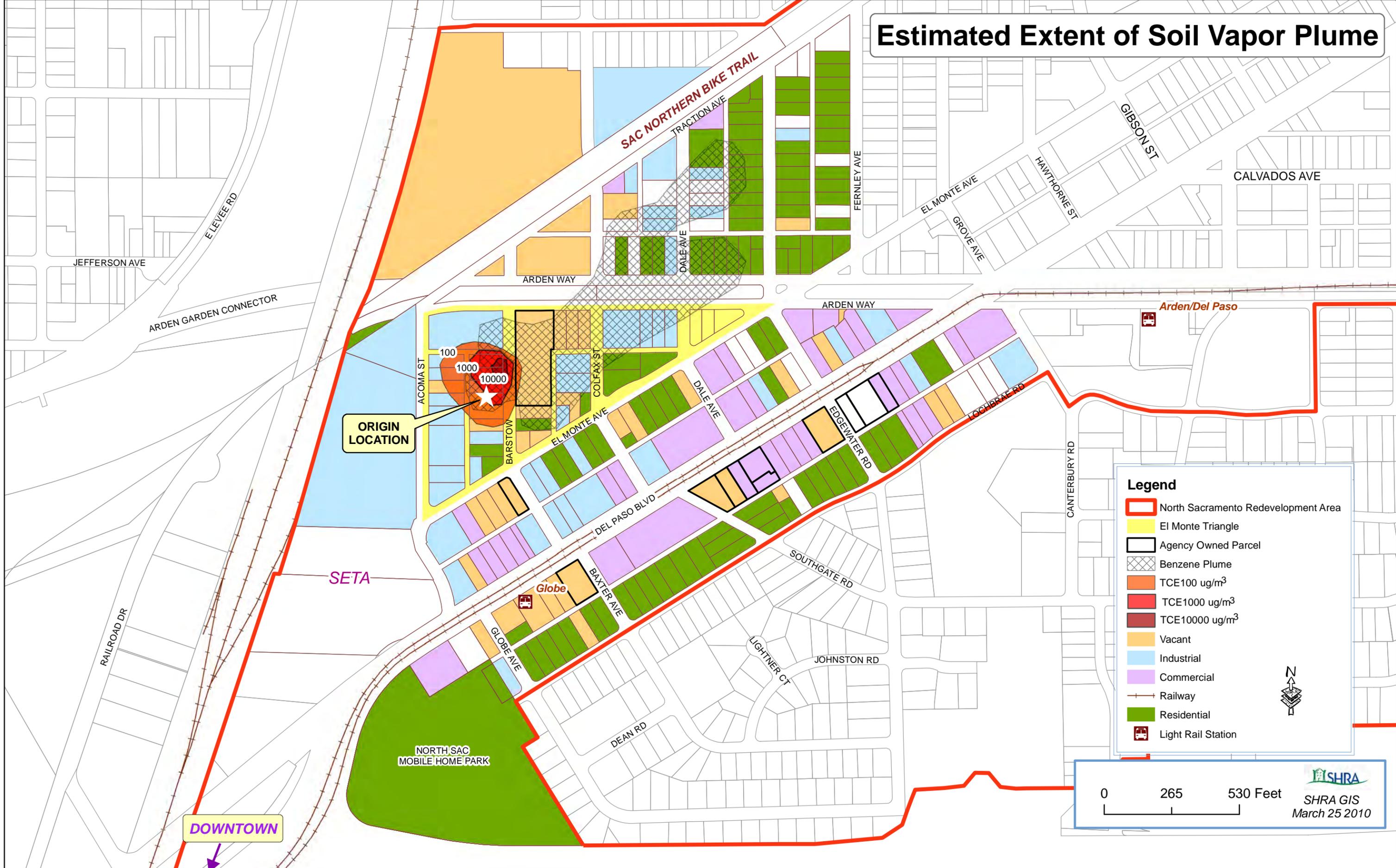
Globe

SETA

NORTH SAC MOBILE HOME PARK



Estimated Extent of Soil Vapor Plume



ORIGIN LOCATION

DOWNTOWN

SETA

NORTH SAC MOBILE HOME PARK

Globe

Arden/Del Paso

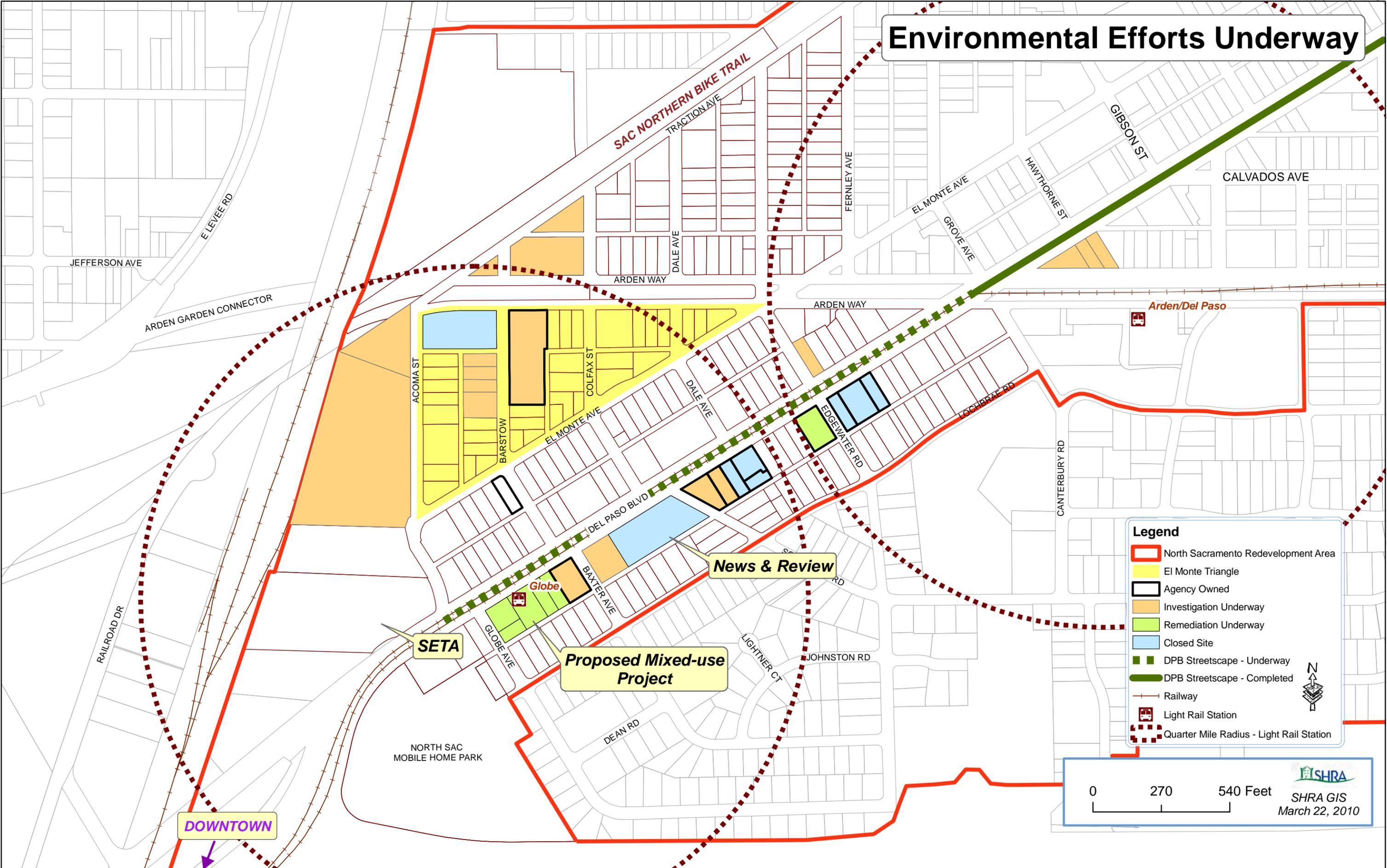
Legend

- North Sacramento Redevelopment Area
- El Monte Triangle
- Agency Owned Parcel
- Benzene Plume
- TCE100 ug/m³
- TCE1000 ug/m³
- TCE10000 ug/m³
- Vacant
- Industrial
- Commercial
- Railway
- Residential
- Light Rail Station

0 265 530 Feet

SHRA GIS
March 25 2010

Environmental Efforts Underway

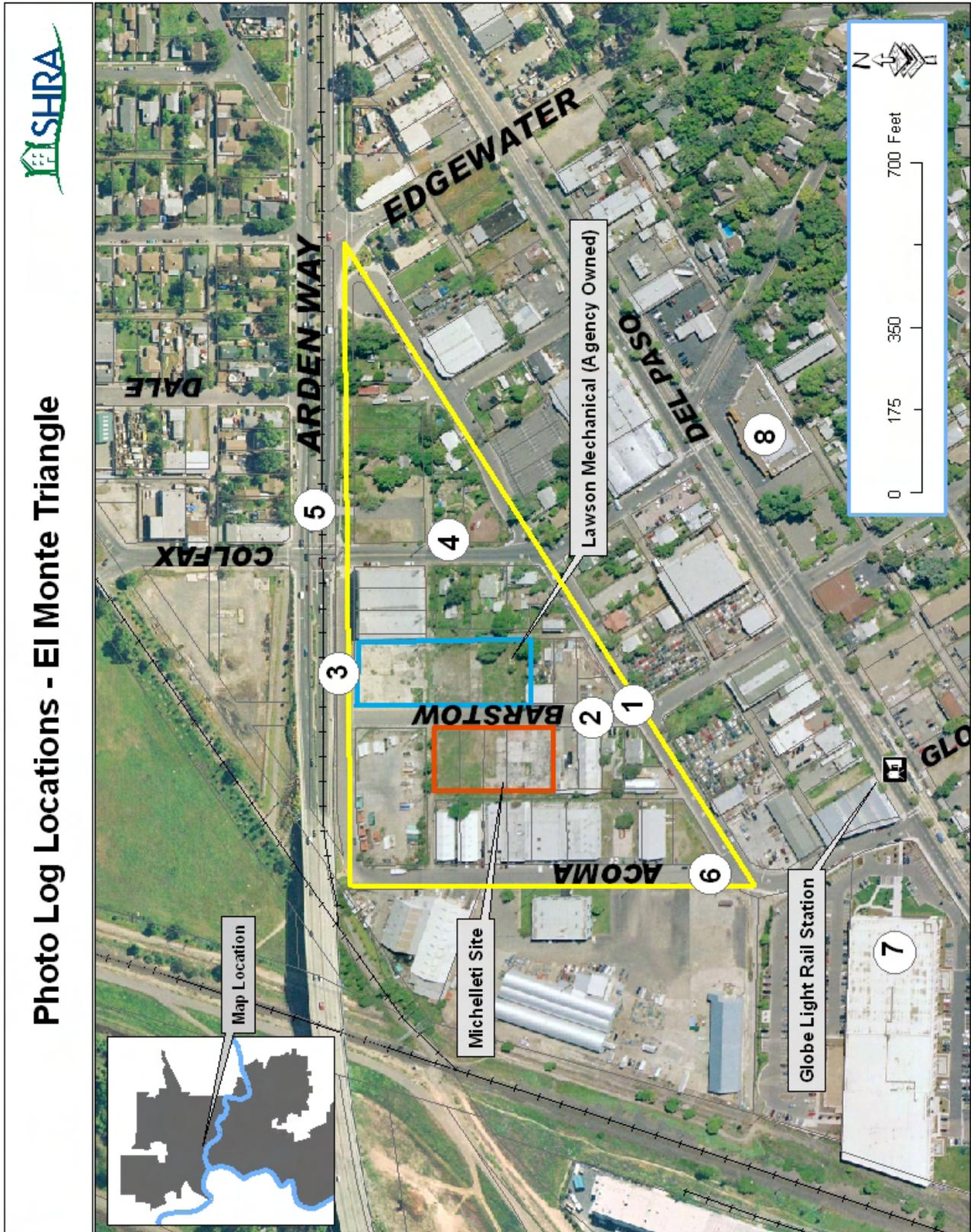


- Legend**
- North Sacramento Redevelopment Area
 - El Monte Triangle
 - Agency Owned
 - Investigation Underway
 - Remediation Underway
 - Closed Site
 - DPB Streetscape - Underway
 - DPB Streetscape - Completed
 - Railway
 - Light Rail Station
 - Quarter Mile Radius - Light Rail Station

0 270 540 Feet

SHRA GIS
March 22, 2010

Photo Log of El Monte Triangle





1 - Residential properties just south of subject Site (looking west).



2 - Looking north along Barstow St. Subject site is the vacant lot on the left, Lawson Mechanical site is vacant lot on the right.





5 - Residential properties located to the northeast (down-gradient) of the subject site and across Arden Way.



6 - Looking north along Acoma Street.



7 – Looking north at the SETA building.



8 – Looking south towards the new News and Review HQ.

**Scope of Work Summary for CAA Request
2147 Barstow Street, Sacramento, CA (aka. El Monte Triangle)**

Project Task**1 - Interim Remedial Strategy**

Unsaturated soil and soil gas will be treated using SVE. Scope includes pre-design SVE study, necessary permits, laboratory analysis, utility clearance, health and safety plan, construction oversight, two years of system O&M, and reporting. The proposed SVE system includes 11 vertical extraction wells (see Figure 5 of enclosed IRAP) to create a vacuum influence zone that encompasses the limits of VOC-impacted soil and soil gas within Site boundaries.

1.1 Pre-Design Investigation

H&SP, permitting & off-site access agreements, vapor monitoring well installation, well installation oversight and sampling, lab analysis, waste disposal.

1.2 Pre-Design Study

Vapor extraction well installation, vapor monitoring well installation, oversight, wellhead assemblies, mobile SVE equipment rental, pre-design SVE study ops, lab analysis, reporting, conceptual drawings.

1.3 Pre-Construction

Final SVE design drawings/specifications, permitting.

1.4 Interim SVE System Construction

Permitting, vapor extraction and monitoring well installation, wellhead assemblies, Vacuum extraction system, vapor phase treatment unit, aboveground piping, electrical connection, lab analysis, waste disposal, system startup and checkout, reporting,

1.5 System O&M (2 years)

1.6 System Decommissioning

2A - DNAPL Source Area Characterization and Interim Remediation

The proposed work entails completion of additional characterization of the dense non-aqueous phase liquid (DNAPL) source area identified beneath the Micheletti property and the offsite dissolved phase plume. Once the delineation is complete, an interim remedy (if necessary) can be developed to aggressively remediate the source area, which is a source of the VOCs identified in soil gas and groundwater beneath and downgradient of the Site.

2A.1 H&S Plan and Workplan

Prior to initiating any field investigation activities, a Site-Specific Health and Safety Plan and a Source Area Delineation Work Plan will be prepared. Costs assume one draft and one final work plan.

2A.2 GW Investigation/MW Installation

Up to 10 groundwater samples proposed up to 200 ft bgs. Three set deep wells and five set shallow monitoring wells are proposed. GW samples will be analyzed for VOCs by an onsite mobile laboratory.

2A.3 Baseline GW Sampling Event

Eight newly installed groundwater monitoring wells and the five existing monitoring wells downgradient will be sampled. Samples will be analyzed for a full range of potential related COCs.

2A.4 Aquifer Testing

Aquifer testing will be performed to obtain aquifer parameters which are needed for future remedial design.

2A.5 Technical Memo

Upon completion of the source area and dissolved phase plume characterization activities, a technical memorandum will be prepared and submitted, summarizing the results of the field investigations. Memo will include text, tables, figures, logs, analytical reports, and recommendations for potential remedial alternatives.

2A.6 Quarterly GW Monitoring

Up to 13 groundwater monitoring wells will be sampled.

2A.7 Remedial Alts/Pilot Study Work Plan

Upon completion of the additional site characterization, consultant will conduct a focused remedial alternatives evaluation to identify candidate technologies to address the DNAPL source area and dissolved chlorinated plume. Based on the evaluation, a pilot study work plan will be prepared outlining the implementation of pre-design studies and other testing that will be used to further evaluate technologies and to provide the design basis for the full-scale system.

2B - Technology Screening/Alternative Evaluation and Pre-Design Studies

The proposed work includes completion of a pre-design study/pilot test and preparation of an IRAP outlining the proposed remedy for remediating the DNAPL source area. The proposed pre-design study will evaluate groundwater hydraulics as related to an in situ remedial approach and to obtain engineering data for full-scale remedial design.

2B.1 Injection Test Well Installation

If enhanced reductive dechlorination (ERD) is concluded to be a viable remedial alternative, one injection well will be installed and four pre-design monitoring wells will be installed to facilitate ERD pilot and tracer study injection and monitoring activities at the site. It is assumed that ten feet of screen will be necessary to adequately provide treatment throughout the vertical extent of the DNAPL source area.

2B.2 Injection Test Baseline Low Flow GW Sampling

Following injection well installation activities, the test injection and monitoring wells will be sampled.

2B.3 Injection Test w/ Carbohydrate and Sodium Bromide as Tracers

Data collected during injection test will be used to design the ERD pilot injection study and determine the location of down-gradient monitoring wells. Cost estimate assumes that up to four sampling events will be conducted.

2B.4 ERD Pilot Test and Reagent Injection Frequency

Samples will be analyzed for TOC and VOCs to determine the amount of bioactivity and for evidence of reductive chlorination. The data collected during the pilot test will be used to determine the full-scale design and estimated remediation cost for the onsite DNAPL source area.

2B.5 Reagent Injection Performance Monitoring

Monitoring wells within the study area will be tested periodically over the 6 to 12 month pre-design test duration.

2B.6 GW Feasibility Study & Full Design Remedial Action Work Plan

The submitted report will include detailed description of ERD pilot study conducted for groundwater and include: ERD pilot and tracer study results and interpretation, injection performance, groundwater monitoring results associated with the pilot study, evaluation of the radius of influence, etc.